ENERGY COST OF BLOCKCHAIN NETWORKS: IMPACTS ON THE ELETRIC SECTOR

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Overview

The 21st century brought some technological transformations that revolutionized far beyond the electric sector. In 2008, in line with technological revolutions, the blockchain concept originally emerged as the operational base of bitcoin, the world's most popular crypto-currency. In short, blockchain is a platform of smart contracts, which disregards the need for a legal mediator, and is able to record transactions in a decentralized way. The functionality and security of the network is carried out through the validation of multiple agents known as miners.

During the last decade, data traffic has expanded unimaginably. However, its growth was noted by the electric sector only in 2017, with the formation of a crypto-currency price bubble, which had the effect of multiplying its price by more than 14 times. This phenomenon turned mining of new assets momentarily a very profitable activity, which, in turn, had repercussions on a greater professionalization of the segment and more concentration of a network that was structured with the premise of being decentralized.

Although blockchain development has been supported exclusively by enthusiasts of its premises, it is currently the object of studies and diverse interests of the electric sector. Numerous projects are being implemented or are being developed at an initial phase. These projects are making possible a greater integration between producers and final energy consumers of energy, by using the infrastructure already establised for the distribution segment.

The increasing maturity of crypto-coins, not only as a means of payment but also as platforms for smart contracts, opens a field of discussions regarding the sustainability of these cryto assets. Furthermore, there is an increase in demand for blockchain technologies worldwide.

In China, Beijing's prohibitive policies have led to an exodus of the cryptomination industry to countries like Canada, which possess lower energy costs - almost as low as the Chinese – and greater institutional stability regarding regulamentation of this sector. This has led to a significant increase in the stagnant energy demand of the United States. In this context, the critical spotlight becomes the greater energy expenditure required to maintain these networks worldwide.

Methods

This study focuses on a case study of the effects of crypto mining from the perspective of Chinese and Canadian electric demand as an consequence of Beijing’s prohibitions regarding mining. This study was carried out through a descriptive analysis, in which a study of the evolution of blockchains networks are carried out, as well as their impact in the electric sector. The study is divided in to two sections. The first section of the article consists of a qualitative research developed through extensive bibliographical research in scientific articles, technical reports and informative texts of electronic means. The second section consists of a case study of China regarding different economic, institutional and political factors, through research in technical reports, government data, and academic articles.

Results

The results of this study demonstrate that the evolution of the cryptocurrencies and their processing systems resulted in a massive growth of energy consumption – approximately 600% in 16 months. The Bitcoin system currently requires more energy than the total energy consumption of medium-sized countries such as Chile or Austria. The increasing raise of the amount of energy that blockchains worldwide require suggest a possible stagnation of this technology - or at least as a digital currency system. However, it is possible to highlight its current impacts and outline a fatal rearrangement of the sector. In just 16 months, the electric consumption of the blockchain has grown 642%, which, in comparative terms, means the insertion of a demand equivalent to Colombia. There is no country in the world capable of absorbing an ever increasing energy demand for a long period of time. The need for cheap and abundant energy, together with specialized electronic equipments

contributed to the concentration of processing powers of blockchain networks in China, which it is responsible for at least 80% of the world's mining. Beijing has signaled that the government will not allow the industry's activities in the country. These limitiations regarding mining in China are having an impact in several countries due to the readjustment and increase of mining activies in other coutries, such as Canada.

Conclusions

The conclusion of this study is that the mining of crypto-coins find in the availability of cheap energy a barrier to their expansion. This results in a computational diaspora and a greater decentralization of the treatment of blockchain data. The future of the cryptomining industry will be achieved through the reconciliation of energy efficiency with the price of digital assets. However, the strategic concern with the stabilization in countries that host their mining, such as Canada, present limitations on the expansion of some energy sources, such as hydroelectric plants, due to environmental impacts, with the argument that the low number of jobs generated with these plants will not compensate for damages to the environment due to increased mining. Therefore, the limitations regarding the remaining energy supply to the miners in Canada is likely to cause a new technological diaspora, which is related to the profitability of mining. The more profitable the activity, the greater the tolerable energy price for the maintenance of the industry, thus increasing the number of possible destinations, in a decentralized scenario, different from the current one, in which 80% of the mining is concentrated in China.

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