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China's Crackdown on Crypto Mining from a Climate Perspective: Unified Efforts from Administrative Authorities and the Judiciary

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Abstract: This article presents an examination of the unified efforts by China's central authorities and the judiciary in the crackdown on crypto mining within the country. It discusses the environmental ramifications of crypto mining and traces its development in China, highlighting the resource-intensive nature of the process. Crypto mining risks China's national objectives of promoting high-quality economic and social development, as well as industrial optimisation, energy conservation and emissions reduction. The central government's commitment to climate goals and ecological civilisation, coupled with the perceived minimal economic benefits and substantial environmental damage caused by crypto mining, led to the issuance of the Notice on Rectifying Mining Activities of Virtual Currencies in September 2021. This article discusses the implications of the Notice and how it has been implemented at both national and local levels by the administrative authorities. With reference to typical cases, it examines how the judiciary in delivering judgments has kept in line with the spirit of the Notice by analysing mining-related civil disputes as they arise in courts and reflects on the interplay of legal and administrative measures in shaping a sustainable and environmentally conscious approach to emerging technologies in China and beyond.

Keywords: crypto mining; China crypto regulation; ecological civilisation

1 Introduction

China was once one of the world's major contributors to Bitcoin mining. Often under the name of data centres in regions with low electricity costs in China, those who work as crypto miners use specially designed computer servers to validate information in a blockchain block by generating a specified cryptographic solution and are then rewarded with amounts of the newly mined crypto tokens such as Bitcoin.

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In light of the adverse environmental implications, Chinese authorities have taken a strong stance in eliminating crypto mining activities in the country since 2021. This article discusses the crackdown on mining activities in China as reflected in national regulatory policies and judicial rulings from the perspective of climate change. The official view is that eliminating crypto mining in the country is of great significance for promoting the optimisation of China's industrial structure, advancing energy conservation, and achieving the goals of carbon peaking and carbon neutrality on schedule. It offers an analysis of the implications of the crackdown in China where such experience may prove to be relevant for other nations' authorities if crypto mining is to be curbed because of its impact on the global environment.

The article begins with a discussion of an explanation of the activity of mining in the context of crypto tokens and its environmental implications. It discusses the mechanism of mining and the development of mining activities in China. The mechanism of crypto mining is purposefully resource intensive, and the extravagant energy consumption is endemic to mining activities. While crypto mining was once very popular in China, with some local governments previously offering tax incentives to the mining sites, the industry has now virtually been strictly forbidden. The core reason lies in the central government's staunch commitment towards climate goals and the concept that such activities are of minimal real benefits to the economy yet cause havoc to the environment. This commitment eventually culminated in the representative Notice on Rectifying Mining Activities of Virtual Currencies, issued by the National Development and Reform Commission and other 10 central authorities on 3 September 2021.[1] A comprehensive analysis of the regulatory measures and the corresponding judicial responses in relation to crypto mining in China is much needed. The third part of this article analyses the effects of the Notice which essentially denounces mining activities and proscribes any future furtherance of such business in the country. The next part discusses, with reference to typical cases, how the judiciary in delivering judgments has kept in line with the spirit of the Notice. The judiciary has since the issuance of the Notice maintained a clear stance of refusing to recognise any legal effects of mining-related contracts, thereby diminishing the economic incentives of continuing to participate in crypto mining. The Chinese civil courts have displayed much vigilance in considering the environmental perils of mining. Overall, the crackdown represents the coordinated effort of the national administrative authorities and the courts in an era where green development is emphasised in China's national development plan. The final part concludes.

1 Fagai Yunxing [2021] 183 Hao.

2 The Mechanism of Mining Crypto Tokens and the Chinese Experience

Crypto tokens are virtual tokens which operate on blockchain networks. Bitcoin, as the representative decentralised crypto token, was initially intended to be a substitute for the centrally controlled fiat currency. Nonetheless, most of the later created alternatives to Bitcoin, known as altcoins, often fall short of fulfilling the essential roles of currency, such as a unit of account or a medium of exchange (Campbell-Verduyn 2018). As a matter of nomenclature, it is therefore more apt to describe the array of altcoins and Bitcoin as crypto tokens, or simply tokens rather than cryptocurrency. The fundamental concept is that Bitcoin is the native token of the Bitcoin blockchain, just as the Ether (ETH) is the native token of the Ethereum blockchain. Most later-created altcoins are often built on an existing blockchain, most commonly as ERC-20 tokens on the Ethereum blockchain network. The blockchain with its Distributed Ledger Technology (DLT) enables the creation, validation, and transfer of these tokens. Specifically, the blockchain as a ledger, records and verifies the ownership and transfer of crypto tokens where each transaction involving a crypto asset is added to a block, and these blocks are linked together in chronological order where each block contains a unique code called a hash, distinguishing it from others and connecting it to the hash of the previous block, forming a chain of blocks (Werbach 2018). Blockchain technology, as a type of DLT, allows agreement on shared data without the need for intermediaries. The shared data is agreed upon by anonymous and untrusted peers through cryptographic verification and replication across multiple nodes. A node is essentially a participant within the blockchain network. After reaching a consensus, each node possesses a copy of the ledger. Nodes hold partial, provisional, and heterogeneous ledgers of valid transactions not yet disseminated to the network, resulting in varied local consensus (Reyes 2017). As information continues to propagate through the network, nodes update their records, eventually converging to a shared ledger. The cryptographic interlinking of records guarantees tamper-proofing, and the resultant shared ledger functions as the authoritative version of these records. As such, the consensus mechanism maintains the transaction order within the network (Li et al. 2021).

Within the blockchain networks, it is possible to mine crypto tokens. In contrast to fiat currencies which rely on governments to print money, this type of crypto tokens relies on an algorithm to be created for circulation. Most people refer to mining in the context of crypto tokens as mining Bitcoin because of its lucrative nature, but it is possible to mine other types of tokens, such as Litecoin (LTC). Some other tokens such as Ether (ETH) and Tether (USDT) are created through 'minting', or

'issuance' whereby an Initial Coin Offering (ICO) takes place. During an ICO, newly created tokens are sold to investors in exchange for established crypto tokens like Bitcoin or ETH or, in some cases, fiat currency. ICO has already been authoritatively prohibited in China since 2017 (see Deng, Huang, and Wu 2018). The Announcement on Preventing the Financing Risks of Initial Coin Offerings issued by the People's Bank of China and 6 other central authorities identifies ICO financing as a type of unauthorised illegal public financing.[2] No organisation or individual may illegally conduct ICO financing, and all existing ICO projects must be immediately ceased. The prohibition of ICOs aims to address the speculation of crypto tokens and the disruption caused by ICO fundraising activities to the economic and financial order. There are other ways of initially generating tokens such as airdrops (Allen, Berg, and Lane 2023). Using Bitcoin as an example, this article focuses on crypto mining in China and its environmental problems.

A critical aspect of understanding Bitcoin mining lies in grasping the Proof of Work (PoW) protocol. Bitcoin has a capped supply, and there will only ever be 21 million bitcoins in existence (see for example, Lee, Li, and Yu 2018). The consensus algorithm comes into play in mining where miners must agree on which block to add to the blockchain. Once consensus is achieved, the block is added, and the miner receives cryptocurrency as a reward. In Bitcoin's case, miners play the role of confirming and securing transactions by adding them to the blockchain. Essentially, a miner selects a group of transactions from the network, solves a math problem related to this set, and shares the solution with the Bitcoin network for verification and consensus (Zhou et al. 2023). All mining nodes are therefore full nodes, storing a complete copy of the blockchain, validating transactions and ensuring that all participants follow the consensus rules. Mining nodes further solve complex mathematical problems by computational power, and if successful, the miner creates a block containing the considered transactions, which is then added to the blockchain. The first miner to complete this process receives a reward in bitcoins for its contribution (Houy 2016).

Bitcoin uses the SHA-256 algorithm as a function for the complex mathematical problems, and each successful miner now earns 6.25 Bitcoin per block (Yi et al. 2022). Approximately every four years, the reward for successfully mining a new block (known as the 'block reward') is halved in an event called the 'halving'. Bitcoin mining is a competitive and energy-intensive process, and it has evolved over the years with the development of specialised hardware known as ASICs (Application-Specific Integrated Circuits). ASIC miners such as the Bitmain Antminer Series are

2 Announcement of the People's Bank of China, the Office of the Central Leading Group for Cyberspace Affairs, the Ministry of Industry and Information Technology and Other Departments on Preventing the Financing Risks of Initial Coin Offerings (4 September 2017).

dedicated to the task of mining Bitcoin and are significantly more efficient than general-purpose hardware (Taylor 2017). Some other major crypto tokens such as ETH now use instead the proof-of-stake mechanism, which is considered more energy-efficient than PoW, as it does not involve the intensive computational work required by mining in PoW systems (and is less susceptible to a 51 % attack) (Ho 2023). Nonetheless, Bitcoin, and others including LTC and Dogecoin (DOGE) continue to generate profits and retain much demand for mining (Du 2023).

A related concept in understanding the power consumption of mining is 'hash rate'. The hash rate refers to the computational power that a miner or a network of miners contributes to the Bitcoin network (Bradbury 2013). It is a measure of how many hashes a miner is capable of calculating per second. As explained, the 'hash' is a mathematical function that converts an input (data of any size) into a fixed-size string of characters. Miners compete to find a hash that meets certain criteria, and the first one to find a valid hash gets the right to add a new block to the blockchain (Fujita et al. 2021). As Bitcoin's valuation continues its upward trajectory, despite the shrinking profitability, there still exists a persistent incentive for miners to augment their hash power investment in Bitcoin mining (Harper 2022). This intensified mining activity, however, comes at the expense of a substantial escalation in the energy consumption of the Bitcoin network. Hash rate transmits the largest net spillover effects to carbon dioxide emissions and Bitcoin electricity consumption. It plays a dominant role in influencing Bitcoin electricity consumption and climate change (Zhang et al. 2023). By design, the mining process is resource-intensive and costly to prevent fraudulent transactions from being validated and added to the blockchain (Allen 2022).

As of May 2023, Bitcoin's energy consumption was estimated at 95.58 Terawatt-hour (TWh) per year (Bains 2023). With data from the Cambridge Bitcoin Electricity Consumption Index (CBECI), Bitcoin's annual electricity consumption is widely established to be more than that of some countries such as the United Arab Emirates and Argentina (Criddle 2021; Huang, O'Neill, and Tabuchi 2021). While the CBECI has explained that there was an overestimation over the years, the current estimate for 2023 stays at 70.4 TWh, and the revised estimate for 2021 and 2022 are adjusted to 89 TWh and 95.5 TWh respectively (Throuvalas 2023). Still, the amount of energy that Bitcoin mining uses is extortionate, and it is widely accepted it contributes hugely to global emissions with associated environmental damages. Also as a digital transactional tool, Crobet, Lucey, and Yarovaya (2021) suggested that each Bitcoin transaction's energy footprint is equivalent to 350,000 Visa transactions or to the power consumption of an average US household over 20.92 days. On average, each $1 in BTC market value created was responsible for $0.35 in global climate damages (Jones, Goodkind, and Berrens 2022). According to the data from CBECI, Bitcoin is responsible for 68.8 Million-tons (Mt) of carbon dioxide emissions per year, surpassing the

entire nation of Singapore and ranking 71st globally (Qin et al. 2023). Specifically for China, it was estimated in 2018 that each $1 of Bitcoin value created was responsible for $0.37 in health and climate damages in China (Goodkind, Jones, and Berrens 2020). In Inner Mongolia, China, a coal-powered Bitcoin mining site alone was responsible for 8000 to 13,000 kg of CO2 emissions per Bitcoin it mines, and 24,000–40,000 kg of CO2 per hour which is the CO2 equivalent for at least 203,000 car kilometres travelled (Malmo 2017). Quantification by Xiao et al. (2023) showed that from 2017 to 2021, mining activities conducted in China contributed to a total of 77.84 million tons of carbon dioxide emissions in the country. If left unregulated, they projected that China's cumulative carbon dioxide emissions could reach 76.40 Mt in 2030 and 722.18 Mt by 2060. While it had been suggested that most mining sites in Sichuan relied on hydroelectric power such that the carbon footprint may be limited (McGinnis and Roche 2019), with some 40 % of China's Bitcoin mines powered with coal, the coal plants are justifiably perceived to be a threat to undermining China's pledge to peak carbon emissions by 2030 and achieve carbon neutrality by 2060 (Jiang et al. 2021). It is against this backdrop that China's authorities decided to commence the crackdown on crypto mining.

As of April 2021, China claimed 46 % of the world's Bitcoin mining (Xiao and Kelsey 2021) and as much as 70 % of the global crypto supply with reference to the hash rate generated in China (Lee 2021). Mining operations tend to concentrate in specific geographic regions that are ideal for accommodating the Bitcoin mines which are essentially giant data centres, typically featuring low rents, moderate climates, and reliable access to cheap electricity, such as Inner Mongolia, Xinjiang, and Sichuan (Barrett 2021). Inner Mongolia alone accounted for 8 % of the global Bitcoin hash rate (Cang 2021). Hosting once the world's largest Bitcoin mining farm in 2017, it was suggested that for every hour the mine in Inner Mongolia operates, it emits at least the same amount of CO2 as 59,405 miles travelled by a car (Gulli 2020). The mining sites under the name of blockchain data centres or cloud computing firms were previously offered preferential policies including tax deductions and electricity perks by some local authorities (Li 2021). Some local governments offered power at a very low rate, as were those in Sichuan, to attract jobs and boost their gross domestic product figures (Campbell 2021). Such an approach has been explicitly disapproved by the State Council in May 2021. The State Council's Financial Stability and Development Committee made clear the intention to 'crackdown on Bitcoin mining and trading behaviour, and resolutely prevent the transfer of individual risks to the society' (Deng 2021). Following this indication, in parts of Sichuan, miners were ordered to clear out computer servers as part of the wider plans to shutter mining operations across the nation (Shepherd 2021). In Inner Mongolia, the local authorities ordered the acceleration of phasing out the outdated and excessive production

capacity, comprehensive clearance, and shutdown of mining projects to ensure the fulfilment of the environmental targets set in China's national plan.[3]

The crackdown on mining eventually culminated in the Notice on Rectifying Mining Activities of Virtual Currencies issued by the National Development and Reform Commission and other 10 central authorities on 3 September 2021 (hereinafter the 'Notice on Mining'). The Notice on Mining falls within the category of normative documents, i.e. non-legislative documents with binding force on private parties, which, for a certain period, exert binding force in a specific field. It does not strictly fall within the formal sources of law, unlike administrative rules, which lie at the lowest hierarchy, ranking below that of law, administrative regulation and local regulation. The Notice on Mining therefore cannot be considered in isolation. It is essential to comprehend at the same time how it has been implemented by the Chinese courts in civil disputes. As will be seen below, despite being a normative document, it remains to be influential as enforced by Chinese courts. Here, 'virtual currencies' as termed by the Chinese authorities refers to the range of non-sovereign virtual currencies which exist and operate on blockchains, contrasted with the virtual currency issued by the State, known as the Central Bank Digital Currency (CBDC), i.e. the e-CNY. To rectify the mining of 'virtual currencies' is therefore to rectify the mining of crypto tokens such as Bitcoin.

3 Legal Implications of the Notice on Rectifying Mining Activities

Issuance of the Notice on Mining is led by the National Development and Reform Commission (NDRC). The NDRC is a macroeconomic management agency under the State Council. The NDRC's main functions include the implementation of sustainable development strategies and coordination of ecological and environmental protection and restoration (see for example, Zhang 2015). It is worth noting that days after on 15 September 2021, the other influential 'Notice on Further Preventing and Resolving the Risks of Virtual Currency Trading and Speculation' was issued by the People's Bank of China, the Supreme People's Court, and the Supreme People's Procuratorate together with 7 authorities. It focuses on the financial risks associated with crypto tokens. The Notice on Mining instead is authoritatively a policy directed at

3 See Inner Mongolia Autonomous Region Development and Reform Commission, Inner Mongolia Autonomous Region Department of Industry and Information Technology and Inner Mongolia Autonomous Region Energy Bureau, 'Notice on Safeguarding measure to ensure the completion of the '14th Five-Year Plan' Energy Consumption Dual-Control Target Tasks' (Neifagai Huanzi Zi [2021] 209 Hao).

environmental concerns further than the oft-cited risks in the financial sphere associated with crypto tokens such as possibly leading to instability of the State's monetary system. The view is that, as put by a spokesperson of the NDRC, crypto mining lacks a positive driving force for industrial development and technological progress, and the haphazard and unregulated development of this sector has serious adverse effects on promoting high-quality economic and social development, as well as energy conservation and emissions reduction (Tang 2021).

The same tenor is echoed in the Notice on Mining. Paragraph 1 states that virtual currency mining activities, as the computational production process of virtual currencies, consume a significant amount of energy and cause substantial carbon emissions but offer limited contribution to the national economy and industrial and technological advancement. 'The disorderly and unregulated development of this activity has adverse effects on promoting high-quality economic and social development and achieving energy conservation and emissions reduction goals.' It is stated that the rectification of mining activities is of great significance for promoting the optimisation of China's industrial structure, advancing energy conservation and emissions reduction, and achieving the goals of peaking carbon emissions and carbon neutrality as scheduled.

Paragraph 2 adopts a guiding principle of 'strict monitoring, strict risk prevention, strictly prohibiting incremental projects and properly handling existing projects', and the basic principles of 'hierarchical responsibility', 'classified processing', 'in accordance with law and regulations', and 'active prudence'. 'Hierarchical responsibility' requires the establishment of a working mechanism with central coordination, provincial-level overall responsibility, and implementation at the municipal or county level. The central government shall coordinate the nationwide rectification of mining activities; provincial governments shall take overall responsibility for rectification within their respective regions, ensuring that municipal and county governments implement their responsibilities according to specific implementation plans as per central arrangements. Municipal or county governments shall refine and implement measures in accordance with central deployment and provincial government implementation plans, ensuring effective implementation. This aligns with the typical top-down approach in the context of climate change plans where the central government determines the appropriate context for provincial and municipal action to follow and achieve relevant targets in China (see Li and Song 2016). For 'classified processing', the Notice on Mining distinguishes between incremental and stock projects of mining. Investment in and construction of incremental projects are thereby immediately prohibited, and the development of mining projects is prohibited in any form. For stock projects, which in essence store the mined tokens as inventory, it demands the accelerated orderly exit of such projects, on the premise of ensuring a smooth transition and determining an

appropriate exit timetable and implementation path. 'In accordance with law and regulations' requires the crackdown on mining with a legal mindset and strict adherence to the law whilst 'active prudence' refers to an active yet prudent approach in accelerating exit strategies while properly resolving conflicts and disputes to ensure social stability. This approach requires that despite the closure of such business, there shall be appropriate measures in place when terminating relevant employment contracts and to ensure the security interests of financial institutions are preserved.

Paragraphs 3 and beyond stipulate the substantive measures to be taken with the guiding and basic principles in mind. Paragraph 3 mandates a comprehensive investigation into whether there is any mining activity in the big data industrial parks and high-tech zones, and there shall be intensified efforts to ensure that no illegal power is supplied to mining farms. Article 7 in Paragraph 4 categorises mining activities under the category of industries to be 'eliminated in the Industrial Structure Adjustment Guidance Catalogue issued by the NDRC in 2019. The Guidance Catalogue has 3 classifications, i.e. those to be encouraged, to be restricted, and to be eliminated. Industries to be eliminated are those that do not comply with relevant legal regulations, lack adequate safety production conditions, cause severe resource wastage and environmental pollution, and concern outdated craftsmanship, technologies, equipment, and products. According to Article 19 of the still-in-force Interim Provisions on Promoting Industrial Structure Adjustment issued in 2005,[4] investments into the 'to be eliminated' industries are prohibited. Financial institutions shall not provide any form of credit-granting support and shall take measures to recover the granted loans. The relevant authorities shall take powerful measures to eliminate such projects within the prescribed time limit. Electricity prices during the time limit for elimination may be raised. Another way of understanding the implication of such classification is through the constantly updated Negative List for Market Access published by the NDRC. Market participants are prohibited access to the industries listed as to be 'eliminated' in the Guidance Catalogue under the Negative List. No investment into these industries shall be made. In the latest consultative version of the Guidance Catalogue drafted in July 2023, 'virtual currency mining activity' is listed as Item 19.6 in the 'elimination' category and as such, shall be immediately eliminated if not already eliminated. In essence, as a matter of law, there is now no one iota of room for crypto mining to be a legitimate form of business within China.

Further, Articles 8 and 9 place much more scrutiny on data centres. Article 8 stipulates that conducting mining activities under the guise of data centres is strictly prohibited. Intensified regulatory actions will identify the high value-added

4 Guofa [2005] 40 Hao.

industries of blockchain, big data and cloud computing and those under the strategic development of the digital economy, as distinct from mining. Any promotion of mining projects under the pretext of developing the digital economy is also forbidden. Article 9 provides for enhanced credit supervision of entities operating data centres. Credit here refers to the trustworthiness and integrity of the entity rather than the financial creditworthiness alone. There shall be statements to be signed by the entities to declare their commitment to not engage in mining activities. Legal restrictions shall be enforced if an entity fails to fulfil such commitment.

As to electricity, which is at the epicentre of mining businesses, any new applications for power supply are to be rigorously inspected to ensure that no power is provided for mining projects in the future, as stated in Article 10. Article 12 emphasises the need to forbid any form of electricity supply made to mining sites. Article 13 implements differentiated electricity pricing during the elimination period, with an additional charge of $0.30 RMB per kilowatt-hour (kWh). Local authorities are allowed to further increase the additional charge in accordance with the actual local conditions. It follows that, as provided in Article 14, no more electricity-related benefits shall be provided for the mining projects. In practice, the effect on mining businesses is more severe than it is portrayed in the Notice on Mining itself. The Development and Reform Commission of Sichuan in response implemented a $2 RMB additional charge per kWh.[5] Elsewhere, Inner Mongolia's Development and Reform Commission implemented a $1 RMB additional charge per kWh.[6] To put this in context, the commercial electricity rate averages at $0.6–0.8 RMB per kWh currently in Sichuan and Inner Mongolia. The price differentiation means that the mining sites have to pay at least twice as much as what they once needed to pay.

In terms of financial support by financial institutions, Articles 11, 15 and 16 prescribe the withdrawal of any kind of financial or taxation support to mining businesses. Any loan already made shall be recovered and any benefits in rent, utility rate and tax previously offered by local governments shall be ceased immediately. Some provincial governments such as Zhejiang have also adopted measures to rectify mining activities focusing on mining equipment.[7] The policy requires the immediate

5 See Sichuan Development and Reform Commission, 'Notice on Intensifying Rectification Efforts on Closure of Virtual Currency Mining Projects and Implementing Differentiated Electricity Prices for the Electricity Consumption' (Chuanfagai Jiage Gui [2022] 186 Hao).

6 See Inner Mongolia Autonomous Region Development and Reform Commission and Inner Mongolia Autonomous Region Department of Industry and Information Technology, 'Notice on Implementing Differentiated Electricity Prices for Virtual Currency Mining' (Neifagai Jiafei Zi [2022] 115 Hao).

7 See Zhejiang Development and Reform Commission and Zhejiang Department of Justice, 'Notice on Rectification of Virtual Currency Mining Equipment' (Zhefagai Nengyuan [2022] 77 Hao).

cessation of the use of any mining equipment whether software or hardware, including ASIC miners, and confiscation will be made in accordance with the law.

With such stringent measures both at national and local levels, Bitcoin mining in China in July and August 2019 was reported to be at 0 % of the global hash rate (Feng 2021). Mining factories have since then tried to relocate to neighbouring countries such as Mongolia and Kazakhstan with an increase in the demand for mining in the United States and some European countries with good sources of renewable energy such as Norway (Szalay 2021). Nonetheless, it has been reported that some miners have gone underground in China which has re-emerged as a major Bitcoin mining hub as data showed that from September 2021 to January 2022, traffic from China returned to some 20 % of the total global hash rate of Bitcoin (Morris 2022). A year after the crackdown on mining, it was suggested that there were still 94 reachable nodes in the Bitcoin network within China (Zirojevic 2022). As the Notice on Mining does not criminalise mining stricto sensu by individuals, except where the activity falls within the scope of the crimes contained in the criminal law such as money laundering, the remaining issue is how the civil courts resolve disputes consonantly with the strong stance adopted in the Notice. As regards the remnants of contracts concerning mining, ranging from the sales and purchase agreements on mining equipment to service agreements on mining, the next section examines the pathway of the Chinese judiciary delivering judgments in line with the spirit of preserving the environment because of the salient burden on the climate.

4 Chinese Courts' Disavow of Mining Activities

The highest courts at national level, i.e. the Supreme People's Court and at provincial level have since the announcement of the Notice on Mining published 'typical' cases in relation to crypto mining activities. In general, the 'typical' cases are representative cases which have profound social significance and are carefully selected by the corresponding highest judicial organs after consultation with judges and experts in the area. It is usually expected that lower-level courts will follow these 'typical' cases in deciding future similar cases (Cheng 2023). This section analyses the leading cases concerning crypto mining to show how the Chinese courts have moved to recognise that mining activities entail significant energy consumption and not to turn a blind eye to the environmental problems they cause. Previously, Chinese courts had divergent approaches to mining-related contracts. For example, for contracts concerning the sale and purchase of mining equipment, some courts ruled that the contract was valid as the then prevailing law did not explicitly categorise the mining equipment as goods prohibited from trading. In a contract where the buyer agreed to buy 2 specified model professional miners from the seller and the seller was

obligated to operate the miners to then distribute portions of the income made from the miners to the buyer, the court had previously found that it does not violate any law or administrative regulation, and thus the contract was held to be valid and enforceable.[8] The view was that the mining machines simply represented a type of legally transferrable property.[9] This seldomly seen approach of condoning mining activities agreed between private parties is no longer appropriate, and the now prevailing approach is to refuse to recognise the effects of these contracts.

The Supreme People's Court (SPC) in February 2023 published 11 exemplary cases of 'Judicial Active and Prudent Promotion of Peaking Carbon Emissions and Carbon Neutrality'. The first of the 11 cases involves a series of agreements concerning the hire purchase of mining machines and related mining services decided by the court in Dongsheng, Beijing.[10] The material facts are as follows. In May 2020, a computing technology company in Beijing (the purchaser) signed an agreement with a company in Shanghai (the seller), agreeing to purchase units of professional Bitcoin mining machines, at a contractual price of some $5.3 million RMB. Until the payment was fully settled, the seller remained the owner of the servers. Before full settlement of the contractual price, it was agreed that the buyer was to bear the production cost and the seller was to receive a portion of the mining income from the machines. The two parties agreed to host the mining machine servers in the cloud computing centre operated by the computing technology company in Beijing. Later on 1 June 2020, the seller signed a separate cooperation agreement with another industrial company in Shanghai, agreeing that the industrial company to represent the seller and sign technical service agreements with third parties for direct settlement, payment of electricity fees, service fees, and receiving Bitcoin. On 5 June 2020, the industrial company, representing the seller, signed an agreement with the computing technology company in Beijing in which the latter was obligated to provide technical services for the concerned servers and to ensure good power supply and continuous operation of the servers. The contract stipulated that in the event of network or power failures during production accidents, repair work shall be completed promptly and the industrial company shall be compensated for any losses. Due to

8 See *Hunan Jinshangtongda Qukuailian Jishu Youxiangongsi, Ningmindeng Maimaihetongjiufen Minshiershen Caijueshu* (2021) Xiang 02 Minzhong 1938 Hao.

9 See *Chenmou Su Zhejiang Moutongxinkeji Youxiangongsi Wangluogouwu Hetongjiufen An* (2018) Zhe 0192 Minchu 2641 Hao.

10 *Shanghai Qinju Shiye Youxiangongsi Su Beijing Yunjisuankeji Youxiangongsi Weituohetong Jiufenan* (2021) Jing 0101 Minchu 6309 Hao. For publication by the Supreme People's Court, see 'The Supreme People's Court's Opinion on Fully Implementing the New Development Philosophy and Providing Judicial Services for Actively and Prudently Promoting Peak Carbon Emissions and Achieving Carbon Neutrality, along with Typical Cases of Judicial Active and Prudent Promotion of Peaking Carbon Emissions and Carbon Neutrality' (20 February 2023).

multiple power outages during the service period, the plaintiff industrial company eventually sued the defendant computing technology company for a breach of contract, seeking compensation of $5.3 million RMB for loss in mining income. The defendant submitted, among other things, that the contract is void for it violates public order and good morals because of its subject matter of mining. The legal basis is Article 153 of the Civil Code. Article 153 provides that '(1) A civil juristic act in violation of the mandatory provisions of laws or administrative regulations is void, unless such mandatory provisions do not lead to invalidity of such a civil juristic act. (2) A civil juristic act that offends the public order or good morals is void.'

The court dismissed the plaintiff's claim, for the agreement between the plaintiff and the defendant concluded on 5 June 2020 is invalid and not enforceable in courts. The court first cited one of the general principles in the Civil Code, Article 9, which provides that 'When conducting a civil activity, a person of the civil law shall act in a manner that facilitates conservation of resources and protection of the ecological environment.' This principle is commonly known as the green principle (see Zhang 2022). The court further cited the Notice on Mining and Article 19 of the Interim Provisions on Promoting Industrial Structure Adjustment, as discussed above, in ruling that any investment in crypto mining is prohibited. In the premises, as regards the activities and relationships between the plaintiff and the defendant on the custody and maintenance of mining machines for Bitcoin mining, the matters are in contradiction to the spirit of Article 9 of the Civil Code. It was held that the contract does not comply with the mandatory provisions of relevant administrative regulations on industrial structure adjustment and regulatory requirements, thereby in breach of public order and good customs. The court shall refuse to acknowledge the effects of such an agreement. The SPC in publishing the case as a typical case suggested that the present court has rightly reinforced the legislative spirit of Article 9 of the Civil Code, i.e. to elevate environmental protection to the status of a basic principle in Chinese civil law, coupled with national industrial plans, to refuse to grant relief to the plaintiff. In invoking Article 153 of the Civil Code and finding that the contract is contrary to public order and good customs, therefore null and void, the SPC stated that the case epitomises the judiciary's resolute commitment towards achieving carbon neutrality and serves as guidance for companies to fortify their environmental consciousness.

Another case on mining decided by the court of Jingyan County in Sichuan was published by the SPC as one of the selected 'Ten Commercial Cases Tried by the People's Courts Nationwide' for the year 2022.[11] The plaintiff agreed to purchase

11 *Huxingrui Su Wangmoumou Maimaihetong Jiufenan* (2021) Chuan 1124 Minchu 1619 Hao. For publication by the Supreme People's Court, see 'Ten Commercial Cases Tried by the People's Courts Nationwide' (19 January 2023).

3 mining machines from the defendant for at a total price of $62,000 RMB on 18 October 2021. The plaintiff then found that the machines were unusable because of some quality issues. After trying to contact the defendant asking how to resolve the issues with no avail, the plaintiff filed the claim seeking an invalidation of the contract and for the defendant to return the purchase price $62,000 RMB. The court found that the purpose of purchasing the mining machines was to engage in the production of Bitcoin through mining activities. The court suggested that mining activities involve significant energy consumption and carbon emissions, which are detrimental to optimising the country's industrial structure and achieving energy conservation and emission reduction goals. Further, they are inconsistent with the dual targets carbon peaking and carbon neutrality, and hinder efforts to conserve resources and protect the ecological environment. Coupled with the inherent financial risks of crypto tokens, the contract was ruled to be null and void for it constitutes a breach of public order and good morals, citing Article 9 and Article 153. As the contract was void, the Jingyan court ordered the purchaser to return the 3 mining machines to the defendant and the defendant to return the contractual sum of $62,000 RMB. The case is another example of an application of the green principle where the court seeks to guide the embodiment of this fundamental principle in civil and commercial activities. The importance of the goals of high-quality economic and social development and optimisation of the national industrial structure has been underlined. The typical significance also lies in establishing the awareness of ecological civilisation for legal persons in conducting themselves in civil relationships.

Similar 'typical' cases have been published by the highest courts at provincial level. For example, the Higher People's Court of Guangdong released 12 typical cases of 'serving and ensuring the ecological construction of a green and beautiful Guangdong', one of which concerns a cooperation agreement between an information company and a technology company where the information company agreed to provide mining services.[12] The technology company alleged that the information company has failed to perform services of quality and sued for the sum of the service fees paid. The court cited the national and provincial policy documents, noting that crypto mining activities consume significant energy and cause huge amounts of carbon emissions. The notion is that such activity is not protected by the law and not to be acknowledged by the courts for it harms public interests and violates public order and good morals. Likewise, Beijing's first-ever contract case on mining had

12 *Shenzhenshi Zhongtianyunchu Kejiyouxiangongsi, Guangzhou Shenmazixunkeji Youxiangongsi Hetongjiufen MInshi Yishen Minshi Caijueshu* (2022) Yue 0106 Minchu 12,756 Hao. For publication by the Higher People's Court of Guangdong, see 'Typical Cases of Guangdong Courts Serving and Guaranteeing the Ecological Construction of a Green and Beautiful Guangdong' (1 June 2023).

been shortlisted as one of the 10 exemplary cases of 'driving the rule of law in the new era' for 2022.[13] The court ruled that the type of mining activities involved in the contract is not conducive to optimising the industrial structure and energy conservation in China. It is also not conducive to achieving the goals of carbon peaking and carbon neutrality. It was found that despite knowing the risks associated with mining as denounced by the authorities, the two companies still signed a mining agreement. The court held that the agreement was invalid, and the rights and interests arising from it should not be protected by law. The consequences of these actions shall be borne by the parties themselves. In the end, the Beijing Court declared the contract between the two companies invalid and dismissed all claims by the plaintiff. The practical significance of this case is that after the ruling, the Beijing court advised the Development and Reform Commission of Sichuan and following the advice, the mining factories in Sichuan involved in the case were all promptly demolished. What has therefore been achieved is the unity of the executive and judiciary in effectively rectifying mining activities within the nation.

When considering the validity of contracts in general, the Notice by the Supreme People's Court on Issuing the Minutes of the National Court Work Conference for Civil and Commercial Trials 2019, intended as a direction for all civil courts, is pertinent. Paragraph 31 of the Notice states that: 'The violation of administrative rules in usual circumstances does not affect the validity of a contract. However, when the content of such regulations pertains to financial security, market order, national macro-policies, or other matters concerning public order and good customs, the contract should be deemed invalid. When determining whether regulations touch upon public order and good customs, the People's Court should carefully consider the regulatory object while taking into account factors such as the intensity of regulation, protection of transaction security, and social impact. These considerations should be thoroughly expounded upon in the judicial decisions.' While the Notice on Mining is a normative document which has a weaker legal force than administrative rules, by finding that mining activities violate the green principle contained in Article 9 of the Civil Code, thereby contravening public order and good morals, Chinese courts have paved the way for exerting judicial oversight over mining activities in the country. Further, the reach of such oversight goes beyond merely requiring civil parties to avoid wasting resources, polluting the environment, or damaging the ecology in the course of the performance of the contract as stipulated in Article 509(3) of the Civil Code. The court scrutinises the substance and nature of mining contracts, and

13 *Beijing Fengfu Jiuxin Yingxiao Keji Youxiangongsi Yu Zhongyan Zhichuang Qukuailianjishu Youxiangongsi Fuwuhetong Jiufen Yishen Minshi Panjueshu* (2020) Jing 0105 Minchu 69,754 Hao. Appeal dismissed in (2022) Jing 03 Minzhong 3852 Hao.

effectively has alleviated the difficulty of legislating promptly to regulate mining activities as a matter of formal law.

As discussed above, where a contract is annulled because it breaches public order and good morals, Article 153 of the Civil Code provides that the contract is void. Article 155 specifies that a void civil juristic act does not have any legal force ab initio. An act that is void ab initio never had any legal effect and is impossible to be ratified. Article 157 further provides that 'Where a civil juristic act is void, revoked, or is determined to have no legal effect, the property thus obtained by a person as a result of the act shall be returned, or compensation be made based on the appraised value of the property if it is impossible or unnecessary to return the property. Unless otherwise provided by law, the loss thus incurred upon the other party shall be compensated by the party at fault, or, if both parties are at fault, by the parties proportionally.' It follows that in theory, any benefit, obtained by any party to the mining contract which is most likely to be annulled by the courts when litigated, shall be returned to the counterparty. As the contract is void, if there is any breach of the terms in the contract, the innocent party has no recourse against the defaulting party in the courts because the courts will not give effect to such a contract.

Instead, the innocent party when faced with a breach of contract, probably should plead for the invalidation of the entire contract. This is because, as in the case decided by the Jingyan court, if annulment is pleaded, the court is likely to restore the parties to the same position before the agreement was made. If only liability for breach of the void contract is pleaded, the court is most likely to refuse to grant relief to the plaintiff. As in the 3 other cases discussed above, the court's reasoning is that where both parties agree to collude to participate in a contract which violates public order and good morals, both parties are at fault, and they have to bear the legal risks of themselves. Naturally, one of the risks is the non-performance of the contract by the other party. In this circumstance, the innocent party is effectively invariably in a relatively weaker position because the best outcome it can expect is to be reinstated to the position before the contract was made. This is so unless the defaulting party is found to be at more fault for rendering the contract to violate public order and good morals. It is however unlikely that the court finds one party to be at more fault when both parties negotiate the contract even-handedly and have equal bargaining power. Whereas the defaulting party may be able to take advantage of its default since the default is likely to be passed over in the courts because the contract is deemed to never have any effect. On the whole, either way, it is clear that the economic incentives of agreeing on mining-related contracts have been curtailed by the courts by denying any legal effects of such contracts. This approach presents a deterrent effect on private parties for any benefit obtained from such contracts is susceptible to be reverted when disputes arise. It is a market-oriented solution that constrains the extent of benefit that can be obtained from agreeing on crypto mining activities.

Consider also the effect of other contracts in addition to contracts for purchasing mining machines or the provision of mining services, such as employment contracts and rental agreements. Except where a party can legitimately suggest that it is unaware of the civil juristic act's connection with mining, those who lend their hands to aid crypto mining activities run the risks of not receiving any gain at all if the other party defaults and litigation is required. The court's fundamental disapproval of such contracts exposes the parties to inherent uncertainty as it is trite that the predictability of contract law lies in making promises costly to break with the contract's enforceability in courts, which in turn allows parties to depend on and invest in reliance upon these promises (Starr, Prescott, and Bishara 2020). By extinguishing such dependence, the existing approach by the judiciary seeks to develop a self-behavioural constraint on the market participants knowing that they are contracting with the counterparty who knows at worst it would merely be placed in its original position if it does not adhere to the provisions in the agreement, and eventually leading to the disappearance of the disavowed activity of mining.

The Chinese courts when handling litigations on mining which are of wider significance to the environment and national macro-policies demonstrate the expected sensitivity towards the importance of synchronising the legal and social effects of the judgments pronounced (He 2021). By publishing civil cases on crypto mining as typical cases, the highest courts demonstrate an external influence on informing the public that the central authorities are backed up by the judiciary in rectifying mining because of its environmental impact. An example mentioned above is where the Beijing court after its conclusion of the case recommended the relevant regional authorities in Sichuan to shut down the mining sites. The nation's pledge to achieve carbon peaking by 2030 and carbon neutrality by 2060 pertains to a concerted effort to be attainted not just by the bureaucracy, but the judiciary and private entities as well. As can be seen from the typical cases considered above, when releasing the cases, there are often emphases on how businesses are expected to enhance their awareness of environmentally friendly business practices in general. Publicity of these cases furthers the unity of political, social, and legal effects. Coherence is much needed for the judges to deliver judgments in analogous cases, but it also impacts the public's perception of the national targets and pursues to transform them from mere observers to committed adherents of the targets. Specifically on crypto mining, with the integrated express disapproval of such practices by the central authorities and the courts, it sends a message to the public, seeking to consolidate the credence of the State's strong stance against any mining activity within China.

In the final analysis, the high degree of policy responsiveness by the courts shown when adjudicating mining-related civil disputes aligns with the SPC's direction of encouraging national courts at all levels to exercise judicial functions

comprehensively to promote ecological civilisation and green development as outlined in its Opinion on Fully Leveraging Judicial Functions to Provide Judicial Services and Safeguards for Advancing Ecological Civilisation Construction and Green Development.[14] The focus on preserving the environment and natural resources is a remarkable and crucial policy in light of China's national conditions where for the past few decades, its economic take-off has been accompanied by environmental challenges that pose a major threat to its sustainable development, as well as public health and welfare (Zhai and Chang 2019). As regards the judicial flexibility or discretion allowed in determining whether an act breaches public order and good morals, when the act in question affects the pursuits of fundamental national environmental strategies, judges justifiably are likely to proffer more weight and respect to the spirit enshrined in various policy documents, and in the context of crypto mining, the latest Notice on Mining. Rectifying crypto mining is but one example of China's commitment to greening its civil law.

5 Conclusions

This article has examined the reasons for China's crackdown on crypto mining and how the crackdown has been implemented. Crypto mining activities run contrary to China's national objectives of promoting high-quality economic and social development, as well as energy conservation and emissions reduction. More specifically, data have shown that if they are left unregulated, they risk undermining China's pledge to peak carbon emissions by 2030 and achieve carbon neutrality by 2060. From what was the world's major contributor to crypto mining, the industry has essentially been phased out gradually in China, if not completely eliminated. The central authorities issued the Notice on Mining in September 2021 to make a clear statement of the State's aim to resolutely sort out the once prevalence of crypto mining activities in the country. Local governments have followed suit by enacting local policies such as charging higher electricity prices specifically for mining businesses. Following the Notice of Mining, any investment into the industry is no longer permitted. Even where any such investment has been made, this article has analysed typical court cases which show that commercial contracts concerning crypto mining are commonly held to be devoid of any legal effects by Chinese courts. These contracts are found to be in violation of public order and good morals and thus are invalid. The risks of any kind of disputes or default arising out of these contracts are borne by the individuals or entities themselves. With the combined efforts of the central authorities and the judiciary, the economic incentives of investing in mining

14 Fafa [2016] 12 Hao.

have been hugely diminished. The crackdown on mining is one of the instances where the unity of public and social effects are taken into consideration by Chinese courts as they render decisions of wider significance. It is anticipated that the judiciary will continue in the future to exercise its function in line with the national agenda of developing a greener society.

The international industry of crypto mining currently and in the future is very likely to present all the more difficult challenges to global efforts in reducing greenhouse gas emissions. The risks and harms of innovation are to be addressed alongside the contributions it portrays. The policy considerations explained in this article are not specific to crypto mining activities in China but are relevant to other countries as well. It has become increasingly evident that an interplay of regulatory measures is necessary in the face of burgeoning technologies to harmonise progress with an ecological equilibrium to safeguard the sanctity of the globally shared environment.

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