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Bitcoin in the Permian? Data centers test Texas grid.

By Shelby Webb | 06/03/2024 06:55 AM EDT

The oil-rich region's transformation shows how surging electricity demand is straining the nation's power system.



Illustration by Claudine Hellmuth/POLITICO (source images via iStock)

The nation's most prolific oil region is becoming a hub for industries that could be a major strain on the Texas electrical grid: bitcoin mining and data centers.

The migration of those technologies into the Permian Basin is occurring as the oil and gas industry is also trying to electrify much of its equipment to meet net-zero goals, setting up a clash that could test the region's already overloaded power system.

"It's sort of stunning how much is coming online, and not from oil and gas," said Cyrus Reed, a member of a state committee studying electricity demand and conservation director of the Sierra Club's Lone Star chapter. "It's almost overwhelming."

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The situation in Texas is emblematic not only of how surging electricity demand is changing the grid and creating potential connection backlogs nationally, but underscores how many regions long associated with oil and gas production are set to be transformed by new technologies.

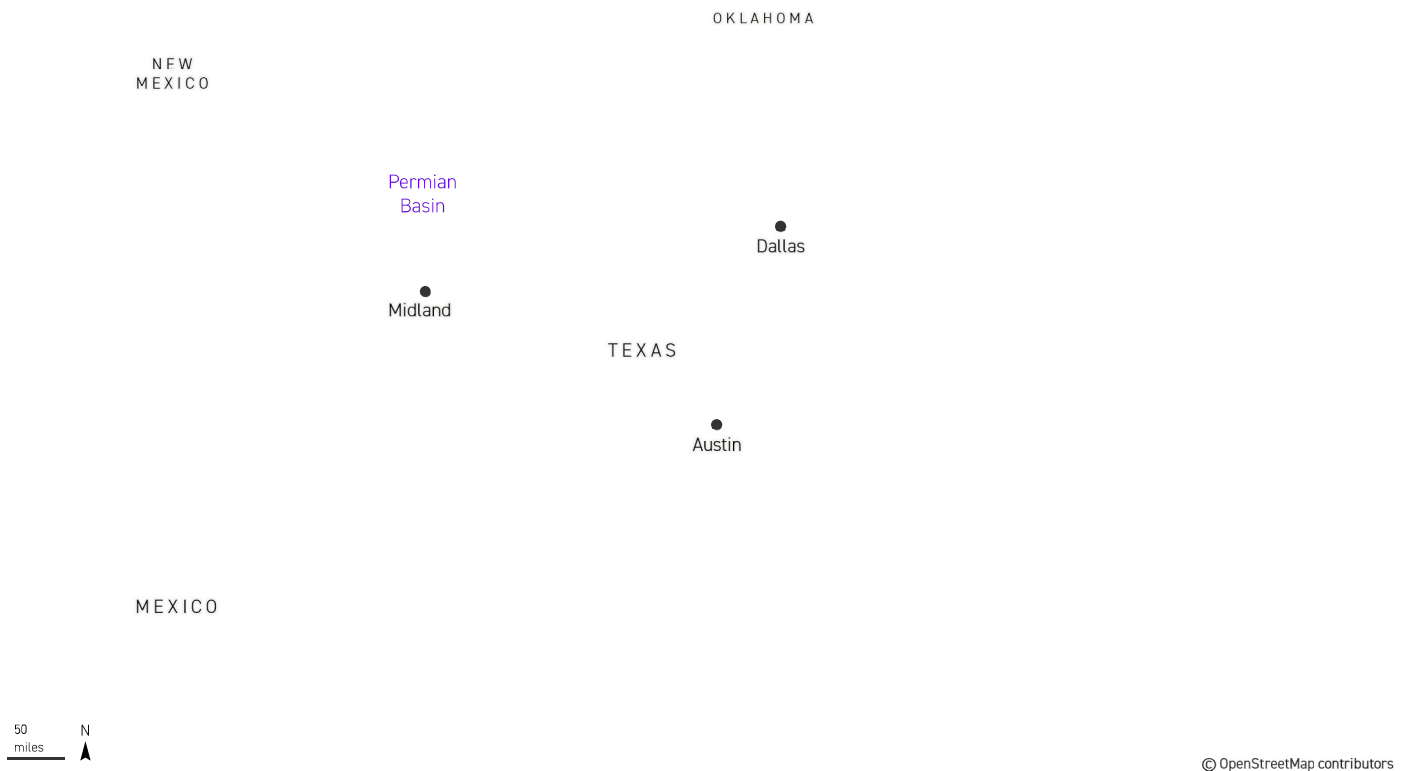
The Electric Reliability Council of Texas, the state's main grid operator, estimates electricity demand from industries in the Permian region will more than double by 2030 compared to 2021, with companies consuming 23,959 megawatts at peak demand times — more power than the entire state of Tennessee generates during similar periods.

By 2030, electricity demand from emerging technologies could eclipse that of the oil and gas industry in the region. The majority of that demand — 58 percent — is expected to come from cryptomining operations, according to ERCOT. Currently, almost all of the industrial electricity demand in the Permian comes from oil and gas.

The shift is raising concerns about how the Permian region will be able to keep up with the electricity surge, especially in terms of adding new transmission lines.

Demand for power in Texas' Permian Basin is poised to explode in coming years

Permian Basin boundary



Source: [Bureau of Economic Geology](#)
Claudine Hellmuth/POLITICO

Todd Staples, president of the Texas Oil and Gas Association, said a lack of transmission is already a problem.

“That infrastructure is not keeping up and the need to electrify these operations has [been an] ongoing issue since I started with TXOGA almost 10 years ago,” he said. “Growth is going to continue, and companies need reliability with their power supplies.”

To address the looming grid crunch, Texas legislators in 2023 ordered a study of transmission and generation needs in the Permian. A draft of the study is expected to be published in June by ERCOT.

Among the issues being examined is how much electrified oil and gas infrastructure will be able to connect to the grid — especially electric fracking rigs that each use about as much power as a small town.

Members of the regional planning committee studying the Permian — which include oil and gas officials, technology companies, ERCOT forecasters, and others — are also examining transmission needs, but there are numerous challenges to building more infrastructure, including adequate funding.

ERCOT declined to make someone available for an interview, and instead referred to an April press release about planning for growth on the Texas grid as a whole.

“As a result of Texas’ continued strong economic growth, new load is being added to the ERCOT system faster and in greater amounts than ever before,” ERCOT President and CEO Pablo Vegas said in the release. “As we develop and implement the tools provided by the prior two legislatures, ERCOT is positioned to better plan for and meet the needs of our incredibly fast-growing state.”

Utility giant Oncor — which is responsible for building transmission lines in the region — said in a statement it has been sharing independent demand growth studies with ERCOT, talking to industries about their power needs and starting to build power line projects.

“Oncor will continue to do its part to support efforts to identify growth needs, incorporate those into long-term infrastructure planning and ensure Texas’ electric delivery infrastructure keeps pace with the needs of industry today and in the years to come,” said Oncor spokesperson Connie Piloto.

A win for gas power plants?

Other industries expected to stress the Permian grid include “green” hydrogen, which is projected to constitute 22 percent of non-oil and gas electricity demand by 2030, according to ERCOT. Crypto mines are forecast to require even more power, reaching more than 6,957 MW of demand by decade’s end.

Ryan Luther, director of energy transition research with Enverus, said his company has tracked a shift of cryptomining operations to West Texas from China, which banned the technology in 2021. The migration is being driven partly by a search for cheap natural gas for power.

“They’re trying to find stranded gas that can’t get to market,” he said of crypto companies.

The reason many are heading to the Permian is because producers are looking for ways to cut emissions by no longer venting or flaring excess natural gas left over from oil production and instead offering the fuel for electricity. Oil and gas developers have been pushed to change their practices partly by EPA, which has finalized several rules in recent months to curb methane emissions.

Among those is a fee of \$900 for every ton of methane that oil and gas operators vent or flare during nonemergencies. The fee is set to rise to \$1,500 per ton in 2026.

Using excess gas for power production is one of the few alternatives to flaring, especially since limited pipelines in the Permian are available to take excess fuel to larger markets like the Gulf Coast.

“For the producers in the Permian, they would rather see in-basin demand for their gas grow than have to build more gas pipelines. Their primary objective is getting oil to market — gas is not as much in the value mix,” said Luther.

Kinder Morgan Executive Chair Richard Kinder, for example, told analysts on the company’s first-quarter earnings call that major technology companies with artificial intelligence and data centers are going to want to locate as close to fuel sources as possible, including natural gas.

“The power needed for AI and the massive data centers being built today and planned for the near future require affordable electricity that is available without interruption, 24 hours a day, 365 days a year,” he said. “And I think it will tend to be located near reliable electric generation because if you’re a Microsoft or a Google, you want that power as close to your facility as possible.”

Still, using gas for power instead of venting or flaring it could be controversial among environmental groups, said Doug Lewin, founder and president of Stoic Energy consulting. “A lot of folks won’t like it, but venting and flaring is much worse [for emissions] than using [gas] for power.”

The Permian region is also a hub for wind, solar and batteries, helping make Texas the renewable capital of the United States. The region can produce 11,747 MW of power at peak times from wind and solar alone, enough to power New York City more than twice over, according to ERCOT.

Much of the available power is trapped in West Texas because of transmission constraints, providing another incentive for energy-hungry companies to move into the region.

"I think if you're an AI data center looking for mostly clean energy with some backup gas nearby, I can't imagine too many better places in the country to go than the Permian," Lewin said. "You can be 70 to 80 percent carbon-free and use gas the other times."

Lewin said he was more skeptical of how much demand from cryptomining could actually come online, a view echoed by Lee Bratcher, president of the Texas Blockchain Council, an industry group.

While there's nearly 7,000 MW of demand from crypto miners' applications in the Permian alone, some of those projects won't come to fruition, Bratcher said.

"A lot of those estimates are significant overestimates, I think ERCOT knows that, but they have to put it in there because there are applications in the queue," Bratcher said.

There's also not enough "investment dollars to build that much infrastructure, so we anticipate a pretty steady growth of about 300 MW per quarter of bitcoin mining that will level off to much lower than that after a year or two. We never anticipate more than 5,000 MW of bitcoin mining in Texas," Bratcher said. That level of bitcoin mining could keep oil and gas as the dominant electricity user in the region.

Bratcher added that bitcoin has growth limits because of its economics, which follow the principle that the more miners come online, the less profitable each unit becomes.

Electric oil

Even if bitcoin doesn't grow as much as expected, the Permian grid is facing major strain because of oil and gas companies electrifying their fleets to help meet emissions goals.

Exxon Mobil, for example, has pledged to achieve net-zero emissions from its Permian operations by 2030, largely by electrifying equipment that currently runs on fossil fuels. Chevron has pledged to reach net zero in its global oil and gas production by 2050.

Occidental Petroleum announced earlier this year it contracted with Axis Energy Services to deploy its first fully electric well service rig, which performs frequent maintenance on equipment. The company's EPIC rig needs a maximum of about 1.25 MW to run, enough electricity to power about 250 homes on a hot summer day.

Clay Holland, senior vice president of operations for Axis, said the advantages of going electric reach beyond oil and gas companies' environmental, social and governance commitments and marketing. The older well service rigs, which run by burning diesel, had "ancient" braking systems and were prone to equipment failures.

There's also cost savings. Buying and hauling 150 gallons of diesel a day to run the traditional well service rigs is costly, especially when multiplied across rigs in a huge geographic area.

"It does take more investment for EPIC rigs on a day-rate basis, but even with higher day rate, the efficiency gained in less maintenance, less safety-related downtime — this has significant cost savings," Holland said. "You can follow the dollar and figure out why it's advantageous; what we have seen in the industry is if it doesn't make dollars and cents, people will run from it."

Other electrified machines use much greater quantities of power than service rigs. Electric fracking rigs, which blast fluid deep below the earth's surface to crack rocks in order to squeeze out more oil and gas, can use more than 25 MW — enough electricity to power more than 6,250 homes at peak demand times in Texas.

But service rigs and other large pieces of equipment in the Permian are not stationary, making it more difficult to site transmission projects.

Connecting equipment like electric frack rigs to the grid and tapping into West Texas' abundant renewable energy supply could prove almost impossible, according to Luther. That's largely because the rigs move from well to well frequently, once they finish fracking in a given spot.

"In the power space, you're not going to build transmission unless you see a 50-year lifespan on that line," Luther said. "Electric fracking fleets [are] not going to be connected because they're going to move around."

Bratcher of the Texas Blockchain Council said miners have been putting down collateral to have more transmission built in the Permian, adding that he doesn't see the electricity demand as a competition between crypto and oil and gas.

"The oil and gas industry has been great for Texas and has been for a long time," Bratcher said. "Bitcoin mining is a new industry that will create rural jobs, like oil and gas has done for decades, and in a unique way."

There isn't a road map for a massive infrastructure build-out of transmission and new power plants in the region in such a short period of time, however.

"All this is kind of new because not many people have done this yet," said Lewin.

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