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## The Urgency of Establishing Special Regulations on Crypto Mining in the Framework of Legal Certainty in Indonesia

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**Abstract:** The rapid development of blockchain technology has driven increased crypto-mining activities in various countries, including Indonesia. However, until now, Indonesia has not had specific regulations that explicitly regulate crypto mining, both in terms of legality, licensing, legal protection, and its impact on the environment and the national electricity system. This ambiguity creates legal uncertainty for business actors, investors, and law enforcement officers in assessing and handling these activities. This study aims to examine the urgency of establishing special regulations regarding crypto mining to provide clear and comprehensive legal certainty. The method used is a normative legal approach with an analysis of applicable laws and regulations and comparative studies with several countries. The study results reveal that special regulations are needed to address the legal challenges that arise from the practice of crypto mining that continues to grow in this digital era.

**Keyword:** Crypto Mining, Regulation, Legal Certainty, Digital Law

**Abstrak:** Perkembangan teknologi blockchain yang sangat pesat telah mendorong peningkatan aktivitas penambangan kripto di berbagai negara, termasuk Indonesia. Namun, hingga saat ini, Indonesia belum memiliki regulasi khusus yang secara eksplisit mengatur penambangan kripto, baik dari sisi legalitas, perizinan, perlindungan hukum, maupun dampaknya terhadap lingkungan dan sistem kelistrikan nasional. Ketidakjelasan ini menimbulkan ketidakpastian hukum bagi pelaku usaha, investor, dan aparat penegak hukum dalam menilai dan menangani kegiatan tersebut. Penelitian ini bertujuan untuk mengkaji urgensi pembentukan regulasi khusus mengenai pertambangan kripto untuk memberikan kepastian hukum yang jelas dan komprehensif. Metode yang digunakan adalah pendekatan hukum normatif dengan analisis terhadap peraturan perundang-undangan yang berlaku dan studi komparatif dengan beberapa negara. Hasil penelitian mengungkapkan bahwa regulasi khusus diperlukan untuk menjawab tantangan hukum yang muncul dari praktik penambangan kripto yang terus berkembang di era digital ini.

**Kata Kunci:** Penambangan Kripto, Regulasi, Kepastian Hukum, Hukum Digital

## INTRODUCTION

The development of blockchain technology in Indonesia in recent years has shown a very significant increase (Apriani, 2023). This innovation has not only changed the pattern of financial transactions through digital currencies such as Bitcoin and Ethereum but has also given birth to a new activity called crypto mining (Rakhman, 2023). Crypto mining is basically a process of verifying digital transactions in a blockchain network, which then provides rewards in the form of crypto assets to the perpetrators (Putranti, 2022). In Indonesia, although the use of crypto assets as an investment tool has begun to be widely known, mining activities themselves are still relatively new and have not received much serious attention from policymakers. The existence of this phenomenon marks an important phase in the transformation of the national digital economy, which requires adaptation in the legal system (Wiwoho, 2024).

Crypto mining as a new phenomenon presents characteristics that distinguish it from conventional economic activities. The mining process not only depends on the sophistication of technology, but also on the consumption of large electrical energy, certain hardware infrastructure, and a stable and fast internet network (Gunardi, 2021). This shows that mining is an activity that is not only virtual-based but also has a real impact on national resources, especially energy. However, in reality, Indonesia has not yet had specific regulations that explicitly regulate crypto mining, both in terms of the legality of activities, technical operational standards, and legal responsibilities of actors. This ambiguity then creates a gray area in practice in the field (Rahardja, 2023).

In this context, legal uncertainty is the main challenge faced. Business actors who want to invest in mining do not get clear guidelines regarding their permits, obligations, or rights. Investors also face significant legal risks because there are no standard rules that guarantee the security of their investments. Even law enforcement officers have the potential to experience confusion in handling cases related to mining activities, whether they need to be treated as violations of the law or as legitimate technological innovations (Wati, 2025). Without an adequate legal framework, the potential for mining to develop as a new sector in the national digital economy is hampered, and Indonesia risks being left behind by other countries in managing the potential of this technology (Thamrin, 2023).

To further understand crypto mining, it is important to know that technically, mining is validating and recording new transactions into the blockchain by solving complex cryptographic puzzles (Raharjo, 2022). This process in the Bitcoin system, for example, uses the Proof of Work (PoW) mechanism, where miners must compete to solve mathematical calculations to get the right to record transactions and receive rewards in the form of new coins (Sugandi, 2022). In its development, there is also a more energy-efficient Proof of Stake (PoS) mechanism, where validation is carried out based on the number of crypto assets owned and 'staked' by the validator (Viddy, Karunia, & Rafiqoh, 2025). These two systems have different legal and technical implications that must be understood if regulations are to be drafted accurately.

When discussing the need for legal certainty in crypto mining, the relevance of Gustav Radbruch's theory regarding legal certainty becomes very important. According to Radbruch, the law must provide predictability so that the public knows their rights and obligations (Badriyah, 2022). In a mining situation without clear regulations, the perpetrators cannot predict with certainty whether their activities are legal, what their tax obligations are, how their business permits must be processed, or what sanctions they face if they violate them (Zimba, 2020). It is contrary to the legal certainty principle which should be a pillar of every modern legal system, especially in the face of disruptive technological developments. Furthermore, legal certainty not only protects individuals but also maintains order in social

and economic life (Halilah, 2021). In the digital technology ecosystem, without adaptive regulations, uncertainty can hinder innovation, reduce investment interest, and even open up loopholes for illegal practices such as illegal mining that damages the environment or energy misuse. Therefore, the theory of legal certainty demands that the state immediately come up with legal norms that can anticipate and direct crypto-mining activities to a legitimate, productive, and sustainable path (Nazar, 2024).

In Indonesian positive law, several regulations related to digital technology have existed, although they are not specific enough to touch on mining issues. Law No. 19 of 2016 concerning Information and Electronic Transactions (ITE), for example, regulates general aspects of electronic transactions and digital data but does not explicitly discuss crypto assets or the mining process (Lase, 2021). This shows that the legal basis for this sector is still general and needs more detailed development. In addition, the ITE Law focuses more on data protection and electronic transactions, not on new blockchain-based economic activities (Kadly, 2021).

More concrete steps can be seen in Law No. 11 of 2020 concerning Job Creation and the latest amendment through Law No. 6 of 2023 concerning the Stipulation of the Perpu Cipta Kerja into Law. Through a risk-based licensing mechanism, the new technology-based business sector gets more space (Rosari, 2024). However, in the list of priority business sectors, crypto mining as a specific category has not been explicitly mentioned. This means that mining is operating within a legal loophole, only adhering to general permits related to information technology, without specific norms on technical, environmental, or energy use standardization. Meanwhile, in the scope of crypto asset trading, the Commodity Futures Trading Supervisory Agency (Bappebti) Regulation No. 8 of 2021 concerning Guidelines for Organizing Physical Market Trading of Crypto Assets on Futures Exchanges provides legal certainty regarding crypto asset trading as a commodity (Rohman, 2021). This regulation regulates the legal buying and selling mechanism for crypto in the physical futures market, determines the list of legal crypto assets, and the requirements for crypto asset traders (Tambun, 2022). However, this Bappebti Regulation does not touch on the mining aspect itself, even though mining is one of the main processes to create the crypto assets being traded. This emphasizes that the legal space for crypto mining is still empty and waiting to be filled.

## METHOD

This study uses a normative legal approach method, which is an approach that is based on a study of applicable positive legal norms and an analysis of legal principles relevant to the issue of crypto mining in Indonesia. The focus of this study is on primary legal materials in the form of laws and regulations such as Law Number 19 of 2016 concerning Electronic Information and Transactions (UU ITE), Law Number 11 of 2020 concerning Job Creation and its latest amendments in Law Number 6 of 2023, Bappebti Regulation Number 8 of 2021 concerning Guidelines for Organizing Physical Market Trading of Crypto Assets on Futures Exchanges, as well as other regulations related to energy and the environment such as Law Number 30 of 2009 concerning Electricity and Law Number 32 of 2009 concerning Environmental Protection and Management. In addition, secondary legal materials in the legal literature, scientific journals, policy reports, and comparative studies from countries such as the United States, Canada, and El Salvador are also used to enrich the analysis. The analysis technique used in this study is descriptive-analytical, namely describing existing regulations, identifying legal gaps related to crypto mining, and analyzing the need for the formation of new regulations based on the theory of legal certainty according to Gustav Radbruch. This study does not use empirical data such as interviews or surveys, because the entire analysis focuses on existing legal documents and literature studies.

## RESULT AND DISCUSSION

### Legal Analysis of Crypto Mining Regulations in Indonesia

The legal status of crypto assets in Indonesia is regulated through several sectoral regulations but does not specifically cover crypto mining activities. Based on the Commodity Futures Trading Supervisory Agency (Bappebti) Regulation No. 8 of 2021, crypto assets are recognized as commodities that can be traded on futures exchanges, not as legal tender. This provision is in line with Bank Indonesia's stance based on Article 1 number 2 of Bank Indonesia Regulation No. 17/3/PBI/2015, which states that the only legal tender is the rupiah. With this legal position, crypto trading activities have received certain legitimacy in Indonesia. However, crypto mining as a process of producing or creating crypto assets has not been explicitly touched on in this legal framework. Regulations only regulate the asset transaction stage, without providing legal clarity on the technical mining activities that are the foundation of the asset's existence.

The absence of specific regulations regarding crypto mining gives rise to various serious legal problems, especially related to uncertainty in terms of licensing and business operations. Mining actors who want to carry out these activities do not know whether they are required to obtain certain permits, such as business permits in the information technology or energy sectors, or whether they are included in certain industry categories that are not yet listed in the Indonesian Standard Classification of Business Fields (KBLI). This ambiguity may violate administrative provisions, which in certain cases can be extended to violations of economic criminal law. For example, Article 9 of the ITE Law states that every electronic system organizer manages its electronic system reliably and safely. Without a specific permit or operational standard, mining activities can be considered to violate the principle of organizing an electronic system reliably.

Furthermore, the new Criminal Code (Law No. 1 of 2023) which came into effect, provides a new basis for law enforcement in the digital economy sector. Article 508 of the new Criminal Code regulates criminal acts related to organizing a business without a permit required by statutory provisions. In mining, business actors who carry out operations without a permit can be prosecuted based on this provision, even though no specific licensing provisions have been made. This situation poses a risk of unfair criminalization for industry players who have no intention of breaking the law, but are simply trapped in a regulatory vacuum. It is one of the real impacts of the state's delay in providing adaptive legal norms to technological developments.

Another impact that also needs to be seriously studied is the relationship between mining activities and national electricity. Law No. 30 of 2009 concerning Electricity, as last amended by Law No. 6 of 2023 concerning the Stipulation of the Job Creation Regulation, emphasizes in Article 3 that the provision of electricity must guarantee the availability of sustainable electricity and pay attention to environmental sustainability. Crypto mining requires large amounts of electricity consumption, even for small-scale mining, electricity is needed that exceeds the needs of an ordinary household. Without regulations governing electricity consumption standards for mining, this activity may disrupt the stability of the national electricity supply, especially in areas where electricity supply is still limited. This is a serious problem that cannot be ignored.

In addition to the electricity aspect, consumer protection is also an important area that needs to be considered in crypto mining activities. Law No. 8 of 1999 concerning Consumer Protection stipulates that consumers have the right to comfort, security, and safety in consuming goods and/or services (Article 4 letter a). In the context of mining, consumers can be harmed if there is a system failure, theft of mining results, or fraud in renting mining services (cloud mining) due to the lack of operational standard protection regulations. Without

legal standards, mining service providers do not have an explicit legal obligation to provide a guarantee of service quality, so the risk of consumers being harmed is high.

Regarding environmental impacts, crypto mining also has consequences that need to be considered from an environmental law perspective. Law No. 32 of 2009 concerning Environmental Protection and Management, which is still in effect and is the main legal umbrella, stipulates in Article 15 that every business plan and/or activity that has a significant impact on the environment must be accompanied by an Environmental Impact Analysis (AMDAL). Large-scale mining activities should be included in this category considering the high energy consumption that impacts changes in carbon emissions and pressure on the national energy infrastructure. Without regulations requiring AMDAL for mining, the potential for environmental damage due to increased emissions and uncontrolled energy use remains wide open.

In addition, the lack of supervision of crypto mining from an environmental perspective increases the chances of violations of the right to a healthy environment. Article 65 paragraph (1) of Law 32/2009 emphasizes that everyone has the right to a good and healthy environment. If mining is carried out massively without control over the use of renewable energy or without energy efficiency, then the constitutional rights of the community to a healthy environment can be disrupted. Regulations regarding the standards for the use of environmentally friendly energy in mining activities are an urgent need so that the balance between the right to technological development and the right to the environment is maintained.

Overall, an analysis of the current legal conditions shows that the unclear legal status of crypto mining has various serious consequences that have a wide impact, both in terms of protecting business actors, protecting consumers, electricity stability, and preserving the environment. Existing regulations only recognize the trading of crypto assets as commodities, while forming these assets through mining has not received proportional legal treatment. In a situation like this, the need for the formation of special regulations on crypto mining in Indonesia becomes increasingly inevitable to address the complexity of the legal problems that are currently being faced.

### **Formation of Special Regulations for Crypto Mining: Comparative Study and Ideal Formulation**

In looking at global developments, crypto mining regulations in several countries provide a concrete picture of how this activity can be managed legally without stifling innovation. The United States, especially the state of Texas, is one of the most progressive examples by providing electricity incentives to miners and establishing a special licensing system. Through this policy, Texas has succeeded in attracting large investments in the mining sector, while controlling the impact on the state's electricity grid. The local government not only clarifies the legal status of mining but also ensures that business actors contribute to the development of energy infrastructure.

In Canada, the province of Quebec has adopted a different approach that focuses more on managing electricity resources. By setting special electricity rates for mining activities, Quebec regulates energy use to remain within reasonable limits and does not disrupt the supply for the needs of the general public. This policy shows that the energy aspect must be an important part of crypto mining regulations, not only from an economic perspective but also in maintaining environmental sustainability. Quebec utilizes the advantages of renewable energy from hydroelectric power plants to attract sustainable mining activities.

El Salvador offers a unique model with the concept of "volcano mining", which is geothermal energy from volcanoes to support Bitcoin mining activities. This integration proves that crypto mining can be oriented to support the clean energy transition if managed



with innovative policies. El Salvador not only legalized Bitcoin as an official means of payment but also built an ecosystem that seeks to reduce the environmental impact of mining activities. This approach inspires that mining regulations can run in line with national efforts to achieve low emission targets.

Based on reflections from the comparative study, Indonesia has a strong urgency to immediately form special regulations on crypto mining. Legal certainty is the main reason, considering that business actors, investors, and law enforcement officers are encountered with uncertainty in assessing the legality of mining activities. In Indonesia, where the adoption of blockchain technology is growing rapidly, legal clarity is an important foundation so that digital innovation does not develop in a legal gray zone that endangers national interests.

In addition, special regulations are needed to manage the impact on the environment and national electricity. Crypto mining that operates without control can burden the electricity grid, increase carbon emissions, and cause injustice in energy distribution. Indonesia, which is trying to increase the mix of new and renewable energy, needs strict regulations so that mining encourages environmentally friendly energy, rather than exacerbating dependence on fossil fuels. This regulation must ensure that the growth of the digital economy is in line with Indonesia's commitment to sustainable development.

The economic opportunities of the crypto mining sector should also not be ignored. With the right regulation, Indonesia can gain fiscal benefits through a fair taxation scheme. State revenue from this sector can be increased through tax regulations on mining income, royalties on the use of electricity resources, and levies on the use of information technology infrastructure. Without regulation, all of these potential revenues are at risk of being lost and instead increasing the unmonitored shadow economy.

In designing the regulation, the formulation of legal material needs to be carefully prepared. First, the legal definition of crypto mining must be emphasized in the regulation, so that there are no differences in interpretation between law enforcement, business actors, and the public. This definition must include, both individual mining and industrial-scale mining and pay attention to various blockchain consensus models such as Proof of Work (PoW) and Proof of Stake (PoS). Setting the right definition will be the entry point for all other legal instruments that follow.

Second, a special licensing system must be the main pillar of crypto mining regulation in Indonesia. Every entity that carries out mining activities must have an operational permit, with certain administrative, technical, and environmental requirements. Regulations should also address energy use, including the requirement to use a certain percentage of renewable energy for mining operations. Institutions such as OJK and Bappebti should be given oversight authority over the financial and technical aspects of crypto mining, with a regular reporting system to ensure compliance.

Finally, the law enforcement aspect must be clarified through administrative and criminal sanctions. Violations such as unlicensed mining operations, illegal use of electricity, or manipulation of transaction data must be subject to strict sanctions by the principles of justice and legal certainty. By building comprehensive, adaptive, and visionary crypto mining regulations, Indonesia can create a healthy digital economic ecosystem while protecting national interests amidst the increasingly rapid global technological transformation.

## CONCLUSION

The rapid development of crypto mining activities in Indonesia requires more specific legal clarity. Currently, Indonesia only regulates crypto assets as commodities through the Bappebti Regulation, without any specific regulations that touch on the operational aspects of crypto mining in detail. This legal vacuum creates uncertainty that may harm business actors, investors, the general public, and even the state in terms of fiscal revenue. Problems arise

related to the environmental impact and national electricity burden due to uncontrolled mining. Comparative studies show that several countries have taken progressive steps in regulating mining through energy incentives, electricity tariff regulations, and the obligation to use renewable energy. It reinforces the urgency that Indonesia needs to immediately form special regulations that provide a comprehensive, progressive, and environmentally friendly legal basis for crypto mining activities, to create a safe, transparent, and sustainable digital ecosystem. In line with that, the suggestion that can be submitted is that the Indonesian government, through related ministries and institutions such as the Ministry of Trade, Bappebti, OJK, and the Ministry of Energy and Mineral Resources, begin to draft special regulations on crypto mining by considering aspects of licensing, energy use, supervision, consumer protection, and strict sanctions provisions. The regulation needs to accommodate the needs of technological innovation while maintaining the principles of legal certainty, economic justice, and environmental sustainability. In addition, in formulating the regulation, it is important to involve various stakeholders, including blockchain associations, business actors, academics, and civil society, so that the resulting legal product can answer real challenges in the field. With this step, Indonesia can position itself strategically in the global digital economy map without ignoring aspects of national protection in energy, law, and the environment.

## REFERENCES

- Apriani, D. A. (2023). Optimasi transparansi data dalam rantai pasokan melalui integrasi teknologi blockchain. *Jurnal MENTARI: Manajemen, Pendidikan dan Teknologi Informasi*, 2(1), 1-10.
- Badriyah, S. M. (2022). *Sistem penemuan hukum dalam masyarakat prismatic*. Jakarta: Sinar Grafika.
- Gunardi, L. &. (2021). Cryptocurrency Trend in Indonesia: A Regulatory Approach to Solve Numerous Economic Problems. *Seri Seminar Nasional Ke-III Universitas Tarumanagara Tahun*, 269-276.
- Halilah, S. &. (2021). Asas Kepastian Hukum Menurut Para Ahli. *Siyasah: Jurnal Hukum Tata Negara*, 4(II).
- Kadly, E. I. (2021). Keabsahan Blockchain-Smart Contract Dalam Transaksi Elektronik: Indonesia, Amerika Dan Singapura. *Jurnal Sains Sosio Humaniora*, 5(1), 199-212.
- Lase, S. M. (2021). Kerangka Hukum Teknologi Blockchain Berdasarkan Hukum Siber di Indonesia. *Padjadjaran Law Review*, 9(1).
- Nazar, D. M. (2024). IMPLEMENTASI PENGGUNAAN CRYPTOCURRENCY DALAM PERSPEKTIF HUKUM PERDATA DAN HUKUM ISLAM GUNA MENCAPAI KEPASTIAN HUKUM PARA PIHAK DI INDONESIA. *Multilingual: Journal of Universal Studies*, 4(3), 154-173.
- Putranti, I. R. (2022). Crypto minning: Indonesia carbon tax challenges and safeguarding international commitment on human security. *International Journal of Business, Economics, and Social Development*, 3(1), 10-18.
- Rahardja, U. (2023). The economic impact of cryptocurrencies in indonesia. *ADI Journal on Recent Innovation*, 4(2), 194-200.
- Raharjo, B. (2022). *Uang Masa Depan: Blockchain, Bitcoin, Cryptocurrencies*. Semarang: Penerbit Yayasan Prima Agus Teknik.
- Rakhman, I. M. (2023). Mining Cryptocurrency di Blockchain. *Jurnal Riset Manajemen Dan Ekonomi (Jrime)*, 1(1), 262-273.
- Rohman, M. N. (2021). Tinjauan Yuridis Normatif Terhadap Regulasi Mata Uang Kripto (Crypto Currency) di Indonesia. *Jurnal Supremasi*, 1-10.

- Rosari, A. &. (2024). Penyederhanaan Izin Usaha Pasca Undang-Undang Cipta Kerja, Berdasarkan Prinsip Perizinan Berbasis Besarnya Resiko Berusaha. *Jurnal Ilmu Hukum, Humaniora dan Politik (JIHHP)*, 4(3).
- Sugandi, H. K. (2022). Rancang Bangun Aplikasi Simulasi Mining Pada Jaringan Blockchain Bitcoin. *Sebatik*, 26(1), 332-339.
- Tambun, M. A. (2022). Tata Kelola Pembentukan Regulasi Terkait Perdagangan Mata Uang Kripto (Cryptocurrency) sebagai Aset Kripto (Crypto Asset). *Mahadi: Indonesia Journal of Law*, 1(1), 33-57.
- Thamrin, D. &. (2023). Analisis terhadap Krisis Regulasi Pengaturan Crypto Currency yang Mengancam Human Security di Indonesia. *Jurnal Keamanan Nasional*, 9(2), 399-422.
- Viddy, A., Karunia, E., & Rafiqoh. (2025). *Crypto & Blockchain: Masa Depan Keuangan Global*. Padang: Takaza Innovatix Labs.
- Wati, Y. E. (2025). Peranan Badan Pengawas Perdagangan Berjangka Komoditi dan Otoritas Jasa Keuangan Dalam Memberikan Perlindungan Hukum Terhadap Investor Mata Uang Digital atau Crypto di Indonesia. *Jurnal Riset Multidisiplin Edukasi*, 2(4), 67-79.
- Wiwoho, J. T. (2024). Cryptocurrency mining policy to protect the environment. *Cogent Social Sciences*, 10(1).
- Zimba, A. W. (2020). Crypto mining attacks in information systems: An emerging threat to cyber security. *Journal of Computer Information Systems*.