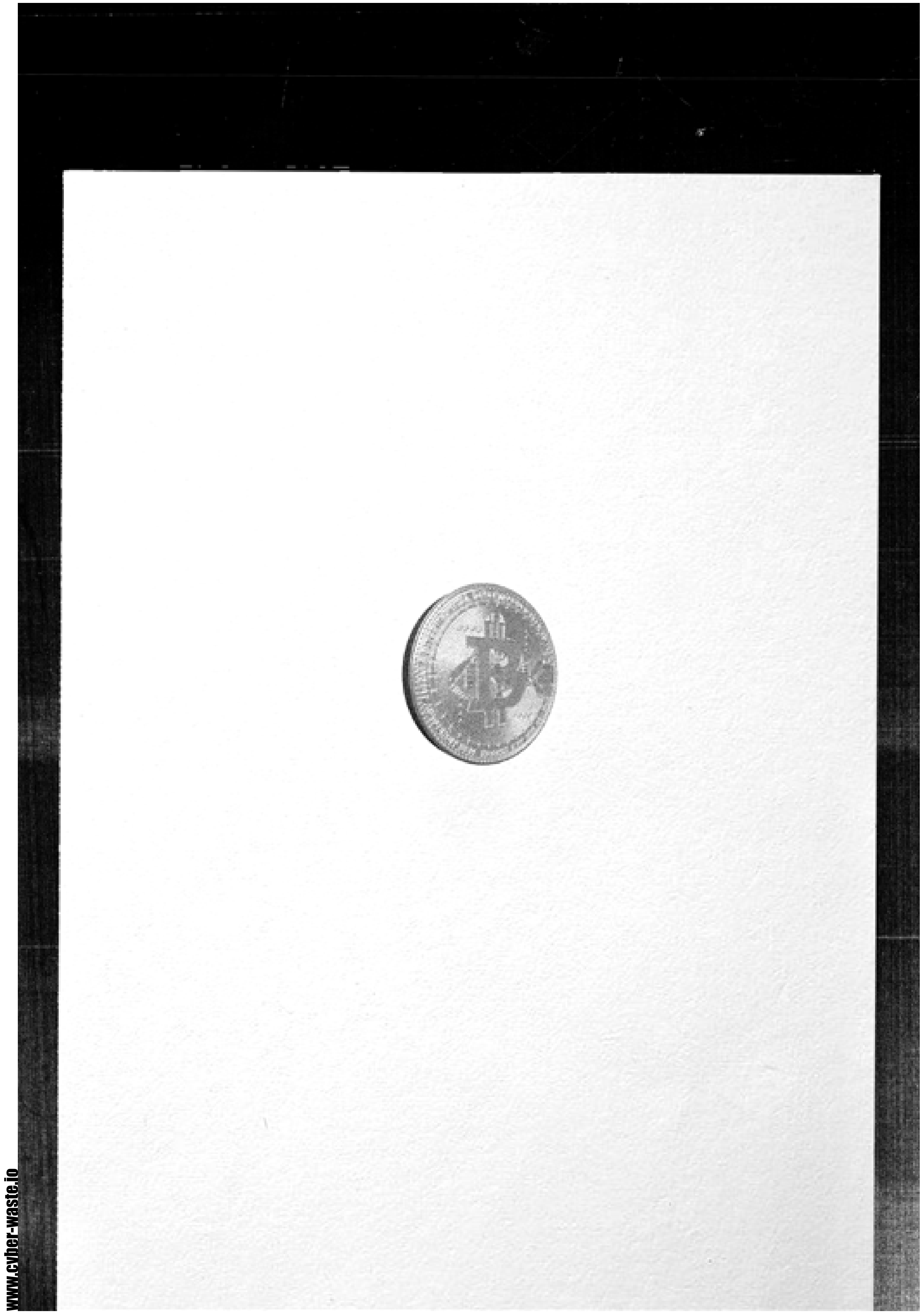
FUTURE FIN.

POSTRATIONAL.

[WWW.CYBER-WASTE.IO](http://www.cyber-waste.io)
INFO@POSTRATIONAL.NET



www.cyber-waste.io

FUTURE FIN.

Cyber-Waste argues that there are hidden waste effects that emerge from digital technology and its infrastructures, and that these waste effects are often hard to see because of a persistent myth that the digital, the virtual, the informational, is somehow cleaner and less substantial than the physical, real, material world. In reality, infrastructures of a ‘digital’ economy are just as physical as the factory or the workshop, and their rise and ubiquity mean they consume a huge amount of energy and cause lots of pollution, like most industrial processes.

This does not mean that these processes are inherently bad. The way that lithium, copper, cobalt and other rare earth materials are currently extracted, the way that waste is accounted for in these processes, and who suffers as a result, are all cause for scrutiny. However, investing in sources and systems for digital technology, renewable energy and its storage is clearly of potential interest to everyone on earth, especially as it becomes impossible to justify continued carbon-based energy production if we are to keep global warming under 2°C. Similarly, the way data is currently acquired and governed is a cause for concern about concentration of power, and what questions and energy are put into maintaining this infrastructure; however, the promise of using big data to answer social questions and allocate resources more effectively is clearly of mass interest.

It is harder to make this argument with cryptocurrency, and Bitcoin in particular. Bitcoin was originally promised as a new form of digital currency. In 2008, Satoshi Nakamoto wrote a white paper entitled ‘Bitcoin: A peer to peer electronic system’. He outlined ‘a purely peer-to-peer version of electronic cash [which] would allow online payments to be sent directly from one party to another without going through a financial institution’.[1] One of the key aspects of Bitcoin’s security is its Proof of Work algorithm, which confirms transactions that have taken place. Computers (or miners) compete with each other by solving complex computational problems (mining) to complete transactions on the network. They can then be rewarded with newly released tokens, such as Bitcoin, which can be used to pay for things, securely. Being able to extract new currency relies on computing power, known as mining.[2]

In reality, Bitcoin has not functioned as a new and disruptive peer to peer electronic currency at any great scale. It has functioned not as a cryptocurrency but as a cryptoasset, as its price volatility made it an attractive investment class in the wake of low growth elsewhere in the economy. As more and more people rush to acquire Bitcoin, the difficulty and complexity of the problems the computers need to solve grows. This is built into the design of the system. This has led to huge Bitcoin ‘farms’, with rows upon rows of servers solving computer problems to acquire Bitcoin, further pushing up the price of Bitcoin and further pushing up the network’s computational demands.

As Tim Swanson writes, 'proof-of-work chains continue to consume resources in direct proportion to the underlying coin value'.[3] These computational demands are staggering as is the accompanying energy consumption. Similar to data centres, the demands are not just power, but also water for cooling.This is also why Bitcoin farms tend to exist in countries with lower temperatures and cheap energy, more often than not powered by coal. For example, Xinjiang province in China accounts for about one third of Bitcoin generation, and despite many renewable energy systems in development, the majority of electricity in the province comes from coal.[4] Bitcoin farms sometimes piggyback on public utilities, the losses (such as pollution and energy outages) are socialised, the gains accrued privately. In March 2021, a report in Joule by Alex De Vries concluded that the Bitcoin network could consume the same amount of energy as all data centres globally.[5] The Cambridge Bitcoin Electricity Consumption Index keeps track of the total electricity production and consumption of the Bitcoin network, and provides comparisons between Bitcoin network and nation states. At the time of publication, if Bitcoin were a country, it would consume 135.01 TW per year, more than any of Sweden, Norway, Argentina, Ukraine and the United Arab Emirates.

However, the network creates waste and material dependencies beyond electricity consumption and carbon emissions. The computers required to solve puzzles and extract Bitcoin are specially made, and single use. They run for 18-24 months and, though a small number of them can be repurposed for parts, the vast majority are discarded, creating significant levels of often toxic eWaste. This is only discarded eWaste, not the waste created in the production process. In general, for electronic goods, over 50% of carbon emissions and 90% of total waste is generated in the upstream mining and production of a device, not in its discarding.[6] The demand for computers that can mine for Bitcoin is affecting other computing industries as well. By 2017, cryptocurrency accounted for around 5% of global semiconductor demand, according to a presentation given by Chen Min, a chip designer at Avalon Mining.[7] The global semiconductor shortage is exacerbated by demand for more advanced processing power as the price of Bitcoin increases, alongside the potential rewards accrued from mining them.[8] A recent report has suggested that cryptocurrency miners are now creating shortages in the laptop market too, buying up stock for their GPU (Graphics Processing Units) and only using them for single use. 'For the third time in less than five years, cryptocurrency mining has pushed GPU prices beyond all sanity'.[9]

The environmental waste of Bitcoin is not going away. Even advancements in processing power does not tend to lead to lower energy consumption: farms do not downsize but 'replace aging hardware with newer ones: they must run faster in order to stay in the same place'.[10] Or rather, Bitcoin mining will produce more environmental waste the higher its price goes. In her book about the development of 'energy' as a moral, western concept during the Industrial Revolution, Cara New Daggett writes that the original conception of energy is one that is productive, compared to unproductive leakage of waste. Energy was equated with work, waste with idleness.[11] The legacy of putting fossil fuels to work is plain to see; Daggett argues that the very concepts of energy and work need to be decoupled to ensure a habitable planet. At a time of climate breakdown, we are only beginning to see the value in not working, of valuing a forest in its extant state rather than chopped down and repurposed. Or, in other words, the value in leaving the biological and ecological worlds to do their world and remove carbon from the atmosphere.

This is a useful lens through which to consider Bitcoin and its Proof of Work system, an unintentional manifestation of Daggett's argument. Only by consuming vast quantities of energy in order to demonstrate legitimate work done can miners access Bitcoin. This raises the price of admission to those who can afford the machinery to carry out that work, so the benefits are enclosed while the costs - huge carbon emissions - are borne by all. If Bitcoin were truly a world-changing electronic payments system that was truly revolutionary, there may be more credible arguments in its defence. Instead, Bitcoin in reality is co-dependent on traditional finance and, what's more, a far less efficient payments and processing system than those that have existed for decades, handling payments of only around $4bn per year.[12]

At its heart, Cyber-Waste looks to dispel the notion that the digital and real worlds are substantially different, and that this understanding will reveal that, contrary to the rhetoric, there is quite a lot of waste built into digital technology. The vast physical apparatus of Bitcoin, not to mention its enormous and growing carbon footprint, clearly demonstrates this. The governance of Bitcoin, presented as revolutionary but in fact an instrument for elite financial speculation, is another sign of wasted or harmful energy.

Nowhere is this strange entanglement between climate breakdown and sustainability, between elite access and populist rhetoric, more apparent than in the recent bizarre story of Tesla and Bitcoin. Tesla vehicles promise to save the world, by weaning it off petrol (though much has been written about the limitations of simply replacing existing private transportation with EVs). It makes a lot of its money through carbon credits. Tesla recently acquired $1.5bn of Bitcoin, further pushing its price up and therefore increasing its emissions. And then it announced that it would start accepting Bitcoin as payment for Teslas, a rare public example of using Bitcoin as a payment technology. Viewed from another angle, however, it is easy to read this as Tesla, a so-called green technology company, buying Bitcoin with orders for its as-yet unmade vehicles.

Bitcoin was presented as solving a monetary or payments problem, a rhetorically powerful premise that plays on general but nonspecific mistrust of seemingly unaccountable financial institutions, from central banks to asset managers, especially at the time of Bitcoin's creation at the height of the Global Financial Crisis (GFC). However, as JP Koning notes, 'what is now apparent is that bitcoin was never a monetary phenomenon. It is a new sort of financial betting game. It is a digital, global, highly secure, and fairer version of the old-fashioned chain letter'[13]. The hidden costs of Bitcoin are increasingly visible; it is becoming common knowledge that the energy consumption is vast: scientists writing in the journal Nature in 2018 even speculated that Bitcoin emissions alone could push global warming above 2°C. Many of the systems discussed in Cyber-Waste can claim to bring about positive effects for the common good, even if their current arrangements prevent them from doing so. In Bitcoin's case, even on its own terms, it is hard to make that argument.

Endnotes

1. Nakamoto S (2008), Bitcoin: A peer to peer electronic system, (here)
2. Tar, A (2018), Proof-of-work, explained, Cointelegraph, (here)
3. Swanson T (2021), Bitcoin and other PoW coins are an ESG nightmare, Great Wall of Numbers, (here)
4. Goldstein A (2021), Bitcoin could push global emissions above 2 degrees celsius, Truthout, (here)
5. De Vries A (2021), Bitcoin boom: What rising prices mean for the network's energy consumption, Joule (here)
6. Lepawsky J (2020), Sources and streams of electronic waste, (here)
7. Min C (2017), The Future of Proof of Work, (here)
8. Yoon J (2021), Bitcoin mining boom adds to chip price inflation, Financial Times, (here)
9. Hruska J (2021), Cryptocurrency miners are reportedly ruining the laptop market, too, (here)
10. Swanson T (2021), Bitcoin and other PoW coins are an ESG nightmare, Great Wall of Numbers, (here)
11. Daggett CN (2019) The Birth of Energy: Fossil Fuels, Thermodynamics, & the Politics of Work, Duke University Press (here)
12. Swanson T (2021), Bitcoin and other PoW coins are an ESG nightmare, Great Wall of Numbers, (here)
13. Koning JO (2019), Bitcoin 11 Years In, Moneyness, (here)

WWW.CYBER-WASTE.IO
INFO@POSTRATIONAL.NET