

CARBON TRADING MEETS SHARIA RETHINKING CAP AND TRADE AND OFFSET FOR SUSTAINABLE FUTURES

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ISBN: 978-623-97987-1-0

Received: 01 October 2025

Accepted: 25 October 2025

Published: 21 January 2026

Abstract:

This study analyzes the compliance of Cap and Trade and Offset transaction mechanisms in Indonesia's carbon trading with the principles of Islamic commercial jurisprudence (fiqh muamalah) using a qualitative descriptive and normative-sharia analysis. The focus includes ownership rights over carbon as intangible assets, clarity of transaction objects, transparency in emission calculations through the MRV (Monitoring, Reporting, Verification) system, and avoidance of gharar, riba, and maisir elements. The findings show that both mechanisms are Shariah-compliant under strict supervision by the Financial Services Authority (OJK) and international certification. Indonesian regulations, especially Presidential Regulation No. 98 of 2021, reinforce market integrity and align with maqashid shariah, particularly in environmental preservation and social justice. Policy recommendations include strengthening the Sharia Supervisory Board, synergy between fatwa authorities and regulators, and improved Sharia literacy among market participants. Overall, carbon trading mechanisms have the potential to be strategic instruments for sustainable development consistent with Islamic principles.

Keywords: *fiqh muamalah, cap and trade, offset, carbon trading, shariah*

Abstrak:

Penelitian ini mengkaji kesesuaian mekanisme transaksi Cap and Trade dan Offset dalam perdagangan karbon Indonesia dengan prinsip fikih muamalah melalui pendekatan kualitatif deskriptif dan analisis normatif-syariah. Fokus penelitian meliputi kepemilikan hak atas karbon sebagai aset imateriil, kejelasan objek transaksi, transparansi perhitungan emisi melalui sistem MRV (Monitoring, Reporting, Verification), serta penghindaran unsur gharar, riba, dan maisir. Hasil kajian menunjukkan bahwa kedua mekanisme dapat dikategorikan sebagai Bai al-Huquq al-Manawiyah yang sah menurut syariah dengan pengawasan ketat oleh OJK dan sertifikasi internasional. Regulasi Indonesia, terutama Perpres No. 98 Tahun 2021, memperkuat integritas pasar karbon serta keselarasan dengan maqashid syariah, khususnya dalam pelestarian lingkungan dan keadilan sosial. Rekomendasi kebijakan mencakup penguatan Dewan Pengawas Syariah, sinergi antara otoritas fatwa dan regulator, serta peningkatan literasi syariah bagi pelaku pasar. Secara keseluruhan, mekanisme perdagangan karbon berpotensi menjadi instrumen strategis pembangunan berkelanjutan yang sesuai dengan prinsip Islam.

Kata Kunci: *fikih muamalah, cap and trade, offset, perdagangan karbon, syariah*

INTRODUCTION

The current ecological emergency has captured the attention of the world community, as caused by rampant issues such as the climate crisis, *global warming*, and massive deforestation. The global community is slowly beginning to realize that the drive for industrial growth and technological advancement can endanger the future of the earth. The continuing spread of environmental damage requires global collaborative efforts to address this problem using scientific techniques and principles.

Collaboration between countries to reduce and adapt to climate change has been a topic of widespread discussion for more than twenty years, beginning with the signing of the Kyoto Protocol by member countries of the United Nations (UN) in 1997, which highlighted the significant and dangerous impact of greenhouse gases (GHGs) (Hidayat, 2023). Not only in the Kyoto Protocol, the risks of climate change have prompted commitments from many countries, starting with the formation of the United Nations Environment Programme (UNEP) in 1972, the IPCC in 1988, the UN Framework Convention on Climate Change (UNFCCC) in 1992, the Kyoto Protocol in 1997, and the Paris Agreement in 2015. The Kyoto Protocol and the Paris Agreement are important references in climate change mitigation measures, whereby all countries are committed to reducing environmental emissions.

According to data from Global Project Carbon, Indonesia ranks 10th with emissions of around 1.69% of total global emissions in 2020. Indonesia's annual CO₂ emissions were recorded at around 589,5 million tons in 2020 (Hidayat, 2023). The latest data for 2023 based on KataData Green shows that Indonesia has risen to 7th place with emissions of 703,14 million tons (Annur, 2023:10-11) This is due to land/forest misuse and massive deforestation. Therefore, to take new steps, Indonesia has submitted its latest NDC (*Nationally Determined Contribution*) as part of its contribution to mitigating the impacts of climate change under the Paris Agreement (Annur, 2023:10-11). Indonesia's latest NDC aims to build climate resilience, achieve emission reduction targets, and plan for *carbon pricing* instruments, which are currently being implemented.

Indonesia's carbon trading is developed through IDX Carbon as an integration with the global carbon market. Due to the benefits of its green landscape, Indonesia's carbon trading is estimated to have the potential to generate revenue of 4,290 trillion per year (Tumiwa, Vianda, & Swadana, 2023). Carbon trading in Indonesia applies two transaction mechanisms, namely Cap and Trade and Offset. The Cap and Trade transaction mechanism is a system in which the government has set a "Cap," which is the maximum limit of carbon emissions for companies in a particular sector. If a company produces emissions below the permit limit, they can sell to other companies that exceed the emission limit. Meanwhile, the Offset mechanism is a system that involves companies offsetting their emissions by investing in environmental companies.

There has been a lot of research on carbon trading and its transaction mechanisms in Indonesia, with a focus on the effectiveness of the mechanisms and legal and religious perspectives. There are a number of studies that highlight this effectiveness, such as comparing the two mechanisms of carbon tax and cap and trade in emission reduction efforts and examining their legal position in Indonesia (Putra, Nabilla, & Jabanto, 2021). The results of these studies show that both carbon tax and cap and trade have their own advantages and disadvantages in the context

of reducing emissions in Indonesia, and highlight the importance of clear legal policy support for their implementation. There is research that examines the carbon trading mechanism from the perspective of maqashid sharia, which finds that carbon trading not only functions as an instrument for reducing emissions, but also as a mechanism for achieving sustainable economic growth. The integration of maqashid syariah principles in carbon trading is considered to support environmental sustainability, improve community welfare, and create social justice (Hidayanto, Hasan, & Sidik, 2023). From existing studies, it appears that research on carbon trading in Indonesia not only discusses technical and legal aspects but also begins to pay attention to ethics and social sustainability through the integration of religious values in its practice.

However, several existing studies still have limitations in terms of a lack of in-depth focus on Islamic law in the Cap and Trade and Offset carbon trading mechanisms in Indonesia from the perspective of fiqh muamalah. Therefore, this study aims to fill this gap by reviewing carbon ownership rights and the calculation of carbon traded in Cap and Trade and offset mechanisms, as well as ensuring that these transactions are in accordance with sharia principles.

This study proposes the hypothesis that the cap and trade and offset transaction mechanisms in carbon trading have the potential to be in line with the principles of muamalah fiqh if they fulfill the aspects of fairness, certainty of carbon ownership rights, and transparency in emission calculations. Strong arguments are needed to justify carbon ownership rights under Sharia, considering that carbon is not a conventional physical asset and the challenge of ensuring there is no *gharar* in determining the value of carbon. If these two mechanisms are in line with Sharia objectives such as protecting the environment, economic justice, and public welfare. Therefore, the carbon trading mechanism not only meets Islamic law criteria but also has the potential to become a strategic means of achieving sustainable development. This study will test this validity by comparing the rules of muamalah fiqh contracts and the actual implementation of carbon trading in Indonesia.

RESEARCH METHOD

This study uses a descriptive qualitative approach to review the cap and trade and carbon offset trading mechanisms in Indonesia that are in accordance with Sharia contract rules. This approach aims to ensure the validity of Sharia values such as justice (*Adl*), blessing (*Barakah*), and avoidance of uncertainty (*Gharar*). Research data was obtained from literature analysis covering journal articles, official reports, and related institutional websites.

Data was collected through secondary sources, including policy documents such as Indonesia's NDC and Presidential Regulation No. 98/2021. Academic literature related to carbon trading and muamalah fiqh, as well as a systematic review of previous studies, was also used to identify *gaps in* the literature. This study applies normative-sharia analysis with the parameters of carbon ownership as *mal* (*milkiiyah*), contract validity, and avoidance of *gharar*. This study integrates technical analysis of carbon trading with sharia principles, particularly in justifying non-physical carbon ownership rights and the transparency of the Cap and Trade and Offset mechanisms, which were still limited in previous studies.

FINDINGS AND DISCUSSION

Regulation and Implementation of Carbon Trading in Indonesia

Carbon trading regulations in Indonesia were only announced in 2021, just before COP26 was held in Glasgow. the Indonesian government released Presidential Regulation (Perpres) No. 98 of 2021 concerning the Implementation of Carbon Economic Value to Achieve Nationally Determined Contribution Targets and Greenhouse Gas Emission Control in National Development (Regulation of the President of the Republic of Indonesia, 2021). The Perpres coordinates reduction and adaptation actions as the two main ways to address climate change.

The enactment of this regulation brings a breath of fresh air to the development of carbon trading in Indonesia. Broadly speaking, the Carbon Economic Value (NEK) mechanism will be implemented through carbon trading, result-based payments, and carbon taxes. This regulation mandates the establishment of a carbon market through cap and trade and offsets, administrative sanctions for exceeding emission limits in Article 13, and the delegation of authority to the Ministry of Environment and Forestry (LHK) and Bappenas for project verification. Regarding the carbon trading mechanism, the regulation separates companies that have greenhouse gas (GHG) emission limits and those that do not emit GHG. Companies with GHG emission limits will be included in the Cap and Trade carbon trading mechanism, while companies without limits will be subject to the Emissions Offset mechanism. The industrial sectors required to participate in this regulation are the energy, transportation, waste management, manufacturing, agriculture, and forestry sectors.

The development of carbon trading in Indonesia has gone through several important phases that show significant progress in policy frameworks and implementation. Initially, Indonesia adopted international mechanisms such as the Clean Development Mechanism (CDM), Joint Crediting Mechanism (JCM), and Verified Carbon Standard (VCS) to reduce emissions through low-carbon technology and forest conservation projects (REDD+). A Monitoring, Reporting, and Verification (MRV) system was also established to ensure the accuracy of emissions data (Annur, 2023). The next phase initiated voluntary carbon trading, specifically in the electricity industry, including an initiative from *the Indonesian Community Derivatives Exchange* (ICDX) to make carbon an official trading commodity.

In terms of regulation, the government has issued several policies such as Law No. 32 of 2009 concerning Environmental Protection and Management, Government Regulation No. 46 of 2017 concerning Environmental Economic Instruments, and most recently Presidential Regulation No. 98 of 2021 concerning Carbon Economic Value Management. The enactment of these policies will strengthen the legal structure of carbon trading in Indonesia (Annur, 2023). The implementation of carbon trading in Indonesia began with a market-based mechanism since the Kyoto Protocol, such as CDM (*Clean Development Mechanism*), JCM (*Joint Credit Mechanism*), and VCS (*Verified Carbon Standard*). Then, a carbon MRV system was developed as part of the 2007 Bali Action Plan, where the application of this system can be used as a reference in the Cap and Trade mechanism, which was implemented in the electricity sector in 2018. Subsequently, the Offsetting scheme was implemented in the Mentaya project, a peatland restoration and conservation project managed by PT Rimba Makmur Utama in

Central Kalimantan Province, covering an area of 157,875 hectares. The program generates an average of 7.5 million certified carbon credits annually, equivalent to the emissions of 2 million cars per year (Katingan Project, n.d.).

Furthermore, the Ministry of Energy and Mineral Resources (ESDM) conducted a voluntary carbon market pilot project in 2021 in the electricity sector, applying a cap and trade mechanism. The latest development is that the Indonesia Commodity and Derivatives Exchange (ICDX), a futures exchange that provides a market for commodities and their derivatives in physical and financial product forms, has plans to make carbon one of the commodities to be traded (ICDX Group, 2020). It can therefore be understood that Indonesia's carbon trading regulations, especially after Presidential Regulation No. 98 of 2021, are a major step towards controlling greenhouse gas emissions and meeting the country's climate goals.

These regulations utilize a Carbon Economic Value (NEK) system with methods such as cap and trade, offsets, and carbon taxes. The Ministry of Environment and Forestry and Bappenas play an important role in the project. Carbon trading has evolved from global programs such as CDM and REDD+ to local voluntary markets, such as pilot projects in the electricity sector and the ICDX plan. However, we still need to examine how well it works, especially how clear the rules are, how well the law is enforced, and whether the necessary support systems are in place. In the future, strengthening regulations and collaboration among stakeholders will be key to ensuring that carbon trading can contribute optimally to sustainable development in Indonesia.

Review of the *Cap and Trade* Transaction Mechanism in Fiqh Muamalah

Carbon trading is one of the global efforts to tackle climate change and reduce greenhouse gas emissions. However, establishing a carbon market has its own challenges, especially when viewed from the perspective of Islamic law. Islamic law, or sharia, has specific rules that may hinder or need to be changed when managing risk and sharia compliance in carbon trading. Studying risk management and sharia compliance in carbon trading is important to see how Islamic law rules may be compatible or incompatible.

The Indonesian carbon exchange is supervised by the OJK and operated by an authorized entity, PT BEI, through IDX Carbon. There are two types of carbon unit transactions traded, namely PTBAE-PU (allowance market) and SPE-GRK (offset market). PTBAE-PU carbon units use a quota or restriction mechanism, a system known as the Cap and Trade mechanism, which is common in non-voluntary carbon exchanges (Centre, 2022). In this system, the government sets a cap on the amount of pollutant emissions released by a company. Companies that exceed this cap can purchase carbon units from other companies that have not exceeded their emission limits. In practice, carbon transactions are recorded on Greenhouse Gas Emission Reduction Certificates (SPE-GRK), which serve as proof of ownership of verified emission reduction rights. The calculation of carbon credits refers to the Reducing Emissions from Deforestation and Forest Degradation Plus scheme, known as REDD+. This scheme is equipped with MRV (*Monitoring, Reporting, Verification*) activities for GHG emissions to determine the baseline/initial emissions as the basis for calculation (Centre, 2022). First, in the measurement stage, a company/project sector is directly assigned an emission quota, for example, a power generation company is given an emission quota of 50,000 tons of CO₂/year. It turns out that in its operations, the company only produces 45,000 tons of CO₂, so it has a surplus of 5,000 tons of CO₂ that can be converted into carbon credits and receive SPE-GRK

that can be traded. Meanwhile, other company sectors that exceed the "Cap" of 55,000 tons of CO₂/year must purchase 5,000 tons of carbon credits from the first company. Then, the results of this measurement are verified to ensure their accuracy and then recorded in the MRV system.

Given that carbon is an invisible commodity that is traded, this raises questions from the perspective of Islamic jurisprudence. In Islam, the conditions of traded goods must be clear and tangible. Considering that carbon is an intangible right in the form of emission reductions that have no physical form, this raises the question of whether these transactions contain elements of *Gharar* (uncertainty) or not. However, there is a strict MRV system that is monitored by independent bodies, and carbon credits that are traded must be certified by international certification bodies such as Verra and Gold Standard. This is emphasized by Riza Suarga, Chair of the Indonesian Carbon Trading Association (APERKARIA), who said that carbon credits cannot be sold without certification because what is being sold is the ability to absorb carbon, which depends on the integrity of the project, the clarity of surveillance, and the avoidance of hoaxes (Wulandari, 2023). Therefore, with the MRV system and strict certification in carbon trading, it can be considered valid from a muamalah perspective because there is protection from elements of *gharar* and *maysir* (excessive speculation).

At the 2025 National Conference of Alim NU Ulama, the chair of the Bahtsul Masail Waqi'iyah Commission, KH Muhammad Cholil Nafis, stated that Cap and Trade transactions in carbon trading are permissible and valid under the *Bai al-Huquq al-Ma'nawiyyah* transaction pattern (Jannah, 2025). The concept of *Bai al-Huquq al-Ma'nawiyyah* refers to the buying and selling of intangible rights or rights that do not have physical form but have economic value and benefits that are in accordance with Islamic law. *Ba'i* literally means "buying and selling," which is the exchange of property for property based on mutual consent between both parties. In muamalah fiqh literature, the objects of buying and selling are not limited to tangible goods, but also include rights that provide benefits, such as copyrights, patents, leases, and rights to certain transferable benefits. Ownership or possession is a relationship between humans and property established by sharia that provides specificity that allows one to derive benefits or dispose of the property in ways that are justified and established by sharia. Meanwhile, *Huquq* means rights, and *Ma'nawiyyah* means immaterial or non-physical (Fahmi Al-Amruzi, 2016).

In the development of contemporary fiqh, intangible rights such as patent rights, copyrights, and rights to emission reductions are recognized as assets (mal) that have economic value and can be traded. Decisions by a number of fiqh authorities, including the results of the 2025 NU National Conference, state that the sale and purchase of intangible rights is permissible and valid as long as it meets the conditions and requirements of a sale and purchase agreement applicable in sharia. These conditions include a clear and transferable object, a valid contract, and no elements of *gharar* (uncertainty), *riba* (usury), or *maisir* (speculation) (Jannah, 2025).

Thus, Indonesia's Cap and Trade carbon trading mechanism, which is supervised by the OJK and implemented by IDX Carbon, is in line with Islamic law principles through a transparent and measurable system such as MRV and international certification. With strict regulatory oversight and clear contracts, these transactions are considered valid under Sharia law. The Cap and Trade transaction scheme applied is also in accordance with the *ijarah* and *Bai al-Huquq*

al-Ma'nawiyyah contracts, where the right to reduce emissions as an intangible asset is recognized as property that can be traded as long as it meets sharia requirements.

Review of the Offset Transaction Mechanism in Fiqh Muamalah

The Offset Mechanism is a carbon emission compensation scheme where companies that do not have mandatory emission limits can purchase carbon credits from emission reduction projects such as reforestation, forest conservation (REDD+), or renewable energy (Broekhoff, Gillenwater, Colbert-Sangree, & Cage, 2019). Simply put, it is an investment by a company that needs carbon credits in environmental projects. This mechanism has been implemented in a project in Kalimantan, where the Katingan Mentaya Project's carbon trading scheme involves selling carbon credits both domestically and internationally to companies that produce carbon in excess of the specified limit (offsetting). Companies that engage in offsetting invest in conservation through renewable energy, biodiversity preservation, and other NBS projects. Shell, one of the world's largest multinational oil and gas companies, is fulfilling the UN's "drive-neutral" campaign program by purchasing carbon credits from this project (Centre, 2022).

The implementation of offset transactions is similar to the cap-and-trade transaction process, which also involves an MRV (*Monitoring, Reporting, Verification*) scheme. From a fiqh muamalah perspective, offset transactions are categorized as a form of *bai' al-Huquq al-Ma'nawiyyah* or the sale and purchase of immaterial rights. Although offset carbon credits are not physical in nature, these rights have economic value and tangible benefits that can be legally traded according to Islamic law. Along with the legal decision on Cap and Trade transactions resulting from the 2025 National Conference of Nahdlatul Ulama (NU) Scholars, it was confirmed that the sale and purchase of carbon credits, both in the cap and trade and offset mechanisms, is valid under the *bai' al-Huquq al-Ma'nawiyyah* transaction pattern because both are sales and purchases of rights that have clear financial value and benefits. The main requirement that must be met is clarity of the transaction object, namely that carbon credits must be measurable and officially recorded through a national registration system and have undergone a rigorous independent verification process.

Offset sale and purchase agreements require the avoidance of elements of gharar (uncertainty), riba (interest), and maysir (gambling). Uncertainty can arise if the emission reduction project that is the basis for obtaining credits cannot be proven in real terms or cannot be scientifically or legally justified. Therefore, the implementation of the MRV system by independent validators and verifiers is crucial to ensure that the emission reductions targeted by the offset are accurately measured. Government regulations such as Presidential Regulation No. 98 of 2021 and Minister of Environment and Forestry Regulation No. 1131 of 2023 regulate the governance and certification of carbon credits to maintain the integrity of the Indonesian carbon market (A'la, 2024).

In addition to the legal aspects of transactions, the offset mechanism is also in line with the objectives of maqashid sharia, namely to protect the interests of the people and preserve the environment (hifzh al-bi'ah). By helping to reduce greenhouse gas emissions, offsets contribute to nature conservation and sustainability, which is part of humanity's responsibility as stewards of the earth according to Islam. Overall, the offset transaction mechanism in carbon trading is acceptable in fiqh as a sale and purchase of intangible rights that is valid and in

accordance with sharia, as long as it meets the requirements of a clear, transparent, and strictly supervised contract to avoid ambiguity and speculation. Strengthening regulations, educating market participants, and sharia supervision are key to ensuring that the offset mechanism runs effectively and provides optimal benefits for the environment and sustainable development in Indonesia.

Recommendations for Developing Sharia Standards for Carbon Trading

Based on an analysis of regulations, mechanisms, and a review of fiqh muamalah on carbon trading in Indonesia, a number of important recommendations have emerged so that the Indonesian carbon market can be run optimally, fairly, and in line with sharia principles. First, it is necessary to strengthen regulations and supervision of the entire carbon trading process, both in the cap and trade and offset mechanisms. These regulations must ensure that every transaction is supported by a transparent and credible MRV (Monitoring, Reporting, Verification) system, as well as carbon credit certification by internationally recognized independent institutions such as Verra and Gold Standard. This is important to prevent the emergence of gharar (uncertainty) and maisir (excessive speculation) in transactions, as emphasized by Riza Suarga, Chair of the Indonesian Carbon Trading Association (APERKARIA), who asserted that carbon credits are only valid for trading if they have been strictly certified and verified, so that the integrity of the project and the clarity of its benefits are maintained.

Second, the government and relevant authorities such as the OJK and the Ministry of Environment and Forestry need to strengthen their synergy with fatwa institutions and national religious authorities. This is so that sharia compliance standards in the carbon market can be adopted comprehensively, including in the drafting of technical regulations and the supervision of transactions. Third, Sharia education and literacy for all carbon market participants must be improved. Many businesses and members of the public do not yet fully understand the principles of muamalah fiqh related to the sale and purchase of intangible rights, as well as the importance of avoiding gharar, riba, and maisir in every transaction. This effort can be carried out through training, socialization, and the development of sharia standards that are easy to understand and implement by market participants. Nisa Uljanah, an Islamic law researcher, also highlights the need to integrate sharia principles into carbon market regulations and practices in order to minimize sharia compliance risks and increase investor confidence (Uljanah, 2024).

Fourth, the establishment of a special Sharia Supervisory Board for carbon trading is highly recommended. This board is tasked with ensuring that all carbon transactions are conducted in accordance with sharia principles, conducting regular sharia audits, and providing fatwas or recommendations on new issues that arise in carbon market practices. In addition, this board can also act as a mediator in the settlement of disputes related to sharia aspects. Strengthening collaboration between the government, market authorities, certification bodies, and religious authorities is key to ensuring that carbon trading in Indonesia is not only effective in reducing emissions but also contributes to achieving sustainable development that is fair and in accordance with Islamic teachings.

CONCLUSION

Based on a fiqh muamalah review of the *Cap and Trade* and *Offset* transaction mechanisms in Indonesian carbon trading, it is concluded that both mechanisms are valid as *Bai' al-Huquq al-Ma'nawiyyah* because the right to reduce emissions

qualifies as a non-physical asset (*mal*) that can be traded in accordance with sharia contracts, as long as it avoids *gharar*, *riba*, and *maysir*. This validity has been confirmed in the 2025 NU National Conference Decision, which requires strict certification and verification. The MRV (*Monitoring, Reporting, Verification*) system, together with Indonesian regulations (Presidential Regulation No. 98/2021), plays a vital role in ensuring the transparency of transaction objects and eliminating uncertainty (*gharar*), supported by OJK supervision and administrative sanctions. This mechanism is also in line with the *maqashid syariah* through its contribution to environmental protection (*hifzh al-bi'ah*) and social justice, particularly by funding conservation projects (REDD+) that realize the role of humans as *khalifah*. The main challenges include the complexity of calculating emissions, the risk of *gharar* if the MRV system is weak, and the limited sharia literacy of market participants. To optimize its potential as a strategic instrument for sustainable development, policy recommendations include the establishment of a special Sharia Supervisory Board, synergy between authorities (OJK, KLHK, MUI/LBM NU), and increased education on the principles of fiqh muamalah.

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