

# Pakistan's Surplus Electricity and the Feasibility of Bitcoin Mining

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**Author**

Manzoor Ahmed Alizai

**Designer**

Usman Tariq



Pakistan's Federal Government, in a strategic attempt to utilize its surplus electricity, has allocated 2,000 megawatts of electricity to phase in Bitcoin mining and Artificial Intelligence (AI) data centres. Headed by the Pakistan Crypto Council (PCC), a government-backed body under the Ministry of Finance, this move aims to convert the surplus electricity into a revenue-generating asset, create high-tech jobs, increase economic growth, and attract foreign direct investment.<sup>1</sup>

The global energy demand to power AI data centers has reached 100 gigawatts (GW), whereas the supply is around 15 GW.<sup>2</sup> This shortfall is seen as an opportunity for countries like Pakistan to capitalize on their excess electricity generation capacity. This assumption, however, warrants further scrutiny, particularly in light of Pakistan's economic challenges and ongoing issues in its power sector - such as grid instability, high electricity costs, and weak transmission capacity—that could directly affect large-scale mining operations.

Over the years, Pakistan's stance on crypto and digital infrastructure has not been consistent. In 2018, the State Bank banned crypto trading and mining due to concerns about illegal use. In 2020, the Khyber Pakhtunkhwa government took a step to legalize crypto mining and set up hydro-powered mining farms. By 2021, unregulated crypto use in Pakistan had grown, with around 15–20 million active users and 25 billion dollars in yearly trading. Through the government's current initiative, it aims to earn 2 billion dollars annually by licensing Bitcoin mining facilities and charging for the energy they use. It has also created a Strategic Bitcoin Reserve—holding Bitcoin as part of the country's assets, joining a small group of countries doing the same.<sup>3</sup> While this approach offers new ways to earn money and spread financial risk, it also comes with risks like sharp changes in Bitcoin's value, hacking threats, and changing international rules, making the long-term results uncertain.

April 2018 — Ban Imposed	2020 — KPK Legalizes Mining	2021 — Crypto Adoption Booms	2025 — National Crypto Strategy
SBP bans crypto trading & mining  Reason: Financial instability & illicit use	Khyber Pakhtunkhwa passes pro-crypto resolution  Launch of govt-funded mining farms powered by hydroelectricity	Pakistan ranks #3 globally in crypto adoption (Chainalysis Index)  Estimated 15–20 million users  Annual trading volume: \$25 billion	Govt allocates 2,000 MW surplus electricity for mining & AI  Revenue potential: \$2 billion/year  Launch of Strategic Bitcoin Reserve as a sovereign asset

Before diving into whether bitcoin mining or maintaining bitcoin reserves is feasible or not, it is important to first understand how the bitcoin ecosystem actually works.

To put it simply, imagine a ledger or personal diary where a person records every transaction or payment made. Each entry is added one after another until the entire page is filled. Let's call this page a block. Once filled, the page is turned, and the next page/block begins. This is the foundation of how Bitcoin records and secures its transactions — through a continuous chain of blocks also known as blockchain technology.

Now, who fills these pages? That's where miners come in. Miners compete with each other to solve a complex mathematical puzzle. The first to solve it gets to confirm the transactions—essentially verifying and grouping them—and officially generate the block, which is then added to the blockchain as a permanent record. In return, the miner is rewarded with bitcoins. This incentive structure encourages miners to keep the system running and secure. Crypto organizations—such as mining companies, exchanges, and infrastructure providers—benefit

<sup>1</sup> <https://www.brecorder.com/news/amp/40364682>

<sup>2</sup> <https://www.brecorder.com/news/40364682/bitcoin-mining-ai-data-centres-pakistan-govt-allocates-2000mw-of-electricity>

<sup>3</sup> <https://www.pakistantoday.com.pk/2025/06/11/pakistans-bold-leap-into-cryptocurrency-mining/>



by earning transaction fees, gaining access to newly minted bitcoins, and building business models around supporting or facilitating these mining operations.

However, bitcoin was designed to limit how many coins enter circulation over time, with the overall total capped at 21 million units. To achieve this, the reward for mining — known as the block incentive — is automatically reduced at regular intervals through a process called halving. This happens roughly every four years. For instance, in 2012, each mined block earned a reward of 50 bitcoins. By 2020, this reward had dropped to 6.25 bitcoins, and after the latest halving in 2024, it stands at 3.125 bitcoins.<sup>4</sup>

An essential component of this process is the concept of proof of work. The puzzle that Bitcoin miners solve isn't a regular one — it needs a lot of computing power. To solve it, miners make lots of guesses, and each guess is called a hash. You can think of a hash like trying different combinations on a lock until you find the one that opens it. The more guesses (hashes) a miner can make each second, the higher their chance of finding the right answer — this speed is called the hashrate. Since the puzzle is extremely difficult and requires trillions of guesses, miners need very powerful and fast computers to compete effectively. As more bitcoins are mined and the system gets more crowded, miners need even more guesses and more energy and powerful computing speeds to stay competitive.

This is why Bitcoin mining was much simpler in the early days. Back in 2012, there were fewer people mining and fewer bitcoins in circulation, so the mathematical problems/puzzles that needed to be solved were much easier. At that time, even a regular laptop could solve enough of these problems—called “hashes”—to successfully earn new bitcoins. Today, however, it requires massive mining farms made up of highly

specialized computing machines, running 24/7. These machines not only consume vast amounts of energy but also need powerful cooling systems to prevent overheating — adding further to resource use.

Back in 2012, the average electricity required to mine one bitcoin was around 500 kilowatt-hours (kWh). Now, that figure has skyrocketed. On average, mining 1 bitcoin in 2024 consumes around 6,400,000 kilowatt-hours (kWh) of electricity, which is equivalent to powering 61 American homes for a whole year.<sup>5</sup>

While the reward for mining bitcoins has steadily decreased over time, the energy — and infrastructure — required to earn those rewards has increased dramatically. Setting up a large-scale Bitcoin mining operation today would require significant investment: around 400–500 million dollars for specialized machines, plus another 300–400 million dollars for cooling systems, data center construction, power grid upgrades, and security. Whether such a setup is profitable depends heavily on the price of Bitcoin, which has swung between 15,000 dollars and 70,000 dollars in the past five years, with the current price hovering around 109,000 dollars. Even though a fully optimized 2,000 megawatt mining facility could potentially generate up to 1 billion dollars a year, these returns are highly uncertain. Factors like hardware wear and tear, rising mining difficulty, global competition, and unstable and unsteady Bitcoin prices can quickly erode profits. This uncertainty is central to evaluating whether dedicating large-scale energy resources to Bitcoin mining is a wise decision for a country like Pakistan.<sup>6</sup>

One of the most critical factors in the viability of Bitcoin mining is energy and resource cost. Since mining operations consume vast amounts of electricity, the cheaper the energy, the more feasible and profitable it becomes to run a mining setup or farm. The countries such as Russia and China have large-scale mining setups, with electricity costs roughly between 0.06 and 0.08 dollars per kWh. In comparison, the average cost of electricity in Pakistan is around Rs. 60 per kWh (\$0.22), which is approximately 65 percent higher than in these peer countries. Similarly, nearly 60 to 70 percent of the revenue from Bitcoin mining is typically spent on energy costs.<sup>78</sup>

Secondly, the cost of energy is also dependent on the site of the bitcoin mining farm. For instance, the setup installed up north in colder temperatures would have much lower cooling needs than in the south -

4 <https://www.kraken.com/learn/bitcoin-halving-history>

5 <https://nftveining.com/bitcoin-mining-cost/>

6 <https://www.brecorder.com/news/40365286>

7 <https://www.statista.com/statistics/263492/electricity-prices-in-selected-countries/>

8 <https://profit.pakistantoday.com.pk/2025/03/22/power-division-pakistan-crypto-council-in-talks-to-utilise-surplus-electricity-for-mining/#:~:text=Bitcoin%20mining%20globally%20is%20a%20power%2Dheavy%20process%2C,countries%20such%20as%20Argentina%20or%20the%20Netherlands.>

where additional energy will be required to cool down the whole facility. Therefore, the consideration of the cost and site where the facility will be established is of utmost importance.

Another important issue is how we classify bitcoin - as a commodity or a security. A commodity is a simple product like wheat, oil, or gold that can be traded with other similar products. These are often raw materials used to make other value-added products. A security is something you can buy or sell that has value, like a stock or bond. It's a type of investment that can be traded for money. In the same way, the regulations for trading securities (like stocks and bonds) are much stricter than the rules for trading commodities (like oil or wheat). People see cryptocurrencies in different ways — some think they are like commodities (such as gold as a store of value), while others see them as securities (like stocks). Crypto companies raise money through Initial Coin Offerings (ICOs) by selling digital coins, which let investors join the project and earn profits—similar to how companies sell shares of stocks in Initial Public Offerings (IPOs) on the stock exchange. How we decide to treat them can strongly affect what happens to crypto in the future.

Whether we consider bitcoin as a commodity or a security, it is a highly speculative asset with volatile price fluctuations. For comparison, bitcoin can experience a price change of 10–15 percent in a single day, compared to stocks, which can only go as much as 1–5 percent. Similarly, a commodity like gold can fluctuate 0.5–2%. Therefore, bitcoin trading is considered a perfect betting market for short-term traders - high risk, high reward. Then there are long-term investors who consider bitcoin as an asset (store of value) and have been accumulating bitcoin as a long-term investment. They are not bothered about bitcoin price volatility and are of the opinion that when more and more people get involved in bitcoin trading, the less volatile it will get and the limited circulation supply will increase its value.

Given all these uncertainties, Pakistan needs to approach Bitcoin mining with caution. Right now, there's no clear government policy or regulatory framework for Bitcoin or AI-related technologies, which makes

the whole process risky and unstructured. The government's weak oversight may enable mismanagement or illegal use. Additionally, Bitcoin is a highly volatile asset—unlike dollars or gold, which are considered

more stable and secure. With Pakistan's fragile economy and inconsistent income sources, it's important to ask: can we really afford to rely on something so unpredictable?

Bitcoin's association with fraud and money laundering cannot be ignored as well. In 2024 alone, an estimated 2.2 billion dollars was stolen from individuals through crypto-related fraud. Reports suggest that around \$40 billion was laundered using various crypto methods, and over 51 billion dollars in digital assets flowed into illicit accounts. In the United States, more than 150,000 complaints related to crypto scams were filed, with investment scams alone causing losses exceeding 5.8 billion dollars<sup>9,10</sup>. In parallel, several cases have emerged from developing countries where people were targeted by deceptive crypto schemes. Many individuals, lured by the promise of high returns, took out loans to invest—but ended up losing their savings.<sup>11,12</sup>

These patterns raise serious concerns for countries like Pakistan, where regulatory safeguards are weak and public awareness is low, increasing the risk of exploitation and financial harm to already struggling communities. Before jumping into large-scale mining as proposed by the government, a proper feasibility study must be done—looking at the social, financial, and economic impacts. Globally, countries are tapping into low-cost indigenous energy resources to reduce the costs of energy-intensive components of Bitcoin mining, like infrastructure and cooling systems. This means identifying suitable locations where energy is cheap, cooling needs are low, and access is easy. Also, since Bitcoin's value can go down and equipment depreciates, is it even worth the cost for the average miner? For a developing country like Pakistan, where every investment must count, this is not just a technology issue—it's a complex, multi-dimensional decision that needs serious planning and careful execution at every level: government, investor, and individual.

9 <https://www.chainalysis.com/blog/2025-crypto-crime-report-introduction/>

10 <https://coinledger.io/research/crypto-crime-report-2025-statistics-trends>

11 <https://www.theguardian.com/technology/2024/jan/24/hyperverse-crypto-scheme-targeted-developing-countries-before-collapse-left-some-investors-suicidal>

12 <https://www.sec.gov/newsroom/press-releases/2024-11>