

# Bitcoin can push global warming above 2 C in a couple decades

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Associate Professor, Geography, College of Social Sciences, University of Hawaii at Manoa. Credit: UH College of Social Sciences

A new study published in the peer-reviewed journal *Nature Climate Change* finds that if Bitcoin is implemented at similar rates at which other technologies have been incorporated, it alone could produce enough emissions to raise global temperatures by 2°C as soon as 2033.

"Bitcoin is a cryptocurrency with heavy hardware requirements, and this obviously translates into large electricity demands," said Randi Rollins, a master's student at the University of Hawaii at Manoa and coauthor of the paper.

Purchasing with bitcoins and several other cryptocurrencies, which are forms of currency that exist digitally through encryption, requires large amounts of electricity. Bitcoin purchases create transactions that are recorded and processed by a group of individuals referred to as miners. Miners group every Bitcoin transaction made during a specific timeframe into a block. Blocks are then added to the chain, which is the public ledger. The verification process by miners, who compete to decipher a computationally demanding proof-of-work in exchange for bitcoins, requires large amounts of electricity.

The electricity requirements of Bitcoin have created considerable difficulties, and extensive online discussion, about where to put the facilities or rings that compute the proof-of-work of Bitcoin. A somewhat less discussed issue is the environmental impacts of producing all that electricity.

A team of UH Manoa researchers analyzed information such as the power efficiency of computers used by Bitcoin mining, the geographic location of the miners who likely computed the Bitcoin, and the CO<sub>2</sub> emissions of producing electricity in those countries. Based on the data, the researchers estimated that the use of bitcoins in the year 2017 emitted 69 million metric tons of CO<sub>2</sub>.

Researchers also studied how other technologies have been adopted by society, and created scenarios to estimate the cumulative emissions of Bitcoin should it grow at the rate that other technologies have been incorporated.

The team found that if Bitcoin is incorporated, even at the slowest rate at which other technologies have been incorporated, its cumulative emissions will be enough to warm the planet above 2°C in just 22 years. If incorporated at the average rate of other technologies, it is closer to 16 years.

"Currently, the emissions from transportation, housing and food are considered the main contributors to ongoing climate change. This research illustrates that Bitcoin should be added to this list," said Katie Taladay, a UH Manoa master's student and coauthor of the paper.

"We cannot predict the future of Bitcoin, but if implemented at a rate even close to the slowest pace at which other technologies have been incorporated, it will spell very bad news for climate change and the people and species impacted by it," said Camilo Mora, associate professor of Geography in the College of Social Sciences at UH Manoa and lead author of the study.

"With the ever-growing devastation created by hazardous climate conditions, humanity is coming to terms with the fact that [climate change](#) is as real and personal as it can be," added Mora. "Clearly, any further development of cryptocurrencies should critically aim to reduce [electricity](#) demand, if the potentially devastating consequences of 2°C of global warming are to be avoided."

Provided by University of Hawaii at Manoa

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