

GBBC Open-Source Ideas Series: Global Energy

Part II: Proof-of-Work Mining

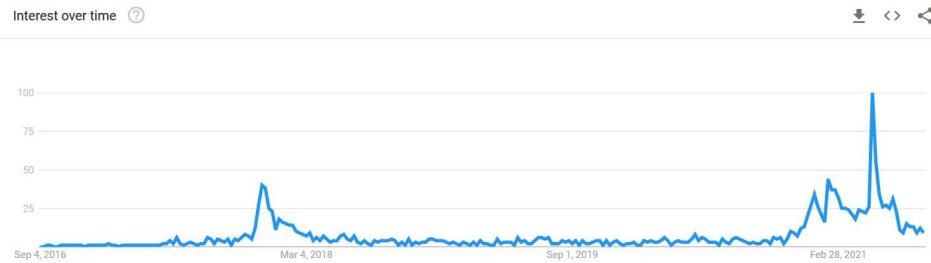


15 September 2021

Toronto, Canada

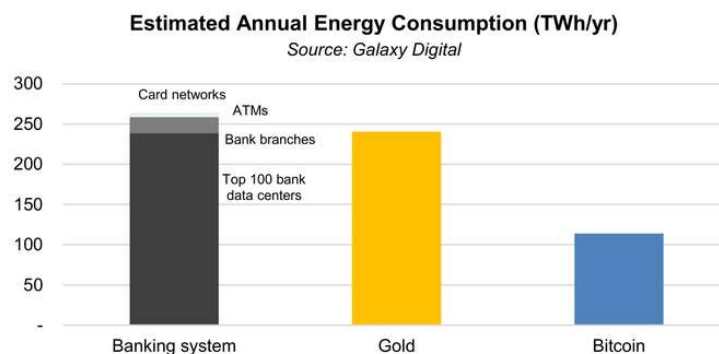
Introduction

The energy use of proof-of-work (POW) has recently been thrust into the spotlight, with various politicians and business leaders speaking out on the topic. Most notably, this includes Tesla and SpaceX CEO Elon Musk, who in May 2021 tweeted out to his nearly 60 million followers that “Tesla has suspended vehicle purchases using Bitcoin. We are concerned about rapidly increasing use of fossil fuels for Bitcoin mining and transactions, especially coal, which has the worst emissions of any fuel.”ⁱ Citing the Cambridge Bitcoin Electricity Consumption Index, he added that Bitcoin’s energy “usage trend over [the] past few months is insane.”ⁱⁱ These tweets were correlated with a significant increase in Google searches for “bitcoin energy” in May 2021.



This public criticism was followed by increased media reporting on the energy consumption of Bitcoin, with *The Wall Street Journal* stating that in the U.S., “older fossil-fuel power plants are shutting down in favor of renewable energy. But some are getting a new lease on life—to mine Bitcoin. In upstate New York, an idled coal plant has been restarted, fueled by natural gas, to mine cryptocurrency.”ⁱⁱⁱ This was accompanied by additional political scrutiny, both on the national^{iv} and state levels. In June 2021, the New York State Senate passed a bill to establish “[a] moratorium on consolidated operations that use” POW to validate blockchain transactions; this bill is currently before the Assembly.^v

These criticisms have been met with resistance from cryptocurrency proponents, as a report by Square and ARK Invest states that Bitcoin miners “function as a unique energy buyer that could enable society to deploy substantially more solar and wind generation capacity. This deployment, along with energy storage, aims to facilitate the transition to a cleaner and more resilient electricity grid... [Miners] offer highly flexible and easily interruptible load, provide payout in a globally liquid cryptocurrency, and are completely location agnostic, requiring only an internet connection”^{vi} Stated plainly by Square and Twitter CEO Jack Dorsey: Bitcoin “incentivizes renewable energy.”^{vii} Additionally, a research report by digital asset firm Galaxy Digital estimates that Bitcoin uses about half of the banking system’s annual energy consumption. Industry proponents continue to maintain that Bitcoin and other cryptocurrencies are an essential part of developing a carbon-neutral grid.

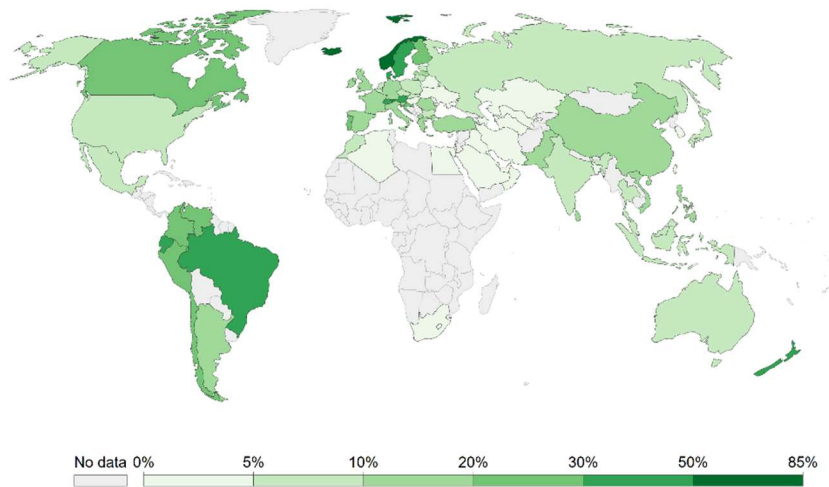


POW Mining and Renewable Energy

An individual's opinion on the energy usage and carbon footprint of Bitcoin and other POW blockchains likely depends on how useful they believe these blockchains and cryptocurrencies are, as well as which sources they trust. For example, the widely cited Cambridge Centre for Alternative Finance estimated in September 2020 that 39 percent^{viii} of POW mining is powered by renewable energy, while CoinShares provided a "conservative estimate" of 73 percent.^{ix} The wide range of estimates is a result of different methodologies, and it is important to note that these figures will fluctuate as mining operations move. For example, many miners were forced to relocate from China because of a government ban on mining.^x

Share of primary energy from renewable sources

Renewable energy sources include hydropower, solar, wind, geothermal, bioenergy, wave and tidal. It does not include traditional biofuels, which can be a key energy source especially in lower-income settings.



Source: Our World in Data based on BP Statistical Review of World Energy (2020)

OurWorldInData.org/energy • CC BY

Note: Primary energy is calculated using the 'substitution method' which takes account of the inefficiencies energy production from fossil fuels.

It is true that POW mining does to some degree incentivize renewable energy — including energy storage — deployment. However, the procurement of renewable energy via Power Purchase Agreements (PPAs) is not an easy or cost-efficient task. While wind and solar prices have declined over the years, prices are now in an upward trajectory due to supply chain constraints, Energy Performance Certificate (EPC) costs, and commodity prices. Further, transactions of long-term Renewable PPAs and energy depend on a wide variety of factors, including economics, wind/solar capacity (MW) and size/duration of energy storage, generation profile, commercial term (i.e., tenor, credit requirements, physical/financial transaction), developer experience, permits and interconnection, equipment procurement, benefits to the community, and the forward supply/demand curve of the power market.

Hut 8's Approach

Hut 8 utilizes a total of 109 MW and has operating assets located in energy-rich Alberta, Canada, with sites in Medicine Hat and Drumheller. This allows the company to operate in a jurisdiction that is growing its renewable resources while having an abundance of natural gas to provide baseload power. The Province of Alberta's commitment to using fully renewable energy sources by 2023 is important and a major reason Hut is supportive of the province, with a 10-year

electricity supply partnership with the City of Medicine Hat and excellent working relationship with the municipality, community, and provincial government.

In addition, the majestic Alberta prairies enable Hut 8 to take advantage of the flat, free air cooling. The winters are long and cold, and the summers are dry, which allows for the perfect climate for crypto miners, requiring less infrastructure and less energy to cool the equipment.

Energy usage and carbon output are just a part of the environmental impacts of POW mining. Hut 8 is working to minimize its carbon emissions and has taken a number of steps to minimize its footprint, including a recycling program for wood, metal, cardboard, electronics, paper, and Styrofoam, and using reusable air filters to reduce waste volume and lifetime costs. Hut has also installed low-emission LED lighting throughout all facilities in Medicine Hat and Drumheller, and is electrifying the majority of its site vehicles, specifically four UTVs and three skid steers. The company continues to explore ways to increase its operational efficiency in a sustainable manner supporting Canada's larger goal to be leading in carbon emission reduction efforts by 2030.

Conclusion

A recent report from the United Nation's Intergovernmental Panel on Climate Change (IPCC) found that global "warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO₂ and other greenhouse gas emissions occur in the coming decades," causing devastating effects for the world. All industries must take immediate and significant action to become greener. The cryptocurrency mining industry is no different. Besides the work previously mentioned, Hut 8 is planning to engage both local and national community leaders in an effort to educate individuals on the industry and various employment opportunities within. Additionally, the leadership team frequently speaks with the media about the crypto industry, specifically regarding ESG and Hut 8's progress.

The industry has begun to make progress with initiatives like the Crypto Climate Accord, which seeks to "decarbonize the global crypto industry by prioritizing climate stewardship and supporting the entire crypto industry's transition to net-zero greenhouse gas emissions by 2040," and the Bitcoin Mining Council, which was created to serve as an "open forum where Bitcoin miners could promote transparency, share best practices, and educate the public on the benefits of Bitcoin and Bitcoin mining."^x These initiatives will be critical to engage the public and governments, and ultimately make the industry greener.

ⁱ <https://twitter.com/elonmusk/status/1392602041025843203>

ⁱⁱ <https://twitter.com/elonmusk/status/1392780304138473473>

ⁱⁱⁱ <https://www.wsj.com/articles/bitcoin-miners-are-giving-new-life-to-old-fossil-fuel-power-plants-11621594803>

^{iv} <https://twitter.com/SenWarren/status/1402725005113364486?s=20>

^v <https://www.nysenate.gov/legislation/bills/2021/a7389/amendment/a>

^{vi} <https://twitter.com/sqcrypto/status/1384901045134974978?s=20>

^{vii} <https://twitter.com/jack/status/1384903902907314176>

^{viii} <https://www.jbs.cam.ac.uk/faculty-research/centres/alternative-finance/publications/3rd-global-cryptoasset-benchmarking-study/>

^{ix} <https://coinshares.com/research/bitcoin-mining-network-december-2019>

^x <https://bitcoinminingcouncil.com/>