

Hearing Before the Clean Air, Climate, and Nuclear Safety Subcommittee on the Crypto-Asset Environmental Transparency Act

March 7, 2023

Testimony of Dr Anna Kelles, representative of the 125th New York Assembly District

Dear Senators Markey and Ricketts,

I write to voice my support for Senator Markey's "Crypto-Asset Environmental Transparency Act" as the representative of the 125th New York Assembly District. The environmental and socioeconomic impacts of expanding Proof-of-Work based cryptocurrency mining will continue to have devastating environmental and socioeconomic consequences on my constituents and the world.

There are two ways to grow wealth in the cryptocurrency space. One is to buy, sell, and invest in cryptocurrencies in digital exchanges like Coinbase, Binance, Kraken, Gemini and many others. This is most parallel to exchanges for stocks, bonds, and dividends like the Wallstreet exchange. Each exchange has its rules including fees they collect for all transactions. The second way to grow wealth is to become a validator of those transactions and mine or win coin in exchange for validating blocks of transactions. One method of validation, called Proof-of-Work, was the first to be established with the launch of the first mainstream cryptocurrency Bitcoin and is by far the most energy intensive and therefore environmentally harmful. With enough vertical integration and consolidation, however, mining or winning coin can be cheaper than buying it and is therefore highly attractive for investors.

In the early years of cryptocurrency mining starting in 2009, miners were almost exclusively what we call "boutique miners," individuals who have a few computers in their homes or small business owners who had a small operation added to their business. However, as the value of Bitcoin rose more miners entered the market. A miner's competitive advantage to win Bitcoin for their effort of validating blocks of transactions is based exclusively on having more computers using the newest cryptomining processing technology. Today most small scale boutique miners have been edged out by the giants in the industry.

In an article published earlier this year titled, "Is Crypto Mining Still Profitable in 2023?" the author notes, "The mining market is dominated by large companies who secure large warehouse facilities to house their army of ASIC mining rigs. Some of these companies might run mining pools that smaller miners can contribute to in order to get a piece of some block rewards in exchange for a small fee. This is all to say that today, mining Bitcoin as an individual is rarely profitable unless someone has access to extra low-cost electricity and affordable equipment." This is the main reason that cryptocurrency mining as an industry has not only become harder to access for traditional marginalized populations, but has also led to cryptocurrency like Bitcoin being one of the most consolidated currencies in the world, with 0.01% of Bitcoin accounts owning about 27% of all Bitcoin.

Proof-of-work data-processing efforts of cryptomining facilities require thousands of times more electricity than an average residential and commercial customer. It is estimated that cryptomining facilities for Bitcoin alone use more energy than all the processing for Google, Amazon, and Facebook combined, more than all the data centers globally combined, and more energy than all the solar panels that exist globally. In fact, according to Digiconomist, one Bitcoin transaction requires approximately 880 kWh. This is equal to the energy needed to power the average US household for 30 days.

Given that a cryptocurrency mining operation creates minimal jobs (e.g. one of the largest operations in the US has 120 staff for 100,000 ASIC miners with only 40 staff on duty per shift, despite a daily profit as of a year ago of \$2 million per day), profits for a cryptomining company are limited not by labor costs like a majority of existing global industries. As a result, profits are limited by the cost of electricity.

Up until 2021, China was the hotbed of cryptocurrency mining, hosting over 75% of all cryptomining worldwide. Not only is there abundant hydroelectric but electricity prices are constrained by the government rather than fluctuating with demand. In 2021, due to environmental concerns and the opportunity costs to other industries of the higher energy demand of cryptocurrency mining, China banned the industry.

After the Chinese government banned bitcoin mining and trading to reach their greenhouse gas reduction goals, Bitcoin mining facilities went on the hunt for cheap electricity, including here in the US.

As one of the solutions for cheap energy, cryptomining companies worked to reopen dormant and retired fossil fuel plants like the large scale facility called Greenidge, in Dresden, NY on Seneca Lake. An environment with moderate temperatures, clean air with low particulate levels, abundant free fresh water for cooling, high availability of dormant fossil fuel power plants, and loopholes in regulatory and statutory structure have made New York an ideal location for cryptocurrency mining companies. Mining companies are buying retired or dormant electrical generating facilities that have outlived their viability in the wholesale electricity markets and are restarting operations under outdated certificates that do not account for the permitting standards applied to new, more efficient facilities to serve blockchain transaction authentication operations.

In the Finger Lakes, Greenidge Generation Station (Greenidge) provides service directly to the cryptomining operation on their property, entirely bypassing the grid and thus evading oversight by the Public Service Commission. This “behind-the-meter” power generation with outdated, inefficient technology has allowed Greenidge to perform cryptocurrency operations at the highest possible GHG emission rate, running at only 13% capacity and resulting in a ten-fold increase in emissions from the last time the facility was in use as a coal-fired plant. In addition to the harmful pollutants emitted by fossil fuel combustion at plants, such as nitrogen oxides (NOx) and sulfur dioxide (SO₂), frequent replacement of supercomputers has created a profound amount of electronic waste much of which is ending up in landfills throughout the world.

Furthermore, these facilities negatively impact aquatic life due to the large quantities of water withdrawn from regional freshwater streams and lakes to be utilized in cooling systems for both

generating electricity from the power plant and to cool the consolidated computer systems from the massive heat generation of the 24-hour operation of over 30,000 miners. The circulating water is returned to water bodies at significantly higher temperatures than the water withdrawn, killing thousands of fish every year and contributing to harmful algal bloom outbreaks that are toxic for both wildlife and humans and have been on a rapid rise in all freshwater bodies across NY state. Greenidge alone draws nearly 140 million gallons of water per day from Seneca Lake for use in its cooling systems heating 40-50 degree water to up to 108 degrees.

Gas fueled power plants also affect the health and quality of life in surrounding neighborhoods. Emission of hazardous air pollutants from the power plants are known to cause asthma, heart attacks, strokes, reproductive damage, and preterm birth. These public health impacts are most acutely felt in environmental justice communities and vulnerable populations including children, developing fetuses, seniors, and individuals with lung and cardiovascular disease.

Noise pollution is another significant concern for residents in towns across the country who have stacks of consolidated mining rigs in open fields or mining warehouses in their community. The long waves of low-frequency noise travel farther before losing energy and this can affect areas for miles around a cryptocurrency mining facility. Some liken the noise to a semi in a driveway, or a jet engine on a tarmac.

Communities hosting mining facilities, whether within power plants, warehouses, or in shipping containers stacked in open fields, find few economic benefits, as the facilities create scarce opportunities for permanent employment, harm local natural resources, and given that consolidated operations are mostly owned by large scale publicly-traded corporations, profits do not remain in the communities that are negatively impacted by the pollution that the cryptocurrency mining creates. Meanwhile, in many communities the cryptocurrency mining operations can threaten existing thriving industries. In the Finger Lakes, for example, the \$3 billion agritourism industry that employs over 65,000 people and is the backbone of the local economy depends on clean air and water and access to the quiet sounds of nature which are threatened by the introduction in the last 5 years of large scale cryptocurrency mining on Seneca Lake.

In the hunt for cheap energy, many mining operations have been set up in municipalities powered by hydroelectric energy. The energy is consistently cheap for residents unless the usage rate exceeds a statutorily set level and then rates go up, as is the case in upstate New York communities. According to a Berkeley Haas working paper authored by faculty at the University of Chicago's Booth School of Business, "the power demands of cryptocurrency mining operations in upstate New York push up annual electric bills by about \$165 million for small businesses and \$79 million for individuals—with little or no local economic benefit."

Industry proponents have stated that consolidated cryptocurrency operations can be part of the climate solution by promoting the development of renewable energy infrastructure but this is simply not true. Large scale cryptocurrency mining in New York state is significantly increasing the state's total base load demand on the grid itself putting further pressure on our need for a massive electrical line overhaul. The significant demand on our hydroelectric system and existing renewable energy infrastructure is in direct competition with getting our existing energy

demand off of fossil fuels. Some estimates suggest we will need to increase our wind and solar infrastructure development goals by over 60% to meet our states climate goals just with the completion of the “in-construction” and proposed cryptocurrency mining projects estimated for completion in 2023. As cryptocurrency mining operations that are on the grid do not themselves produce or store energy they do not act as a battery storage. They do not store excess energy. They can pause activity and reduce how much they pull off the grid at any one point in time but, as in Texas, they do not voluntarily do this unless paid to do so or unless they are at imminent risk of or are currently causing brownouts.

Proof-of-Work cryptocurrency mining uses a staggering amount of energy with each Proof-of-work-authenticated transaction, creating the same amount of greenhouse gas emissions as approximately 90 gallons of gasoline. Other forms of validation, such as proof-of-stake, open representative voting, federated consensus, proof-of-activity, and proof-of-burn, utilize far less energy, posing less of a threat to meeting state and federal climate change emissions goals. With appropriate regulation, it is possible for validation methods to transition to a less energy-consumptive method of authentications, as Ethereum recently succeeded in doing, resulting in a total immediate reduction in over 99.5% of their total energy consumption and a total 0.2% drop in global energy consumption.

Please pass the "Crypto-Asset Environmental Transparency Act" to require the Environmental Protection Agency to conduct a comprehensive impact study of U.S. cryptocurrency mining activity and require the reporting of greenhouse gas emissions from cryptocurrency mining operations that consume more than 5 megawatts of power. We must carefully study the environmental and grid impacts of cryptocurrency mining methods, such as proof-of-work mining, and implement appropriate statutes and regulations to prevent the damage it is doing and will continue to do to our public health and environment.

Sincerely,

A handwritten signature in black ink that reads "Anna R. Kelles". The signature is written in a cursive, flowing style.

Anna R. Kelles