



Carbon Credit Trading: A Juridical and Fiqh Muamalah Review

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Abstract

This paper examines carbon credit trading from both juridical and fiqh muamalah perspectives. Carbon trading as promoted under the Kyoto Protocol and the Paris Agreement, has become a strategic instrument for mitigating climate change by assigning value to verified emission reductions. As interest in environmental finance grows, assessing its alignment with Islamic legal principles is increasingly important. This study employs a qualitative library research method using a descriptive-analytical approach. Data sources include national and international laws, classical and contemporary Islamic legal texts, and academic journal articles relevant to the topic. The findings show that, from a juridical perspective, the Emission Reduction Purchase Agreement (ERPA) positions carbon credit trading within the framework of civil law, especially in contract and property law domains. From the fiqh muamalah perspective, carbon trading can be interpreted through the concept of *ijarah bi al-manfa'ah*, where the tradable benefit is the certified reduction of emissions. In this context, countries or companies engaged in reforestation or low-emission initiatives provide measurable environmental services to higher-emission entities, who compensate them financially. The study concludes that carbon credit trading, when implemented with transparency and fairness, aligns with both legal and sharia principles. The novelty of this research lies in its integrative analysis, offering a conceptual bridge between modern environmental policy and Islamic commercial jurisprudence, providing insights for regulators, Islamic finance institutions, and policy-makers seeking to develop sharia-compliant environmental instruments.

Keywords: *fiqh muamalah, carbon credits, trade, juridical*

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1. INTRODUCTION

In recent decades, the issue of climate change has become a global problem that needs to be addressed as stated by Woodward¹, Siriwardana and Nong², Michaelowa et al³. Dubois et al⁴, Woerdman dan Nentjes⁵, dan Zhao et al⁶ stated that efforts to reduce greenhouse gas (GHG) emissions have become a major focus at various levels, from individual, regional, national and international levels. This problem certainly requires a solution so that it can be resolved immediately. Among the schemes rolled out in addressing this problem as stated by Prihatiningtyas dkk⁷, Azizi et al⁸, Wakabayasi and Kimura⁹ is carbon trading, also known as Credit Carbon Trading.

Credit carbon trading is one of the outcomes of the 1997 Tokyo Protocol, which came into effect in 2005.¹⁰ 192 countries have committed to this protocol, with the aim of reducing emissions.¹¹ The United Nations body that deals with climate change (UNFCCC) suggests three ways and schemes in an effort to unravel global climate problems, namely: Clean Development Mechanism (CDM), Joint Implementation (JI), Emissions Trading.¹²

The discussion on carbon trading has become a crucial issue in the global agenda to address climate change.¹³ This is due to the growing awareness of the urgency of environmental protection. A multidimensional approach is becoming increasingly important, including religious and legal perspectives. In this context, views from fiqh muamalah and positive law are expected to provide rich and relevant insights.

¹ Alistair Woodward, "Climate Change: Disruption, Risk and Opportunity," *Global Transitions* 1 (2019): 44–49, doi:10.1016/j.glt.2019.02.001.

² Mahinda Siriwardana and Duy Nong, "Nationally Determined Contributions (NDCs) to Decarbonise the World: A Transitional Impact Evaluation," *Energy Economics* 97, no. December 2017 (2021): 105184, doi:10.1016/j.eneco.2021.105184.

³ Axel Michaelowa, Igor Shishlov, and Dario Brescia, "Evolution of International Carbon Markets: Lessons for the Paris Agreement," *Wiley Interdisciplinary Reviews: Climate Change* 10, no. 6 (2019): 1–24, doi:10.1002/wcc.613.

⁴ Ghislain Dubois et al., "It Starts at Home? Climate Policies Targeting Household Consumption and Behavioral Decisions Are Key to Low-Carbon Futures," *Energy Research and Social Science* 52, no. January (2019): 144–58, doi:10.1016/j.erss.2019.02.001.

⁵ Edwin Woerdman and Andries Nentjes, "Emissions Trading Hybrids: The Case of the EU ETS," *Review of Law and Economics* 15, no. 1 (2019), doi:10.1515/rle-2014-0054.

⁶ Fuquan Zhao et al., "Carbon Emission Reduction Strategy for Energy Users in China," *Sustainability (Switzerland)* 12, no. 16 (2020): 1–19, doi:10.3390/su12166498.

⁷ Wilda Prihatiningtyas et al., "Perspektif Keadilan Dalam Kebijakan Perdagangan Karbon (Carbon Trading) Di Indonesia Sebagai Upaya Mengatasi Perubahan Iklim," *Jurnal Ilmu Hukum* 7, no. 2 (2023): 163–86, <https://doi.org/10.24246/jrh.2022.v7.i2.p163-186>.

⁸ Nur Azizi MJ, Akbar Kurnia Putra, and Bernard Sipahutar, "Perdagangan Karbon: Mendorong Mitigasi Perubahan Iklim Diantara Mekanisme Pasar Dan Prosedur Hukum," *Jurnal Selat* 10, no. 2 (2023): 91–107, doi:10.31629/selat.v10i2.4853.

⁹ Masayo Wakabayashi and Osamu Kimura, "The Impact of the Tokyo Metropolitan Emissions Trading Scheme on Reducing Greenhouse Gas Emissions: Findings from a Facility-Based Study," *Climate Policy* 18, no. 8 (2018): 1028–43, doi:10.1080/14693062.2018.1437018.

¹⁰ Jörgen Larsson et al., "International and National Climate Policies for Aviation: A Review," *Climate Policy* 19, no. 6 (2019): 787–99, doi:10.1080/14693062.2018.1562871.

¹¹ Lea S. Svenningsen, "Social Preferences for Distributive Outcomes of Climate Policy," *Climatic Change* 157, no. 2 (2019): 319–36, doi:10.1007/s10584-019-02546-y.

¹² Wakabayashi and Kimura, "The Impact of the Tokyo Metropolitan Emissions Trading Scheme on Reducing Greenhouse Gas Emissions: Findings from a Facility-Based Study."

¹³ Robyn Clark, James Reed, and Terry Sunderland, "Bridging Funding Gaps for Climate and Sustainable Development: Pitfalls, Progress and Potential of Private Finance," *Land Use Policy* 71, no. August 2017 (2018): 335–46, doi:10.1016/j.landusepol.2017.12.013.

Fiqh muamalah is a branch of Islamic law that regulates economic transactions and interactions,¹⁴ while positive law is the legal framework that governs the social and economic order in a country.¹⁵ Both play a crucial role in understanding how carbon trading operates dynamically. By combining these two views, it is hoped that a comprehensive understanding of the sustainability and compatibility of carbon trading with religious and legal principles can be found. Through this holistic review, it is hoped that ideas and recommendations will emerge that consider the ethical, legal, and economic aspects of dealing with the challenges of climate change through carbon trading mechanisms.

Importantly, in terms of the context of fiqh muamalah, carbon trading will shed light on justice and fair dealing between the parties involved. Concepts such as *ijab* and *qabul* (offer and acceptance), *'adl* (fairness), and *gharar* (unintended uncertainty) become relevant in evaluating carbon trading transactions. In addition, principles such as *maslahah* (benefit) and *mafsadah* (harm) are also important considerations in assessing the positive and negative impacts of carbon trading on society and the environment. These are the important subject matters of fiqh muamalah.¹⁶ It can be briefly described that this discussion will look at how carbon trading can be conceptualized within the framework of fiqh muamalah, identifying critical aspects that need to be considered, such as carbon pricing, fair trading mechanisms, and distribution of proceeds.

From a positive law perspective, carbon trading should be harmonized with existing regulatory frameworks, including environmental, trade and tax laws. The positive law review also needs to consider aspects such as sustainability, transparency, and accountability in the implementation of carbon trading. In addition, it will explore how laws and regulations govern carbon trading in terms of licensing, reporting, and enforcement against violations or matters that fall within the scope of existing laws and regulations in Indonesia.¹⁷

Comparative analysis between the perspectives of fiqh muamalah and positive law will help uncover similarities and differences in views and approaches to carbon trading. With a deeper understanding of the ethical, economic, and legal implications of carbon trading within these two frameworks, policy recommendations based on the principles of justice, sustainability and the common good can be developed.

With a good understanding of carbon trading through the lens of fiqh muamalah and laws and regulations, it is hoped that a more sustainable and inclusive solution to the climate change crisis can be found. The harmony between religious values, social justice and legal frameworks can be the right foundation for collective efforts to create a more just future for the next generation. It is also hoped to make a valuable contribution to the cross-disciplinary understanding of carbon trading, as well as broaden our horizons on how religious and legal principles can be applied to address the pressing challenges of climate change.

¹⁴ Aang Asari and Muhammad Irkham Firdaus, "Comparison of Rahn Contract from the Perspective of Islamic Law and Indonesian Guarantee Law," *Journal of Islamic Economics Lariba* 8, no. 2 (2022): 255–70, doi:10.20885/jielariba.vol8.iss2.art1.

¹⁵ Fazlurrahman Syarif, "Regulatory Framework for Islamic Financial Institutions: Lesson Learnt between Malaysia and Indonesia," *Journal of Halal Product and Research* 2, no. 2 (2019): 79–85, doi:10.20473/jhpr.vol.2-issue.2.79-85.

¹⁶ Muhammad Rifky Santoso and Andri Soemitra, "Fiqh Muamalah in Shariah Multifinance Company: Literature Study," *Jurnal Ilmiah Ekonomi Islam* 8, no. 02 (2022): 1134–44.

¹⁷ Erna Meike Naibaho, "Tinjauan Hukum Dalam Perdagangan Karbon Kredit" (Universitas Indonesia, 2011).

Previously there have been studies related to the buying and selling of carbon credits found by researchers including: Ade Bebi Irama, with research results that there are opportunities for non-tax revenues ranging from Rp51 trillion to Rp180 trillion during the carbon emission reduction program.¹⁸ Nur Azizi MJ, et al with the results of his research that referring to the 2015 UNFCCC Paris Agreement, it was found that there were no clear rules regarding the global mechanism for setting carbon prices. As a result, market competition has become unhealthy, especially between developed and developing countries.¹⁹ Ren et al., with the results of their research that China's green finance industry is growing rapidly, and there is an increase in the green finance sector. green finance development index, as well as the increasing use of non-fossil energy, contributes to a decrease in carbon intensity.²⁰

From several previous studies, not found at the time this article was created, so this paper will try to elaborate in more detail about the concept of Credit Carbon Trading in the context of fiqh muamalah and positive law so that with this approach, a more comprehensive insight will be obtained.

This research employs a qualitative library research approach using descriptive-analytical methods.²¹ The literature analysed in this study includes laws and regulations, classical and contemporary Islamic legal texts, as well as national and international journal articles published within the last ten years that are relevant to carbon trading, Islamic commercial law (fiqh muamalah), and civil legal systems. The inclusion criteria emphasise sources that provide conceptual clarity on the mechanism and legal status of carbon trading, either from the juridical or Islamic legal perspective. In examining these materials, the research applies a comparative approach to identify the compatibility of carbon credit trading with both sharia principles and positive law. This includes exploring legal concepts such as agreement (akad), ownership (milk), and benefit (manfa'ah) in Islamic law, and comparing them with principles of contract and property in civil law. Through this method, the paper aims to present a coherent understanding of how carbon credit trading is viewed and assessed normatively by both legal traditions.

2. DISCUSSION

2.1 *Carbon Credit Trading and its Scope*

Second level headings are typed in boldface with capital first letters (like the subsection heading of this paragraph). This template is used when writing the full paper, headers and footers will be set automatically. Authors are only asked to replace the "XXX" number (with the real number assigned once the abstract was accepted) on the header of the first page to set a unique page number. The discussion of carbon credit trading is a new one in Indonesia. Historically, however, carbon credit trading has long been recognized abroad. It was first recognized in the United States in 1967 and 1970 under the name emission trading which aimed to reduce the rate of air pollution in the

¹⁸ Ade Bebi Irama, S.E., M.B.A., "Perdagangan Karbon Di Indonesia: Kajian Kelembagaan Dan Keuangan Negara," *Info Artha* 4, no. 1 (2020): 83–102, doi:10.31092/jia.v4i1.741.

¹⁹ Azizi MJ, Kurnia Putra, and Sipahutar, "Perdagangan Karbon: Mendorong Mitigasi Perubahan Iklim Diantara Mekanisme Pasar Dan Prosedur Hukum."

²⁰ Xuedi Ren, Qinglong Shao, and Ruoyu Zhong, "Nexus between Green Finance, Non-Fossil Energy Use, and Carbon Intensity: Empirical Evidence from China Based on a Vector Error Correction Model," *Journal of Cleaner Production* 277 (2020): 122844, doi:10.1016/j.jclepro.2020.122844.

²¹ Sugiyono, *Metode Penelitian Bisnis: Pendekatan Kuantitatif, Kualitatif, Kombinasi, Dan R&D* (Bandung: CV. Alfabeta, 2017).

country. The concept used in the trading mechanism is Cap and Trade (C&T).²² Carbon trading has been gaining popularity since it was introduced at the 3rd UNFCCC (United Nations Framework Convention on Climate Change) conference in Tokyo, known as the Kyoto Protocol. This was based on the success of the US in implementing Cap & Trade (C&T) in reducing the increasing rate of air pollution in the country.²³ In addition, the emergence of carbon credits is based on climate change which is increasing every year and requires joint participation from all groups to participate in handling it even though the handling is different.

Carbon credit trading is the practice of trading units of carbon credits that represent the reduction or avoidance of one ton of carbon dioxide emissions or the equivalent of other greenhouse gas emissions.²⁴ Tampubolon further explained that carbon credit trading is the practice of buying and selling carbon credit certificates, where what is traded is not carbon or pollutant gas itself, but efforts to control or reduce carbon emissions (which are recorded in carbon credit certificates).²⁵ So in essence, in carbon credit trading, it is not gas or carbon emissions that are traded but certificates for the availability of emission credits that are still less than the specified limit or ownership of certificates for carbon emission reductions for a particular country.

In the Tokyo Protocol agreement, there are 3 agreement schemes related to the parties that can transact in carbon trading activities, it is stated that this carbon trade can transact not only from the government but the company or private parties can also be involved, as stated by CIFOR in Naibaho²⁶ a) Transactions between government and government (Government to Government), b) Transactions between private parties and government (Private to Government) c) Transactions between private parties and private (Private to Private).

There are 20 carbon trading schemes currently in place and Cap and trade is the most widely used,²⁷ this scheme is also applied in Indonesia and has begun to be tested in 2021 in the PLTU project by the Ministry of Energy and Mineral Resources.²⁸ In the Kyoto Protocol, participating countries are categorized into two groups, namely the Annex I or Annex B group and the Non-Annex group. Annex I or Annex B groups are developed countries that are required to reduce carbon emissions termed as Cap. Non-Annex is a country that is not required to reduce emissions but is asked for its commitment in contributing to the reduction of greenhouse gas emissions called trade.²⁹

The UNFCCC has determined that there are three schemes for reducing carbon emissions from Annex I or Annex B countries: Emission Trading, Clean Development Mechanism (CDM), and Joint Implementation (JI).³⁰ The following is an explanation of each scheme.

²² Zhao et al., "Carbon Emission Reduction Strategy for Energy Users in China."

²³ Naibaho, "Tinjauan Hukum Dalam Perdagangan Karbon Kredit."

²⁴ Wyatt Thompson et al., "The US Biofuel Mandate as a Substitute for Carbon Cap-and-Trade," *Energy Policy* 113, no. October 2017 (2018): 368–75, doi:10.1016/j.enpol.2017.10.041.

²⁵ Rossi Tampubolon, "Perdagangan Karbon: Memahami Konsep Dan Implementasinya," *STANDAR: Better Standard Better Living* 1, no. 3 (2022): 25–29, <http://majalah.bsilhk.menlhk.go.id/index.php/STANDAR/article/view/32>.

²⁶ Naibaho, "Tinjauan Hukum Dalam Perdagangan Karbon Kredit."

²⁷ Veronica Caciagli, *Emission Trading Schemes and Carbon Markets in the NDCs: Their Contribution to the Paris Agreement, Climate Change Management*, 2018, doi:10.1007/978-3-319-72874-2_31.

²⁸ Tampubolon, "Perdagangan Karbon: Memahami Konsep Dan Implementasinya."

²⁹ Claudio Vergara Valderrama et al., "Designing an Environmental Supply Chain Network in the Mining Industry to Reduce Carbon Emissions," *Journal of Cleaner Production* 254 (2020), doi:10.1016/j.jclepro.2019.119688.

³⁰ Kai Kang et al., "Bi-Objective Inventory Allocation Planning Problem with Supplier Selection and Carbon Trading under Uncertainty," *PLoS ONE* 13, no. 11 (2018): 1–25, doi:10.1371/journal.pone.0206282.

2.1.1 Emission Trading

If a developed country produces greenhouse gas (GHG) emissions below the permitted limit, it can sell excess emissions to other developed countries that cannot meet their obligations. This scheme is called emission trading. The regulation on emission trading is written in Article 17 of the Kyoto Protocol. In emission trading, there is a term called AAU (Assignment Amount Unit) which means the maximum allowed carbon unit. When exceeding this limit, the country or company is obliged to buy from companies that have a difference below the AAU or countries that fall into the non-Annex category.³¹ Carbon trading takes place in carbon markets or carbon exchanges. There are two types: Compliance Market (official market) and Voluntary Market (voluntary market). Compliance Market is a type of market whose regulations follow the official regulations that have been officially set by the state or internationally. Voluntary Market is a type of market that operates outside of national and international regulations, this type is built with the aim of supporting the reduction of carbon emissions on a voluntary basis. So, in general, it can be concluded that Compliance Market is built based on compliance with existing regulations and Voluntary Market is built on a voluntary basis.

2.1.2 Joint Implementation

Joint Implementation (JI) is one of the flexible mechanisms stipulated in Article 6 of the Kyoto Protocol. JI provides an opportunity for Annex I countries of the Kyoto Protocol to reduce or limit emissions by obtaining Emission Reduction Units (ERUs) from emission reduction projects or emission absorption from other developed countries.³²

2.1.3 Clean Development Mechanism

The Kyoto Protocol explains that the Clean Development Mechanism (CDM) is a mechanism to reduce greenhouse gas emissions by involving the participation of developing countries in cooperation with developed countries. This mechanism is regulated in Article 12 of the Kyoto Protocol.³³ The basic principle of CDM projects is the principle of additionality, which means that CDM projects must provide significant added value to both the environment and the economy. This principle is essential to ensure that a project can be considered a CDM project. Under this principle, the project should be compared to a no project (BAU) scenario. The difference between the BAU scenario and the emission reductions achieved by the CDM project will issue Certified Emission Reductions (CERs).

In practice, carbon trading can not only provide economic benefits by providing an additional source of revenue for non-Annex countries and companies that have lower than permitted emissions, but it can also help reduce the rate of increase in carbon emissions.³⁴ However, carbon trading also raises several problems, such as:³⁵ a) Some experts see that the CDM program does not result in increased carbon sequestration as promised in the development projects, b) There is a potential for double counting in CDM projects where both parties involved claim that they contribute to carbon sequestration in a CDM project, c) The focus on carbon credits can shift attention from the original goal

³¹ Tampubolon, "Perdagangan Karbon: Memahami Konsep Dan Implementasinya."

³² Zhao et al., "Carbon Emission Reduction Strategy for Energy Users in China."

³³ Caciagli, *Emission Trading Schemes and Carbon Markets in the NDCs: Their Contribution to the Paris Agreement*.

³⁴ Woodward, "Climate Change: Disruption, Risk and Opportunity."

³⁵ Naibaho, "Tinjauan Hukum Dalam Perdagangan Karbon Kredit."

of reducing carbon emissions, so that the program can be considered as a business that prioritizes economic benefits and even become a legitimization tool for environmental pollution, d) There is a risk of fraud in new investments due to the difficulty of controlling and assessing these projects. Carbon trading is often associated with SMF (Secondary Mortgage Fund) which is considered as the main factor causing the financial crisis, e) REDD (Reducing Emissions from Deforestation and Forest Degradation) is only considered as a new mechanism to commercialize forests.

2.2 Carbon Credit Trading in a Legal Perspective

In the view of law, carbon credits will be studied from several perspectives because the existence of ERPA (Emission Reduction Purchase Agreement) which means an agreement between the seller and buyer of carbon credits shows that carbon credit trading is related to civil law aspects. Some legal studies in carbon credit trading are as follows:

2.2.1 Legal Aspects of Civil Property

The disagreement over the legal character of carbon credits, whether as a commodity or currency, is an interesting issue because the rules governing carbon credit trading are not clear on this point. As it evolves, the view on the nature of the object of carbon credits is more likely to be *sui generis*.³⁶ A more in-depth discussion of the provisions of the definition of carbon credits, consisting of 4 (four) main elements, namely:³⁷ a) Right to emit b) A specified substance c) Of a certain quantity d) Restriction over a defined period.

Although carbon credit trading is in practice subject to the international public law framework and the rights and obligations arising from ERPA, where the applicable law in these agreements is generally foreign law, it is important to discuss the property aspects of carbon credits from the perspective of property law regulation in Indonesia. Property law (*zakenrecht*) is a collection of legal rules concerning objects regulated in Book II of the Civil Code, namely articles 499 to 1232 of the Civil Code. The regulatory system is closed, which means that a person cannot create new property rights other than those regulated in Book II of the Civil Code or the Law. The reasons put forward by the doctrine of property law are as follows:³⁸ a) Property law does not recognize the principle of "freedom of contract" (Article 1338) as found in Book III of the Civil Code. b) Property law is generally coercive. c) Property law is absolute, which means that it gives the owner the right to defend the right against the claims of other parties. d) Property rights can be fought against individual rights (rights that only apply and can only be defended against the opposing party in the agreement).

Based on the above explanation and given the absence of a law specifically regulating carbon credits, it can be concluded that carbon credits are not objects in the sense of property law in Indonesia. However, when viewed from the theory of the properties of property that make it an object of law, carbon credits have property properties. The general principles of the law of things include:³⁹ a) Having binding legal force (*dwingendrecht*), which means that the rules that apply according to the law must

³⁶ Jillian Button, "Carbon: Commodity or Currency? The Case for an International Carbon Market Based on the Currency Model," *Harvard Environmental Law Review* 32, no. 2 (2008): 571–96.

³⁷ *Ibid.*

³⁸ Frieda Husni Hasbullah, *Hukum Kebendaan Perdata Hak-Hak Yang Memberi Kenikmatan* (Jakarta: Ind Hill Co, 2002) hal 32-33.

³⁹ *Ibid.* hal 34-39

be obeyed, b) Can be transferred, c) Has individuality, which means that it is tangible and is a single unit, not objects that are determined by type and number, d) The principle of totality, e) Indivisibility, f) The principle of priority, g) The principle of mixing, h) Different arrangements and treatment of movable and immovable objects, i) The principle of publicity relating to the announcement of the ownership status of an object, j) Property Agreements that result in the transfer of property rights.

The material properties of carbon credits include:⁴⁰ a) Individuality, where carbon credits are a unit of measurement of a country's emission reduction efforts and results. Each unit of carbon credit (i.e. CER in the CDM scheme) has a unique serial number and can be traded at a certain value (price). b) Publicity principle, because in the CDM scheme there is a CER registration process that makes it accessible to the public via the internet, so that CER or carbon credit can be considered as an object that can be seen by others, which is contained in the CDM registration system, starting from the temporary account managed by the CDM implementing agency to the Project Participant account (Holding Account).

2.2.2 Legal Aspects of Binding/Agreement (Indonesia)

According to the Civil Code, an agreement is an act in which one or more people agree to be bound by one or more other people. This creates a legal relationship between the parties involved and is referred to as an engagement. The law of agreements applies an open legal system that provides freedom to make agreements with any content if it does not violate public order and decency. This system contains the principle of freedom to make contracts, which is emphasized in the Civil Code article 1338 paragraph (1) which states that every agreement made legally applies as law to the parties who make it. This article emphasizes that all types of agreements are permitted and binding for the parties who make them as stipulated in the law.

In an Agreement, the elements contained in it can be divided into several groups, namely: a) Essential elements, which are elements that must exist in an Agreement, without which an Agreement is impossible, b) Natural elements, which are elements regulated by law but can be changed or eliminated by the parties, c) Accidental elements, which are elements added by the parties and are not regulated by law.

Based on the above explanation, the provisions, or articles in the ERPA can be classified as follows: Essential elements in the ERPA include provisions on carbon credit price, project price/value, and carbon credit volume. Natural elements in the ERPA include provisions on carbon credit ownership, agreement termination, dispute resolution, and Force majeure. Accidental elements in the ERPA include provisions regarding administrative costs in the agreement, as well as guarantees agreed by the parties to reduce risks arising from the agreement.

An agreement will be said to be valid, if it fulfills four conditions, namely:⁴¹ a) an agreement between the parties involved, which means that the subjects making the agreement want the same thing reciprocally, with consent given freely. Consent is not considered valid if it is given under duress, mistake, or fraud (Article 1321 of the Civil Code), b) capacity to make an agreement, which means that the party making the agreement must be capable under the law. Article 1330 of the Civil Code explains that minors, persons placed under guardianship, and persons who are prohibited by law from making certain agreements, are not considered capable of making agreements, c) the

⁴⁰ Ibid., hal 34-39

⁴¹ J Satrio, *Hukum Perjanjian* (Bandung: PT Citra Aditya Bakti, 1992).hal 57

existence of a certain thing, which means that only tradable goods can be the subject of the agreement (Article 1332 of the Civil Code), d) halal, which is a cause that does not conflict with law, decency, or public order (Article 1337 of the Civil Code).

Considering these requirements, there are potential differences of opinion in considering the ERPA as a valid agreement. For example, there is uncertainty regarding carbon credits as the object of the agreement, or the ERPA is considered valid because Indonesia has ratified the Kyoto Protocol as the legal basis for carbon credit trading. Agreements can be classified into two types,⁴² which helps to understand the diverse characteristics of existing agreements. First, named agreements, which are agreements with specific names and limited in number, such as sale and purchase and lease. Second, unnamed agreements are agreements without a specific name and unlimited in number. ERPAs fall into the category of nominee agreements because usually the contents of ERPAs are not only about buying and selling carbon credits, but also involve the financing of certain projects that are the source of carbon credits. Although carbon credit is one of the objects of the agreement, in property law it is not yet considered as an object due to the closed nature of property law.

2.3 Carbon Credit Trading in the Perspective of Fiqh Muamalah

2.3.1 Carbon Credit Tashawwur

Carbon credits are a relatively new concept; therefore, from the fiqh perspective, a clear tashawwur is necessary that can explain the case so that the right approach can be given to the case, here are some points related to carbon credits.⁴³

First, production process that result in gas and pollution. Carbon credits are closely related to the term's emissions, combustion, smoke, environmental pollution, carbon, carbon credits, carbon trading, and the like. So, carbon emission means the gas produced by burning chemical compounds that contain carbon dioxide (CO₂) compounds, such as diesel, coal, and similar fuels. So, carbon emissions are like smoke from burning garbage or carbon dioxide, from factories burning coal or fuel, and from vehicle exhausts burning fuel. All of these pollute the environment and endanger health.

Second, the government requires reimbursement. Companies are allowed by the authority to emit carbon emissions in their industrial processes. For example, if a company is engaged in producing chemical products, it is allowed to emit a certain level. One unit of carbon credit is equal to 1 ton of carbon dioxide (CO₂) emission reduction. Carbon credits are a form of entitlement for a company to produce a certain amount of carbon emissions or other greenhouse gases during its operations.

Third, the way the company or entity does the offsetting. (1) On the other hand, green lands such as forests produce oxygen and can be used as compensation for the emissions produced. For example, if company A owns 10 hectares of forest in Kalimantan, its forest will produce carbon credits worth IDR 10 million. Then company B, which causes air pollution (emissions), buys carbon credits through A for Rp 10 million. If the transaction is done manually, then A who owns the forest sells the carbon credit to company B, then company B transfers the amount of Rp 10 million. (2) To facilitate understanding, carbon credits can be explained with equivalents and illustrations. For example, a company that cuts down trees to make the forest deforested must be compensated by reforestation. Reforestation is a natural and manual way.

⁴² Ibid., hal 132

⁴³ Oni Syahroni, "Kredit Karbon, Bolehkah?," *Republika*, 2024, <https://republika.id/posts/50422/kredit-karbon-bolehkah>. diakses 15 Februari 2024 jam 11.22 WIB

Another way is to buy carbon credits generated by green lands. (3) If the transaction in the above example is carbon trading, the carbon is now listed as a security on the commodity exchange so that companies can purchase or transact through the exchange.

Fourth, by way of trading, carbon trading is the process of buying and selling carbon credits, where the buyer can emit carbon emissions more than a set limit. How carbon trading works can be explained as follows. a) Emissions Trading Scheme (ETS), also known as cap-and-trade system, is generally mandatory and regulates the carbon market with a cap on carbon emissions set by the government. Under this scheme, traded emissions are for future emissions. Participants include organizations, companies, and countries, with emission reduction obligations implemented through an initial quota allocation. Participants must report their emissions periodically and at the end of the period, participants that exceed the limit can purchase additional quota from other participants that have remaining quota, and vice versa. b) Carbon Credit Trading Schemes, also known as baseline and crediting or carbon offset systems, do not require an initial quota as the commodity is the certified result of carbon emission reductions from emission reduction projects. One unit of carbon credit is usually equivalent to one ton of CO₂ reduction. In this scheme, the value of the credit is earned at the end of the period and can be sold to meet emission reduction targets or achieve a carbon neutral or zero emission position.

2.4 Perspective of Fiqh Muamalah

Fiqh in language means understanding. Prophet Musa had said in his prayer:

وَاحْلُلْ عُقْدَةً مِنْ لِسَانِي. يَفْقَهُوا قَوْلِي.

“Remove the stiffness from my tongue. That they may understand my words” (Surah Tāha: 27-28)

The Prophet Muhammad Shallallahu 'alaihi wasallam once prayed for Ibn Abbas:⁴⁴

اللهم فقهه في الدين .

“Ya Allah, *faqqihhu* in religion, which means make him understand the religion”.

So, Allah granted the prophet's prayer, with this Ibn Abbas became the most knowledgeable person about the Quran.⁴⁵

Al-faqīh for the Arabs means, one who is knowledgeable, everyone who is knowledgeable about something is a *faqih*.⁴⁶ So it can be concluded that *fiqh* in language means understanding and knowing something.⁴⁷

While *fiqh* according to the term conveyed by Syafi'i is:

العلم بالأحكام الشرعية العملية المكتسب من أدلتها التفصيلية

“The knowledge of the laws of sharia al amaliyah taken from detailed arguments.”⁴⁸

Muamalah in language: mutual action in meeting their respective needs: *fiqh muamalah* as stated by Ibdalsyah and Hendry Tanjung is the rules of Allah that regulate humans as social creatures in all their worldly affairs.⁴⁹ Within the scope of *muamalah*, there are principles that underlie the *muamalah*, which are as follows: Mubah principle,

⁴⁴ Muhammad bin Ismail bin Ibrahim bin Indra Al-Bukhari, *Shahih Bukhori* (Beirut: Dar Ibn Katsir, 1987).

⁴⁵ Umar Sulaiman Al-Asyqar, *Al-Madkhol Ila Al-Syariah Wa Al-Fiqh Al-Islami* (Yordania: Dar al-Nafas, 2005).

⁴⁶ al- Imam Ibnu Al-Manzhur, *Lisan Al-Arab* (Arab Saudi: Wizarah al- Syuun al-Islamiyah, n.d.).

⁴⁷ Muhammad Haj, *Al-Madkhol Li Dirasah Al-Syari'ah Al-Islamiyyah*, 3rd ed. (Mogadishu: Dar al-Ilm, 2015).

⁴⁸ Wahbah al-Zuhaili, *Fiqh Islam Wa Adillathu*, 2nd ed. (Damaskus: Dar al-Fikr, 1985).

⁴⁹ Ibdalsyah and Tanjung Hendri, *Fiqh Muamalah, Konsep Dan Praktek* (Bogor: Azam Dunya Bogor, 2014).

Halal principle, Maslahah principle, Benefit principle, Willingness principle, Balance principle, Trust principle, Written principle, and Justice principle.⁵⁰ Another area of discussion will be the determination of possible contracts in carbon trading.

2.5 Focus of Fiqh Muamalah Research on the Sale and Purchase of Carbon Credits

The fiqh muamalah research on carbon credit trading in this article focuses on transactions that encourage action to tackle climate change. This is not only limited to the management of existing forests, but more broadly, includes initiatives to expand forest areas in various countries around the world. The Clean Development Mechanism (CDM) is one strategy through which industrialized countries can implement emission reduction projects in developing countries. The carbon reduced through CDM projects is then quantified and validated in the form of certificates known as Certified Emission Reduction (CER). It is these CER certificates that become the object of carbon trading, better known as Carbon Trading. As such, this study seeks to delve deeper into the sharia aspects of carbon credit trading, particularly in the context of forest development and CDM implementation, as a concrete step in response to global climate change.

2.5 Carbon Credit Buy-Sell Object Standard

In the context of reducing the negative impacts of air pollution and mitigating global warming, carbon credits have emerged as a crucial mechanism that aims to facilitate the transition towards more sustainable environmental practices. Carbon credits, as a market instrument designed to compensate greenhouse gas emissions, should be rooted in real initiatives that contribute to substantial emission reductions.⁵¹ In this case, the ideal object of carbon credit sales would be concrete efforts that limit or reduce atmospheric carbon emissions. This approach criticizes the practice of allowing entities to purchase carbon credits to 'buy out' of their responsibility to reduce emissions, especially when such purchases are not followed by significant emissions reduction efforts.

On the other hand, forestry companies, agricultural landowners, and entities implementing conservation and reforestation projects can play a vital role in global warming reduction efforts. Through activities such as replanting, sustainable forest management and renewable energy initiatives, these entities contribute directly to the reduction or sequestration of CO₂ emissions from the atmosphere.⁵² These activities not only generate carbon credits through the reduction of greenhouse gas emissions but also support the restoration and preservation of forest ecosystem functions, which is a critical component of the global strategy to address climate change. Through this approach, carbon credits become more than just a financial instrument; they are transformed into an important tool for environmental conservation and global sustainability.

Within the framework of sale and purchase contracts and *ijarah* in Islamic law, the object of the transaction (*māl*) is one of the fundamental pillars that must be fulfilled. Each of

⁵⁰ Talitha Nabila, Neneng Nurhasanah, and Adam Agus Putra Panji, "Tinjauan Fikih Muamalah Terhadap Jual Beli Emas Online," in *Prosiding Hukum Ekonomi Syariah*, vol. 7, 2021, 234–38, <http://dx.doi.org/10.29313/syariah.v0i0.27764>.

⁵¹ Dian Ratnawati, "Indonesian Treasury Review Carbon Tax Sebagai Alternatif Kebijakan Mengatasi Eksternalitas Negatif Emisi Karbon Di Indonesia," *Indonesian Treasury Review Jurnal Perbendaharaan, Keuangan Negara Dan Kebijakan Publik* 1, no. 2 (2016): 53–67, doi:<https://doi.org/10.33105/itrev.v1i2.51>.

⁵² Eko Komara et al., *Kajian Mekanisme Benefit Sharing Fcpf Carbon Fund Untuk Pendanaan Desa Hijau Di Kalimantan Timur* (Jakarta: Penabulu Foundation, 2017).

these pillars is bound by certain conditions for the validity of the transaction, where the existence and clarity of the object of the transaction is the main requirement.⁵³ Therefore, the importance of a specific certification body in the context of reducing climate change impacts through forest management practices emphasizes that such certification must explicitly and significantly contribute to climate change mitigation. This certification serves as a verification mechanism that ensures that positive effects on the environment, particularly in the reduction of carbon emissions, can be accurately identified, measured, and accounted for, thus qualifying the existence of a clear and beneficial contract object in the context of Islamic muamalah.

2.5 Takyif Fiqh on the Sale and Purchase of Carbon

In the context of fiqh muamalah, a valid object of sale must meet several basic criteria, including that it must be clear (*ma'lūm*), have benefits (*nāfi'*), and be halal.⁵⁴ Carbon credit trading, although intangible, can be classified as a trade of benefit (*manfa'ah*), aligning with the principles of an ijarah contract.

However, it is important to address a key issue: in typical ijarah, the benefit originates from a tangible good or a service actively rendered. In carbon trading, the benefit is not from something actively done by the seller, but rather from not doing something harmful, such as avoiding deforestation or refraining from emitting carbon. This raises a question of validity: can non-action (*imsak*) or preservation efforts be the subject of an ijarah?

According to several contemporary scholars such as Wahbah Zuhaili and the Fiqh Academy (*Majma' al-Fiqh al-Islami*), the benefit (*manfa'ah*) in ijarah does not necessarily have to be tied to physical service, but may also include rightful use, access, or legal entitlements as long as they are measurable, deliverable, and clearly defined.⁵⁵ In this case, carbon credits represent the benefit of environmental preservation that has been certified and quantified (e.g., one ton of CO₂ avoided), which has value in both regulatory and market systems. This preservation is not a mere absence of action, but an outcome of deliberate environmental stewardship.

A concrete example: a reforestation company that has planted 1,000 hectares of forest receives certification of having sequestered 10,000 tons of CO₂ per year. These credits can then be traded with a manufacturing company that exceeds its emission quota. What is being "rented" or "transferred" is not the tree or the air itself, but the benefit of emission reduction achieved by the seller. Thus, the transaction can be viewed within an ijarah bi al-manfa'ah framework, in which the manfa'ah is emission reduction service, quantified and delivered through carbon credit certificates.

Moreover, the concept of al-'iwadh (compensation) in Islamic contracts allows for innovation as long as there is no gharar (excessive uncertainty), zulm (injustice), or riba (usury). In this carbon trade structure, the elements of ijarah are arguably fulfilled: there is a clear contract (*akad*), a specific benefit (*manfa'ah*), agreed compensation (*ujrah*), and both parties have legal capacity.^{56,57} Therefore, the structure aligns with

⁵³ Mushthafa al Bugha, Mushthafa al Khin, and Ali Asy-Syarbaji, *Al Fiqh Al Manhaji Ala Mazhab Al Imam Al Syafi'i*, 13th ed. (Damaskus: Dar al-Qalam, 2012).

⁵⁴ Wahbah al-Zuhaili, *Fiqh Islam Wa Adillathu*.

⁵⁵ Abdul Jalil, "Global Warming Dan Carbon Trading Perspektif Fiqh," *Jurnal Sains Dan Edukasi Sains* 12, no. 1 (2012): 195–218, doi:10.21154/al-tahrir.v12i1.53.

⁵⁶ Muhammad Furqon Almurni, "Takyif Fiqh Pulsa Dan Aplikasinya Terhadap Convert Pulsa Menjadi Saldo Bank Dan E-Money," *Yurisprudencia: Jurnal Hukum Ekonomi* 9, no. 1 (2023): 1–23.

⁵⁷ Wahbah al-Zuhaili, *Fiqh Islam Wa Adillathu*.

maqasid al-shariah by promoting environmental protection (masalah ‘ammah) and preventing harm (mafsadah).

3. CONCLUSION

Carbon credit trading, as introduced through the Kyoto Protocol and ratified in the Paris Agreement, presents a novel economic mechanism for addressing climate change by assigning value to carbon emission reductions. From a juridical perspective, this mechanism is linked to civil law principles through the Emission Reduction Purchase Agreement (ERPA), which reflects elements of contract and property law. Simultaneously, from the viewpoint of fiqh muamalah, carbon credit trading may be classified under the *ijarah bi al-manfa’ah* framework, wherein the traded benefit measured as reduced carbon emissions is acknowledged as a form of legitimate and compensable utility (*manfa’ah*). Although the benefit in this context does not result from direct services or tangible goods, contemporary Islamic legal reasoning supports the permissibility of exchanging environmental services that have been verified and quantified. This position also aligns with the maqāsid al-sharī’ah in promoting public welfare (*maṣlahah*) and preventing harm (*mafsadah*), especially in environmental preservation efforts. The comparative analysis conducted in this study affirms the potential compatibility between Islamic jurisprudence and civil legal norms in governing modern environmental trade mechanisms such as carbon markets.

Nevertheless, this study is subject to several limitations. It is conceptual in nature and does not include empirical data or case studies from industry stakeholders, regulatory institutions, or sharia advisory councils. It also does not elaborate on the divergence of opinions across Islamic legal schools or regional implementation challenges. Future research should address these gaps by exploring stakeholder perceptions, legal operationalisation in Muslim-majority jurisdictions, and the readiness of Islamic financial institutions to adopt such instruments. As a practical recommendation, governments and Islamic finance regulators are encouraged to develop clear, contextual sharia frameworks for environmental finance, including guidelines for carbon credit certification and permissible trading mechanisms. Institutions such as national fatwa councils may also consider issuing legal opinions (*fatāwā*) to ensure broader acceptance and compliance. These steps are necessary to integrate carbon markets into ethical Islamic finance models and to ensure that environmental preservation efforts are carried out in a manner that is both legally sound and religiously principled.

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5. REFERENCES

- al- Imam Ibnu Al-Manzhur. *Lisan Al-Arab*. Arab Saudi: Wizarah al- Syuun al-Islamiyah, n.d.
- Almurni, Muhammad Furqon. “Takyif Fiqh Pulsa Dan Aplikasinya Terhadap Convert Pulsa Menjadi Saldo Bank Dan E-Money.” *Yurisprudencia: Jurnal Hukum Ekonomi* 9, no. 1 (2023): 1–23.

- Asari, Aang, and Muhammad Irkham Firdaus. "Comparison of Rahn Contract from the Perspective of Islamic Law and Indonesian Guarantee Law." *Journal of Islamic Economics Lariba* 8, no. 2 (2022): 255–70. doi:10.20885/jielariba.vol8.iss2.art1.
- Azizi MJ, Nur, Akbar Kurnia Putra, and Bernard Sipahutar. "Perdagangan Karbon: Mendorong Mitigasi Perubahan Iklim Diantara Mekanisme Pasar Dan Prosedur Hukum." *Jurnal Selat* 10, no. 2 (2023): 91–107. doi:10.31629/selat.v10i2.4853.
- Bugha, Mushthafa al, Mushthafa al Khin, and Ali Asy-Syarbaji. *Al Fiqh Al Manhaji Ala Mazhab Al Imam Al Syafi'i*. 13th ed. Damaskus: Dar al-Qalam, 2012.
- Button, Jillian. "Carbon: Commodity or Currency? The Case for an International Carbon Market Based on the Currency Model." *Harvard Environmental Law Review* 32, no. 2 (2008): 571–96.
- Caciagli, Veronica. *Emission Trading Schemes and Carbon Markets in the NDCs: Their Contribution to the Paris Agreement*. *Climate Change Management*, 2018. doi:10.1007/978-3-319-72874-2_31.
- Clark, Robyn, James Reed, and Terry Sunderland. "Bridging Funding Gaps for Climate and Sustainable Development: Pitfalls, Progress and Potential of Private Finance." *Land Use Policy* 71, no. August 2017 (2018): 335–46. doi:10.1016/j.landusepol.2017.12.013.
- Dian Ratnawati. "Indonesian Treasury Review Carbon Tax Sebagai Alternatif Kebijakan Mengatasi Eksternalitas Negatif Emisi Karbon Di Indonesia." *Indonesian Treasury Review Jurnal Perbendaharaan, Keuangan Negara Dan Kebijakan Publik* 1, no. 2 (2016): 53–67. doi:https://doi.org/10.33105/itrev.v1i2.51.
- Dubois, Ghislain, Benjamin Sovacool, Carlo Aall, Maria Nilsson, Carine Barbier, Alina Herrmann, Sébastien Bruyère, et al. "It Starts at Home? Climate Policies Targeting Household Consumption and Behavioral Decisions Are Key to Low-Carbon Futures." *Energy Research and Social Science* 52, no. January (2019): 144–58. doi:10.1016/j.erss.2019.02.001.
- Eko Komara, Sardi Winata, Rokhmad Munawir, and Rado Puji Santoso. *Kajian Mekanisme Benefit Sharing Fcpf Carbon Fund Untuk Pendanaan Desa Hijau Di Kalimantan Timur*. Jakarta: Penabulu Foundation, 2017.
- Haj, Muhmmad. *Al-Madkhol Li Dirasah Al-Syari'ah Al-Islamiyyah*. 3rd ed. Mogadishu: Dar al-Ilm, 2015.
- Hasbullah, Frieda Husni. *Hukum Kebendaan Perdata Hak-Hak Yang Memberi Kenikmatan*. Jakarta: Ind Hill Co, 2002.
- Ibdalsyah, and Tanjung Hendri. *Fiqh Muamalah, Konsep Dan Praktek*. Bogor: Azam Dunya Bogor, 2014.
- Irama, S.E., M.B.A., Ade Bebi. "Perdagangan Karbon Di Indonesia: Kajian Kelembagaan Dan Keuangan Negara." *Info Artha* 4, no. 1 (2020): 83–102. doi:10.31092/jia.v4i1.741.
- Jalil, Abdul. "Global Warming Dan Carbon Trading Perspektif Fiqh." *Jurnal Sains Dan Edukasi Sains* 12, no. 1 (2012): 195–218. doi:10.21154/al-tahrir.v12i1.53.
- Kang, Kai, Wei Pu, Yanfang Ma, and Xiaoyu Wang. "Bi-Objective Inventory Allocation Planning Problem with Supplier Selection and Carbon Trading under Uncertainty." *PLoS ONE* 13, no. 11 (2018): 1–25. doi:10.1371/journal.pone.0206282.
- Larsson, Jörgen, Anna Elofsson, Thomas Sterner, and Jonas Åkerman. "International and National Climate Policies for Aviation: A Review." *Climate Policy* 19, no. 6 (2019): 787–99. doi:10.1080/14693062.2018.1562871.
- Michaelowa, Axel, Igor Shishlov, and Dario Brescia. "Evolution of International Carbon

- Markets: Lessons for the Paris Agreement.” *Wiley Interdisciplinary Reviews: Climate Change* 10, no. 6 (2019): 1–24. doi:10.1002/wcc.613.
- Muhammad bin Ismail bin Ibrahim bin Indra Al-Bukhari. *Shahih Bukhori*. Beirut: Dar Ibn Katsir, 1987.
- Nabila, Talitha, Neneng Nurhasanah, and Adam Agus Putra Panji. “Tinjauan Fikih Muamalah Terhadap Jual Beli Emas Online.” In *Prosiding Hukum Ekonomi Syariah*, 7:234–38, 2021. <http://dx.doi.org/10.29313/syariah.v0i0.27764>.
- Naibaho, Erna Meike. “Tinjauan Hukum Dalam Perdagangan Karbon Kredit.” Universitas Indonesia, 2011.
- Prihatiningtyas, Wilda, Suparto Wijoyo, Indria Wahyuni, and Zuhda Mila Fitriana. “Perspektif Keadilan Dalam Kebijakan Perdagangan Karbon (Carbon Trading) Di Indonesia Sebagai Upaya Mengatasi Perubahan Iklim.” *Jurnal Ilmu Hukum* 7, no. 2 (2023): 163–86. <https://doi.org/10.24246/jrh.2022.v7.i2.p163-186>.
- Ren, Xuedi, Qinglong Shao, and Ruoyu Zhong. “Nexus between Green Finance, Non-Fossil Energy Use, and Carbon Intensity: Empirical Evidence from China Based on a Vector Error Correction Model.” *Journal of Cleaner Production* 277 (2020): 122844. doi:10.1016/j.jclepro.2020.122844.
- Santoso, Muhammad Rifky, and Andri Soemitra. “Fiqh Muamalah in Shariah Multifinance Company: Literature Study.” *Jurnal Ilmiah Ekonomi Islam* 8, no. 02 (2022): 1134–44.
- Satrio, J. *Hukum Perjanjian*. Bandung: PT Citra Aditya Bakti, 1992.
- Siriwardana, Mahinda, and Duy Nong. “Nationally Determined Contributions (NDCs) to Decarbonise the World: A Transitional Impact Evaluation.” *Energy Economics* 97, no. December 2017 (2021): 105184. doi:10.1016/j.eneco.2021.105184.
- Sugiyono. *Metode Penelitian Bisnis: Pendekatan Kuantitatif, Kualitatif, Kombinasi, Dan R&D*. Bandung: CV. Alfabeta, 2017.
- Svenningsen, Lea S. “Social Preferences for Distributive Outcomes of Climate Policy.” *Climatic Change* 157, no. 2 (2019): 319–36. doi:10.1007/s10584-019-02546-y.
- Syahroni, Oni. “Kredit Karbon, Bolehkah?” *Republika*. 2024. <https://republika.id/posts/50422/kredit-karbon-bolehkah>.
- Syarif, Fazlurrahman. “Regulatory Framework for Islamic Financial Institutions: Lesson Learnt between Malaysia and Indonesia.” *Journal of Halal Product and Research* 2, no. 2 (2019): 79–85. doi:10.20473/jhpr.vol.2-issue.2.79-85.
- Tampubolon, Rossi. “Perdagangan Karbon: Memahami Konsep Dan Implementasinya.” *STANDAR: Better Standard Better Living* 1, no. 3 (2022): 25–29. <http://majalah.bsilhk.menlhk.go.id/index.php/STANDAR/article/view/32>.
- Thompson, Wyatt, Robert Johansson, Seth Meyer, and Jarrett Whistance. “The US Biofuel Mandate as a Substitute for Carbon Cap-and-Trade.” *Energy Policy* 113, no. October 2017 (2018): 368–75. doi:10.1016/j.enpol.2017.10.041.
- Umar Sulaiman Al-Asyqar. *Al-Madkhol Ila Al-Syariah Wa Al-Fiqh Al-Islami*. Yordania: Dar al-Nafais, 2005.
- Valderrama, Claudio Vergara, Ernesto Santibanez-González, Bruno Pimentel, Alfredo Candia-Véjar, and Linda Canales-Bustos. “Designing an Environmental Supply Chain Network in the Mining Industry to Reduce Carbon Emissions.” *Journal of Cleaner Production* 254 (2020). doi:10.1016/j.jclepro.2019.119688.
- Wahbah al-Zuhaili. *Fiqh Islam Wa Adillathu*. 2nd ed. Damaskus: Dar al-Fikr, 1985.
- Wakabayashi, Masayo, and Osamu Kimura. “The Impact of the Tokyo Metropolitan Emissions Trading Scheme on Reducing Greenhouse Gas Emissions: Findings

- from a Facility-Based Study.” *Climate Policy* 18, no. 8 (2018): 1028–43. doi:10.1080/14693062.2018.1437018.
- Woerdman, Edwin, and Andries Nentjes. “Emissions Trading Hybrids: The Case of the EU ETS.” *Review of Law and Economics* 15, no. 1 (2019). doi:10.1515/rle-2014-0054.
- Woodward, Alistair. “Climate Change: Disruption, Risk and Opportunity.” *Global Transitions* 1 (2019): 44–49. doi:10.1016/j.glt.2019.02.001.
- Zhao, Fuquan, Feiqi Liu, Han Hao, and Zongwei Liu. “Carbon Emission Reduction Strategy for Energy Users in China.” *Sustainability (Switzerland)* 12, no. 16 (2020): 1–19. doi:10.3390/su12166498.