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Blockfusion

From CO2 to H2O: Shifting the Energy Mindset for Crypto Mining

Crypto mining may be energy-intensive, but miners can drive sustainability through innovation. High Performance Computing (HPC) data centers such as Blockfusion avoid carbon emissions by investing in clean energy and leveraging automated technology that optimizes the flexibility of their electricity loads.

Blockfusion has transformed a decommissioned coal-fired power plant into a state-of-the-art, **clean-energy-powered data center** in Niagara Falls, N.Y. In doing so, Blockfusion has generated revenue while helping the environment by providing grid services through CPower and **technology partner OBM**.

"We want to operate in the most effective and efficient way possible to make sure that we do the right things for the local community and our industry. That's where

Blockfusion maximizes its energy earnings and on-bill savings while minimizing its environmental impact by automatically participating in demand response programs and other grid services.

Photo Credit: Blockfusion

demand response comes in," said Kant Trivedi, Co-Founder and Chief Operations Officer of Blockfusion USA Inc.

Blockfusion maximizes its energy earnings and on-bill savings while minimizing its environmental impact by automatically participating in demand response programs and other grid services. Any miner that consumes energy from the grid in a market where they can similarly provide grid services can benefit like Blockfusion has by following its path.

Hands-free and in near real-time, Blockfusion's operations automatically power down within 10 minutes of receiving notification from grid operators and CPower. The miner

has streamlined its energy curtailment program by integrating OBM's Foreman software and CPower's **virtual power plant (VPP) platform** for seamless automation.

"Bitcoin mining is a very large, flexible load. If there's a demand response event because the grid is stressed or electricity pricing spikes, you can power down the mine without impacting end-users," OBM CEO Dan Lawrence said.

Miners can also do more than curtail load to improve grid capacity. Given the flexibility of their load, miners can provide an array of fast-acting grid services such as **regulation**, which the New York Independent System Operator describes as helping the

ISO maintain scheduled interconnection frequency at 60 HZ.

Mining Opportunity

Blockfusion began as a **HPC data center company** in 2019, and remains true to those roots, but pivoted to mining when the Covid-19 pandemic hit in early 2020.

"We were building the foundation for a data center when supply chain challenges started and everything screeched to a halt," Trivedi recalled. "So, we asked ourselves what we could leverage our infrastructure for and how we could get it up and running quickly."

Blockfusion turned to mining to capitalize on the facility's immense

Niagara Falls, NY   *Photo Credit: Blockfusion*

computing power. Miners use groups of powerful computers to earn crypto currency, or digital tokens, for validating **blockchain transactions** through complex cryptographic algorithms.

Rewards can be substantial (**cryptocurrency prices** range from hundreds of dollars for newer currencies to tens of thousands for the oldest, Bitcoin), but so too can the investments. Miners keep upping their computing power to validate transactions before competitors. Competition is especially fierce in "**bitcoin mining**" the largest subset of mining focused on Bitcoin, which was the first cryptocurrency.

Blockfusion has become one of the largest crypto miners in the Northeast for Bitcoin in particular by flexing its computing might. But the HPC data center has not been immune to industry challenges.

Overcoming Mining Challenges
"Sensitivity to energy prices is absolutely critical within our industry. Most Bitcoin miners want power to be as cheap as possible," Trivedi said.

"We could have generated it for much cheaper, but we chose to spend millions of dollars and hire a lot of people to convert the plant to consume power from the grid," he continued.

"Now, it has paid off for us. Miners in New York have challenges with respect to the grid, especially if they are behind the meter and generating their own power."

Environmental advocates and lawmakers in New York and elsewhere in the U.S. argue that the energy-intensive cryptocurrency industry is a major polluter that must be controlled or stopped. For example, New York temporarily paused new permits for fossil-fueled plants that power mines using the **proof-of-work process** that needs lots of energy to scale.

In addition to environmental policy reforms that could limit operations, miners also face market volatility. Low currency prices impair profitability. So do high electricity prices.

Yet, Blockfusion has overcome challenges and **gained a competitive edge** by leveraging its flexible load for grid services such as demand response.

Making More from Energy
"Historically, Bitcoin miners made most of their revenue off Bitcoin mining but as time has passed more miners have identified as just energy companies," said Lawrence, OBM's CEO. "Some public companies have disclosed that they generate as much as 40% of their revenue from demand response participation."

Demand response revenues offset declines in currency prices or mining revenue. Offsets become even more

important as less Bitcoin becomes available.

"There never will be a total of more than 21 million Bitcoin. It's in the code," Lawrence explained.

"The way that gets controlled is that every four years, the amount of Bitcoin that's generated from mining gets halved. In April of 2024, it changed from 6.25 Bitcoin every 10 minutes to 3.125 Bitcoin every 10 minutes.

"Four years after that, it will be halved again, and so on. As miners generate less Bitcoin, they're going to have to find alternative ways to generate money," he continued.

Participating in grid service programs with CPower has enabled OBM to create more value for miners. Together, they help miners such as Blockfusion generate revenue that lets them navigate shifts in the Bitcoin mining market while being good stewards of the grid.

For example, miners that automate load management such as Blockfusion has done can participate in ancillary services programs in which grid operators pay them to drop their loads within 10 minutes or less to keep the grid balanced as supply and demand shift. Miners usually ramp back up soon after.

In some regards, running a mine is like operating a battery, according to Lawrence. "You can turn on the mine when power prices are low or automatically turn it off if there's a demand response event or if pricing spikes," he said.

Furthermore, Lawrence said, "It's one-third of the cost of a battery and pays itself off three times faster while providing similar flexibility."

Such flexibility is increasingly valuable. Grid operators need more flexibility — and will pay customers more for it — as the grid transitions to clean energy.

"With more solar and wind generation moving forward, we will need the ability to respond and curtail load quickly," Lawrence said. "Bitcoin mining is a great example of being able to drop load very fast to counter those peaks and troughs that come with renewable energy sources."

Bolstering the Community

Blockfusion also actively engages in all available grid service programs to enhance sustainability within the
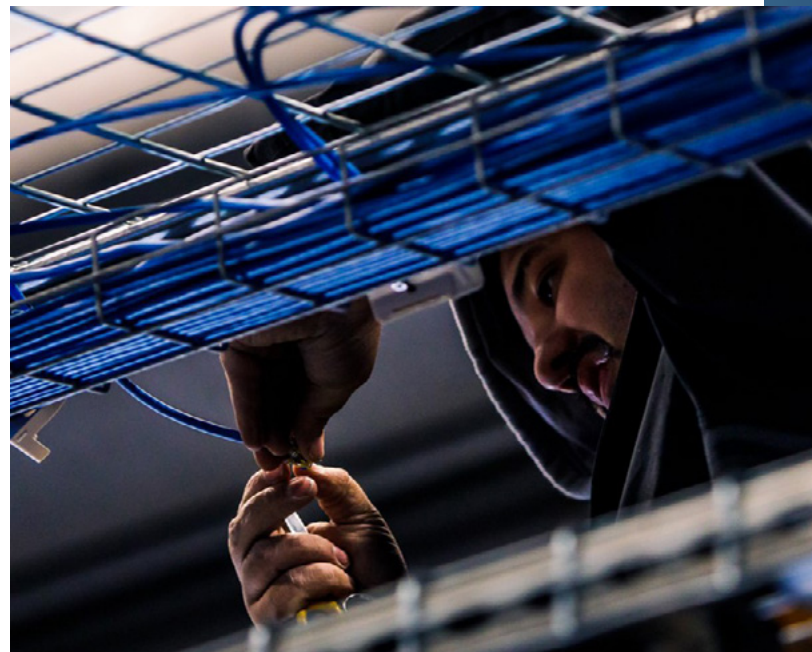

Photo Credit: Blockfusion

local region and the overall grid. And it contributes a part of its energy cost to support clean energy initiatives aligned with its overarching sustainability objectives.

"Demand response has helped us in many ways," Trivedi said. "Although it does have the economic benefits for the organization in terms of our clean energy and renewable goals, the fact that we can dynamically shed the load and give back to the community or the grid as

Blockfusion has aligned its proactive energy strategy with its bold vision since the beginning.
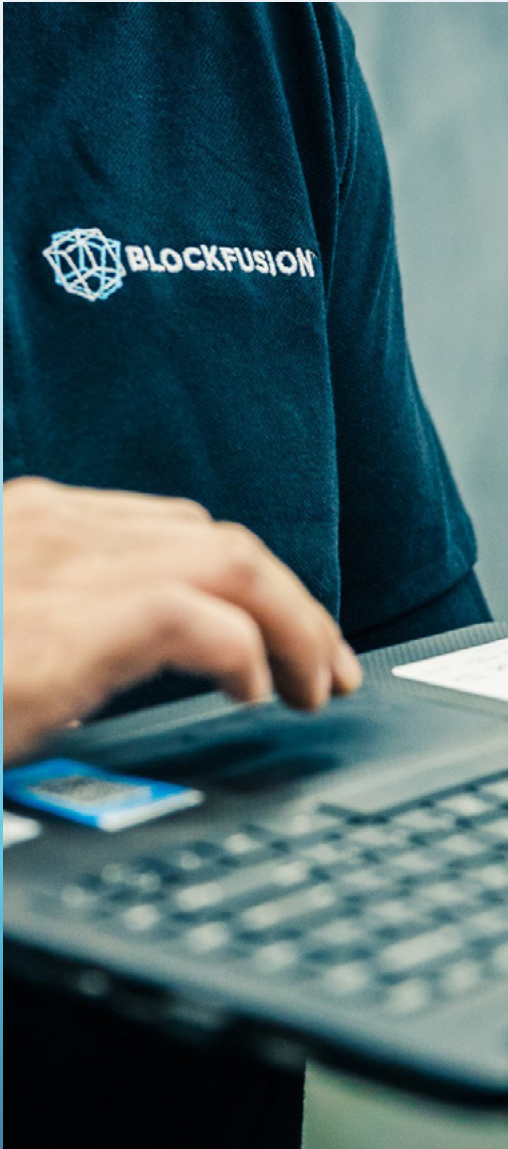
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needed has been beneficial both to us as an organization as well as to the community and to the grid itself."

Blockfusion has aligned its proactive energy strategy with its bold vision since the beginning. "We decided that we were going to put clean energy at the forefront in terms of the way we wanted to operate and the type of energy we wanted to consume," Trivedi recalled.

"As such, we did the conversion and started to work through the transition from generating power for the grid to consuming power from the grid. That was critical in terms of our ability to invest in this space," he continued.

Now, with 50 MW of clean energy generated by the hydropower of Niagara Falls, Blockfusion is empowered to help itself, its industry, the community and the grid. "There are very few organizations like ours, especially in our region, and data centers with renewable energy are sought after," Trivedi said.

CPower and OBM have helped Blockfusion maximize the value of that energy.

"If there's ever a situation where the supply doesn't match the demand of the grid and the grid needs more energy, our software is able to automatically turn our customer's machines off, which serves as a virtual power plant back to the grid," OBM's Lawrence said. "Similarly, if some generation goes offline, we're able to automatically turn our customers off and serve that power back to the grid."

Photo Credit: Blockfusion

HPC data centers such as Blockfusion can participate in a variety of grid services programs, thereby multiplying their earnings and savings. Keeping with Trivedi's energy management goals, Blockfusion has done so effectively and efficiently by leveraging OBM's Foreman software and its integration with CPower's VPP **platform**.

Furthermore, although Blockfusion is not in a participating market, CPower and OBM also offer an integration between OBM's Foreman software and CPower's EnerWise® **Site Optimization** solution to miners served by the grid operators PJM and Independent System Operator-New England.

EnerWise makes participating in grid services more rewarding for miners by automatically identifying and executing the most lucrative energy management strategies in near-real time. "EnerWise has created value for our mining customers because it's much easier for them to make the best economic play in the market. That could be participating in synchronized reserves, in economic demand response or another program at any given moment," Lawrence said.

Blockfusion has gradually participated in more grid services programs as it has increased its load on the grid. As it has done so, it has been mindful of how it could make the most of its energy while impacting the environment the least.

Although its industry is energy intensive, Blockfusion drives sustainability and profitability by optimizing its flexible load with help from CPower and OBM.

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