

Bitcoin's soaring energy consumption remains a sustainability concern

Bitcoin mining, a crucial part of the cryptocurrency's infrastructure, is largely responsible for a staggering 104% increase in electricity usage. The process involves solving intricate mathematical problems to validate and record transactions on Bitcoin's decentralised ledger. This significant uptick raises pressing questions about the sustainability and environmental impact of Bitcoin mining.



Bitcoin mining activity in 2023 has contributed to a surge in electricity use. Source: Dmytro Denidko/Unsplash

"As Bitcoin popularity surges, more miners seek to capitalise on its value. This emphasises the need to examine and mitigate the environmental impact of mining activities. Environmentalists have consistently voiced concerns about the consequences of Bitcoin mining which pose a threat," explains Edith Reads, a finance analyst at Stocklytics.

"These concerns often revolve around the substantial energy consumption in mining operations, which contributes to increased carbon emissions and environmental degradation. Striking a balance between the advantages of decentralised digital currencies and the environmental impact of their creation is now imperative."



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Bitcoin compared to other payment systems

Over the course of a year, the total energy consumption linked to Bitcoin mining operations surged dramatically from around an estimated 67TWh to over 137TWh. To put things into perspective, the energy used in one transaction could power 474,389 Visa transactions. Additionally, the carbon footprint left behind by a transaction is equivalent to 871,620 Visa transactions.

Possible solutions

Scalability challenges significantly impact Bitcoin's energy consumption, and these issues intricately link to environmental concerns. The primary culprit is the energy-intensive proof-of-work (PoW) consensus mechanism, which has drawn criticism primarily for its substantial energy consumption despite effectively securing the network.

“ Bitcoin grapples with challenges in effectively managing an expanding volume of transactions. ”

Alternative consensus mechanisms, like proof of stake, have emerged in response to these challenges. The primary aim of such alternatives is to decrease energy consumption. This could help achieve up to 99.95% energy savings compared to the energy-intensive PoW method.

At what cost?

Analysts have varying opinions on the environmental impact of Bitcoin mining, which is often tied to discussions about the cost of Bitcoin on the environment.

Many critics argue that the environmental impact of Bitcoin mining is disproportionately high, with a carbon footprint deemed excessive. Some even contend that these emissions surpass those of smaller nations, posing a formidable challenge in mitigating carbon output and contributing to environmental degradation.

The [Cambridge Bitcoin Electricity Consumption Index reveals](#) that Bitcoin creation consumes an annual electricity amounting to 147TWh, exceeding the energy consumption of entire countries such as the Netherlands or the Philippines.

In addressing growing concerns, the mining community is actively working on identifying environmentally friendly alternatives. In its evolution and acceptance, it becomes increasingly crucial for the cryptocurrency industry to actively seek and implement solutions that align with global sustainability objectives.

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