

## Design for Grid Reliability and Resilience



Grid resilience is a critical issue facing the Department of Energy (DOE) and the energy sector as a whole. The grid, which is responsible for delivering electricity from power plants to homes and businesses, is facing increasing challenges due to aging infrastructure, extreme weather events, cyber threats, and the integration of renewable energy sources.

These challenges have highlighted the need for the DOE to prioritize grid resilience in order to ensure the reliability and security of the nation's electricity supply.

One of the main challenges to grid resilience is the aging infrastructure of the grid. Many parts of the grid were built decades ago and need upgrades and modernization. This aging infrastructure is more susceptible to failure and can be difficult to repair quickly in the event of a disruption. The DOE must prioritize investments in grid modernization to improve the reliability and resilience of the grid.

While it is obvious that extreme weather events, such as hurricanes, wildfires, and winter storms, are also a major challenge to grid resilience, it is less obvious that for future development we should use "DfRR" Design for Reliability and Resilience guidelines.

We know that these events can cause widespread power outages and damage to the grid infrastructure.

Yes, the DOE must work with utilities and other stakeholders to develop plans and strategies to mitigate the impact of extreme weather events on the grid which may include improving the resiliency of critical infrastructure, such as substations and transmission lines, and implementing new technologies to better monitor and respond to weather-related threats.



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Cyber threats are another significant challenge to grid resilience. As the grid becomes more interconnected and reliant on digital technologies, it becomes increasingly vulnerable to cyber and physical attacks.



These attacks can disrupt the flow of electricity, compromise the security of the grid, and pose a threat to national security. The industry must prioritize cybersecurity measures to protect the grid from malicious actors and ensure the integrity of the electricity supply.

For physical attacks, which are on the rise, there are methods underway to mitigate attacks. At a recent TechCon Conference in Sacramento, I had the honor of moderating a panel with representatives from SMUD, PG&E and Idaho Power, where the presentations they made were simply startling as to the problem and quite brilliant as to their future solutions.

The integration of renewable energy sources, such as solar and wind power, also presents challenges to grid resilience. Since these energy sources are variable and intermittent, it creates challenges for grid operators in balancing supply and demand and maintaining grid stability. The industry must prioritize investments in grid flexibility and storage technologies to accommodate the growing share of renewable energy on the grid.

In conclusion, grid resilience is a complex and multifaceted issue that requires the attention and prioritization of the Department of Energy and by the entire utility family. By addressing the challenges posed by aging infrastructure, extreme weather events, cyber and physical threats, and the integration of renewable energy sources, then we can help ensure the reliability and security of the nation's electricity supply. It is essential that the DOE work with utilities, regulators, and other stakeholders to develop comprehensive strategies and solutions to enhance grid resilience and protect the grid from future threats.



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Alan has decades of experience in the power systems industry and is one of the greatest reliability experts out there.

