



The Role of Retail Green Sukuk in Advancing Green Economy Development in Indonesia: An Islamic Economic Perspective

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Article Info	Abstract
Article history: Received March 10, 2026 Revised April 13, 2026 Accepted June 27, 2026 Available online August 15, 2026 *Corresponding author email: fatkhurrohmanalbanjari@gmail.com Keywords: Green Economy, Islamic Economics, Retail Green Sukuk, Sustainable Development, Sustainable Finance.	Introduction/Main Objectives: This study examines the role of Retail Green Sukuk as a Sharia-compliant financing instrument in supporting Indonesia's Green Economy and sustainable development. Research Methods: A qualitative descriptive library research approach was used, drawing on government reports, regulations, academic literature, and official publications. Data were analyzed using the Miles and Huberman model. Finding/Results: Retail Green Sukuk supports financing for renewable energy, water conservation, green transportation, waste management, and biodiversity projects. Its implementation reflects Maqashid Sharia, Khalifah, Amanah, and Maslahah. Major opportunities include Indonesia's large Muslim population, growing Sharia investment participation, and government support, while challenges involve limited financial literacy, regulatory complexity, infrastructure constraints, high costs, and greenwashing risks. Conclusion: Retail Green Sukuk can accelerate Indonesia's low-carbon transition and strengthen sustainable Islamic finance through stronger regulation, collaboration, and public education.
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INTRODUCTION

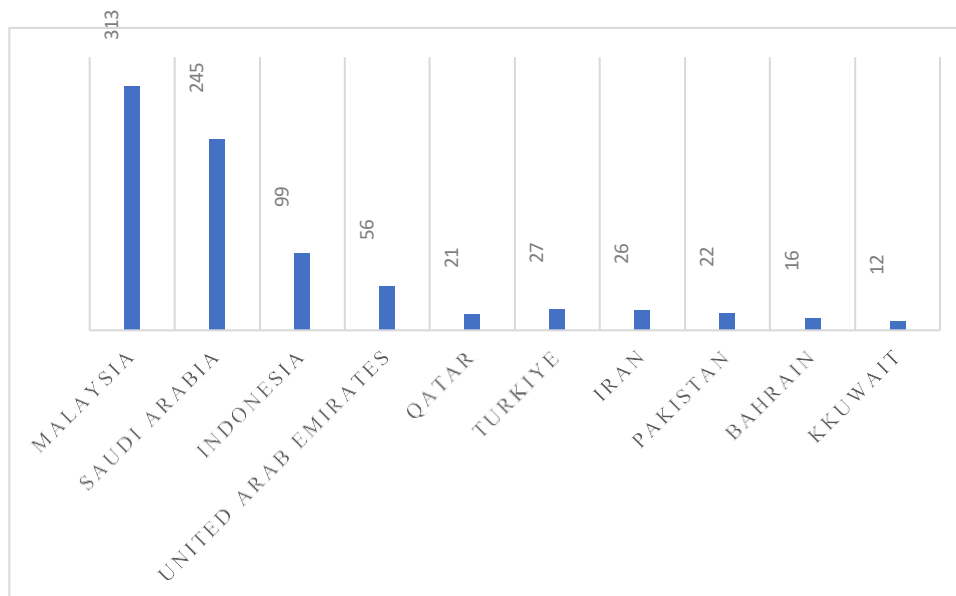
Sukuk is an instrument within the Sharia capital market that is rapidly growing as a promising financing alternative in Indonesia. Amidst increasingly complex global economic challenges, sukuk emerges as a funding solution aligned with Sharia principles, integrating financial values with an ethical foundation. Since its inception, sukuk has not only served as an investment vehicle but also played a strategic role in financing infrastructure projects and enhancing social welfare. Consequently, sukuk represents one of the most innovative products in the evolution of contemporary financial systems. Overall, sukuk can be characterized as an alternative source of funding, particularly for the government and corporate entities (Fatah, 2011).

Implementing the Green Economy concept requires financing sources that not only focus on economic growth but also account for environmental and social considerations. In this context, Green Sukuk emerges as a Sharia-compliant financial instrument that links development financing needs to sustainability principles. Unlike conventional sukuk, Green Sukuk proceeds are specifically allocated to finance projects that deliver environmental benefits, such as renewable energy, eco-friendly transportation, waste management, and natural resource conservation. Sukuk regulation in Indonesia is overseen by the Financial Services Authority (OJK) pursuant to Law No. 19 of 2008 concerning State Sharia Securities (SBSN), which is based on the Audit Board of the Republic of Indonesia (BPK RI) document serving as the primary regulatory framework for state sukuk. Additionally, there are related regulations issued by the OJK and the Ministry of Finance, including OJK Regulation (POJK) No. 18 of 2015 on the Issuance and Requirements of Sukuk. According to Mardani (2021), comprehensive and transparent regulations are crucial for fostering investor confidence and driving the growth of the sukuk market.

Sukuk has proven to be an effective source of financing for infrastructure projects in Indonesia. Research indicates that sukuk can fund major projects, such as toll roads, power plants, and housing. These comprehensive regulations demonstrate the government's commitment to developing Sharia-compliant financing instruments that support sustainable development. The introduction of Green Sukuk regulations aims not only to boost investor confidence but also to ensure that the funds raised are genuinely used to finance projects that have a positive impact on the environment and society. (Fitrianto, 2019). The growth of sukuk demonstrates a positive trend, both globally and within Indonesia. The Indonesian government issues retail Sukuk as a Sharia investment instrument to finance the state budget (APBN) deficit and development projects. In 2023, the government issued Retail State Sukuk twice: series SR018 in March and SR019 in September.

These two series were issued to boost the national economy and foster public welfare. Retail Sukuk offers several advantages that make it a valuable investment option for the public. First, it allows individuals to invest safely and earn returns in accordance with Sharia principles. Second, it provides an opportunity for the public to invest in state projects, thereby enabling them to participate in national development. Third, Retail Sukuk helps strengthen the economy and improve public welfare.

Gambar 1. Sukuk Ritel di Negara Islam Tahun 2023 (USD Miliar Dollar)



In 2023, Indonesia ranked third among Islamic nations in terms of retail sukuk issuance. The government issued Retail Sukuk series SR018 and SR019 using a dual-tranche structure. The rise in the number of investors and the issuance value of Retail Sukuk demonstrates that this instrument is gaining increasing public acceptance as a safe and sustainable Sharia-compliant investment alternative. This trend not only reflects the government's success in enhancing Sharia financial inclusion but also highlights the significant potential of Retail Green Sukuk as a source of financing for low-carbon development. With growing public participation, Green Sukuk can serve as a strategic instrument to support the implementation of the Green Economy in Indonesia. These issuances demonstrated strong public interest; total orders for SR018 reached IDR 21.495 trillion, while total orders for SR019 amounted to IDR 25.334 trillion. Each series offered two tenors, 3 years and 5 years, with competitive fixed coupon rates. The SR018T3 carried a coupon of 6.25%, and the SR018T5 offered 6.40%, whereas the SR019T3 provided a coupon of 5.95% and the SR019T5 offered 6.10%. The Retail Sukuk were issued online via the e-SBN platform managed by the Ministry of Finance, in collaboration with 33 distribution partners for SR018 and 32 for SR019, comprising banks, securities firms, and fintech platforms. Investor participation increased; SR018 attracted 52,743 investors (including 18,490 new investors), while SR019 attracted 66,533 investors (including 18,015 new investors).

Data indicate that the largest investor group for both SR018 and SR019 was Generation Y (Millennials), accounting for over 40% of the investor base. This demonstrates growing public awareness and interest in Retail Sukuk, positioning them as an attractive investment option, particularly for the younger generation. From the initial issuance in 2009 through the end of 2023, the total issuance of Retail SBSN, including Cash Waqf Linked Sukuk (CWLS), reached IDR 411.97

trillion, involving 923,384 investors (Putri & Fathoni, 2025). This significant increase reflects strong public interest in Sharia-based investments that are safe, profitable, and contribute to national development. The government can continue to develop Retail Sukuk as a safe and profitable Sharia investment instrument for the public.

Retail Sukuk is essential for the country's sustainable economic development. There are three primary reasons why economic development must be sustainable. Indonesia has committed to achieving its Net Zero Emission target by 2060 and supporting the attainment of the Sustainable Development Goals (SDGs). Achieving this target requires substantial, sustainable green financing. In this context, the Retail Green Sukuk serves as a Sharia-compliant financing instrument that can support low-carbon development by funding a range of environmentally friendly projects. First, there is a moral imperative: the current generation, which utilizes various products and services derived from natural resources, bears an ethical responsibility to ensure those resources remain available for future generations. Second, there is an ecological reason; biodiversity plays a crucial role in maintaining ecosystem balance, so economic activities should not undermine these ecological functions. Third, there is an economic reason. The goals of sustainable development encompass a wide range of objectives, such as eradicating poverty in all its forms across all regions, ensuring inclusive, quality education, building resilient infrastructure, creating safe, livable cities, and providing decent work for all segments of society.

There is a strong link between Retail Sukuk and sustainable development, primarily because it serves as an alternative financing tool that supports national development projects aligned with sustainability principles. Various prior studies have examined Green Sukuk as an instrument for Sharia-compliant financing and sustainable investment. Most of this research has focused on regulatory aspects, market development, and contributions to infrastructure financing. However, few studies have specifically analyzed how Retail Green Sukuk contributes to implementing the Green Economy from an Islamic economic perspective—particularly by examining the opportunities, challenges, and contributions to sustainable development. Therefore, this study aims to address that gap. With the world's largest Muslim population, Indonesia possesses immense potential to develop its sukuk market. This potential presents a strategic opportunity for Indonesia to become a hub for Sharia finance, particularly in sukuk-based instruments. However, the development of sukuk in Indonesia faces undeniable challenges. Key obstacles include low public understanding of sukuk instruments and the complexity of product structures, which can make them difficult for many investors to access.

Nevertheless, significant opportunities exist, especially given the growing awareness of the importance of sustainable and Sharia-compliant investments. Government and financial institution support also plays a crucial role in driving innovation and product diversification within the domestic sukuk market. Unlike previous studies, this research not only examines the Retail Green Sukuk as a Sharia financing instrument but also analyzes its contribution to implementing the Green Economy from an Islamic economic perspective. Thus, this study is expected to provide

a conceptual contribution regarding the relationship between Sharia financing and sustainable development in Indonesia.

This study aims to examine in depth the role of Retail Sukuk as a Sharia financing instrument that functions not only as an investment vehicle but also as a significant contributor to sustainable national development. It explores how Retail Sukuk supports the financing of infrastructure and social projects while reflecting sustainability values across moral, ecological, and economic dimensions. Furthermore, the study highlights the substantial potential for Retail Sukuk development in Indonesia, driven by increasing public participation, particularly among the younger generation, in Sharia-compliant investments. By identifying implementation practices, growth trends, and existing challenges and opportunities, this research seeks to provide a broader understanding of the importance of Retail Sukuk in achieving inclusive, sustainable economic development that aligns with Sharia principles.

THEORITICAL REVIEW

Islamic Economic Principles For Green Economy Development

a. Maqashid Sharia

Maqashid Sharia represents the fundamental objectives of Islamic Sharia, aiming to realize public welfare *maslahah* and prevent harm *mafsadah* in human life. According to Al-Shatibi, Maqashid Sharia focuses on safeguarding five essential elements (*al-dharuriyyat al-khams*): religion (*hifz al-din*), life (*hifz al-nafs*), intellect (*hifz al-'aql*), lineage (*hifz al-nasl*), and property (*hifz al-mal*). From an Islamic economic perspective, every economic activity must be directed toward achieving sustainable societal well-being without harming the environment or social life.

b. Khalifah

In Islamic teachings, humans are entrusted with the role of khalifah fil ardh (God's vicegerent on earth), bearing the responsibility to manage and utilize natural resources equitably and sustainably. The concept of khalifah emphasizes that humans do not have the right to exploit the environment excessively; rather, they are obligated to maintain the balance of ecosystems for the benefit of both present and future generations. This principle aligns with the concept of the Green Economy, which emphasizes a balance between economic growth, environmental sustainability, and social well-being. In the context of this study, Retail Green Sukuk is a Sharia-compliant financial instrument that supports the fulfillment of the human role as khalifah by financing projects that have positive environmental and sustainable development impacts.

c. Trustworthiness (Amanah)

Trustworthiness is a fundamental principle in Islamic economics that emphasizes honesty, responsibility, transparency, and accountability in all economic activities. This principle requires any party managing public funds to utilize those funds in accordance with established objectives and to provide a transparent account of their usage. In the implementation of Retail Green Sukuk,

the principle of trustworthiness is realized through the management of funds specifically allocated to finance projects that meet the environmentally friendly criteria set out in the Green Sukuk Framework. Furthermore, the government is obligated to report on fund utilization and the resulting environmental impact to maintain investor confidence. Thus, the principle of trustworthiness serves as a crucial foundation for enhancing the credibility and effectiveness of Green Sukuk as a Sharia-compliant financing instrument.

d. Maslahah

Maslahah is a concept in Islamic economics that emphasizes maximizing societal benefit while avoiding any harm that could threaten human life. An economic policy is considered to fulfill the principle of maslahah if it delivers sustainable economic, social, and environmental benefits. In the context of Green Sukuk, financing for green projects not only yields economic benefits through infrastructure development but also provides social benefits, such as improving the community's quality of life, and environmental benefits, including reductions in carbon emissions, increased energy efficiency, and the preservation of natural resources. Therefore, Green Sukuk can be viewed as a Sharia financial instrument that embodies the concept of maslahah within sustainable development.



Figure 1. Islamic Economic Principles For Green Economy Development

These four concepts demonstrate that, from an Islamic perspective, economic development is not solely oriented toward economic growth but also toward achieving a balance among economic, social, and environmental dimensions. The principles of Maqashid Sharia, khalifah (stewardship), amanah (trust), and maslahah (public interest) serve as the normative foundation for the development of sustainable Sharia financial instruments. Consequently, this study employs these four concepts as a theoretical basis to analyze how Retail Green Sukuk contributes to the implementation of the Green Economy in Indonesia. Through this approach, the study evaluates Green Sukuk not only as a financing instrument but also as a means to realize sustainable development aligned with Islamic economic values.

Sustainable Development

The concept of sustainability is simultaneously simple and complex; consequently, its definition is multidimensional and open to various interpretations. Given this complexity, experts have agreed to adopt the Brundtland Commission's definition provisionally, which states that "sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (Dan et al., 2025). Sustainable development is inseparable from the concept of the Green Economy. The Green Economy is a development approach that emphasizes economic growth while prioritizing environmental sustainability, resource efficiency, and social well-being. Consequently, sustainable development requires financing instruments capable of allocating funds to projects that deliver economic benefits while maintaining environmental sustainability (UNEP, 2011).

There are at least three primary reasons why economic development must be sustainable. First, there is the moral imperative. The current generation, which enjoys goods and services derived from natural resources and the environment, has a moral obligation to preserve the services these resources provide for future generations. This moral obligation entails refraining from natural resource extraction that damages the environment, thereby depriving future generations of the opportunity to enjoy those same services. Second, there are ecological reasons. Biodiversity, for instance, holds immense ecological value; therefore, economic activities should not be directed toward actions that threaten these ecological functions. Third, there are economic reasons. The economic rationale remains a subject of debate, as it is unclear whether past and current economic activities have met sustainability criteria. The economic dimension of sustainability is inherently complex, often leading to a narrow definition of it as the maximization of intergenerational welfare.

The concept of sustainability rests on at least three fundamental axioms. First, the treatment of the present and the future assigns a positive long-term value. Second, there is an acknowledgment that environmental assets contribute to economic well-being. Third, there is an awareness of the constraints arising from the implications for environmental assets. Sustainable development encompasses several goals, such as eradicating poverty in all its forms and in all locations (both rural and urban) and ensuring inclusive, equitable, and quality education. Furthermore, the aim is to end hunger by promoting sustainable agriculture to achieve food security and improved nutrition, building resilient infrastructure, making cities safe, fostering sustainable and inclusive economic growth, and creating decent jobs for all.

Sukuk

Sukuk are Sharia-compliant securities issued in accordance with Sharia principles that represent ownership of specific assets, usufruct, or projects. Unlike conventional interest-based bonds, Sukuk utilize Sharia contracts such as *ijarah*, *mudharabah*, *musyarakah*, or *wakalah*, thereby remaining free from elements of *riba* (usury), *gharar* (uncertainty), and *maisir* (gambling). In Indonesia, the issuance of Sukuk is governed by Law Number 19 of 2008 concerning

State Sharia Securities (SBSN) and various fatwas issued by the National Sharia Board of the Indonesian Ulema Council (DSN-MUI).

Retail Green Sukuk is a type of State Sharia Securities (SBSN) issued by the Indonesian government to mobilize public funds for financing projects that adhere to sustainability principles ("green projects"). Unlike conventional Retail Sukuk, which can be used for various state financing needs, funds raised through Retail Green Sukuk are specifically allocated to sectors that benefit the environment—such as renewable energy, sustainable transportation, energy efficiency, waste management, and natural resource conservation. Consequently, the Retail Green Sukuk serves not only as a Sharia-compliant investment instrument but also as a component of green finance policy that supports the implementation of a green economy in Indonesia.

From a sustainable development perspective, Retail Green Sukuk serves as a strategic financing instrument that bridges Islamic economic principles and the goals of the green economy. By financing environmentally friendly projects, Retail Green Sukuk supports efforts to reduce carbon emissions, increase the use of renewable energy, develop green infrastructure, and sustainably manage natural resources. Thus, the Retail Green Sukuk not only delivers economic benefits by mobilizing public funds but also generates social and environmental benefits aligned with the principles of Maqashid Sharia and the concept of *maslahah* (public interest).

Based on the foregoing, it is evident that the Retail Green Sukuk is a Sharia-compliant financial instrument, distinguished from conventional Sukuk by the specific earmarking of the funds raised to support environmentally conscious projects. Consequently, this study employs the concept of Retail Green Sukuk as a theoretical framework for analyzing its contribution to the implementation of the Green Economy in Indonesia.

Sukuk transactions involve distinct economic rules, specifically the requirement for an *akad* (contractual agreement) at the outset. The type of contract varies, tailored to the needs and mutual agreement of the parties involved. The underlying assets or investments must be *halal* (permissible) and clearly defined, free from elements of uncertainty. These rules, which are foreign to conventional bonds, are stipulated in the Fatwas of the National Sharia Board (DSN). These fatwas are derived from the Qur'an, the Hadith, and the consensus (*ijma'*) of Islamic scholars. The legal basis for the implementation of sukuk in Indonesia rests on robust Sharia regulations, including: scholarly rulings (*ijtihad*) prohibiting bonds that generate coupon-based income; scholarly rulings supporting the application of Sharia contract principles in sukuk; Law Number 19 of 2008 concerning State Sharia Securities (SBSN); Financial Services Authority Regulation (POJK) Number 18/POJK.04/2015 regarding the issuance and requirements of sukuk; and various fatwas issued by the National Sharia Board of the Indonesian Council of Ulama (DSN-MUI), namely: Number 32/DSN-MUI/IX/2002 on Sharia Bonds; Number 41/DSN-MUI/III/2004 on *Ijarah* Sharia Bonds; Number 69/DSN-MUI/III/2008 on State Sharia Securities (SBSN); Number

70/DSN-MUI/III/2008 on Issuance Methods for State Sharia Securities (SBSN); and Number 95/DSN-MUI/III/2004 on Wakalah State Sharia Securities (SBSN).

METHOD

Research Design (Type of Research)

This study employs a descriptive qualitative research approach. This approach was selected because the study aims to gain an in-depth understanding and analysis of the role of Retail Green Sukuk in supporting the implementation of the Green Economy in Indonesia through the interpretation of relevant data and documents. Qualitative research enables the researcher to explain phenomena comprehensively without hypothesis testing; instead, it emphasizes the analysis of meanings and relationships between concepts, as well as the interpretation of the data obtained.

Research Approach

This study employs a library research approach. All data were gathered by examining scholarly sources on Retail Green Sukuk, the green economy, sustainable development, and Islamic economics. This approach was selected because the study focuses on analyzing the concepts, policies, and implementation progress of the Retail Green Sukuk, drawing on various official documents and prior research findings.

Data Sources

The primary data in this study consists of official documents issued by the Ministry of Finance of the Republic of Indonesia, the Financial Services Authority (OJK), the Fiscal Policy Agency, and the Indonesia Green Sukuk Framework, as well as the Green Sukuk Allocation and Impact Report, which contain information regarding the issuance and utilization of Retail Green Sukuk. Secondary data were obtained from national and international journal articles, scholarly books, reports from international institutions, laws and regulations, conference proceedings, and other relevant publications concerning Green Sukuk, Green Finance, the Green Economy, and Islamic economics. Data analysis was conducted using the Miles and Huberman interactive analysis model, which comprises three stages: data reduction, data display, and conclusion drawing and verification. During the data reduction stage, the researcher selected information relevant to the research focus. Subsequently, the selected data were systematically organized into narratives and tables to facilitate analysis. The final stage involved interpreting the displayed data to conclude the contribution of Retail Green Sukuk to the implementation of the Green Economy in Indonesia. The collection processes are properly conducted; the data analysis methods are relevant and state-of-the-art.

RESULT AND DISCUSSION

Implementation of the Green Economy in the Development of Muslim Communities in Indonesia

Retail Sukuk

The implementation of Retail Sukuk in development represents a tangible form of state engagement with Sharia-compliant financing instruments to support the national sustainable development agenda. Retail Sukuk, particularly those structured as Green Sukuk, are directed toward environmentally friendly projects aimed at mitigating negative environmental impacts, such as renewable energy development, waste management, and the rehabilitation of coastal areas and forests (Hastuti, 2018). Through this instrument, the public can directly participate in national development in line with Sharia principles while earning safe and stable returns.

The impact of utilizing Retail Sukuk is far-reaching, encompassing the creation of green jobs, the reduction of carbon emissions, and heightened public awareness regarding environmental importance. Through projects funded by the Retail Sukuk, the government can integrate economic growth with environmental preservation, aligning with the Sustainable Development Goals (SDGs). Consequently, Retail Sukuk stands as a state financing innovation that is not only consistent with Sharia principles but also relevant to the global need for inclusive and environmentally friendly development.

One example of Retail Sukuk implementation is the Ministry of Finance's funding of mangrove rehabilitation and coastal conservation projects. These projects are crucial not only for maintaining coastal ecosystem stability but also for ensuring the survival of marine species such as sharks and sea turtles that inhabit these regions. For instance, Cenderawasih Bay National Park serves as a natural habitat for various shark species, including whale sharks. Marine conservation and ecotourism initiatives can be supported through Green Sukuk programs. Conservation areas financed by Retail Sukuk often double as educational ecotourism sites, allowing the public and researchers to observe marine wildlife, such as sharks. Thus, Retail Sukuk supports not only the physical aspects of development but also educational and ecological dimensions.



Source: Ministry of Finance of the Republic of Indonesia.

**Figure 2 Whale Shark Conservation Center in Cenderawasih Bay, Papua,
Funded by Sukuk**

In addition to the aforementioned conservation activities, Green Sukuk addresses environmental and ecosystem challenges. There has been a year-on-year increase in both investor participation and the results achieved through Green Sukuk issuances. These outcomes offer a response to the ongoing climate change crisis; the development of green projects acts as a key solution for addressing climate change in Indonesia (Grahesti et al., 2022). Since 2018, the Government of Indonesia, through the Ministry of Finance, has issued three series of Green Sukuk instruments. Issuance volumes stood at IDR 1.25 trillion in 2018, IDR 30.25 trillion in 2019, IDR 25.45 trillion in 2021, and IDR 101.35 trillion in 2022. The funds raised through these debt securities are utilized for regional and national infrastructure development. Green Sukuk, issued by both government agencies and the private sector, serves as a financing instrument that mobilizes capital from investors to support development (Maulida et al., 2023).

This Green Sukuk-based national development fosters climate resilience. Examples include drought management initiatives funded in 2020 across Central Sulawesi, Bali, Bengkulu, and Gorontalo, totaling over IDR 500 billion. Additionally, food security projects in 2020 supported irrigation system upgrades and national food initiatives with funding of IDR 1.9 trillion. Natural disaster mitigation programs were also implemented in 2020 using Sukuk funding totaling IDR 1.5 trillion across Central Kalimantan, Sulawesi, Lampung, and Maluku. Numerous other activities supporting sustainable economic development in Indonesia are documented in the country's Sharia finance reports. Retail Sukuk, in particular, offers the public an opportunity to select suitable investment options. The program mentioned above certainly encourages the government to continue evolving and striving to foster sustainable

economic development.

Water Conservation

Water conservation has become a strategic priority in Indonesia's green investment agenda, reflecting the country's commitment to achieving the Sustainable Development Goals (SDGs), particularly SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action). The regulatory framework was initially established through OJK Regulation No. 60/POJK.04/2017 concerning the Issuance and Requirements of Green Bonds, which requires that at least 70% of the proceeds from green securities be allocated to environmentally beneficial activities. These activities include sustainable water resource management, clean water supply, sanitation infrastructure, watershed conservation, renewable energy, and climate change mitigation. Since 2024, this framework has been expanded under **POJK No. 18 of 2023**, which also covers sustainability-linked bonds and sukuk.

Indonesia's sovereign green sukuk has financed numerous projects related to water conservation and climate resilience. Beyond supporting renewable energy projects such as hydropower plants, green sukuk proceeds have contributed to improving water resource management systems, enhancing sanitation facilities, and strengthening climate adaptation initiatives that improve long-term water security. These investments support sustainable economic development while reducing environmental degradation and increasing resilience to climate-related risks. Investments in water conservation in Indonesia include:

- 1) **Construction of clean water infrastructure in remote and 3T (frontier, outermost, and underdeveloped) areas.** Green investments improve access to safe drinking water by developing water supply networks, reservoirs, distribution pipelines, and sanitation facilities. These projects help reduce regional disparities in water access while improving public health and supporting inclusive economic development.
- 2) **Rehabilitation of critical watersheds.** Investment in watershed restoration focuses on reforestation, erosion control, riverbank protection, and ecosystem rehabilitation. Healthy watersheds improve groundwater recharge, reduce flooding and sedimentation, and ensure sustainable water availability for communities, agriculture, and industry.
- 3) **Water resilience programs for sustainable agriculture.** Green financing supports irrigation modernization, rainwater harvesting, efficient water-use technologies, and climate-smart agricultural practices. These initiatives enhance agricultural productivity while minimizing water consumption and strengthening farmers' resilience to drought and climate variability.
- 4) **Industrial wastewater management through wastewater treatment plants (IPAL).** Green investments encourage industries to install and upgrade wastewater treatment facilities that reduce pollution before wastewater is discharged into rivers and other water bodies. Effective wastewater management improves water quality, protects aquatic ecosystems, and supports compliance with environmental regulations while

promoting sustainable industrial production.

Solar Power Plants (PLTS)

Solar photovoltaic (PV) development has become one of the most strategic sectors in Indonesia's green investment agenda, considering the country's abundant solar resources and its commitment to achieving carbon neutrality by 2060. Indonesia has an estimated technical solar energy potential of 3,295 GW, making solar the largest renewable energy resource in the country. Despite this enormous potential, the utilization rate remains relatively low, indicating substantial investment opportunities for both domestic and international investors. Accelerating solar energy deployment is therefore considered essential for reducing dependence on fossil fuels, improving national energy security, and supporting Indonesia's commitments under the Paris Agreement and the Sustainable Development Goals (SDGs), particularly SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action).

Green investment in the solar energy sector has been significantly strengthened through the issuance of sovereign green sukuk, public-private partnerships, and international climate finance initiatives. One of the most prominent examples is the **Cirata Floating Solar Power Plant (PLTS Terapung Cirata)** in West Java, developed through collaboration between PT PLN Nusantara Power and Masdar (United Arab Emirates). The project represents a landmark achievement in Indonesia's renewable energy transition, with an installed capacity of **192 MWp (approximately 145 MWac)** and an investment value of around **USD 129 million**. Since its commercial operation in 2023, Cirata has become one of the largest floating solar power plants in Southeast Asia and demonstrates Indonesia's capability to integrate innovative renewable energy technologies into its national electricity system. The project is expected to reduce greenhouse gas emissions substantially while supplying clean electricity to thousands of households in Java.

Indonesia's commitment to expanding solar power generation is further reinforced through the **Just Energy Transition Partnership (JETP)**. Under the Comprehensive Investment and Policy Plan (CIPP), Indonesia prioritizes large-scale deployment of solar photovoltaic projects as a key strategy for decarbonizing the national electricity sector. The JETP roadmap identifies approximately **29 GW of solar photovoltaic capacity** to be developed by 2030 as part of the accelerated renewable energy transition, including utility-scale ground-mounted and floating solar projects. Priority projects include floating solar developments at the Jatiluhur, Saguling, and Singkarak reservoirs, as well as distributed solar systems for remote areas and diesel-replacement programs.

The Indonesian government has also established an ambitious long-term electricity development strategy in which **approximately 75% of the planned additional 100 GW of electricity generation capacity over the next fifteen years will come from renewable energy sources, including solar, hydropower, geothermal, and wind**. This policy reflects a strategic

shift toward a low-carbon electricity system while simultaneously attracting sustainable investment and supporting green economic growth. The expansion of solar power is expected to stimulate technological innovation, create green employment opportunities, strengthen domestic manufacturing capacity, and enhance Indonesia's competitiveness in the global clean energy market.

Beyond electricity generation, investments in solar photovoltaic infrastructure generate broader environmental and socio-economic benefits. Large-scale solar deployment helps reduce carbon emissions, improve air quality, lower long-term electricity generation costs, and expand energy access in remote and underserved regions. Furthermore, floating solar photovoltaic systems offer additional advantages by minimizing land-use conflicts, reducing water evaporation from reservoirs, and complementing existing hydropower infrastructure through hybrid renewable energy systems, thereby improving overall grid flexibility and reliability.

Environmentally Friendly Transport Infrastructure

The transportation sector represents one of the largest contributors to greenhouse gas (GHG) emissions in Indonesia, making the development of environmentally friendly transport infrastructure a strategic priority within the country's green investment agenda. Green investments in this sector are designed to accelerate the transition toward a low-carbon transportation system by promoting sustainable urban mobility, reducing dependence on fossil fuels, improving air quality, and enhancing energy efficiency. These initiatives align with Indonesia's commitment to achieving its Nationally Determined Contributions (NDCs) under the Paris Agreement and its target of net-zero emissions by 2060 or sooner. They also contribute directly to Sustainable Development Goals (SDGs), particularly SDG 9 (Industry, Innovation and Infrastructure), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action).

Green investment in the transportation sector encompasses the development of **low-emission mass transit systems**, the expansion of the **electric vehicle (EV) ecosystem**, and the promotion of **renewable transportation fuels**, including biodiesel and bioethanol. These investments aim not only to reduce carbon emissions but also to improve urban mobility, decrease traffic congestion, strengthen national energy security, and stimulate sustainable industrial development through green technology innovation.

One of the most significant applications of sovereign green sukuk financing has been the development of **Light Rail Transit (LRT)** infrastructure. Green sukuk proceeds have supported the construction of the **Jabodebek Light Rail Transit (LRT)** system, which provides a cleaner alternative to private vehicle use in the Greater Jakarta metropolitan area. By shifting commuters from conventional road transport to electric rail systems, the project is expected to reduce fuel consumption, alleviate traffic congestion, and significantly lower greenhouse gas emissions while improving the efficiency and accessibility of public

transportation. The project illustrates how Islamic sustainable finance instruments can directly contribute to climate change mitigation through investment in environmentally friendly infrastructure.

Beyond mass transportation, the Indonesian government has prioritized developing a comprehensive **electric vehicle (EV) ecosystem**. This strategy covers the entire industrial value chain—from the extraction and processing of critical minerals such as nickel and battery manufacturing to electric vehicle assembly, charging infrastructure development, and battery recycling. As the world's largest nickel producer, Indonesia seeks to leverage its abundant mineral resources to become a regional hub for EV production, attract foreign direct investment, and promote domestic industrialization. This initiative is supported by **Presidential Regulation No. 55 of 2019** on the Acceleration of Battery Electric Vehicle Programs, as well as subsequent policy measures to increase EV adoption and investment. In addition to electrification, Indonesia continues to promote **biofuel development**, particularly **biodiesel (B35 and B40 programs)** and bioethanol, as part of its broader strategy to reduce dependence on imported fossil fuels and lower transportation-related emissions. The mandatory biodiesel blending program has become one of the largest globally, contributing to energy diversification, improved energy security, and increased demand for domestically produced renewable fuels. Green investment supports the expansion of biofuel production facilities, distribution infrastructure, and technological innovation to improve fuel efficiency and sustainability.

Overall, environmentally friendly transport infrastructure serves as a cornerstone of Indonesia's sustainable development strategy. By integrating green sukuk financing, electric mobility, renewable fuels, and sustainable public transportation, Indonesia is fostering a cleaner, more resilient, and more inclusive transportation system. These investments not only generate environmental benefits through reduced greenhouse gas emissions but also create economic opportunities, strengthen industrial competitiveness, and improve the quality of life for urban populations.

Opportunities for Implementing Retail Sukuk in Indonesia

Retail Sukuk offers a beneficial investment instrument for the public, as it aligns with Sharia principles and provides attractive returns. Furthermore, Retail Sukuk contributes to national development, with both the principal and returns guaranteed, offering investors a sense of security. Retail Sukuk holds significant growth potential in Indonesia due to several supporting factors. First, growing investor awareness regarding socially responsible investment makes Retail Sukuk an appealing choice for those seeking to invest ethically. Second, Indonesia's status as the country with the world's largest Muslim population creates vast opportunities for the development of the Sharia financial industry.

Additionally, Indonesia's promising economic growth and green infrastructure development programs serve as supporting factors. The Indonesian government is currently

aggressively pursuing infrastructure development, and Retail Sukuk can serve as a key instrument to support these initiatives. Thus, Retail Sukuk not only yields financial gains for investors but also contributes to national development. The mechanism for Retail Sukuk in Indonesia involves issuance by the government or corporations, utilizing structures such as Sukuk Mudharabah and Sukuk Ijarah. The types of Sukuk actively traded on the Indonesia Stock Exchange (IDX) include Sukuk Ijarah and Sukuk Mudharabah, encompassing both sovereign and corporate Sukuk (Karina, 2019).

In the long term, Retail Sukuk could experience rapid growth in Indonesia if efforts to enhance Sharia economic inclusion and literacy are sustained (Humaida et al., 2020). Currently, the low levels of Sharia economic inclusion and literacy in Indonesia remain a challenge that must be addressed. Therefore, education and outreach on Retail Sukuk and Sharia finance more broadly are crucial to boosting public awareness and participation. Furthermore, Retail Sukuk can serve as an instrument to support sustainable and responsible development, such as in the Cenderawasih Bay National Park (TNTC) conservation area. This area boasts high biodiversity that requires protection and utilization governed by appropriate regulations. Through effective cooperation schemes, TNTC can collaborate with various stakeholders to strike a balance between ecology and development.

Thus, Retail Sukuk can serve as a key instrument to support environmental conservation and sustainable development in Indonesia. The Cenderawasih Bay National Park (TNTC) conservation area exemplifies a region requiring wise and sustainable management. Through effective collaboration among the government, local communities, and investors, TNTC could serve as a model for other conservation areas across Indonesia. By investing in Retail Sukuk, investors can support sustainable and responsible development while simultaneously earning attractive financial returns. Retail Sukuk can be an effective instrument for fostering sustainable development in Indonesia.

Challenges in Implementing Retail Sukuk in Indonesia

The development of green finance in Indonesia continues to face significant challenges. According to the Financial Services Authority (OJK), a primary challenge is the limited capacity of financial institutions to identify social and environmental risks. This can lead to a lack of awareness regarding these risks and ineffective risk mitigation processes. Furthermore, a lack of awareness among financial institutions regarding the importance of green finance poses a challenge, driven by high risk levels and insufficient government incentives for green projects. Maturity mismatches in financing also pose a challenge, as green projects are typically long-term. A lack of information on green projects can make it difficult to identify suitable investment opportunities (Fitrianto, 2019). Additionally, the banking sector's limited capacity to support green projects, stemming from the relatively low profile of these issues, is another challenge.

The development of the market for environmentally-based Sharia bonds (Green

Sukuk) in Indonesia faces its own set of challenges. Limited human resources and a lack of market participants' understanding of environmentally based Sharia capital market products are among these challenges. Insufficient outreach regarding Sharia investment product innovations, specifically Green Sukuk, which are based on environmental and sustainable development principles, also poses a challenge. Green Sukuk may entail exposure to higher risk profiles, as many green projects involve advanced, novel technologies.

Investor characteristics that may differ from those of typical Islamic investors can also influence the performance of green bonds. In this context, the Cenderawasih Bay National Park Conservation Area could collaborate through partnership schemes to strike a balance between ecology and development. Thus, the development of green finance and Green Sukuk can serve as instruments to support sustainable and responsible development in Indonesia.

Challenges and Barriers to Green Investment in Indonesia

Infrastructure and Technology Limitations

Many renewable energy projects, particularly in remote areas, face challenges related to limited transmission networks, a lack of supporting infrastructure, and inadequate energy storage technology. As of 2023, renewable energy accounted for only about 11.5% of Indonesia's total energy mix—well below the government's 2025 target of 23% (KESDM, 2023).

High Initial Investment Cost

Green projects, such as large-scale solar power plants and geothermal facilities, require substantial upfront investment and entail long payback periods. Consequently, domestic financial institutions tend to be cautious about extending financing, particularly due to the absence of robust risk mitigation mechanisms—such as credit guarantees or project risk insurance.

Regulatory and Licensing Complexity

Lengthy permitting processes, overlapping policies between central and regional governments, and legal uncertainty regarding land rights pose serious obstacles to implementing green projects. Comprehensive improvements are still needed to synchronize regulatory documents (Coordinating Ministry for Economic Affairs, 2025).

Limited Green Financial Literacy

Public and business-sector awareness and understanding of green investment remain relatively low. Literacy levels concerning the Sharia capital market in Indonesia, including green sukuk, remain very low. A lack of information for investors regarding the companies or projects available for investment poses a distinct challenge (OJK, 2022; IMAGAMA FEB UGM, 2024).

Waste Management Challenges

Although waste management regulations are already in place, their implementation still faces obstacles, namely: 1) Limited wastewater treatment infrastructure in various

regions; 2) High construction and operational costs for waste treatment facilities; 3) Shortage of experts in waste management; 4) Inconsistent regulatory compliance across regions.

The Threat of Greenwashing

Greenwashing, corporate efforts to appear environmentally friendly without taking substantive action, poses a threat to the credibility of the green investment ecosystem. Standardization and independent verification of green projects require further strengthening, even though initial steps have been taken through verification by institutions such as CICERO (Center for International Climate and Environmental Research).

Dependence on Fossil Fuels

Indonesia still relies on coal for approximately 60% of its electricity generation. This reliance acts as a structural barrier to attracting green investment from multinational companies that require the use of green energy within their supply chains (IWGFF, 2024).

CONCLUSION

This study demonstrates that the Retail Green Sukuk has evolved beyond its role as a Sharia-compliant investment instrument to a strategic financing mechanism that supports the implementation of Indonesia's green economy. Grounded in the Islamic economic principles of *Maqashid Sharia*, *Khalifah*, *Amanah*, and *Maslahah*, Retail Green Sukuk integrates economic, environmental, and social objectives by financing renewable energy, environmentally friendly transportation, water conservation, waste management, and biodiversity protection projects. The increasing level of public participation, particularly among younger investors, also indicates growing confidence in Sharia-based sustainable investment and highlights the instrument's potential to strengthen financial inclusion while contributing to the achievement of the Sustainable Development Goals (SDGs) and Indonesia's Net Zero Emission target.

Despite these promising developments, the effectiveness of Retail Green Sukuk remains constrained by several structural challenges, including limited green financial literacy, insufficient public understanding of Sharia investment products, regulatory complexity, infrastructure and technological limitations, high initial investment costs, and the potential risk of greenwashing. Addressing these issues requires stronger policy coordination, greater transparency in green project reporting, enhanced incentives for sustainable investment, and broader collaboration among the government, financial institutions, private sectors, and local communities to develop a more inclusive and credible green finance ecosystem.

The novelty of this study lies in its integration of Islamic economic principles with the Green Economy framework to explain the strategic role of Retail Green Sukuk in sustainable development. Unlike previous studies that primarily focused on regulatory or financial aspects, this research highlights the normative contribution of Islamic values in supporting environmentally responsible financing. However, because this research employs a qualitative, literature-based approach, its findings remain conceptual. Future studies are therefore

encouraged to employ quantitative methods, case studies, or impact assessments to evaluate the economic, environmental, and social effectiveness of Retail Green Sukuk in achieving sustainable development outcomes in Indonesia.

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