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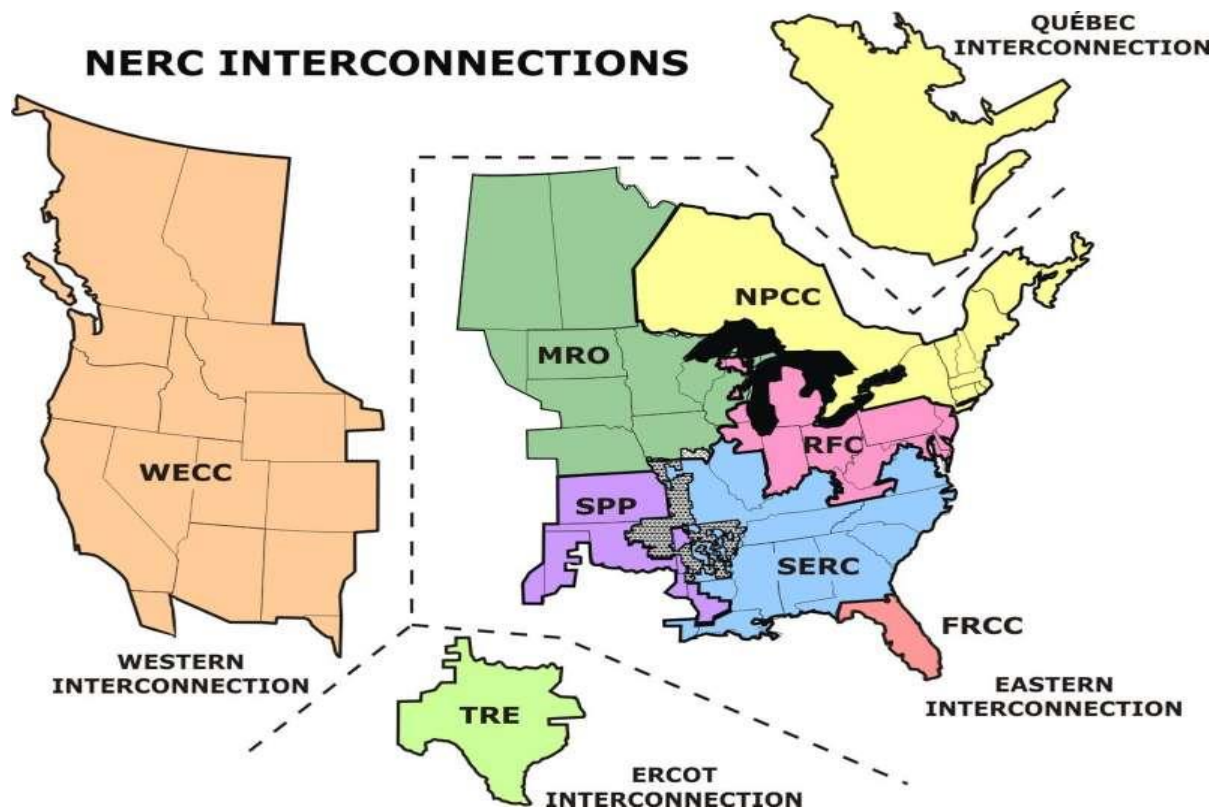
A national US power grid would make electricity cheaper and cleaner David Roberts

Vox, David Roberts, 20 June 2020

Electricity is the fuel of the future. And as more and more of American life is electrified — transportation and buildings are already on their way — the electricity grid will face greater demands and will need to evolve to meet them.

One branch of that evolution is smaller. “Microgrids” are small grids that connect a college campus, a business, or even a single house, allowing it to act as a semi-independent island within the larger grid. Microgrids are helping to support the growth of distributed energy, with power generation, storage, and management taking place on the customer side of the power meter.

But the other branch, equally important, is bigger. The US does not actually have a national grid. Our grid is instead split into three regions — the western interconnection, the eastern interconnection, and, uh, Texas — that largely operate independently and exchange very little power.



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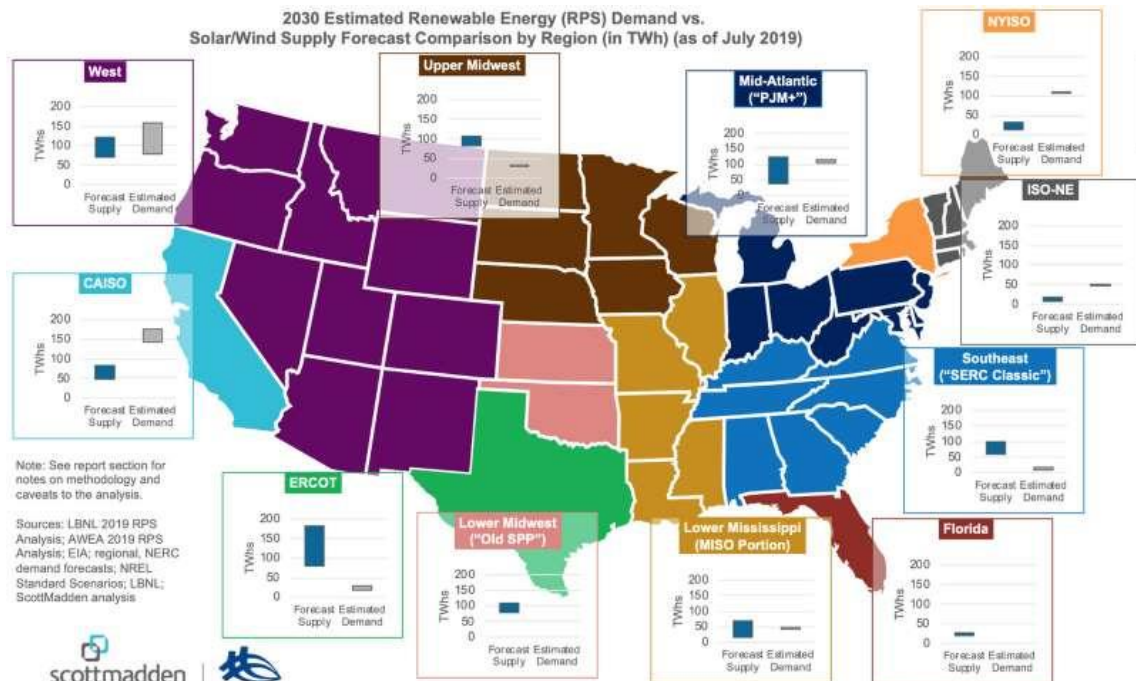
Power nerds have known for years that this is barrier preventing all sorts of efficiencies. Earlier this week, an effort launched to finally deal with it: the Macro Grid Initiative, which “seeks to expand and upgrade the nation’s transmission network.” It is a collaborative project by the American Council on Renewable Energy, Americans for a Clean Energy Grid, the Advanced Power Alliance, and the Clean Grid Alliance.

The initiative is a welcome development. This idea of a national grid overdue for some well-funded support. Rather than get into the policies and regulatory changes necessary to accomplish this goal — which are many, complex, and lamentably boring — I’m going to briefly cover the top five reasons why it’s a good idea. Here’s why the US should, at long last, build a national grid.

1. It will unlock renewable energy potential

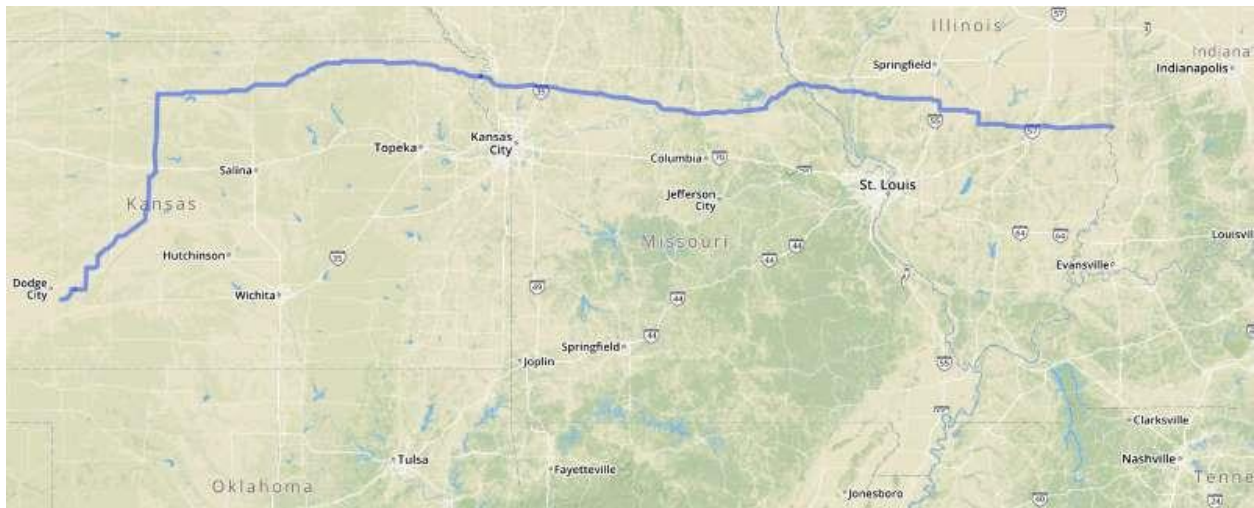
The areas of the US with the most renewable energy potential are not necessarily the ones that *need* the most energy. A report from the Wind Energy Association found that the 15 states between the Rocky Mountains and the Mississippi River — Montana, Wyoming, Colorado, New Mexico, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, Arkansas, and Louisiana — account for 87 of the nation’s total wind energy potential and 56 percent of its utility-scale solar potential, but are only projected to account for 30 percent of the nation’s energy demand in 2050.

This map, from a [report by energy consultancy Scott Madden](#), shows the estimated 2030 balance of power supply and demand for each region of the country. As you can see, some regions (notably the Upper Midwest and Texas) will be producing substantially more than they consume, while others (notably in the West and Northeast) will consume much more than they produce.



The way to balance this out — to make sure that every region is producing as much renewable energy as possible and that the energy is put to good use — is to connect these regions with high-voltage transmission lines. The more each region can import and export electricity, the more it can balance its own fluctuations in supply and demand with its neighbors' and maximize the use of renewable energy.

One example: the proposed 780-mile Grain Belt Express would carry solar and wind power from Kansas to Missouri and Illinois. It is expected to carry around 4 gigawatts of low-cost renewable energy (enough to power 1.6 million homes a year), unlock \$7 billion worth of new renewable energy projects, and relieve congestion on both ends of the line.



© Grain Belt Express The route of the proposed Grain Belt Express high-voltage direct-current (HVDC) transmission line.

2. It will reduce greenhouse gas emissions

Solar and wind energy are variable; they come and go with the weather. A grid with lots of wind and solar power needs ways of smoothing out the fluctuations and filling the gaps. Energy storage, including batteries, can provide some of that flexibility, but not enough.

Transmission is a different story. In 2016, Chris Clack, Alexander McDonald, and colleagues modeled the US energy system out to 2030 at a high degree of resolution. The results, published in *Nature Climate Change*, show that, using only existing technologies and without any additional energy storage, US power sector emissions can be reduced by up to 80 percent from 1990 levels by 2030. And this can be accomplished “without an increase in the levelized cost of electricity.”

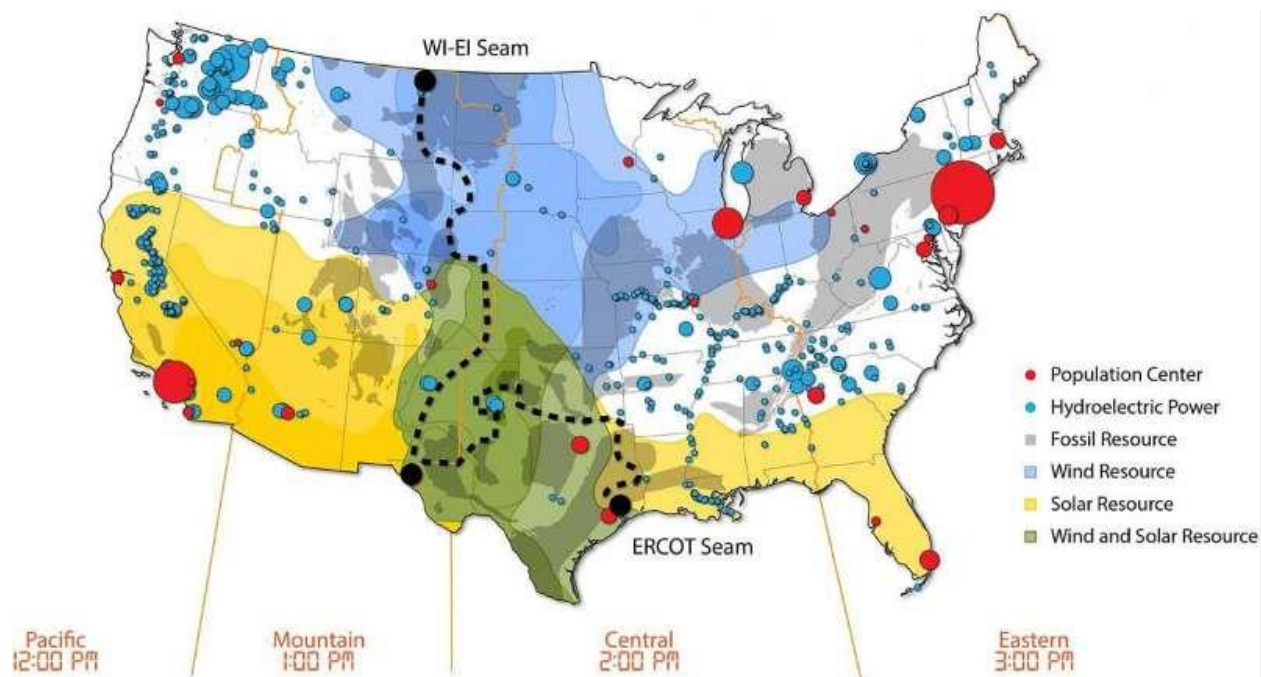
How is this possible? “This reduction in carbon emissions is achieved by moving away from a regionally divided electricity sector to a national system enabled by high-voltage direct-current transmission.”

3. It will save consumers money

Clack et al. also found that weaving the regionally divided power system into a single national system would save consumers around \$47.2 billion a year through increased efficiency and cheaper renewable energy.

In 2018, a team assembled by the National Renewable Energy Laboratory (NREL) published the Interconnections Seam Study, a close analysis of the costs and benefits of stitching together America's fragmented grid. It found that for every \$1 invested, ratepayers would see more than \$2.50 in benefits. (If you're curious, I wrote a longer post on the Seam Study.)

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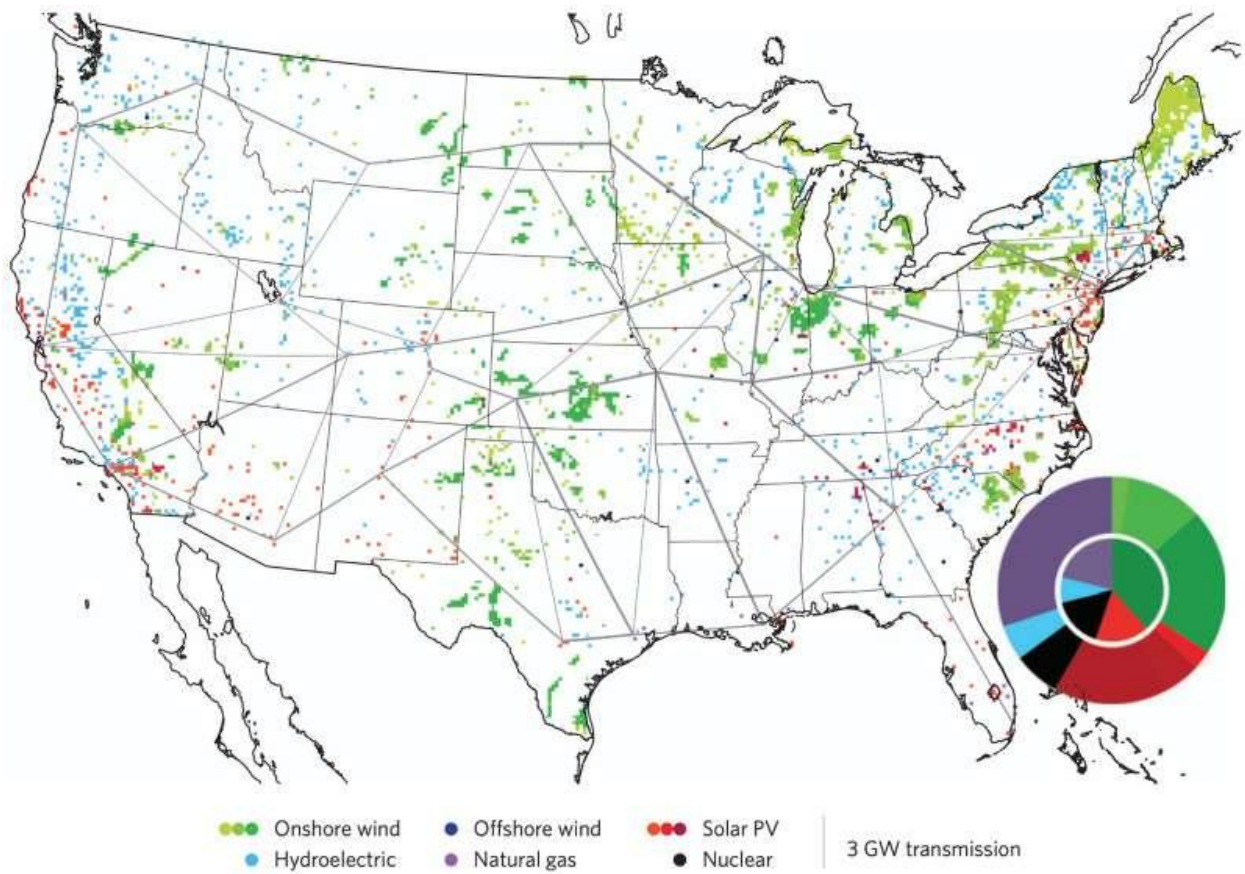


© NREL Renewable resources, power plants, and population centers.

4. It will make the grid more reliable

There's a lot of discussion about "resilience" in the power sector these days. As the Scott Madden report shows, various regions of the country can, during severe weather events, face fuel shortages, transmission congestion, and even rolling blackouts. If nothing else is done, the coming retirement of many coal, oil, and natural gas plants will exacerbate these vulnerabilities.

The best way to build resiliency against these events, which are increasing in frequency thanks to climate change, is to connect the regions of the country into a single national grid, so that regions facing difficulty can draw power from neighbors who aren't.



© Nature Climate Change A cost-optimized single electrical power system for the contiguous US.

This already works on a smaller scale. During the prolonged cold temperatures of 2017's "bomb cyclone," the ability of eastern regions to exchange energy prevented blackouts and kept prices under control.

5. It would create jobs

A Green New Deal-style investment into a national grid would create thousands of construction and maintenance jobs. Given that every region's needs and challenges are idiosyncratic, and the process of building lines is complex and egregiously slow (averaging around 10 years), it's impossible to estimate how many. But transmission development jobs are high-quality union jobs, available in every part of the country.

So, there you have it: if you want cleaner, more efficient, more reliable, cheaper electricity, join me in three cheers for a US national grid!