Bitcoin Policy Institute

Key Facts on Bitcoin & the Environment

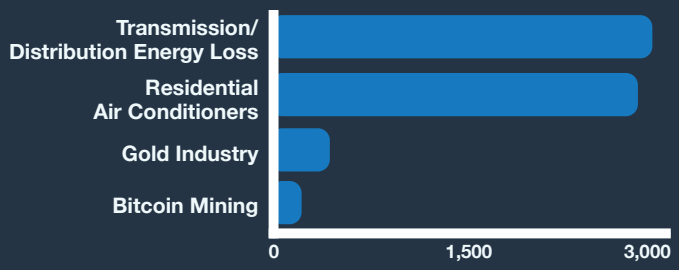
Bitcoin mining underpins a regulated U.S. commodity market valued at almost $1 trillion dollars. With more than 100 million users worldwide, Bitcoin is an open monetary network that allows anyone with an Internet connection to store wealth securely and make payments anywhere with nearly instant final settlement. While the Proof of Work (PoW) mechanism it uses to secure transactions is energy-intensive, Bitcoin's environmental impact is greatly overstated and rarely considered in the context of advantages it may provide over non-natively digital alternatives. Often overlooked are the ways mining may benefit the environment, the energy grid, and the U.S. economy.

Environmental Impact

Bitcoin PoW accounts for roughly 0.27% of global energy consumption[1]– less than gold mining or residential air conditioners.

Bitcoin energy consumption is 28-56% renewable,[2,3] while U.S. consumption was only 12%[4] renewable in 2020. Bitcoin is thus driving more demand for renewable energy than the typical U.S. energy consumer.

Annual Energy Consumption (KWh/yr)



Looking Ahead

Scaling protocols that interoperate with Bitcoin enable it to grow globally without a proportionate increase in energy consumption. The Lightning Network, for example, enables the settlement of millions to billions of payments in a single bitcoin transaction.[10]

Recent projections[11] determined that even if bitcoin's price rises to **$490,000, mining would peak at 0.9% of global carbon emissions in 2027 and decline thereafter.**

Potential Benefits to Renewables & Grid Stability

Bitcoin miners offer utilities a co-located power consumer that can plug in anywhere and switch on and off instantly.[5] **These qualities may provide unique benefits to renewable energy generation and grid stability.**

Renewable energy operations are constrained when energy generation exceeds what can be used locally or transmitted.[6] Because miners can plug in anywhere and switch on and off instantly, renewable firms can boost profits by mining bitcoin with energy that would otherwise have been wasted. One study found that integrating bitcoin mining can lead to a 50-80%[7] reduction in curtailed (i.e., wasted) renewable generation, increasing efficiency and profitability. Already, Texas-based Lancium is building a 2,000 MW renewable energy plant that will incorporate bitcoin mining[8] to deal with curtailment and alleviate congestion when too much solar or wind is being produced.

Bitcoin miners support "demand response" programs for utilities and act as a form of controllable load[9], able to adjust their power profile within seconds. This helps keep energy grids stable, improves the resilience of the overall system, and may mitigate shocks like the Texas blackouts in Feb 2021.

More Research is Needed

Bitcoin's impact on energy economics, grids, and the environment is a complex question that should be analyzed and answered using credible data—resulting in evidence-based policy.

An often-cited study warning that "bitcoin could push global temperatures above 2 degrees" has been widely debunked by climate experts in peer reviewed journals. Three separate articles (all published by *Nature Climate Change*) dismissed the study because of its poor methodology and false assumptions: with one warning, **"[T]he scenarios used by Mora et al are fundamentally flawed and should not be taken seriously by the public, researchers, or policymakers."**[12]

Citations

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