ASSESSING THE IMPACT OF GREEN SUKUK ON RENEWABLE ENERGY

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ABSTRACT. *Green sukuk, situated at the intersection of Islamic finance and environmentally responsible investing, emerges as a promising tool for funding renewable energy projects while adhering to Shariah principles. This paper critically examines the significance of Green sukuk in advancing sustainable energy initiatives. It begins with a conceptual overview of Green sukuk, including its structure and types, followed by case studies from Malaysia, Indonesia, and the Arab region that highlight its practical applications. Finally, the study explores the opportunities and challenges of integrating Green sukuk into global climate strategies. While Green sukuk holds substantial potential—particularly in MENA regions—issues such as Shariah compliance, market transparency, pricing inefficiencies, and regulatory shortcomings pose considerable hurdles. The paper concludes by emphasizing the need for deeper research and stronger governance to enhance Green sukuk's effectiveness in driving sustainable development.*

KEYWORDS:*Green sukuk; Islamic finance; renewable energy; sustainable investment; Shariah compliance; socially responsible investing (SRI); climate finance; Islamic bonds; sustainable development goals (SDGs); MENA region; ethical finance.*

INTRODUCTION

The need for sustainable and socially responsible investment strategies is increasing along with the global awareness of environmental challenges (Araminta *et al*, 2022). Concurrently, Islamic finance has become recognized as a reliable and moral framework for managing and allocating wealth. An unique financial product called as *Green sukuk*, is the result of this confluence. Investors that value sustainability and adherence to Islamic financial principles are quickly becoming more interested in *Green sukuk* (Dey *et al*., 2016). For people and organizations looking to combine environmental responsibility with faith-based investments, *Green Sukuk* presents an alluring alternative since it satisfies Shariah goals and is consistent with the moral and sustainability-focused principles of Islamic finance.

This essay attempts to critically discuss the significance of Green sukuk in financing renewable energy projects. Followed by a brief literature review, Section 1 defines the instrument, its different types and a structure, Section 2 discusses past examples of real-life sustainable energy projects that were financed visa *Green sukuk*. And, last section examines the prospects and possible challenges of its practical implementation in the light of existing literature.

LITERATURE REVIEW

Considerable research has been conducted studying the structure (El Amri *et al.,* 2021), benefits and potential (Araminta *et al.,* 2022), challenges (Rahman *et al*., 2022; Bahari *et al*., 2016) and more. In terms of geographic focus of *Green sukuk* research, Alkadi (2024) found that the majority of studies have focused on Malaysia and Indonesia. Regarding the time period, Abdullah

and Keshminder (2022) pointed out that it wasn't until the Paris Agreement in December 2015 that environmental issues became a major focus of national agendas. This change accounts for the consistent rise of *Green sukuk*-related research, which went from one study in 2016 to 19 studies by 2022.

Alam *et al.* (2016) defined the typical *Green sukuk* structure as the securitization of future income streams from ring-fenced assets or projects that adhere to Shariah and environmental compliance norms is what. While Alam *et al*. (2016) provided a foundational *Green sukuk* framework, other scholars have proposed alternative models. For instance, Sarac and Karabulut (2021) suggested three partnership-based *Green sukuk* models to finance wind power installations, taking into account different business cycles and scenarios. Also, Musari (2022) combined *Green sukuk* with Cash Waqf-Linked Sukuk (CWLS), introducing a novel strategy to address climate change in Indonesia.

Multiple research publications have looked at the advantages of *Green sukuk*, highlighting a number of benefits (Alam *et al*., 2016; Bukhari *et al.,* 2020; Rahim and Mohammad, 2018). These consist of environmental preservation, tax breaks, risk diversification, and support for the Sustainable Development Goals (SDGs). Furthermore, according to Alkadi (2024), *Green sukuk* provides a solution for infrastructure and environmental initiatives, meeting the financial needs of nations with expanding populations.

DISCUSSION

1. Green sukuk: definition, structure and types.

Initiatives designated as "green projects" have fuelled significant interest as a result of the increased emphasis on ecologically sustainable development on a worldwide scale. Islamic finance presents a unique opportunity to develop financial products that complement the global push for green initiatives. Its tenets inherently promote environmental sustainability, which makes it a good fit for the moral standards required by green projects. Therefore, Islamic finance's overarching objective of advancing community welfare naturally extends to environmental conservation (Adil *et al*., 2023).

Green sukuk is acknowledged as a distinct asset class situated at the nexus of three investing domains: socially responsible investments (SRI), sukuk, and Islamic mutual funds (Alam *et al.,* 2016). While standard sukuk can finance a broad spectrum of projects, *Green sukuk* are uniquely engineered to finance renewable energy ventures and environmentally sustainable initiatives, The "green" label denotes their sole emphasis on low-carbon and ecologically friendly projects (Liu and Lai, 2021). Addressing one of the higher Islamic values that prioritize environmental preservation is their main goal. Sukuk are structured using several Islamic financial models, namely Ijarah, Wakalah, Murabahah, Musharakah, Mudharabah, Istisna and Salam. The particular needs of the project determine the structure to be used, frequently in conjunction with other Islamic financial instruments (Bukhari *et al.*, 2020; El Amri *et al*., 2021, Mat Rahim & Mohamad, 2018).

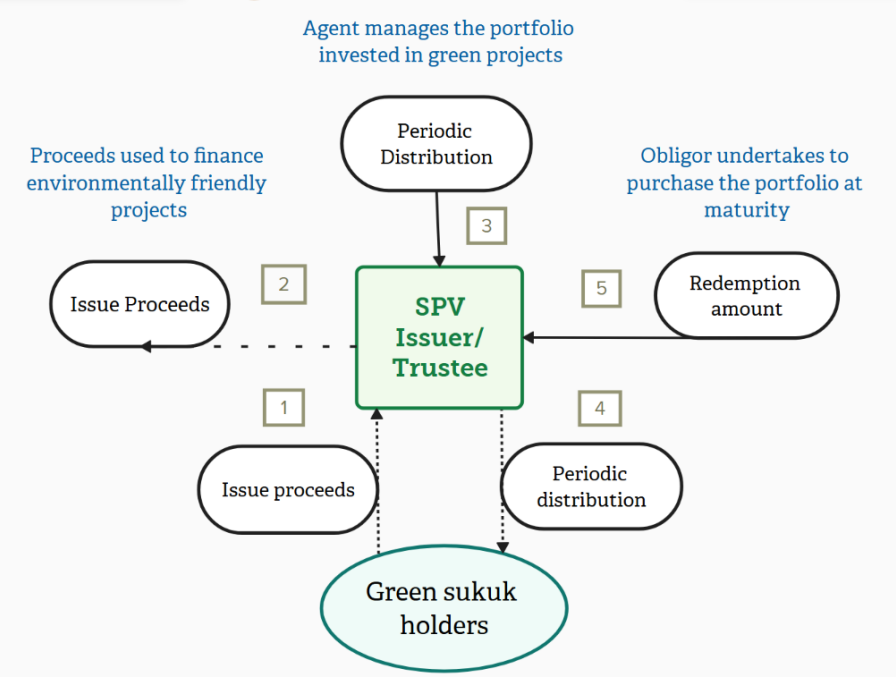


Figure 1. Structure of *Green sukuk*[1]

As depicted in the Figure 1, the structure of *Green sukuk* entails securitizing future cash flows from pre-selected projects or assets that satisfy particular requirements. The money raised by these sukuk issuances is allocated to green initiatives that adhere to Shariah. The sukuk investors receive a portion of the project portfolio's revenues once the Special Purpose Vehicle (SPV) costs have been subtracted. The Obligor agrees to buy the portfolio back from the SPV when it matures. The total nominal value of the trust certificates plus any outstanding accrued periodic dividends are used to determine the repurchase price (Figure 1).

In principle, sukuk are in line with Shariah rules that regulate Islamic finance, even though they resemble traditional bonds. One of its unique features is the fact that sukuk grant ownership stakes in the underlying assets or the profits produced by those assets. Furthermore, because of their risk-sharing arrangement, they are especially well-suited for infrastructure development and provide a workable way to close financial gaps in poor countries (International Monetary Fund, 2015).

2. Practical usage of Green sukuk to finance renewable energy projects

As highlighted in Climate Bonds Initiative (2019), *Green sukuk,* similar to Green Bonds, can be used to fund ecologically friendly assets and initiatives in fields like pollution control, climate change adaptation, and renewable energy, solar energy projects, wind farms, biogas facilities, energy efficiency initiatives and electric vehicle programs. One of the noteworthy examples is a 50 MW photovoltaic solar venture named "One Solar Watt per Person". Two Australian solar and lighting companies[2], spearheaded this project, which was issued through Malaysia with an projection towards Indonesia. The first phase, worth $150 million, was funded in late 2012 and has a total value of $550 million (Dorsman *et al.,* 2016). These kinds of solar systems are beneficial since they are easy to install and generate income quickly—usually within

[1] Developed by author based on a study by Alam *et al.* (2016)
[2] Mitabu Australia and Solar Guys International

months (Reve, 2013). Clean and renewable energy solutions can be supported by *Green sukuk*, as demonstrated by this initiative.

Further major examples of *Green sukuk*-funded projects issued by China is the Bakun Hydroelectric Plant, and Malaysian's project is Tadau Energy's solar photovoltaic project, respectively (Mat Rahim and Mohammad, 2018). In order to build a 50 MW solar photovoltaic facility in Kudat, a small area in Malaysia's Sabah province, Tadau Energy issued a 10-year sukuk worth RM 250 million in 2017. In the meantime, a 2,400 MW hydropower plant was being built as part of the Bakun hydropower project, which was overseen by Sarawak Energy Berhad, a state-owned company in Sarawak. The construction of a 205-meter-tall dam was part of this 30-year project, which was anticipated to cost $1.6 billion. According to Mat Rahim and Mohamad (2018), the electricity rate was fixed at 6.25 cents per kilowatt-hour and would increase by 1.5% annually.

Table 1. Major areas covered by *Green sukuk*[3]

N	Country	Areas	Estimated funds
1	Malaysia	Renewable energy	5.362 billion US dollars
		Real estate	
2	Indonesia	Renewable energy	3.234 billion US dollars
		Waste management	
		Energy efficiency	
		Pollution	
		Sustainable transportation	
3	UAE	Green buildings	1.2 billion US dollars
		Sustainable water management	
		Renewable energy	
4	Saudi Arabia	Green projects	1 billion US dollars

Above given example of *Green sukuk* funded projects are only a few instances. Table 1 might provide better glimpse of *Green sukuk* markets, i.e. major issuing countries and the estimated funds. As can be seen, Malaysia is by far the most active is *Green sukuk* ventures, with estimated amount constituting approximately five times more than that of UAE, each amounting to around 5.4 and 1.2 respectively (Table 1). It can be inferred that Southeast Asian countries are comparatively major players that Arab region.

3. Opportunities and challenges of integrating Green sukuk in global climate initiatives

Green sukuk has a massive potential, especially in MENA regions for the upcoming decade. Over the past ten years, in multiple Arab countries power demand has consistently increased by about 6% annually. At the same time, 14 Arab nations are working to increase the production of renewable energy due to the depletion of fossil fuel sources and the good climate for solar and wind energy (Alam *et al*., 2023). In order to overcome the current energy shortfalls

[3] Developed by author based on data provided by Rahman *et al*. (2022)

in these nations, their goal is to increase the output of renewable energy from 12 GWh in 2013 (which made up only 6% of total energy production) to around 75 GWh by 2030. The National, a newspaper published in Abu Dhabi, estimates that *Green sukuk* may produce about $300 billion, which could be used for projects that lessen the effects of climate change. This illustrates the enormous financial potential of *Green sukuk* in assisting energy and sustainable development initiatives in areas where investments in renewable energy are becoming more and more committed (Alam *et al*., 2016).

Nevertheless, despite being an innovative and unique financial product that has been well embraced by the market, *Green sukuk* continues to encounter several issues. To fully achieve its potential and improve its social impact in line with the goals of the most recent Sustainable Development Goals (SDGs) agenda, there remains significant space for refinement to fully realize its potential and improve its social impact in alignment with SDGs. According to Rahman *et al*. (2022), and Masood *et al*., (2024), **guaranteeing Shariah compliance** is one of the main issues with sukuk, especially *Green Sukuk*. The "sell-buyback" characteristic, which closely resembles the contentious "*sale of Inah*," is a particularly important concern. Since many Islamic scholars believe that transactions based on Inah are prohibited by Islamic law, this structure presents serious Shariah issues.

In addition to problems with Shariah compliance, the *Green Sukuk* market also faces **lack of transparency**. Bahari *et al*. (2016) points out that investor confidence is weakened by the lack of clarity surrounding the management and distribution of money in *Green Sukuk* projects. Thirdly, According to Dorsman *et al*. (2016), **unfavourable pricing models** is also posing a challenging position. *Green Sukuk* is less appealing than traditional Green Bonds because it relies on pricing models that do not adequately reflect investor interests.
Fourth on the list is a reputational risks. Structure of *Green sukuk*, like sukuk generally, suffers from inconsistencies. Although this flexibility can be helpful in certain situations, it undermines the credibility of sukuk as a trustworthy and moral financing instrument by causing investor negative perception (Dorsman *et al*., 2016).

Lastly, the absence of thorough rules that support and align with the main goals of *Green sukuk* initiatives is a major problem when issuing *Green sukuk*, according to the author's systematic investigation. This lack of regulations is noticeable among other stakeholders as well as at the governmental level, resulting in a gap that jeopardizes the growth and effectiveness of these projects (Bahari *et al*., 2016). These issues resulted in a lower demand for *Green Sukuk* compared to more established Green Bonds, which are often viewed as more transparent and straightforward financial instruments.

CONCLUSION

This article analysed the role of Islamic Bond, Green sukuk in leveraging the renewable energy ventures and types of challenges this financial tool is currently witnessing and its future prospects. First section had relatively descriptive character, defining the sukuk itself, types and structures; its difference from conventional green bonds. The actual implications of *Green sukuk* in renewable energy industry was given in examples of solar venture, hydraulic plant and green buildings issued by Malaysia and Indonesia. Furthermore, it has been made evident that Arab countries, such as UAE and Saudi Arabia are much smaller players in the markets compared Southeast Asian sukuk issuers.

In Section 3, critical analyses of sukuk issues and opportunities were made. Although *green sukuk* has a great potential to finance sustainable energy projects in MENA regions due to their massive demand, however several challenges are hindering its progress, such as guaranteeing Shariah compliance, lack of transparency, unfavourable pricing models and inadequate governance framework. More research should be conducted to suggest viable solutions to the above mentioned problems.

REFERENCES

1. Adil, M., Hoogendoorn, H.J. and Jumat, Z.H. (2023) 'Sukuk Innovation: Powering sustainable finance', Palgrave CIBFR Studies in Islamic Finance, pp. 145–158. doi:10.1007/978-3-031-13302-2_7.
2. Alam, A. *et al.* (2023) 'Development and evaluation of Islamic Green Financing: A systematic review of Green Sukuk', *Environmental Economics*, 14(1), pp. 61–72. doi:10.21511/ee.14(1).2023.06.
3. Alam, N., Duygun, M. and Ariss, R.T. (2016) 'Green Sukuk: An innovation in Islamic Capital Markets', *Energy and Finance*, pp. 167–185. doi:10.1007/978-3-319-32268-1_10.
4. Ali, Q. *et al.* (2023) 'An empirical study of the effects of Green Sukuk Spur on economic growth, social development, and financial performance in Indonesia', *Environment, Development and Sustainability*, 26(8), pp. 21097–21123. doi:10.1007/s10668-023-03520-6.
5. Abdullah, S.M. and Keshminder, J.S. (2022), "What drives Green Sukuk? A leader's perspective*", Journal of Sustainable Finance and Investment,* Vol. 12 No. 3, pp. 985-1005.
6. Alkadi, R.S. (2024) 'Towards a sustainable future: A comprehensive review of green sukuk', *Review of Accounting and Finance*, 23(4), pp. 467–488. doi:10.1108/raf-03-2023-0105.
7. Araminta, D.V., Qudziyah, Q. and Timur, Y.P. (2022) 'The role of Green Sukuk in realizing the Sustainable Development Goals 2030 Agenda', *Jurnal Ekonomi dan Bisnis Islam (Journal of Islamic Economics and Business)*, 8(2), pp. 251–266. doi:10.20473/jebis.v8i2.37531.
8. Bahari, N.F., Ahmad, N.W., Shahar, W.S.S. and Othman, N. (2016), "A review on the potential growth of Sukuk, issues and its challenges", *International Conference on Economics and Banking*, Vol. 2, pp. 395-403.
9. Bukhari et al. (2020), "Green banking and Islam: two sides of the same coin", *Journal of Islamic Marketing*, Vol. 11 No.4, pp. 977-1000.
10. Climate Bonds Initiative (2019), "Climate bonds taxonomy", available at: www.climatebonds.net/ standard/taxonomy
11. Dey, D., Hussain, T. and Hauman, M. (2016), Green Bonds and Islamic Finance, White and Case, New York, NY.
12. Dorsman, A. B., Arslan-Ayaydin, Ö., & Karan, M. B. (2016). Energy and Finance: Sustainability in the Energy Industry (pp. 1–203). https://doi.org/ 10.1007/978-3-319-32268-1.
13. El Amri, M.C., Mohammed, M.O. and Abdi, M.H. (2021) 'How green sukuk structure contributes to SDGreen sukuk?', *Islamic Wealth and the SDGreen sukuk*, pp. 621–637. doi:10.1007/978-3-030-65313-2_32.
14. International Monetary Fund (2015) Islamic finance: opportunities, challenges, and policy options. *IMF staff discussion note SDN/15/05*. International Monetary Fund, Washington, DC
15. Kachkar, O. and Al Fares, M. (2024) 'Sri Sukuk to achieve SDGs with a special reference to the legal and regulatory framework in Malaysia', *Contributions to Management Science*, pp. 159–184. doi:10.1007/978-3-031-61778-2_9.

16. Liu, F.H. and Lai, K.P. (2021) 'Ecologies of green finance: Green sukuk and development of Green Islamic Finance in Malaysia', *Environment and Planning A: Economy and Space*, 53(8), pp. 1896–1914. doi:10.1177/0308518x211038349.
17. Masood, A., Rahim, N. and Lee, U.H. (2024) 'Driving green sukuk development to meet ESGREEN SUKUK and Society 5.0 aspirations through Innovative Technology', *Contributions to Management Science*, pp. 1–18. doi:10.1007/978-3-031-61778-2_1.
18. Mat Rahim, S.R. and Mohamad, Z.Z. (2018) 'Green Sukuk for financing renewable energy projects', *Turkish Journal of Islamic Economics*, 5(2), pp. 129–144.
19. Musari, K. (2022), "Integrating Green Sukuk and cash Waqf linked sukuk, the blended Islamic finance of fiscal instrument in Indonesia: a proposed model for fighting climate change", *International Journal of Islamic Khazanah,* Vol. 12 No.2, pp.133-144.
20. Rahman, A. *et al.* (2022) 'The challenges of Green Sukuk policy implementation for achieving sustainable environment', *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 7(11).
21. Reve. (2013). *Sukuk to Fund an Indonesian Solar Power Project.*
22. Sarac, M. and Karabulut, E. (2021), "Partnership based Sukuk model in environmental and social investments", *Journal of BRSA Banking and Financial Markets,* Vol. 15No. 1, pp. 27-59