On January 20, 2022, the U.S. House Committee on Energy and Commerce (the “Committee”) held a hearing on the energy consumption associated with cryptocurrency activity. In announcing the hearing on January 12, 2022, Committee Chairman Frank Pallone (D-NJ) and Oversight and Investigations Chair Diana DeGette (D-CO) stated: “In just a few short years, cryptocurrency has seen a meteoric rise in popularity. It’s time to understand and address the steep energy and environmental impacts it is having on our communities and our planet.”

By the close of the hearings, committee members received a two-hour lesson about a wide range of topics: blockchain (and its varying types of consensus mechanisms) and its energy impact to the climate; how crypto mining can affect utilities’ management of energy resources and ultimately the price consumers pay for their
electricity; how utilities work with energy-intensive miners; and where to strike the balance between green energy goals and the economic development of cryptocurrency. A number of members of the Committee appeared open to preserving the potential innovations and economic growth from blockchain while still improving efficiencies in power usage and achieving growth in renewables.

This is Part I of a two-part post on the issues raised by the Congressional hearing on the energy usage of blockchains. In this part, we will discuss how different blockchain consensus mechanisms impact energy usage and some potential solutions discussed at the hearing. In Part II, which will be published soon, we will delve into some ESG considerations now affecting businesses as related to cryptocurrency investments and blockchain usage.

The hearing ultimately was more of a productive discussion and education for Congress, with further discussions regarding concrete policies or drafting legislation reserved for the future. Still, looking ahead, the energy issues attendant with cryptocurrency bring to mind a number of ESG issues that companies will face in the future, given how blockchain, crypto and NFTs will gain a bigger foothold on balance sheets and technology wish lists.

The hearing comes on the heels of cryptocurrency’s well-publicized energy consumption – specifically the energy needs related to proof-of-work (“PoW”) blockchains as opposed to proof of stake (“PoS”) blockchains. Multiple commentators and legislators have sounded the alarm about the potential adverse impact of energy usage attributed to Bitcoin (and other PoW blockchains). Senator Elizabeth Warren previously warned that to protect the planet there needed to be a “crack down on environmentally wasteful crypto mining practices.” The European Securities and Markets Authority (“ESMA”) warmed of “soaring” environmental costs and called for a proof-of-work mining ban. Institutional investors also have been warned of creeping ESG exposure to the asset class.

The hearing largely focused on how to make proof-of-work networks (namely Bitcoin and, for now, Ether) greener, either through the use of renewables or by turning to other blockchains that use the lower energy consuming proof-of-stake consensus mechanisms.

At various points, the hearing highlighted Bitcoin’s electricity use: Chairman Pallone, in his opening statement, noted, for example, that the 2021 carbon emissions from Bitcoin and Ethereum cryptomining were 78.8 million tons of carbon – roughly equivalent to the tailpipe emissions from more than 15.5 million gasoline powered cars on the road. It was also noted at the hearing that Bitcoin consumes more electricity than Ukraine or Norway (and if “cryptocurrency mining” were a country, it would be the 27th most power-needy in the world).

Experts additionally piqued the curiosity of the Committee when explaining the concept of “curtailed” energy. Until battery storage technology improves and electrical grids are modernized, a certain percentage of green energy produced can go to waste when, for example, a solar or wind farm produces more energy than is needed. There was testimony at the hearing suggesting that cryptominers (or cryptominers combined with data centers) located near green power sources, can use this curtailed energy or excess power that would otherwise go to waste. By
using such flexible load arrangements, the committee heard, miners can provide environmental value by providing capital to renewable projects through their consumption of excess renewable sources, or by consuming energy that would otherwise be flared (to be discussed in Part II of this post).

However, not everyone on the Committee was convinced that renewables are a panacea; instead, they suggested that transitioning from proof of work to proof of stake networks, which consume less energy, is the best path forward.

**Proof of Work vs. Proof of Stake: What’s the Difference?**

PoW and PoS are the two major consensus mechanisms that cryptocurrencies use to verify new transactions, add them to the immutable blockchain ledger and create tokens. Decentralization requires many computers, each using energy, to participate in the verification process. PoW and PoS are the two methods by which the computers agree on the legitimacy of a transaction.

Proof of work, the original blockchain consensus mechanism, was a method of cryptographic proof popularized by the advent of Bitcoin (and the 2008 release of Satoshi Nakamoto’s noteworthy paper about the technology underlying it). Blockchains using PoW consume large amounts of energy, as virtual miners around the world race to solve a complex cryptographic problem to secure the network and win the right to update the blockchain. Winners are rewarded with the network’s currency. As an example, currently Bitcoin and Ethereum use PoW mechanisms, though Ethereum plans to transition to Ethereum 2.0 later this year, which will use PoS. Practically speaking, this PoW consensus mechanism incentivizes miners to invest in expensive computing equipment, which in turn results in investments in places to store and cool equipment, and the consumption of massive amounts of energy to power their systems, or rigs.

On the other hand, Proof of Stake – the predominant consensus mechanism used by some other blockchains (and soon Ethereum 2.0) – is much less energy intensive, to the tune of 99.99% less than PoW blockchains. PoS “validators” are the analog of PoW miners: validators secure the network in exchange for a cryptocurrency reward. While PoW miners use their intensive computing power and energy in the race to validate transactions and secure the network, PoS “validators” dedicate their own stake of cryptocurrency to the network.

Contrasted with PoW, PoS does not require high-powered computers and intensive energy consumption because any user can act as a validator by using a computer to create a node. PoS nodes only use marginally more energy than a laptop. In addition, PoS is faster, more scalable, and can process more transactions per second than PoW.

Thus, as can be seen, the Congressional hearing unpacked many issues that will require further deliberation. News is abounding with technological advances in blockchain – involving, for example, new decentralized finance (DeFi) applications (or Daaps), cross-chain solutions, NFTs, metaverse applications, supply chain modernization, or new cryptocurrency offerings. However, alongside these advances, will undoubtedly be efforts to “greenify” blockchain, whether through moves toward increasing renewable energy sources for cryptomining or a greater
move toward PoS blockchains. The latest Congressional hearing will likely not be the last time we will hear about these issues.

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