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Crypto-asset Market Regulation and Sustainable Development Goals

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Abstract. The literature has long pointed out the energy consumption of blockchain technology, including in the context of the Sustainable Development Goals. The paper includes, with this aspect in mind, an analysis of existing and proposed crypto-asset regulations, in particular the draft MiCA regulation. This analysis was conducted to answer the research question of how current and proposed regulations on crypto-assets address the issue of energy consumption by blockchain networks. However, the analysis of these regulations should not be limited only to the impact of blockchain technology on electricity consumption and greenhouse gas emissions (Sustainable Development Goals 7 and 13) but also consider other aspects of the crypto-asset impact, i.e. its effect on the implementation of Sustainable Development Goals 8, 8.1., 8.2, 9.3, 8.10, 10.5., 10c. Therefore, it is necessary to ask the research question whether crypto-asset regulations, both in force and those proposed, take these goals into account and are conducive to their realization. The research used the dogmatic-legal method based on analysis of draft and existing legislation, and took into account the literature on the subject. The study found that the analyzed crypto-asset regulations of some European countries, Japan and a number of US states, as well as the draft MiCA regulation as of October 2022 and draft federal regulations in the US, do not address the problem of regulating the energy consumption of blockchain networks used for issuing and trading crypto-assets and thus do not directly affect the reduction of electricity consumption by these networks and thus the reduction of greenhouse gases. On the other hand, they are undoubtedly relevant to the achievement of Sustainable Development Goals 8.1., 8.2, 9.3, 8.10, 10.5., 10c. In addition, legal regulation of crypto-assets facilitates blockchain systems that enable more efficient management of energy distribution, particularly green energy, which contributes to the achievement of Sustainable Development Goals 7 and 13. It follows

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that despite the lack of provisions aimed directly at reducing the energy consumption of crypto-asset emissions and trading in the existing and proposed crypto-asset regulations analyzed, these regulations contribute positively to the achievement of the Sustainable Development Goals. This does not mean, however, that the idea of reducing the energy consumption of blockchain networks through legal regulation, particularly for private networks, should be abandoned – rather, such targeted regulation should be contained within energy law.

Keywords: cryptocurrency, crypto-assets, blockchain, sustainability, bitcoin, MiCA.

JEL Classification: K22, K32.

1. CRYPTO-ASSETS REGULATIONS

The development of blockchain technology in the last decade has been very dynamic. The first such system was bitcoin, and this system still dominates, although it has lived to see hundreds of imitators very similar to it. However, it should be noted that over time cryptocurrencies, also in terms of technical parameters, began to vary more and more. Classic cryptocurrencies (such as Bitcoin) operate in decentralized (and distributed) public systems (in public blockchain) and on open source software. Thus, there is no entity controlling the system of such a "classic" cryptocurrency. Some of the current cryptocurrencies lose this feature because they are based on private blockchain or on software that is not open source (e.g., Ripple – XRP). The literature distinguishes between public blockchain (e.g. Bitcoin, Ethereum, EOS), private blockchain (e.g. IBM Hyperledger Fabric), or consortium blockchain (e.g. R3 Consortium), for more see Lee, 2019, p. 778.

Blockchain has many more applications than just issuing and trading cryptocurrencies for payment (or, prevailingly, investment) purposes. Blockchain can, for example, be used to manage supply chains, as a durable storage medium (e.g., for document circulation, including real estate records), can be an important part of the Internet of Things (IoT), and can be linked to artificial intelligence. With the launch of the Ethereum network, the era of smart contracts began – computer programs run on blockchain, with the blockchain acting as "virtual machine" (Etherium, Ethereum Classic, Neo, Stratis, Lisk, EOS, Qtum). Such blockchains and smart contracts have made it possible to issue tokens and, moreover, launch the most advanced smart contracts that are DAOs (Decentralized Autonomous Organization). This, in turn, formed the basis for the current development of the so-called DeFi platforms. Initially completely outside the legal framework, token issuances of various kinds began to be carried out, both in exchange for cryptocurrencies (most notably Bitcoin) and other tokens as well as legal tender. These are called ICOs – Initial Coin Offering, but also STOs – Security Token Offering (if the tokens can be considered securities). More recently, IEOs – Initial Exchange Offering (when a cryptocurrency exchange conducts the issuance) – have become popular. Some also distinguish IDO – Initial Decentralized Exchange Offering, when an ICO is organized by a decentralized exchange (DEX).

In practice and doctrine, this phenomenon is called tokenization, and both doctrine and supervisory authorities distinguish between different types of tokens. For example, the UK FCA distinguishes between exchange tokens,

security tokens and utility tokens[1]. Also, the Swiss Financial Market Supervisory Authority (FINMA) distinguishes payment tokens, utility tokens, asset and hybrid tokens[2].

As a consequence of the development of blockchain technology and tokenization, a new concept has emerged, used in practice and doctrine – crypto-assets, covering both classic cryptocurrencies and tokens issued using smart contracts.

The proliferation of blockchain technology and the increasing use of cryptocurrencies and tokens by businesses and investors (including consumers and small investors) has led to increased state involvement in the area of regulating the technology. There are four approaches used by states towards cryptocurrencies and tokens: (a) a ban, which can be absolute or partial; (b) the operation of regulatory sandboxes, innovation hubs, or public-private partnerships by supervisory authorities; (c) the inclusion of cryptocurrencies (virtual currencies) in existing regulations, primarily in anti-money laundering and counter-terrorist financing regulations and tax laws; (d) the creation of legislation dedicated to blockchain technology, which can be regulations that apply only to virtual currencies (cryptocurrencies) or that take a broader view of the issue, i.e. concerning cryptocurrencies (virtual currencies) and crypto-assets.

For the topic of this study, only the approaches under (a) and (c) are relevant. AML/CFT regulations, by design, do not pursue objectives other than AML/CFT and therefore have little impact on the Sustainable Development Goals.

As of 2021, there is an absolute ban on cryptocurrencies in: China, Nepal, Egypt, Tunisia, Algeria, Mali, Iraq, Oman. In contrast, countries with an (indirect) implicit ban are: Bahrain, Bangladesh, Benin, Bolivia, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Ivory Coast, Democratic Republic of Congo, Ecuador, Gabon, Georgia, Guyana, Indonesia, Jordan, Kazakhstan, Kuwait, Lebanon, Lesotho, Libya, Macao, Maldives, Moldova, Morocco, Namibia, Niger, Nigeria, Pakistan, Palau, Qatar, Saudi Arabia, Senegal, Tajikistan, Tanzania, Togo, Turkey, Turkmenistan, United Arab Emirates, Vietnam, Zimbabwe[3]. "Implicit ban" is used here in the following sense: "prohibiting banks and other financial institutions from dealing in cryptocurrencies or offering services to individuals/businesses dealing in cryptocurrencies or banning cryptocurrency exchanges are examples of implicit bans." The implicit ban is relevant to this study because it significantly restricts the development of blockchain technology and crypto-assets, which has implications for the Sustainable Development Goals. In countries where an absolute ban has been imposed, cryptocurrency mining has decreased dramatically, which has translated into lower electricity consumption and thus also lower carbon emissions - this is especially true of China (Sang, 2022, p. 12 – 14). It should be noted, however, that these bans change significantly over time – here the best example is China, which in recent years has gone from full freedom for cryptocurrencies, through a partial ban, to an absolute ban (Haynes and Yeoh, 2020, pp. 206–211). The literature indicates that after China banned cryptocurrencies, Central Asia and other countries with a low proportion of clean electricity increased cryptocurrencies mining CO2 (Sang, 2022, p. 16).

The European Union's regulation of crypto-assets is being prepared – work on the draft MiCA regulation[4] is well advanced (as of the first months of 2023). The U.S. has been looking to regulate crypto-assets at the federal level for some time, and a significant step in this direction is President Joe Biden's Executive Order on Ensuring

[1] Financial Fonduct Authority, Guidance on Cryptoassets. Consultation Paper CP19/3, January 2019, p. 8.
[2] Finma Guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICOs), Published 16 February 2018, p. 3, https://www.finma.ch/en/news/2018/02/20180216-mm-ico-wegleitung.
[3] Regulation of Cryptocurrency Around the World: November 2021 Update. The Law Library of Congress.
[4] Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Markets in Crypto-assets, and amending Directive (EU) 2019/1937 (COM/2020/593 final).

Responsible Development of Digital Assets[5]. So far, two attempts at federal regulation of cryptocurrencies have failed – in December 2019, a federal bill titled the "Crypto-Currency Act of 2020" was submitted to Congress and in June 2022, the "Lummis-Gillibrand Responsible Financial Innovation Act" – "RFIA"[6] – was introduced in the Senate (Arciniegas and Conner, 2022; Dewery, 2023).

The regulations that are in effect at the beginning of 2023 should be divided into two types: those that apply narrowly to cryptocurrencies (virtual currencies), primarily regarding the exchange of cryptocurrencies (virtual currencies) for legal tender, and those that address the topic holistically concerning crypto-assets, and therefore also apply to tokenization.

An example of the first, narrow regulation, mainly relating to the control of the operation of a cryptocurrency market (and cryptocurrency exchange office), are the provisions contained in the Estonian Act on Countering Money Laundering and Terrorist Financing of 2017[7], the Polish Act on Countering Money Laundering and Financing of Terrorist March 1, 2018[8], or the UK's The Money Laundering, Terrorist Financing and Transfer of Funds (Information on the Payer) Regulations 2017[9]. The very extensive BitLicence[10] in force in New York State can also be included in this group.

Some countries are moving from such narrow regulation of cryptocurrencies (virtual currencies) to full regulation of crypto-assets, here Japan is an example. However, uniquely, the regulation of crypto-assets in Japan was included in the Payment Services Act[11] (as amended in 2022).

There are more and more pieces of legislation on cryptocurrencies every year, with the EU's aforementioned draft MiCA regulation being the key one (this regulation, moreover, will also have global significance). Few countries in the EU and European Economic Area already have crypto-asset regulation: this includes, for example, Malta (Virtual Financial Assets Act)[12], Gibraltar (Financial Services (Distributed Ledger Technology Providers Regulations 2017)[13], Lichtenstein (Token and TT Service Provider Act; TVTG)[14]. Whereas, in the US, regulation of crypto-assets has, for example, Illinois (the Blockchain Technology Act)[15], Wyoming (Wyoming Utility Token Act[16] and Wyoming

[5] Executive Order on Ensuring Responsible Development of Digital Assets, The White House. Available at: https://www.whitehouse.gov/briefing-room/presidential-actions/2022/03/09/executive-order-on-ensuring-responsible-development-of-digital-assets/.

[6] https://www.congress.gov/bill/117th-congress/senate-bill/4356/all-info.

[7] Rahapesu ja terrorismi rahastamise tõkestamise seadus Vastu võetud 26.10.2017, RT I, 17.11.2017, https://www.riigiteataja.ee/akt/121112020013; https://www.riigiteataja.ee/en/eli/517112017003/consolide.

[8] Journal Laws of 2022, item 593 with amendments.

[9] The Money Laundering, Terrorist Financing and Transfer of Funds (Information on the Payer) Regulations 2017; https://www.legislation.gov.uk/uksi/2017/692/contents/made.

[10] N.Y. Comp. Codes R. & Regs. Tit. 23, § 200 (2015), Official Compilation Of Codes, Rules And Regulations Of The State Of New York Title 23. Financial Services Chapter I. Regulations Of The Superintendent Of Financial Services Part 200. Virtual Currencies

[11] https://www.japaneselawtranslation.go.jp/en/laws/view/3965/en.

[12] Virtual Financial Assets Act (CAP. 590), L.N. of 2018; https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=NIM:202103962 ; https://legislation.mt/eli/cap/590/eng/pdf.

[13] Financial Services (Distributed Ledger Technology Providers) Regulations 2017, Legal Notice No. 204/2017, Gibraltar Gazette No. 4401 (Oct. 12, 2017), https://perma.cc/QG2W-8TQ6.

[14] Token and TT Service Provider Act: Gesetz vom 3. Oktober 2019 über Token und VT-Dienstleister (Law of 3 October 2019 on Tokens and TT Service Providers (Token and TT Service Provider Act; TVTG)) Serial number (LR-Nr.): 950.6.), https://www.lcx.com/wp-content/uploads/2020_Liechtenstein_Blockcchain_Laws_Translation_English.pdf.

[15] Financial Regulation (205 ILCS 730/) Blockchain Technology Act; https://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=4030&ChapterID=20 (access only from US territory).

[16] Wyoming Utility Token Act (Wyo. Stat. Ann. § 34-29-101 to 34-29-105), https://wyoleg.gov/statutes/compress/title34.pdf.

Money Transmitter Act[17]), Nebraska (Nebraska Financial Innovation Act)[18], Colorado (Colorado Digital Token Act)[19].

2. IMPACT OF BLOCKCHAIN TECHNOLOGY USED FOR CRYPTO-ASSET ISSUANCE AND TRADING ON ELECTRICITY CONSUMPTION AND GREENHOUSE GAS EMISSIONS (SUSTAINABLE DEVELOPMENT GOALS 7 AND 13)

From the perspective of Sustainable Development Goals 7 and 13 of the resolution Transforming our world: the 2030 Agenda for Sustainable Development (hereafter: Agenda for Sustainable Development), a significant drawback of Distributed Ledger Technology (in particular, blockchain technology), noticed from the very beginning of its development, is the energy intensity of the Proof of Work – PoW process, which has no fully rational justification (Bala et al., 2016, p. 152). There is no doubt that blockchain technology has an impact on greenhouse gas emissions and electricity consumption (see: Fadeyi et al., 2019, p. 6; Jiang et al., 2021, p. 4; Náñez Alonso et al., 2021, p. 3). However, in the context of the topic of this article, it should be noted that not every activity on blockchain has to be related to the issuance and trading of crypto-assets (e.g., real estate record-keeping, documentation workflow, supply chains). In addition, the authors of the research often focus on mining cryptocurrencies in decentralized networks, mainly bitcoin, which in its classic form still uses an energy-intensive Proof-of-Work process (e.g. Jones, et. al., 2022, p. 1 and next). This is the right approach, as mining cryptocurrencies using the Proof-of-Work mechanism is the most energy-intensive of all uses of blockchain technology, and undoubtedly has an impact on CO2 emissions, contributing to global warming[20] (see: Jiang et al., 2021, p. 1 and next; Jones, et. al., 2022, p. 6; Sang, et. al., 2022, p. 16; Huynh, et. al., 2022, p. 90-91). Moreover, so far there has been an increase in the amount of electricity used in cryptocurrency mining (Sang et al., p. 9). This is a worrisome trend that hinders the achievement of Sustainable Development Goals 7 and 13. On the other hand, the amount of energy used to mine cryptocurrencies coming from renewable sources, i.e. green energy, is increasing every year.[21] In addition, blockchain technology can also be used to more effectively manage energy distribution, particularly green energy, and thus positively contribute to the Sustainable Development Goals 7 and 13 (Khezami, et. al., 2022, p. 12, 19; Barceló, et. al., 2023, p. 1 and next). This includes, for example, smart grids – this concept even has a legal definition, contained in Regulation 2022/868 of May 30, 2022, on guidelines for trans-European energy infrastructure[22]. Crypto-assets can directly help in such use of this technology, providing, for example, a unit of account for green energy producers.

It should be noted here that the Proof-of-Work mechanism is specific to public blockchain networks and is currently associated rather with the issuance of cryptocurrencies without the use of smart contracts (the most

[17] Wyoming Money Transmitter Act (Wyo. Stat. Ann. § 40-22-101 to 40-22-129), https://wyoleg.gov/statutes/compress/title40.pdf.

[18] Nebraska Financial Innovation Act (2021 NE L 649), https://custom.statenet.com/public/resources.cgi?id=ID:bill:NE2021000L649&ciq=urn:user:PA6792530&client_md=641676d8d62dcc3f6ddf370c2d7d2733&mode=current_text.

[19] Colorado Digital Token Act (Colo. Rev. Stat. Ann. § 11-51-308.7), https://leg.colorado.gov/sites/default/files/documents/2019A/bills/2019a_023_01.pdf.

[20] Cambridge Bitcoin Electricity Consumption Index, https://ccaf.io/cbeci/index.

[21] For bitcoin, this trend has recently collapsed, see: Cambridge Bitcoin Electricity Consumption Index, https://ccaf.io/cbeci/index . However, using only the one cryptocurrency, Bitcoin, on behalf of all cryptocurrencies to calculate energy consumption or CO2 emissions will cause large errors (Sang et al., p. 16).

[22] See Article 2(9) of Regulation 2022/869, according to which 'smart electricity grid' means an electricity network, including on islands that are not interconnected or not sufficiently connected to the trans-European energy networks, that enables cost-efficient integration and active control of the behaviour and actions of all users connected to it, including generators, consumers and prosumers, in order to ensure an economically efficient and sustainable power system with low losses and a high level of integration of renewable sources, of security of supply and of safety, and in which the grid operator can digitally monitor the actions of the users connected to it, and information and communication technologies for communicating with related grid operators, generators, energy storage facilities, and consumers or prosumers, with a view to transmitting and distributing electricity in a sustainable, cost-efficient and secure way.

representative example is the bitcoin network). In contrast, issuance of tokens by smart contracts is currently based more on blockchain networks that use less energy-intensive Proof-of-Authority – PoA (such a mechanism is used by the Hyperledger Fabric blockchain, for example) or Proof-of-Stake (PoS). The latter mechanism and its three main variations: Pure Proof-of-Stake (PPoS; used, e.g., by Algorad), Delegated Proof-of-Stake (DPoS; used, e.g., by EOS and TRON), and Bonded Proof-of-Stake (BPoS; used, e.g., by Ethereum 2.0) appears unrivaled in terms of energy consumption[23]. Blockchains based on PoS mechanisms consume even orders of magnitude less than those based on the PoW mechanism, because they do not use the mining process – in their case, the energy reduction is 99.95%, or 99.98% or even more.[24] This is relevant to the achievement of Sustainable Development Goals 7 and 13, as it shows that it is not blockchain technology (or Distributed Ledger Technology more broadly) that is energy-intensive, but only one of its components, which can in principle be quite easily replaced by another (but of course, the way in which transactions are approved matters, and each of these ways has its own advantages and disadvantages, if only in terms of security, which the PoW mechanism provides to the greatest extent. For obvious reasons, without going into technical details, such a replacement can take place without any complications in newly created networks, not in those already in operation. However, the example of Etherium, the most popular public blockchain network after Bitcoin, shows that the transition from Proof of Work – PoW to Proof of Stake (PoS) – or more precisely on one of its types: PPoS, is possible and such a migration can be done successfully. This paves the way for lawmakers, through legal regulation, to attempt to force the use of such blockchain networks (or Distributed Ledger Technology more broadly) that are not energy-intensive and thus do not lead to increased CO2 emissions. However, is such interference by the legislature necessary, given the clear trend now towards blockchain networks based on low-energy block validation mechanisms? The most pertinent question, however, is how to enforce the application of a given regulation. This is only possible if there is an entity on which the obligation can be imposed and then enforced. In this case: the entity that controls a given blockchain network (distributed ledger), i.e. a private blockchain. In contrast, for public, decentralized (distributed) blockchains, which consist of multiple nodes (such as Bitcoin), there is no single entity, or even group of identified entities, on which specific obligations can be imposed regarding the energy consumption of network. These are not completely abstract considerations, as some legislative experience in this area is already there, and it relates to the work on the MiCA draft.

In the April 2022 version of the MiCA draft[25] The European Parliament proposed that the energy consumption of the blockchain system be reduced. It should be noted, it was also rightly pointed out, that in addition to the carbon footprint, the Proof of Work mechanism leads to significant generation of electronic waste due to the frequent replacement of mining hardware. This version of the draft proposes that a white paper for crypto-assets operating on a Proof-of-Work basis should include an independent assessment of the crypto-asset's likely energy consumption. In addition, the European Parliament intended to explicitly refer to Regulation 2019/2088[26] (Sustainable Finance Disclosure Regulation – SFDR) in the recitals of the MiCA Regulation. The European Parliament's proposed paragraph 5c of the MiCA recitals (April 2022) stated that: in line with the objectives of the Sustainable Finance Agenda, requirements regarding sustainability-related disclosures as defined in SFDR and the EU Taxonomy for sustainable activities should also apply to crypto-assets as well as to crypto-asset service provider

[23] See more: Energy Efficiency of Blockchain Technologies, The EU Blockchain Observatory and Forum, 30 September 2021, p. 11 – 15, https://www.eublockchainforum.eu/news/new-thematic-report-energy-efficiency-blockchain-technologies.
[24] Energy Efficiency of Blockchain Technologies, The EU Blockchain Observatory and Forum, 30 September 2021, p. 15 and the literature cited there.
[25] Proposal for a regulation on Markets in crypto-assets - Three-column table to com-mence trilogues ST 7694 2022 INIT, 1.04.2022 - https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CONSIL:ST_7694_2022_INIT&from=PL.
[26] Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector, OJ L 317, 9.12.2019, p. 1–16 as amended.

and issuers. However, these proposals were not included in the text of the October 2022 MiCA[27] (i.e., the last publicly available version of the MiCA Regulation draft, before this article was turned in for publication).

It seems that given the current scope of the SFDR, which covers entities of the EU Single Financial Market, once the MiCA comes into force, it will be necessary to amend the SFDR and extend the scope of this regulation also to issuers of crypto-assets, offerors of crypto-assets and crypto-asset service providers.

A review of the current crypto-asset regulations identified above in this publication has shown that in none of these regulations, neither in Europe, Japan nor the US, has the lawmaker even attempted to legislatively limit the energy consumption of the blockchain network (and more broadly: Distributed Ledger Technology) used to issue and trade cryptocurrencies and tokens.

Legislators, however, recognize the problem, with the Lummis-Gillibrand Responsible Financial Innovation Act 2022 (RFIA), for example, proposing that the each year, the Federal Energy Regulatory Commission, in consultation with the Commodity Futures Trading Commission and Securities and Exchange Commission, shall analyze the following topics with respect to digital asset markets: (1) energy consumption for mining and staking of digital asset transactions; (2) the effect of energy consumption described in paragraph (1) on national, regional, and local energy prices; (3) the effects of mining and staking of digital asset transactions on baseload power levels; (4) the use of renewable energy sources, including use of nonrenewable sources that would otherwise be wasted, and a comparison of digital asset market energy consumption with the financial services industry and economy as a whole; (5) the sources and reliability of the data used under this subsection; (6) a process for regulated entities to make information publicly available regarding energy consumption, including sources of energy and amount, and, if appropriate, recommendations to Congress to establish such a process. Unfortunately, as already mentioned, RIFA was not legislated.

Another example, but the law in force, is issued by the President of the USA in March 2022 Executive Order on Ensuring Responsible Development of Digital Assets. This document states that advances in digital and distributed ledger technology for financial services have led to dramatic growth in markets for digital assets, with profound implications for among others energy demand and climate change. According to sec. 5(b)(vii) Executive Order within 180 days of the date of this order, the Director of the Office of Science and Technology Policy, in coordination with other federal agencies, to produce a report on the climate and energy implications of crypto-assets in the United States. This report has been prepared.[28]

The literature postulates that appropriate regulation should be adopted, but rather from the field of energy law (Sang, et. al., 2022, p. 16). It is also important to enforce the laws already in place. Of great importance may be, for example, the effective fight against "illegal" cryptocurrency mines, i.e. those that use stolen electricity to mine cryptocurrencies (crypto-assets) (Dindar and Gül, 2022, p. 1667 and next).

On the other hand, an absolute ban on cryptocurrencies (and at the same time crypto-assets) undoubtedly translates into lower carbon emissions. This has been clearly demonstrated in the related literature (Sang et al., 2022, pp. 12 – 14).

3. SUSTAINABLE ECONOMIC GROWTH (GOAL 8.1.)

The development of blockchain technology, especially in the area of cryptocurrency issuance and trading, undoubtedly contributes to economic growth. The current level of development of the crypto-asset market creates the need for legal regulation, equivalent to other financial markets (such as the capital market, the banking market,

[27] Letter to the Chair of the European Parliament Committee on Economic and Monetary Affairs, Brussels 5 October 2022, ECOFIN 965, 2022, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CONSIL:ST_13198_2022_INIT&from=En.

[28] Climate and Energy Implications of Crypto-Assets in The United States, September 2022, https://www.whitehouse.gov/wp-content/uploads/2022/09/09-2022-Crypto-Assets-and-Climate-Report.pdf

or the payment services market, for example). This regulation is necessary not only to protect consumers and small investors, but also to strengthen competitiveness and sustain growth. To achieve this, it is necessary to place crypto-asset related service providers under professional, objective state (public) supervision. All of the above-mentioned regulations are more or less aimed at such a goal, by which they undoubtedly contribute to Sustainable Development Goals 8.1.

4. STRENGTHEN THE CAPACITY OF DOMESTIC FINANCIAL INSTITUTIONS TO ENCOURAGE AND EXPAND ACCESS TO BANKING, INSURANCE AND FINANCIAL SERVICES FOR ALL (GOAL 8.10)

Many services provided in connection with crypto-assets can already be considered financial services. For example, according to MiCA (October 2022) "crypto-asset service" means any of the services and activities listed below relating to any crypto-asset:

- the custody and administration of crypto-assets on behalf of third parties;
- the operation of a trading platform for crypto-assets;
- the exchange of crypto-assets for funds;
- the exchange of crypto-assets for other crypto-assets;
- the execution of orders for crypto-assets on behalf of third parties;
- placing of crypto-assets;
- providing transfer services for crypto-assets on behalf of third parties;
- the reception and transmission of orders for crypto-assets on behalf of third parties;
- providing advice on crypto-assets;
- providing portfolio management on crypto-assets.

This catalog includes new financial services for crypto-assets, while the entities providing these services can be considered financial institutions. With the MiCA Regulation, consumers will have easier and safer access to these services and thus the regulation will support Sustainable Development Goal 8.10. A similar summary – a catalog of services and an indication of the entities providing these services are included in the other crypto-asset regulations identified above – so it should be assumed that these also contribute to Sustainable Development Goal 8.10.

5. IMPROVE THE REGULATION AND MONITORING OF GLOBAL FINANCIAL MARKETS AND INSTITUTIONS AND STRENGTHEN THE IMPLEMENTATION OF SUCH REGULATIONS (GOAL 10.5)

The MiCA Regulation draft introduces state (public law) supervision of crypto-asset service providers. Similarly, such supervision is introduced by the Malta Virtual Financial Assets Act, Gibraltar Financial Services (Distributed Ledger Technology Providers) Regulations 2017, Lichtenstein TVTG as well as Illinois the Blockchain Technology Act, Wyoming Utility Token Act, Nebraska Financial Innovation Act, California Digital Financial Assets Law, Colorado Digital Token Act. Thus, these pieces of legislation support Sustainable Development Goal 10.5.

6. REDUCE TO LESS THAN 3% THE TRANSACTION COSTS OF MIGRANT REMITTANCES (GOAL 10.C)

International bank transfers are still very expensive and take a long time. The European Union has found a systemic solution to this problem through the SEPA (Single Euro Payments Area) project and the regulation of payment services, resulting in the D + 1 rule in EU countries and the requirement that charges levied by a payment service provider on a payment service user in respect of cross-border payments in euro shall be the same as the charges levied by that payment service provider for corresponding national payments of the same value in the

national currency of the Member State in which the payment service provider of the payment service user is located.[29] However, this rule does not apply to transfers from third countries to the EU.

Crypto-assets, in particular stablecoins, enable the rapid and inexpensive transfer of value from one country to another, virtually independent of the payment systems controlled by banks and central banks. Payments in crypto-assets, unlike payments via banking systems, are almost instantaneous and, depending on the chosen crypto-asset (especially in the case of stablecoin) more or less cheap than international transfers. However, the lack of regulation, especially concerning global stablecoins, generates a far greater risk of losing funds than the use of banking systems.

Practice shows, for example, that Ukrainian citizens employed in Poland send money earned in Poland to Ukraine in such a way by exchanging it in Poland at cryptocurrency exchange offices or through cryptocurrency market for cryptocurrencies (primarily bitcoins or stablecoins), which are then sent to Ukraine. In turn, those who leave Ukraine often choose cryptocurrencies instead of bank accounts to store spare funds. Laws such as the MiCA Regulation governing stablecoin and regulating cryptocurrency market and cryptocurrency exchange offices can create a regulatory framework that provides greater financial security for migrants, providing more protection against fraud and loss of funds.

7. IMPLEMENTATION OF OTHER SUSTAINABLE DEVELOPMENT GOALS

The literature also points to Sustainable Development Goals other than those mentioned above, which blockchain technology can contribute to achieving. These include: goal 6 (ensure access to water and sanitation for all); goal 9 (build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation); goal 11 (make cities inclusive, safe, resilient and sustainable); goal 12 (ensure sustainable consumption and production patterns); goal 14 (conserve and sustainably use the oceans, seas and marine resources); goal 15 (sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss) – from Parmentola et al., 2022, pp. 209–210. The potential use of blockchain technology is supposed to (Parmentola et al, 2022, p. 210):

- support peer-to-peer trading of water rights (goal 6);
- develop smart contract for transport and logistics (goal 9);
- creating more liveable cities implementing platforms to monitor energy consumption, waste and so on (goal 11);
- enables tracking and tracing of supply chains and natural resource usage (goal 12);
- implementation mechanisms to monitor water pollution and preserve marine resources (goal 14);
- offer small cash payments in exchange for conserving nature (goal 15).

In order to achieve these goals using blockchain technology, cryptocurrencies are not essential, however, they can be part of a given system (e.g., they can be used for payments or settlement in blockchain systems (more broadly: DLT) designed to achieve these goals. Undoubtedly, legal regulation of crypto-assets would strengthen the operation of such systems. It should be noted at this point that in the regulations and draft regulations analyzed, there is no direct reference to blockchain systems designed to achieve the Sustainable Development Goals, not only Goals 7 and 13 but also Goals 6, 9, 11, 12, 14, 15.

[29] Art. 3 (1) Regulation (EU) 2021/1230 of the European Parliament and of the Council of 14 July 2021 on cross-border payments in the Union, OJ L 274, 30.7.2021, p. 20–31. According to art. 3 (2) of this regulation Charges levied by a payment service provider on a payment service user in respect of cross-border payments in the national currency of a Member State that has notified its decision to extend the application of this Regulation to its national currency in accordance with Article 13 shall be the same as the charges levied by that payment service provider on payment service users for corresponding national payments of the same value and in the same currency.

8. CONCLUSIONS

The analyzed crypto-asset regulations do not address at all the problem of regulating the energy consumption of blockchain networks used to issue and trade crypto-assets. The exception is the obligation contained in some of them to prepare an appropriate report on energy consumption by blockchain networks. The analyzed crypto-asset regulations do not have a direct impact on reducing the electricity consumption of these networks and thus on limiting greenhouse gases. Because they contribute (to a greater or lesser extent, depending on the regulation) to the protection of crypto-asset users, including consumers and small investors, but also to the strengthening of competitiveness by defining the catalog of crypto-asset services, the catalog of entities providing these services, and the introduction of state (public) supervision, they are important for supporting Sustainable Development Goals 8.1., 8.2, 9.3, 8.10, 10.5., 10c. (and also indirectly contribute to the Goals 6, 9, 11, 12, 14, 15). It is also not without significance that legal regulation of cryptocurrencies facilitates blockchain systems that enable more efficient management of energy distribution, particularly green energy, thus making such regulation serve the achievement of Sustainable Development Goals 7 and 13.

Therefore, it should be concluded that despite the lack of provisions aimed directly at reducing the energy consumption of crypto-asset emissions and trading in the existing and proposed crypto-asset regulations analyzed, these regulations contribute positively to the achievement of the Sustainable Development Goals. However, the idea of legally limiting the energy consumption of blockchain networks, especially private networks, should not be completely abandoned. It seems that it would be more appropriate to place such provisions within the energy law regulations. In addition, it may be important for reducing the power consumption of blockchain networks to effectively counter power theft for the purpose of mining cryptocurrencies (crypto-assets).

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REFERENCES

Arciniegas, J., & Conner, W. T. (2022). The Digital Asset Regulatory Landscape Begins to Take Shape: The Responsible Financial Innovation Act. *The Investment Lawyer. Covering Legal and Regulatory Issues of Asset Management*, *29*(10), https://intelliconnect.cch.com/docmedia/attach/WKUS-TAL-DOCS-PHC/46/IIVL_IL_1022.pdf.

Bala S., Kopyściański T., Srokosz W. (2016). Cryptocurrencies as electronic means of payment with-out the issuer : computer science, economic, and legal aspects. Wroclaw. https://depot.ceon.pl/handle/1234.

Barceló, E., Dimić-Mišić, K., Imani, M., Spasojević Brkić, V., Hummel, M., & Gane, P. (2023). Regulatory Paradigm and Challenge for Blockchain Integration of Decentralized Systems: Example—Renewable Energy Grids. *Sustainability*, *15*(3), 2571. https://doi.org/10.3390/su15032571.

Dewery, J. N. (2023). *Blockchain & Cryptocurrency Regulation 2023*. Global Legal Group. https://www.skadden.com/-/media/files/publications/2023/01/legal_considerations_in_the_minting_marketing_and_selling_of_nfts.pdf.

Dindar, B., & Gül, Ö. (2022). The detection of illicit cryptocurrency mining farms with innovative approaches for the prevention of electricity theft. *Energy & Environment*, *33*(8), 1663–1678. https://doi.org/10.1177/0958305X211045066.

Fadeyi, O., Krejcar, O., Maresova, P., Kuca, K., Brida, P., & Selamat, A. (2019). Opinions on Sustainability of Smart Cities in the Context of Energy Challenges Posed by Cryptocurrency Mining. *Sustainability*, *12*(1), 169. https://doi.org/10.3390/su12010169.

Haynes, A., & Yeoh, P. (2020). *Cryptocurrencies and cryptoassets: Regulatory and legal issues*. Informa Law from Routledge.

Huynh, A. N. Q., Duong, D., Burggraf, T., Luong, H. T. T., & Bui, N. H. (2022). Energy Consumption and Bitcoin Market. *Asia-Pacific Financial Markets, 29*(1), 79–93. https://doi.org/10.1007/s10690-021-09338-4.

Jiang, S., Li, Y., Lu, Q., Hong, Y., Guan, D., Xiong, Y., & Wang, S. (2021). Policy assessments for the carbon emission flows and sustainability of Bitcoin blockchain operation in China. *Nature Communications*, *12*(1), 1938. https://doi.org/10.1038/s41467-021-22256-3.

Jones, B. A., Goodkind, A. L., & Berrens, R. P. (2022). Economic estimation of Bitcoin mining's climate damages demonstrates closer resemblance to digital crude than digital gold. *Scientific Reports*, *12*(1), 14512. https://doi.org/10.1038/s41598-022-18686-8.

Khezami, N., Gharbi, N., Neji, B., & Braiek, N. B. (2022). Blockchain Technology Implementation in the Energy Sector: Comprehensive Literature Review and Mapping. *Sustainability*, *14*(23), 15826. https://doi.org/10.3390/su142315826.

Lee, J. Y. (2019). A decentralized token economy: How blockchain and cryptocurrency can revolutionize business. *Business Horizons*, *62*(6), 773–784. https://doi.org/10.1016/j.bushor.2019.08.003.

Náñez Alonso, S. L., Jorge-Vázquez, J., Echarte Fernández, M. Á., & Reier Forradellas, R. F. (2021). Cryptocurrency Mining from an Economic and Environmental Perspective. Analysis of the Most and Least Sustainable Countries. *Energies*, *14*(14), 4254. https://doi.org/10.3390/en14144254.

Parmentola, A., Petrillo, A., Tutore, I., & De Felice, F. (2022). Is blockchain able to enhance environmental sustainability? A systematic review and research agenda from the perspective of Sustainable Development Goals (SDGs). *Business Strategy and the Environment*, *31*(1), 194–217. https://doi.org/10.1002/bse.2882.

Sang, X., Leng, X., Xue, L., & Ran, X. (2022). Based on the Time-Spatial Power-Based Cryptocurrency Miner Driving Force Model, Establish a Global CO2 Emission Prediction Framework after China Bans Cryptocurrency. *Sustainability*, *14*(9), 5332. https://doi.org/10.3390/su14095332.