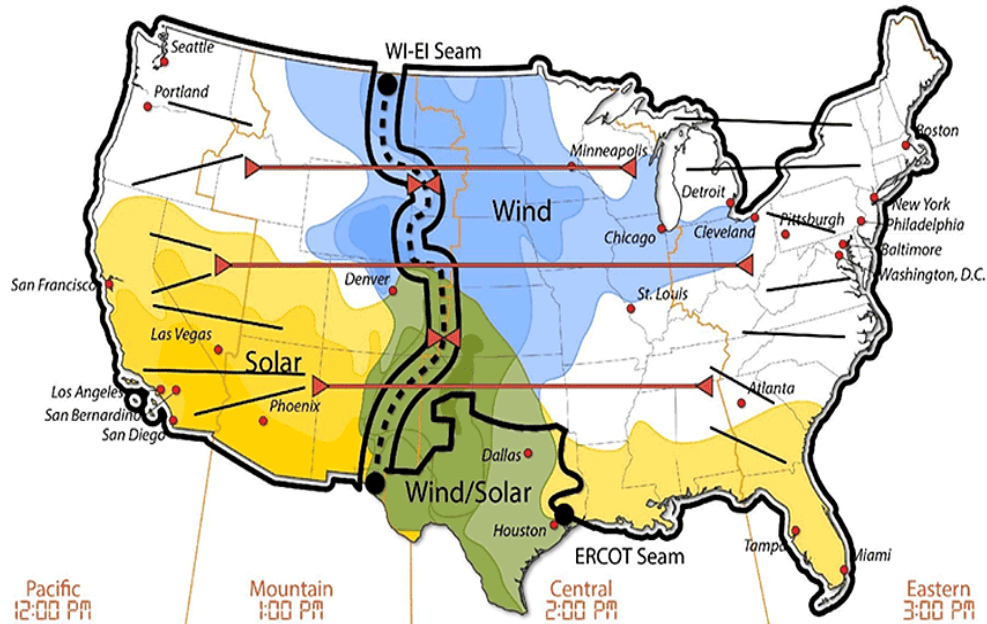


DOE study sees economic, security benefits in single U.S. grid

By Peter Behr, E&E News • July 27, 2018



The U.S. electric power “grid” grew up over nearly a century as three largely separate, synchronized grids — the Eastern and Western interconnections and the Texas system. The east and west sections were divided reasonably by the Rocky Mountains. Texas kept to itself rather than share its cheap power from lignite deposits with fellow Americans, according to

a colorful historical account. This illustration shows how HVDC transmission lines and other investments could link Eastern and Western grid networks. (From National Renewable Energy Laboratory)

Now a new analysis led by the National Renewable Energy Laboratory pointedly asks why the three-way split still makes sense. The conclusion: It doesn't.

The [NREL seam study](#), released at the TransGrid-X 2030 Symposium in Ames, Iowa, argues that connecting the separate grids into a single network would deliver significantly cheaper and cleaner electricity.

In the most ambitious of NREL's scenarios, an overlay of high-voltage direct-current (HVDC) lines across much of the U.S. would allow electric power to be directed from the most economic generation sites to population centers. Many of the long-haul lines could be built alongside interstate highway system corridors.

DC lines connecting solar power generation in the sun-rich southwest U.S., or the prime wind power locations in the Great Plains, with distant customers would allow power to be steered across time zones to maximum advantage. Surplus wind power from central and offshore installations after sunset could be sent west to Los Angeles. Afternoon Sun Belt power could be sent to Chicago, advocates say.

“The weather is becoming more important because of its impact on supply and demand,” said Aaron Bloom, group manager of NREL's Grid Systems Analysis Group, lead presenter of the lab study at yesterday's symposium. A more interconnected grid could offset the harm to power generation from extended drought or flooding and make power more available when extreme weather causes customer power demand to spike.

HVDC lines can have advantages in recovering from large-scale power blackouts, depending on their configuration, noted Andrew Phillips, vice president for transmission and distribution for the Electric Power Research Institute. *“They aren't part of the synchronized grid and can be quickly switched on and off.”*

“We can do thousand-mile lines with a massive amount of controllability,” Bloom said of HVDC circuits. “The term I’m using for it is the idea of a transmission renaissance. What if we build transmission in the U.S. as China is doing now?” he added.

Big transmission: The TransGrid study, with extensive computer modeling, lays out several power line construction scenarios of different magnitudes, assuming no policy changes in one case and a rising price on power plant carbon emissions for the other.

In the most ambitious scenario, three large HVDC lines are built from the West Coast to the Mississippi River, connected in California, with a spur running into Florida. In the constant policy case, this option requires \$14 billion of power line investment over 15 years in a current dollar calculation. **Because wind generation rises, power plant fuel charges drop nearly \$10 billion, and that and other operating savings create a payback in less than the 15 years.**

With a rising carbon price, the amount of wind energy is much higher, and the generation investment is, as well. But with larger operating savings, customers receive \$2.52 for every \$1 invested, the study concludes. Former Federal Energy Regulatory Commission Chairman James Hoecker, who spoke at the Ames symposium, said that *“this work lends enormous credibility to the idea of ‘big transmission’ even at a time when new technologies and security concerns have policymakers looking to efficient distributed energy solutions, as well.”* Hoecker, Executive Director of the Wires organization lobbying for transmission expansion, noted there have been other high-profile studies like NREL’s ([Climatewire](#), Jan. 3, 2012). He stated that they have led nowhere because of financial, regulatory and political obstacles.

Suggestions for a bigger transmission grid face opposition from fossil fuel industry advocates, environmental groups opposed to power line projects, and utilities and generators that did not want to face competition from new electricity sources invading their turf over new power lines. Now, the expansion of affordable rooftop solar and microgrids makes an argument for shrinking grid connections, not expanding them.

“The reality is, there are very vocal stakeholders who do not want to see any more transmission. Some generators don’t like it because it creates more competition. There are incumbent utilities that have local power plants that are high cost and should be retired, but we need them in the absence of transmission. There are also local renewable power interests who don’t like transmission because it brings in lower-cost renewables,” Johannes Pfeifenberger, principal with the Brattle Group consulting firm, said in 2015 ([Energywire](#), April 24, 2015).

And today, the Trump White House and EPA shun energy strategies with climate goals, backed by conservative Republicans in Congress.

“I’ve been down this road before. There are lots of obstacles,” Hoecker said. *“NREL looks at this and says, ‘Clean energy.’ Others are going to say, ‘That means it’s bad for coal or gas.’”* But those counterarguments shouldn’t erase the benefits of a stronger grid for economic security and national security, he said. Hoecker said he hoped the new NREL study would provide economic and security arguments on top of the climate policy benefits.

“This study should persuade both pro-market and environmentally motivated policymakers to work to overcome those barriers in light of the tremendous benefits for consumers, the North American economy and national security that major grid investment will produce over the coming decades.”

Complete NREL Study available <https://www.nrel.gov/analysis/seams.html>