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The carbon conundrum: Hopes and hurdles in Indonesia's OJK-led trading scheme

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Abstract

Introduction to the Problem: Indonesia is one of the world's largest carbon emitters and has good potential for carbon trading. However, several aspects of carbon trading in Indonesia still need to be addressed, including difficulties in carbon value, carbon price setting, market monitoring, and carbon trading infrastructure development.
Purpose/Study Objectives: The research examines Indonesia's carbon trading challenges and opportunities in the climate change era. Then, what is OJK's role in terms of carbon trading?
Design/Methodology/Approach: The research methods used a normative study by looking at carbon emission trading regulations in Indonesia, as well as a systematic literature review involving researching, reading, analyzing, evaluating, and summarizing scholarly literature.
Finding: The study reveals that OJK regulates carbon trading through frameworks like Law No. 4 of 2023 and OJK Regulation No. 14 of 2023, enabling carbon units to be traded as securities with a market potential of US$300 billion per year, supported by Indonesia's forests' carbon sequestration. Key challenges include developing carbon trading infrastructure, mastering emission reduction technologies, effective OJK market surveillance, and enhancing public engagement and transparency. Opportunities include economic growth from foreign investment, promoting sustainable development through renewable energy projects, and integrating with the global carbon market. OJK's role is crucial in regulating and supervising carbon trading, developing market infrastructure, ensuring compliance, building participant capacity, aligning with international standards, supporting climate change mitigation, and fostering international partnerships. Thus, OJK is essential for transparent, fair, and compliant carbon trading, addressing challenges, and leveraging opportunities, supporting Indonesia's net-zero emissions target by 2060 and global climate goals.
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Introduction

The issue of carbon emissions is a significant driver of climate change. The increase in atmospheric CO_2 levels has been rapid and unprecedented, with current levels being about 50% higher than pre-industrial times. This rise in greenhouse gases is causing global temperatures to increase, leading to various environmental impacts such as more frequent and severe weather events, rising sea levels, and disruptions to ecosystems. Addressing carbon emissions is crucial for mitigating climate change and its impacts. This involves reducing fossil fuel use, enhancing energy efficiency, and transitioning to renewable energy sources (Nunes, 2023).

To address this, the Indonesian Financial Services Authority (OJK) has introduced regulations to manage carbon emissions through carbon trading. OJK Regulation No. 14 of 2023 on Carbon Trading through Carbon Exchange (POJK 14/2023) establishes guidelines for the issuance, generation, trading, and monitoring of emissions certificates and offset carbon credits. This regulation classifies carbon units as securities and mandates that carbon trading be conducted through a regulated carbon exchange. The goal of these regulations is to create a market-based mechanism to reduce greenhouse gas emissions by allowing the buying and selling of carbon units. This approach aims to incentivize businesses to lower their emissions and invest in cleaner technologies (Gunawan et al., 2025).

Carbon exchange is a regulatory mechanism of trading and recording carbon unit ownership by the market mechanism, which aims to minimize greenhouse gas emissions through carbon purchases and sales. An emerging concern among economic actors is the practice of carbon emission trading (Novita and Imanullah, 2020). It is considered that the main driving force of carbon emissions trading occurs after scientists have proposed increasing global climate change by 5 degrees Celsius. If the global climate continues to increase, it will potentially bring catastrophic environmental damage (Jones et al., 2023). Scientists believe that greenhouse gas emissions are to blame for the feared deterioration of the global climate. The biggest contributor to greenhouse gas emissions is the energy sector, notably the burning of fossil fuels like petroleum, natural gas, and coal. Thus, this sector will experience a direct impact due to the world agreement regarding the management of climate change (Shivanna, 2022).

The Statistical Review of World Energy 2024, reports that the countries with the largest emitters, Indonesia ranks number 6 out of the 10 largest GHG emitters in the world throughout 2023, with 704.4 million tons of carbon dioxide equivalent. China occupies the number one country in the world from the energy sector with 11,218.4

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million tons of carbon dioxide equivalent. Meanwhile, the United States (US) ranks second as the world's largest emitter from the energy sector with 4,639.7 million tons of carbon dioxide equivalent (The Energy Institute, 2024). Indonesia from the energy sector in 2023 will decrease by around 3 million tons of carbon dioxide equivalent when compared to 2022. However, Indonesia is predicted to experience an increase in emissions in the near term due to its high dependence on coal for power generation (Pristiandaru, 2024). Indonesia needs to open a carbon exchange so that the state assets can be managed in an optimum manner by the state and state revenue. The significant issue in accommodating such cases is how to create regulation of carbon trading that is efficient and maximal, particularly the role, duties, and authorities of OJK and the Indonesia Stock Exchange (IDX). At this point, OJK along with the Self-Regulatory Organization (SRO) consisting of IDX, Indonesian Securities Depository and Settlement Institution (*Custodian Sentral Efek Indonesia* or KSEI), and Indonesian Clearing and Guarantee Institution (*Kliring Penjaminan Efek Indonesia* or KPEI), and government start to accelerate regulation framework of carbon exchanges in Indonesia. Acceleration is necessary to support green economy development. It is also a strategic measure to create a new economy through the establishment of carbon exchanges and the issuance of Green Taxonomy 1.0 (Alessi and Battiston, 2022).

Meanwhile, Indonesia has regulated the rule of carbon trading as drafted in the Presidential Regulation Number 98 of 2021 on the Implementation of Carbon Economic Value for Nationally Determined Contribution Targets and Controlling Greenhouse Gas Emissions in National Development, Minister of Environment and Forestry Regulation (Permen-LHK) No. 21 of 2022 concerning Guidelines for Implementing Carbon Pricing (Permen-LHK 21/2022), and Article 24 of Law Number 4 of 2023 on the Financial Sector Development and Strengthening (P2SK Law). Carbon trading can be one method to control carbon emissions in a country. In addition, Indonesia will launch its targets in the 2023 Nationally Determined Contribution (NDC) and net zero emissions (NZE) by 2060. So far, the OJK's duties and authorities in participating in the implementation of carbon trading are to be emphasized and clarified so that the implementation does not conflict with regulations for a prolonged time and confirms the extent of supervision that can be performed by OJK in terms of regulation of carbon exchanges in Indonesia (Jiang et al. 2016). Thus, it must be set out as early as possible so that over-regulation will not occur in the future which can harm the economic sector.

This urgency is in line with the findings of research conducted by *Koh, et., al*, (2021). By gathering data on how carbon pricing has affected developing nations, the study sought to close a knowledge gap. According to the study's findings, carbon pricing is generally recognized as an effective strategy to mitigate climate change. Eight countries with middle incomes and 39 developed nations have adopted carbon pricing. Some developing countries still use subsidies, while others implement environmental-fiscal reforms to boost their society and economy to low emissions of greenhouse gases. Some studies have demonstrated that carbon-pricing measures can

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assist businesses to adapt and motivate them to innovate and stay competitive (Koh, 2021).

Carbon pricing in developing countries is not always regressive at the household level, considering the diverse uses of energy, especially for rural residents. As economies restructure heading to de-carbonization, the aggregate effects on employment and Gross Domestic Product (GDP) change over time. A meticulously planned carbon pricing strategy with an income recycling mechanism tailored to the socioeconomic conditions of a nation can generate many benefits from economic growth, increase employment and equity, reduce debt, or achieve other sustainable development goals (Koh, 2021). *Dirgantara's* research examined carbon pricing frameworks in various countries—including Brazil, Canada, China, Colombia, and New Zealand—analyzing their successes and obstacles as potential lessons for Indonesia, particularly in relation to REDD+. The study highlighted key challenges Indonesia may face in adopting carbon pricing, such as selecting the right policy instruments, ensuring government commitment, maintaining transparency, fostering public participation, addressing subnational capacity gaps, and navigating the complexities of different carbon pricing mechanisms (Dirgantara, 2022; Choi, Lee, and Psaros, 2013).

In 2018, *Halimah and Yanto's* research revealed that companies with higher profitability tend to report lower carbon emissions. Since the Paris Agreement, many firms have begun disclosing their carbon emissions at regular intervals. A profitable company is expected to implement policies that mitigate environmental harm, both in the immediate and distant future. With sufficient financial resources, businesses can invest in upgrading or replacing production equipment to adopt more eco-friendly alternatives (Halimah and Yanto, 2018).

P2SK Law states that carbon trading through a "carbon exchange" will be considered as a financial activity in the capital market sector. Therefore, OJK has the authority to supervise Indonesia's domestic carbon market. Based on this mandate, on 2 August 2023 OJK issued Regulation No. 14 of 2023 on Carbon Trading through Carbon Exchanges (POJK 14/2023) to further regulate the implementation of Indonesia's carbon market. Against this backdrop, the study addresses two central legal questions. First, it explores the challenges and opportunities surrounding carbon trading in Indonesia during an era defined by climate change. Second, it investigates the role of the OJK (Financial Services Authority) in shaping Indonesia's carbon market framework, adopting a normative legal approach to evaluate its regulatory impact.

Methodology

The research used the normative method. It used literature materials or secondary data, which consist of primary, secondary, and tertiary legal materials as the secondary source of data. There was no need to find direct filed data (Soekanto, 2007). According to *Soerjono*, normative-legal research or legal research is a term used to describe studies of secondary data or literature in the field of law (Marzuki, 2013). Secondary data includes official documents, such as regulations related to the subject

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and object of the research, such as P2SK Law, and Regulations of the Financial Services Authority Number 77/POJK.01/2016 (POJK 77/2016), Law Number 21 of 2011 on Financial Services Authority (OJK Law), and Law No. 10 of 2011 regarding Amendment to Law Number 32 of 1997 on Future Commodities Trading, Regulations of the Financial Services Authority Number 14 of 2023 on Carbon Trading through Carbon Exchange (POJK 14/2023), and other relevant regulations, books, reports of the research results, national and international journals, newsletters, and so forth.

Results and Discussion

The Challenges and Opportunities of Indonesia's Carbon Trading in the Climate Change Era

As a country having abundant natural resources, Indonesia is committed to minimizing carbon emissions as a means to prevent the increase of global temperature by improving the Enhanced Nationally Determined Contribution (E-NDC) target to 32% or equivalent to 912 million tons of CO_2 by 2030. Previously, Indonesia targeted a 29% reduction in carbon emissions or 835 million tons of CO_2 (Haryanto et al., 2023). Minimizing and reducing carbon emissions was one of the measures in dealing with the global ecosystem that had to be well-addressed and thorough. In short, the steps can provide benefits for the existing natural resources of Indonesia.

Participating in international mechanisms like the E-NDC can enhance Indonesia's ability to achieve this goal by addressing global challenges that have local impacts. In essence, while the immediate benefits of carbon reduction are felt locally, the broader impact is global. This aligns with the principle of "justice for all Indonesians" by ensuring that Indonesia plays a responsible role in the global community, ultimately benefiting both its citizens and the world at large.

In Indonesia, which had one of the largest tropical forests in the world, carbon trading was quite beneficial. The Coordinating Ministry of Maritime and Investment claims that Indonesia has the third-largest tropical forest in the world, covering an area of 125.9 million hectares and having the capacity to absorb 25.18 billion tons of carbon emissions. Meanwhile, the total area of mangrove forests in Indonesia reached 3.31 million hectares and peat was about 7.5 million hectares, respectively absorbing carbon emissions of 33 billion tons and 55 billion tons. The application of Natured Based Solution (NBS) projects contributed to carbon trading as a provider of carbon credit in GHG emissions mitigation. According to the calculation of the Ministry of Environmental and Forestry (KLHK) in 2020, the potential economic value from carbon trading reached IDR 350 trillion in the following five years (Sujiwo and Nurlaili, 2022).

Limitation of CO_2 emissions would also reduce as much as 4.3 percent every year. It is planned to start in 2028. Under ETS, the carbon price would increase from 85 Euros

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to 100 Euros per tonnage (Schauenberg, 2023). Moreover, current climate change has become a frequently discussed issue in countries around the world. In dealing with climate change, two actions are required to take altogether, such as mitigation and adaptation. At the international level, the world responded to the issue of climate change by establishing the United Nations Framework Convention on Climate Change (UNFCCC) (Seo, 2017). A total of 195 countries have ratified this treaty, including Indonesia.

One of the concrete steps that can be taken by Indonesia to participate in mitigating and adapting to climate change is through carbon trading. Carbon trading was the agreed mechanism in the Kyoto Protocol and the Paris Agreement (Michaelowa, Shishlov, and Brescia, 2019) that provided tradable emission rights for a country. In Indonesia, Presidential Regulation No. 98 of 2021 defined carbon trading as a mechanism-based market in reducing GHG emissions through sales and purchase of carbon units. Additionally, Law No. 6 of 1994 on Ratification of the United Nations Framework Convention on Climate Change ratified it.

The establishment of the Kyoto Protocol in 1997 was one of the significant accomplishments in this convention's implementation. This protocol obliged affluent countries to lower their greenhouse gas emissions by an average of 5 percent below the 1990 threshold. This protocol prevailed in 2005 after Indonesia ratified it through Law No. 17 of 2004 on the Ratification of the Kyoto Protocol to The United Nations Framework Convention on Climate Change (Yusdiyanto et al. 2025).

In the new Enhanced Nationally Determined Contribution (NDC), targets of carbon emission reduction increased to 31.89% with self-effort or 43.2% with international aid. In the normal condition scenario (business as usual), the 2030 Indonesian carbon emission would be projected to reach 2,869 million tons of equivalent carbon dioxide (M-Ton CO2e). Hence, with the existence of a new Enhanced NDC, the government targeting Indonesia's carbon emissions in 2030 would decrease to 1,953 M-Ton CO2e with self-effort, or 1,632 M-Ton CO2e with international aid (Katadata, n.d.). Indonesia as an archipelago state has a tropical forest of 125 million hectares of area and is capably estimated to absorb 25 billion tons of carbon, not including its mangrove forest and peat. Hence, it is estimated to produce income, valued at 565.9 billion US dollars from carbon trading (Tawakkal, 2022); (Darvas, Schoenmaker, and Véron, 2016).

The European Union was ambitious to be the first area in the world has been successful in reducing zero emission status by 2050. To seize it, emissions of greenhouse gas would be reduced by as much as 55 per cent by 2030. The ambition was to deconstruct the domestic carbon market, called the Emissions Trading System (ETS). This system set emission limits for every company and managed inter-corporation emission rights trading. Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for

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achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 (European Climate Law) ratified through heated negotiation in the European parliament was the biggest climate legislation that had ever been negotiated in the European Union. The ETS managed emissions from oil and gas, coal, metal processing, cement, the chemical sector, and other energy-intensive industries. These sectors represent about 40 per cent of the EU's total annual emissions. For approximately 10,000 companies in these sectors, emission levels have been mandatory since 2005. Now, the EU is expanding the scope of the carbon market to other sectors that also contribute to emissions (Carlén et al., 2019).

Departing from the experience of the EU above. In fact, carbon pricing refers to two policy options, such as emission trading and carbon tax. These created financial incentives to reduce emissions through price. This was a market-based strategy to address environmental problems including the emission of greenhouse gases and combat global warming (Tietenberg, 2013). Emissions trading, sometimes called Emissions Trading Scheme (ETS) or Cap and Trade (C&T), focuses on capping the aggregate total of emissions, so the market can determine its price (Perino and Pioch, 2017). This enabled the government to determine which industries and facilities produced specific pollution and set broad emission targets for such industries and facilities. Some limited licenses validated the disposal of a certain number of pollutants during certain periods that could be distributed and sold by the government (Driga and Drigas, 2019).

Meanwhile, carbon tax determined the price that the market allowed to determine comprehensive emission extent. Shortly, the carbon tax was levied and imposed against people emitting greenhouse gases. Adjusting marginal social cost to minimize carbon emissions and marginal social profits from global warming mitigation aimed to internalize global external cost resulting from CO_2 emissions, which are thought to be efficient for the use of the atmosphere in terms of carbon emissions (Khoshnava et al., 2019), and internalize the externality of anthropogenic climate change, enabling producers and consumers to consider the social cost of increasing pollution of greenhouse gas levels (Dirgantara, 2022). It was because they motivated businesses (and/or individuals) to take action towards pollution, which was in their best interest, and advanced comprehensive policy objectives (Graafland and Bovenberg, 2020).

Carbon prices in the European Union increased above € 100 per ton or IDR 1.62 million tons (by assuming an exchange rate of IDR 16,214 per euro) (Susanna Twidale, 2023). The European Union allowance (EUA) benchmark had risen to a level of €101.25 per ton before ending at €100.49 per ton. This was the highest price record to be paid to factories and power plants in the union. EUA was the main currency in the emissions trading system (ETS) in the EU. It required manufacturers, electricity companies, and airlines to pay for every ton of carbon dioxide that they generated, being part of the EU to satisfy its climate targets (Fajrian, 2022). Therefore, Indonesia is able to imitate how private companies that own large emitters should

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participate in the distribution to contribute by paying for every ton of carbon dioxide they produce, as part of Indonesia's efforts to meet its climate targets. So that OJK, which has the responsibility of supervising business actors who have a large contribution in contributing to carbon emissions in the financial services sector, to participate in mitigating and adapting to climate change by succeeding in carbon trading in Indonesia.

Furthermore, the carbon market was an economic instrument functioning as a means of policy execution (policy tool) to provide incentives for mitigation activity of climate change. In the carbon market, the traded commodity was right on emissions of greenhouse gases in ton-CO_2 equivalent units. The right could be the right to release greenhouse gases or the right to decline greenhouse gas emissions. Meanwhile, the type of greenhouse gases that could be traded in the carbon market was generally classified into six types of greenhouse gases as listed in the Kyoto Protocol, comprising carbon dioxide (CO2), methane (CH 4), nitrate oxides (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6) (Rust et al., 2022).

Besides various alternative developments of the types of carbon market above, almost all countries, globally, agreed that mitigation of climate change had to be widely conducted and the carbon market was one of the financing types that was successfully implemented. In the future, the carbon market is expected to not only function as a financing alternative to climate change but also provide the following benefits as follows (Nurdiawansyah and Lindrianasari, 2018):

1. Increasing energy and financing efficiency, particularly for low-carbon development at the domestic level;
2. Accelerating renewable energy development;
3. Fundraising for environmental and natural resources conservation;
4. Improving private and industrial participation and roles in national climate change mitigation;
5. Being a driving force domestic economy.

Therefore, the current carbon market became an attractive alternative economic instrument in development. Various developed and developing countries relied on the carbon market as a policy tool to improve their economic efficiency and create job opportunities (Rachmaniar et al., 2021). Referring to the profile report of Indonesian climate change risk from the World Bank (2021), Indonesia ranked 97 out of 181 countries that dealt with the impacts of climate change risk. The rating was depicted from the ND-GAIN (Notre Dame Global Adaptation Initiative) index. This indicator measures how vulnerable a country is to climate change by considering the factorial combination of politics, geography, and social (Wongpiyabovorn, Plastina, and Crespi, 2023). Due to social factors contributing to the country's vulnerability to temperature rising, the study by the World Bank placed Indonesia as a quite vulnerable country,

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though Indonesian temperature rising was estimated lower than the global average. Thus, Indonesia had to continuously take mitigation measures in dealing with such risk, including its contribution to press GHG emissions.

Through carbon trading, Indonesia would be crucial to meeting the goals of the Paris Agreement globally, and the engagement of domestic stakeholders was one of the factors creating such an opportunity. The domestic industries could also significantly contribute to enhancing the ecosystem of carbon trading as either consumer of carbon credit or providers of carbon credit. In the next development, the Indonesia Commodity and Derivatives Exchange (ICDX), a futures exchange that provided a market for commodities and their derivatives in physique or finance products had planned to turn carbon into one of the traded commodities (Lantara, 2010).

If carbon credit were a commodity and followed the benchmark of other countries, the government could promptly execute carbon trading through the ecosystem of carbon trading (exchanges, clearing, and custodian), which had been available under the supervision of Commodity Futures Trading Supervisory Board (*Badan Pengawas Perdagangan Berjangka Komoditi* or BAPPEBTI). Thus, the existing and qualified commodity exchange for supporting the carbon market in Indonesia was necessary given more chances to contribute to advancing the domestic commodity market. In the implementation of carbon trading as a commodity, BAPPEBTI enabled the supervision of futures commodity exchange. Referring to Law No. 10 of 2011 regarding the Amendment to Law Number 32 of 1997 on Futures Commodity Trading, BAPPEBTI was assigned to build, regulate, develop, and supervise Futures Commodity Trading (Hanim and Noorman, 2020).

The role of BAPPEPTI would be similar to the role of the Commodity Futures Trading Commission (CFTC) in carbon trading exchanges in the United States of America. CFTC was an independent institution in the U.S. government that was in charge of regulating commodity and derivatives markets (Welt, 2010). CFTC was incorporated to protect the public from deception, manipulation, and abuse practices related to sales of commodities and futures as well as financial options, and to promote open, competitive, and healthy futures and options markets in the financial sector (Robinson and Sullivan, 2022).

In the context of Indonesia, the implementation of carbon trading under BAPPEBTI's supervision would necessitate establishing a robust regulatory framework to ensure transparency, integrity, and market confidence. This framework would involve stringent monitoring, reporting, and verification (MRV) processes to accurately account for carbon emissions and credits. Furthermore, BAPPEBTI's experience in managing futures markets could be leveraged to develop standardized contracts and trading platforms for carbon credits, enhancing liquidity and price discovery in the carbon market.

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Additionally, collaboration between BAPPEBTI and other regulatory bodies, such as OJK, would be essential to align the carbon trading regulations with financial market standards and international best practices. This partnership would help mitigate risks associated with carbon trading, such as fraud and market manipulation while fostering investor confidence and participation. By drawing parallels with the CFTC's role in the U.S., BAPPEBTI could adopt similar regulatory approaches to safeguard the interests of market participants and ensure a fair and efficient carbon trading ecosystem. Moreover, the potential economic benefits of a well-regulated carbon market in Indonesia are substantial.

It could attract significant foreign investment, stimulate green projects, and drive sustainable economic growth. By capitalizing on the country's vast forest resources and carbon sequestration potential, Indonesia could position itself as a leading player in the global carbon market. This strategic move would not only contribute to global climate change mitigation efforts but also support the nation's economic development goals. The integration of carbon trading as a commodity under BAPPEBTI's supervision, with a robust regulatory framework and collaboration with other regulatory bodies, holds significant promise for advancing Indonesia's carbon market. This approach would ensure transparency, integrity, and investor confidence, positioning Indonesia as a key participant in the global efforts to combat climate change while driving sustainable economic growth.

Moreover, the critical aspects regarding the implementation of carbon pricing in Indonesia, such as political will toward carbon pricing were different with 2,869 M-ton CO2e that was projected in the 2030 Green House Gas (GHG) emissions. Indonesia had set a reduction target emission of 834 M-ton CO2e (unconditional) and 1,081 M-ton CO2e (conditional) for 2030. Only 12.13% of 23.9% of the total emissions reduction goals (conditional) were reached in 2018. Under the unconditional scenario, only the energy and agriculture sectors had reached the GHG emissions reduction target (Fatkhullah et al., 2023), while other sectors would require more strict approaches to achieve such objectives. Governmental regulations regarding carbon pricing were considered deliberate attempts to lower GHG emissions and increase state revenue for financing development expenditures. However, it could not be applied without the coordination of other stakeholders and firm political commitment from the central government. Strengthening this institutional and political foundation becomes essential to ensure the effective implementation of carbon pricing mechanisms across sectors.

In line with this, the necessity of carbon pricing and its technical guidelines has been emphasized (Akhtar et al., 2022). To support the country’s progress in achieving its NDC and establishing a robust carbon regulation framework, the Indonesian carbon pricing law is expected to play a pivotal role. This law, structured into ten chapters, would cover general provisions, purpose and scope, compliance, implementation, disclosure and framework, development of low carbon strategies, control and

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assessment mechanisms, improvement and financing, transitional provisions, and closing articles. In addition, specific implementing rules issued by the relevant ministries would be based on a presidential regulation governing carbon pricing. Therefore, there is an urgent need to stipulate detailed and sector-specific provisions to ensure that each ministry adopts a coherent perspective aligned with its responsibilities. This can be informed by Canada's approach, which enacted a comprehensive federal carbon pricing law that is uniformly enforced across various jurisdictions.

Based on the rules of carbon pricing had to be issued by the government in December 2020, but it would happen in a short period. This could avoid people's concerns about how the urgency of the carbon pricing needed to be applied. Transparency and public participation in the implementation of carbon pricing were important, as we had learned from New Zealand. Obtaining political trust, stable policies, and government support could assist in the application of a carbon pricing regime (Klenert et al., 2018).

Country power was required and evenly distributed, and sub-national jurisdiction freedom was required to enforce climate policies. Indonesia has developed various national and sub-national technical skills through Reducing Emissions from Deforestation and Forest Degradation (REDD+), particularly in its implementation, and built country capacity in carbon trading. However, the archipelago and its diverse small farms contributed to the unequal distribution of the REDD+ incentives at the local level, and the community could impose an exchange between cost equality and effectiveness (Duchelle et al., 2018). Therefore, the sub-national government was significantly necessary to apply, innovate, and learn policies (Seymour et al., 2018). To apply their carbon pricing mechanism, in line with the national rule, the sub-national jurisdiction had to have a certain autonomy level.

The properties of multilevel carbon pricing that multi-stakeholder participation from all governmental levels, businesses, and local communities was required for the application of carbon price. Indonesia had attempted to insert various national, regional, city, and local organizations into its policy (Smith, 2005). However, in the context of multi-stakeholders, the field experience demonstrated that the need to satisfy various conflicting interests also made difficult coordination of actors on the national level. Every sector focused on its desires and interests rather than looking for solutions. Indeed, participation from various stakeholders' interests could assist climate change policy (Rey-Coquais, 2021). However, finding a solution would not be achieved if it just discussed widespread issues. Many actions were required to boost radical changes. Furthermore, Indonesia had the higher opportunity to apply carbon price or ETS, but it could not be both, based on experience with the REDD+ project (Angelsen, 2013). Indonesia planned to implement both but could take one page from Canada. Having wide coverage from significant pollutant industries and system

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flexibility, Canada successfully implemented ETS and carbon pricing through provincial and federal regulations.

To emulate Canada's success, Indonesia needs to adopt a pragmatic approach by prioritizing the most feasible and impactful carbon pricing mechanism. This involves thoroughly assessing the current economic, social, and environmental landscape to determine whether a carbon tax or an ETS would be more suitable. Additionally, fostering collaboration and dialogue among stakeholders is crucial to addressing conflicting interests and ensuring cohesive policy implementation. Drawing lessons from Canada, Indonesia can implement pilot projects at the regional or provincial level to test and refine its carbon pricing strategies before scaling them up nationally. This phased approach allows for adjustments based on real-world feedback and helps build broader support among stakeholders.

Furthermore, establishing a robust legal and regulatory framework is essential to provide clarity and stability for carbon pricing mechanisms. This includes setting clear emission reduction targets, defining compliance requirements, and establishing monitoring and enforcement mechanisms. Ensuring transparency and accountability in the process will enhance trust and participation from all stakeholders. In addition to governmental efforts, engaging the private sector and civil society is vital. Providing incentives for businesses to adopt low-carbon technologies and practices, alongside raising public awareness about the benefits of carbon pricing, can drive collective action toward achieving climate goals. Ultimately, by learning from international experiences and tailoring solutions to its unique context, Indonesia can effectively implement a carbon pricing mechanism that balances economic growth with environmental sustainability, contributing to global efforts to mitigate climate change.

OJK's Role in Indonesia's Carbon Trading – A Normative Approach to Climate Change

As an independent state institution, the OJK plays a significant role in regulating Indonesia's carbon emissions trading. Following the ratification of the P2SK Law, the OJK was tasked with overseeing carbon market implementation. Under Article 6, its responsibilities include regulatory and supervisory functions, which encompass:

1. financial services activity in the Banking sector;
2. financial services activity in the Capital Market sector, Derivatives finance, and carbon exchanges;
3. financial services activity in the Insurance, Guarantees, and Pension Funds sectors;
4. financial services activity in the Financing Institutions, joint venture capital companies, micro-financial institutions, and other IJKs;
5. financial activities in the ITSK sector and digital financial assets and crypto assets;
6. behavior of financial business actors and the implementation of customers' education and protection; and

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7. he integrated the financial sector and conducted a Finance Conglomerate systemic impact assessment.

These responsibilities emphasize OJK's comprehensive oversight across various financial sectors, ensuring that carbon emissions trading is conducted transparently and effectively (Mahsunah and Adjani, 2024). By encompassing a broad range of financial activities, from banking to digital assets, OJK aims to foster a sustainable financial environment. The supervision of carbon exchanges is particularly significant as it aligns with global efforts to reduce carbon footprints and combat climate change, highlighting Indonesia's commitment to environmental sustainability.

Executing the duties as stipulated in Article 3 and Article 4, OJK had the Regulation right to manage instrumental secondary trading related to carbon economic value on the carbon exchanges. Carbon trading was a mechanism-based market to reduce emissions of greenhouse gases through sales and purchase of carbon units. Carbon units as referred to in section (1) are effective based on this Law. Domestic and/or international carbon trading could be conducted with the carbon exchange mechanism. Carbon exchange as referred to in section (1) was a system governing carbon trading and/ or notes of carbon unit ownership. Carbon exchanges only could be held by market organizers that had obtained business permits from the OJK. Based on the OJK regulation, market organizers could develop activities or products based on carbon units as referred to in section (21). Through the carbon exchanges mentioned in section (1), carbon trading was carried out by:

1. developing infrastructure for carbon trading;
2. organizing the utilization of state revenue from carbon trading; and/ or
3. managing the administration of carbon transactions.

This framework aimed to ensure a robust and transparent market for carbon units, fostering confidence among market participants. By developing the necessary infrastructure, OJK facilitated the smooth operation of carbon trading, enabling effective monitoring and reporting of carbon unit transactions (Muskanan et al., 2025). Organizing the utilization of state revenue from carbon trading ensured that the proceeds were managed efficiently and could be reinvested into environmental and sustainability projects. Additionally, managing the administration of carbon transactions provided a systematic approach to record-keeping and compliance, crucial for maintaining the integrity of the carbon market. This comprehensive approach by OJK highlighted Indonesia's commitment to leveraging market mechanisms in addressing climate change, supporting both environmental sustainability and economic growth (Indrawati, Satriawan, and Abdurohman, 2024).

The current global ecosystem has been affected by economic sectors, particularly regarding carbon market trading. The biggest challenge that would be dealt with by OJK was how OJK could participate in the green investment to respond to

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uncontrollably increasing climate change related also to carbon emissions trading that had not been regulated in Indonesia. OJK, a capital market regulator, could facilitate capital management required by green projects, which needed more funding. Besides that, OJK also had a significant role in managing carbon emissions trading in Indonesia. Thus, the urgency of strengthening the Indonesian economy through carbon emissions trading could be a solution (Nasih et al., 2024).

To address these challenges, OJK needed to establish a clear regulatory framework for carbon trading that aligns with international standards. This framework would not only provide guidelines for market participants but also attract foreign investment into Indonesia's carbon market. By fostering a transparent and efficient trading environment, OJK could enhance investor confidence and promote the growth of green investments (Jameaba, 2024). Furthermore, OJK could collaborate with other government agencies, private sectors, and international organizations to develop and implement policies that support sustainable development. This collaboration would ensure that the benefits of carbon trading are maximized, contributing to the reduction of greenhouse gas emissions and the advancement of environmental sustainability. Education and awareness campaigns could also be initiated by OJK to inform businesses and the public about the importance of carbon trading and its impact on climate change. By promoting a deeper understanding of these issues, OJK could encourage more companies to participate in carbon markets and adopt sustainable practices.

The company, which required funding, could register its projects in the capital markets to obtain lenders. Further, the projects that would emit carbon credit carbon could trade their carbon credit in the commodity market regulated by BAPPEBTI. Specifically, another alternative in which the development of carbon credit was traded in the commodity markets with BAPPEBTI, the supervisor, OJK could take a role in facilitating the further utilization of carbon credit as collateral or guarantee in the issuance of financing (Suwardiyati et al., 2024). For example, a company that had carbon credit could submit it as a guarantee on loan to banking or being the underlying bond issuance. This third way could become an option for regulation harmonization in the carbon market so that overlapping does not occur.

It also implied that the government had given the existing commodities exchanges priority in terms of building the perfect infrastructure for the carbon market for several reasons, including infrastructure capability and an adequate level of supervisory rather than opening opportunities to the emergence of new SRO, that its effectiveness of the system had not been tested yet. Increasing the trading volume of the carbon market on the existing commodity exchanges could greatly impact the overall national economic ecosystem (Wibowo, 2023).

The development of the carbon trading infrastructure mentioned in section (5) of the POJK 14/2023 was performed by the coordination between ministries/agencies with

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the supervisory authority of carbon exchanges, where the carbon exchange center is domiciled in Indonesia. Carbon trading through the carbon exchanges had to satisfy requirements and obtain permission from the OJK. The further provisions regarding carbon trading through the carbon exchanges as stipulated in Article 25 were regulated in the POJK 14/2023 after consulting with the House of Representatives. Subsequently, in terms of drafting the regulation as referred to in section (1), the OJK coordinated with ministries and/or other relevant authorities. Executive Head of Capital Market Supervisor, Derivatives Finance, and Carbon Exchanges led the supervisory tasks towards financial services activity in the Capital Market sector, Derivatives finance, and carbon exchanges. Then, as previously explained, OJK attempted to revise regulation and supervision for the financial service actors in the carbon market through carbon market supervisory (Park and Kim, 2020). In addition, it also provided innovation for business actors, engaging in the carbon market to operate harmoniously and equally with the implementation of better green investment. Also, it had to consider adverse impacts on the living and environment and the future of financial sounds of nation, state, and society.

Moreover, OJK needed to improve its collaboration with related stakeholders. OJK had to coordinate and cooperate with other stakeholders in the carbon market to complete each other in the management of the carbon market, avoid duplicative regulations as well as mitigate potential risks and challenges in establishing equilibrium between the development of the national financial system, carbon market, environment, and customer protection aspects. The coordination with stakeholders and international cooperation surrounding the carbon market required OJK to play a proactive role since setting and alignment with international regulations required joint attempts. Additionally, by collaborating with related national or international agencies, OJK required activating follow-up of the Cooperation Agreement.

In the context of Indonesia, both carbon tax and ETS were still quite new. Carbon tax offered several benefits including price stability and provided the determined price of business and utility (Bogner, 2024). The tax had to be carefully selected to provide positive impacts and not burden issuers excessively since it had also a weakness that caused uncertainty about how many emissions would be reduced. It also requested public feedback about the proposed law in carbon pricing. This emphasized how the importance of the involvement of stakeholders' interest in the law of carbon pricing. However, the lack of transparency and the lack of Indonesia's political commitment to notice public interests led the participation of stakeholders, specifically public participation, to be low and become a significant issue in Indonesia (Gea, Sadalia, and Absah, 2024). Therefore, the stakeholders had to participate and synergize in clear management related to Indonesian emission carbon trading. Indonesia is considered one of the world's largest emission-producing countries (Kawulur et al., 2024).

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To address these challenges and enhance the effectiveness of carbon tax and ETS, Indonesia needs to establish a transparent and inclusive decision-making process. This involves actively engaging various stakeholders, including businesses, environmental groups, and the general public, in discussions about carbon pricing policies. By doing so, the government can ensure that the policies are not only effective in reducing emissions but also fair and equitable. Furthermore, building robust monitoring and reporting systems is crucial for maintaining transparency and accountability in carbon trading. This would help track the progress of emissions reductions and provide valuable data to inform policy adjustments (Grassi et al., 2021). Additionally, investing in public education and awareness campaigns can increase understanding and support for carbon pricing mechanisms, encouraging greater participation from all sectors of society.

Indonesia's commitment to international climate agreements, such as the Paris Agreement, should also be reinforced through strong domestic policies and actions. This would demonstrate the country's dedication to combating climate change and could attract international support and investment in Indonesia's green initiatives. While the introduction of carbon tax and ETS in Indonesia presents challenges, it also offers significant opportunities for reducing emissions and promoting sustainable development. By fostering stakeholder engagement, enhancing transparency, and reinforcing political commitment, Indonesia can effectively leverage carbon pricing to address climate change and achieve its environmental and economic goals (Trencher et al., 2022).

Conclusion

The OJK regulates carbon trading through specific legal frameworks, such as Law No. 4 of 2023 concerning the Development and Strengthening of the Financial Sector P2SK Law and OJK Regulation No. 14 of 2023 concerning Carbon Trading through the Carbon Exchange. In the implementation, Indonesia still faces some of the key challenges including the development of a strong carbon trading infrastructure, the acceleration of mastery of the technologies necessary for the reduction of greenhouse gas emissions, effective market surveillance by the OJK, and increased public engagement and transparency. These challenges require special attention to ensure market integrity and the sustainability of carbon trading in Indonesia.

On the other hand, various opportunities can be exploited, including the potential for economic growth through increased foreign investment and national income, the promotion of sustainable development by encouraging renewable and low-carbon energy projects, and integration with the global carbon market. These opportunities also include the creation of new financial instruments and carbon credit-related investments, which contribute to a green economy. OJK has a crucial role in regulating and supervising carbon trading in Indonesia. This role includes regulating and implementing carbon trading, developing market infrastructure, ensuring regulatory compliance and enforcement, and building the capacity of market participants

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through training and the application of best practices. In addition, OJK plays a role in aligning Indonesia's carbon trading regulations with international standards, contributing to global climate change mitigation efforts, and building international partnerships to improve carbon trading practices.

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References

Akhtar, Muhammad Zaheer, Khalid Zaman, Faheem Ur Rehman, Abdelmohsen A Nassani, Mohamed Haffar, and Muhammad Moinuddin Qazi Abro. 2022. "Evaluating pollution damage function through carbon pricing, renewable energy demand, and cleaner technologies in China: Blue versus green economy." *Environmental Science and Pollution Research* 29 (17): 24878–93. https://doi.org/10.1007/s11356-021-17623-y.

Alessi, Lucia, and Stefano Battiston. 2022. "Two sides of the same coin: Green taxonomy alignment versus transition risk in financial portfolios." *International Review of Financial Analysis* 84 (November):102319. https://doi.org/10.1016/j.irfa.2022.102319.

Angelsen, Arild. 2013. "REDD+ as Performance-based aid: General lessons and bilateral agreements of Norway." https://www.econstor.eu/ handle/ 10419 / 93710.

Bogner, Lukas. 2024. "Law, knowledge and space: Expertise across the legal geographies of green finance." *Competition & Change*, March. https://doi.org /10.1177/10245294241240921.

Carlén, Björn, Anna Dahlqvist, Svante Mandell, and Pelle Marklund. 2019. "EU ETS emissions under the cancellation mechanism - effects of national measures." *Energy Policy* 129 (June):816–25. https://doi.org/10.1016/j.enpol.2019.02.060.

Choi, Bo Bae, Doowon Lee, and Jim Psaros. 2013. "An analysis of Australian company carbon emission disclosures." *Pacific Accounting Review* 25 (1): 58–79. https://doi.org/https://www.emerald.com/insight/content/doi/10.1108/01140581311318968/full/html.

Darvas, Zsolt, Dirk Schoenmaker, and Nicolas Véron. 2016. "Reforms to the European Union financial supervisory and regulatory architecture and their implications

Article History
Submitted 29 March 2024 - Revision Required 9 August 2024 - Accepted 15 April 2025

P-ISSN: 1412-6834
E-ISSN: 2550-0090

for Asia." https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2893060.

Dirgantara, Pradipta. 2022. "Reflecting on REDD+: Challenges towards Indonesia's carbon pricing." In *IOP Conference Series: Earth and Environmental Science*, 1105:12003. IOP Publishing. https://iopscience.iop.org/article/10.1088/1755-1315/1105/1/012003/meta.

Driga, Anna Maria, and Athanasios S Drigas. 2019. "Climate change 101: How everyday activities contribute to the ever-growing issue." *International Journal of Recent Contributions from Engineering, Science & IT (IJES)* 7 (1): 22. https://doi.org/10.3991/ijes.v7i1.10031.

Duchelle, Amy E, Frances Seymour, Maria Brockhaus, Arild Angelsen, Moira Moeliono, Grace Yee Wong, Thu Thuy Pham, and Christopher Martius. 2018. "REDD+: Lessons from National and subnational implementation: Ending tropical deforestation: a stock-take of progress and challenges." https://researchportal .helsinki.fi/en/publications/redd-lessons-from-national-and-subnational-imp l ementation-ending-.

Fatkhullah, Mukhammad, Nugroho Rinadi Pamungkas, Muhammad Alhada Fuadilah Habib, and Iwed Mulyani. 2023. "Reducing greenhouse gas emissions through community-based action: an analysis of the program Kampung Iklim in Indonesia." *Asean Social Work Journal* 11 (1): 28–37. https://www. asean socialwork.com/index.php/asw/article/view/33.

Gea, Marinus, Isfenti Sadalia, and Yeni Absah. 2024. "Genealogy and implementation of green finance in Asia and Indonesia." *KnE Social Sciences*, January. https://doi.org/10.18502/kss.v9i2.14926.

Graafland, Johan, and Lans Bovenberg. 2020. "Government regulation, business leaders' motivations and environmental performance of SMEs." *Journal of Environmental Planning and Management* 63 (8): 1335–55. https://doi.org/ 10.1080/09640568.2019.1663159.

Grassi, Giacomo, Elke Stehfest, Joeri Rogelj, Detlef van Vuuren, Alessandro Cescatti, Jo House, Gert-Jan Nabuurs, et al. 2021. "Critical adjustment of land mitigation pathways for assessing countries' climate progress." *Nature Climate Change* 11 (5): 425–34. https://doi.org/10.1038/s41558-021-01033-6.

Gunawan, Muhammad Gilang, Hilda Novyana, Anni Alvionitas Simanjuntak, Yanto Yanto, and Syamsul Hadi. 2025. "Reviewing the new chapter of carbon trading implementation in Indonesia as a manifestation of the 13th sustainable development goals." In , 274–83. https://doi.org/10.2991/978-2-38476-356-6_32.

Halimah, N Putri, and Heri Yanto. 2018. "Determinant of carbon emission disclosure at mining companies listed in Indonesia stock exchange." *KnE Social Sciences*, 127–41. https://knepublishing.com/index.php/KnE-Social/article/view/3124.

Hana Mahsunah, Dima, and Wulan Kencana Adjani. 2024. "Building a robust international carbon crediting framework: Insights from Indonesia's joint crediting mechanism." *IOP Conference Series: Earth and Environmental Science* 1395 (1): 012030. https://doi.org/10.1088/1755-1315/1395/1/012030.

Hanim, Lathifah, and M Noorman. 2020. "Implementation the Warehouse Receipt System As One Of Banking Credit Guarantee According To Act On Warehouse Receipt System." *Sultan Agung Notary Law Review* 1 (2): 121–38. https:// core.ac.uk/download/pdf/286134567.pdf.

Haryanto, Budi, Jatna Supriatna, Triarko Nurlambang, and Marsum. 2023. "Status of nationally determined contributions in Indonesia: A Review on climate change

JURNAL HUKUM NOVELTY
P-ISSN: 1412-6834
E-ISSN: 2550-0090
Volume 16, Issue 1, 2025, pp. 43-63

health impacts." In , 115–28. https://doi.org/10.1007/978-3-031-38878-1_8.

Indrawati, Sri Mulyani, Elan Satriawan, and Abdurohman. 2024. "Indonesia's fiscal policy in the aftermath of the pandemic." *Bulletin of Indonesian Economic Studies* 60 (1): 1–33. https://doi.org/10.1080/00074918.2024.2335967.

Jameaba, Muyanja. 2024. "Digitalization, emerging technologies, and financial stability: Challenges and opportunities for the Indonesian banking sector and beyond." *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4808469.

Jiang, Jingjing, Dejun Xie, Bin Ye, Bo Shen, and Zhanming Chen. 2016. "Research on China's cap-and-trade carbon emission trading scheme: Overview and outlook." *Applied Energy* 178 (September):902–17. https://doi.org/ 10.1016 / j. apenergy.2016.06.100.

Jones, Matthew W., Glen P. Peters, Thomas Gasser, Robbie M. Andrew, Clemens Schwingshackl, Johannes Gütschow, Richard A. Houghton, Pierre Friedlingstein, Julia Pongratz, and Corinne Le Quéré. 2023. "National contributions to climate change due to historical emissions of carbon dioxide, methane, and nitrous oxide since 1850." *Scientific Data* 10 (1): 155. https://doi.org/10.1038/s41597-023-02041-1.

Katadata. n.d. "Indonesia janji kurangi emisi karbon." Katadata. Accessed June 16, 2023. https://databoks.katadata.co.id/datapublish/2022/11/10/Government-Indonesia- Janji-kurangi-emisi-karbon-ini-target-barunya.

Kawulur, Hisky Ryan, Erwin Saraswati, Abdul Ghofar, and Arum Prastiwi. 2024. "Carbon Strategy, Political Connection and Carbon Performance: Evidence from Polluting Industries." *International Journal of Energy Economics and Policy* 14 (4): 251–64. https://doi.org/10.32479/ijeep.16182.

Khoshnava, Seyed Meysam, Raheleh Rostami, Rosli Mohamad Zin, Dalia Štreimikienė, Alireza Yousefpour, Wadim Strielkowski, and Abbas Mardani. 2019. "Aligning the criteria of green economy (GE) and sustainable development goals (SDGs) to implement sustainable development." *Sustainability* 11 (17): 4615. https://doi.org/10.3390/su11174615.

Klenert, David, Linus Mattauch, Emmanuel Combet, Ottmar Edenhofer, Cameron Hepburn, Ryan Rafaty, and Nicholas Stern. 2018. "Making carbon pricing work for citizens." *Nature Climate Change* 8 (8): 669–77. https://doi.org/10.1038/s41558-018-0201-2.

Koh, Jane. 2021. "Impacts of carbon pricing on developing economies." *International Journal of Energy Economics and Policy*. https://www.zbw.eu/econis-archiv /bitstream/11159/7780/1/1771778415_0.pdf.

Lantara, I Wayan Nuka. 2010. "A survey on the use of derivatives in Indonesia." *Gadjah Mada International Journal of Business* 12 (3). https://journal.ugm.ac.id/gamaijb/article/view/5504.

Marzuki, Peter Mahmud. 2013. "Penelitian Hukum."

Michaelowa, Axel, Igor Shishlov, and Dario Brescia. 2019. "Evolution of International carbon markets: Lessons for the Paris Agreement." *WIREs Climate Change* 10 (6): e613. https://doi.org/10.1002/wcc.613.

Muskanan, Moni Wehelmina, Carol Tilt, Kathy Rao, and Rob Whait. 2025. "Contributing to Indonesia's SDG achievement: Disclosures of regional-owned enterprises." *Journal of Public Budgeting, Accounting & Financial Management* 37 (2): 273–95. https://doi.org/10.1108/JPBAFM-06-2023-0104.

Nasih, Mohammad, Astri Puspitasari, Iman Harymawan, Fajar Kristanto Gautama Putra, and Hadrian Geri Djajadikerta. 2024. "The relationship of carbon emission

Article History
Submitted 29 March 2024 - Revision Required 9 August 2024 - Accepted 15 April 2025

P-ISSN: 1412-6834
E-ISSN: 2550-0090

disclosure on the cost of debt." *Sage Open* 14 (4). https://doi.org /10.1177/21582440241292134.

Novita, Windy Sonya, and Moch Najib Imanullah. 2020. "Aspek hukum peer to peer lending (Identifikasi permasalahan hukum dan mekanisme penyelesaian)." *Jurnal Privat Law* 8 (1): 151. https: //doi.org/ 10.20961 /privat. v8i1.40389.

Nunes, Leonel J. R. 2023. "The rising threat of atmospheric CO2: a review on the causes, impacts, and mitigation strategies." *Environments* 10 (4): 66. https://doi.org/10.3390/environments10040066.

Nurdiawansyah, Nurdiawansyah, and Lindrianasari Lindrianasari. 2018. "Carbon emission issues in Indonesia." *Review of Integrative Business and Economics Research* 7 (Sup 3): 20–33. http://repository.lppm.unila.ac.id/id/eprint/18505.

Park, Hyoungkun, and Jong Dae Kim. 2020. "Transition towards green banking: Role of financial regulators and financial institutions." *Asian Journal of Sustainability and Social Responsibility* 5 (1): 5. https://doi.org/10.1186/s41180-020-00034-3.

Perino, Grischa, and Thomas Pioch. 2017. "Banning incandescent light bulbs in the shadow of the EU emissions trading scheme." *Climate Policy* 17 (5): 678–86. https://doi.org/10.1080/14693062.2016.1164657.

Pristiandaru, Danur Lambang. 2024. "RI masuk 10 besar negara penghasil emisi sepanjang 2023." *Kompas.Com*, 2024. https://lestari.kompas.com /read/2024 /06/25/170000786/ri-masuk-10-besar-negara-penghasil-emisi-sepanjang-2023.

Rachmaniar, A, A P Supriyadi, H Pradana, and Mustriadhi. 2021. "Carbon trading system as a climate mitigation scheme: Why Indonesia should adopt it?" *IOP Conference Series: Earth and Environmental Science* 739 (1): 012015. https://doi.org/10.1088/1755-1315/739/1/012015.

Rey-Coquais, Solène. 2021. "Territorial experience and the making of global norms: How the Quellaveco dialogue roundtable changed the game of mining regulation in Peru." *The Extractive Industries and Society* 8 (1): 55–63. https://doi.org/10.1016/j.exis.2020.05.002.

Robinson, Spenser, and George Sullivan. 2022. "Proposed guidelines for U.S. scope 2 GHG reduction claims with renewable energy certificates." *The Electricity Journal* 35 (7): 107160. https://doi.org/10.1016/j.tej.2022.107160.

Rust, Dominique, Ioannis Katharopoulos, Martin K. Vollmer, Stephan Henne, Simon O'Doherty, Daniel Say, Lukas Emmenegger, Renato Zenobi, and Stefan Reimann. 2022. "Swiss halocarbon emissions for 2019 to 2020 assessed from regional atmospheric observations." *Atmospheric Chemistry and Physics* 22 (4): 2447–66. https://doi.org/10.5194/acp-22-2447-2022.

Schauenberg, Tim. 22AD. "What's interesting of carbon market reform in the European Union?," 22AD. https://www.dw.com/id/reformasi-pasar-karbon-uni-eropa/a-64239815.

Seo, S Niggol. 2017. "Beyond the Paris Agreement: Climate change policy negotiations and future directions." *Regional Science Policy & Practice* 9 (2): 121–40. https://doi.org/https://doi.org/10.1111/rsp3.12090.

Seymour, F, W Boyd, C Stickler, A E Duchelle, D Nepstad, N H A Bahar, and D Rodríguez Ward. 2018. "Jurisdictional approaches to redd+ and low emissions. Development: Progress and Prospects." https://www.cifor.org/library/6933.

Shivanna, K. R. 2022. "Climate change and its impact on biodiversity and human welfare." *Proceedings of the Indian National Science Academy* 88 (2): 160–71.

JURNAL HUKUM NOVELTY
P-ISSN: 1412-6834
E-ISSN: 2550-0090
Volume 16, Issue 1, 2025, pp. 43-63

https://doi.org/10.1007/s43538-022-00073-6.

Smith, Benjamin. 2005. "Life of the party: The origins of regime breakdown and persistence under single-party rule." *World Politics* 57 (3): 421–51. https://doi.org/10.1353/wp.2006.0004.

Soekanto, Soerjono. 2007. "Penelitian hukum normatif: Suatu tinjauan singkat."

Sujiwo, Aryo Sahid, and Nurlaili Nurlaili. 2022. "Evaluation of Ecosystem services and mangrove management based on the blue economy approach of Untung Jawa Island." *Jurnal Mandiri: Ilmu Pengetahuan, Seni, Dan Teknologi* 6 (2): 116–36. https://doi.org/https://doi.org/10.33753/mandiri.v6i2.218.

Susanna Twidale, Kate Abnett and Nina Chestney. 2023. "EU carbon hits 100 euros taking cost of polluting to record high." *Reuters*, 2023. https://www. reuters . com/markets/carbon/europes-carbon-price-hits-record-high-100-euros-2023 -02-21/.

Suwardiyati, Rumi, Azlin Alisa Ahmad, Reka Dewantara, Dwi Benny Satria, and Ranitya Ganindha. 2024. "Setting the readiness of law to implement central bank digital currency in Indonesia." *Arena Hukum* 17 (3): 514–44. https://doi.org/10.21776/ub.arenahukum2024.01703.3.

Tawakkal, Habib. 2022. "OJK Siap dukung penyelenggaraan bursa karbon." Ojk. 2022. Https://kontak157.ojk.go.id/appkpublicportal/WebSite/ArticleList /View/10120.

the Energy Institute. 2024. "Statistical Review of world energy." UK. https://www. energyinst.org/statistical-review.

Tietenberg, Tom H. 2013. "Reflections—carbon pricing in practice." *Review of Environmental Economics and Policy*. https://www.journals.uchicago.edu /doi/abs/10.1093/reep/ret008?journalCode=reep.

Trencher, Gregory, Adrian Rinscheid, Daniel Rosenbloom, and Nhi Truong. 2022. "The rise of phase-out as a critical decarbonisation approach: A systematic review." *Environmental Research Letters* 17 (12): 123002. https://doi.org /10.1088 /1748-9326/ac9fe3.

Welt, Aviad S. 2010. "OTC Emissions derivatives as facilitators of market-based climatic regimes in the wake of the financial meltdown." *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1933289.

Wibowo, Adhi Prasetyo Satriyo. 2023. "Strengthening of micro small and medium business empowerment through financial sector development and strengthening act." *Jurnal Budget: Isu Dan Masalah Keuangan Negara* 8 (1): 1–19. https://ejurnal.dpr.go.id/index.php/jurnalbudget/article/view/154.

Wongpiyabovorn, Oranuch, Alejandro Plastina, and John M Crespi. 2023. "Challenges to voluntary ag carbon markets." *Applied Economic Perspectives and Policy* 45 (2): 1154–67. https://doi.org/10.1002/aepp.13254.

Yusdiyanto, Yusdiyanto, Budiyono Budiyono, Ahmad Saleh, Dewi Nurhalimah, and Rachel Sophia Joy Aprilia Gultom. 2025. "Legal approaches to climate change mitigation: evaluating implementation strategies and mainstreaming efforts." *Pancasila and Law Review* 5 (2): 71–84. https://doi.org/10.25041/ plr.v 5i2. 4018.

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