U.S. Senate panel probes how crypto mining increases energy consumption

WASHINGTON — The so-called mining for digital assets, or cryptocurrency, consumes as much electricity as some entire nations, and U.S. senators explored the issue Tuesday in what they said was their first-ever hearing focused on the energy implications of digital currency.

Crypto mining in both Nebraska and Pennsylvania was discussed in particular by the members of the panel of the Senate Committee on Environment and Public Works.

Touting his legislative proposal to improve transparency of crypto mining, Democratic Sen. Ed Markey, of Massachusetts, likened it to being "more like digital coal than digital gold" and implored the industry — Bitcoin being the most popular currency — to "work smarter, not harder" by improving energy efficiency as the world faces the effects of climate change.

"Bitcoin mining in the United States uses as much power as we need to light every single home in our country, and that demand on our grid is only going to grow," Markey said in opening remarks.

Markey's bill, introduced Monday, would require cryptocurrency asset operators to report emissions to the Environmental Protection Agency, and would mandate the agency to conduct a study of energy usage required by thousands of robust, special-use computers to add new transactions to the decentralized digital accounting ledger, he said. The text of the bill was not yet published.

The hearing before the Senate Subcommittee on Clean Air, Climate and Nuclear Safety featured testimony from Rob Altenburg, of PennFuture, a Pennsylvania-based clean energy advocacy organization; Courtney Dentlinger, an executive with the Nebraska Public Power District, a publicly owned utility; and Anna R. Kelles, a member of the New York State Assembly.

The subcommittee's top Republican, Sen. Pete Ricketts, of Nebraska, pushed back on environmental concerns.

Reminding fellow members that CNBC ranked his state No. 1 last year for cultivating a crypto economy, Ricketts said he's "particularly interested in this topic as to whether this industry could result in more economic development."

"Crypto asset mining is hardly alone in being an industry reliant on large data server banks," Ricketts later continued. "Finance, technology, government, academia and many others use significant amounts of electricity to power their computing needs. We should be providing the tools for open competition in a free market and not allowing politicians or bureaucrats in Washington D.C. to pick winners and losers."

Cheap electricity in Nebraska

Both Nebraska and Pennsylvania are home to crypto mining operations.

Cheap electricity in Nebraska — 100% powered by publicly owned utilities — makes the state an attractive option for the crypto data centers, where acres of extremely fast computers encased in what look like metal shipping containers attempt to guess long combinations of numbers to verify a new transaction, some at speeds of up to trillions of guesses per second.

One 11-acre crypto mining site in Kearney, Nebraska, consumes as much electricity as the city itself, which has a population of 33,790, according to a local news analysis published in January.

However, the industry has had "significant benefits" for the state, Nebraska Public Power District's Dentlinger told lawmakers, giving the example that just one of Nebraska's crypto mining facilities generated $1.8 million in state sales taxes and $3.8 million in local taxes over a 12-month period.

Dentlinger also argued that consistent electricity demand from a customer benefits the wider customer base.

"In our predominantly non-metro and rural service area, diversification of businesses and economic growth is critical as these areas continue to see population declines," she told lawmakers. "In fact, local leaders have been very receptive to crypto mining facilities as they've seen the potential for significant economic development benefits for their communities."

Crypto operations pop up in Pennsylvania

PennFuture's Altenburg argued there's a different story in Pennsylvania, one where regulators can't keep tabs on crypto operations popping up across the state.

Last year, a site inspection by the Pennsylvania Department of Environmental Protection found that a company in Clearfield County had plugged into a natural gas well site without seeking a permit. The company, Big Dog Energy, was running 30 natural gas generators to power its crypto operation. The EPA took the lead on investigating.

Altenburg told lawmakers it's "impossible to know which or how many of Pennsylvania's thousands of fracked gas wells are being used in this way."

Another company, Stronghold Digital Mining, burns waste coal to power crypto operations. The company — which argues it is an "environmentally beneficial" Bitcoin miner for finding a use for an environmental hazard — sources from the ubiquitous piles of waste coal around the state and converts it into for electricity at two sites, one in Venango County between Pittsburgh and Erie, and the other in Carbon County northwest of Allentown, according to the company's website.

"Waste coal is a problematic fuel to say the least. As the name implies, it has low energy value compared to ordinary coal, so plants need to burn even more to generate the same amount of electricity. In the process, they emit more ozone precursors, fine particulates, acid gases, heavy metals, and it's the second-most carbon intensive generation, next to residual fuel oil," Altenburg said.

Why crypto mining requires energy

Cryptocurrency mining involves the use of robust computing power to add to digital ledger technology, such as "blockchain."

The decentralized digital financial record of transactions is a ledger or database where users, or "miners," on a common network can agree on entries, sometimes called "blocks," through a "consent mechanism."

Energy usage varies depending on which consent mechanism is used. For example, Bitcoin is based on a "proof of work" mechanism, which in part ensures security of the ledger by requiring miners to have access to special computers and considerable amounts of energy.

Another popular cryptocurrency, Ethereum, recently switched to a "proof of stake" mechanism, which consumes a fraction of the energy — as of 2021 it accounted for 0.001% of global energy usage — because it relies on miners to risk a stake of their crypto assets as a way to enforce the integrity of the accounting ledger.

U.S. power usage for crypto

A September 2022 report from the White House Office of Science and Technology Policy warned that cryptocurrency mining uses a significant amount of energy that has only increased during the past five years.

Crypto assets worldwide use 120 to 140 billion kilowatt-hours per year — or roughly exceeding the total energy usage of countries like Argentina or Australia, the report found.

The U.S. accounts for one-third of the world's crypto asset operations, consuming about 0.9% to 1.7% of the nation's electricity usage, which is about equal to the energy used to power all home computers or all residential lighting in the U.S., according to the OSTP.

President Joe Biden ordered the interagency report in a March 2022 wide-ranging executive order on "Ensuring Responsible Development of Digital Assets," which included exploring energy implications and possible impediments to reaching the administration's climate goals.

Those goals include reducing greenhouse gas emissions by 50% by 2030, achieving a carbon-free electricity grid by 2035 and reaching net-zero emissions by mid-century.

Markey's bill has been referred to the Senate Committee on Environment and Public Works.

Sens. Jeff Merkley, a Democrat from Oregon, and Bernie Sanders, an independent from Vermont, have signed on as co-sponsors.

Markey compared reducing the energy usage of cryptocurrency mining to updating energy standards for appliances or fuel economy for vehicles.

"We're not looking to end refrigeration or automotive technology. What we're saying is that we should be more efficient, we should be more aware of the emissions into our atmosphere that are avoidable," Markey said. "So on the one hand, this (cryptocurrency) is a very innovative sector, economically, and they count themselves as innovators. But all we're asking for them to do is look across the board at innovation."