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Planned AI Centers Strain Energy Grid

By Jennifer Hiller

Data centers are desperate to connect to the U.S. electric grid. What remains fuzzy is how many will ultimately be built and how much electricity they will require.

U.S. utilities are reporting a sharp upswing in interconnection requests from prospective data centers that will need an extraordinary amount of electricity to power America's artificial-intelligence race.

In some cases, the collective requests equal or surpass—by multiples—the existing electricity demand in a utility's entire service region.

Take American Electric Power, a big utility that serves 11 states, and Sempra's Texas utility Oncor. Combined, they have received requests to connect projects, many of them data centers, to the grid requiring almost 400 gigawatts of electricity.

That is an astronomical amount that represents more than half the peak electricity demand in the Lower 48 states on two hot days in July.

Part of the problem is the electricity needs of the same potential projects are being double, triple or quadruple counted by different utilities. Data-center developers and tech companies are peppering

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utilities around the country with requests for service while scouting locations where they can quickly construct massive data centers and connect to the grid.

"A lot of it is real, but how much?" asked Tom Falcone, president of the Large Public Power Council, a trade association for the nation's largest not-for-profit electric utilities.

Utilities see a massive opportunity in AI but realize that many proposed projects will never be built—earning them the moniker "phantom data centers."

Utilities don't want to run the risk of building too many power plants or transmission lines. If the AI hype is overblown or the tech industry doesn't ultimately need as much electricity as projected, other customers would get stuck with the infrastructure costs.

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Electricity prices across the country have increased 5.5% in the past year, outpacing inflation, according to Labor Department data.

U.S. electricity demand was flat for two decades until around 2020 but is now rising across the country, growing about 2% a year nationally, according to the U.S. Energy Information Administration.

The AI frenzy is largely responsible: A search on a generative AI platform like ChatGPT can use at least 10 times the amount of energy as a google search.

Demand is rising at an even faster pace in places like Northern Virginia and Texas with large data centers and factory growth.

In Texas, Oncor has requests from large customers such as data centers or industrial facilities in its interconnection queue by the end of June, up 30% from the end of March.

Its current system peak, or the power consumption at the moment customers require the most electricity, is 31 gigawatts.

The requests in the queue from data centers require about 186 gigawatts, while industrial firms have requested about 19 gigawatts.

The transmission-and-distribution utility serves a swath of the Dallas-Fort Worth area, a major market for data centers, and much of the West Texas oil field, where companies have been electrifying operations.

Historically, the average data-center interconnection request at Oncor required less than 100 megawatts of electricity.

That is now closer to 700 megawatts, with some facilities requiring more, said Geoff Bailey, Oncor's vice president of corporate strategy.

American Electric Power, meanwhile, has a 37-gigawatt system.

Already, new customers requiring about 24 gigawatts of electricity have signed agreements to receive service by the end of the decade. That growth is equivalent to serving at least six million new homes.

AEP executives have called it "transformational."

But AEP has an additional 190 gigawatts of potential demand in line—roughly five times its current system size, and the equivalent power use of at least 48 million homes.

"We know not all of that is going to come online, but even a fraction of that is significant," Trevor Mihalik, AEP's chief financial officer, told analysts on the company's recent earnings call.

CenterPoint Energy, the area, has seen a huge spike in interest from data centers, despite criticism about its storm response.

Hurricane Beryl last year knocked out power to much of the area because of downed trees in neighborhoods, but CenterPoint's high-voltage transmission system—the part of the grid of key interest to data-center developers—was unscathed.

"What we saw with Hurricane Beryl was that we had no direct outages related to the transmission system and our substations, which is what feeds these data centers," Chief Executive Officer Jason Wells said. "And so the data-center community, ironically, felt more comfortable pursuing investment here, and our interconnection timelines are some of the fastest in the country."

Electricity use on CenterPoint's Houston-area system is currently a little more than 22 gigawatts, one of the highest for a U.S. metro area because of the combination of its industrial base, medical center and population.

It has interconnection requests for about 53 gigawatts of power, roughly 25 gigawatts of which are from data centers.

A year ago, data centers were seeking just one gigawatt of power, said Wells, who estimates about 20% of the requested power will ultimately be delivered.

Utilities across the country are giving similar odds to data-center prospects.

The developers are typically considering several possible construction sites because grid connections can take years and they can run into unpredictable roadblocks with permits or zoning.

"These hyperscalers and data-center developers are themselves trying to figure out where they have a more streamlined path to market," said Akshat Kasliwal, managing consultant at PA Consulting. "There's just so much uncertainty around how long it will take for them to be able to energize and interconnect."