

JANUARY 2022

*Focus* —

# Borat and the Bitcoin

An energy crisis and civil unrest threaten the viability of crypto mining in Kazakhstan, the world's second-largest center for bitcoin mining after the United States.



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## The Kazakh crisis

The situation deteriorating in Kazakhstan, which has been plagued by chaotic riots for several days. The repression has left dozens dead in the capital. President Kassym-Jomart Tokayev has so far failed to calm the protests, despite the resignation of the government, the introduction a state of emergency and the enforcement of a curfew in the country.

Although the movement is political in appearance, it is inflation, particularly of energy prices, that is at the heart of the crisis. The anger began on Sunday, January 2, in the western city of Zhanaozen because of reduced subsidies on Liquefied natural gas (LNG), a fuel that many people use to power their cars. A new law now lets gas prices be set by the market, causing prices to skyrocket in a matter of days. The anger that began in the provinces has since spread to the country's largest city, Almaty.

Kazakhstan is the first nation in the world to lose its government due to the energy crisis. A rather unexpected outcome for one of the world's largest energy exporters. This Central Asian country is the 9th largest exporter of coal, 9th of oil and 12th of natural gas. Export opportunities played a role in ending subsidies in the domestic market. Before the new rules were established, domestic prices were well below production costs, creating shortages in some provinces that lost any incentive to produce LNG, and opening the door to the black market. The government's adjustment seeks to fix this issue, but the process may be painful, especially in a political context that was already very tense before the crisis.

Moreover, Kazakh people have been facing another energy problem for several months: an overloaded power grid that leads to power shortages throughout the country. The designated culprit: the tens of thousands of crypto-currency mining farms, whose activity is very energy-intensive and has strained the nation's power grid beyond its current capacity.

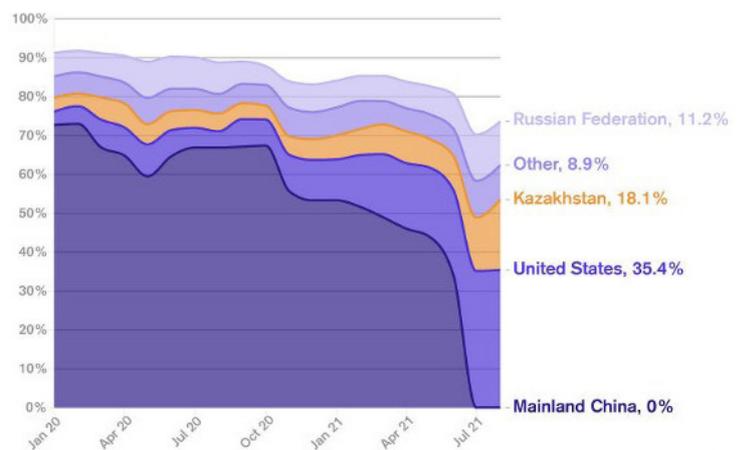
## Bitcoin mining in Kazakhstan

As a reminder, crypto-currency mining is an activity that consists in validating a transaction on a blockchain network by solving a complex mathematical equation. The mining technically called "Proof of work" allows to secure the blockchain. The difficulty of the calculations required to validate transactions has increased over time. In the beginning, Bitcoin was mined on conventional computers, but today the computing power required is so big that there is no other alternative than to rely on ASICs bitcoin miners, which are computers specialized in this practice. Mining farms, with thousands of computers, are currently operating in many countries including Kazakhstan. The electricity used by these farms for mining is proving to be very expensive these days. For example, bitcoin mining on a global scale currently consumes the equivalent of the energy needs of Argentina...

In the years 2019-2020, China was the undisputed leader in bitcoin mining with between 75% and 100% of the "hashrate" coming from China (the "hashrate" is a measure of the

computational power per second used when mining. But in May 2021, the Chinese authorities suddenly decided to ban mining on their territory. The blockchain's decentralized and borderless nature has led miners to move to other countries in the space of a just a few weeks without harming the Bitcoin network. Preferred destinations: The United States, Canada, Russia and ... Kazakhstan. Borat's country went from 9% to 18% of the global market share in a few months, putting it in the second place for countries hosting the most crypto-currency miners (the 1st place is currently held by the United States).

### Kazakhstan is the 2nd country in terms of Hash Rate on the Bitcoin network



Source: Decrypt

According to the Financial Times, more than 87,000 farms were established in Kazakhstan, the vast majority of them migrating from China. Why did Kazakhstan attract so many miners? Mainly because this neighboring country of China provided - at the time, at least - electricity in abundance (production twice the domestic consumption) and at a low cost (4 cents per kilowatt hour in March, half the price of China and a third of the price of electricity in the United States).

However, the sudden influx of miners has changed things. Usually, the country sees an increase in electricity consumption of around 3% each year, but with the arrival of the cryptocurrency miners, the increase reached 8% by 2021, according to the Financial Times. Kazakhstan's power grid is overloaded, leading to a nationwide power shortage. In October 2021, the three largest coal power plants experienced an emergency shut-down. Southern Kazakhstan, the poorest part of the country in terms of energy coverage, was also the most affected by the shortage.

The poor stability of the electrical grid is beginning to affect mining activity itself. Another constraint on miners is an indirect consequence of the social unrest. Indeed, to prevent further chaos and the formation of opposition groups via social networks, the government decided to restrict access to the Internet. These restrictions further complicate things for miners, some of whom will be forced to leave Kazakhstan and move their farms to the United States - at least that is what miners such as BIT Mining and Canaan envisage. Following the eviction of miners from China,

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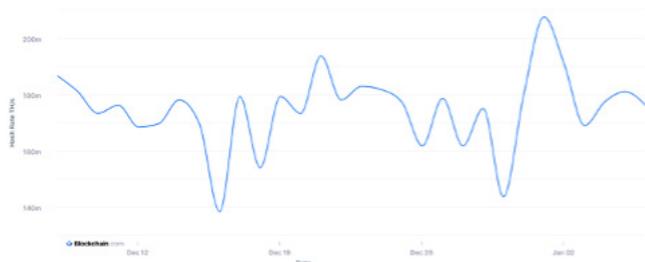
the US market share has risen to 35%. It could continue to rise as events in Kazakhstan unfold - although the migration of farms is likely to be less important than in the case of the Chinese “exodus” last summer.

For sure, the Kazakh government decided to harden the tone. But it has especially in its target the illegal miners. There are indeed two categories of miners: those registered by the government and the illegal ones. According to the Financial Times, the government has attributed this shortage to an increase in the number of unregistered miners. An energy consumption tax will therefore be introduced for miners, which will allow the government to differentiate between official miners and those who work illegally. It will also provide additional financial resources to invest in the country’s electrical grid. Unlike the Chinese, the Kazakh government does not seem inclined to drive out of its territory an activity that contributes to GDP growth. The country expects crypto mining to add \$1.5 billion to its economy over the next five years. A figure that could become even larger if illegals become official and Kazakhstan is able to keep its “farmers.”

## What are the consequences for the price of bitcoin?

First of all, there are short-term implications for the price of bitcoin, which has fallen sharply (-12%) since the beginning of the year. Even if other reasons are given for the drop, there is indeed a positive correlation between the hashrate and the price of bitcoin. Until these farms relocate (to the US) or the situation stabilizes in Kazakhstan, the hashrate is likely to go down and weigh on the price of bitcoin.

### Total Hashrate



Source: Blockchain.com

In the long-run, there is once again the question of over-consumption of energy by crypto currencies. The link between electricity shortages and bitcoin mining is not exclusive to Kazakhstan. Indeed, Iran was forced to ban cryptocurrency mining for four months in 2021 to avoid power outages. Texas, which experienced a series of blackouts last winter, has also

become an El Dorado for miners, with low prices and loose regulations. The sharp rise in electricity use by miners raises fears of similar blackouts.

In the age of climate disruption, the over-consumption of energy related to crypto mining could lead many countries to ban cryptocurrency activities. In Sweden, several institutions have called on the European Union to ban mining.

However, solutions are emerging. Projects for mining farms powered by photovoltaic panels are being studied, notably by Square, the company owned by Jack Dorsey, ex-CEO of Twitter. Cowa, the largest mining farm in Europe located in Norway, is 100% powered by hydro-electric energy.

Since its creation in 2009, bitcoin has gone through many crises and spectacular crashes (see table below). The Kazakh crisis creates new risks but also opportunities.

### History of bitcoin declines since September 2010

Bitcoin: Major Corrections From All-Time Highs (September 2010 - Today)							
Correction Period	# Days	Bitcoin High	Bitcoin Low	% Decline	% Return to New High	New High Date	# Days to New High
11/10/21 to 1/7/22	58	68991	41012	-41%	68%	?	?
4/14/21 to 6/22/21	69	64802	29031	-55%	123%	10/20/2021	120
1/8/21 to 1/21/21	13	41962	28845	-31%	45%	2/8/2021	18
12/17/17 to 12/15/18	363	19783	3122	-84%	534%	11/30/2020	1079
11/8/17 to 11/12/17	4	7879	5507	-30%	43%	11/16/2017	8
9/2/2017 to 9/15/17	13	5014	2951	-41%	70%	10/12/2017	40
6/11/17 to 7/16/17	35	3025	1837	-39%	65%	8/5/2017	55
3/10/17 to 3/24/17	14	1326	892	-33%	49%	4/27/2017	48
11/30/13 to 1/14/15	410	1166	170	-85%	585%	2/23/2017	1181
4/10/13 to 7/7/13	88	266	63	-76%	323%	11/7/2013	211
6/8/11 to 11/17/11	162	32	1.99	-94%	1504%	2/28/2013	631
5/13/11 to 5/21/11	8	8.45	5.58	-34%	51%	5/25/2011	12
2/10/11 to 4/4/11	53	1.10	0.56	-49%	96%	4/17/2011	66
11/6/10 to 11/10/10	4	0.50	0.14	-72%	257%	1/31/2011	86
9/14/10 to 10/8/10	24	0.17	0.01	-94%	1600%	10/24/2010	40

Data Source: CoinDesk

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Source: Charlie Bilello

### For further information

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