

Analysis of the Role of Green Sukuk in Supporting the National Energy Transition: An Islamic Economic Perspective

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Abstract

Sukuk occupies a strategic position as a Sharia-compliant financial instrument that supports national development. The dynamics of modern times have encouraged sukuk to evolve into a more innovative instrument, paving the way for the emergence of green sukuk as a form of sustainable financing. This study focuses on the role of green sukuk in supporting the national energy transition from the perspective of Islamic economics. It aims to analyze the contribution of green sukuk to renewable energy projects, evaluate its alignment with Sharia principles, and identify implementation challenges as well as opportunities for further development. A qualitative approach using a literature review method was chosen for data collection. All information is derived from secondary data obtained through various scholarly sources, including academic journals and other relevant literature. This method is appropriate because the research is conceptual in nature and does not require direct field data. The findings indicate that green sukuk plays a significant role in financing environmentally friendly projects, particularly those related to renewable energy, while also offering economic, social, and ecological benefits that align with Sharia principles. However, its implementation still faces several obstacles, such as low public literacy, limited institutional capacity in assessing environmental risks, and a wide climate financing gap. Despite these challenges, green sukuk holds considerable potential to become a key instrument in advancing sustainable development in Indonesia.

Keywords: green sukuk, islamic economics, renewable energy

Introduction

Sukuk occupies a strategic position as a Sharia-compliant financial instrument that supports the advancement of national development. Sukuk is a long-term Islamic investment instrument in which the issuer is obligated to provide returns to investors through Sharia-based mechanisms such as profit-sharing or fees. The dynamics of contemporary development have encouraged sukuk to evolve into a more modern instrument, paving the way for the emergence of green sukuk as an innovation in sustainable financing (Putra, Hiljannah, Desfiansyah, & Sarjono, 2023). Green Sukuk was first introduced in 2018 as part of Indonesia's commitment to reducing greenhouse gas emissions (UNDP, 2018). This issuance was the first of its kind in the world and marked a significant milestone in the expansion of green financing. By 2020, the total issuance value of Green Sukuk had reached approximately 3.24 billion (UNDP, 2018).

This instrument is considered aligned with national objectives, as the funds raised are specifically allocated to development projects that emphasize environmental considerations. Consequently, Green Sukuk has become one of the key mechanisms supporting Indonesia's efforts to address the challenges of climate change (Pujiantoro, Dindalila, & Fakhrudin, 2021). Green Sukuk is a bond instrument that adheres to Sharia principles, in which 100% of the proceeds are allocated to financing environmentally friendly projects that contribute to climate change mitigation, climate change adaptation, and biodiversity conservation. The issuance of Green Sukuk is estimated to contribute to the reduction of greenhouse gas emissions by approximately 10.3 million tons of carbon dioxide equivalent (CO_{2e}). Funds raised through Green Sukuk have been utilized to support various climate mitigation initiatives in Indonesia, including the development of sustainable transportation, renewable energy, and waste management systems (Putra et al., 2023). The emergence of Green Sukuk also represents a response to the increasing demand for financing aligned with the Sustainable Development Goals (SDGs), while serving as a vehicle for mobilizing capital toward climate-friendly investments. Projects financed through this instrument have been shown to support SDG achievement and address both environmental and social challenges. Furthermore, Green Sukuk strengthens Indonesia's efforts to advance sustainable development and address environmental issues by channeling funds into renewable energy projects. All financing activities are aligned with Sharia principles and the objectives of *maqāṣid al-sharī'ah*, ensuring that the supported projects not only deliver environmental benefits but also contribute to societal well-being and the preservation of natural resources (Kurnia & Suwita, 2024).

Research on Green Sukuk using a literature review approach has been widely conducted by previous scholars. Several studies have examined the contribution of Green Sukuk to achieving the Sustainable Development Goals (SDGs) in Indonesia (Kurnia & Suwita, 2024), as well as its role in promoting sustainable national development (Putra et al., 2023). Unlike earlier studies, the present research specifically focuses on the role of Green Sukuk in supporting the national energy transition from an Islamic economic perspective. The objectives of this study are to analyze the contribution of Green Sukuk to the financing of renewable energy projects, assess its alignment with Sharia principles, and identify the implementation challenges and development opportunities associated with this instrument.

Methods

This study employs a qualitative approach using a literature review method as the basis for data collection. All information is derived from secondary sources obtained through various written references, such as scholarly journals, books, encyclopedias, official reports, and other literature relevant to the research focus. This method is selected because the study is conceptual in nature and does not require direct field data collection. The stages of the literature review include selecting the topic, identifying relevant sources, extracting key information, and organizing the findings in a systematic manner.

The collected data are analyzed using content analysis and qualitative descriptive techniques. Information from the literature is reduced, categorized according to thematic discussions, and then presented in a coherent narrative. Through this analytical process, the study aims to address several key questions, namely the contribution of green sukuk to financing the national energy transition, its alignment with the principles of Islamic economics, and the challenges and opportunities encountered in optimizing its issuance.

Results

The Contribution of Green Sukuk to Renewable Energy Projects

As a country with the largest Muslim population in the world, Indonesia possesses significant potential for the development of Islamic finance. Its demographic landscape, dominated by a productive-age population, serves as an important asset for the growth of this sector. The high demand potential presents strategic opportunities for Islamic finance to play a role in supporting national development. The issuance of green sukuk was initially driven by increasing environmental degradation, the rising frequency of natural disasters, and the growing impacts of climate change in Indonesia. Indonesia's geographical characteristics as a tropical country with two seasons make it particularly vulnerable to various disasters, such as floods, landslides, droughts, and forest fires. These conditions encouraged the government to introduce innovative financing instruments to address environmental issues more systematically (Grahesti, Nafii'ah, & Pramuningtyas, 2022).

In support of the sustainable development agenda and the achievement of the SDGs, the Indonesian government introduced green sukuk as a Sharia-compliant investment instrument specifically designed to finance environmentally friendly projects (Suwanan, Munir, & Merlinda, 2022). This instrument is considered highly relevant given Indonesia's vulnerability to the impacts of climate change. Green sukuk have the potential to make a significant contribution to environmental preservation by funding non-fossil energy initiatives and various other environmental programs. Furthermore, the issuance of green sukuk enhances Indonesia's position in expanding the green financial instrument market at both the national and international levels. Its introduction creates new opportunities for the government and the private sector to secure alternative funding sources aimed at achieving a low-carbon economy. Through this mechanism, renewable energy such as solar and wind power can be utilized more effectively to meet local electricity needs (Putra et al., 2023). Green sukuk reflect economic, environmental, and Islamic values simultaneously, and they hold significant potential for addressing several existing challenges (Arfarizan, 2025). This instrument serves as a strategic source of financing amid the increasing use of natural and mineral resources for economic and infrastructure development, which may generate adverse environmental impacts (Mauliyah, Hasanah, & Hasanah, 2023). One of the key functions of green sukuk is to support Indonesia's Low Carbon Development (LCDI), known in Indonesian as *Pembangunan Rendah Karbon*. Indonesia's Low Carbon Development represents an improvement in planning tools derived from the National Action Plan for Greenhouse Gas Emission Reduction (RAN-GRK), which is regulated under Presidential Regulation of the Republic of Indonesia Number 61 of 2011 concerning RAN-GRK (Yaniza, Rachmawati, Ramadhanti, & Bimo, 2022).

Alignment of Green Sukuk with Sharia Principles

Sukuk, or Islamic bonds, are financial securities that represent proof of ownership of an asset whether tangible or intangible or ownership of a specific project that operates in accordance with Sharia principles. The fundamental basis for issuing sukuk lies in Islamic legal provisions, which stipulate that the returns received by investors must not originate from interest; instead, they are derived through profit-sharing mechanisms or Sharia-compliant fees in accordance with *Fiqh Muamalah*. In its development, green sukuk have emerged as an innovative form of sukuk specifically designed to finance environmentally friendly projects, particularly in the fields of clean energy and renewable energy. This instrument was developed

to support environmental preservation and contribute to climate change mitigation (Anjani et al., 2024 as cited in (Rahmawati & Rohmayanti, 2025)). The distinctiveness of green sukuk lies in their ability to harmonize Sharia values with environmental sustainability goals. This instrument not only provides financial returns but also delivers measurable social and ecological benefits (Wati, Rochmah, & Huda, 2025).

The Sharia structure of green sukuk in Indonesia generally utilizes the contracts of *ijarah* (leasing), *wakalah* (agency), or *mudharabah* (profit-sharing partnership). Each of these contracts is structured to ensure the absence of *riba* (interest), *gharar* (uncertainty), and *maysir* (speculation). Every issuance of green sukuk must obtain a Sharia compliance opinion from the Sharia Supervisory Board (DPS), either from the issuer's internal board or from the National Sharia Council of the Indonesian Ulema Council (DSN-MUI). This process ensures that all aspects of the instrument including contract structure, fund allocation, and the distribution of investment returns are aligned with *fiqh muamalah* and Sharia principles. The projects financed through green sukuk embody the value of public benefit (*maslahah*) as they provide tangible advantages for society while simultaneously preserving the environment. From the perspective of Islamic Economics, the green sukuk instrument represents a humanitarian effort undertaken as part of humanity's role as Allah's khalifah on earth, entrusted with protecting and sustaining nature in accordance with the teachings of the Qur'an (Mauliyah et al., 2023). Green financing serves as a concrete manifestation of the implementation of *maqashid al-shariah*, the primary objectives of Islamic law, which include the protection of life (*hifzh al-nafs*), wealth (*hifzh al-mal*), and environmental sustainability. The practices of Islamic financial institutions in channeling funds toward environmentally oriented projects are consistent with the pursuit of promoting public welfare (*maslahah 'ammah*) (Rahmad, 2023 as cited in (Rahmawati & Rohmayanti, 2025)).

Opportunities and Challenges of Green Sukuk in Indonesia

Indonesia, as the country with the largest Muslim population in the world, has significant potential to develop the Islamic financial market within the global economy. This is supported by the Global Islamic Finance Report (2018), which states that Indonesia possesses exceptional prospects for advancing its Islamic financial system. One of the Islamic financial instruments currently being strongly promoted by the government is the green sukuk. The issuance of green sukuk has received positive responses from the public, encouraging the government to consider issuing additional green sukuk in subsequent years. Most sukuk issued have been absorbed by the market and have even generated excess demand, particularly those issued by the government. Furthermore, Indonesia, as a tropical country, is considered one of the richest nations in terms of biodiversity. However, this also makes Indonesia highly vulnerable to the negative impacts of climate change. As a consequence, the demand for clean energy and energy efficiency continues to increase. Additionally, the rapid growth of Indonesia's population has led to rising demand for energy, water, transportation, urban development, and infrastructure. This significant population increase ultimately heightens the need for energy financing and greater investment to support clean energy efficiency and energy-related projects to meet future population needs (Karina, 2019 as cited in (Pujiantoro et al., 2021)).

The presence of green sukuk provides Indonesia with opportunities to expand its investor base, not only among Sharia-compliant investors but also among conventional investors who prioritize ethical and socially responsible investment. This instrument also has

the potential to support the development of sustainable alternative energy and to enhance the liquidity of sukuk instruments. Beyond offering financial benefits, green sukuk play an important role in environmental conservation, the protection of natural resources, and ecosystem restoration through the financing of long-term projects. The diversification of green project portfolios that can be financed through green sukuk allows investors to benefit from risk reduction. For the government and the private sector, green sukuk offer opportunities to raise capital that supports the transition toward a low-carbon economy, including through the utilization of renewable energy sources such as solar and wind power to meet national energy needs (Putra et al., 2023).

In relation to efforts to reduce the impacts of climate change, Indonesia has set a target to reduce greenhouse gas emissions by 29% independently, and up to 41% with international support by 2030. However, achieving these targets faces significant challenges, particularly due to a substantial financing gap. The financing needs for climate action are estimated to reach USD 247.2 billion, or approximately IDR 3,461 trillion per year, clearly indicating that the national budget is insufficient to cover the entire requirement. Therefore, innovative financial instruments such as green sukuk are crucial for bridging this funding gap and accelerating the achievement of the Sustainable Development Goals (Ministry of Finance, 2021 as cited in (Suwanan et al., 2022)). Despite their substantial potential, the implementation of green sukuk still encounters several obstacles, one of which is the low level of literacy regarding the concept of green sukuk among the general public, academics, and even work units (*satuan kerja* or *satker*) responsible for providing the underlying assets. The limited understanding among *satker* regarding the procedures for proposing green projects, particularly for projects that have not yet been initiated, creates difficulties in meeting the requirement for project-based assets, which ideally should constitute 90% of the total underlying assets (Qur'an & Akhmadi, 2025).

A number of additional challenges also hinder the development of green sukuk. It has been noted that some stakeholders still lack a comprehensive understanding of green sukuk-based business models, and many potential investors are not yet familiar with this instrument in depth. The Financial Services Authority (OJK) has identified at least five major challenges in advancing green financing. First, the limited capacity of financial institutions to identify social and environmental risks results in weak risk mitigation efforts. Second, there is a lack of policy incentives to encourage the development of environmentally friendly projects. Third, there is a mismatch between financing tenors and the characteristics of environmental projects, which generally require long-term funding. Fourth, there is inadequate availability of information regarding green projects, making it difficult for potential investors to assess investment prospects. Lastly, financial institutions and banks still have limited capacity in providing financing for sustainable projects.

Conclusion

Green sukuk represent an innovative Sharia-compliant financing instrument that plays a strategic role in supporting sustainable development in Indonesia. This instrument not only expands the Islamic financial market but also serves as an essential mechanism for funding various environmentally friendly projects, particularly in the renewable energy sector. With characteristics that align with Sharia principles and are consistent with global agendas on climate change mitigation, green sukuk are able to deliver economic, social, and ecological benefits simultaneously. The presence of green sukuk also strengthens Indonesia's position in

the international green instrument market while creating opportunities for both the government and the private sector to obtain financing for the transition toward a low-carbon economy.

Although it offers significant potential, the development of green sukuk in Indonesia still faces several challenges, including low public literacy regarding this instrument, limited capacity of financial institutions in managing social and environmental risks, and the lack of policy incentives for green projects. On the other hand, the need for financing climate-change mitigation is enormous and cannot be fully covered by the national budget alone. Therefore, green sukuk is becoming an increasingly important instrument to close this financing gap. With strengthened literacy, improved regulatory quality, and stronger support from stakeholders, green sukuk has the potential to become a key pillar in achieving sustainable development and safeguarding environmental sustainability in Indonesia.

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Conflict of interests

The author explicitly declares that there is no conflict of interest in any form throughout the conduct of the research and the preparation of this article. The author is not bound by any financial interests, employment relationships, organizational affiliations, or personal circumstances that could influence the objectivity of the study. All data utilized were analyzed independently without external influence, and all arguments, interpretations, and conclusions presented are the result of scholarly reasoning free from external pressure. Thus, the academic integrity and coherence of this article are fully preserved.

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