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EU–ASEAN Green Bond Policies: A Legal Comparative Review and Their Implications for Sustainable Finance Development in ASEAN

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Abstract

Climate change presents an urgent and far-reaching global challenge, and current mitigation efforts remain insufficient to limit global temperature rise to the 1.5°C threshold set under the Paris Agreement. Although Southeast Asia contributes only modestly to global greenhouse gas emissions, the region faces disproportionately severe climate risks stemming from rapid population growth, accelerating industrialization, and continued dependence on fossil fuels. In this context, green finance – particularly the issuance of green bonds – has emerged as a pivotal instrument for mobilizing capital toward environmentally sustainable development and supporting the achievement of the Sustainable Development Goals (SDGs). The European Union has made notable progress in constructing a comprehensive and coherent regulatory framework for sustainable finance, exemplified by the EU Green Bond Standard, the EU Taxonomy, and related disclosure requirements. These mechanisms collectively enhance market integrity, promote investor confidence, and ensure the environmental credibility of financial instruments. By contrast, ASEAN member states confront persistent challenges, including regulatory fragmentation, limited institutional capacity, and underdeveloped legal infrastructures, which hinder the effective deployment and scaling of green bonds across the region. This article conducts a comparative legal and policy analysis of green bond frameworks in the EU and ASEAN, examining their respective regulatory architecture, implementation mechanisms, and degree of alignment with international standards. Through this comparison, the study identifies critical gaps within ASEAN's regulatory landscape and highlights opportunities for strengthening sustainable finance governance. The article ultimately recommends the adoption of harmonized taxonomies, the formulation of coherent national policies, and the enhancement of regional cooperation as essential strategies for advancing a robust and credible green bond market in the ASEAN region.

Keywords: *green bond, sustainable finance, sustainable development.*

INTRODUCTION

Climate change has emerged as the primary global concern, prompting nations worldwide to strive to keep the average global temperature increase below 1.5°C above pre-industrial levels. Despite these efforts, countries' climate actions are deemed insufficient across all scenarios anticipated by the Intergovernmental Panel on Climate Change (IPCC); the 1.5°C threshold will likely be surpassed in the early 2030s.[1] Analysis indicates that the combined emission-reduction commitments made by nations would likely result in a temperature rise of 2.1–2.9°C by the end of the century.[2] Moreover, the current commitments are projected to lead to surpassing the 1.5°C target around 2030.[3] To maintain global temperature within the 1.5°C limit, the global economy must reduce greenhouse gas (GHG) emissions by 2030. Alternatively expressed, the global economy necessitates robust measures to mitigate the impacts of climate change.[4] At the conclusion of the COP27, UN Secretary-General António Guterres emphasized the urgent need for real climate action[5], noting that there is 'much homework and little time' given that the international community is already halfway between the Paris Climate Agreement and the 2030 deadline.[6] At the essence of global efforts to tackle climate change lies the centrality of financial instruments. In the pursuit of a low-carbon economy, or ideally, the realization of zero-net carbon emissions, the employment of green finance for sustainable investment, with the green bond as a prominent instrument, is critical, particularly in developing countries.[7]

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[1] World Economic Forum, *The Global Risks Report 2024: Insight Report*, 19th ed. (World Economic Forum, 2024), 42, https://www.weforum.org/publications/global-risks-report-2024/.

[2] Piers M. Forster et al., "Indicators of Global Climate Change 2022: Annual Update of Large-Scale Indicators of the State of the Climate System and Human Influence," *Earth System Science Data* 15, no. 6 (2023): 2295–327, https://doi.org/10.5194/essd-15-2295-2023.

[3] UNFCCC, *United Nations Climate Change: Annual Report 2022* (UNFCCC: United Nations Framework Conventionon Climate Change, 2023), https://unfccc.int/sites/default/files/resource/UNClimateChange_AnnualReport_2022.pdf.

[4] UNFCCC, "Maintaining a Clear Intention to Keep 1.5°C within Reach: Key Takeaways from COP27," United Nations Climate Change, October 26, 2022, https://unfccc.int/maintaining-a-clear-intention-to-keep-15degc-within-reach.

[5] Lukoye Atwoli et al., "COP27 Climate Change Conference—Urgent Action Needed for Africa and the World," *JAMA* 328, no. 22 (2022): 2215–16, https://doi.org/10.1001/jama.2022.20637.

[6] António Guterres, *Statement by the Secretary-General at the Conclusion of COP27 in Sharm El-Sheikh*, Statements (United Nations Secretary-General, 2022), https://www.un.org/sg/en/content/sg/statements/2022-11-19/statement-the-secretary-general-the-conclusion-of-cop27-sharm-el-sheikh.

[7] UNFCCC, "Mobilizing More Financial Support for Developing Countries: Key Takeaways from COP27," United Nations Climate Change, November 2022, https://unfccc.int/process-and-meetings/conferences/sharm-el-

Recognizing its status as a developing region, the population of Southeast Asia was recently documented to be approximately 685.15 million of people[8], with projections suggesting a rise to 715 million by 2025.[9] ASEAN acknowledges the necessity to address the repercussions of its rapid growth. The combination of a growing population, swift urbanization, and industrial expansion is contributing to an increase in energy consumption, consequently leading to higher carbon emissions.[10] Although the region is not considered to be the most significant GHG emitter with a generating GHG amount of less than 7% during the 1990-2019 period[11], the region has experienced a surge in overall energy demand by 80% predominantly met by a doubling in fossil fuel extraction since 2000, resulting in heightened concerns over energy security and environmental issues due to escalating CO_2 emissions.[12] Projections indicate a substantial 140% increase in ASEAN's CO_2 emissions per capita from 2015 to 2040, challenging its status as one of the lowest emitters.

The electricity generation sector stands out as a major contributor to the region's carbon footprint, largely reliant on fossil fuels like coal, oil, and gas. Despite abundant renewable energy sources such as hydro, solar, geothermal, and wind power, ASEAN's heavy dependence on fossil fuels hinders the transition to cleaner alternatives. ASEAN governments struggle to make this shift due to the ongoing use of fossil fuel subsidies, aimed at alleviating poverty and mitigating economic hardships, especially during periods of recession.[13]

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[8] *International Monetary Fund: World Economic Outlook | Population Millions of People* (IMF, 2025), https://www.imf.org/external/datamapper/LP@WEO/OEMDC/ADVEC/WEOWORLD.

[9] Muhammad Mohsin et al., "Role of Green Technology Financing in Renewable Energy Development in Asean," in *Green Finance and Renewable Energy in ASEAN and East Asia*, 1st ed., Routledge-ERIA Studies in Development Economics (Routledge, 2023), 210.

[10] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN* (The ASEAN Working Committee on Capital Market Development, 2020), 8, https://www.theacmf.org/sustainable-finance/publications/report-on-promoting-sustainable-finance-in-asean; Muhammad Mohsin et al., "Role of Green Technology Financing in Renewable Energy Development in Asean," in *Green Finance and Renewable Energy in ASEAN and East Asia*, 1st ed., Routledge-ERIA Studies in Development Economics (Routledge, 2023), 210–11.

[11] Sharon Seah, "Obstacles to Decarbonisation in Southeast Asia," Article, Fulcrum: Analysis on Southeast Asia, April 5, 2023, https://fulcrum.sg/aseanfocus/obstacles-to-decarbonisation-in-southeast-asia/.; Jiahui Qiu et al., "Assessing Climate Ambition Enhancement in ASEAN Countries' Nationally Determined Contributions," SSRN, February 14, 2023, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4357879.

[12] Mohsin et al., "Role of Green Technology Financing in Renewable Energy Development in Asean."

[13] Seah, "Obstacles to Decarbonisation in Southeast Asia," April 5, 2023.

In response to climate change, at the international level, all member States of ASEAN (AMS) are participants of the Paris Agreement[14] under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC). In alignment with the Paris Agreement, each AMS has pledged to reduce carbon emissions to meet the targets outlined in their respective Nationally Determined Contributions (NDCs) and has also demonstrated a strong commitment to achieving the Sustainable Development Goals (SDGs).[15] Despite significant advancements towards achieving particular national objectives, it has been determined that ASEAN is unlikely to achieve any of its 2030 SDGs. As climate change poses a formidable challenge, it is necessary to reduce carbon emissions through financial mechanisms, such as green bonds, to facilitate sustainable economic growth.[16] With ASEAN's green financing opportunities projected to reach USD 3 trillion between 2016 and 2030, there remains considerable and untapped potential for growth in this area.[17] One of the key challenges for AMS in implementing the SDG agendas is mobilizing adequate financial resources. For example, achieving SDGs 6 (clean water and sanitation), 7 (affordable and clean energy), and 9 (industry, innovation, and infrastructure) in just five AMS—Malaysia, Indonesia, the Philippines, Thailand, and Vietnam—will require an estimated USD 1.3 trillion by 2030, with a projected funding gap of USD 538 billion. Despite economic diversity, all AMS face a shared challenge in securing sufficient financial resources for SDG-specific goals. The financial sector must play a crucial role in addressing climate change and social development challenges, not only by financing green and SDG-related projects but also by driving a shift toward a more sustainable economy.[18]

The expansion of the green bond market, which mitigates the negative impacts of pollution and allocates resources to sustainable projects, provides a compelling

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[14] Paris Agreement, UNTC XXVII-7-d (2015), https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en.

[15] Clarence Tolliver et al., "Green Bonds for the Paris Agreement and Sustainable Development Goals," *Environmental Research Letters* 14, no. 6 (2019): 1–15, https://doi.org/10.1088/1748-9326/ab1118.

[16] Ngoc Thanh Tran et al., "Environmental Outlook of Asean-5 through the Lens of Green Bonds, Environmental Technologies and Financialization," *International Journal of Engineering Business Management* 16 (December 2024), https://doi.org/10.1177/18479790241238129.

[17] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 3, 8, 11–12.

[18] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 13–14.

rationale, from an efficiency standpoint, for endorsing associated policies. However, the legal framework for financial tools such as green bonds is still underdeveloped in certain Southeast Asian countries, even though they are among the regions most affected by climate change and hotspots of environmental pollution in pursuit of economic development. To establish and support a more robust legal framework and policies that incentivize corporations to engage in green bond issuance, this article specifically discusses the following issues: What is a green bond? How have Southeast Asian countries developed their legal and policy framework to regulate green bonds under the auspices of ASEAN? And, by comparing with the policies of the European Union (EU), what lessons can be learned, and what are the implications for improvement?

METHODOLOGY

This article adopts a doctrinal legal research method complemented by comparative and policy analysis. The doctrinal approach involves the systematic examination of primary legal sources, including international treaties, regional agreements, national legislation, and green bond standards issued by both the EU and ASEAN. The comparative component evaluates the divergence and convergence between the EU and ASEAN frameworks, focusing on institutional design, standardization, regulatory enforcement, and market incentives. A policy analysis approach is adopted to evaluate the effectiveness of existing regulatory frameworks, identify key challenges, and propose context-specific success factors for the ASEAN region, drawing on lessons from the European Union experience.

RESULT AND DISCUSSION

Overview of Green Bonds

Green bonds, like their conventional counterparts, serve as fixed-income assets to attract capital from investors in the debt capital market. The issuer typically raises a predetermined sum over a specified period, known as 'maturity', with the principal repaid upon maturity, complemented by periodic interest payments. What sets green bonds apart from conventional bonds is their distinctive label 'green'. Green bonds are a specialized form of bond tailored to fund environmentally beneficial projects, signaling a firm commitment to allocate the proceeds from the bond issuance exclusively to finance or refinance projects aimed at environmental preservation or improvement.[19] The allocation of the proceeds generated from bond issuance to finance environmentally friendly projects, including renewable energy, sustainable use of resources, and climate change adaptation, is the main disparity between green bonds and traditional bonds.[20]

The International Capital Markets Association (ICMA) has set out the Green Bond Principles (GBPs) fundamentally outlining a structured four-stage process for green bond issuance, in particular:[21]

1. The initial stage focuses on the utilization of proceeds, which differentiates green bonds from traditional ones. Green bonds aim to allocate funds solely to projects supporting climate change mitigation and natural resource conservation.
2. The second stage involves project evaluation and selection in terms of investment, economic, environmental, and social risks and benefits of proposed projects. External expert reviews are often recommended for credibility and to broaden the investor base, particularly for pension funds.
3. The third stage is related to proceeds management. Given the designated use of funds, proceeds from receipt to project utilization should be carefully tracked. The generation of revenues from the project and the investors' returns could be potentially tracked and monitored for transparency.

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[19] OECD, *Mobilising Bond Markets for a Low-Carbon Transition*, Green Finance and Investment (OECD Publishing, 2017), 5, https://doi.org/10.1787/9789264272323-en; Andini Nurul Aini et al., "Green Bonds, Investor Attention and Stock Market Reaction: Evidence from ASEAN Countries," *International Journal of Energy Economics and Policy* 13, no. 6 (2023): 335, https://doi.org/10.32479/ijeep.15162.

[20] Aini et al., "Green Bonds, Investor Attention and Stock Market Reaction: Evidence from ASEAN Countries," 2023, 335.

[21] ICMA, *Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bonds*, The Green Bond Principles (ICMA, 2021), 4–6, https://www.icmagroup.org/assets/documents/Sustainable-finance/2022-updates/Green-Bond-Principles_June-2022-280622.

4. The fourth stage focuses on reporting. Buyers of green bonds rely on accurate and standardized reporting to ensure that their investments solely support green projects. Transparent reporting of all project parameters is crucial for maintaining investor confidence.

During the 2007 – 2020 period, countries within the EU, including France, Germany, and the Netherlands, emerged as leading issuers of green bonds.[22] It was recorded that the green bond sales experienced phenomenal development in 2023 with sales from corporates and governments steeply increasing to USD575 billion. European governments, including Italy, France, Germany, Ireland, the Netherlands, and the UK, are major issuers of green bonds.[23] Some AMS, such as Indonesia, Singapore, Thailand, and Malaysia, were among the most significant green bond issuers in Asia between 2015 and 2020.[24]

The promotion and facilitation of green bonds rest upon three fundamental pillars: national, regional, and global, each comprising distinct types of policy instruments aimed at advancing the adoption of green bonds. At the national level, policies encompass several key aspects. Firstly, there is the establishment of national standards governing green bonds, which includes the formulation of guidelines, standards, frameworks, and principles. Secondly, there are policies aimed at reducing the financial barriers associated with labeling bonds as 'green', achieved through mechanisms such as green bond grants and tax incentives. Thirdly, other national policies, including initiatives fostering cooperation and providing policy signals, contribute to the broader landscape of green bond promotion.[25] Moving to the regional sphere, policies extend their influence across multiple economies, as

[22] Dina Azhgaliyeva and Zhanna Kapsalyamova, *Policy Support in Promoting Green Bonds in Asia*, no. 1275, ADBI Working Paper Series (Asian Development Bank Institute, 2021), 4, https://www.adb.org/publications/policy-support-promoting-green-bonds-asia.

[23] "Green Bonds Reached New Heights in 2023," *Bloomberg Professional Services*, February 8, 2024, https://www.bloomberg.com/professional/insights/trading/green-bonds-reached-new-heights-in-2023/.

[24] Azhgaliyeva and Kapsalyamova, *Policy Support in Promoting Green Bonds in Asia*, 5; Dina Azhgaliyeva et al., *Green Bonds for Financing Renewable Energy and Energy Efficiency in South-East Asia: A Review of Policies*, no. 1073, ADBI Working Paper Series (Asian Development Bank Institute, 2020), 13–17, https://www.adb.org/publications/greenbonds-financing-renewable-energy-efficiency-southeast-asia.

[25] Muhammad Saeed Meo and Marcin Staniewski, eds., *Green Bonds and Sustainable Finance: The Evolution of Portfolio Management in Conventional Markets*, Routledge International Studies in Money and Banking (Routledge, 2024).

observed in the policies enacted by regional entities like the EU and the ASEAN. Regional green bond policies encompass collaborative efforts and initiatives aimed at standardizing practices within the region. On the global stage, instruments for cooperation and the establishment of international standards and guidelines play a crucial role. Notable examples include the Green Bond Principles developed by the International Capital Market Association (ICMA), which serve as a benchmark for green bond issuance worldwide. In terms of measurement, national policies are typically represented as binary variables, indicating their presence or absence, while regional and global variables quantify the number of policies implemented within their respective domain.[26]

The utilization of green bond proceeds is primarily directed towards supporting environmental protection across multiple sectors. Several sectors, including energy, investments in green building investments, transportation, and water-related projects, are key recipients. However, within ASEAN, the distribution of green bond proceeds appears to be less varied. Economies within this region predominantly channel funds towards green building initiatives and energy-related projects.[27]

The voluntary ASEAN Green Bond Standards and the EU Green Bond Standards are regional.[28] While the ASEAN standards are rooted in the ICMA's Green Bond Principles (GBP), they offer more specific guidelines for identifying bonds as ASEAN green bonds. To qualify as ASEAN green bonds, issuers must comply with these standards. Similarly, projects seeking EU green bond designation must align with the EU taxonomy.[29]

Policy and Practices – Green Bonds in the European Union

Green bonds are a form of debt instrument designed to finance projects with environmental benefits, such as renewable energy, sustainable technologies, and

[26] Azhgaliyeva and Kapsalyamova, *Policy Support in Promoting Green Bonds in Asia*, 2.

[27] Azhgaliyeva and Kapsalyamova, *Policy Support in Promoting Green Bonds in Asia*, 6; Azhgaliyeva et al., *Green Bonds for Financing Renewable Energy and Energy Efficiency in South-East Asia: A Review of Policies*, 13–17.

[28] David Ramos Muñoz, *Greening the Bond Market: A European Perspective*, 1st ed., with Agnieszka Smoleńska, EBI Studies in Banking and Capital Markets Law Series (Springer International Publishing AG, 2023).

[29] Azhgaliyeva and Kapsalyamova, *Policy Support in Promoting Green Bonds in Asia*.

pollution-free transport. In the European Union (EU), the green bond market has grown substantially since 2007, when the European Investment Bank (EIB) issued the world's first green bond, the Climate Awareness Bond.[30] Since then, Europe has become the global leader in green bond issuance, driven by the region's commitment to combating climate change and fostering sustainable development. The adoption of the Paris Agreement in 2015 further fueled this growth,[31] with European governments, corporations, and financial institutions increasingly recognising green bonds as an essential tool to meet ambitious climate targets. The introduction of the European Green Deal in 2019 marked a turning point, providing a comprehensive roadmap to reach carbon neutrality by 2050.[32] It underscored the critical role of sustainable finance, including green bonds, in transitioning to a low-carbon economy.[33] Green bonds play a pivotal role in channelling investments into initiatives aligned with the European Union's sustainability objectives, particularly those outlined in the European Green Deal.[34] They provide essential funding for projects aimed at combating climate change, reducing greenhouse gas emissions, and promoting a circular economy.[35]

Unlike traditional bonds, which finance a broad range of activities, green bonds are explicitly tied to environmentally beneficial projects.[36] Issuers of green bonds are required to clearly define how the funds will be used, with a focus on sustainability. In this regard, the European Union Green Bond Standard (EuGBS), introduced in 2021, sets binding requirements for issuers seeking the EU-certified green bond label, ensuring rigorous reporting and transparency to guarantee that funds are directed

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[30] Serena Sertore, *15 Years on, Green, Social and Sustainability Bonds Are Still the Future of Sustainable Finance* (European Investment Bank, 2022), https://www.eib.org/en/stories/15-years-green-bond.

[31] Kristin Ulrike Löffler et al., "Drivers of Green Bond Issuance and New Evidence on the 'Greenium,'" *Eurasian Economic Review* 11, no. 1 (2021): 1–24, https://doi.org/10.1007/s40822-020-00165-y.

[32] European Parliament, "Green Deal: Key to a Climate-Neutral and Sustainable EU," June 22, 2022, https://www.europarl.europa.eu/topics/en/article/20200618STO81513/green-deal-key-to-a-climate-neutral-and-sustainable-eu.

[33] Andreas Lichtenberger et al., "Green Bonds for the Transition to a Low-Carbon Economy," *Econometrics* 10, no. 1 (2022): 11, https://doi.org/10.3390/econometrics10010011.

[34] Anamaria Dan and Adriana Tiron-Tudor, "The Determinants of Green Bond Issuance in the European Union," *Journal of Risk and Financial Management* 14, no. 9 (2021): 446, https://doi.org/10.3390/jrfm14090446.

[35] Dan and Tiron-Tudor, "The Determinants of Green Bond Issuance in the European Union."

[36] Annica Cochu et al., *Study on the Potential of Green Bond Finance for Resource-Efficient Investments* (European Commission: Directorate General for the Environment, 2016), 1–171, https://data.europa.eu/doi/10.2779/234777.

toward genuine green initiatives. Issuers are mandated to provide clear and detailed disclosures about how the proceeds from green bonds are allocated, ensuring alignment with the EU Taxonomy's sustainability criteria.[37] These disclosures must include information on the environmental objectives of the funded projects, how the projects meet specified green criteria, and the mechanisms in place to verify compliance.[38] Additionally, regular reporting on the progress and outcomes of the projects is required,[39] fostering accountability and reducing the risk of greenwashing. This makes green bonds an attractive option for environmentally conscious investors, while allowing issuers to signal their commitment to sustainability. By setting a high standard for green bond issuance, the EUGBS aims to increase investor confidence and attract more capital to green projects.[40] EuGBS also addresses the lack of enforceable rules in the current market.[41] While existing frameworks like ICMA's Green Bond Principles[42] and CBI's Climate Bonds Standard[43] provide guidance, they rely on voluntary, often vague criteria, leaving room for inconsistency.[44] Unlike these

[37] The proceeds must be allocated to economic activities that significantly contribute to one or more of the six environmental objectives outlined in the Taxonomy Regulation. These objectives, as specified in Article 9, include: (a) climate change mitigation; (b) climate change adaptation; (c) sustainable use and protection of water and marine resources; (d) transition to a circular economy; (e) pollution prevention and control; and (f) protection and restoration of biodiversity and ecosystems. see Regulation (EU) 2020/852, OJ L 198, 22.6.2020, p. 13–43 (2020), Art. 9, https://eur-lex.europa.eu/eli/reg/2020/852/oj.

[38] European Commission, "The European Green Bond Standard - Supporting the Transition," 2023, https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/european-green-bond-standard-supporting-transition_en.

[39] European Commission, "The European Green Bond Standard - Supporting the Transition."

[40] Nikos Maragopoulos, "Anticipating the EU Green Bond Standard: The Core Elements of the European Green Bond Regulation," in *Oxford Law Blogs*, Oxford Business Law Blog, July 7, 2023, https://blogs.law.ox.ac.uk/oblb/blog-post/2023/07/anticipating-eu-green-bond-standard-core-elements-european-green-bond.

[41] Sebastian Mack, "Turning Green into Gold: How to Make the European Green Bond Standard Fit for Purpose," Policy Brief, in *Jacques Delors Centre*, Hertie School: Jacques Delors Centre, 2022, https://www.delorscentre.eu/en/publications/detail/publication/green-bond-standard.

[42] The Green Bond Principles (GBP), published under the governance of the International Capital Market Association (ICMA), are voluntary guidelines aimed at promoting transparency, integrity, and best practices in the green bond market. They focus on four core components: use of proceeds, project evaluation and selection, management of proceeds, and reporting. These principles provide a flexible framework for issuers but remain non-binding, relying on market-driven compliance to guide the development of sustainable finance. For more details, see ICMA, *Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bonds*.

[43] The Climate Bonds Standard, developed by the Climate Bonds Initiative, certifies green bonds and debt aligned with climate goals, using sector-specific criteria, independent verification, and ongoing reporting to ensure credibility and transparency. For more details, see CBI, "Climate Bonds Standard: Globally Recognised, Paris-Aligned Certification of Debt Instruments, Entities and Assets Using Robust, Science-Based Methodologies," in *Climate Bonds*, Climate Bonds Standard Version 4.3 (Climate Bond Certified, 2025), https://www.climatebonds.net/files/documents/CBI_Standard_V4.3_FINAL_2025-08-20-102147_gbqn.pdf.

[44] CBI, "Climate Bonds Standard: Globally Recognised, Paris-Aligned Certification of Debt Instruments, Entities and Assets Using Robust, Science-Based Methodologies."

non-binding standards, the EuGBS ensures greater transparency and accountability. Yet, it is worth noting that since the EuGBS is designed to complement rather than replace private standards,[45] its adoption remains optional, allowing issuers to choose between it and existing private labels.

The green bond market in Europe has experienced exponential growth over the past decade. Europe accounts for over 50% of global green bond issuance,[46] cementing its status as the largest regional market for green finance. In 2023, annual EU green bond issuance is projected to reach €430 billion, a substantial increase from the early 2010s when issuance volumes were relatively modest.[47]

Among European countries, France and Germany stand out as notable examples in the green bond market. France has been a pioneer by issuing its first sovereign green bond in 2017, raising €7 billion.[48] The proceeds have been allocated to various environmental projects, including climate change mitigation and adaptation, biodiversity protection, climate change, and pollution control.[49] Building on this leadership, France continues to innovate in green finance. In 2022, Agence France Trésor (AFT) issued the world's first inflation-linked sovereign green bond, the Green OAT €i 0.10% due July 2038.[50] This €4 billion bond protects its value against inflation by linking it to the European consumer price index (excluding tobacco), demonstrating France's responsiveness to evolving market demands.[51] Germany, meanwhile, has also made significant strides. In 2020, it introduced the innovative

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[45] European Commission, *Strategy for Financing the Transition to a Sustainable Economy*, COM(2021) 390 final, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (European Commission, 2021), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0390.

[46] European Union, *European Green Bonds*, Infographic (Council of the European Union: General Secretariat, 2023), https://www.consilium.europa.eu/en/infographics/european-green-bonds/.

[47] Esther Kramer, *European Green Bond Standard: Initial Appraisal of a European Commission Impact Assessment*, PE 694.239, Initial Appraisal of a European Commission Impact Assessment (European Parliamentary Research Service (EPRS), 2021), 1–8, https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/694239/EPRS_BRI(2021)694239_EN.pdf.

[48] Green Finance Platform, *France Has Issued an EUR 7.5 Billion Green Bond* (Directorate General of the Treasury, 2017), https://www.greenfinanceplatform.org/policies-and-regulations/france-has-issued-eur-75-billion-green-bond.

[49] Green Finance Platform, *France Has Issued an EUR 7.5 Billion Green Bond*.

[50] Mark Segal, "France Issues First-Ever Inflation-Linked Green Bond," *ESG Today* (France), May 27, 2022, https://www.esgtoday.com/france-issues-first-ever-inflation-linked-green-bond/.

[51] Segal, "France Issues First-Ever Inflation-Linked Green Bond."

"twin bond" approach, issuing a green bond alongside a conventional bond with the same maturity and coupon.[52] This strategy ensures high liquidity in the secondary market for green bonds while allowing Germany to establish a benchmark green yield curve quickly.[53] The initiative aligns with Germany's broader goal of expanding its investor base in the green bond market.[54] The inaugural 10-year green bond raised €6.5 billion and was more than five times oversubscribed, indicating strong investor demand.[55] Since then, Germany has continued to expand its green bond program. In 2023, the Federal Republic of Germany was the largest issuer of green bonds in the country, with issuances totalling $18.7 billion.[56] In June 2024, Germany issued €3 billion in a syndicated tap of its 1.80% August 2053 green Bund.[57] These initiatives by France and Germany demonstrate the effectiveness of green bonds in mobilizing capital for environmental and energy transition projects, contributing significantly to Europe's sustainability goals.

Not only nations but also European companies have been active in issuing green bonds to finance sustainable initiatives. For instance, Air Liquide issued a €500 million green bond to fund energy transition projects, including low-carbon hydrogen and carbon capture technologies.[58] Similarly, KPN, the Dutch telecommunications company, issued a €500 million green hybrid bond to support its sustainability efforts, such as enhancing energy efficiency and promoting clean transportation.[59] Additionally, Neste Corporation issued a €500 million green bond to finance the

[52] Mark Segal, "Germany's Inaugural Federal Green Bond Issue Meets Strong Demand, 5x Oversubscribed," *ESG Today*, September 3, 2020, https://www.esgtoday.com/germanys-inaugural-green-bond-issue-meets-strong-demand-5x-oversubscribed/.

[53] Tanguy Claquin, "Germany Issues a €6.5 Billion Inaugural Green Bond," Crédit Agricole CIB, https://www.ca-cib.com/news/germany-issues-eu65-billion-inaugural-green-bond.

[54] Claquin, "Germany Issues a €6.5 Billion Inaugural Green Bond."

[55] Claquin, "Germany Issues a €6.5 Billion Inaugural Green Bond."

[56] R. Hirschmann, "Largest Issuers of Green Bonds in Germany in 2023 (In Billion U.S. Dollars)," in *Statista* (Statista, 2024), https://www.statista.com/statistics/1293978/largest-issuers-of-green-bonds-in-germany/?srsltid=AfmBOoqYnFauoyFrmNtOLkxm8tg98xwviPp3BY_aA92lZWKzG3y3s36M.

[57] Emese Bartha, "Germany Plans EUR3 Billion Syndicated Tap of August 2053 Green Bund," Currency, *MarketScreener* (UK), June 3, 2024, https://uk.marketscreener.com/news/latest/Germany-Plans-EUR3-Billion-Syndicated-Tap-of-August-2053-Green-Bund-46886188/.

[58] Air Liquide, *Air Liquide Has Successfully Issued a 500 Million Euros Green Bond to Finance the Energy Transition*, Press Release (Air Liquide, 2025), https://www.airliquide.com/group/press-releases-news/2024-05-23/air-liquide-has-successfully-issued-500-million-euros-green-bond-finance-energy-transition.

[59] KPN, *KPN Successfully Issues € 500m Green Hybrid Bond*, June 11, 2024, https://ir.kpn.com/news-and-events/news/news-details/2024/KPN-successfully-issues--500m-Green-Hybrid-Bond/default.aspx.

development and expansion of renewable and circular solutions aimed at mitigating climate change by reducing greenhouse gas emissions.[60] These examples demonstrate the significant role that European corporations play in advancing environmental sustainability through green bond issuances.

Policy and Practices – Green Bonds in the ASEAN Region

Founded on 08 August 1967, the Association of Southeast Asian Nations (ASEAN) consists of ten member states: Indonesia, Malaysia, the Philippines, Singapore, Thailand, Brunei, Vietnam, Lao PDR, and Myanmar (AMS).[61] By 2021, the ASEAN's population surpassed 663 million people, making the region one of the third most populous regions in the world.[62] The urbanization of the ASEAN region has advanced rapidly, rising from 45.7% in 2012 to 50.7% in 2021, a 5% increase.[63] Furthermore, ASEAN's GDP exceeded USD3,348 million, making the region the world's sixth-largest economy.[64] The regional economy is recognized as highly promising for growth, with the potential to reach fourth place by 2050.[65] However, AMS' economies exhibit significant disparities, as evidenced by the GDP per capita rates documented in 2021, varying from the highest at USD 72,399.7 (Singapore) to the lowest at USD 1,314.4 (Myanmar).[66]

According to recent studies, AMS have encountered severe impacts caused by climate change. The majority of AMS, encompassing Myanmar, the Philippines, Bangladesh, Vietnam, and Thailand manifests exhibit vulnerability to adverse consequences of acute weather events. These nations stand among the top ten countries most affected

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[60] Neste Corporation, *Neste Corporation Issues EUR 500 Million Green Bond*, Stock Exchange Release (2021), https://neste.com/news/neste-corporation-issues-eur-500-million-green-bond.

[61] ASEAN, "About ASEAN," https://asean.org/about-asean/.

[62] ASEAN Secretariat, *ASEAN Statistical Yearbook 2022*, in *ASEAN Main Portal* (ASEAN, 2022), 18:3, https://www.aseanstats.org/publication/asyb2022/.; Evelyn S. Devadason et al., *ASEAN Integration Report 2022*, API Report No. 07, ASEAN Prosperity Initiative (API) (Institute for Democracy and Economic Affairs (IDEAS) & The Friedrich-Naumann-Stiftung For Freedom (FNF), 2022), 1–162, https://www.aseanprosperity.org/publications/research-papers/asean-integration-report-2022/.

[63] ASEAN Secretariat, *ASEAN Statistical Yearbook 2022*.

[64] ASEAN Secretariat, *ASEAN Statistical Yearbook 2022*; Devadason et al., *ASEAN Integration Report 2022*, 43.

[65] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 8.

[66] ASEAN Secretariat, *ASEAN Statistical Yearbook 2022*, 41.; ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 8.

by climate-related extremes during the 1998 –2018 period.[67] Climate change presents a formidable challenge for ASEAN nations, given the region's substantial populations and concentrated economic activities along coastlines. Changes in weather patterns such as average temperature and precipitation have led to extreme weather events or natural disasters including flooding, soil erosion, rising sea levels, and storms while numerous communities heavily rely on agriculture and natural resources. Hence, tackling climate change becomes an imperative priority.[68] All AMS have participated in the climate change treaty, particularly the 1992 UNFCCC[69] as well as other multilateral agreements under the auspices of the UNFCCC, including previously, the 1997 Kyoto Protocol[70], and later, the 2015 Paris Agreement.[71] In line with these international instruments, most AMS have pledged in their Nationally Determined Contributions (NDCs) to curtail carbon emissions by 2030 [72]to achieve a low-carbon future and transition to the circular economy.[73]

An effective approach to aiding governments in meeting their financial requirements and fulfilling their NDCs is to connect NDCs to green financing. This not only broadens the spectrum of green investment opportunities but also facilitates the transformation of projects with the potential to be environmentally sustainable into formally recognized 'green' initiatives.[74] Through the adoption of policies, roadmaps, or actions to develop sustainable finance, several AMS have formalized and codified green financing at the national level. In accordance with the SDGs, the Regional Roadmap designed to operationalize the 2030 Agenda for SDGs in Asia and the

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[67] David Eckstein et al., *Global Climate Risk Index 2020: Who Suffers Most from Extreme Weather Events? Wether-Related Loss Events in 2018 and 1999 to 2018*, Briefing Paper, with Rixa Schwarz et al., Global Climate Risk Index 2020 (Germanwatch Nord-Süd Initiative e.V, 2019), 9, https://www.germanwatch.org/sites/default/files/20-2-01e%20Global%20Climate%20Risk%20Index%202020_14.pdf.

[68] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 8.

[69] United Nations Framework Convention on Climate Change (UNFCCC), UNTC XXVII-7 (1992), https://treaties.un.org/Pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXVII-7&chapter=27&Temp=mtdsg3&clang=_en.

[70] Kyoto Protocol to the United Nations Framework Convention on Climate Change, UNTC XXVII-7-a (1997), https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-a&chapter=27&clang=_en.

[71] Paris Agreement.

[72] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 3 & 10.

[73] ASEAN, *ASEAN Annual Report 2022–2023: ASEAN Matters-Epicentrum of Growth* (The ASEAN Secretariat, 2023), 43:33, https://asean.org/wp-content/uploads/2023/07/NEW-FINAL-ASEAN-Annual-Report-2022-2023.pdf.

[74] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 43.

Pacific.[75] A unified regional financial action plan specifically tailored for the SDGs agenda was lacking until November 2021 when ASEAN introduced the initial version of the ASEAN Taxonomy for Sustainable Finance. Subsequently, a second edition, recently released in March 2023, represents an improvement over its 2021 predecessor. This taxonomy assumes a crucial role in supporting the regional shift towards a low-carbon and circular economy. Serving as a comprehensive framework, a standardized language, and an evaluative instrument, the ASEAN Taxonomy provides AMS with green financial instruments, including green bonds.[76]

At the regional level, within the coordination process of ASEAN Capital Markets Forum (ACMF), AMS has adopted the ASEAN Green Bond Standards (ASEAN-GBS) in 2017 and subsequently revised in 2018 in light of the International Capital Market Association (ICMA)'s Green Bond Principles. The ASEAN-GBS is formulated to apply to issuers and projects dedicated to environmental protection, except for fossil fuel-related projects, within the ASEAN region, and is specifically adapted to meet the requirements and commitments of ASEAN.[77] The ASEAN-GBS sets out four principal requirements that a project should satisfy to be eligibly to be labeled as ASEAN Green Bond, including (i) identification of the use of proceeds, (ii) having the process for evaluation and selection, (iii) having the process to manage bond proceeds, and (iv) report on the use of proceeds and impacts.[78]

The introduction of the ASEAN-GBS and the ASEAN Taxonomy signifies a renewed emphasis on green finance within ASEAN regional policies. This marks a positive progression in the right direction. As green bonds are expected to play a crucial role

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[75] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 4.

[76] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 4.; ASEAN, *ASEAN Annual Report 2022–2023: ASEAN Matters-Epicentrum of Growth*, vol. 43.

[77] Muhammad Zarunnaim Wahab and Asmadi Mohamed Naim, "Assessment on the Asean Standards to Support Sustainable and Responsible Investments (SRIs) and Green Bonds," *Journal of Emerging Economies and Islamic Research* 9, no. 2 (2021): 78, https://doi.org/10.24191/jeeir.v9i2.13112.

[78] *Asean Green Bond Standards* (The ASEAN Capital Markets Forum (ACMF), 2019), https://www.theacmf.org/sustainable-finance/publications/asean-green-bond-standards.; Raja Syamsul Anwar et al., *Report on The Roles of ASEAN Central Banks in Managing Climate and Environment-Related Risks*, ASEAN Central Banks and Monetary Authorities (Bank Negara Malaysia, 2020), 1–98, https://www.bnm.gov.my/documents/20124/914558/2020-11-17+ASEAN+Task+Force+Report_for+publication.pdf.

in energy-efficiency financing, AMS must nurture the development of local green bond markets to facilitate investments in a sustainable future.[79]

Challenges and Policy Implications for the European Green Bond Market

One challenge in the green bond market is the fragmentation of standards, with frameworks such as the GBP and the CBS operating independently, without a unified system. This lack of standardization may create confusion for issuers and investors, making it harder to assess and compare green bonds. It also opens the door to regulatory arbitrage, in which issuers choose the framework that best suits their interests, undermining the market's credibility.[80] The lack of harmonized standards in the green bond market significantly raises transaction costs for both issuers and investors. Issuers are forced to navigate varying disclosure and certification requirements, while investors must undertake extensive due diligence to validate claims. The EuGBS was introduced to address these challenges by providing a unified framework aligned with the EU Taxonomy, thereby promoting consistency and transparency.[81] However, despite its intended benefits, the EuGBS has faced criticism for imposing additional administrative burdens that may deter smaller issuers from participating in the market.[82] Navigating the EU Taxonomy, a cornerstone of the EUGBS, is particularly challenging due to its complexity and incomplete data availability.[83] Consequently, many issuers continue to rely on the more established ICMA GBP, which currently accounts for 97% of green bond issuances, often supplemented by certifications from organizations such as the CBI.[84] Critics argue that the EuGBS could exacerbate fragmentation rather than solve it.[85] This risk arises

[79] Azhgaliyeva et al., *Green Bonds for Financing Renewable Energy and Energy Efficiency in South-East Asia: A Review of Policies*, 18.

[80] Stephen Kim Park, "Investors as Regulators: Green Bonds and the Governance Challenges of the Sustainable Finance Revolution," in *Stanford Journal of International Law*, vol. 54, no. 1, Rochester, NY, 2018, https://doi.org/10.1007/s40804-023-00278-2.

[81] European Commission, "The European Green Bond Standard - Supporting the Transition."

[82] Jacqueline Heng, "A Guide to the European Green Bond Standard," Lexology, November 7, 2023, https://www.addleshawgoddard.com/en/insights/insights-briefings/2023/finance/guide-to-the-european-green-bond-standard/.

[83] Heng, "A Guide to the European Green Bond Standard."

[84] Heng, "A Guide to the European Green Bond Standard."

[85] Michal Pyka, "The EU Green Bond Standard: A Plausible Response to the Deficiencies of the EU Green Bond Market?," *EBOR: European Business Organization Law Review* 24, no. 4 (2023): 623–43, https://doi.org/10.1007/s40804-023-00278-2.

because the EuGBS is designed to complement, rather than replace, existing private standards for green bond issuance.[86] With that said, it is suggested that fragmentation itself may not be a critical issue[87], but instead emphasizes its link to a far more pressing problem: greenwashing.

Greenwashing is a term that represents one type of fraud due to the usage of misleading information about its green image and green products in general.[88] Greenwashing poses a significant challenge as it undermines the credibility of sustainable finance,[89] a cornerstone of efforts to combat climate change and promote environmental responsibility. When issuers falsely claim that their bond proceeds finance environmentally beneficial projects, they not only mislead investors but also divert crucial capital from genuine green initiatives.[90] This practice erodes trust in the market, making investors more hesitant to participate and potentially increasing the cost of capital for legitimate green projects.

Although the creation of EuGBS is believed to combat greenwashing and improve transparency in the green bond market,[91] its voluntary nature poses limitations. This lack of mandatory enforcement reduces its potential for widespread adoption and weakens its impact in addressing market fragmentation. Enforcement challenges compound the problem. The EU's securities regulator (ESMA) revealed that while greenwashing remains a critical issue in financial markets, enforcement has been

[86] Pyka, "The EU Green Bond Standard: A Plausible Response to the Deficiencies of the EU Green Bond Market?"

[87] Pyka, "The EU Green Bond Standard: A Plausible Response to the Deficiencies of the EU Green Bond Market?"

[88] Natalie Runyon, "Are Allegations of Greenwashing Part of ESG Fraud? It Depends on Whom You Ask," Thomson Reuters, September 12, 2022, https://www.thomsonreuters.com/en-us/posts/investigation-fraud-and-risk/greenwashing-esg-fraud/.

[89] ESMA, *Final Report on Greenwashing: Response to the European Commission's Request for Input on "Greenwashing Risks and the Supervision of Sustainable Finance Policies,"* nos. ESMA36-287652198–2699 (the European Securities Markets Authority (ESMA), 2024), 49, https://www.esma.europa.eu/sites/default/files/2024-06/ESMA36-287652198-2699_Final_Report_on_Greenwashing.pdf.

[90] Robin Wigglesworth, "Green Bonds Are Bunkum: And Investor Don't Care," FT Alphaville, *The Financial Times*, September 16, 2024, https://www.ft.com/content/4796ae28-4dda-4ae4-9d37-525374864e7a.

[91] European Parliament, "Green Bonds: More Transparency, No Greenwashing," February 10, 2023, https://www.europarl.europa.eu/topics/en/article/20230928STO06003/green-bonds-more-transparency-no-greenwashing.

limited due to resource constraints faced by national regulators (NCAs).[92] Billions of euros have flowed into green-labelled investments, heightening concerns over exaggerated climate-friendly claims.[93] Although the EU has implemented mandatory climate-related disclosures for asset managers, listed companies, and green bond issuers, few formal enforcement actions have been taken.[94]

This issue is particularly pronounced in emerging markets, such as Southeast Asia, where regulatory frameworks are still developing. Immature markets are more vulnerable to greenwashing, as investors may lack the tools to verify claims or hold issuers accountable.[95] The reputational damage caused by greenwashing can ripple through financial systems, deterring global investors and slowing the adoption of green finance as a viable solution to environmental challenges.

Challenges and Policy Implications for ASEAN

Green finance remains in its nascent stage in ASEAN and faces significant hurdles, affecting both green bond issuers and investors.[96] For issuers, limited credit absorption capacity and the expenses associated with meeting green bond requirements are significant obstacles. On the investor front, challenges encompass a constrained investment pipeline, insufficient data and analytical capabilities, and the absence of green bond indices, listings, and ratings.[97]

The absence of a regional policy on sustainable or green finance is a formidable challenge. Recent studies indicate that not all AMS have established national policies for sustainable or green finance. Even among those AMS that have developed such

[92] Huw Jones, "Regulators Lack Resources to Tackle Greenwashing, Says EU Watchdog," *Reuters* (London), June 4, 2024, https://www.reuters.com/sustainability/regulators-lack-resources-tackle-greenwashing-says-eu-watchdog-2024-06-04/.

[93] Jones, "Regulators Lack Resources to Tackle Greenwashing, Says EU Watchdog."

[94] Jones, "Regulators Lack Resources to Tackle Greenwashing, Says EU Watchdog."

[95] Samuel Mutarindwa et al., "Certification against Greenwashing in Nascent Bond Markets: Lessons from African ESG Bonds," *Eurasian Economic Review* 14, no. 1 (2024): 149–73, https://doi.org/10.1007/s40822-023-00257-5.

[96] Divyam Nagpal and Diala Hawila, *Renewable Energy Market Analysis: Southeast Asia* (IRENA, 2018), 113, https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_Market_Southeast_Asia_2018.pdf.

[97] Azhgaliyeva et al., *Green Bonds for Financing Renewable Energy and Energy Efficiency in South-East Asia: A Review of Policies*.

policies, the progress is inconsistent.[98] Establishing a universally recognized taxonomy and standard for sustainable or green finance is critical to providing clear guidance and instilling market confidence in the authenticity of sustainability labels. This holds particular significance in the domain of green financing, where investors seek specific outcomes and are wary of deceptive practices like 'greenwashing'. At the ASEAN level, as mentioned above, there exist ASEAN-GBS and ASEAN Taxonomy outlining indicative eligible project categories for adhering to these standards to prevent 'greenwashing'. However, AMS has yet to introduce any national taxonomies for sustainable or green finance.[99]

Driving green finance forward in the region requires a policy catalyst.[100] The national level of each AMS should be the initial initiative, recognizing the diverse circumstances within each country that necessitate tailored policy approaches.[101] While not all AMS have developed national policies yet, it is crucial to initiate the journey towards green finance even in the absence of comprehensive policies. One strategy could involve implementing soft policies within the ASEAN Working Committee on Capital Market Development, ensuring their compatibility with other national decision-making processes. Funding forms the backbone of sustainability initiatives, including public funding, offering a robust platform for introducing, advocating, and facilitating sustainable finance. For ASEAN member states, establishing national-level policies is essential, given each country's distinct circumstances.[102] Although developing such policies may take time, soft policy measures can be adopted at the ASEAN level without encroaching on national sovereignty. Financial resources, particularly public funding, play a pivotal role in

[98] Azhgaliyeva et al., *Green Bonds for Financing Renewable Energy and Energy Efficiency in South-East Asia: A Review of Policies*.

[99] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*.

[100] Han Phoumin et al., eds., *Green Finance and Renewable Energy in ASEAN and East Asia*, Routledge-ERIA Studies in Development Economics (Routledge, Taylor & Francis Group, 2024), https://doi.org/10.4324/9781003397670.

[101] Muhammad Sadiq et al., "The Role of Green Finance, Eco-Innovation, and Creativity in the Sustainable Development Goals of ASEAN Countries," *Economic Research-Ekonomska Istraživanja* 36, no. 2 (2023), https://doi.org/10.1080/1331677X.2023.2175010.

[102] Anam Tariq and Arshad Hassan, "Role of Green Finance, Environmental Regulations, and Economic Development in the Transition towards a Sustainable Environment," *Journal of Cleaner Production* 413 (August 2023), https://doi.org/10.1016/j.jclepro.2023.137425.

advancing these initiatives. Ministries of Finance (MOFs) are well-positioned to facilitate sustainable finance by prioritizing green funding for environmentally sustainable projects.[103]

In particular, MOFs could introduce a 'Sustainable Finance First for Sustainable Projects' soft policy, encouraging project owners to prioritize sustainable finance. For instance, green finance should take precedence for infrastructure projects meeting green criteria. Considering that certain sustainable projects may fall under the purview of ministries or government agencies beyond MOFs, these entities should also be engaged in such efforts. Aligning NDCs with green financing presents an effective means for governments to meet their NDC obligations while expanding the scope of green investment opportunities. This approach not only fosters green projects but also encourages existing projects to adopt environmentally friendly practices.[104]

Another challenge suppressing the development of green bonds is the lack of financing resources set aside to support their plans for achieving SDGs. There have been a small number of AMS have thoroughly studied how much money they need and how to use it effectively achieve their committed SDGs.[105] Thus, it is necessary to formulate internal policies regarding diversifying financial sources for green or sustainable projects, reducing the sole reliance on funding from the national budget and considering other funding options by finding the optimal mixture of public, private, and development capital whenever feasible.[106] Achieving this will require a well-coordinated strategy, with a strong focus on attracting and leveraging substantial private investment.[107] Additionally, it necessitates a shift in the approach to project funding. The adoption of an open-system strategic financing approach could replace individual project evaluations to prioritize the mobilization of large-scale private capital.[108]

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[103] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 53.

[104] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 5 & 53.

[105] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 3.

[106] Ahmed Imran Hunjra and John W. Goodell, eds., *The Palgrave Handbook of Green Finance for Sustainable Development*, Palgrave Studies in Green Finance (Springer International Publishing, 2024), https://doi.org/10.1007/978-3-031-65756-6.

[107] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 53–54.

[108] ASEAN WC-CMD, *Report on Promoting Sustainable Finance in ASEAN*, 53–54.

In comparison to the EU within which the regional collaboration and the establishment of standardized practices have stimulated the issuance of private green bonds.[109] However, this phenomenon has not been observed to the same extent within ASEAN. Establishing economic and regulatory frameworks to support green finance is crucial for creating an environment where green finance can develop. Standardization of requirements for green projects and definition of investments satisfying the criteria for green bonds are essential. In addition, it is necessary to strengthen regulations governing environmental reporting to ensure transparency and accountability. Mechanisms for sharing information on corporate pollutant production and environmental violations, as well as reliable assessments of green credit within broader social credit and assessment systems. Effective reform initiatives should leverage social capital to attract socially responsible investors. Furthermore, it is critical to devise strategies to promote green finance, encourage sustainable economic growth, and channel long-term investments in human capital toward environmentally friendly financing options.[110]

CONCLUSION

This article has examined the regulatory development, institutional mechanisms, and policy frameworks governing green bonds in the EU and ASEAN, revealing both common aspirations and distinct challenges in each region's pursuit of sustainable finance. The EU has made significant strides in advancing green bond markets through the implementation of binding regulations, such as the EU Green Bond Standard and the EU Taxonomy, and through strong institutional coordination and investor confidence. These measures have fostered a coherent and transparent green finance ecosystem, serving as a global model for regulatory innovation and climate-aligned financial instruments.

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[109] Falendra Kumar Sudan, "Leveraging Green Bonds to Address Debt Sustainability and Economic Recovery in South Asia: Lessons from EU and ASEAN Countries," *Regional Economic Development Research* 4, no. 2 (2023): 101–20, https://doi.org/10.37256/redr.4220233543.

[110] Mohsin et al., "Role of Green Technology Financing in Renewable Energy Development in Asean," 226.

By contrast, ASEAN's green bond landscape remains at a formative stage. Despite progress through initiatives like the ASEAN Green Bond Standards and the ASEAN Taxonomy for Sustainable Finance, regulatory fragmentation, the absence of national taxonomies, limited market depth, and inconsistent policy implementation continue to constrain the region's green finance potential. Moreover, the lack of adequate financial resources, institutional capacity, and investor safeguards leaves the ASEAN green bond market vulnerable to issues such as greenwashing and credibility gaps.

Nevertheless, ASEAN possesses significant opportunities to strengthen its green finance ecosystem. Drawing lessons from the EU, AMS should prioritize developing robust national legal frameworks and adopting harmonized taxonomies tailored to local contexts yet aligned with international norms. Regional coordination, particularly through the ASEAN Capital Markets Forum and relevant working groups, should be reinforced to foster policy coherence, regulatory convergence, and cross-border investment flows. Ministries of Finance must also play a more proactive role in mobilizing public and blended finance, incentivizing private sector participation, and ensuring that sustainable finance becomes a central pillar of national development strategies.

Ultimately, green bonds offer tremendous potential to bridge the climate finance gap and accelerate ASEAN's transition to a low-carbon, climate-resilient future. Realizing this potential requires not only regulatory alignment and technical innovation but also sustained political will and regional solidarity. A well-calibrated blend of legal reforms, institutional strengthening, and market incentives – anchored in lessons from the EU experience – will be critical in positioning green finance as a catalyst for sustainable development across Southeast Asia.

COMPETING INTEREST

The authors of the study affirm that they have no potential conflicts of interest.

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Cochu, Annica, Carsten Glenting, Dominic Hogg, et al. *Study on the Potential of Green Bond Finance for Resource-Efficient Investments*. European Commission: Directorate General for the Environment, 2016. https://data.europa.eu/doi/10.2779/234777.

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