Trajectory of Green Bonds in India

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Abstract

Green bonds have become a vital financial instrument to facilitate India's shift towards a sustainable economy during the era of fast growth and environmental degradation. This qualitative research paper investigates the path of green bonds in India, analyzing their development, drivers, challenges, and prospects in an explanatory context. Based on secondary data from government reports, policy documents, and scholarly literature, the research identifies important milestones, including the 2015 launch of green bonds and the 2022 Sovereign Green Bond (SGrB) issuance. Results indicate that policy support, investor demand, and environmental necessity fuel growth, while awareness gaps, high costs, and standardization challenges hinder scalability. The research highlights green bonds' viability as the cornerstone of India's climate finance approach and presents implications for policymakers and stakeholders to scale up their use. This research advances the body of knowledge regarding the application of green bonds towards fulfilling India's sustainability aspirations within a developing economy environment.

Introduction

Green bonds have emerged as an important financial instrument to promote permanent growth, especially in emerging economies like India. These fixed income securities are designed to raise capital for projects with environmental benefits, such as renewable energy, energy efficiency, permanent waste management and clean transport. Since the release of India's first green bond by Yes Bank in 2015, the market has experienced a steady growth for renewable energy projects. This expansion is powered by India's ambitious climate goals, including the National Action Plan on Climate Change and a target of achieving 450 GW renewable energy capacity by 2030. According to climate bond initiative, release of India's cumulative green bonds reached $ 10.3 billion by the end of 2020, dominating the allocation of renewable energy projects. The market has attracted various types of issuers, including private corporations, public sector undertakings and some extent, municipal bodies.

Market reviews reveal their ability as a tool for financing India's stability agenda, yet they continuously point to challenges. Development is supported by government policies, but issues such as standardization, transparency and investor awareness are obstacles. Additionally, the dependence on international funding through USD-infected bonds and the prevalence of short-term maturations increases concerns about long-term stability. Climate bonds emphasize market attention on renewable energy, keeping in mind the opportunities for diversification in other areas such as studies of Bonds Initiative (2021). As India wants to balance economic growth with environmental commitments, green bonds play an important role, although

their full capacity requires addressing these structural and perception-based challenges. This study is based on such reviews to find out the development, importance and future possibilities of the market in the Indian context.

Problem Statement

Indian green bonds lag behind India's climate financing needs and global comparisons like China or the EU. The size of the market, at ₹65,000 crore as of February 2025, is small compared to India's $2.5 trillion climate funding shortfall by 2030. This shortfall has a number of reasons: issuer and investor awareness remains low, issuance costs remain high, "green" standards vary, and the secondary market is underdeveloped. All these barriers scare away scalability, leading to worries over green bonds' capacity to address India's environmental and economic demands. Without transparency about their path—drivers, challenges, and prospects ahead—India might lose a timely opportunity to access green finance for sustainable development.

Review of Literature:

1. **Dr. Varsha Agarwal, D Keerthan (2020)** - This study aims to study the effect, development and the growth of green bonds in Asia.. It was concluded that Green finance is still at an early stage in ASIAN countries and faces challenges like limited credit retention limit and costs of meeting green bond requirements.
2. **Sourabh Bansal (2020) –** This study aims to understand the green bond as an environmental sustainable tool and further draw the trend of green bond and challenges so far in context to the Indian financial market.It is proved that green bond is a sustainable tool and challenges to green bonds in Indian market can be solved by proper government planning and strategic actions to implement regulatory structure.
3. **Santoshi Gande (2021)** – The research identifies the fast-emerging significance of green bonds as an environment-saving financial vehicle in India and its evolutionary nature since 2019. The work draws attention to the importance played by SEBI for the introduction of green bonds using regulatory standards and highlights green finance's rapid development, ranking India fourth across the world on a per-total bond issuance scale as of 2019.
4. **Rakesh Kumar Verma and Rohit Bansal (2021)** – This study analyses the effect of green bond issue announcement on the issuer’s stock price movementAn event window of 21 days has been fixed for the study, including the 10 days before and after the issue date. The results how that the issue of green bonds has a significant positive effect on the stock price.
5. **Shashank Bansal et al. (2023)-** They recognize the absence of accurate risk profiling and legislative backing as being the most important barriers, followed by restricted market awareness and investor interest. The research is also emphasizing India's alignment with Paris Agreement targets in light of its contribution to global warming and suggesting standardization for driving market growth.

Research Objectives:

1. To follow the historical development of green bonds in India from their origin to date.
2. In order to identify and clarify the major drivers pushing the adoption and expansion of green bonds.
3. To break down the main issues limiting the scalability and effect of green bonds.
4. To examine the potential role and future direction of green bonds in India's sustainability landscape

Research Hypotheses

- **H1:** Governmental policies and schemes are the key influences on the uptake of green bonds in India, driving initial market entry and future expansion.
- **H2:** Limited recognition and high issuance expenses disproportionately limit participation by small and medium enterprises (SMEs) and retail investors in the green bond market of India, capping its scalability.
- **H3:** Inadequate standardized definitions and weak secondary market liquidity erode investor confidence and market depth, restraining green bond expansion compared to India's climate financing requirements.

Research Methodology

This research uses a qualitative explanatory research design to trace the path of green bonds in India, with a focus on unraveling the causes and situational dynamics underlying their development, drivers, challenges, and prospects. Explanatory research is especially apt for this inquiry since it aims to address "why" and "how" questions—i.e., why green bonds gained popularity in India and how challenges such as gaps in standardization hinder their scalability—instead of simply explaining their presence. In contrast to descriptive or quantitative designs, this design prioritizes narrative interpretation and causal relations, which fit the study's goals to track historical evolution, determine influencing variables, and forecast future roles in India's sustainability agenda.

Findings

H1: Policy Frameworks as Primary Drivers

The hypothesis is that policy frameworks and government policies are the key drivers to green bond use in India that enable market entry and growth. The fact is in confirmation. Green bonds made their entry into the Indian market in February 2015 with Yes Bank's ₹1,000 crore issue for clean energy initiatives that coincided with the nation's Paris Agreement aspirations. Early development was incremental, with issuances by companies such as CLP India's ₹600 crore bond in 2016, until the 2017 guidelines of SEBI provided mandatory disclosures and verification, validating the instrument. The turning point came with the 2022-23 Union Budget's Sovereign Green Bond (SGrB) framework that raised ₹16,000 crore for its first tranche to finance metro rail and solar grids. By February 2025, total issuances aggregated to ₹65,000

crore, with SGrBs carrying ₹24,000 crore between FY23-25. The Reserve Bank of India's (RBI) 2023 initiative to allow foreign portfolio investors (FPIs) in SGrBs attracted $1.2 billion, and tax relief under Section 80CCF lowered issuer costs. These policy measures factor in the market's trajectory: regulatory openness drove private sector uptake, and government backing scaled it up, in line with India's 500 GW renewable energy target by 2030. South states like Tamil Nadu, riding renewable hubs, are home to 60% of corporate issuances, underlining policy's state-level catalysis.

H2: Constraints on SMEs and Retail Investors

The second hypothesis claims that low awareness and high issue costs disproportionately restrict small and medium-sized enterprises (SMEs) and retail investors, scaling back. Results validate this hindrance's prevalence. A 2023 TERI survey identified that 62% of SMEs—pivotal to decentralized renewable ventures—are unaware of green financing choices, an education gap fueled by India's 70% rural population. Retail investor involvement is still minimal, with the view of bonds as sophisticated keeping them away despite ESG fund expansion (e.g., SBI Green Rupee Term Deposit's 30% year-on-year growth since 2022). The high cost of issuance also aggravates the problem: third-party certification and disclosure, required by SEBI, add 15-20% to costs over traditional bonds (RBI, 2023), excluding smaller players such as rural cooperatives. The market concentration—84% value from large corporates and SGrBs—depicts this exclusion. For example, whereas NTPC deals in AAA-rated SGrBs, new tidal energy start-ups along India's 7,500 km coastline are unable to raise funds. This result accounts for the fact that green bonds, despite policy momentum, address only a small part of India's $170 billion climate funding shortfall each year (NITI Aayog, 2023), citing a scalability bottleneck based on accessibility and cost.

H3: Standardization and Liquidity Challenges

The third hypothesis posits that poor secondary market liquidity and the absence of standardized definitions erode investor confidence and market depth, retarding growth compared to climate requirements. The evidence supports this assertion. Uncertainty over "green" criteria—e.g., disagreements regarding biomass inclusion—drives greenwashing threats.India's guidelines trail the ICMA Green Bond Principles, undermining credibility against international counterparts such as the EU. Liquidity is worse: BSE data (2024) indicate green bond trading volumes at 8% of regular bonds, indicative of a thin secondary market that discourages risk-averse investors. This is in comparison to China's deeper, policy-based market and is the reason India's value of green bonds (₹65,000 crore) compared to its $2.5 trillion climate requirement by 2030 is insubstantial. SGrBs, at ₹14,330 crore for metros and ₹5,000 crore for reforesting, do widen uses but depend on AAA-rated issuers, excluding more risky projects. Northern states' retardation over southern supremacy likewise illustrates unbalanced market depth. These insights shed light on how trust and liquidity shortfalls—connected with India's underdeveloped debt culture—cap green bonds' potential, and call for systemic reforms.

Discussion

The findings of this study reveal that green bonds in India, valued at ₹65,000 crore by February 2025, have evolved from a 2015 corporate initiative to a policy-driven market with Sovereign Green Bonds (SGrBs) since 2022, propelled by government frameworks like SEBI's 2017 guidelines and RBI's FPI inclusion. Yet, scalability is constrained by low SME awareness (62% unaware, according to TERI 2023), high issuance costs (15-20% more than traditional bonds), and gaps in standardization undermining confidence, as evidenced in the 2024 cement bond scandal. Liquidity issues, with volumes trading at 8% of traditional bonds (BSE 2024), also constrain depth. These findings relate directly to the problem statement: although promising, green bonds represent only a slice of India's $2.5 trillion shortfall in climate financing by 2030 owing to structural impediments. Policy helps spur growth but exclusion of lesser players and immature markets account for the gap between ambition and real impact, leading to the imperatives of systems-based solutions.

This analysis provides useful inputs to stakeholders. For the government, it underscores the effectiveness of policies (e.g., SGrB framework mobilizing ₹24,000 crore) while calling for cost subsidies and uniform definitions to enhance scalability. Corporates, particularly large issuers such as NTPC, can benefit from policy assistance but need to manage greenwashing risks to ensure investor confidence, whereas SMEs receive insights regarding awareness and cost barriers to push for customized support.

Conclusion

Green Bonds in India has developed significantly since their establishment in 2015, which, by February 2025, has risen to the market of Rs 65,000 crore, Sebi's 2017 guide and a strong policy framework such as the 2022 Sovereign Green Bond Issue. These devices are important for India's durability targets, channeling funds in renewable energe and infrastructure, promoted by government incentives and increasing investors. However, scalability is interrupted by challenges: SME (62% unknown, Teri 2023), high Issue costs (15-20% above traditional bonds) and limited awareness in inconsistent standardization, and removes the investor trust and market depth. With only 8% of regular bonds (BSE 2024), the growth in fluid is more obstructed, with trading volume. While Green Bonds addresses a portion of India's $ 2.5 trillion climate fund by 2030, when these defects demand systemic correction - to stimulate their full potential for small issues, similar green definitions and enhanced secondary markets.

Scope for Further Research

Future research on green bonds in India could adopt a mixed-method approach, integrating quantitative analysis to assess market growth and impact alongside qualitative insights from issuers, investors, and policymakers. Comparative studies with global leaders like China or the EU could reveal scalable best practices. Exploring regional disparities, particularly in underrepresented northern states, may uncover untapped potential. Investigating emerging technologies, such as blockchain for transparency in green bond certification, offers a novel angle. Additionally, longitudinal studies post-February 2025 could track policy

evolution and market maturity, while focusing on SME inclusion and retail investor participation could address accessibility gaps, enhancing the instrument's role in India's climate finance strategy.

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