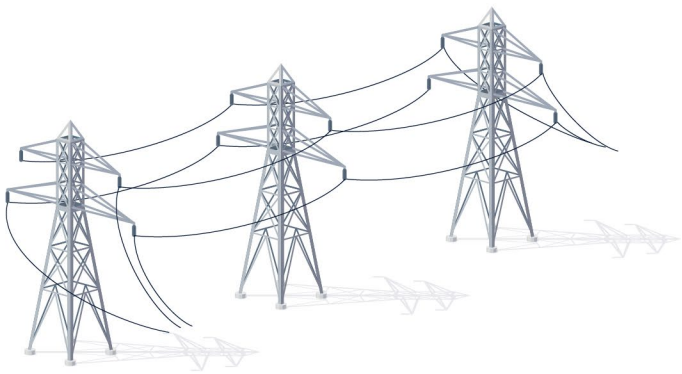
JOINT MEMORANDUM ON INTERAGENCY COMMUNICATION AND CONSULTATION ON ELECTRIC RELIABILITY

Summary Report

December 2024



This report provides a summary of activities and efforts under the Joint Memorandum on Interagency Communication and Consultation on Electric Reliability between the U.S. Department of Energy and U.S. Environmental Protection Agency. The Memorandum provides a framework for interagency cooperation and consultation on electric sector resource adequacy and operational reliability. The Memorandum also outlines activities that each agency will undertake individually and collectively to monitor, share information, and consult to support the continued reliability of the electric system. The Memorandum was signed on March 9, 2023, and this Summary Report provides an update on activities held to date.

Executive Summary

On March 9, 2023, the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE) signed a Joint Memorandum on Interagency Communication and Consultation on Electric Reliability (Memorandum). The Memorandum built upon longstanding engagement between the agencies and further commits both agencies to routine and comprehensive communication about policies, programs, and activities regarding electric reliability. This Summary Report provides the public with information on past, present, and future activities and engagements under the Memorandum, which have strengthened communication and collaboration on electric system reliability within and outside of the Federal Government. Engagements pursuant to the Memorandum provide an information-sharing venue for EPA and DOE that promotes a joint understanding of relevant electric reliability issues and enhances the agencies' ability to hear directly from stakeholders with reliability responsibilities regarding their short- and long-term concerns and results of their internal analyses and planning efforts. Both agencies remain committed to sharing and expanding expertise in this critical area to enhance Federal planning and actions.

Background

At a time of transition in the electric power sector, the Memorandum provides a framework for EPA and DOE to communicate and collaborate effectively and jointly engage external stakeholders on electric reliability matters. EPA and DOE both create and implement policy and provide funding that affects the electric sector. Although EPA and DOE have distinct institutional mandates and legal authorities, each agency has considerable expertise in various aspects of electric system reliability and both support the ability of federal and state governments, grid operators, regional reliability entities, power companies, municipal utilities, and electric cooperatives to continue to deliver a high standard of reliable electric service. This shared responsibility requires cooperation and information sharing across a diverse set of stakeholders.

Under the Memorandum, the agencies agreed to monitor, share information, and consult on reliability considerations using appropriate informational, policy, and regulatory tools within their respective statutory authorities and mandates. This engagement provides EPA with broad perspectives to inform the development and implementation of effective and workable health and environmental protections that complement a reliable power supply. Additionally, this shared information enhances DOE's ability to hear directly from stakeholders on key reliability issues and form a better understanding of the issues, drivers, and opportunities for DOE to support stakeholders.

As part of its outreach efforts with various stakeholders under the Memorandum, EPA and DOE engage in regular outreach and consultation with the Federal Energy Regulatory Commission (FERC) staff. EPA and DOE also engage other key stakeholders who play important roles in the reliable operation of the electric system. These include the North American Electric Reliability Corporation (NERC), which is the FERC-designated Electric Reliability Organization; regional reliability entities; state public utility commissions; developers, owners, and operators of generation, transmission, and distribution resources; demand response providers; consumer and other public interest organizations; and other stakeholders.

Summary of Meetings

Since signing the Memorandum, EPA and DOE have held three formal engagements to discuss reliability-related topics with key stakeholders with reliability responsibilities (see Appendix 2 for a complete list of participants). These engagements were not open to the public.

- The first event, held in May 2023, focused on NERC's 2023 Summer Reliability Assessment[1] and potential short-term reliability and resource adequacy issues that could occur during potential extreme weather conditions in Summer 2023, particularly extreme heat. In addition to NERC representatives, FERC staff and the National Association of Regulatory Utility Commissioners (NARUC) Executive Committee members and staff also participated. As part of the Memorandum process, EPA, and DOE plan to continue to routinely engage with NERC given NERC's importance in electric sector reliability.
- The second event was held in September 2023 with members of the Independent System Operator (ISO)/ Regional Transmission Organization (RTO) Council (IRC). The event focused on resource adequacy, how ISOs/RTOs work to ensure sufficient resources to meet electric demand, and opportunities to expand communication between IRC members and both EPA and DOE. This engagement provided the IRC an opportunity to highlight short- and long-term reliability challenges facing ISOs/RTOs serving diverse regions of the country, as well as policy/market tools and technologies they are deploying to overcome those challenges. In addition, EPA, DOE, and FERC provided updates on ongoing complementary work, provided technical feedback and support, and identified areas for future collaboration.
- The third event was held in January 2024 with NERC and focused on findings from the 2023 Long-Term Reliability Assessment (NERC report).[2] FERC staff and NARUC Executive Committee members and staff also participated. The NERC report identified reliability trends, emerging issues, and potential risks that could impact the long-term reliability, resilience, and security of the system. The NERC report included the Memorandum between EPA and DOE in its overall recommendation for strengthening relationships among stakeholders and policymakers.[3]

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[1] NERC's 2023 Summer Reliability Assessment (SRA) identified, assessed, and reported on areas of concern regarding the reliability of the North American bulk power system for the 2023 summer season. The SRA also highlighted forecasts and conditions that might affect the reliability of the system. It is available at https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_SRA_2023.pdf

[2] NERC's Long-Term Reliability Assessment (LTRA) assessed the adequacy of the bulk power system in the United States, Canada, and Baja California, Mexico over a 10-year period. It included projections of the electricity supply and demand, an evaluation of transmission system adequacy, and discussion of key issues and trends that could affect reliability. It is available at https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2023.pdf

[3] "The Memorandum of Understanding between the U.S. Department of Energy (DOE) and the U.S. EPA to foster interagency cooperation and consultation to support electric grid reliability is an encouraging

EPA and DOE plan to hold additional events in early 2025.

Additionally, EPA and DOE participated in several electric sector reliability-related engagements outside the Memorandum over the last year:

- **FERC's annual Reliability Technical Conference, November 2023**. This event included a session focused on EPA's then-proposed Carbon Pollution Standards, which included new source performance standards and guidelines for fossil fuel-fired power plants.[4] EPA provided testimony to the Commission on the proposed carbon pollution standards and answered questions from the commissioners about how the proposal considered reliability. There was also a panel with state, industry, and independent experts on the proposed rule. EPA included materials from this technical conference in the docket of its rulemaking, as the event informed its decisions and record on critical elements pertaining to electric sector reliability.
- **NARUC's annual Winter Policy Summit, February 2024**. EPA's Assistant Administrator for the Office of Air and Radiation, Joe Goffman, participated in NARUC's Winter Policy Summit and provided an update on EPA efforts. He also joined a panel of state commissioners from Indiana, Colorado, and West Virginia along with NARUC's President (representing North Dakota) to hear their perspectives.
- **Regulatory process engagements for rulemakings**. EPA conducted extensive outreach as part of its electric sector regulatory efforts to better understand concerns about electric sector changes underway and how EPA might design regulations that are consistent with improving and assuring reliability. For example, as part of the process for developing the final carbon pollution standards,[5] EPA engaged in follow-up conversations with all balancing authorities and systems operators that submitted public comments on the proposal to discuss those comments. In addition, EPA solicited comments on reliability-related mechanisms in a supplemental proposal issued in November 2023. After carefully examining the record, EPA responded with a suite of revisions to the proposal to provide additional flexibilities, revised compliance deadlines, and reliability-specific mechanisms that work in concert with reliability and resource adequacy planning processes.
- **Regular briefings with NERC**. Experts at NERC regularly brief EPA and DOE leadership and staff and supplied important technical information to improve work products and policies. NERC issues routine reports as part of its reliability assessments, and EPA has briefed NERC technical staff on regulatory efforts that were recently finalized. This two-way communication is invaluable to EPA and DOE and helps staff understand each organization's respective mission, authorities, and policies.

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acknowledgement of the need for environmental policies to carefully consider electric grid reliability and provides a path for flexibility provisions to be addressed." NERC's Long-Term Reliability Assessment (2023), page 12, https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2023.pdf

[4] 88 FR 33240 (May 23, 2023) available at https://www.govinfo.gov/content/pkg/FR-2023-05-23/pdf/2023-10141.pdf

[5] 89 FR 39798 (May 9, 2024) available at https://www.govinfo.gov/content/pkg/FR-2024-05-09/pdf/2024-09233.pdf

Key Stakeholder Observations

EPA and DOE have benefitted from the valuable perspectives shared through Memorandum-driven engagements. These observations provide stakeholder insights into key areas impacting electric reliability planning and serve to identify areas of follow-up. The perspectives and information gathered have helped to enhance and deepen understanding of various ongoing changes and strategies related to electric sector reliability. These observations are briefly summarized here, and do not reflect EPA or DOE viewpoints, perspectives, or policies. Rather, these summaries are meant to highlight important themes that stakeholders have relayed and explained during various Memorandum events. The stakeholder observations include:

- **A changing mix of resources**. The portfolio of generating resources in the United States has undergone rapid and significant changes, with more changes expected to occur. A significant amount of existing coal-fired generating capacity has retired over the last decade, and gas-fired power plants now provide the largest share of electricity supply. Renewable energy generation, mostly wind and solar, has grown rapidly and is expected to continue to grow. The agencies' engagements under the Memorandum have shed light on how these trends are playing out in diverse regions of the country and how reliability authorities are planning for and responding to these trends.
- **Growing severity and frequency of extreme weather events due to climate change**. Weather events such as polar vortexes and extended cold snaps, droughts, heat waves, wildfires, and atmospheric rivers and flooding have increasingly disrupted energy infrastructure, including the electric system, in recent years. Extreme weather events are becoming more common, with increasingly severe impacts and longer duration, and can strain the system for prolonged periods of time.
- **Infrastructure**. Reliability authorities have emphasized the importance of ensuring that transmission investments keep pace with the increase in utility scale wind and solar resources, which are generally located outside of major load centers. New transmission infrastructure deployment has a notably longer deployment timeline than other technology deployment.
- **Emerging technologies**. Grid operators have expressed that long-duration storage and grid-edge/transmission-enhancing technologies show promise in bolstering the reliability of the electric system, but that there is uncertainty with respect to the pace of deployment and continued improvement in these technologies. The contribution of storage to resource adequacy may be underrepresented in future resource mix forecasts and somewhat location specific in its contribution to reliability, even though storage capacity could scale significantly. Grid enhancing technologies may also provide significant benefits but are also highly location specific.
- **Load growth and demand-side management**. Expectations around future electricity demand have shifted after an extended period of relatively flat electricity demand. Growth rates of

forecasted peak demand have risen significantly due to electrification trends, new data centers, economic growth, and market shifts. Electricity demand-side management through technology or market signals will be a key area to track.

- **Regulatory, policy, and market signals**. A myriad of signals may have influenced recent and ongoing trends in the electric sector, including market and fuel price trends, clean energy incentives, environmental policy, equity considerations, and consumer-driven preferences. Each of these important elements may continue to influence the electric system, and all of them are a part of management and planning considerations to ensure that the electric system continues to reliably meet the needs of a diverse set of stakeholders.

EPA Efforts

EPA's mission is to protect human health and the environment. The agency has an outstanding track record of ensuring its public health-based emissions standards and guidelines that impact the electric sector are sensitive to reliability-related issues and constructed to complement grid operators' ability to deliver reliable power. By providing EPA with a deeper understanding of ongoing technological, market, and policy developments in the electric sector and how they affect resource adequacy and reliability, the Memorandum assists EPA in carrying out its mission and informs EPA's ongoing and future regulatory and policy efforts.

The engagement and information sharing conducted under the Memorandum framework since its inception has deepened relationships with key stakeholders and further enhanced EPA understanding of important dimensions of electric sector reliability. Some examples of recent regulatory initiatives that have involved consideration of electric sector reliability issues include:

- **Air Pollution and Climate-Related Regulatory Engagements**. EPA recently finalized several important regulations that address harmful air pollution from power plants. The electric sector is a leading emitter of sulfur dioxide, nitrogen oxides, heavy metals, and carbon dioxide, which all have negative impacts on public health. The development of these rules involved careful evaluation of the electric sector and potential reliability implications, while also providing long-term certainty and clarity to the industry with respect to Federal environmental regulations. EPA undertook extensive, customized engagement over the course of various rulemakings with balancing authorities and grid operators, as well as staff and Commissioners of FERC, DOE, NERC, and other expert entities, to enhance EPA's understanding of concerns related to ongoing changes in the electric system in the context of recently finalized environmental regulations. These include the Good Neighbor Plan,[6] the carbon pollution standards,[7] and the National Emission Standards for Hazardous Air Pollutants for Coal- and Oil-Fired Electric Utility Steam Generating Units (EGUs), also known as the Mercury and Air Toxics Standards.[8] The engagement, as part of these regulatory efforts, was instrumental to informing the final shape of the requirements as various reliability considerations were evaluated.[9] As a result of these engagements as well as public comments, these final rules adopted multiple flexibilities or features that were designed, in part, to address reliability concerns, wherever possible. These include emissions trading and allowance features, phase-in of pollution reduction requirements,

[6] 88 FR 36654 (June 5, 2023) available at https://www.epa.gov/Cross-State-Air-Pollution/good-neighbor-plan-2015-ozone-naaqs

[7] 89 FR 39798 (May 9, 2024) available at https://www.epa.gov/stationary-sources-air-pollution/greenhouse-gas-standards-and-guidelines-fossil-fuel-fired-power

[8] 40 CFR Part 63 Subpart UUUUU available at https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards

[9] All relevant information under each regulatory effort can be found in each respective rulemaking docket.

provisions for system emergencies, and extensions to timelines where reliability challenges might arise.

- **Mobile Sources.** In addition to larger stationary sources regulations, EPA finalized two regulatory programs that impact light- and heavy-duty vehicles: the Multi-Pollutant Emissions Standards for Model Year 2027 and Later Light-Duty and Medium-Duty Vehicles (March 2024) and the Phase 3 Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles (April 2024).[10, 11] As part of this effort, EPA evaluated the potential impacts of electrified vehicle charging demand on the electric sector and included supplemental analyses as part of the final rules inclusive of important final rule changes and flexibilities. These performance-based vehicle emissions standards will be phased-in primarily between 2027 and 2032 and provide important flexibilities for vehicle manufacturers.
- **Effluent Limitations.** EPA finalized the Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category to strengthen certain discharge limitations in the Steam Electric Power Generating Category.[12] The effluent guidelines include a number of features designed to address reliability concerns. For example, compliance timelines are synced for general consistency with other EPA regulations, and extensions are allowed for units that are needed to support reliability where there is a demonstrated need.
- **Coal Combustion Residuals**. EPA finalized a rule requiring the safe management of coal combustion residuals (CCR) placed in areas that were previously unregulated at the federal level. The Legacy CCR Surface Impoundments rule covers historical CCR disposal areas at active power plants, as well as inactive power plants with surface impoundments that are no longer being used.[13] The final rule included provisions that allow for consideration of reliability concerns for specific affected facilities, on a case-by-case basis.

For each of its rulemakings, EPA conducted modeling that examined and evaluated the potential impacts of the resource adequacy implications of its programs. The agency also performed a variety of other sensitivity analyses that incorporated increased future electricity demand, changes in natural gas prices, as well as the combined impact of EPA's additional regulatory actions affecting the electric sector. These analyses helped demonstrate that the impacts of EPA rules related to electricity generating units are projected to result in anticipated electric system changes that remain within the confines of key NERC assumptions, are consistent with peer-reviewed projections for the electric sector, and are consistent with goals, planning efforts and Integrated Resource Plans (IRPs) of industry itself. EPA projections show that the rules pertaining to Electric Utility Generating Units, whether alone or combined with other rules, are not expected to adversely affect resource adequacy.

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[10] 89 FR 27842 (Apr. 18, 2024), available at https://www.govinfo.gov/content/pkg/FR-2024-04-18/pdf/2024-06214.pdf

[11] 89 FR 29440 (Apr. 22, 2024), available at https://www.govinfo.gov/content/pkg/FR-2024-04-22/pdf/2024-06809.pdf

[12] 89 FR 40198 (May 9, 2024), available at https://www.govinfo.gov/content/pkg/FR-2024-05-09/pdf/2024-09185.pdf

[13] 89 FR 38950 (May 8, 2024), available at https://www.govinfo.gov/content/pkg/FR-2024-05-08/pdf/2024-09157.pdf

DOE Efforts

Supporting a secure, resilient, and reliable power system is a cornerstone of DOE's mission to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions. EPA and DOE jointly identified several reliability-related topics of interest in which DOE had work under way. DOE provided in-depth briefings on these topics to EPA and continues to progress on this important work, including:

- **Inverter-based resources**. DOE published several national laboratory studies which examined power systems with high shares of inverter-based resources. DOE supports the Universal Interoperability for Grid-forming Inverters (UNIFI) Consortium[14] —a group of national laboratory, industry, and academic partners advancing grid-forming inverter technologies – to build on these efforts. Grid-forming inverter technologies are important technologies to address issues such as inverter cut-outs observed in recent years in Texas and California.
- **Electric vehicle charging**. DOE published the Multi-State Transportation Electrification Impact Study,[15] which assessed the ability of the electric distribution system to meet demand from electric vehicles and highlighted the value of charging flexibility in reducing system infrastructure needs.
- **Technology deployment assessments.** DOE published The Future of Resource Adequacy[16] report that outlined the array of technology solutions across generation, storage, transmission, and demand for electricity, along with the key Federal incentives available to support deployment. DOE also published liftoff reports on technology-specific assessments, such as Virtual Power Plants[17] and Innovative Grid Deployment,[18] which provide deeper information on demand-side resources and deployment that can be used to meet resource adequacy and reliability needs.
- **Data centers and electricity demand growth.** DOE provided a website[19] that placed data center demand in historical context, described how data center demand growth is distinguished from demand growth due to electrification and manufacturing, and listed DOE resources available to address electricity demand in the near term and beyond. DOE also released an Electricity

[14] https://www.energy.gov/eere/solar/unifi-consortium

[15] https://www.energy.gov/sites/default/files/2024-03/2024.03.18%20NREL%20LBNL%20Kevala%20DOE%20Multi-State%20Transportation%20Electrification%20Impact%20Study%20FINAL%20DOCKET.pdf

[16] https://www.energy.gov/sites/default/files/2024-04/2024%20The%20Future%20of%20Resource%20Adequacy%20Report.pdf

[17] https://liftoff.energy.gov/vpp/

[18] https://liftoff.energy.gov/innovative-grid-deployment/

[19] https://www.energy.gov/policy/articles/clean-energy-resources-meet-data-center-electricity-demand

Demand Resource Hub,[20] which includes information on the solutions and suite of DOE tools available to capture the benefits of load growth while maintaining system reliability, affordability, and security.

- **Transmission assessments and planning**. DOE conducted several studies to enhance transmission planning.[21] DOE released its National Transmission Needs Study,[22] which serves as DOE's triennial state of the U.S. electric transmission report and provides a robust assessment of current and near-term future transmission needs through 2040. DOE also finalized the National Transmission Planning Study,[23] which identifies transmission that will provide broad-scale benefits to customers, informs regional and interregional transmission planning processes, and identifies interregional and national strategies to accelerate decarbonization while maintaining system reliability.

[20] https://www.energy.gov/policy/electricity-demand-growth-resource-hub

[21] https://www.energy.gov/gdo/enhanced-transmission-planning

[22] https://www.energy.gov/gdo/national-transmission-needs-study

[23] https://www.energy.gov/gdo/national-transmission-planning-study

Continuing Efforts

As the electric sector continues to evolve, both EPA and DOE understand that ensuring electric reliability requires long-term planning, engagement, and transparency. The Memorandum provides a useful framework for EPA and DOE to remain engaged with key reliability stakeholders, and to continue collaboration, information sharing, monitoring, and outreach activities on this important topic.

EPA and DOE plan to host additional engagement sessions with stakeholders in early 2025, in keeping with the goals of the Memorandum. These meetings will center on key electric sector reliability themes and allow more thorough and fulsome information sharing across stakeholders and with EPA and DOE. In addition, EPA and DOE will continue to hold routine technical meetings, with FERC participation, to share more-detailed technical data and information across our agencies and with the public. And lastly, EPA and DOE will meet quarterly to facilitate information sharing and key updates across their respective organizations.

Conclusion

The Memorandum has been an important part of the ongoing electric reliability dialogue among EPA, DOE, FERC, and other stakeholders including NERC, NARUC, and the RTO/ISOs. Engagements pursuant to the Memorandum provided an information sharing venue between both agencies and key stakeholders, and enhanced EPA and DOE's ability to hear directly from stakeholders on key reliability issues. The Memorandum advanced effective communication, consultation, and collaboration on electric reliability using appropriate informational, policy, and regulatory tools within respective statutory authorities and mandates. As the electric sector adapts to rapid and significant changes, the Memorandum provides a framework for both agencies to support reliable electric service as they carry out their respective missions and authorities.

Appendix 1: EPA, DOE, and FERC Participating Offices

United States EPA

- Office of Atmospheric Protection, Office of Air Quality Planning and Standards, Office of Water, Office of General Counsel, Office of Land and Emergency Management, Office of Transportation and Air Quality, Office of Policy, and the Region 1 office.

United States DOE

- Office of Policy, Office of Cybersecurity, Energy Security, and Emergency Response, Office of Electricity, Office of Energy Efficiency and Renewable Energy, Office of Fossil Energy and Carbon Management, and Office of the General Counsel.

FERC

- Office of Electric Reliability, Office of Energy Policy and Innovation, and Office of General Counsel.

Appendix 2: Meeting Participants

Inaugural meeting of the parties to the Memorandum

The inaugural meeting took place on May 25, 2023, and included participants from:

- NERC
- NARUC, Executive Committee

Second meeting of the parties to the Memorandum

The second meeting took place on September 7, 2023, and included participants from:

- United States EPA
- United States DOE
- FERC
- ISO/RTO Council
  - California ISO (CAISO)
  - Electric Reliability Council of Texas (ERCOT)
  - Midcontinent ISO (MISO)
  - ISO New England (ISO-NE)
  - New York ISO (NYISO)
  - PJM Interconnection (PJM)
  - Southwest Power Pool (SPP)
  - Ontario's Independent Electricity System Operator (IESO)

Third meeting of the parties to the Memorandum

The third meeting took place on January 9, 2024, and included participants from:

- United States EPA
- United States DOE
- FERC
- NERC
- NARUC, Executive Committee