Global Journal of Economic and Finance Research

e-ISSN: 3050-5348
p-ISSN: 3050-533X

Vol. 02(06): 412-418, June 2025

Home Page: https://gjefr.com

Bond Financing and Green Credit in Renewable Energy: Evidence and Policy Implications from Vietnam

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KEYWORDS: renewable energy, green finance, green credit, green bonds

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Publication Date: 17 June-2025
DOI: 10.55677/GJEFR/08-2025-Vol02E6

ABSTRACT

The development of renewable energy is a strategic priority in realizing Vietnam's commitment to net-zero emissions by 2050. Amid the growing capital demands of renewable energy projects, corporate bonds and green credit have emerged as effective financial instruments. This paper evaluates the current status of capital mobilization through bond issuance in the renewable energy sector, with a specific focus on solar and wind power projects in Vietnam during the 2019–2022 period. Data reveal a significant decline in renewable energy bond issuance since 2021, highlighting critical challenges related to bond maturity structure, liquidity constraints, and legal frameworks. Based on these findings, the paper proposes several policy and institutional recommendations to address financial bottlenecks and promote the sustainable development of Vietnam's green capital market.

1. INTRODUCTION

In the context of escalating global challenges such as climate change, environmental degradation, and resource depletion, the concepts of "green growth" and sustainable development have become central to national development strategies. At the 26th United Nations Climate Change Conference (COP26), Vietnam officially pledged to achieve net-zero carbon emissions by 2050-marking a significant shift from a resource-intensive, "brown" growth model to one centered on green innovation and energy efficiency.

Within this transition, renewable energy development plays a critical role. It not only ensures national energy security but also significantly reduces greenhouse gas emissions from the electricity generation sector, which constitutes a major portion of the country's total emissions. Under Vietnam's Power Development Plan VIII (PDP8), the government aims to raise the share of renewable energy to 70% of the electricity mix by 2050. However, to realize this goal, the World Bank (2023) estimates that Vietnam will need to mobilize approximately USD 134-150 billion by 2030 and around USD 400-500 billion by 2050 for clean energy projects and related transmission infrastructure.

In light of these demands, the need for a robust green finance system and the diversification of capital mobilization channels becomes urgent. Given the limitations of public budgets in meeting long-term investment requirements, leveraging private sector financing-particularly through medium- and long-term financial instruments such as corporate bonds, especially green bonds-is viewed as a strategic solution. Green bonds, by definition, are debt instruments issued specifically to finance environmentally beneficial projects, with renewable energy being a top priority. These instruments not only address capital challenges but also enhance transparency, improve corporate image, and attract institutional and international investors increasingly oriented toward ESG (Environmental, Social, and Governance) principles.

Nevertheless, Vietnam's green bond market remains nascent, lacking standardization, with few energy enterprises possessing the capacity to issue effectively. This situation calls for comprehensive research into the role, potential, and barriers of utilizing bonds- particularly green bonds- for financing renewable energy in Vietnam. A proper assessment of institutional readiness, corporate capacity, investor sentiment, and international best practices is essential to propose practical and context-specific solutions. These will contribute to the development of a green financial market and effectively support the national energy transition.

This paper analyzes the role of bonds- especially green bonds- in financing renewable energy projects in Vietnam. Based on the theoretical foundation of sustainable finance and an examination of recent bond issuance practices in the country, the study

proposes key policy orientations and recommendations to improve capital mobilization for green growth, thereby supporting the long-term objective of sustainable renewable energy development by 2050.

2. LITERATURE REVIEW

Amidst the global climate crisis, green credit and green bonds have emerged as critical financial instruments for mobilizing capital toward sustainable development projects, particularly in the renewable energy sector. While both international and domestic studies have examined the role of these instruments in promoting green growth, significant research gaps remain regarding the practical implementation conditions and regulatory frameworks in developing economies such as Vietnam.

Green credit refers to loans or financing provided to support environmentally friendly projects, such as renewable energy, energy efficiency, waste management, and sustainable transportation. According to the Climate Bonds Initiative (2022), green credit not only contributes to carbon emission reductions but also enhances access to finance for environmentally responsible enterprises, especially through preferential interest rates and prioritized lending conditions.

Green bonds- debt instruments issued to raise capital for projects that deliver environmental benefits- have experienced remarkable global growth. Between 2013 and 2022, the green bond market expanded exponentially, with annual issuances exceeding USD 500 billion (OECD, 2022). Studies such as Flammer (2021) show that green bonds not only diversify funding sources but also generate positive impacts on issuers' financial performance and brand value.

In Vietnam, the green bond market is still in its infancy but possesses significant growth potential. A report by the International Finance Corporation (IFC, 2021) estimates that Vietnam could mobilize over USD 70 billion through green bonds from 2022 to 2030 to finance climate mitigation and adaptation projects. However, institutional barriers- including the absence of a clear legal framework, lack of standardized disclosures, and weak environmental impact assessment protocols- have hindered the market's development (Nguyen & Tran, 2023).

In terms of renewable energy finance, numerous studies have affirmed that the development of solar, wind, and other clean energy forms requires an effective combination of incentive policies, financial support, and private sector engagement (IRENA, 2021; World Bank, 2022). Concurrently, research by Zhang et al. (2022) and Tawiah et al. (2021) highlights that green bonds and green credit can only be effective when embedded within a comprehensive financial strategy supported by a conducive policy ecosystem, the development of green capital markets, and active participation from financial institutions.

Although existing literature has addressed the connection between green finance and green growth, few studies have explicitly explored the mechanisms for mobilizing and allocating green bond capital for renewable energy projects in Vietnam. Therefore, this study aims to bridge this gap by analyzing the theoretical foundations, international experiences, and current practices in Vietnam. It ultimately proposes feasible solutions to enhance the effectiveness of green bond financing for renewable energy development.

3. THE CURRENT STATUS OF THE RENEWABLE ENERGY SECTOR IN VIETNAM

In the context of climate change becoming a global challenge, the development of renewable energy is considered a strategic solution to reduce greenhouse gas emissions and pursue green growth. Following the 26th United Nations Climate Change Conference (COP26), more than 110 countries committed to achieving net-zero emissions by 2050, and over 105 countries pledged to cut methane emissions by 30% by 2030.

Vietnam has clearly demonstrated its commitment to global integration by declaring a target of net-zero emissions by 2050 and participating in the establishment of the Just Energy Transition Partnership (JETP). These commitments not only reflect Vietnam’s international responsibility but also serve as a strong impetus for energy policy reform, particularly in shifting towards renewable energy sources.

Vietnam is among the early adopters of renewable energy in its national power development strategy. In Power Development Plan VII (2011), the government set targets to increase the share of renewable energy from 3.5% in 2010 to 4.5% in 2020 and 6% in 2030. Wind power was identified as a key priority, with targets of 1,000 MW by 2020 and 6,200 MW by 2030. Subsequent revisions to Power Development Plan VII and the latest Power Development Plan VIII continued to underscore the strategic importance of clean energy sources.

Thanks to clear policy direction and supportive investment incentives, Vietnam’s renewable energy sector witnessed a breakthrough during 2018- 2023. Solar power capacity surged from just over 100 MW before 2018 to more than 18,854 MW by the end of 2023. Wind power also experienced rapid growth, expanding from 135 MW in 2015 to 3,980 MW in 2022, and reaching 4,745 MW by the end of 2023.

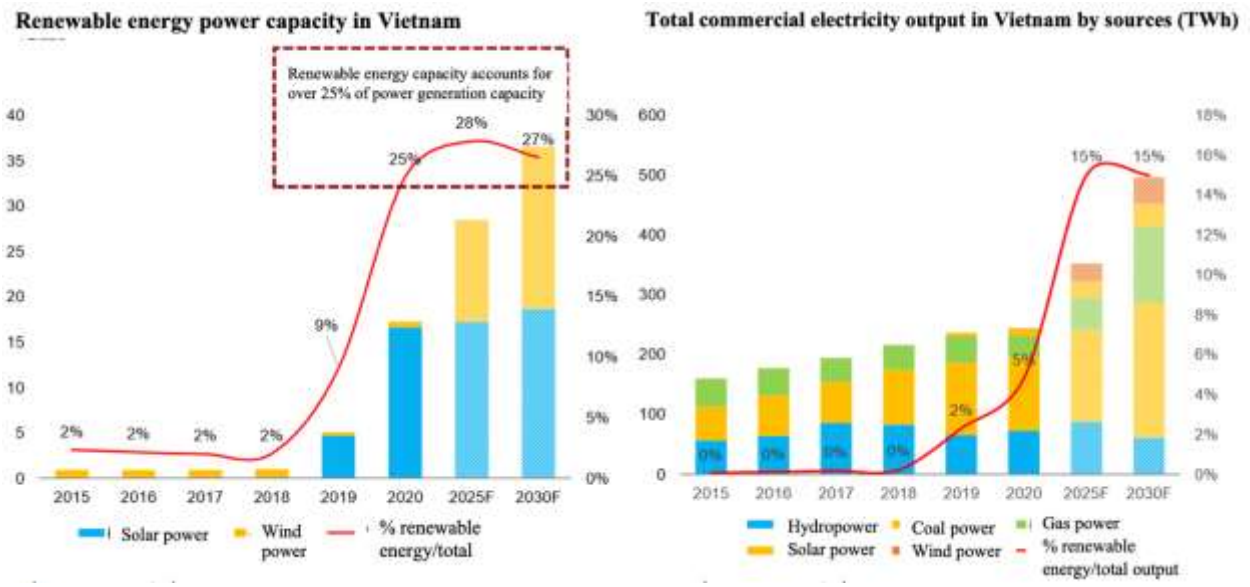

Figure 1: Renewable Energy Generation Capacity in Vietnam
Source: Fiin Ratings, Power Development Plan VIII

By the end of 2023, Vietnam's total renewable energy capacity had reached approximately 23,600 MW, accounting for nearly 27% of the country's total installed electricity capacity. This marks a significant step toward establishing renewable energy as a key pillar of the national energy structure.

Notably, the rapid growth in solar and wind power was largely driven by attractive investment policies. The application of the Feed-in Tariff (FiT) mechanism prior to November 2021- offering a fixed price of 8.5 US cents/kWh for onshore wind and 9.8 US cents/kWh for offshore wind- played a crucial role in drawing both domestic and foreign investors. By the end of 2020, the total approved wind power capacity had reached nearly 13 GW, primarily concentrated in the Southwest and South Central regions. In 2022, installed wind capacity rose to 5,059 MW, nearly ten times higher than in 2020.

Overall, Vietnam's renewable energy sector is entering a phase of rapid expansion, with increasing participation from the private sector and a progressively clearer policy framework. However, to sustain this growth, Vietnam must continue institutional reform, enhance mobilization of private capital, and establish a transparent and competitive electricity market to ensure long-term economic, environmental, and social efficiency.

4. THE STATE OF GREEN FINANCE FOR RENEWABLE ENERGY DEVELOPMENT

According to the Ministry of Industry and Trade, Vietnam plans to add 16,000 MW of onshore wind power and 7,000 MW of offshore wind power by 2030. These figures are projected to increase to 56,000 MW and 64,000 MW, respectively, by 2045, while solar power capacity is expected to rise to 87,000 MW by 2045. By 2050, the power system is expected to rely entirely on renewable energy sources. However, mobilizing financial resources for the implementation of Power Development Plan VIII remains a major challenge. Estimates suggest that Vietnam will require between USD 12- 15 billion annually by 2030 and up to USD 400 billion by 2050 for renewable energy investment.

4.1. Financing through Green Credit

Developers of renewable energy projects in Vietnam can access green credit through commercial banks or development banks and funds. Several commercial banks have allocated specific green credit lines to provide concessional loans for renewable energy projects. Debt servicing and repayment schedules are often aligned with project cash flows, reflecting the capital-intensive and long-term nature of renewable energy investments.

The State Bank of Vietnam (SBV) has finalized its green credit development strategy, providing guidance on green lending practices across sectors and managing environmental and social risks. Between 2017 and 2022, outstanding green credit grew at an average annual rate of nearly 23%, surpassing the overall credit growth of the economy. Circular No. 17/2022/TT-NHNN, which outlines environmental and social risk management in lending activities, has supported credit institutions in implementing green credit. According to the Department of Credit for Economic Sectors, as of the end of 2022, 39 out of 129 credit institutions had issued green loans. This number rose to 47 in 2023 and is projected to reach 50 in 2024.

Table 1: Outstanding Green Credit and Loans for Renewable and Clean Energy in Vietnam, 2020–2024
Unit: trillion VND

Year	2020	2021	2022	2023	9/2024
Outstanding Green Credit	348	447	500	621	680
Outstanding Loans for Renewable and Clean Energy Sector	84	179	233	279	22

Source: State Bank of Vietnam

The Bank for Investment and Development of Vietnam (BIDV) is one of the pioneers in green credit. Between 2020 and 2021, BIDV financed 25 solar and wind power projects with a total loan value of VND 23.4 trillion. By the end of 2022, BIDV led the green credit market with over 1,386 clients and committed green credit lines exceeding USD 2.68 billion. In July 2024, BIDV signed a EUR 50 million climate credit agreement with AFD to finance climate adaptation projects. The bank also issued a "Sustainable Loan Framework" aligned with international standards and aims to reach a green loan portfolio of USD 3 billion by 2025, representing around 5% of total outstanding loans.

At Vietcombank, green credit has also been strongly promoted. The bank partnered with JBIC to provide USD 500 million for renewable energy projects. Green credit outstanding rose significantly from VND 11.765 trillion in 2020 to VND 46.1 trillion in 2023, with 84% allocated to renewable energy. As of Q1/2024, green credit outstanding reached VND 47.7 trillion, accounting for 3.7% of the bank's total lending.

In addition, several other banks such as VietinBank, SHB, HDBank, VPBank, ACB, and Techcombank have also implemented green credit programs using funds from the World Bank, IFC, JBIC, and the Green Climate Fund. Many of these programs focus on renewable energy, green buildings, and energy efficiency, contributing to Vietnam's commitment to achieve net-zero emissions by 2050.

4.2. Financing through Green Bonds

Several banks have supported green credit projects by purchasing green bonds issued by project developers. According to the Vietnam Bond Market Association, in 2020, bonds from the energy sector reached VND 37,017 billion, accounting for 8% of the total bond issuance volume, marking a 274% increase compared to 2019. In 2021, this figure declined to VND 28,453 billion (equivalent to 4% of the total issuance), and by 2022, the issuance volume dropped sharply to only VND 2,900 billion. This decline is largely attributed to changes in the legal framework governing bond issuance, particularly the implementation of Decree No. 65/2022 and Decree No. 08/2023. As a result, energy bonds are expected to be less vibrant in the near future compared to the previous period.

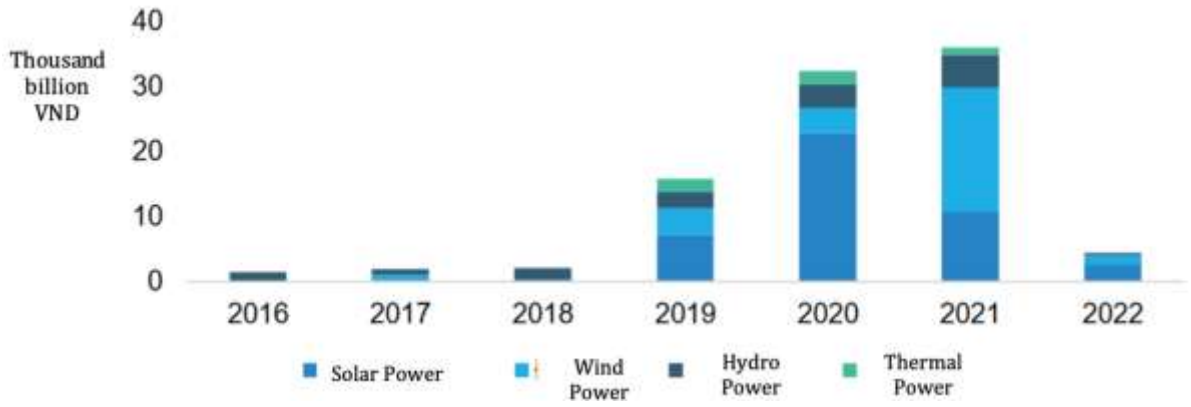

Figure 2: Structure of Energy Bonds Issued in the Period 2016- 2022
Source: Fiin Ratings

Between 2016 and 2020, a total of four green bond issuances were recorded, with a combined value of USD 284 million. From 2019 to the first half of 2024, Vietnam issued approximately USD 1.16 billion in green bonds. Notably, EVNFinance issued VND 1,725 billion in 2022, while BIDV issued VND 2,500 billion in 2023 and VND 3,000 billion in 2024.

4.3. Carbon Credits

Carbon credits are tradable certificates that authorize the emission of one metric ton of carbon dioxide (CO_2) or an equivalent amount of other greenhouse gases (tCO_2e). These credits function as market-based permits granting their holders the right to emit a defined amount of emissions and can be bought and sold on carbon markets.

In Vietnam, carbon credit mechanisms have made notable progress. On October 22, 2020, the Government of Vietnam and the World Bank signed an Emission Reductions Payment Agreement (ERPA) for the North Central Region, covering the period

from 2018 to 2024. Subsequently, on October 31, 2021, the Ministry of Agriculture and Rural Development signed a protocol with the Emergent organization under the LEAF Coalition to transfer 5.15 million tons of CO_2 emissions at a minimum price of USD 10 per ton (approximately USD 51.5 million) during 2022- 2026. The program is expected to cover approximately 4.26 million hectares of forest, including both natural and plantation forests across 11 provinces in the Central Highlands and South Central Coast.

From a policy perspective, the Vietnamese Government issued Decree No. 06/2022/ND-CP on greenhouse gas emission reduction and ozone layer protection. Under this policy, by the end of 2027, Vietnam aims to establish a comprehensive legal framework governing carbon credits, including mechanisms for trading, offsetting, and the operation of a carbon credit exchange. A pilot exchange is planned to commence in 2025, with full-scale operations expected by 2028, enabling integration with regional and international carbon markets.

Simultaneously, the private sector has begun to participate in this emerging market. On September 29, 2023, CT Group launched the ASEAN Carbon Credit Trading Platform Joint Stock Company (CCTPA), marking the establishment of the first carbon credit exchange in Vietnam. Additionally, FPT IS signed a memorandum of understanding with Japan's Carbon EX platform to jointly develop projects aligned with international standards such as Verra, the Gold Standard, and J-Credit.

4.4. Financing from Other Capital Sources

Between 2017 and 2021, the State Bank of Vietnam (SBV) mobilized resources from international financial institutions and bilateral and multilateral development partners to enhance the financial capacity of credit institutions in implementing green credit and supporting sustainable development. Key initiatives include:

(i) Finalizing the effectiveness conditions for the Vietnam Energy Efficiency for Industrial Enterprises Project, with a loan amount of USD 101.7 million.

(ii) Cooperating with the World Bank to develop and secure funding from the Green Climate Fund (GCF), which committed a total of USD 86.3 million in technical assistance and guarantee funds to support energy efficiency projects.

(iii) Receiving technical assistance from the Southeast Asia Energy Sector Investment Planning and Building Fund, supported by the Asian Development Bank (ADB).

(iv) Continuing the implementation of the Green Small and Medium Enterprise Financing Project, managed by the ODA Credit Project Management Unit, focusing on financing renewable energy, green industry, and energy-saving and efficiency initiatives.

In 2021, ADB approved a green loan of USD 116 million for three wind power companies- Lien Lap, Phong Huy, and Phong Nguyen- in Quang Tri province. The International Finance Corporation (IFC), a member of the World Bank Group, also announced funding for two wind energy projects in central Vietnam, providing a financing package of USD 57 million for Thuan Binh Wind Power JSC.

In December 2022, ADB and BIM Energy signed a USD 107 million financing agreement. This included USD 25 million from ADB's ordinary capital resources and USD 82 million in syndicated loans, with a 15-year term to support the operation of an 88 MW wind power project in Ninh Thuan province. The project is estimated to reduce approximately 215,000 tons of CO_2 emissions annually, contributing to Vietnam's commitments to combat climate change and achieve net-zero emissions.

Also in December 2022, the Japan International Cooperation Agency (JICA) signed a USD 7 million credit agreement with Binh Duong Water - Environment Joint Stock Company (BIWASE) to finance a "Waste-to-Energy Power Generation Project."

Vietnam has taken concrete steps to attract foreign capital, particularly through the Just Energy Transition Partnership (JETP). This initiative aims to mobilize an initial USD 15.5 billion in public and private finance over the next 3 to 5 years to support Vietnam's green energy transition. However, this funding remains modest compared to the substantial scale and scope required under Power Development Plan VIII.

5. RECOMMENDATIONS AND POLICY PROPOSALS

On May 15, 2023, the Government of Vietnam issued Decision No. 500/QD-TTg approving the National Power Development Plan for the period 2021- 2030, with a vision to 2050 (PDP VIII). The plan clearly sets the target of increasing the share of renewable energy to 67.5%- 71.5% by 2050 and emphasizes the development of renewable energy sources and new energy production for export purposes. By 2030, Vietnam aims to achieve an electricity export capacity of approximately 5,000–10,000 MW.

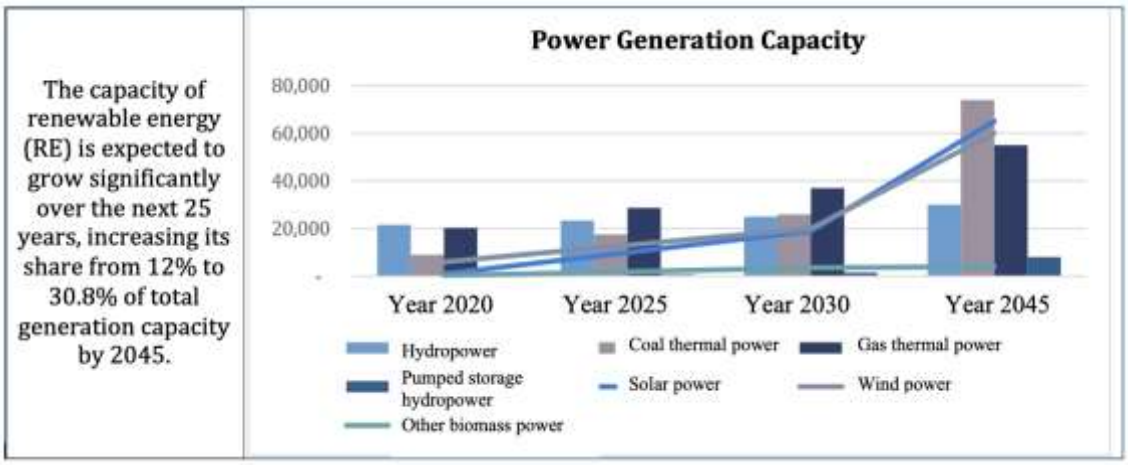

Figure 3. Estimated scale of the renewable energy sector in the period 2020- 2045, based on current renewable energy projects under development

Source: Vietnam Renewable Energy Industry Report, October 2020

According to PDP VIII, the total investment demand for power generation is projected to reach USD 114 billion during 2021-2030, with wind power accounting for 30% and gas-fired power 35% of the total. For the period 2031-2050, capital demand is expected to surge to USD 495 billion, with wind power continuing to dominate at about 65%, followed by solar power at 18%. Compared to PDP VII, PDP VIII places greater emphasis on "green" development, but its implementation will be significantly more challenging without adequate financial resources.

5.1. Recommendations for the Government

First, to effectively attract green finance, a solid foundation of legal, infrastructural, and technological support for sustainable development must be established. Legally, the Government should coordinate with relevant ministries to develop a comprehensive legal framework for renewable energy, including detailed classification of sub-sectors such as solar power (rooftop, floating, industrial), wind power (onshore, offshore), biomass, wave energy, and ocean current energy. In terms of technology and physical infrastructure, policies should promote R&D, intellectual property protection, technical innovation, and investment in recycling technologies for renewable energy equipment such as solar panels, wind turbines, and green carbon technologies.

Second, capital mobilization should be enhanced through coordinated efforts between the Government and the State Bank of Vietnam (SBV). On one hand, private sector participation in investment should be encouraged via public-private partnerships (PPP), with transparent competitive bidding and simplified administrative procedures. On the other hand, preferential policies are needed to attract ODA, FDI, and concessional loans, prioritizing renewable energy projects in capital allocation and investment approval.

5.2. Recommendations for the State Bank of Vietnam

First, the legal framework for green credit must be improved. The SBV should issue detailed guidance on green credit criteria, eligible sectors, and unified regulations for credit institutions (CIs) to apply during appraisal, lending, and monitoring of green loans. Simultaneously, environmental and social risk management requirements should be integrated into the lending regulations, providing a clear legal basis for CIs in practical implementation. SBV should also develop a comprehensive plan encompassing mechanisms, policies, and green credit programs, along with capacity-building and capital mobilization measures to ensure the banking sector can effectively support the green growth strategy.

Second, the SBV should promote the green banking model by raising awareness and strengthening social- environmental responsibility across the financial system. This includes enhancing the capacity of CIs to develop green financial products, including mobilization and lending activities in areas such as renewable energy, low-carbon consumption, and environmentally friendly production.

Third, the SBV should consider mechanisms for preferential interest rates or the provision of concessional credit lines to commercial banks, thereby improving access to capital for renewable energy projects. Additionally, it should coordinate inter-sectorally to develop a coherent and effective green finance mechanism.

Moreover, environmental and social risk management requirements must be systematically embedded in the lending regulations of CIs to ensure a solid legal foundation for implementation. The SBV should simultaneously formulate a synchronized plan covering policies, mechanisms, and green credit programs, while also providing incentives, increasing capital, and enhancing institutional capacity to enable the banking system to effectively contribute to the goals of green growth and sustainable development. This should go hand in hand with close coordination with other ministries and sectors to jointly establish a robust framework to advance green finance nationwide.

6. CONCLUSION AND LIMITATIONS

6.1. Conclusion

This study has examined the current state and challenges associated with mobilizing capital through green bonds and green credit to support the development of renewable energy in Vietnam. In the context of Vietnam's commitment to achieving net-zero emissions by 2050, green finance—particularly green corporate bonds and green credit- has emerged as a critical tool to attract long-term private sector capital for the energy transition. Data from 2019- 2024 indicates an upward trend in green credit, whereas green bond issuance in the energy sector has declined due to regulatory changes and limitations in implementation capacity.

Although major banks such as BIDV and Vietcombank have actively participated in financing renewable energy projects and begun integrating environmental–social criteria into lending practices, the overall scale of financing remains modest compared to the significant capital demand outlined in Power Development Plan VIII. The lack of a harmonized legal framework, standardized environmental impact assessment criteria, and effective incentive mechanisms remains a substantial barrier to the development of Vietnam's green capital market.

Based on these findings, the study proposes several policy recommendations: (i) completing the legal framework for green credit and green bonds; (ii) strengthening the capacity of credit institutions and enterprises in designing green projects; (iii) applying preferential mechanisms such as concessional interest rates and credit guarantees; and (iv) promoting cross-sectoral coordination to establish a coherent and effective green finance ecosystem.

6.2. Limitations and Directions for Future Research

Despite offering important practical insights, this study has certain limitations. First, it primarily relies on secondary data and official reports, which may not fully capture informal factors or hard-to-quantify challenges in capital mobilization. Second, it does not employ quantitative models to measure the relationship between green finance and renewable energy development outcomes. Third, the analysis remains largely at the national level, without delving into differences between specific energy types (e.g., offshore wind vs. rooftop solar) or regional disparities.

Future research could address these limitations by applying panel data models to conduct quantitative impact assessments, combining in-depth surveys of bond-issuing enterprises, or undertaking international comparative studies to extract transferable models for Vietnam. In addition, longitudinal research that monitors the development of the regulatory framework and the evolution of capital costs over time would provide high practical value for policy planning and implementation.

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