May 9, 2022

Via Electronic Delivery

Office of Science Technology Policy
Notice of Request for Information on the Energy and Climate Implications of Digital Assets

To Whom It May Concern:

The Chamber of Digital Commerce (the "Chamber") recognizes the importance of providing information on behalf of the digital asset industry, particularly in regards to digital asset mining. We are pleased to see the Office of Science and Technology Policy (OSTP) has embarked on this process and is seeking public consultation. The Chamber welcomes the opportunity to provide feedback on the Energy and Climate Implications of Digital Assets.

About the Chamber

The Chamber is the world's largest blockchain trade association. Our mission is to promote the acceptance and use of digital assets and blockchain technology. We are supported by a diverse membership that represents the blockchain industry globally.

Through education, advocacy, and close coordination with policymakers, regulatory agencies, and industry across various jurisdictions, our goal is to develop a responsible, pro-growth environment for digital asset mining highlighting all of the opportunities this emerging industry will present to the United States.

Our members include the world's leading innovators, operators, advisory firms, and investors in the blockchain ecosystem, including the top digital asset mining companies. The Chamber is committed to leveraging digital asset mining to achieve climate goals, develop sustainable energy infrastructure, and advance national security.

Overview

Since China's ban of digital asset mining, the U.S. has become the global leader in hash rate. This is an opportunity for the U.S. to assert leadership on several fronts: expanding economic growth via digital asset adoption, securing the Bitcoin network, and perhaps most important, an unprecedented opportunity to deploy infrastructure that enables a clean energy transition.

The digital asset mining industry today is spurring U.S. economic growth, job creation, and innovation, especially in rural areas where opportunity and innovation are needed most. This is being achieved while also creating financial incentives for the buildout of renewable energy infrastructure.

Yet, these opportunities are sometimes lost in the policy debates with misinformation. While digital asset mining currently uses less than 0.1% of the world's energy[1], headlines make claims such as "Bitcoin Uses More Energy than Many Countries," or "Bitcoin Mining Makes Senaca Lake Feel Like a Hot Tub."

The reality is digital asset mining can be far more flexible with its energy needs, particularly when compared to other energy intensive industries, such as data centers and manufacturing facilities. Key to an abundant clean energy future, the Chamber of Digital Commerce's digital asset mining industry members are committed to using carbon neutral or renewable resources across the industry and partnering with utilities on growing renewable energy.

The Biden Administration has established robust climate goals. Digital asset mining can serve as a catalyst to achieve these worthy goals, offering unique capabilities that traditional data centers and energy consumers cannot. While providing a utility with a reliable base customer that provides consistent demand - and revenue - for utilities to build out clean energy infrastructure, digital asset miners can power down to allow critical usage of energy.

Why are these policies important? Bitcoin has been adopted by over 100 million individuals worldwide and digital asset mining is the foundation of this ecosystem, creating an opportunity for millions of people in less fortunate economic circumstances to access a new financial system by allowing them to store their savings in a medium that is independent of rapidly increasing inflation, banks fees, and long-standing inequities in our banking system.

1. *Protocols*

Proof-of-Work Consensus Mechanism

Proof-of-work was introduced in the early 1990s as a means to reduce email spam. The idea was computers might be required to perform a small amount of work before sending an email. This work would be minimal for someone sending one off emails, but it would require a lot of computing power and resources for users to send mass emails aka SPAM.

Proof-of-work is a necessary part of adding new blocks to the Bitcoin blockchain. Blocks are summoned to life by miners, the players in the ecosystem who execute proof-of-work. A new block is accepted by the network each time a miner comes up with a new winning proof-of-work, which happens roughly every 10 minutes.

The energy consumption required to validate blocks is critical to ensure the security of the blockchain. It also ensures that block production remains decentralized. No one has an advantage for

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[1] Global Bitcoin Mining Data Review Q1 2022, Bitcoin Mining Council, March 2022

mining bitcoin early. Bitcoin miners that started ten years ago still have to compete on equal footing with a new miner that joins today.

Proof of Stake Consensus Mechanism

In proof-of-stake, the block creation terms are "forge" or "mint". These terms should not be confused with mining — although validators act similarly to miners in proof-of-work. Staking is when you pledge your coins to be used for verifying transactions. Validators carry the responsibility to mint blocks, confirm transactions, and protect the network through staking.

Proof-of-stake requires validators to lock up a certain number of tokens into the network as their stake to create a validator node. Requiring validators to lock digital assets ensures they have 'skin in the game'. Validators must maintain network functionality or risk seeing their asset value depreciate. Additionally, validators risk losing their stake if they act maliciously. A nefarious actor that processes invalid transactions may be penalized and lose tokens through slashing.

Proof-of-stake optimizes for scalability and provides much higher transaction throughput. However, proof-of-stake networks run the risk of fewer entities controlling block production and the network's token. Centralized block production also leads to weaker security since there are less validators susceptible to attack or collusion.

2. Hardware

Proof-of- work miners are constantly operating and updating to ensure the use of state of the art equipment. The industry is continually evaluating various tools and technologies, including immersion and lifecycle mining, that may allow the mining industry to reduce our electricity consumption and improve the efficiency of the fleet.

One such example of how miners are extending deployment of hardware is called "lifecycle mining," which refers to the concept that the energy inputs and datacenter model that miners employ should be tailored to the age of the hardware. As newer more efficient hardware comes online, this hardware will be deployed to energy hook ups with less disruption, as areas with more renewables are suitable for older units. The opportunity cost is much lower with older units, so they can be placed alongside a more intermittent renewable source of energy and still be economical.

3. Resources & 4. Economics

Proof-of -work mining, like all industrial activity, uses energy. In 2020 it was estimated that proof-of-work mining used 188 terawatts of power, which is about 0.122% of global energy consumption. While eliminating all digital asset mining would not put a meaningful dent in carbon emissions, it could slow our progress in transitioning this country to more renewable energy.

At the start of last year, over 50% of the industry's computing power (hash rate) was located in China and 13% was in the U.S. By July 2021, China had banned mining, and the U.S.' share of the

network's hash rate had grown to 35%[2]. Today, digital asset mining in the U.S. continues to grow, predominantly in states with regulatory friendly environments and excess renewable power (e.g., Georgia and Texas)[3]. In 2021, the efficiency of digital asset mining globally improved by 53%, and the percentage of our industry that is primarily powered by sustainable power improved from 37% to 59%[4].

Chamber of Digital Commerce members are partnering with energy companies to build clean, green, renewable energy resources (e.g. solar and wind) that might not otherwise be built, but for our ability to provide consistent, reliable, flexible, baseload to finance these critical investments in our nation's renewable infrastructure.

5. Past or ongoing mitigation attempts & 6. Potential energy or climate benefits

Chamber of Digital Commerce mining members are increasingly focused on minimizing carbon emissions associated with their activities by procuring renewable energy, favoring locations with renewable energy, and using otherwise wasted energy.

Digital asset miners can buy energy from energy providers when energy is abundant (e.g., West Texas with an excess of wind and solar), drawing from the grid the rest of the time. In doing so, the miners monetize a renewable asset that would otherwise be dumped into the ground, while maintaining generally high uptime. During periods of energy scarcity, the miners can be turned off. The net effect is that renewables become more economical, as they can monetize their asset even when the grid has no demand for it.

Digital asset miners represent "interruptible load," which means that they can deal with power outages without suffering adverse impacts to their business. Of course, they prefer to have power all of the time, but nothing catastrophic happens when they lose power, unlike other industrial consumers such as hospitals, high-end data centers, factories and smelters.

For example, on the rare occasions when customer demand spikes during extreme weather events that create heating or cooling peaks, digital asset miners work cooperatively with utilities to cut off their power demands for the benefit of the grid in mere minutes with no adverse effects. The right to curtail a miner's energy use at the request of the utility in times of high demand is typically agreed to in the power purchase contract between the parties. No other industry that uses the amount of energy - data centers, cloud service providers and manufacturing facilities - has the capacity to do this.

It's also important to note that even as digital asset mining has increased over the past few years, the Bitcoin Mining Council estimates that the global mining industry's sustainable electricity mix is 58.5% and growing. This number will only grow over time as digital asset miners form partnerships with energy providers, utilities, communities, and other groups to develop new energy capacity by providing new and valuable economic incentives for energy companies to build green infrastructure and green sources of power.

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[2] Bitcoin Electricity Consumption Index Mining Map, Cambridge Centre for Alternative Finance, July 2021

[3] America's Bitcoin Miners See Georgia as the New U.S. Hotspot, Bloomberg, February 2022

[4] Global Bitcoin Mining Data Review Q4 2021, Bitcoin Mining Council, December 2021

Miners are partnering with nuclear power plants (which often produce excess power at night, when the grid is less demanding). Likewise we expect the same to be true of solar and wind energy producers. We see the advantage of digital asset mining as an additional consistent and flexible customer.

7. Likely future developments or industry trajectories & 8. Implications for U.S. policy

No industry has seen the amount of growth that digital asset mining has seen in the past few years. While it is difficult to predict the future, there are a number of potential developments and implications for U.S. energy policy to consider.

U.S. Energy Transition

Digital asset mining is evolving energy policy in the U.S. and creating opportunities for a more sustainable energy transition. Digital asset mining has the ability to rapidly advance all fuels and all technologies. Examples include, solar and wind energy: digital asset mining can finance renewable infrastructure build outs and investment, while simultaneously adding capacity to the grid. For the nuclear energy industry, digital asset mining offers the ability to extend the lifetime of the U.S. reactor fleet while also funding new technologies such as small modular reactors (SMR's). Digital asset mining also offers natural gas a way to use otherwise wasted flared gas, rather than it just being burned into the atmosphere.

National Security

Energy is a cornerstone of national security. As highlighted above, digital asset mining offers an unmatched opportunity for the United States to revitalize an energy infrastructure that has been in dire need of an update for decades. The vulnerability of the U.S. electric grid is well documented. The Biden administration has launched public-private action plans to shore up the cybersecurity of the electricity, pipeline, and water sectors. Digital asset mining can be a key catalyst to stabilize, modernize, and improve the nation's energy grid, thus improving national security for all citizens.

Financial Inclusion

The policies for this ecosystem should not be measured by a one size fits all method. Bitcoin has been adopted by over 100 million individuals worldwide and digital asset mining is the foundation of this ecosystem, creating opportunities for millions of people in less fortunate economic circumstances to access the financial system by storing their savings in a medium that is independent of rapidly increasing inflation, banks fees, and long-standing inequities in our banking system.

Conclusion

The Chamber supports all that digital asset mining offers the United States with an unprecedented opportunity to achieve climate goals, develop sustainable energy infrastructure, advance national security, and it provides more opportunity to many with limited financial options. Like any new and developing industry, digital asset mining will go through growing pains, we encourage the Biden

Administration to continue transparent coordination with the digital asset mining industry at the benefit of all United States citizens.

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The Chamber is pleased to serve as a resource to the OSTP and the White House on these matters, we thank you for the opportunity to respond to this Request for Information and look forward to the continued development of digital assets in the United States.

Very truly yours,

Perianne Boring
Founder & CEO

Tom Mapes
Sr. Policy Analyst