Why Long-distance Transmission Matters to Energy Customers

Unlike today's highway system that links cities, states, and regions to one another through a high-speed national network, our electric transmission system remains a network of mostly regional and local transmission lines, with limited capacity to transfer power between regional grid networks. The build-out of regional and interregional lines that collectively constitute long-distance transmission has been slowed by barriers in how transmission is planned and permitted and how costs are allocated. The average of 10-12 years to approve a new long-distance line means the grid is not keeping pace with demands.

As the resource mix of electricity generation shifts to diversified, distributed, and renewable sources often located further away from demand centers, and as existing fossil fuel plants retire, these factors increase the need to move the lowest-cost sources of power and share power across grid regions, particularly during increasing extreme weather events. Transmission expansion is therefore key for resource adequacy and cost savings for customers.

Two terawatts of generation and storage projects remain stuck in interconnection queues across the nation, and 95% of these projects are renewable generation and storage. These projects are on hold due in large part to transmission congestion that prevents these projects from connecting to the grid, which means customers are seeing bottlenecks to accessing projects, as well as increased costs.

The ability to increase overall transmission capacity and remove barriers to interregional transmission that transfers power from one transmission planning region to another is crucial to:

- enable customer access to clean, lower-cost energy;
- improve reliability; and
- meet growing demand as manufacturing and the number of data centers and electricity intensive technologies increase and more sectors of the economy electrify. These new technologies include electric heat pumps, hydrogen fuel use, and direct air capture and carbon sequestration.

Addressing these needs through an expanded, modernized grid is critical to business and economic growth as well as global competition. Princeton's ZERO Lab in a 2022 report found that without a doubling of the current pace of new transmission capacity, more than 80% of the Inflation Reduction Act's (IRA's) emission reductions from new clean generation incentivized by the new law's favorable tax treatment will not be realized.

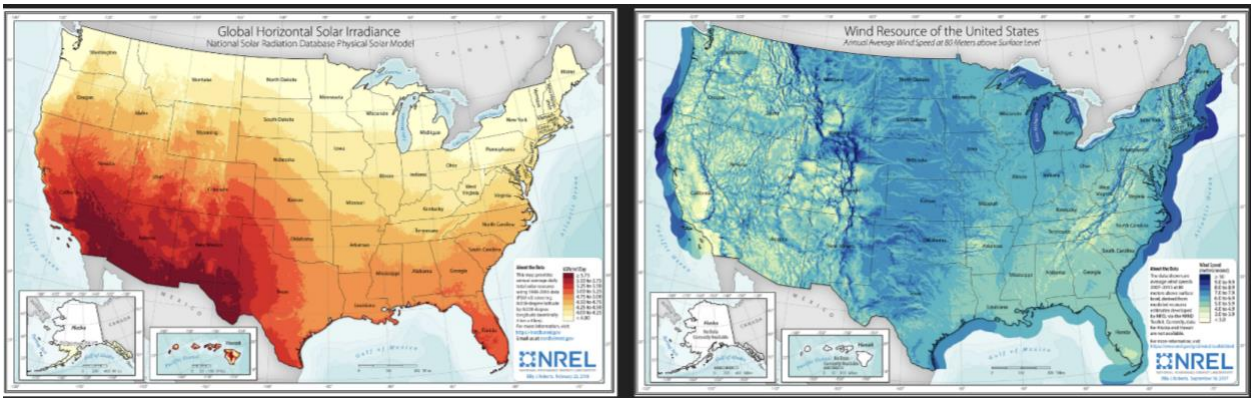
The U.S. Department of Energy's 2023 National Transmission Needs Study found that interregional transmission capacity must grow by 114% to meet a moderate load growth and high clean energy growth scenario, the "new normal" following enactment of the IRA incentives. For regional transmission under the same growth scenario, transmission capacity must increase by 64%.

> *"Expanding interregional transmission capacity enables the system to take advantage of the geographic and temporal diversity of energy resources, so that abundant production in one region can help compensate for low production in other areas, which improves the electric system's ability to produce affordable, reliable energy while increasing the operational flexibility of the grid."* **— U.S. Department of Energy's 2023 National Needs Transmission Study**

Long-distance transmission provides access to lower-cost, clean energy

A lack of ability in interconnected electric systems to reliably move or transfer power from one area to another over all transmission lines under specified system conditions, known as transfer capability, increases prices for customers and impedes low-cost clean energy development. Renewable energy is now often the lowest-cost form of energy for customers, but the strongest renewable resources often are located far from load centers and require additional transmission to serve those loads.

Resource maps of solar and wind show high resource areas are not generally co-located with demand centers



To meet both national clean energy goals as well as unlock clean energy projects for customers, transmission is the bottleneck. A 2021 report published by the Lawrence Berkeley National Laboratory estimates the United States will need about 950 gigawatts (GW) of new clean power capacity and about 225 GW of storage to achieve 80% clean electricity by 2030.

Transmission Boosts Grid Reliability

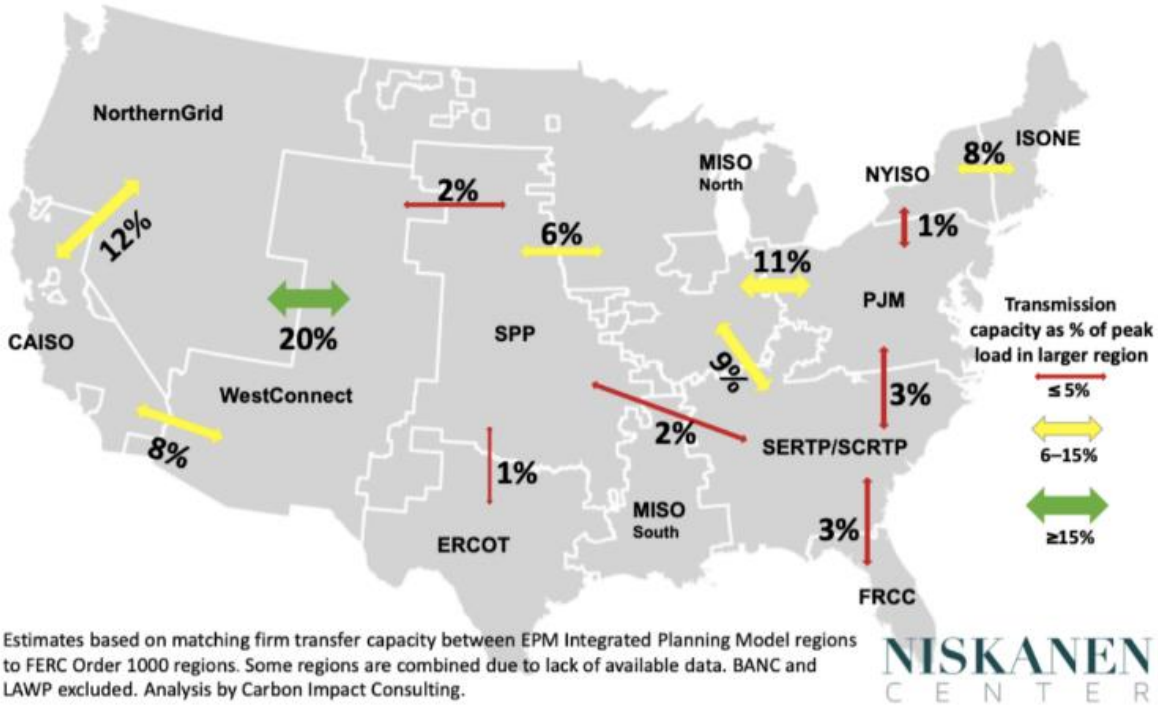
Without an expanded network of new, long-distance transmission lines, the nation's electric grid remains vulnerable to the growing severity and more frequent threat of disruptive extreme weather

events. Devastating blackouts are not just confined to summers. Winter Storm Uri in 2021 left 200 lives lost and up to $130 billion in economic losses. Winter Storm Elliott in 2022 resulted in estimated economic losses of $5.4 billion.

In the face of record-breaking high temperatures during recent summers, all resources have been needed to ensure power supply, but clean energy resources have been crucial in keeping the grid up and running. In Texas, where Austin in the summer of 2023 had 45 straight days with triple digit temperatures, renewables and storage provided up to a third of the grid's needs under the immense demand of millions of air conditioners, as coal and gas plants tripped offline in the heat.

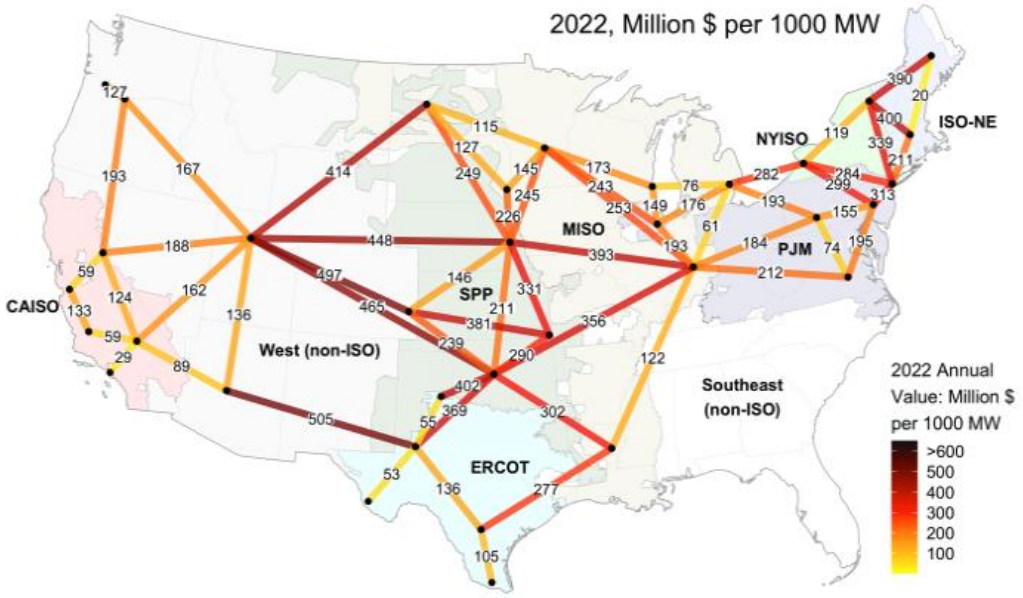
While no two transmission planning regions are alike in operation or authority, the Federal Energy Regulatory Commission's (FERC's) Order 1000 identifies 14 regional transmission planning regions. Using FERC's planning regions, analysis conducted by the Niskanen Center found most existing transmission planning regions are incapable of transferring significant amounts of power to neighboring regions should the need arise.

Existing transmission transfer capability between grid regions



Recent estimates found that improved transmission ties could reduce power outages and save customers hundreds of millions of dollars, both during regular operation and during extreme weather. The map below from the Lawrence Berkeley National Laboratory shows increased transmission would result in hundreds of millions in potential cost benefits annually in almost every region. Sharing energy resources via long-distance transmission is critical keeping the lights on during extreme weather.

Potential annual savings to customers from new interregional transmission lines

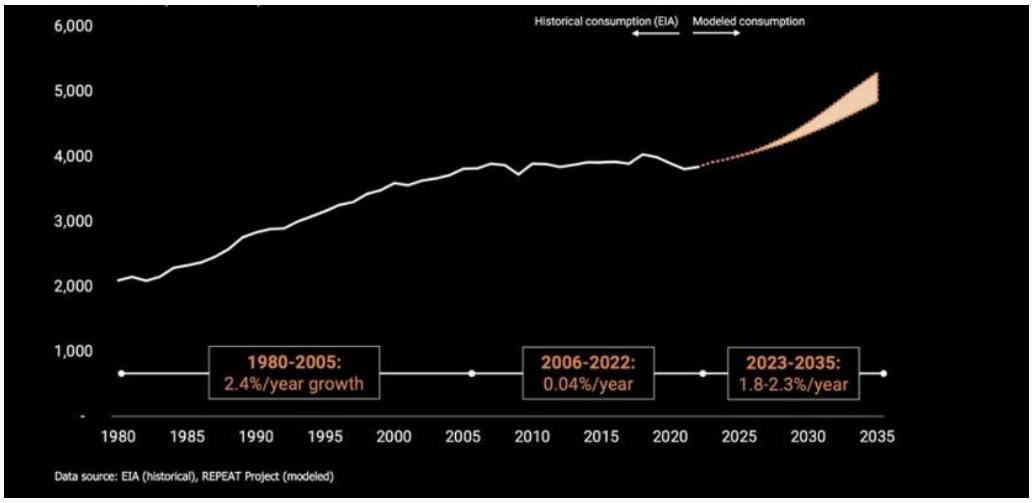


High transmission value is observed in many regions in 2022. *The annual cumulative value of a hypothetical 1000 MW transmission link is shown. These values are marginal (applying to the next unit of transmission) and based only on hourly energy price arbitrage.*

Transmission expansion is critical to growing electricity demand

While demand growth has been relatively flat for the past two decades, the U.S. Energy Information Administration predicts demand will see strong, sustained growth as certain manufacturing spurred by federal legislation increases; economic sectors like transportation, buildings, and industry electrify; computing power needed for data centers and artificial intelligence increases; and electricity-hungry technologies like hydrogen production, heat-pumps, and carbon capture and sequestration systems move into commercial production.

Total annual U.S. electricity consumption in billion kilowatt hours or terawatt hours



Electric utilities already have issued warnings about their inability to meet the new demand. The Tennessee Valley Authority (TVA) in 2023 advised companies with large data center needs to avoid imposing new load demands in its service area. Georgia Power in 2023 issued an amendment to its integrated resource plan (IRP) just a year after the plan was approved, calling for a 17-fold increase in its planned capacity.

Demand for more power is increasing, and supply is available, but the wires to connect the two do not exist at the scale customers need. Expanding our ability to exchange power between grid regions would create daily cost and reliability benefits to customers as an increasingly diverse mix of generation sources needs to connect to the grid to meet rising demand. Increased long-distance transmission would serve as an essential insurance policy during increasing extreme weather events and, like the federal interstate highway system did decades ago, would help the United States meet the needs of the future.