

Secretary of Energy Advisory Board (SEAB)

Recommendation on Grid Resiliency

Approved unanimously by the SEAB on January 24, 2023

Summary: From a resource allocation perspective, we believe most DOE resiliency funding should support interregional transmission as well as distribution solutions that enhance the resiliency and flexibility of the grid. This will complement ongoing efforts at the Federal Energy Regulatory Commission (FERC) to require interregional transfer capability. Given that most outages occur at the distribution level, investments in distributed resources, distribution hardware and data analytics will enable better reliability. DOE may also wish to support other resources and initiatives that appear particularly promising, including the development of regional electricity markets, demand-side management, longer-term energy storage, and generation mix.

The benefits of prioritizing grid resiliency are:

- Enhanced reliability and resilience (resource, load, weather, and geographic diversity)
- Greater deliverability of renewables
- Enhances Load Carrying Capacity (LCC) of renewables
- Greater market efficiency
- Significant potential net benefits

1. DOE Funding Recommendations

- For all aspects of DOE transmission funding, prioritize projects which will enhance the interregional ties that will help regions support one another during times of extreme load or generation shortages (e.g., extreme weather events and challenging market conditions).
- Prioritization of interregional projects will help compensate for lack of interregional planning, though such projects should not be seen as full substitutes for robust planning.
- Ensure that interregional transmission and distribution solution projects are meeting Justice 40 Initiative (e.g., community engagement) and Just Transition (e.g., community benefit agreements) priorities (e.g., preferential weighting criteria within RFP).
- Screen all projects against interregional criteria, in part to ensure that there are no interregional projects which would create similar benefits at a lower cost.

2. DOE Study Recommendations

- For grid simulations, ensure use of stochastic modeling as opposed to deterministic modeling to fully capture the impact of extreme events – thus helping ensure the grid of the future is dimensioned for future climate shocks.
- Ensure similar methodology for grid modeling and simulations between and among regional transmission organizations (RTOs) and Distribution Service Operators (DSOs).
- Conduct studies to support development of minimum amounts of interregional power flows between regions FERC may develop a reliability standard imposing this requirement.
- Benefits should be broadly and consistently defined in evaluating interregional projects.

- Provide technical support to RTOs, Independent System Operators (ISOs), and other key stakeholders that are studying interregional transmission needs and benefits.

3. DOE should fund other promising resources and initiatives, including supporting the development of regional electricity markets, demand-side management, longer-term energy storage, and generation mix.

- Regional electricity markets are helpful because they provide greater load, resource, weather, and geographic diversity. They also promote competition, which can result in greater efficiency and save consumers money. As an example, the Energy Imbalance Market in the West is estimated to have saved consumers more than \$2 billion since its founding in 2014. Market operators also have a wider area view than individual Balancing Authorities and can do transmission planning more effectively than individual states or transmission planning regions. DOE could help facilitate discussions by convening among key stakeholders and by doing studies that help states evaluate the benefits of joining an RTO/ISO market.
- Demand-side management can help preserve reliability during peak load conditions. Peak shaving also has important economic, and environmental benefits. Demand response can eliminate the need to build and to run expensive and less efficient fossil fuel peakers, such as diesel generators or gas combustion turbines. DOE may be able to assist state policymakers in evaluating the benefits of demand-side management as a resource and identifying best practices in implementing demand-side management, as well as effective market mechanisms.
- Longer-term energy storage can help maintain reliability when generation is unavailable. Lithium-ion batteries typically have a four-hour duration. Hydropower assets have long provided storage capabilities, but historic droughts across the West threaten their long-term availability. DOE should continue to support research on advanced battery technologies and on lowering costs for green hydrogen, where the hydrogen is stored until it is needed to generate electricity.
- As we look to interregional connections and market dynamics, we need to better model the effect of generation mix on grid stability and resiliency. DOE should provide funding for the DOE National Laboratories, Federally Funded Research and Development Centers, and/or research universities to improve modeling of dynamic resource mix and its impact on planning, grid stability, and reliability. This would entail better leveraging of digitalization, data, advanced analytics, machine learning, and edge computing to allow better responses to congestion, unplanned outage, volt-ampere reactive (VAR) stability, and frequency response, or other disturbances.