

# Fossil Fuels Burden In Cryptocoin Mining

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## ABSTRACT

*Crypto currency is digital platform works itself as a exchange media for individual coin ownership. Multiple computerized layers control the data transactions makes secure and with most safe mode. Decentralized model and promising technological allows outside the control of central authorities. Wide adaption creates heavy circulations of currency coins globally. These circulations of coins through the block chains require high configuration computers test rigs to solve complex puzzles. Mining is very slow process and consume huge power in the form of electricity. Fossil fuel burden is resent challenge to make the process of mining environment friendly.*

**Keyword-** Crypto currency, Mining, Carbon emission

## 1. INTRODUCTION

Crypto coins created through a process of mining involved powerful computers compete to solve complex mathematical problems. The process is energy dependable, used electricity generated by fossil fuels. The crypto mining means getting crypto currencies by solving cryptographic equations through the use of computers. This process includes validating blocks and adding transaction records to a public record (ledger) known as a block chain. It is the process of creating new Crypto coins by solving a computational puzzle. Such mining is necessary to maintain the ledger of transactions upon which Crypto coins is based. Nowadays Miners have using complex machinery and rigs to speed up mining operations. In early stages of Crypto coins in the early 2000s, individuals does Crypto coins mining using their personal computers. With increase in popularity mining become difficult. To accommodate the growing level of difficulty, more computer processing power was required. The miners used gaming computers to attempt to mine Crypto coins. It makes mining difficulty and amount of computing power required increased. Before computers and chips were created for the sole purpose of mining Crypto coins. Today, it requires sophisticated hardware along with strong computing abilities and energy requirement. To Solve Crypto coins algorithm and to add in the block chain and receiving Crypto coins requires huge amount of electricity. Keeping costs of electricity low is the resent challenged making Crypto coins mining profitable and sustainable. Crypto coins mining are the process of creating new Crypto coins by solving a computational puzzle. This leads heavy energy usages and used fossil fuel usage causes environmental damages and pollutions.

### 1.1 Concept Cryptography

In cryptography it provides secure communication in the presence of malicious third-parties as adversaries. Encryption uses an algorithm and a key to transform an input into an encrypted output. Advance cryptography uses complex mathematical equations (algorithms) and secret keys to encrypt and decrypt data. Recently cryptography prefer as it provides secrecy and integrity to our data, and both authentication and anonymity to the transact communications.

### Features of Cryptology

- Confidentiality: keep communication private.
- Integrity: detect unauthorized alteration to communication.
- Authentication: confirm identity of sender.
- Authorization: establish level of access for trusted parties.
- Non-repudiation: prove that communication was received.

### 1.2 Different Models

Cryptography risky when the security of your computer if people can break into it through other means. But cryptography will shield your data, which should help to minimize the impact of a penetration if it may happen.

## 2. CIRCULATION AND MINING

The term circulating supply refers to the number of crypto currency coins or tokens that are available publicly and its circulation in the market. The circulating supply of it will gradually increase the certain fix supply of blocks in chain for million coins. The amount of coins or token in circulation is a fluctuating value that can rise or decline over time period. If a crypto currency is minable then new coins can be get created gradually in the process of mining. The supply can also go down either deliberately via burning or as a result of accidents, like sending coins to an irrecoverable address or to funds are stored wallet. The network at large has no reliable knowledge of how much of the total supply is in active circulation, making the metric of circulating supply an imperfect approximation.

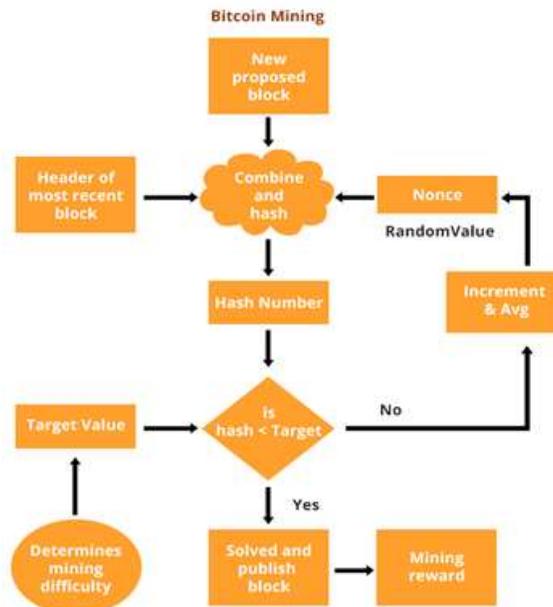


Fig -1 Flow chart coin mining process

### 2.1 Mining platforms

To create new crypto currency and add components to existing block chain mining software is used. After mining new crypto currency is validated and belongs to the miners as a reward for contributing to the block chain. To find blocks mining technology utilizes the processing power of a computer's graphics processing unit (GPU). Mostly mining is done through a mining pool, by using resources over a network and distributes as a reward.

Other tools dedicate local server resources to mining pools. To qualify for inclusion in it mining Software product must. Allocate resources to crypto currency mining GPU or CPU for mining mostly used by connecting mining hardware to the block chain or pool. To mine it an android Smartphone also used. This is because it has the most suitable mining-friendly operating system for mining. The mobile market is facilitate various apps designed for android that can use to mine Crypto coins directly.

### 2.2 Consumption of fissile fuels in Mining

The tremendous amounts of electricity consume as miners use big and efficient systems to mine blocks and validate transactions. The crypto mining is largely dependent on fossil fuels. Crypto currency mining often uses electricity produced from fossil fuels. The price of Crypto coins increases relatively with amount of energy consumed. The promising rise in cost of coin attracting more miners to join the Crypto coins network. A University of Cambridge

study has stated Crypto coins consume more than 120 Terawatt Hours (Twh) each year. In a report published by Galaxy Digital and confirmed by International Energy Agency (IEA), the annual electricity consumption of the Crypto coins network stood at 113.89 terawatts per hour per year (TWh/year) whereas, the banking systems consume 263.72 TWh/yr while gold mining consumes around 240.61 TWh/yr of energy. In effect, traditional banking systems or even gold mining consume twice the energy of Crypto coins mining.

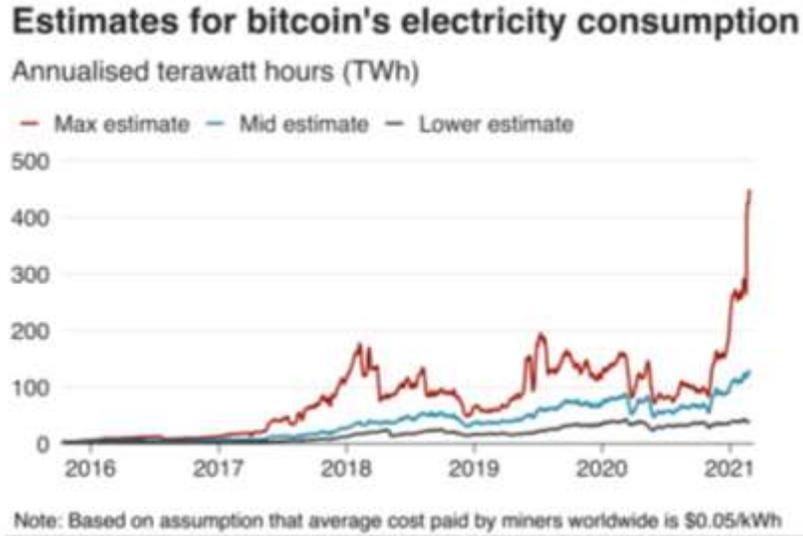


Fig-2 Energy consumption crypto mining [Source Cambridge center for alternative finance]

### 3. PRESENT SCENARIO

The best Crypto coin miner available in market nowadays is the 14 TH/s Antminer S9 with power consumption of 1370W and is priced at \$1700 also it requires a 1600W power supply along with it. Suggested one is the APW3+ power supply which is also available on the same site at \$105. So, total hardware cost is around \$1800. Along with the customs charges for importing it, the total comes to around \$2300. This cost in number of Crypto coins will be around 1.16 Crypto coins (1BTC = \$1980). The profitability of mining Crypto coins with an Antminer S9. The current difficulty factor which is at 559970892891 with 14 TH/s power, it is possible to mine 0.18 Crypto coins per month. Assuming the difficulty level to be same and electricity to be free, it will take around 6.5 months to cover the hardware costs return on investment. Let us now factor the electricity costs. The lowest electricity tariff in India, is in Jharkhand, is around Rs. 3.2/kWh. With the power rating of 1370 W, in one month we will be using around 1000 kWh which amounts to Rs 3209 or 0.024 Crypto coins. With the addition of miners to the network, the mining difficulty increases as the number of blocks to be solved in a specific interval of time remains constant. On an average the difficulty factor increases by around 5% per 14 days. The number of Crypto coins generated in 19th month will be 0.026 and in 20th month will be around 0.023 which is lower than the cost of electricity. The number of Crypto coins mined in 19 months will be 1.556 Crypto coins Electricity cost for 19 months will be 0.456 Crypto coins. So, net income will be  $1.556 - 0.456 = 1.1$  Crypto coins Net loss = hardware cost – income =  $1.16 - 1.1 = 0.06$  Crypto coins Since electricity cost becomes greater than the Crypto coins mined, a break-even point will never be reached. Institutional investors started large scale facilitation to mines the coin and retailer pull based domestic mining creates huge generation of fossil fuel against consumption of electricity.

#### 3.1 Pollution Burden

Depending on the energy source, it is estimated that crypto-mining can produce 3-15 million tons of global carbon emissions.[4]China is one of the world's largest producer, and consumer, of coal energy with mines in the Xinjiang and Inner Mongolian provinces heavily reliant on coal energy sources to provide crypto-mining companies with cheap energy prices. Coal energy sources offer prices up to 30% cheaper than the average energy consumption prices for industrial firms.[5]However, when compared to the total amount generated by renewable energy sources in Canada, any crypto currency mined in China would generate four times the amount of CO<sub>2</sub> emissions. [6]Recent

figures indicate crypto-mining facilities may subsidize the development of renewable energy resources by seeking the cheapest resource, optimizing consumption value. Bit coin mining operations in China illustrate the relationship between renewable energy and crypto-mining. The providences that host most crypto-mining facilities correlate with providences that produce their energy from renewable resources. In 2017, 80% of China's Bit coin mining operations were based in Sichuan – a province that generates approximately 90% of its energy production from renewable resources, thereby accounting for 43% of global Bitcoin mining operations.[7] A report by Coin Shares Research estimates that approximately 77.6% of crypto-mining facilities are consuming electricity derived from renewable resources, while the other 22.4% are obtained from fossil and nuclear producers.<sup>[8]</sup> Additionally, large-scale mines in other popular locations are primarily located in the Pacific Northwest, Upstate New York, Northern Scandinavia, Iceland, and Georgia – regions that extensively use renewable energy.

### **3.2 Recommendations**

It is possible to divide the database horizontally and it's distributed over multiple servers to lessen network load. These shard chains may leads to distribute network load among 64 new chains, resulting in decreased network node hardware needs. Adapting energy efficient option as New York state-based coal-powered power plant, converted to natural gas. With the purchase of carbon offset credits to be carbon neutralizing the wasted resources that are already consuming electricity. By avoiding the use of extra electricity from grid. Adapting solar, hydropower and other nonrenewable recourses based energy option for mining

### **4. CONCLUSIONS**

Pollution burden due to crypto mining and consumption of fossil fuel is majorly hampering the environment. More secure and promising features of crypto coins will get prefer exponentially in now and future days. The alternative mining through solar or nonrenewable source will be the most profitable and environment friendly option.

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