



HASHR8 RESEARCH

# BITCOIN MINING INDEX

The State of Bitcoin Mining in Russia



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# CONTRIBUTORS

## RESEARCH TEAM

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## CONTRIBUTORS

This report would not have been possible without the contributions of leading professionals in the Russian mining industry.

Thank you to **Igor Runets** (CEO of BitRiver), **Max Matrenitski** (CEO of Cyberian Mine), **Jahon Khabilov** (CEO of Sigmoidpool), **Artem Eremin** (Founder of Chilkoot), **Didar Behbauov** (Founder of Xive), **Alan Dorjiyev** (Head of Data Center Association of Kazakhstan), and **Darek Piotrowski** (COO of 2Miners).

# ABSTRACT

By some estimates, Russian miners rank among the top-three countries in terms of their contribution to the Bitcoin network hashrate. We analyze the dynamics underpinning the Russian Bitcoin mining industry. Russia's Siberian region houses the dominant share of the country's mining facilities. A significant energy surplus from advanced hydropower infrastructure in the region enables miners to secure extremely competitive electricity rates. A federal law passed in 2020 clearly defines Bitcoin mining as an economic activity but will require entities to operate in a specific manner. Mining hardware that will be used for proprietary mining must be owned in the name of a foreign entity. Pooling and exchanging activities must also be carried out with a foreign entity. Mining hardware imported directly is subject to a 20% tax but mining facilities can also import indirectly through Kazakhstan and pay a 12% VAT. Russia has several large-scale mining facilities that offer hosting agreements to overseas institutional clients. Some facilities have a capacity of over 100 MW. The current energy draw of Bitcoin mining in Russia is estimated to be 800 MW to 900 MW.

# INTRODUCTION

The Bitcoin Mining Index will be a collection of research reports analyzing the key dynamics underpinning the Bitcoin mining industry in different regions. When sufficient data is gathered, we will attempt to quantify the attractiveness of regions for prospective Bitcoin miners.

In the inaugural release, we explore the Bitcoin mining industry in Russia. Russian miners represent a significant portion of the global mining industry with [estimates](#) ranking the Russian mining industry among the top-three country-level contributors to network hashrate [1].

This report will be split into six sections. Given that electricity rates are a key factor determining whether a miner can operate profitably, we firstly explore the electricity rates secured by facilities and the energy mix of the region. [A survey of 125 miners](#) between March and May this year reported that electricity represented 79% of a miner's operational expenditure, on average [2]. The high percentage of miner cost attributable to electricity emphasizes the importance of miners securing access to competitive electricity rates.

Secondly, we explore the regulatory stance in the regions. A region may have free electricity power but it could be unfeasible for most miners due to the regulatory and political uncertainty in the region. A contemporary example would be Venezuela. Thirdly, we investigate the key factors to consider regarding capital expenditure. This section will mainly be concerned with hardware importation but will also detail factors relating to data center development and labor costs. Cambridge Center for Alternative Finance survey data estimated that the percentage of a miner's cost attributable to capital expenditure ranges from 37% to 52% [2]. This is consistent with previous estimates from CoinShares that have put the figure at [44% in December 2019](#) and at [38% in June 2019](#) [3, 4].

The fourth section explores how mining facilities typically structure their business. It will explore what entities are typically formed and why business is carried out in certain ways. For the fifth section, we present the key domestic firms in the Bitcoin mining industry. This will include publicly-known mining facilities, mining pools, management companies, ASIC manufacturers, hardware resellers, and technology firms. We will also cover the presence of institutions in the region.

Finally, we give a tentative estimate of the total energy draw in the region. The energy draw is compared to current estimates for total network draw to approximate a percentage for the hashrate share of the region.

# METHODOLOGY

The information in this report was mainly gathered by speaking with industry professionals who are operating key firms in the region being investigated. Information was checked for veracity by cross-referencing with several professionals. We also carried out interviews with professionals in regions closely related to the region being investigated. For our Russian release, we also interviewed professionals with Bitcoin mining firms in Kazakhstan. As Kazakhstan shares a border and customs union with Russia, several Kazakh mining professionals were able to clarify points relating to the Bitcoin mining industry in Russia. Information gathered was further fact-checked and augmented through online research. Online research consisted of reviewing government websites, forums, and media releases.

## ELECTRICITY RATES AND ENERGY MIX

Facility Electricity Rate:	\$0.012 to \$0.03
All-in Hosting Rate:	\$0.035 to \$0.06

Russia is the [fifth-largest producer of hydroelectric power](#) worldwide [5]. The dominant share of Russian mining facilities are based in the Siberian region. It is estimated that hydropower plants in the [region generate a surplus of 5 GW of energy](#) [6]. The hydropower infrastructure in this region is far away from the Western Russian cities that house the majority of Russia's populations and energy consumption.





*The Krasnoyarsk Dam in Divnogorsk, Russia.*

This energy surplus allows Bitcoin mining facilities to secure extremely competitive electricity rates in these regions. The benefits of the Siberian region vastly outweigh alternative Russian regions for mining. The vast oversupply of energy allows facilities to secure low costs for the long-term while also having the option to scale at any point. Bratsk, Irkutsk, and Krasnoyarsk are the main mining hubs within the Siberian region.

Energy is sourced from a wholesale market for the national grid. The exact mix of energy is unknown. However, the predominant energy source in Siberia is hydropower. Other regions lack such advanced hydropower infrastructure. This will subject facilities in other regions to higher electricity costs and they may also be forced to rely on subsidized electricity rates which can be a burden on the relationship with local government.



*Map of Russia and the Siberia region.*

The only exception to miners sourcing from the national grid may be a joint venture between a power producer and a facility where a custom rate is negotiated. One example of an exception was a joint venture formed between hosting provider [BitRiver and energy company En+](#) [7]. In this case, rates below wholesale will be secured. However, these cases are rare and the vast majority of facilities will source from the wholesale market with clearly-defined market rates.

Wholesale electricity rates are typically in the range of \$0.02 to \$0.025 per kWh. However, rates of \$0.03 have been observed. By avoiding peak hours, rates as low as \$0.012 have been secured. Avoiding peak hours is a strategy that is typically only employed by those operating old-generation equipment. In this case, miners sacrifice uptime to secure lower electricity rates.



As electricity bills are paid in arrears, miners cannot know peak hours in advance. To secure the absolute minimum electricity rates possible, miners must avoid all potential peak hours. This can mean an uptime as low as 70%.

All-in hosting rates are generally in the range of \$0.04 to \$0.05 per kWh. However, rates as low as \$0.035 have been observed and rates as high as \$0.06 have been observed. For hosting rates above \$0.05, additional services are typically included like coverage for repair costs.

## REGULATORY STANCE

After three years of investigating digital assets, the Russian government passed the Digital Financial Assets Act in August of 2020. The law will come into effect in January of 2021. Cryptocurrency exchanges will become illegal under this federal law.

Bitcoin mining is legal under certain circumstances. Bitcoin miners can carry out proprietary mining operations and offer hosting services provided they establish their business correctly. For proprietary mining, Bitcoin mining hardware must be owned in the name of a foreign entity. All exchange and mining pool activities must be carried out with overseas entities. For hosting services, hardware can be owned by a domestic entity and rented to overseas clients. Domestic firms providing hosting services cannot use their hardware for proprietary mining.

While the federal law makes transacting in cryptocurrency illegal for Russian citizens, cryptocurrency may be received in some special circumstances like inheritance. [A draft bill](#) is currently being proposed that would require citizens to report such holdings to Russian tax authorities if the transaction value exceeds 600,000 Russian Rubles in one year [8]. At the current exchange rate, this equates to roughly \$7,800. Fiat transaction value is

calculated at the time of transfer. This bill is anticipated to be passed into law by January 2021.

A separate draft bill which was proposed by the Ministry of Digital Development, Communications, and Mass Media, would require all data centers, including mining facilities, to regularly report data to the government [9]. It is currently unclear what the exact reporting requirements would be but industry professionals believe the data is for the government to track the development of digital infrastructure in Russia.

On the local and regional level, Siberian authorities have been very supportive of the mining industry. The industry has been a significant consumer of the surplus energy created in the industry while also creating jobs and sourcing foreign investment. The relationship between miners and local authorities in other Russian regions is far more uncertain and variable. Some miners outside of Siberia may rely on subsidized electricity rates and this can put a strain on relationships with local authorities.

## HARDWARE LOGISTICS

Russian miners dominantly import hardware from Mainland China. Hardware is either directly imported into Russia or is initially imported into Kazakhstan and afterward transported to the Russian facilities. While miners are not subject to import duty, the government does add VAT on the imported hardware.

The VAT added in Russia is 20% while the Kazakhstan VAT is 12%. As Russia and Kazakhstan share the same customs union, this provides Russian miners with an incentive to indirectly import hardware through Kazakhstan. Russian miners can establish a Kazakh entity to coordinate the importation of hardware into Kazakhstan. This hardware is then sold to the Russian entity and the Russian entity saves on VAT expenses.



*The five countries in the Eurasian Customs Union.*

In some remote Siberian regions, there is an increased risk of damage to hardware. [A facility near the Boguchany Dam in Eastern Siberia poses a risk of damage to the hardware](#) being transported to the region due to the road being partly paved with stones [10].

Delivery times for these routes is roughly three to four weeks. This delivery time can be reduced to a few days by transporting the rigs via air travel. An international airport in Irkutsk provides a convenient route to the Siberian region. However, this alternative is far more costly and is rarely used.

Despite an abundance of infrastructure in Siberia from the Soviet Union era, most miners choose to build out their data centers due to the suboptimal quality of the infrastructure which has been abandoned. There are no standard buildout costs for data centers in the region and the price will depend on the owner's ability to source each component. Labor costs are

estimated to be roughly \$0.002 to \$0.0025 per kW. However, this figure is hard to approximate and it is tentative.

## BUSINESS SETUP

From January 2021 onwards, the Digital Financial Assets Act will require firms to carry out much of their business activity as a foreign entity. For proprietary mining, equipment must be registered in the name of the foreign entity, and all exchange and pooling activities would also need to be carried out through the foreign entity. If the miner intends to solely rent their equipment to overseas clients, the hardware can be owned by a domestic entity. Domestic entities will be subject to a corporate tax of 20%. Entities established in special economic zones may be able to achieve a tax rate of 0%.

## KEY DOMESTIC FIRMS AND INSTITUTIONAL PRESENCE

**BitRiver** operates a hosting business in the Siberian region with several farms holding a capacity of 100 MW. The firm heavily targets the Western market and provides hosting solutions to overseas institutions. BitRiver owns facilities in various regions within Siberia. Other firms include **Minery**, **MineSpot**, **UMC**, **BitCluster**, and **MinerPark**. MinerPark also designs containers for Bitcoin mining.

**Vnish** and **MSKMiner** are Russian firms that provide custom firmware for miners. Vnish has been developing firmware for miners since the release of the Antminer S9. Their firmware solutions also extend to the Antminer S17 and Whatsminer, Canaan, and Innosilicon hardware. Vnish also provides a free ASIC management software called Anthill. MSKMiner similarly offers

firmware for Bitmain, Innosilicon, Whatsminer, and Canaan hardware. They are partnered with Hive OS who provides ASIC management software.

Bitcoin mining pools that focus on the Russian market include **EMCD**, **Sigmapool**, and **Trustpool**. The Trustpool domain has a dot ru suffix indicating that it is predominantly focused on the Russian market. **2Miners** is another mining pool operator with a large customer base in Russia. 2Miners provides mining pool services exclusively for altcoins. **ViaBTC** also has a strong presence in Russia. ViaBTC has a representative office in Minsk – the capital of Belarus – to establish better relationships with customers in the CIS region and Europe.

**Chilkoot** is a distributor of mining hardware and delivers to regions within the Russian Federation and EAC customs union. Large mining firms will source hardware directly from manufacturers. However, small-scale and retail miners may source hardware from Chilkoot. Chilkoot distributes Whatsminer, Canaan, and Innosilicon hardware.

## ESTIMATED HASHRATE SHARE

The Cambridge Center for Alternative Finance estimated that Russia's share of global hashrate ranged from 5.46% to 6.9% between September 2019 and April 2020 [1]. This share was sufficient to consistently rank the country within the top three countries. China consistently ranked first with estimates placing their hashrate share from 65.02% to 75.62%. The estimates indicated that Russia's share of hashrate was comparable to that within the United States. Recent estimates by industry professionals in Russian mining put Russia's energy draw from mining at ~800 to 900 MW. Current Cambridge Center of Alternative Finance estimates put the total energy draw of the Bitcoin network at 10.6 GW [11]. If these estimates are accurate, Russia's current consumption would represent between 7.5% and 8.5% of the Bitcoin network hashrate.

# CONCLUSION

The energy infrastructure in Russia's Siberia region fosters favorable dynamics for competitive Bitcoin mining. Without sacrificing uptime, facilities can secure rates in the range of \$0.02 to \$0.025. This ranks Siberia among the most competitive regions worldwide for electricity rates. Lower electricity rates can be secured in Iran and Venezuela but these regions come with their own tradeoffs. The Digital Financial Assets Act being introduced was an extremely positive development for the Bitcoin mining industry in Russia as it clarifies how entities must operate. This allows miners to establish long-term operations with legal certainty. The downside of the federal law is that miners must carry out much of their activities through a foreign entity. Importation of hardware is a further downside with miners commonly facing three to four weeks for delivery and a 20% VAT for direct import.



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