BUSINESS

Crypto boom a boon for electricity providers, but questionable for climate

Crypto mining centers, which consume huge amounts of electricity, are popping up in Minnesota and North Dakota. Critics say they enhance fossil fuel power production.

By Mike Hughlett (https://www.startribune.com/mike-hughlett/6370445/) Star Tribune

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Billions of dollars are flowing into digital currency. And the energy-intensive operations needed to create and store bitcoin have lit up power demand, a potential boon to the region's slow-growth utility companies.

Electricity-rich North Dakota aims to become a crypto hub. Even municipal utilities in Brainerd and Glencoe, Minn., are tapping into bitcoin production.

A new cryptocurrency operation in Jamestown, N.D. — served by Minnesota's Otter Tail Power — will easily draw twice as much electricity as the entire city. The crypto center immediately became Otter Tail's second largest customer, and it may eventually double in size.

"We are continually contacted about adding new ones," said Tim Rogelstad, president of Fergus Falls-based Otter Tail. "The question we are wrestling with is, 'What can we accommodate?'"

The fast expansion in cryptocurrency, though, comes with a catch.

If utilities don't adequately manage crypto's voracious electricity appetite, they risk saddling ratepayers with higher costs. And the U.S. electric grid — like much of the world's — is still anchored in climate-eroding fossil fuels.

That means crypto's rapid expansion is exacerbating climate change, the industry's critics say. "The question is, to what extent?" said Alex de Vries, an economist and data scientist in the Netherlands.

On his Digiconomist website, de Vries estimates bitcoin's carbon footprint is equal to that of the Czech Republic. Put in financial terms, one bitcoin transaction emits as much carbon dioxide as 2.7 million Visa credit card settlements.

The crypto mining industry — companies that produce bitcoin and host cryptocurrency operations— says it's increasingly seeking out wind and solar power.

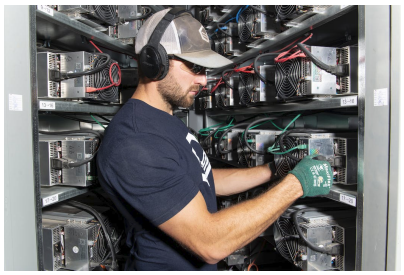
"It is very rare when there is no generation from renewables," said Dave Perrill, CEO of Eden Prairie-based Compute North, which hosts crypto mining centers, including in Nebraska and Texas. "Environmental and social factors are very important to our customers, and they are very important to us."

Still, crypto miners can't bank on inherently variable wind or solar power: Their computers churn day and night in a relentless competition to mint digital currency.

27 trillion piece puzzle

Crypto mining companies deploy an arsenal of computers to solve a math problem — with a payoff in cryptocurrency as the reward.

"It's like a puzzle with 27 trillion pieces and one is missing," said Vivian Fang, an



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TERRY A. RATZLAFF, COMPUTE NORTH

Compute North, based in Eden Prairie, is trying to find ways to power more of its cryptocurrency centers, like the one in Kearney, Neb., with more renewable energy, its CEO said.

TERRY A. RATZLAFF, COMPUTE NORTH

One of the crypto mining centers hosted by Eden Prairie-based Compute North is in Kearney, Neb. These centers need huge

accounting professor at the University of Minnesota's Carlson School of Management.

There are thousands of cryptocurrencies, but the most widely produced is bitcoin.

Their proponents argue that cryptocurrencies can protect wealth from the vicissitudes of inflation through a decentralized financial system — one free of intervention from central banks and commercial banks.

Speculators in cryptocurrency have minted fortunes. But its use in everyday commerce is still limited. To skeptics, cryptocurrency is a financial medium for internet criminals, and at worst a sort of Ponzi scheme.

Whatever the view, the main method of crypto mining — called "proof of work" — consumes enormous amounts of electricity.

"Proof of work is a race of computing power," Fang said. The more hardware, the greater the chance a crypto miner will hit a payday.

Electricity is by far the largest operating cost for crypto mining companies. And the sluggish electricity industry — its sales long crimped by energy conservation — could use the business.

When Dallas-based Applied Blockchain opened the crypto mining operation in Jamestown earlier this year, it was topped only by Enbridge, which needs power to push Canadian oil through it Minnesota pipelines, as Otter Tail's largest customer.

The crypto electricity boom is moving quickly. Otter Tail, a publicly traded company with 133,000 customers in Minnesota and the Dakotas, first met with Applied Blockchain last July, Rogelstad said. They made a deal in August.

"We are used to dealing in months and years, and they are used to dealing in seconds and minutes," he said.

The Applied Blockchain crypto center will use 100 megawatts of power almost continuously, or about 10 % of Otter Tail's peak electricity demand. The utility and Applied are talking about doubling that power draw.

For smaller utilities, crypto's impact can be even greater.

Two crypto mining operations, totaling 70 megawatts, are planned for Brainerd; together they would almost double the peak electricity demand for the city's municipal utility. A smaller crypto project in Glencoe would roughly double electricity use by its municipal utility.

Minnesota entities want to share in crypto benefit

Minnesota's electricity markets generally aren't as compelling as other states', said Perrill of Compute North, which sets up crypto power deals. "The power costs are just way too high."

North Dakota's economics are better, and the state is courting crypto miners, including through tax breaks on data center equipment. In January, the state announced a $1.9 billion crypto center near Williston that would consume up to 700 megawatts of electricity.

North Dakota is one of the nation's top wind power producers. But its electricity system is grounded in five large coal-fired power plants. Otter Tail owns portions of two of them, though it's divesting its stake in one and adding significant amounts of renewable power.

Grand Forks-based Minnkota Power Cooperative, which serves northwestern Minnesota, is rooted in coal. It generates electricity for a 100-megawatt crypto mining center that opened in Grand Forks late last year.

Minnkota and other North Dakota electricity producers have plans to outfit their coal plants with technology to "capture" carbon emissions. But the technology is expensive and largely unproven at coal plants.

Crypto's use of natural gas and coal — respectively the leading U.S. fuels for electricity generation — led Ben Jones, an economics professor at the University of New Mexico, to study crypto mining's affects on carbon emissions and other pollution.

Jones and two other researchers found that $1 of bitcoin value created in 2018 was responsible for 49 cents in climate and health damages in the U.S. and 37 cents in China, the world's crypto mining capital until recently.

"Bitcoin is moving to decarbonization the same we are all moving — slowly," Jones said.

Jones and de Vries said the crypto industry effectively stepped back from renewables after it was banned last year in hydro-power rich China. The United States is now the world's bitcoin mining leader, followed by coal-heavy Kazakhstan.

After China booted crypto, renewable energy's share of bitcoin mining fell from around 41% in 2020 to 25% last August, said a recent article co-authored by de Vries in the scientific journal Joule.

The Bitcoin Mining Council, a trade group, disputes such numbers. In a survey of its members, it concluded that sustainable energy accounted for nearly 60% of bitcoin production in 2021's fourth quarter.

There's another method of crypto mining called "proof of stake" that does not depend on raw computational power — therefore consuming far less electricity — but it hasn't been widely deployed yet.

Utilities say they are protecting ratepayers

Plattsburgh, in upstate New York, has ample and cheap hydropower from the St. Lawrence River, making it a magnet for crypto miners.

But during a 2018 cold spell, power demand — boosted by crypto — exceeded allotted supply, forcing Plattsburgh to buy expensive spot market electricity. Residential customers saw temporary increases in their bills.

Minnesota utility managers say they have structured their crypto power contracts to avoid socking ratepayers.

Otter Tail traditionally needs a continuous supply of power to customers at all times. But it can limit electricity to Applied Blockchain through what's called an "interruptible" power contract.

A large user like a crypto mining center can get a particularly low rate on the condition its power can be shut off if the grid is stressed — such as by high summer electricity demand or storm-related damages.

Municipal utilities in Brainerd and Glencoe also have interruptible power contracts with crypto customers. Those cities, as well as Otter Tail, also say they have enough existing capacity to accommodate new demand from crypto miners.

In Brainerd and Glencoe, municipal utilities hooked crypto miners into substations that had been built out years ago to enhance grid reliability and prepare for economic growth. The municipal power directors of both cities say existing ratepayers won't foot any extra costs from crypto.

"There is absolutely no negative impact on our other customers," said Dave Meyer, general manager of Glencoe Light & Power. "Otherwise, I would not have pursued it."

Mike Hughlett covers energy and other topics for the Star Tribune, where he has worked since 2010. Before that he was a reporter at newspapers in Chicago, St. Paul, New Orleans and Duluth.

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