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FACT SHEET

RELIABILITY WITHIN REACH:
A CLEAN, DEPENDABLE ELECTRIC GRID FOR THE FUTURE REQUIRES IMPROVEMENTS TODAY

Our way of life depends upon a reliable power grid. Grid operators keep the grid running, but this task has become challenging in a world dependent on fossil fuels and vulnerable to climate change. We have the tools now to build a more reliable grid and make affordable, clean power available to all.

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While some grid operators and their affiliated organizations have voiced complaints regarding the pace of the transition and the decommissioning of old, dirty power plants, the urgency of addressing the climate crisis demands that there be no further delay. It is imperative for grid operators to expedite measures to deploy clean energy resources, operate agile electricity markets, and build a more robust grid.

This policy brief outlines the most important steps Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs) must immediately undertake to build an electricity system fit for the challenges of climate change. Instead of trying to delay clean energy or object to long-overdue standards for power plant emissions from the Environmental Protection Agency (EPA), grid operators should advance these critical steps forward.

GRID OPERATORS HAVE THE POWER TO BUILD A BETTER GRID

Our current system is in desperate need of a major upgrade. Throughout the United States, our nation's power infrastructure has shown growing susceptibility to climate change–fueled severe weather, including sudden cold snaps and wildfires. The Federal Energy Regulatory Commission (FERC) and North American Electric Reliability Corporation (NERC) recently highlighted Winter Storm Elliott in December 2022 as the fifth cold-weather event in 11 years to threaten or interrupt the supply of power to customers.[1] The cold weather risk is most pronounced in regions dependent on gas and coal. Up and down the East Coast, Winter Storm Elliott broke down the natural gas production cycle, disrupting wellheads and freezing pipelines and power plants. Coal power plants hardly fared better, contributing to 16 percent of the outages in the mid-Atlantic region. These failures pushed the grid to the brink, causing blackouts for over 1 million people.[2] Failures of gas delivery and generation during February 2021's Winter Storm Uri wrought similar havoc in Texas.[3]

Continued fossil fuel dependence will not only exacerbate extreme weather impacts but also protract the power grid's vulnerability during critical times. We have the picture of our future power system: It will be powered by a diverse clean energy supply, hardened by battery storage, and enabled by high-capacity power lines capable of moving clean energy over wide distances. This future grid will be more reliable and resilient in worsening storms, protect human life, and cut carbon pollution. Progress depends on power grid operators mobilizing toward the clean energy future.

NINE RECOMMENDATIONS TO BOLSTER GRID RELIABILITY

We have tools at our disposal to ensure reliability today and deliver cleaner, cheaper power to consumers. The following steps are critical to reaching these goals.

1. **Develop comprehensive, forward-looking transmission system plans.** Although the clean energy transition is well underway, most ISOs/RTOs are not yet planning transmission infrastructure for future grid needs. The lack of forward-looking infrastructure investment is an increasingly large barrier to new generation. Time is of the essence, and inaction threatens the long-term reliability of the grid. Grid operators should not wait for FERC action on transmission planning but instead use existing tools and well-known best practices to swiftly resolve transmission planning issues and expand access to clean and reliable energy. The building blocks of sound regional planning include:
   - **Preparing for the grid of the future.** The grid has the highest-ever backlog of new clean power plants seeking to connect to the grid. While these clean energy resources in the queue are critical to meet demand growth from electrification, the size of the queue backlogs indicate that grid operators have seriously underestimated clean energy demand. RTOs and ISOs should plan ambitiously for the future and account for all the benefits of transmission to the system when deciding whether to build new lines.
   - **Using existing infrastructure corridors.** Existing transmission corridors, highways, and even rail lines should be used whenever possible to add new transmission capacity more quickly than would occur with building on undeveloped corridors.
   - **Adopting "smart from the start" principles.** Planning transmission in ways that minimize landscape impacts and benefit communities will accelerate the siting and permitting processes that occur after the grid operators approve new lines.[4]
   - **Allocating the costs of new transmission fairly.** RTOs and ISOs should ensure that all those who benefit from new transmission infrastructure pay for new projects. If operators first add up all the benefits of new transmission and then establish formulas to fairly allocate costs across broad regions where those benefits will accrue, regions, states, and customers will be more likely to support new transmission.
2. **Plan new transmission between regions.** Almost no new transmission is currently being planned and built between regions, despite the irrefutable value of doing so.[5] Resource sharing between regions is common during extreme weather events, yet the weak links between regions limit the amount of power that can be shared. The grid must be larger than the weather. Interregional connections can also help provide geographical diversity to balance wind and solar resources to maintain reliability all year long. Grid operators do not have to and should not wait for FERC or congressional action to make progress on interregional transfer standards.
3. **Simplify interconnection of low-risk, high-reward resources.** Interconnection queues across the country have become a major barrier to new generation that is urgently needed for a reliable power grid. FERC recently issued Order 2023, which will make significant improvements to the interconnection queue process. In this order, FERC simplified the interconnection requirements

for resources that have little to no impact on transmission congestion, like storage additions for queued renewables or additional resources co-located with existing generation that has surplus capacity.[6] Grid operators can take this concept a step further to fast-track replacement resources at the sites of retiring generation and identify headroom on the existing grid where new generation can connect with minimal network upgrades. Grid operators must waste no time in complying with and going beyond Order 2023 to quickly connect new resources to the grid.

4. **Increase market participation by demand-side resources.** Demand response—reducing power consumption in response to market or utility price signals—and other power management approaches should be top of mind for grid operators, yet their use remains far short of their potential. For example, building and vehicle electrification increases the potential for virtual power plants to provide resource adequacy at half the cost of gas generators and batteries, giving grid operators a powerful demand-side resource.[7] These resources can sharply and quickly reduce power demand during extreme weather events, decrease dependence on vulnerable fossil fuels, and avoid the need for some grid build-out. Demand response can be accessed in the short term and on short notice, but grid operators have not rolled out market structures and incentives to encourage widespread demand-side participation. FERC Order 2222 was adopted in 2020 to compel grid operators to use these demand-side tools, but three years later, no RTO has fully implemented the order, and problems remain with many RTO filings.[8]
5. **Accelerate integration of battery storage.** Battery storage is the wonder resource: It provides everything from fast grid services to energy and capacity for hours at a time, at a lower cost and often with better performance than even the most modern combined-cycle gas turbine.[9] It balances the variability of wind and solar and enhances the reliability value of solar after the sun sets. Storage resources also harden the local grid against extreme weather events. No wonder, then, that 465 GWs of battery storage are waiting in interconnection queues around the country.[10] FERC Order 841 improved the participation of energy storage in power markets, but it did not address the full range of barriers in the existing market paradigm.[11] Realizing the full value of energy storage for all its attributes requires ISOs and RTOs to fully implement Orders 841 and 2222 and remove the remaining barriers to energy storage.
6. **Maximize the capacity of existing power lines with advanced transmission technologies.** Higher-capacity conductors, dynamic line ratings, and other advanced transmission technologies can increase power flows over existing transmission lines, allowing existing generation to access more load and new generation to come online much more quickly. Using these technologies could double the amount of interconnection capacity in the wind-rich Great Plains alone.[12] While FERC Order 2023 affirms that advanced transmission technologies "could reduce or even eliminate the need for the future construction of new transmission assets," the order requires only that ISOs and RTOs "evaluate" these technologies, not that they use them even when they are demonstrably superior in meeting grid needs.[13] Grid operators should fully take advantage of advanced transmission technologies and maximize the capacity of the existing transmission system.
7. **Account for capacity values consistently, accurately, and fairly.** ISOs and RTOs are tasked with measuring the contribution to grid reliability of every power plant on the system. While this may have been a straightforward endeavor in the past, this "capacity accreditation" process has become inconsistent and piecemeal in the face of an increasing share of weather-dependent power sources, growing threats from extreme weather, and the addition of new resources and technologies. The process has also failed to account for the risk of correlated outages—where many generators fail simultaneously—thereby risking reliability of the system.[14] (The impact of correlated gas outages was highlighted in Winter Storm Elliott.) And by overstating the reliability value of fossil fuel resources, grid operators have procured too many of them. Capacity accreditation gone wrong deprives the system of clean energy supply and the fuel diversity needed for a reliable resource mix. Accreditation should recognize that reliability is not a characteristic of a single resource type but a feature of the overall system.
8. **Improve software and other technical shortcomings.** There is a common refrain of grid operators when new technology attempts to enter the market: "Our software cannot support that." MISO, the Midwest grid operator, has had challenges fully modeling storage's capabilities in providing fast grid-balancing services. It has failed for years to fully integrate distributed energy resources because of software limitations in its energy and ancillary services markets. In New York, NYISO has yet to fully unlock the potential of virtual power plants because its systems cannot handle residential resources smaller than its 10-kW requirement for market participation.[15] When the grid needs more resources at lower cost, it is no longer acceptable for technological barriers to artificially delay the clean energy transition and to keep prices high for consumers.
9. **Create new regional markets in the West and Southeast in non-RTO regions.** RTOs operate wide regional markets, plan for future energy needs, and coordinate transmission build-out requirements over wide areas. RTOs also have nearly immediate situational awareness during extreme weather or natural disasters that threaten the grid and are empowered to dispatch resources where they are needed the most. Regional market structures are absent in most of the West (except California) and in the Southeast. The resulting fragmented responsibility and operational complexity lead to higher costs, reduced reliability, and limited ability to share clean energy resources. An RTO, or at minimum a regional energy and ancillary services market, would have

tremendous benefits for these areas. Most studies on the issue agree that an RTO across the West would result in a more efficient and reliable system, with similar benefits noted in the Southeast.[16]

TAKEAWAYS

We need a diverse, resilient power supply and smart transmission infrastructure planning. Increasingly extreme weather pokes holes in the myth that fossil fuels guarantee reliability. This view becomes more difficult to defend with every severe winter storm that leaves customers without power. Grid operators have the urgent responsibility to plan for a future clean energy grid, rather than resist measures like EPA standards that mobilize the energy transition. They must improve a range of planning and market practices and get ahead of the clean energy curve, rather than fall further behind. Sluggish and inadequate reforms, outdated planning practices, and markets protecting fossil fuel interests must not get in the way. The right choices now will ensure that all consumers can access clean, cheap, reliable energy in the coming decades.

ENDNOTES

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