



PRESS RELEASE

The Dynamic Sustainability Lab at Syracuse University

Sustainability & Energy Value Advisors (SEVA)

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New Study Highlights Trends Effecting Resiliency and Reliability of U.S. Electricity Grid

SYRACUSE, NY & WASHINGTON, D.C. October 16, 2024 -- A newly released study details rapidly emerging trends impacting the reliance and stability of the U.S. electrical grid and sheds light on the impending crises America will face if multiple issues are not addressed.

The study, “U.S. Electricity Transitions: Emerging Threats and Opportunities for the Resiliency and Reliability of the U.S. Grid,” provides insights into how the grid currently operates, the inconsistencies and shortcomings in the system and their potential consequences, and the opportunities to protect our communities through new technologies and public policies.

The study was led by Dr. Jay Golden, Director of the Dynamic Sustainability Lab and Pontarelli Professor of Environmental Sustainability & Finance at Syracuse University. Dr. Golden is also an Advisory Board member of Sustainability & Energy Value Advisors (SEVA), which provided insights to the report.

The study specifically addresses trends associated with areas including supply and demand, climate, cybersecurity risks, and the impacts of technologies and artificial intelligence, all of which are impacting the reliability and resilience of the grid.

Additionally, the majority of the U.S. electricity grid is aging, in many cases past its 50-year life expectancy. Specifically, over 70% of the 5.5 million miles of transmission and distribution lines in the U.S. are in the second half of their life expectancy, with inadequate line modernization and replacement activity. The key findings from this important report are summarized below.

1. Our aging electricity grid is a threat to our economic and national security.

The American Society of Civil Engineers in 2021 gave a C-minus grade for the 600,000 miles of transmission lines. Many components of our transmission and distribution system are much older than their 50-year life expectancy, and over 70% of the transmission and distribution lines are well into their second half of their lifespans. Massive investments are needed to upgrade and modernize our grid, yet our U.S. manufacturing supply chain cannot support the need for critical equipment and infrastructure.



2. The grid is facing unprecedented growth in demand.

We have a surge in load growth demand, doubling over the past few years, stemming from AI, data centers, and electrification/decarbonization, but we are not adding baseload generation and battery storage capacity sufficient to meet future demand. Microsoft recently announced their intent to re-start Three-Mile Island Nuclear Reactor to meet demand for their AI future. Federal Energy Regulatory Commission (FERC) filings for 2023 reflect an almost doubling of five-year load growth demand from 2.6% to 4.7%, indicating 38 gigawatts (GW) of peak demand growth. Many experts believe this to be an underestimate, and that the nation will witness an even higher growth rate.

3. We have a grid connection backlog in the U.S.

Interconnection requests now typically take more than three years to complete. The timeline from the initial connection request to having a fully built and operational plant has more than doubled from less than two years for projects built in 2000-2007 to more than four years for those built in 2018-2023. The delay is hindering badly needed new electricity generation sources from coming online. Grid connection backlogs in the U.S. grew 30% in 2023.

4. Our grid is under constant threat.

There are increasing threats to the stability of our grid. The U.S. experienced about two times more weather-related outages during the last 10 years (2014-2023) than during the 10 years between 2000-2009, costing the U.S. economy up to \$169 billion annually. Additionally, physical and cyberattacks are on the rise, with a 340% increase in 2023 as compared to 2015. We must better fortify our grid to reduce its vulnerability to these events.

5. The energy industry and broader society are under enormous pressure to combat climate change by reducing carbon emissions.

We are replacing much of our fossil energy resources with renewable sources, primarily solar and wind. The mix of new renewable energy sources, many of which are intermittent, creates new challenges to an already challenged electricity grid. Balancing the load by using battery storage, microgrids, virtual power plants, and other resources will be key to meeting decarbonization goals, while ensuring reliability.

6. Fixing the problem is expensive.

Improvements in and replacements of the grid's 8,000 power-generation units, 600,000 circuit miles of AC transmission lines, and 70,000 substations are estimated to cost more than \$2.5 trillion by 2035.



The U.S. Electricity Transition study provides valuable insights into all of the major issues and challenges facing our electricity systems. It provides the reader with a solid understanding of the major topics and provides a resource for anyone exploring electricity generation and the grid. The study also contains a thorough glossary and fast facts regarding the current state of the U.S. power generation system and the grid.

To Access the Free Report: Go to <https://www.dynamicslab.org/>.

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About the Dynamic Sustainability Lab: The Dynamic Sustainability Lab (DSL) at Syracuse University is an internationally recognized research center focused on the opportunities, risks, and unintended consequences of the transition to a Net-Zero Carbon economy. The DSL focuses on the domains of energy & technology transitions, built environment transitions, biobased transitions, and institutional transitions. To learn more, visit <https://www.dynamicslab.org/>.

About SEVA: Sustainability & Energy Value Advisors (SEVA) is an energy advisory company that is home to leading thought leaders, researchers, and practitioners who provide both industry and governments around the globe the strategies and technical insights needed to meet the challenges of an ever-changing energy landscape. Our partners take advantage of the impactful insights we provide at the nexus of energy, economics, and the environment. To learn more, visit <https://sevadvisors.com/>.