

Series in Energy Transition, Carbon Neutrality, and Sustainability - Volume 3

# GREEN FINANCE AND ENERGY TRANSITION IN ASEAN

Han Phoumin  
Farhad Taghizadeh-Hesary  
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Rabindra Nepal

# GREEN FINANCE AND ENERGY TRANSITION IN ASEAN

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# Introduction

**Han Phoumin, Farhad Taghizadeh-Hesary,  
Fukunari Kimura, and Rabindra Nepal**

*Green Finance and Energy Transition in ASEAN* provides an in-depth analysis of how Southeast Asia economies can foster the energy transition to achieve carbon neutrality through innovative sustainable finance policies and strategic green investments. It highlights the role of private investments, the financial implications of moving away from fossil fuels, financing energy efficiency, and the importance of climate finance. This book explores various financing mechanisms in debt and equity, such as investments in an optimal fuel mix, green initiatives, green bonds, green Sukuk, transition finance, and the critical collaboration between regional policies and global financial systems to ensure a sustainable energy future for ASEAN.

This book consists of 10 chapters and is structured into two sections: Regional Insights and Policies and Investment Strategies and Financing Mechanisms.

## **Section I: Regional Insights and Policies**

**Chapter 1:** Vidya explores the role of green finance, renewable energy adoption, and technological innovation in achieving carbon neutrality in ASEAN. The study reveals that green bonds expedite renewable energy transitions, while technological innovation greatly reduces carbon

emissions. The findings highlight the necessity for targeted policies, carbon pricing, regulatory reforms, and cross-border collaborations to align economic growth with sustainability objectives.

**Chapter 2:** Panthamit *et al.* explore the impact of Chinese outward foreign direct investment (COFDI) on decoupling carbon emissions in ASEAN. The study reveals that COFDI can either promote or impede carbon decoupling, influenced by technological advancements and scale effects. The findings highlight the necessity for green investments, technology transfer, and customized policies to reconcile economic growth with carbon reduction in ASEAN.

**Chapter 3:** Rimaud explores the economic viability of phasing out fossil fuel power assets and replacing them with renewable energy. The study highlights the financial challenges of early coal-fired power plant retirements and emphasizes the role of carbon pricing, concessional financing, and transition credits in making such shifts economically feasible. Findings suggest that a market-based approach, integrating carbon credit mechanisms and financial incentives, can enhance investment attractiveness while supporting the transition to a low-carbon economy.

**Chapter 4:** Husaini *et al.* examine the role of green bonds in promoting carbon neutrality throughout the ASEAN-5, stressing their significance in addressing the region's renewable energy investment shortfall. The study analyzes issuance trends, major green projects, and policy hurdles, emphasizing the need for stronger financial strategies and regulatory frameworks to enhance sustainable financing. The findings highlight green bonds as a crucial tool for improving energy security and reducing climate-related economic risks in ASEAN.

**Chapter 5:** Hinnells examines the policy and financial mechanisms aimed at doubling energy efficiency improvements in ASEAN by 2030, as established by COP28. The study underscores the importance of market transformation, integrating energy labels, financial incentives, and regulatory standards to promote efficiency across multiple sectors. The findings highlight the necessity for harmonized policies, cross-border collaboration, and financial support for adopting technology to achieve ASEAN's energy efficiency goals.

## Section II: Investment Strategies and Financing Mechanisms

**Chapter 6:** Amin *et al.* investigate the role of foreign direct investment (FDI) in achieving an optimal fuel mix for ASEAN's energy transition. The study underscores how FDI can fill the region's renewable energy investment gap, accelerating the move from fossil fuels. The findings highlight the need for stronger regulatory frameworks, investment incentives, and regional collaboration to enhance FDI's impact on sustainable energy development.

**Chapter 7:** Chang examines the financial requirements for achieving carbon neutrality in ASEAN's power sector through an integrated power trade model. The study reveals that reduced cross-border power trade heightens the demand for additional capacity, increasing overall costs. Policy recommendations emphasize the significance of regional grid integration, investments in renewable energy, and financial incentives to support ASEAN's net-zero transition by 2050.

**Chapter 8:** Mohsin and Iram investigate strategic investment opportunities for China's low-carbon transition, highlighting the significance of green finance and fintech innovations. The study emphasizes key areas such as renewable energy infrastructure, energy storage technologies, and digital financial tools, which improve investment efficiency and risk management. The findings underscore the importance of policy incentives, financial innovations, and regulatory frameworks in accelerating China's energy transition and achieving its carbon neutrality goals by 2060.

**Chapter 9:** Hassanudin *et al.* explore the effectiveness of green sukuk, a Shariah-compliant financial instrument, in funding renewable energy projects and promoting carbon neutrality in Malaysia. The study highlights successful case studies, illustrating how green sukuk attracts investors and supports large-scale clean energy initiatives. The findings stress the need for regulatory improvements, financial innovation, and increased market awareness to broaden the adoption of green sukuk and maximize their impact on sustainability.

**Chapter 10:** Iqbal examines the role of green finance, technological innovation, and subsidies in facilitating China's power system transition to

net-zero carbon by 2060. The study's empirical findings show that green finance limits fossil fuel expansion while mobilizing investments in sustainable supply chains. The findings emphasize the need for stronger financial transition mechanisms and policy reforms to accelerate China's energy shift.

This book comprehensively examines green finance and investment strategies in ASEAN, addressing the financial and policy challenges of fostering the energy transition. While existing literature often focuses on isolated aspects of sustainable energy, this volume bridges the gap by exploring how financial instruments, foreign investment, and policy frameworks interact to drive the transition.

Through empirical research, the chapters offer fresh insights into financing renewable energy, improving energy efficiency, and achieving carbon neutrality. By incorporating regional perspectives, sectoral insights, and country-specific case studies, *Green Finance and Energy Transition in ASEAN* equips policymakers, researchers, and investors with data-driven strategies for financing the energy transition.

This book's findings offer actionable recommendations for sustainable energy transitions across ASEAN and East Asia, while its policy insights provide valuable guidance for the rest of the world.

## Chapter 9

# Green Sukuk and Carbon Neutrality in Malaysia: An Analysis of the Effectiveness of Islamic Finance in Funding Renewable Energy Projects

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### Abstract

This chapter examines the role of green sukuk in advancing carbon neutrality in Malaysia, focusing on their effectiveness in funding renewable energy projects. Green sukuk are Shariah-compliant financial instruments that merge Islamic finance principles with environmental sustainability goals. Malaysia, a global leader in Islamic finance, issued the world's first green Sukuk (singular form of sukuk) in 2017, setting a precedent for sustainable finance. The study explores the operational

mechanisms and market dynamics of green sukuk and highlights successful case studies such as Tadau Energy and Quantum Solar Park. These projects demonstrate the potential of green sukuk to attract diverse investors and support large-scale renewable energy initiatives. The chapter also addresses challenges in the adoption and implementation of green sukuk, including high initial costs, regulatory complexities, and market awareness. Through qualitative research and expert interviews, the study provides insights into the socioeconomic and environmental impacts of green sukuk, emphasizing their role in promoting sustainable development and financial inclusion. The findings suggest that while green sukuk have significantly contributed to Malaysia's renewable energy sector, further efforts are needed to enhance financial support market and innovation in green finance products. This research underscores the importance of integrating Islamic finance with sustainability objectives to achieve carbon neutrality and foster a resilient, inclusive economy.

**Keywords:** Green Sukuk, carbon neutrality, Islamic finance, renewable energy

## 1. Introduction

### 1.1. *Overview of Islamic finance: Core principles and features*

Islamic finance is a Shariah-compliant financial system based on principles derived from the Quran, Hadith, and Islamic jurisprudence. Unlike conventional finance, it prioritizes ethical practices, social justice, and fair wealth distribution, prohibiting harmful activities like gambling, alcohol, and usury (*riba*). A key feature is the ban on interest, as money alone cannot generate profit without real economic activity. Instead, profit is earned through risk-sharing and asset-backed ventures, such as *Mudarabah* (profit-sharing) and *Musharakah* (joint ventures), where profits and losses are shared. This approach promotes equitable financial relationships, discourages excessive debt, and fosters a socially responsible economy. Islamic finance prohibits *gharar*, or excessive uncertainty and speculation, requiring transactions to be based on tangible assets with clear terms. This ensures transparency, fairness, and ethical conduct, avoiding unjust enrichment. Contracts with excessive uncertainty, like certain derivatives, are not allowed. Emphasizing social responsibility, Islamic finance encourages investments in societal well-being, such as infrastructure and education, and includes *zakat* (almsgiving). Asset-backed financing, like *Ijarah*

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