



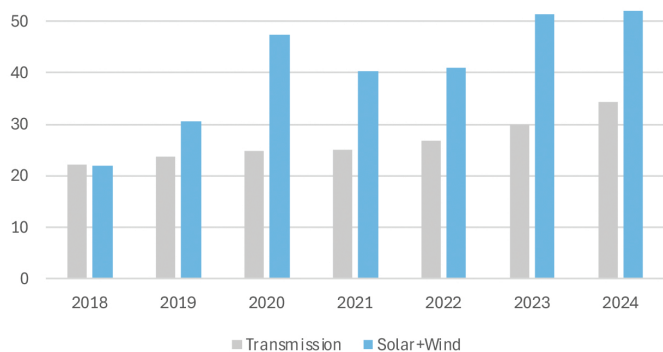
UBS Asset Management

When new energy meets old wires

U.S. electric grid infrastructure in the age of Trump and AI

In a world where exciting infrastructure technologies are becoming more efficient and innovative, the U.S. electric grid remains objectively ancient. Much of the grid was built in the 1960s and 1970s¹, and it is struggling to keep up with the rapid growth of renewable energy. Investments in transmission lines have lagged behind investments in renewables in recent years (see Figure 1), resulting in congestion and inefficiencies across the entire system.

Figure 1: U.S. transmission vs. renewables investments (USD bn)



Source: Edison Electric Institute, Rhodium Group/MIT, UBS Asset Management, February 2025

This problem is exacerbated by the fact that renewable energy sources are often located far from demand centers. Since most of the grid was built half a century ago, it was not designed to support these new resources. Without new transmission lines, the full potential of renewables has been limited due to grid congestion, which leads to the curtailment of this cheap, clean and abundant energy source (which is essentially discarded or wasted).

In addition, the rising popularity of electric vehicles and the broader electrification of industrial sectors have increased demand for electricity, adding further strain to the electric grid. Integrating smart grid technologies can enhance the efficiency of these new sources of demand, allowing for real-time monitoring and adaptive responses to shifting demand patterns.

A modernized grid will not only connect more renewables and enable further industrial electrification but also ensure resiliency and energy security in an era of rapid technological advancements. Policies, such as the Bipartisan Infrastructure Law, aims to support grid investments, but progress remains slow. Despite billions earmarked for transmission improvements, bureaucratic and regulatory hurdles continue to stall projects.

Politics, permits and procrastination

Transmission lines are more complicated to develop and construct than generation projects. They are spread across vast distances, requiring approvals from multiple counties, states, landowners and regulatory agencies. Right-of-way disputes, environmental reviews and local opposition further delay projects.

For example, the TransWest Express Transmission Project, a 732-mile line connecting Wyoming wind farms to Southern Nevada through Colorado and Utah, was proposed in 2005 but only broke ground in 2023 after 18 years of regulatory battles and will be completed in 2028. Similarly, the 550-mile SunZia Transmission Project, which aims to transport wind energy from New Mexico to Arizona, took over 15 years to secure permits.

By contrast, renewable energy projects benefit from shorter development timelines and fewer regulatory hurdles, taking only one to three years to build once construction begins.

There is also a structural business reason behind these bottlenecks. In deregulated electricity markets, upstream power developers can respond to price signals quickly, as they are motivated to lock in higher power prices (e.g. through long-term power purchase agreements).

In contrast, grid investments earn a fixed regulated return on equity (ROE), which means they lack the same urgency to build infrastructure as quickly, leading to timing discrepancies between generation and transmission.

Make electrons move again

So, what can help improve the grid congestion in the U.S.? The federal and local governments can accelerate grid development by streamlining permitting, reducing regulatory delays and offering better financial incentives.

Currently, many utilities would rather prioritize downstream distribution (and upstream generation for vertically integrated utilities) than transmission lines, since the former is easier to develop, and still generates similar ROEs. If the government can ease regulatory approvals, improve cost recovery or take any action that lowers the cost of capital and project execution risks, developer would likely redirect investments back into transmission lines.

The government can also boost the regulated ROEs of transmission projects outright. When a new transmission line is built, it is often the upstream generators or the downstream consumers that benefit the most. The grid developer should arguably gain a larger share of the financial upside. While ROE incentive adders already exist, the qualification process is often politically contentious, so any reforms to this system would be highly beneficial.

In our view, a combination of both financial incentives and regulatory reforms will be the most effective way of boosting new transmission project developments.

Outlook for electric grids in the age of Trump and AI

There is some early optimism for the electric grid under the Trump administration. Although Trump has been an ardent critic of renewable energy, his efforts in streamlining permitting and approvals are a positive for new transmission projects, which is often stuck in regulatory purgatory during the development process.

At the same time, the rapid rise of artificial intelligence (AI) and data centers, which Trump has been publicly highly supportive of, is driving electricity demand growth to levels not seen in decades. AI-driven data centers require enormous amounts of power, increasing strain on an already congested grid. Regardless of Trump's policies on renewables, the sheer growth in electricity demand will necessitate more investment in both generation and transmission.

Finally, stabilization of the macro environment should improve the outlook for the electric grid in 2025. Higher interest rates and project cost inflation have been a headache for all types of large capital projects in the last few years. We should therefore see a pickup in new activity from developers.

A matter of location

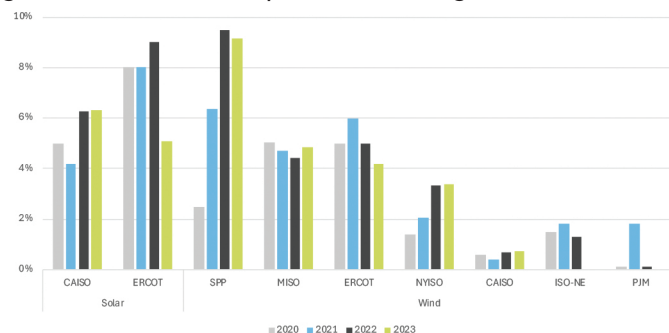
So where should we invest? Grid bottlenecks vary significantly by region. Regulated markets tend to fare slightly better than deregulated markets, as vertically integrated utilities own both generation and transmission, allowing for better coordination.

Across the deregulated markets, those that have the highest renewable energy penetration also experience the most severe grid congestion issues. These include ERCOT in Texas (wind and solar), CAISO in California (solar), and SPP, which covers states along the Northern and Central Plains (wind). These areas are prime locations for new transmission investments.

In addition to grid investments, investors can capitalize on these bottlenecks by investing in energy storage projects. Energy storage systems can absorb excess renewable energy that would otherwise be wasted in congested areas and store

it for later use. When demand peaks, this stored energy can be sold back to the grid at higher prices, thereby reducing curtailment and enhancing grid efficiency.

Figure 2. Curtailment as percent of total generation



Sources: ISO websites and annual report, UBS Asset Management, February 2025

Energy storage not only mitigates the impact of grid congestion but also provides a flexible and reliable solution to balance supply and demand. By storing surplus energy during periods of low demand and releasing it during high demand, energy storage projects help stabilize the grid, improve reliability, and support the integration of more renewable energy sources.

Conclusion

The U.S. grid is struggling to keep pace with rapid changes in the energy landscape. While renewables, electric vehicles, data centers and industrial electrifications have expanded quickly, transmission development remains slow due to permitting delays, economic misalignments, and regulatory inertia.

However, the need for new infrastructure has never been clearer. AI-driven electricity demand, regional grid disparities and shifting energy policies are creating new investment opportunities. Whether through transmission or energy storage, investors who understand the unique dynamics of power markets and regulatory reforms will be well-positioned to benefit from the grid's inevitable modernization.

¹Department of Energy, *What does it take to modernize the US electric grid?* October 2023

* Asset under management stated on gross asset values basis, reflecting values as at Sept. 30, 2024, where available.

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