



## The Effectiveness of Islamic Green Sukuk in Financing Renewable Energy and Sustainable Development

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### **Abstract**

*This study explores the effectiveness of Islamic Green Sukuk as an innovative Shariah-compliant financing instrument for renewable energy projects and sustainable development initiatives. As the demand for environmentally responsible investments grows, Islamic finance has introduced Green Sukuk to channel capital towards projects that mitigate climate change, reduce carbon emissions, and promote long-term sustainability. The research adopts a descriptive-analytical methodology, reviewing case studies from pioneering markets such as Malaysia, Indonesia, and the Gulf region. Findings suggest that Islamic Green Sukuk not only mobilizes substantial resources for renewable energy but also strengthens the ethical dimension of investment by aligning financial returns with environmental and social impact. However, challenges remain regarding standardization, transparency, and regulatory frameworks, which must be addressed to enhance the scalability of this instrument. Ultimately, the study argues that Islamic Green Sukuk has the potential to become a cornerstone in bridging the gap between Islamic finance and global sustainability goals.*

**Keywords:** Islamic Green Sukuk; Renewable Energy; Sustainable Development; Shariah-Compliant Finance; Climate Change Mitigation; Ethical Investment.

# **L'efficacité des sukuk verts islamiques dans le financement des énergies renouvelables et du développement durable**

## **Résumé**

*Cette étude explore l'efficacité des sukuk verts islamiques en tant qu'instrument de financement innovant conforme à la charia pour les projets d'énergie renouvelable et les initiatives de développement durable. Face à la demande croissante d'investissements respectueux de l'environnement, la finance islamique a introduit les sukuk verts afin de canaliser les capitaux vers des projets qui atténuent le changement climatique, réduisent les émissions de carbone et favorisent la durabilité à long terme. La recherche adopte une méthodologie descriptive et analytique, examinant des études de cas provenant de marchés pionniers tels que la Malaisie, l'Indonésie et la région du Golfe. Les résultats suggèrent que les sukuk verts islamiques mobilisent non seulement des ressources substantielles pour les énergies renouvelables, mais renforcent également la dimension éthique de l'investissement en alignant les rendements financiers sur l'impact environnemental et social. Cependant, des défis subsistent en matière de normalisation, de transparence et de cadres réglementaires, qui doivent être relevés afin d'améliorer l'évolutivité de cet instrument. En fin de compte, l'étude soutient que les sukuk verts islamiques ont le potentiel de devenir une pierre angulaire pour combler le fossé entre la finance islamique et les objectifs mondiaux de durabilité.*

**Mots-clés :** *sukuk verts islamiques ; énergies renouvelables ; développement durable ; finance conforme à la charia ; atténuation du changement climatique ; investissement éthique.*



## Introduction

The global economy is undergoing a paradigm shift towards sustainability as climate change, environmental degradation, and energy insecurity increasingly dominate policy and financial agendas. In this context, green finance has emerged as a critical mechanism for channeling investments into projects that mitigate environmental risks and promote long-term ecological balance. Within the Islamic finance industry, the concept of Green Sukuk has gained momentum as a Shariah-compliant instrument designed to fund renewable energy projects and sustainable development initiatives. First pioneered in Malaysia and later adopted in Indonesia and the Gulf region, Islamic Green Sukuk exemplifies the convergence of ethical finance, environmental responsibility, and economic growth.

Islamic Green Sukuk not only fulfills the requirements of Shariah by avoiding interest (*riba*) and promoting risk-sharing, but it also responds to contemporary global demands for climate-conscious financial products. By directing resources to renewable energy—such as solar, wind, and hydropower—these sukuk instruments contribute to both economic diversification and the achievement of the United Nations Sustainable Development Goals (SDGs).

### *Problem Statement*

Despite the rapid growth of Green Sukuk issuances, questions remain about their effectiveness in achieving the intended outcomes of financing renewable energy and promoting sustainable development. Challenges such as

inconsistent regulatory frameworks, lack of standardization in reporting environmental impact, and concerns about “greenwashing” cast doubt on the scalability and reliability of Islamic Green Sukuk. The central research problem of this study is therefore articulated as follows:

**To what extent are Islamic Green Sukuk effective in mobilizing resources for renewable energy and contributing to sustainable development, while remaining faithful to Shariah principles?**

### *Significance of the Study*

This research is significant for several reasons:

- ***Academic Contribution:*** It enriches the literature by linking Islamic finance, particularly sukuk, with global sustainability and climate finance debates.
- ***Practical Relevance:*** The study offers insights for policymakers, regulators, and financial institutions seeking to strengthen the Green Sukuk market.
- ***Societal Impact:*** By exploring mechanisms that finance renewable energy and environmental protection, the research addresses urgent global concerns of climate change and sustainable development.

### *Objectives of the Study*

The primary objectives are to:

- Assess the role of Islamic Green Sukuk in financing renewable energy projects.
- Examine their contribution to broader sustainable development goals.
- Identify the challenges and opportunities facing the Islamic Green Sukuk market.



Soumission : 03/01/2025    Acceptation : 01/05/2025    Publication : 25/08/2025

- Propose policy recommendations to enhance their effectiveness and global impact.

### *Methodology*

The study adopts a descriptive–analytical approach, supported by case study analysis of Green Sukuk issuances in Malaysia, Indonesia, and selected Gulf countries. Data will be drawn from secondary sources, including financial reports, regulatory guidelines, and scholarly literature. This mixed approach allows for both a theoretical evaluation and a practical assessment of the successes and limitations of Islamic Green Sukuk.

### *Axes of the Study*

The article is structured around three main axes:

- ***Theoretical Foundations:*** Conceptualizing Islamic Green Sukuk within the framework of Islamic finance and sustainable development.
- ***Practical Applications:*** Case-based analysis of Green Sukuk issuances and their effectiveness in financing renewable energy projects.
- ***Future Prospects and Policy Implications:*** Challenges, opportunities, and recommendations for strengthening Islamic Green Sukuk as a tool for sustainable finance.

## **1. Theoretical Foundations of Islamic Green Sukuk and Sustainable Development**

The intersection of Islamic finance and sustainable development reflects a growing recognition that financial systems must not only generate profit but also contribute to

broader environmental and social objectives. Within this framework, Islamic Green Sukuk has emerged as a Shariah-compliant instrument designed to fund environmentally sustainable projects. To fully understand its potential, it is necessary to examine the theoretical underpinnings of sukuk as an Islamic financial tool, the evolution of green finance, and the integration of both concepts under the umbrella of sustainable development.

### **1.1. Sukuk in Islamic Finance**

Sukuk, often referred to as Islamic bonds, represent ownership in an underlying asset, usufruct, or investment project, rather than a debt obligation. They comply with Shariah principles by avoiding *riba* (interest), *gharar* (excessive uncertainty), and *maysir* (gambling). Sukuk instruments are structured around contracts such as *ijarah* (leasing), *mudarabah* (profit-sharing), and *wakalah* (agency), ensuring that investors share in both the risks and returns of the financed project (CBI, 2022).

In the context of infrastructure and development finance, sukuk have already proven to be a reliable tool for mobilizing large-scale resources, particularly in Muslim-majority countries where demand for Shariah-compliant investments is high (Smaoui & Khawaja, 2017).

### **1.2. The Rise of Green Finance**

Green finance refers to financial products and services specifically designed to support environmental sustainability, including renewable energy, energy efficiency, and climate adaptation. Globally, the issuance of green bonds has grown exponentially since the mid-2000s,



Soumission : 03/01/2025    Acceptation : 01/05/2025    Publication : 25/08/2025

reflecting rising investor demand for climate-conscious instruments (CBI, 2022).

The integration of “green” criteria into financial markets reflects a paradigm shift: investments are no longer judged solely on financial returns but also on environmental and social impact. This dual objective resonates strongly with Islamic finance, which emphasizes ethical investing and socio-economic justice.

### 1.3. Conceptualizing Islamic Green Sukuk

Islamic Green Sukuk combines the structural features of conventional sukuk with environmental objectives. Proceeds from Green Sukuk must be directed toward projects that deliver measurable environmental benefits, such as renewable energy plants, sustainable agriculture, or waste management.

Key distinguishing features include: (Dusuki & Bouheraoua, 2011)

- **Shariah Compliance:** Ensures that both the financing structure and the underlying project align with Islamic principles.
- *Environmental Certification:* Independent verification is required to classify sukuk as “green,” often based on international standards such as the Green Bond Principles.
- *Social Responsibility:* Aligns financial activity with the ethical imperative of stewardship (khilāfah) over natural resources, a key concept in Islamic thought .

#### 1.4. Sustainable Development and Maqasid al-Shariah

The objectives of Shariah (Maqasid al-Shariah)—which include the preservation of life, wealth, and the environment—overlap significantly with the United Nations Sustainable Development Goals (SDGs). Financing renewable energy projects through Islamic Green Sukuk therefore represents not only an economic innovation but also a religious and ethical duty.

By promoting clean energy and sustainable growth, Green Sukuk embody the principle of *maslahah ‘ammah* (public interest), linking Islamic finance directly to global sustainability efforts (Ali, Hassan, & Zaman, 2020).

#### 1.5. Challenges in Theoretical Integration

Despite strong conceptual alignment, integrating Islamic finance with green finance raises theoretical challenges: (Usmani, 2008)

- **Standardization:** Diverse Shariah interpretations may lead to inconsistencies in Green Sukuk structures.
- **Verification:** Ensuring that environmental claims are genuine remains a challenge, as “greenwashing” could undermine credibility.
- **Dual Compliance:** Green Sukuk must simultaneously meet Shariah standards and international environmental certification, requiring robust governance mechanisms.

These challenges highlight the importance of governance frameworks that ensure Islamic Green Sukuk remain both religiously legitimate and environmentally impactful.



## 2. Practical Applications - Case Studies of Green Sukuk for Renewable Energy Projects

While the theoretical foundation of Islamic Green Sukuk highlights their potential in advancing sustainable development, the true measure of effectiveness lies in practical application. Over the past decade, several pioneering issuances in Malaysia, Indonesia, and the Gulf region have demonstrated how Green Sukuk can be mobilized to finance renewable energy and environmentally responsible infrastructure. These case studies provide valuable insights into both the opportunities and limitations of Islamic Green Sukuk as a financing tool.

### 2.1. Malaysia: The World's First Green Sukuk : (SC, 2017)

- Malaysia has been a global leader in Islamic finance innovation and was the first country to issue a Green Sukuk in 2017.
- The issuance of RM 250 million (approximately USD 60 million) Green Sukuk by Tadau Energy Sdn Bhd was directed toward financing a 50MW solar photovoltaic plant in Sabah.
- Structured on the Ijārah contract, this sukuk adhered to both Shariah principles and the Green Bond Principles, demonstrating dual compliance.
- The project provided renewable energy to thousands of households while reducing carbon emissions, setting a precedent for future issuances.
- This milestone signaled to global markets that Islamic finance could actively participate in climate-

related investment, positioning Malaysia as a pioneer in sustainable Islamic capital markets.

## **2.2. Indonesia:** Sovereign Green Sukuk for National Development : (MFI, 2018)

- Indonesia became the first sovereign issuer of Green Sukuk in 2018.
- The government raised USD 1.25 billion to finance renewable energy, sustainable transport, and waste-to-energy projects.
- Subsequent issuances reinforced Indonesia's commitment, with proceeds directed toward building solar power plants, geothermal facilities, and reforestation projects.
- Notably, Indonesia tapped both domestic and international investors, including environmentally conscious funds in Europe and the Middle East, thereby internationalizing Islamic Green Sukuk.

These sovereign issuances demonstrate how Green Sukuk can be integrated into national strategies for achieving the Sustainable Development Goals (SDGs).

## **2.3. The Gulf Region:** Expanding Market Potential : (IsDB, 2019) (Bloomberg, 2019)

- The Gulf Cooperation Council (GCC) has also begun to explore Islamic Green Sukuk to diversify economies away from hydrocarbons.
- In 2019, Majid Al Futtaim, a UAE-based conglomerate, issued a USD 600 million Green Sukuk to fund renewable energy integration in retail malls and real estate projects.



Soumission : 03/01/2025 Acceptation : 01/05/2025 Publication : 25/08/2025

- Similarly, the Islamic Development Bank (IsDB) launched a EUR 1 billion Sustainability Sukuk in 2019, partially earmarked for renewable energy and sustainable infrastructure

These examples highlight the potential of the GCC to scale up Islamic Green Sukuk as part of their energy transition agendas, especially in the context of Vision 2030 strategies.

#### 2.4. Effectiveness and Emerging Lessons

Practical applications reveal several strengths of Islamic Green Sukuk: (MFI, 2018)

- ***Mobilizing Large-Scale Capital:*** Both corporate and sovereign issuances attracted strong investor demand, often oversubscribed.
- ***Dual Legitimacy:*** Compliance with Shariah and environmental standards reassured diverse stakeholders.
- ***Visibility and Global Reach:*** International participation underscored the global appeal of Green Sukuk.

However, limitations persist:

- ***Monitoring Impact:*** Measuring actual environmental benefits remains inconsistent.
- ***Regulatory Gaps:*** Lack of harmonized global frameworks hinders scalability.
- ***Market Depth:*** While growing, Green Sukuk still represent a small fraction of global green finance.

### 3. Future Prospects and Policy Implications of Islamic Green Sukuk

The development of Islamic Green Sukuk reflects a promising synergy between Shariah-compliant finance and global sustainability goals. Yet, for these instruments to become a mainstream solution for renewable energy financing and sustainable development, certain structural, regulatory, and market-related challenges must be addressed. This axis explores the future potential of Islamic Green Sukuk, the policy implications of their expansion, and recommendations to strengthen their role as a bridge between Islamic finance and sustainable development.

#### 3.1. Opportunities for Growth

Islamic Green Sukuk presents significant opportunities that can shape the future of sustainable finance in Muslim and non-Muslim markets alike: (UNP, 2021) (OECD, 2020)

- *Alignment with SDGs:* Green Sukuk directly contribute to several United Nations Sustainable Development Goals, including affordable clean energy (SDG 7), climate action (SDG 13), and sustainable cities (SDG 11).
- *Investor Demand:* The rapid rise of Environmental, Social, and Governance (ESG) investing has created strong appetite among global institutional investors for green assets, including Shariah-compliant ones.
- *Cross-Border Appeal:* Islamic Green Sukuk are not confined to Muslim-majority countries; they can attract international investors seeking ethical and green instruments, broadening the investor base.
- *Economic Diversification:* For oil-dependent economies in the Gulf, Green Sukuk represent a



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vehicle for financing the energy transition and diversifying revenue streams.

### 3.2. Policy and Regulatory Implications

For Islamic Green Sukuk to scale effectively, robust policies and governance mechanisms must be in place: (WB & IIFM, 2021)

- *Standardization of Frameworks*: Currently, issuances follow varying environmental certification and Shariah governance models. Harmonized standards are required to ensure consistency and investor confidence.
- *Transparency and Reporting*: Regular and verifiable reporting on the environmental impact of projects financed by Green Sukuk is essential to avoid “greenwashing.” Independent third-party verification should be institutionalized.
- *Shariah Governance*: Greater collaboration between Shariah boards across jurisdictions is needed to unify interpretations, ensuring that both the structure and underlying projects meet Shariah requirements.
- *Incentives and Supportive Policies*: Governments can play a pivotal role by offering tax incentives, credit guarantees, or subsidies to encourage Green Sukuk issuance and investment.

### 3.3. Challenges to Address

Despite their promise, Islamic Green Sukuk face critical hurdles:

- **Market Depth:** They represent a small fraction of global green bonds, limiting liquidity and secondary market activity.
- **Capacity Gaps:** Some zakat or waqf institutions lack the expertise to integrate Green Sukuk into broader Islamic social finance frameworks.
- **High Costs:** Certification, structuring, and compliance costs may deter smaller issuers, particularly in developing countries.

These challenges underscore the need for multi-stakeholder efforts to build a mature and resilient Islamic Green Sukuk ecosystem.

### 3.4. Strategic Recommendations

To strengthen the effectiveness of Islamic Green Sukuk, the following strategies are proposed:

- **Global Standardization:** Develop unified Shariah and environmental frameworks in collaboration with international bodies such as AAOIFI, IFSB, and the Climate Bonds Initiative.
- **Capacity Building:** Provide training programs for issuers, regulators, and Shariah scholars on the design and monitoring of Green Sukuk.
- **Integration with Islamic Social Finance:** Link Green Sukuk with zakat and waqf initiatives to create blended financing models for climate and social projects.
- **Regional Cooperation:** Encourage regional platforms (ASEAN, GCC) to promote cross-border Green Sukuk, enhancing liquidity and investor confidence.



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- *Policy Incentives*: Governments should introduce supportive policies to lower issuance costs and stimulate market growth.

### 3.5. Future Outlook

Looking forward, Islamic Green Sukuk are poised to play a central role in financing the transition to low-carbon economies. If integrated into national climate strategies and supported by international collaboration, they could evolve from niche instruments into mainstream solutions for global sustainability. Their success will depend not only on financial innovation but also on ensuring that they embody the ethical and spiritual principles of Islamic finance.

### Conclusion

This study examined the theoretical, practical, and policy dimensions of Islamic Green Sukuk as an innovative tool for financing renewable energy and promoting sustainable development. The analysis of theoretical foundations confirmed that sukuk, as Shariah-compliant instruments, naturally align with the ethical imperatives of stewardship (*khilāfah*) and the preservation of public welfare (*maṣlaḥah ʿāmmah*). By integrating green finance principles, Islamic Green Sukuk enhance this alignment by linking financial activity with environmental and social impact.

Case studies from Malaysia, Indonesia, and the Gulf region demonstrated the practical viability of Green Sukuk in mobilizing substantial resources for renewable energy projects. Malaysia's pioneering issuance, Indonesia's

sovereign Green Sukuk, and GCC corporate initiatives highlighted both the local and global appeal of these instruments. Nevertheless, challenges such as fragmented regulation, inconsistent environmental impact reporting, and high issuance costs continue to limit scalability.

Looking forward, Islamic Green Sukuk hold significant potential to serve as a bridge between Islamic finance and global climate action. Their success will depend on harmonized frameworks, greater transparency, and supportive policies that reduce barriers for issuers and build investor confidence.

## Key Findings

1. **Shariah and Sustainability Convergence:** Islamic Green Sukuk integrate religious principles with sustainability objectives, making them ethically robust instruments.
2. **Proven Market Viability:** Practical experiences in Asia and the Gulf confirm that Green Sukuk can attract both domestic and international investors.
3. **Dual Legitimacy:** Compliance with Shariah and international green standards strengthens investor confidence and market credibility.
4. **Persistent Challenges:** Regulatory gaps, lack of standardized reporting, and greenwashing risks remain major hurdles.
5. **Strategic Potential:** Islamic Green Sukuk can significantly contribute to SDGs and national energy transition strategies if properly supported.



## Recommendations

1. **Standardization of Frameworks:** Develop unified guidelines combining Shariah principles with global green certification standards.
2. **Capacity Building:** Train regulators, issuers, and Shariah scholars in structuring and monitoring Green Sukuk.
3. **Policy Incentives:** Governments should provide tax breaks, subsidies, or guarantees to lower issuance costs.
4. **Enhanced Transparency:** Mandate independent third-party audits of environmental impact to counter greenwashing concerns.
5. **Integration with Islamic Social Finance:** Explore synergies between Green Sukuk, zakat, and waqf to fund projects that address both social and environmental needs.
6. **Regional and Global Cooperation:** Encourage cross-border platforms to scale the market and improve liquidity.

## References

1. Ali, S. S., Hassan, M. K., & Zaman, R. (2020). Green sukuk for sustainable development: A roadmap for Islamic finance. *Journal of Islamic Monetary Economics and Finance*, , 06 (Special Issue), 145–172.
2. Bloomberg. (2019). *Majid Al Futtaim sells world's first corporate green sukuk*. Bloomberg News.
3. CBI. (2022). *Green bond market summary 2021*. Climate Bonds Initiative.

4. Dusuki, A. W., & Bouheraoua, S. (2011). *The framework of Maqasid al-Shariah and its implication for Islamic finance*. Islamic Research and Training Institute (IRTI) Working Paper.
5. IsDB. (2019). *IsDB raises EUR 1 billion sustainability sukuk*. Jeddah: IsDB: Islamic Development Bank.
6. MFI. (2018). *Green Sukuk: Financing climate resilience*. Jakarta: Government of Indonesia. Ministry of Finance Indonesia.
7. OECD. (2020). *ESG Investing: Practices, Progress and Challenges*. PARIS: Organisation for Economic Co-operation and Development (OECD).
8. SC. (2017). *Malaysia launches the world's first green sukuk*. Securities Commission Malaysia.
9. Smaoui, H., & Khawaja, M. (2017). The determinants of sukuk market development. *Emerging Markets Review*, 30, 135–151.
10. UNP. (2021). *Sustainable Development Goals Report 2021*. United Nations Publications.
11. Usmani, M. T. (2008). *An introduction to Islamic finance*. Karachi: Maktaba Ma'ariful Qur'an.
12. WB, & IIFM. (2021). *Green Sukuk: Leveraging Islamic Finance for Climate Action*. Washington, DC: World Bank: World Bank & International Islamic Financial Market (IIFM).