

# Energy-intensive Bitcoin transactions pose a growing environmental threat

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A study published in *Energy Research & Social Science* warns that failure

to lower the energy use by Bitcoin and similar Blockchain designs may prevent nations from reaching their climate change mitigation obligations under the Paris Agreement.

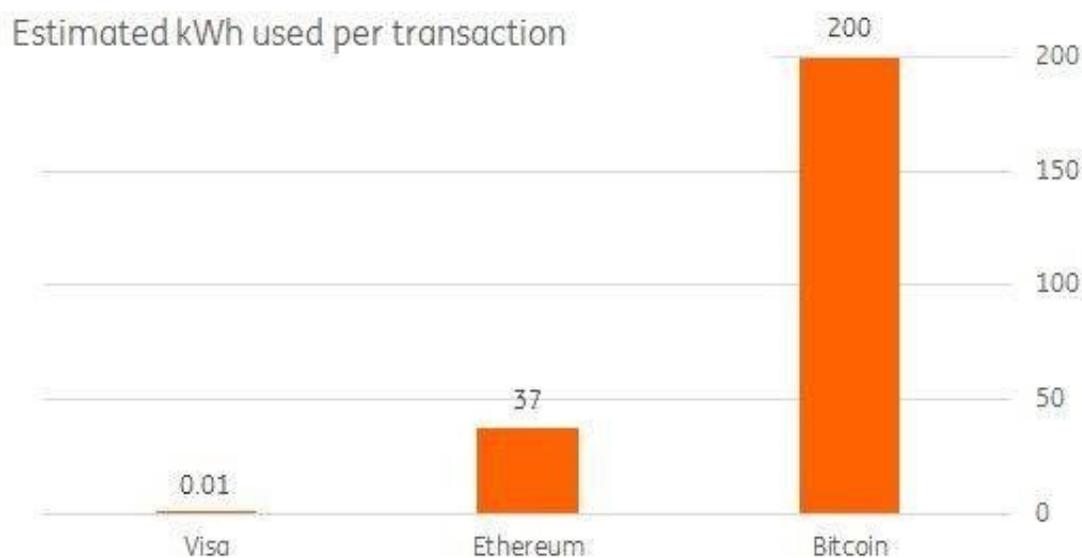
The study, authored by Jon Truby, Ph.D., Assistant Professor, Director of the Centre for Law & Development, College of Law, Qatar University, Doha, Qatar, evaluates the financial and legal options available to lawmakers to moderate [blockchain](#)-related energy consumption and foster a sustainable and innovative [technology](#) sector. Based on this rigorous review and analysis of the technologies, ownership models, and jurisdictional case law and practices, the article recommends an approach that imposes new taxes, charges, or restrictions to reduce demand by users, miners, and miner manufacturers who employ polluting technologies, and offers incentives that encourage developers to create less energy-intensive/carbon-neutral Blockchain.

"Digital currency mining is the first major industry developed from Blockchain, because its transactions alone consume more electricity than entire nations," said Dr. Truby. "It needs to be directed towards sustainability if it is to realize its potential advantages.

"Many developers have taken no account of the environmental impact of their designs, so we must encourage them to adopt consensus protocols that do not result in high emissions. Taking no action means we are subsidizing high energy-consuming technology and causing future Blockchain developers to follow the same harmful path. We need to de-socialize the environmental costs involved while continuing to encourage progress of this important technology to unlock its potential economic, environmental, and social benefits," explained Dr. Truby.

As a digital ledger that is accessible to, and trusted by all participants, Blockchain technology decentralizes and transforms the exchange of assets through peer-to-peer verification and payments. Blockchain

technology has been advocated as being capable of delivering environmental and social benefits under the UN's Sustainable Development Goals. However, Bitcoin's system has been built in a way that is reminiscent of physical mining of natural resources—costs and efforts rise as the system reaches the ultimate resource limit and the mining of new resources requires increasing hardware resources, which consume huge amounts of electricity.



Bitcoin's peer-to-peer transaction verification is a polluting process, requiring machine hardware around the world to run at a high rate, 24 hours a day, producing vast amounts of heat and emissions. Credit: Elsevier, *Energy Research & Social Science*

Putting this into perspective, Dr. Truby said, "the processes involved in a single Bitcoin transaction could provide electricity to a British home for a month—with the environmental costs socialized for private benefit.

"Bitcoin is here to stay, and so, future models must be designed without

reliance on energy consumption so disproportionate on their economic or social benefits."

The study evaluates various Blockchain technologies by their carbon footprints and recommends how to tax or restrict Blockchain types at different phases of production and use to discourage polluting versions and encourage cleaner alternatives. It also analyzes the legal measures that can be introduced to encourage technology innovators to develop low-emissions Blockchain designs. The specific recommendations include imposing levies to prevent path-dependent inertia from constraining innovation:

- Registration fees collected by brokers from digital coin buyers.
- "Bitcoin Sin Tax" surcharge on digital currency ownership.
- Green taxes and restrictions on machinery purchases/imports (e.g. Bitcoin mining machines).
- Smart contract transaction charges.

According to Dr. Truby, these findings may lead to new taxes, charges or restrictions, but could also lead to financial rewards for innovators developing carbon-neutral Blockchain.

**More information:** Jon Truby, Decarbonizing Bitcoin: Law and policy choices for reducing the energy consumption of Blockchain technologies and digital currencies, *Energy Research & Social Science* (2018). [DOI: 10.1016/j.erss.2018.06.009](https://doi.org/10.1016/j.erss.2018.06.009)

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