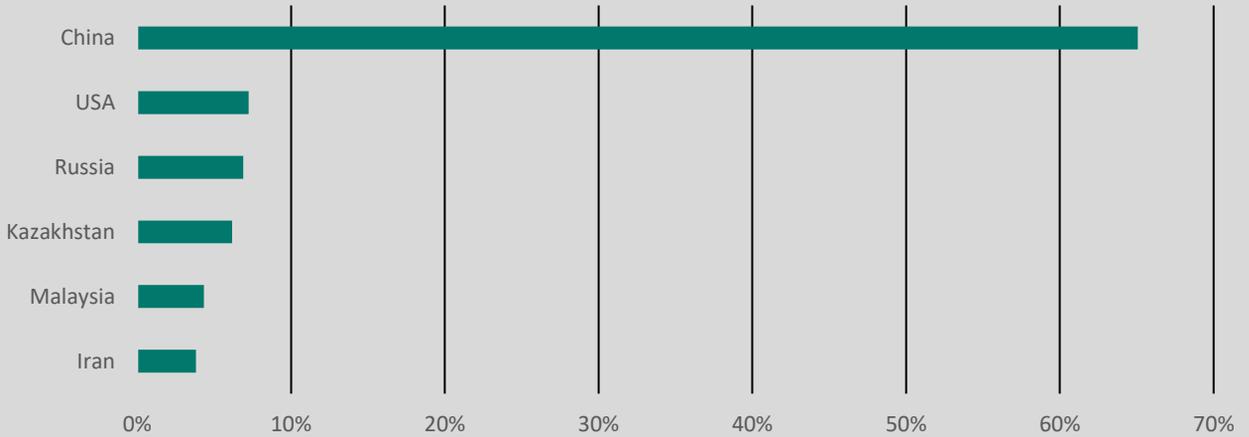




Supporting Iran in implementation of an integrated energy efficiency market

# Crypto mining and electricity supply in Iran

**Figure 1. Distribution of Bitcoin Mining Hash Rate by Country as of April 2020**



Source: Cambridge Centre for Alternative Finance<sup>1</sup>

## The controversy of crypto mining

Since 2019, the year the US sanctions were expanded, the Iranian government officially accepts the operation of bitcoin farms. The imposed sanctions reduced Iranian oil exports significantly such that alternative ways to convert oil into cash were sought. As bitcoins are harder to track than conventional payment methods they were seen as an approach to circumvent the sanctions. Moreover, an increase in employment and the possibility of foreign investments were stated as incentives for the legalization of bitcoin mines by the Iranian Presidential Center for Strategic Studies.<sup>2</sup>

**Figure 2. Iran’s Share of Global Bitcoin Mining Hash Rate (estimated dashed line)**



Source: Cambridge Centre for Alternative Finance, Elliptic<sup>3</sup>

Iran's share of the global mining capacity has risen steadily since then, making it one of the largest bitcoin farming nations (see figure 1). Iran’s share of the global hash rate capacity more than doubled from September 2019 to January 2021 to an estimated share of 4.5 % (see figure 2). A significant driver for this rising trend are not-licensed farms that account for about 85 % of the whole mining capacity in Iran.<sup>4</sup>

Bitcoin mining is very energy-intensive. As of May 2021, the total annual electricity consumption of miners in Iran was estimated at around 5 TWh – 1.4 % of the total energy consumption.<sup>5</sup> This is roughly equivalent to the annual consumption of Iranian street lightning.<sup>6</sup> Although, by its very nature, the number of illegal miners and their electricity consumption is hard to estimate precisely.

In recent months, crypto farming has caught public attention as winter power outages occurred for the first time, for which the Ministry of Energy blames bitcoin farms. The power outages even intensified in May leading to a state-ordered suspension of bitcoin mining for four months.

## Potential for the Market for Energy Efficiency and Environment (M3E)

Due to its vast energy consumption and the high tariffs imposed on bitcoin miners, the crypto mining industry could be a suitable participant in the M3E, especially in light of the drastic measures taken by the Iranian government for reducing the energy supply shortages. On one hand, buying energy saving certificates can reduce the financial burden of the energy-intensive mining process. On the other hand, increased energy efficiency by low-tariff customers can stabilize and possibly increase the available energy supply reducing the pressure towards the mining industry by the Iranian government.

To investigate whether the mining industry can play a role in the demand side of M3E, interviews were conducted with a member of the blockchain association and a representative of a private thermal powerplant developer. Here are their main statements:

### *The advocacy group for crypto farms:*

“Linking bitcoin mining with energy efficiency and renewable energy seems logical, but we as a newborn industry should not be responsible to invest in this kind of expensive and unclear processes which are the government's responsibility. The government could just impose taxes on our income instead of making our industry illegal or increase tariffs.”

### *Private thermal powerplant developer:*

“The energy-saving idea is not very promising and I do not see it working. Raising energy prices would be the easiest solution if we want to support energy-efficiency projects. Having a market for certificates would only support brokers and financial market players.”

## Discussion and Conclusion

The common view of crypto miners and operators of private-owned powerplants is that higher market prices would be the most effective way to solve the problems with electricity supply. From an economic point of view, this is reasonable as it sets incentives for energy efficiency measures and thus, reduces electricity demand, while it provides powerplant operators with financial resources to modernize powerplants and reduce distribution losses in the grid – hence stabilizing the energy supply. However, the introduction of market prices for energy is currently considered as a political tabu.

Although participants in the energy markets prefer non-subsidized market prices and as little governmental involvement as their first-best solution, the introduction of M3E could be an implementable second-best alternative. M3E adds a premium to saving energy encouraging energy-efficiency investments for low-tariff customers. High-tariff customers as bitcoin miners could benefit in two ways: they could slightly reduce their energy tariff by buying energy certificates and hope for a more stable energy supply through an increase in energy-efficiency. For low-tariff customers, bitcoin miners could serve as large, reliable and easy-accessible pool of certificate buyers supporting their small-scale investments in energy-efficiency projects.

All in all, the advantages of the M3E as a second-best solution are apparently not yet known to potential users. In addition, they fear above all bureaucracy, unreliability and high transaction costs of a market for energy efficiency. The involvement of brokers is also viewed with skepticisms. However, such should be addressed with an appropriate policy design of the M3E. This is exactly the ongoing task of the IREEMA project.

### Footnotes

1. [Cambridge Bitcoin Electricity Consumption Index \(CBECI\)](#)
2. <http://www.css.ir/Media/PDF/1399/11/28/637490646286891046.pdf>
3. [How Iran Uses Bitcoin Mining to Evade Sanctions and “Export” Millions of Barrels of Oil \(elliptic.co\)](#)
4. [https://www.deutschlandfunk.de/energieprobleme-iran-setzt-mining-von-kryptowaehrungen-aus.1939.de.html?drn:news\\_id=1263400](https://www.deutschlandfunk.de/energieprobleme-iran-setzt-mining-von-kryptowaehrungen-aus.1939.de.html?drn:news_id=1263400)
5. [Cambridge Bitcoin Electricity Consumption Index \(CBECI\)](#)
6. <https://pep.moe.gov.ir/>

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