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The Legal Framework for Carbon Trading: Examining its Juridical Implications for Civil Liability and Environmental Responsibility in Indonesia

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ABSTRACT

The Indonesian legislation on carbon trading is a key instrument for national and global climate targets. This analysis, according to the present study, utilizes a normative juridical model in viewing Indonesia's carbon trading law and focusing on implications toward civil liability and environmental obligation. The findings suggest that while the model is aligned with international norms and is multi-carbon price inclusive, it is beset with enforcement uncertainties, uncemented provisions of civil liability, and weakly constructed monitoring mechanisms. Additionally, the absence of adequate community participation mechanisms is not only an issue of equity and social inclusion. In learning from global best practices, such as the European Union Emissions Trading System (EU ETS) and China's national carbon market, the research identifies areas of improvement that involve enhancing legal clarity, enforcement mechanisms, and environmental responsibility. These are key in ensuring that Indonesia's carbon trading system has a sufficient contribution to promote both legal accountability and environmental sustainability.

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1. INTRODUCTION

1.1 Background Research

Climate change is one of the most significant issues of this 21st century, and countries across the world are decreasing greenhouse gas (GHG) emissions and striving toward sustainable development. Being a developing nation with huge forests as carbon sinks, Indonesia has a vital contribution to make toward world climate mitigation. Among the advanced mechanisms that have been employed to address these challenges, carbon trading has drawn increasing interest. As part of the general carbon market, carbon trading enables states and institutions to meet emission reduction goals by trading carbon credits. While the system promises to promote both economic effectiveness and environmental sustainability, its function in Indonesia is marked by complex legal,

regulatory, and socio-economic factors. Indonesia's carbon market relies on environmental policies and laws that align with global instruments such as the Paris Agreement, but loopholes in regulations and overlapping jurisdictions still hinder its effective implementation [1].

Enhanced monitoring, reporting, and verification mechanisms are required to enhance the credibility and performance of the system [1]. It is economically viable, as it presents a way of attributing value to carbon and enables fair mitigation measures consistent with Maqashid Sharia values that balance both ecological management and economic gain [2]. Additionally, the carbon market forms part of Indonesia's plan in meeting its Nationally Determined Contribution (NDC) obligation and achieving sustainable development goals [3]. Nonetheless, the country is faced with overwhelming challenges in reducing emissions on the one hand and ensuring low-cost energy to drive economic development on the other, and hence there is a need to include socio-economic factors in policy design [4]. Even though carbon markets have the potential to promote energy-carbon performance, resolving technical issues and guaranteeing broad-based stakeholder participation are key to ensuring long-term success [5].

Carbon trading in Indonesia is governed by a number of laws and policies that support the country's NDCs under the Paris Agreement, where Presidential Regulation No. 98 of 2021 has been a breakthrough in establishing a carbon pricing system incorporating carbon trading, reduction of emissions, and climate financing. Although this law provides a fundamental legal framework—including carbon taxes and carbon credit trading—it is in its initial stage and must be refined to cover vital areas such as civil liability, environmental responsibility, and the involvement of stakeholders [6]. While the regulation aligns with global climate governance trends, it is silent on fair benefit-sharing and engaging vulnerable communities, which are the foundations of moving environmental justice forward [1].

These gaps raise concern that carbon trading will be reduced to a financial instrument rather than an accountability and environmental protection mechanism. Some of the primary challenges to effective implementation are regulatory ambiguities, overlapping responsibilities, and weak enforcement mechanisms, which hamper progress toward the attainment of emissions reduction targets [1]. Suggestions for addressing these challenges are enhancing public engagement, strengthening enforcement tools, and harmonizing national policy with global standards to foster private sector participation [1]. Comparative learnings from China, Canada, Germany, and New Zealand illustrate how derivative rules are instrumental in safeguarding a transparent and efficient carbon market in Indonesia [7]. Lastly, the development of an inclusive and robust carbon trading mechanism is not only essential for Indonesia's climate ambitions but also for the realization of broader environmental conservation and sustainable development objectives, hence the need for policy formulation and research harmonization with environmental law regimes [3].

The call for action on climate change has never been more imperative, its impacts—ranging from extended heatwaves to biodiversity loss—threatening planetary ecosystems and human well-being to an unprecedented extent. Indonesia, one of the world's largest greenhouse gas emitters and a country endowed with rich natural resources, is at the center of global climate action. Implementation of carbon trading, being a market-based instrument, promises to drive emission cuts alongside economically sustainable development. Without an overreaching and enforceable legislative framework, carbon trading, however, is likely to be abused, implemented inefficiently, or be unaccountable. To ensure that carbon trading is a valuable addition to Indonesia's environmental and development objectives, urgent action should be taken to strengthen the legal, regulatory, and enforcement basis of the system.

1.2 Research Objective

Despite the issuance of key policies such as Presidential Regulation No. 98 of 2021, Indonesia's carbon trading legal framework remains underdeveloped and full of challenges. There are no legal liabilities and obligations for carbon market participants, and this leaves one wondering how to handle potential violations or disputes. Furthermore, the incorporation of environmental responsibility into the legal framework is still limited, leaving one to wonder whether carbon trading actually promotes environmental sustainability or is simply a fiscal tool. This absence of regulatory depth and enforcement weakens the system's ability to realize significant emissions reductions and preserve natural ecosystems. This article aims to examine the legal framework of carbon trading in Indonesia and how it affects civil liability and environmental accountability. Specifically, it will: (1) examine current legislation and regulations for carbon trading, their strengths and weaknesses; (2) investigate juridical consequences of civil liability for carbon trading with a focus on accountability institutions; (3) assess in which ways environmental accountability is integrated into the scheme and linked to sustainable development goals; and (4) provide proposals for improving the legal regime in order to be effective, accountable, and environmentally responsible.

2. LITERATURE REVIEW

2.1 Conceptual Framework of Carbon Trading

Carbon trading is a market mechanism that aims to reduce greenhouse gas emissions by enabling entities to buy and sell carbon credits, offering a cost-effective way of reducing emissions while promoting investments in low-carbon technologies. A model utilized within the system is the cap-and-trade system, which sets an emission ceiling on aggregate emissions and permits trading in allowances to guarantee reductions where they are most cost-effective [8]. The EU ETS is a classic illustration of the effectiveness of this model, having achieved substantial GHG emission reductions through well-designed incentives [9]. The project-based mechanism system, such as the Clean Development Mechanism (CDM) under the Kyoto Protocol, allows emission reduction from specific activities—such as renewable energy or afforestation activities—to be equated into tradable credits [9], [10]. In Indonesia, carbon trading law foundation is established by legislations like Presidential Regulation No. 98 of 2021, which is intended to develop carbon markets [5]. Despite still being in its development stage at the practical level, Indonesia's carbon trading mechanism has high potential to upgrade both energy and carbon performance through technical innovation and broader stakeholder engagement [5].

2.2 Legal Framework for Carbon Trading in Indonesia

Indonesia's carbon market in Presidential Regulation No. 98 of 2021 aims to align carbon pricing with national climate targets (NDCs), but is significantly impeded by issues of enforcement, accountability, and fairness. Ineffective whole-of-nation monitoring, reporting, and verification (MRV) systems weaken regulatory effectiveness and integrity [1]. The legislation also lacks clear provisions for equitable benefit sharing and public participation, with risks of exclusion of vulnerable groups [11]. Legal ambiguities regarding stakeholder mandates and liability only compound complexity in implementation [6]. REDD+ lessons highlight the importance of institutional capacity, while Brazil-Canada comparisons reinforce the need for transparency and carbon pricing instruments adapted to context [12].

2.3 Civil Liability in Carbon Trading

Indonesia's carbon trading scheme is poorly developed, particularly in addressing civil liability, which erects substantial obstacles to accountability and investor trust. The legal provisions outlined within Presidential Regulation No. 98 of 2021 are ill-defined and weak, particularly in enforcement and equitable distribution of benefits, which it is difficult to ensure compliance and resolve disputes effectively [11]. Shortcomings in blanket liability standards fall below the credibility of carbon

markets because participants may fail to meet emission reduction targets or reporting requirements. Comparisons with countries like New Zealand and Germany reveal the need for derivative regulations to reinforce a robust carbon exchange [7], [13]. Besides, inadequate legal protection and unclear enforcement instruments can deter investors and promote scams such as double counting or sales of worthless credits, which compromise market confidence [1], [14]. To thwart these, one should enhance institutional capacity, harmonize national policy with international best practices, and adopt global carbon market best practice [7], [11]. Apart from that, increasing public participation and ensuring the participation of marginalized communities are vital in promoting equity and environmental justice within Indonesia's carbon trading system [1].

2.4 Environmental Responsibility in Carbon Trading

Indonesian carbon trading, like that of most developing economies, is viewed to balance economic growth and environmental sustainability, but its potential is typically forestalled by inefficacious monitoring and evaluation systems and exclusion of local communities from central decision-making frameworks. Even though Presidential Regulation No. 98 of 2021 aimed to join the global carbon trade trend, the regulation falls short of upholding equity in distribution and genuine representation of vulnerable individuals, thus placing the concern at the forefront of environmental injustice issues [11]. Hazards of creating environmental injustices in the shape of hotspots for toxicity and heavy pollution unfairly borne, such as California's cap-and-trade scheme, would also emerge in Indonesia if they fail to provide tighter measures [15]. Moreover, loose regulation mechanisms and nepotism in prioritizing business aims at the expense of environmental intentions could also increase the widespread disparities in carbon trading systems [16]. Effective monitoring and evaluation mechanisms are essential to ensure that carbon trade projects are undertaken with real greenhouse gas emission reductions and align with sustainable development, as strongly emphasized in the Indonesian as well as global debate [11], [16]. Examples of the Bisasar landfill in South Africa demonstrate how poorly designed carbon projects lead to greater local environmental and health effects instead of halting climate change [17]. These issues require increased public engagement and effective enforcement to prevent marginalization of affected populations, alongside system reform to correct ethical problems and provide distributional justice in carbon markets [11], [18].

2.5 Theoretical Framework

The theoretical framework of this study rests on the principles of environmental law and sustainable development, on the basis of three frameworks: the Polluter Pays Principle (PPP), that polluters have to pay for the expenses incurred—justifying the concept of civil liability in carbon trading; the doctrine of Sustainable Development in the Brundtland Report (1987), which centers on the equilibrium of economic, environmental, and social objectives—providing a comprehensive outlook to assess the environmental responsibility of carbon trading schemes; and the Market-Based Environmental Governance theory, which promotes the use of economic tools like carbon trading to encourage environmental goals—emphasizing the importance of proper legal and institutional frameworks. Through integrating these observations, the study aims to foster an integrated discussion of the Indonesian legal and regulatory aspects of carbon trading, particularly on strengthening civil liability and environmental responsibility.

3. METHODS

3.1 Approach

The research design used is descriptive-analytical, with the aim of systematically describing legal provisions and critically analyzing their implications for civil liability and environmental responsibility in Indonesia's carbon trade system. The purpose of the study is to identify gaps, ambiguities, and areas for improvement in the existing legal framework to enhance its effectiveness

in promoting environmental sustainability and legal accountability.

3.2 Sources of Legal Materials

The primary and secondary legal materials used in this study include:

Table 1. Source Data

Type of Legal Material	Examples
Primary Legal Materials	- Laws and regulations related to carbon trading, such as Presidential Regulation No. 98 of 2021 on Carbon Pricing and Law No. 32 of 2009 on Environmental Protection and Management. - International agreements and conventions, including the Paris Agreement and the United Nations Framework Convention on Climate Change (UNFCCC).
Secondary Legal Materials	- Legal commentaries, journal articles, and books analyzing carbon trading mechanisms, civil liability, and environmental responsibility. - Reports and guidelines from international organizations, such as the UNFCCC, regarding best practices in carbon trading and emission reduction strategies.
Tertiary Legal Materials	- Legal dictionaries, encyclopedias, and other reference materials that provide definitions and explanations of legal terms and concepts relevant to the study.

3.3 Data Collection Techniques

Document analysis is employed as the primary data collection technique in this study, including a comprehensive examination of legislative documents, government regulations, and policy reports; court decisions and case law regarding carbon trading and environmental accountability; and scholarly works and reports that offer theoretical and experiential understanding of carbon trading. The documents were selected based on their relevance to the research objective and their ability to enable insight into the legal framework and its implications.

3.4 Data Analysis

Data collected in this research were qualitatively analyzed, focusing on legal interpretation, comparative analysis, and critical evaluation. Legal interpretation involved both grammatical interpretation of understanding the word-to-word meaning of legal text and systematic interpretation to assess conformity and interaction of various laws and regulations in the Indonesian carbon trading regime. Comparative examination was made through comparison of Indonesia's legal framework with the world's best practice, such as the European Union Emissions Trading System (EU ETS) and the Chinese national carbon market, with the aim to identify areas that require improvement. Critical analysis was utilized in order to evaluate the adequacy and consistency of the legal framework in resolving civil liability and environmental responsibility and to find gaps and inconsistencies that can prevent the effective operation of carbon trading mechanisms in Indonesia.

4. RESULTS AND DISCUSSION

4.1 Legal Framework Governing Carbon Trading in Indonesia

Indonesia's law on carbon trading is primarily stipulated by Presidential Regulation No. 98 of 2021 on Carbon Pricing and complemented by broader environmental legislation, such as Law No. 32 of 2009 on Environmental Protection and Management. The regulation is aimed to mainstream carbon trading in the climate policy of Indonesia to achieve the Nationally Determined Contributions (NDCs) of Indonesia under the Paris Agreement. The system aligns carbon trading with emission reduction targets by providing a systematic approach to promote the reduction of greenhouse gases (GHGs). It is adaptable in that it employs various instruments such as carbon trading, carbon

taxes, and payment for results to address the needs of various sectors and economic conditions. Second, by adopting standards that are consistent with international norms, like those outlined by the United Nations Framework Convention on Climate Change (UNFCCC), the framework achieves legitimacy and eases possible cross-border cooperation.

Despite these benefits, the structure faces several fundamental challenges. Some of the greatest challenges include vagueness in enforcement, precisely the issue of what should be done in situations of non-adherence and disputes. Additionally, the institutional framework is unclear on civil liability, failing to state the legal requirements and penalties for stakeholders, reducing accountability. Monitoring, reporting, and verification (MRV) systems are also underdeveloped, reducing reliability and environmental integrity of carbon credits exchanged. Lastly. the scheme. has me.ager provision for public awareness and participation. required in the provision. of assurance for. transparency. representation. and fairness. in the implementation of carbon trading.

4.2 Juridical Impacts on Civil Liability

The concept of civil liability within carbon trading involves the jurisdictional undertakings by the players in the market to adhere. to. regulations. submit. accurate. data. of. emissions. and. prevent. frauds. In Indonesia, the existing legal framework does not comprehensively address such obligations, resulting in massive regulatory and operational problems. Unclear provisions on civil liability is one of the reasons for uneven enforcement since authorities do not effectively collect fines or settle judicial cases. Moreover, the lack of clearly defined standards of liability increases the risk of misrepresentation and fraud, for instance, the sale and issuance of worthless carbon credits, which could significantly harm the integrity of the carbon market.

A good carbon trading system also requires robust dispute resolution mechanisms, in particular for complex and potentially cross-border transactions. But Indonesia's current regulatory framework lacks a generic framework to address such conflicts, so it is creating legal uncertainty and eroding investor confidence. Not providing legal certainty and assurance risks destabilizing not only the carbon market but also private sector engagement, and that is crucial to the success of market-based climate solutions. Therefore, strengthening provisions of civil liability and having a clear mechanism of dispute resolution are critical steps towards enhancing the effectiveness and accountability of Indonesia's carbon trading system.

4.3 Environmental Responsibility

Carbon trading must go beyond reducing emissions to taking an active role in higher environmental sustainability, including ecosystem conservation, conservation of biodiversity, and equitable allocation of resources. In Indonesia, reforestation and renewable energy projects have huge potential to be aligned with these environmental objectives under carbon trading. However, the success of such schemes is often limited by weak monitoring and evaluation (M&E) systems, which limits measuring real impacts and holding people accountable. Without strict regulation, carbon trading can be employed as a mere token gesture rather than an effective tool of climate and environmental policy.

One of the major problems in Indonesia's existing system is the absence of enforcement to stop the abuse of carbon trading as a greenwashing effort—where companies promote environmental contributions without actual impact. Such an abuse lowers the integrity of carbon markets and results in tighter regulatory enforcement having to be introduced as a priority. Furthermore, the absence of significant participation, especially from indigenous and marginalized people, raises deep questions regarding social equity. Local people's non-participation in the planning and benefits of carbon trading activities diminishes not only the legitimacy risk for such initiatives but also makes them less efficient for long-term sustainability and commitment to equitable environmental management.

4.4 Comparative Lessons from Global Best Practices

Several countries have had successful carbon trading systems with learnings that can be transferred to Indonesia, such as the European Union Emissions Trading System (EU ETS) and China's National Carbon Market. The EU ETS has gained prestige due to its robust enforcement mechanism, transparent monitoring, reporting, and verification (MRV) system, and strict compliance rules that ensure market integrity and prevent malpractice [7], [19]. Similarly, China's carbon market demonstrates success in large-scale implementation under the support of strong government regulation and fiscal incentives, initiating massive emission reductions [2], [7]. It can go a long way towards making Indonesia's carbon trading system strong, credible, and environmentally impactful with the same methods applied—such as open MRV systems, well-defined legal liabilities, and well-specified compliance penalties [1], [3]. Open MRV systems, highlighted in the Chinese and EU policies, are also essential to underpinning trust in the markets, and the Indonesian system could benefit from additional integration of newer data collection and verification technologies [5], [10].

Government regulation and fiscal incentives are equally important when the carbon markets work well, as exemplified in China's case where the state plays a central regulatory role while encouraging low-carbon investments [1], [20]. For Indonesia, having a particular regulatory body and offering fiscal incentives could increase participation and compliance. Moreover, the EU and Chinese legislations and regulations are characterized by their comprehensiveness and adherence to international standards, which Indonesia must emulate through closing loopholes in regulations and overlapping jurisdictions [3], [21]. Achieving an equilibrium between the environmental sustainability of ecosystems and the development of economy is another useful lesson, because China and the EU both had managed to implement carbon trading into total policy models [2], [22]. Indonesia has to follow in the same fashion in order for its carbon market not only enhance its Nationally Determined Contributions (NDCs) but also contribute towards its economic strength in the longer term [5], [10].

4.5 Proposed Improvements

To address the identified gaps and weaknesses of Indonesia's carbon trading program, several key steps are recommended. First, legal certainty needs to be enhanced by setting clear civil liability rules, including sanctions for fraud and non-compliance, and detailing guidelines on monitoring and verifying emissions for ensuring carbon credit integrity. Second, enforcement mechanisms need to be strengthened by developing a robust regulatory framework with clearly defined roles of authorities and establishing a specialized dispute resolution mechanism specific to carbon trading, i.e., arbitration and mediation. Third, promoting environmental integrity requires the establishment of strict monitoring and evaluation (M&E) systems to assess the real environmental impact of carbon trading projects while making certain that local communities and indigenous peoples are engaged in project design and benefit-sharing. Finally, learning from international best practices, in particular the European Union Emissions Trading System (EU ETS) and China's national carbon market, can strengthen regulatory oversight and market performance. Encouraging international collaboration will also facilitate exchanges of expertise and promote harmonization of standards for more effective and credible carbon trading in Indonesia.

5. CONCLUSION

Indonesia's emission trading scheme is a big stride towards sustainable development and climate change mitigation. However, the scheme has a few serious flaws, including ambiguities in enforcement mechanisms, a lack of clear provisions on civil liability, and weak stakeholder involvement. The study recognizes the importance of an effective and transparent emissions monitoring and verification system, clear legal accountability, and equitable participation.

The incorporation of global best practices, as evidenced in the EU ETS and Chinese carbon market, would be capable of strengthening Indonesia's regulatory framework and market performance. Specifically, the adoption of clear liability rules, stringent monitoring provisions, and inclusive policy processes is imperative. Addressing these gaps will not only render the framework more effective but also align it with the broader objectives of environmental justice and global climate commitments. By putting these reforms first, Indonesia can become a leader in sustainable carbon trading, weighing economic development against ecological stewardship.

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