

How Crypto Miners Can Support A Cleaner Energy System

By **Dennis Elsenbeck and David Flynn** (September 30, 2022, 5:38 PM EDT)

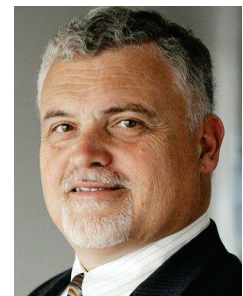
Bitcoin was introduced in 2008 as a decentralized currency that could be transmitted through a peer-to-peer network and recorded on a ledger known as a blockchain. Since then, like any emerging industry, cryptocurrency has been subject to a high level of public, regulatory and legislative scrutiny.

The issues are complex and nuanced. While bitcoin uses enormous amounts of energy and creates significant recycling challenges as mining hardware becomes obsolete, there are many positive practices that are being implemented by this industry as it matures. These include:

- Aiding in electric transmission capacity, thereby lowering consumer energy costs;
- Financially supporting dispatchable supply, if connected to existing generation;
- Decarbonizing unreliable power grids;
- Promoting alternative fuel sources like hydrogen, renewable natural gas, etc.; and
- Creating productive uses for brownfields and other aging or underutilized sites.



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Concerns of the Energy and Environmental Community

Many communities around the country and the world believe they are experiencing negative environmental effects from proof-of-work cryptocurrency mining. One example is Dresden, New York, where the Greenidge Generating Station, located on the shores of Seneca Lake, ceased operating as a coal-fired plant in 2011.

For the past two years, the plant has been powering a proof-of-work crypto mining facility via natural gas generation. Greenidge reported a significant, but permitted, increase in its greenhouse gas emissions from 2020 to 2021.

Other crypto mining operations tie directly into New York's transmission network, as long as the miner successfully navigates through the local utility and New York Independent System Operator capacity studies. Limitations are placed on the size of crypto mining based on studies previously conducted by the affected systems.

Crypto mining operations tend to use their allocated capacity 24/7, whereas typical commercial and industrial operations range from eight to 24 hours based on the load profile — 45% to 95% — of a given facility, and are a less predictable load. The greater the load profile, the greater the utilization of the asset.

In June, New York state legislators passed a bill that would, if signed by Gov. Kathy Hochul, give the state two years to evaluate how crypto mining fits into the mandates of the Climate Leadership and Community Protection Act. If signed by the governor, it would make New York one of the first states in the U.S. to impose a moratorium on such activity.

Environmentalists claim that these crypto mining operations significantly undermine New York's climate goals under the CLCPA, through fossil fuel generation and the consumption of transmission capacity. But a more objective assessment is that cryptocurrencies could advance — and are in fact already furthering — a number of sustainability objectives.

How Bitcoin Can Advance Sustainability Objectives

Crypto miners are unique energy buyers because, while they have a flat load profile and typically run 24/7, they also offer highly flexible and easily interruptible loads. These attributes make many analysts believe that crypto mining could integrate successfully with emerging clean energy mandates and priorities.

A flat load profile is good for grid connection because of its predictability. Since the grid is, on the whole, underutilized, bringing in a crypto miner as an energy customer can flatten costs for transmission systems. Crypto mining is also unique because it offers highly flexible and easily interruptible loads, which support demand response initiatives and switching to a dispatchable supply to deal with the typical intermittency and storage shortfall issues associated with many renewable energy resources.

Through their electric bills, grid-connected bitcoin operators, like all ratepayers, support New York's utilities and the New York State Energy and Research Development Authority's programs and incentives. However, due to the nature of their 24/7 operations, they pay a great deal more, as subsidies are assessed based on energy consumption — thus reducing the burden borne by other ratepayers.

Crypto miners can start, stop or pause computing processes, which allows for the addition of more flexible loads, helping increase grid resilience. As an example, Duke Energy Corp., the second largest energy utility in the country, has a number of crypto mining customers who are voluntarily enrolled in its Demand Response Automation program, and curtail usage when requested by the utility.

In the U.S., much of the grid infrastructure has an average age of at least four decades. Thus, the ability of crypto miners to reduce demand at a moment's notice can help the utility manage insufficient transmission capacity, and make the old infrastructure more reliable.

Including load requirements in transmission planning and investment helps spread the cost of infrastructure to developers. Current rate proceedings to achieve climate goals require utility

transmission upgrades, ultimately funded by ratepayers, to connect renewable energy sources to enhance the resiliency of the electric system.

These intermittent energy sources tend to be located away from load centers, and will take a number of years and ratepayer dollars to be completed. Bitcoin operations that use existing fossil-fired power generation ensure the support of system resiliency, as the grid and fuel diversity evolve.

Moving Toward Alternative Energy Supplies

Bitcoin miners are naturally moving toward alternative energy supplies. Renewable power developers are starting to seek out crypto mining companies as energy off-takers, for example, using wind power generated at night, which makes renewables projects more economical for institutional investors.

Many industry analysts predict that within five to 10 years, renewables and crypto mining companies will co-locate and integrate to improve utility networks, with wind and solar leading the way. In moving toward alternative energy solutions, some bitcoin operators have already been assets to their local utility grids by providing market-driven energy solutions.

For example, Lancium LLC, a Houston-based energy management company, builds technology and energy infrastructure solutions with the objective of decarbonizing the grid. In November 2021, Lancium announced that it had raised \$150 million to build a number of bitcoin mines throughout Texas that will be powered by renewables, and add more solar and wind power to the grid.

Similarly, Canadian company HIVE Blockchain Technologies Ltd. has a Swedish data center that derives its energy from hydropower, and offers a large reserve that the Swedish grid can draw on when it is suffering disruptions from the local power supply.

The Bitcoin Mining Council, a voluntary organization of crypto mining companies, reported in its recent survey that by the fourth quarter of 2021, the participating companies ran on a 66.1% sustainable power mix.

Other Benefits Offered by Bitcoin Mining Companies

From an economic perspective, crypto operations can provide financial support for microgrids, peaker plants and energy storage projects; add jobs to the local economy; and pay property taxes and other fees to the host community, often on grossly underutilized properties.

From an environmental perspective, brownfield sites — those sites that once housed industrial operations and are or were contaminated, thereby restricting redevelopment — are often suitable for crypto mining operations.

Crypto mining companies do not have a high volume of traffic, need many parking spots or have other major development needs, so locating them on brownfield sites frequently aligns with the private economic objectives and regulatory requirements of redevelopment of these kinds of properties.

New York offers an excellent tax credit incentive program that essentially repays a developer for cleanup when new development occurs on a contaminated site.

The Energy Future of Crypto Mining

The crypto mining industry is aware of the criticism being leveled in the public discourse and by legislators and regulators throughout the country. It recognizes the need to reduce its carbon footprint, and to find other ways to be viewed positively and accepted into communities.

Some self-regulation is beginning to emerge among responsible cryptocurrency mining operators. For example, Green Proofs is an assessment tool to evaluate and certify the carbon impact of crypto mining operations. Crypto miners share data on electricity and renewables usage, along with other pertinent information, and receive a net impact score that investors, hosting facilities and the market can use to evaluate a mining company's sustainability profile.

Another example of forward-looking change is the creation of the Crypto Climate Accord, a private sector initiative with the support of more than 200 companies and individuals across the cryptocurrency, finance, technology, climate and energy sectors.

The accord, which was inspired by the Paris Agreement, will provide an open-source toolbox of solutions that will hopefully result in net-zero emissions related to crypto operations' energy consumption by 2030.

Many bitcoin companies are transitioning from proof-of-work to proof-of-stake, which is not nearly as energy-intensive. Miners put down a large deposit proving they have a stake in the outcome when they attempt to verify an entry on the blockchain, rather than having their computers take billions of stabs at a random number.

Cryptocurrency is here to stay, and many other changes are surely in the offing as the industry develops. For example, certain cryptocurrencies have incorporated renewable energy into their models, pairing it with validation methods that use less energy.

As cryptocurrencies evolve, they must address energy and environmental concerns to gain greater adoption. Climate objectives cannot be achieved overnight, and regulators, legislators, environmentalists, the business and financial sectors, and other stakeholders must consider the short-term impact on ratepayers and taxpayers, to ensure long-term commitment to achieving sustainability targets.

How best to balance economic and environmental sustainability with the evolution of the crypto mining industry is a worthwhile debate that could bring together these constituencies.

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