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Green Economic Transition and Financial Policy: A Systematic Literature Review on Renewable Energy Investment in Developing Countries

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ABSTRACT

Abstract: The transition toward a green economy has become a central agenda for developing countries seeking to reconcile economic growth with climate commitments, yet financing this transition remains constrained by limited fiscal space and underdeveloped capital markets. This study employs a library research (systematic literature review) approach to examine the role of financial policy instruments—specifically green bonds, carbon pricing, and blended finance—in accelerating the green economic transition and renewable energy investment in developing countries. Secondary data were collected from peer-reviewed journal articles, institutional reports, and policy documents published between 2018 and 2026, retrieved from Scopus-indexed sources and reputable institutional databases including the OECD, World Bank, and Climate Policy Initiative. The literature was analyzed thematically to identify recurring patterns, instrument effectiveness, and research gaps. The findings show that green bond markets have expanded rapidly but remain concentrated in developed economies; carbon pricing has been adopted cautiously in developing countries, with narrower coverage and lower rates than in OECD economies; and blended finance has emerged as a complementary mechanism specifically targeted at de-risking smaller-scale renewable energy projects overlooked by conventional green bond markets. Across all three instruments, developing countries face persistent structural barriers—weak regulatory frameworks, greenwashing risk, high transaction costs, limited institutional capacity, and continued fossil-fuel-oriented investment by state-owned enterprises—that keep them in what this study terms a "sub-investment-grade" trap. The review also identifies a scarcity of empirical evidence on the long-term macroeconomic impact and effective sequencing of these instruments in emerging economies. This study contributes a consolidated, cross-instrument synthesis of financial policy literature relevant to green transition in the Global South and offers directions for future empirical research and policy design.

Keywords: green economy; green bonds; carbon pricing; blended finance; developing countries.

1. INTRODUCTION

The escalating impact of climate change, coupled with rising energy prices and geopolitical instability, has pushed the green economy agenda to the forefront of global policy discourse. For developing countries, the transition toward low-carbon and resource-efficient economic systems is not merely an environmental imperative but also an opportunity to attract new sources of investment and strengthen long-term economic resilience. However, the pace of transition in the Global South remains considerably slower than in advanced economies, largely due to constrained fiscal capacity, underdeveloped financial markets, and limited access to affordable green financing instruments.

This urgency has intensified in recent years as extreme weather events, energy price volatility following geopolitical disruptions, and mounting international pressure to meet Paris Agreement commitments have converged to place developing economies in a particularly difficult position. Unlike developed nations, which can draw on deep capital markets and established institutional investors to fund their transition, many developing countries must

simultaneously address urgent development priorities—poverty reduction, infrastructure deficits, and energy access—while also mobilizing capital for climate mitigation. This dual burden makes the choice and design of financial policy instruments especially consequential: a misallocated or poorly designed instrument risks diverting scarce public resources without generating commensurate climate or economic benefits.

Financial policy plays a pivotal role in bridging this gap. Instruments such as green bonds, carbon pricing mechanisms, blended finance, and renewable energy subsidies have been increasingly adopted to mobilize both public and private capital toward sustainable projects. Since the European Investment Bank and World Bank pioneered large-scale green bond issuance in 2013, the global green bond market has expanded substantially, yet issuance remains heavily concentrated in Europe, the United States, and China, with emerging markets accounting for a comparatively small share. Alongside green bonds, carbon pricing—through carbon taxes and emissions trading systems—has been promoted as a cost-effective mechanism that both discourages emissions-intensive activity and generates public revenue, though its adoption in developing countries has generally proceeded more cautiously, with narrower sectoral coverage and lower price levels than in OECD economies. Blended finance has likewise gained prominence as a mechanism to de-risk renewable energy investment by combining concessional and commercial capital, particularly in regions such as Sub-Saharan Africa and South and East Asia, where perceived investment risk remains a primary deterrent to private capital flows.

Despite the growing body of literature examining these green financial instruments individually, most existing studies focus on developed-market contexts or analyze single instruments in isolation, leaving a considerable gap in understanding how green bonds, carbon pricing, and blended finance interact and perform collectively within developing-country settings. Moreover, much of the developing-country evidence remains fragmented across disciplinary boundaries—environmental economics, development finance, and energy policy—making it difficult for researchers and policymakers to obtain a consolidated view of what is known, what remains contested, and where critical evidence gaps persist. This fragmentation is particularly problematic given the pace at which the literature itself is expanding: publication volume on green finance topics has grown markedly since 2021, yet syntheses that specifically center developing-country experiences remain comparatively scarce.

This study addresses that gap by conducting a systematic literature review of financial policy instruments supporting the green economic transition, with particular attention to renewable energy investment in developing countries. The novelty of this study lies in its explicit focus on the financing dimension of the green transition—rather than the broader policy or technological dimensions typically emphasized in prior reviews—and in its integrated treatment of multiple complementary instruments (green bonds, carbon pricing, and blended finance) within a single synthesis, drawing on recent literature (2018–2026) to capture the most current developments in the field. By consolidating this evidence, the study aims to provide researchers with a clearer map of the existing knowledge base and to offer policymakers a more coherent basis for designing financial strategies that can accelerate renewable energy investment across the developing world.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Green Economy and Sustainable Development Theory

The green economy concept, as articulated by UNEP, refers to an economic system that results in improved human well-being and social equity while significantly reducing environmental risks and ecological scarcities. Within this framework, financial policy is regarded as a central enabling mechanism: governments must create an environment that stimulates investment in green technology, supports green entrepreneurship, and integrates environmental considerations into economic planning. This requires regulatory frameworks that encourage renewable energy, energy efficiency, and sustainable infrastructure, while simultaneously addressing the capital, technological, and human-resource constraints that hinder green investment in lower-income countries.

Green bonds have emerged as the most extensively studied financial instrument in this literature. Systematic reviews following PRISMA-based protocols show that green bond research has grown sharply since the Paris Agreement, with studies concentrating in journals such as Energy Economics, Journal of Cleaner Production, and Finance Research Letters. Empirical findings converge on a modest but heterogeneous "greenium"—a pricing advantage for green bonds relative to conventional bonds—typically ranging between one and sixty-three basis points, alongside positive long-term effects on renewable resource utilization efficiency. However, this body of evidence remains geographically skewed: bibliometric analyses confirm that green bond markets are still dominated by developed economies, with fragmented and comparatively scarce evidence from emerging markets. Determinant studies further identify a lack of standardized frameworks, high transaction costs, greenwashing risk, weak sovereign credit ratings, and limited investor awareness as recurring barriers to green bond expansion in developing countries.

2.2. Carbon Pricing and Blended Finance as Complementary Instruments

Beyond green bonds, carbon pricing—implemented through carbon taxes or emissions trading systems (ETS)—has drawn growing attention as a cost-effective mitigation instrument that simultaneously generates public revenue to support the green transition. OECD data covering more than seventy countries show a gradual expansion of effective carbon rates since 2021, though coverage and price levels remain considerably lower in developing economies than in the OECD area. Country-level reviews, such as those examining Indonesia's mandatory ETS and South Africa's and Singapore's carbon tax schemes, indicate that developing countries tend to adopt carbon pricing at modest introductory rates before gradually broadening sectoral coverage, reflecting a cautious, politically constrained approach to implementation.

Expert-elicitation studies further reveal that policymakers in developing countries weigh distributional and political-feasibility concerns as heavily as economic efficiency when designing carbon-pricing instruments, which helps explain the persistence of low rates and narrow coverage despite the instrument's theoretical cost-effectiveness.

Blended finance has emerged as a complementary mechanism specifically targeted at de-risking renewable energy investment in developing countries. By combining concessional public or philanthropic capital with commercial finance, blended structures aim to rebalance the risk-return profile of projects that would otherwise be commercially unviable. Reports from the Climate Policy Initiative and IEEFA identify off-taker risk, currency risk, policy risk, and limited liquidity as the dominant barriers that blended finance is designed to mitigate, with the largest opportunities concentrated in Sub-Saharan Africa and South and East Asia. Complementary studies emphasize that reducing the cost of capital—through international climate finance and multilateral development-finance institutions—is a critical lever for accelerating variable renewable energy (solar and wind) deployment, given that developing countries remain far from installing renewable capacity at a pace comparable to developed economies despite favorable resource endowments.

2.3. Structural Barriers to Renewable Energy Financing in Developing Countries

Across these financial instruments, the literature converges on a common set of structural barriers. First, regulatory and institutional weaknesses—including the absence of standardized green taxonomies, inconsistent policy frameworks, and low sovereign creditworthiness—raise the perceived risk of green investment and deter private capital. Second, misaligned stakeholder objectives among development finance institutions (DFIs), private investors, and governments, combined with limited institutional capacity, hinder the formation of scalable collaborative financing models such as public-private partnerships. Third, sector-level analyses show that state-owned enterprises continue to dominate energy investment in developing economies while remaining heavily weighted toward fossil fuels, crowding out the fiscal and institutional space available for renewable energy financing.

These barriers collectively explain why green financial instruments—despite their demonstrated effectiveness in developed markets—have achieved only partial and uneven traction in the Global South. Importantly, most of the reviewed studies rely on qualitative case analysis, policy review, or scenario-based modeling rather than robust empirical testing of long-term macroeconomic outcomes. This confirms the research gap motivating the present study: systematic, cross-instrument evidence on how green bonds, carbon pricing, and blended finance jointly perform under developing-country conditions remains scarce, particularly across Southeast Asia, Sub-Saharan Africa, and Latin America.

3. RESEARCH METHODOLOGY

3.1 Research Design

This study adopts a qualitative library research (studi pustaka) design, employing a systematic literature review (SLR) approach to synthesize secondary sources rather than collecting primary field data. Library research was selected because it enables a comprehensive, structured synthesis of the rapidly expanding body of literature on green financial policy, allowing the identification of thematic patterns, consensus findings, and unresolved research gaps without the time and resource constraints of primary data collection. Given that this study examines three distinct but interrelated instruments—green bonds, carbon pricing, and blended finance—a cross-instrument synthesis design was chosen over a single-instrument review, allowing patterns of complementarity and shared structural barriers to be identified across the literature. The review broadly follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol commonly applied in recent green-finance reviews, adapted to a policy-focused synthesis.

3.2 Data Collection

Data were collected from secondary sources, including peer-reviewed journal articles indexed in Scopus and Web of Science, institutional reports (World Bank, UNEP, OECD, IEA, Climate Policy Initiative, IEEFA), and policy documents published between 2018 and 2026. The search strategy combined keywords across three instrument clusters: (i) green bonds — "green bond," "greenium," "green bond issuance"; (ii) carbon pricing — "carbon tax," "emissions trading system," "carbon pricing developing countries"; and (iii) blended finance — "blended finance," "concessional capital," "renewable energy financing." These were further combined with contextual terms such as "developing countries," "emerging markets," and "renewable energy transition." Inclusion criteria were: (i) publication in English, (ii) peer-reviewed or institutionally credible sources, (iii) explicit focus on financial instruments or policy related to green/renewable energy transition, and (iv) relevance to developing or emerging economies. Sources lacking methodological transparency, non-peer-reviewed blogs, and duplicate records were excluded.

3.3 Data Analysis

Data analysis was conducted through thematic synthesis: sources were first screened by title and abstract, then read in full to extract key findings, instrument type, methodological approach, and geographic focus. Extracted information was organized into a synthesis matrix and coded into recurring themes—market growth, instrument effectiveness, structural barriers, cross-instrument complementarity, and policy recommendations—following the coding logic used in prior bibliometric and SLR studies in this field. Findings were then organized by instrument (green bonds, carbon pricing, blended finance) before being synthesized across instruments to identify shared structural barriers and potential sequencing strategies. This thematic

approach allows patterns and gaps across the literature to be identified transparently and enables replication by other researchers.

4. RESULTS AND DISCUSSION

4.1 Green Bond Market Growth and Its Concentration in Developed Markets

The reviewed literature reveals that the global green bond market has expanded markedly since 2013, with publication volume and citations reaching record levels in 2023–2024, reflecting sustained academic and policy interest. However, this growth remains geographically concentrated: developed markets in Europe, the United States, and China dominate issuance, while emerging markets show fragmented and comparatively limited representation despite rising demand for renewable-energy financing. Meta-analytic evidence further indicates that green bond proceeds are disproportionately allocated to energy, transport, and building sectors, with severe underinvestment—below five percent—in waste management and agriculture, sectors of particular importance to many developing economies.

These findings align with, yet also extend, prior reviews that emphasize policy-driven barriers—weak regulatory frameworks, greenwashing risk, high transaction costs, and limited sovereign creditworthiness—as key constraints on green bond expansion in developing economies. The persistence of a "greenium," albeit modest, suggests investor willingness to accept lower yields for environmental credibility, which developing-country issuers could leverage if regulatory credibility is strengthened. Nevertheless, this review identifies a notable scarcity of empirical, country-level studies examining the long-term macroeconomic and welfare impacts of green bonds specifically within developing-country contexts, as most existing evidence remains descriptive or policy-oriented rather than causal.

4.2 Carbon Pricing and Blended Finance: Complementary but Uneven Progress

A second pattern emerging from the literature concerns carbon pricing. Evidence shows that developing countries have adopted carbon taxes and emissions trading systems at a cautious pace, typically beginning with modest rates and narrow sectoral coverage before gradually expanding—as illustrated by Indonesia's mandatory ETS and South Africa's and Singapore's carbon tax schemes. This gradualism reflects the political economy constraints identified in expert-elicitation studies, where policymakers in developing countries weigh distributional fairness and political feasibility as heavily as economic efficiency, often resulting in price levels too low to generate strong mitigation incentives on their own. Compared to green bonds, carbon pricing thus functions less as a direct financing instrument and more as a revenue-generating and behavior-shifting mechanism whose fiscal proceeds can, in principle, be redirected toward renewable energy investment—though the literature suggests this redirection is inconsistently implemented across countries.

Blended finance emerges as the instrument most directly targeted at overcoming the risk barriers that limit both green bond issuance and private renewable energy investment. Reports from the Climate Policy Initiative and IEEFA identify off-taker risk, currency risk, policy risk, and liquidity constraints as the dominant barriers blended finance is designed to mitigate, with the greatest opportunities concentrated in Sub-Saharan Africa and South and East Asia. This evidence complements the green bond findings: while green bonds mobilize capital primarily for larger, more bankable projects, blended finance appears better suited to smaller-scale or early-stage renewable energy projects that conventional green bond markets tend to overlook. Taken together, these two instruments suggest a degree of complementarity rather than substitution, though the literature offers little empirical guidance on how governments might sequence or combine them effectively.

4.3 Structural Barriers and the "Sub-Investment-Grade" Trap

A third and cross-cutting finding concerns the structural barriers that constrain all three instruments simultaneously. The concentration of green bond proceeds in energy, transport, and building projects reflects a broader "bankability bias," whereby financiers favor sectors with predictable, large-scale, and easily monitored returns. When macroeconomic stability improves or domestic capital markets deepen, developing countries are better positioned to attract these instruments; however, because access to green finance remains heavily bounded by investor risk perception and institutional credibility, the capacity of smaller economies to cross the threshold from pilot-scale green projects to systemic transition is highly constrained. In this sense, many developing countries remain perpetually positioned just below the "green investment-grade" line, where a minor deterioration in sovereign risk rating or policy uncertainty can immediately disrupt financing flows.

This trap is reinforced by institutional weaknesses documented across the reviewed literature: the absence of standardized green taxonomies, misaligned objectives among development finance institutions, private investors, and governments, and the continued dominance of state-owned enterprises in energy investment—entities that remain heavily weighted toward fossil fuels rather than renewables. Because many developing-country issuers lack independent verification frameworks, investors default to conservative risk pricing that keeps green capital flowing predominantly toward already-mature markets. While international cooperation frameworks and blended finance mechanisms have begun to address this imbalance, the evidence reviewed suggests they remain insufficient in scale relative to the financing gap. To shift developing economies from marginal participants into active drivers of the global green transition, coordinated interventions—capital de-risking instruments, capacity-building for green taxonomy development, and stronger multilateral climate-finance commitments—are fundamentally required.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This systematic literature review demonstrates that financial policy instruments—green bonds, carbon pricing, and blended finance—play distinct yet complementary roles in advancing the green economic transition, but their deployment in developing countries remains disproportionately limited relative to developed markets. Green bonds have grown rapidly in volume but continue to concentrate capital in already-bankable sectors and geographies; carbon pricing has been adopted cautiously, generating modest fiscal revenue rather than serving as a primary financing channel; and blended finance has proven most effective at addressing the risk barriers facing smaller-scale renewable energy projects, particularly in Sub-Saharan Africa and South and East Asia. Across all three instruments, structural barriers—weak regulatory frameworks, greenwashing risk, high transaction costs, limited institutional capacity, and the continued dominance of fossil-fuel-oriented state-owned enterprises—keep many developing countries positioned just below the threshold needed to attract sustained green capital flows.

These findings carry both theoretical and policy implications. Theoretically, the study extends the green-economy and sustainable-finance literature by consolidating fragmented, instrument-specific evidence into a single cross-instrument synthesis that centers developing-country experiences. Practically, it underscores the need for policymakers to treat green bonds, carbon pricing, and blended finance not as substitutes but as complementary tools whose effective sequencing and coordination could meaningfully close the green-investment gap—for instance, using blended finance to de-risk early-stage projects while carbon-pricing revenues help fund concessional capital pools, with green bonds subsequently scaling up bankable projects once market confidence is established. This study is limited by its reliance on secondary, English-language, peer-reviewed sources, which may underrepresent region-specific or non-English policy literature; future research should incorporate broader regional databases and grey literature.

5.2 Recommendations

Future research is recommended to move beyond descriptive and bibliometric synthesis toward empirical, panel-based, or comparative case-study designs that measure the causal impact—and optimal sequencing—of green financial instruments on macroeconomic and welfare outcomes in developing countries. Policymakers are encouraged to prioritize the development of standardized green taxonomies, strengthen institutional capacity for green-bond verification and carbon-market oversight, expand the strategic use of blended finance to unlock smaller-scale renewable energy projects, and deepen international cooperation on climate finance to close the green-investment gap between developed and developing economies.

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