

The Legal Architecture of Green Bonds in India: Challenges and Prospects for Sustainable Development

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Abstract

Environmental concerns have been one of the most relevant areas of discussion for the global economy. The rise in environmental problems is closely connected with Industrial Development. In addition to other efforts undertaken to control environmental harm in nations worldwide, “Green Bonds” are considered to be the most effective innovations for promoting and attaining Sustainable Development Goals (SDGs). Green Bonds mainly emphasise sustainable financing i.e. channelling financial resources for promoting a robust and greener future, by the use and production of renewable energy, thereby reducing global emissions. Considering the significant impact of “Green Bonds” on the production and emission of renewable energy, it is pertinent to understand the impact of “Green Bonds” in the attainment of sustainability.

The present paper explores the evolution and adoption of Green Bonds in India and the legal and regulatory framework surrounding them. The work will focus on the adoption of green bonds in addressing environmental sustainability and the challenges faced by the government in operationalising the green bonds framework. It will also delve into the growing literature on green bonds in India to understand the trends of green investments with a particular focus on the role of financial institutions, the government and key stakeholders. Additionally, it evaluates the environmental impact of green bond-funded projects and their compliance with India's climate commitments under international frameworks. Lastly, the research highlights the critical role of green bonds in facilitating India's transition towards a low-carbon, sustainable economy and provides suggestions for improving the framework and ushering in green financial systems in India

Key Words: Green Bonds, Sustainability, Environment, ESG, Sustainable Development Goals.

Introduction

Environmental problems have been one of the most pertinent subjects of discussion for the global economy. The rise in environmental concerns is akin to Industrial Development. In addition to other measures implemented to regulate environmental destruction globally, “Green Bonds” are seen as the most impactful innovations for attaining and promoting Sustainable Development Goals (SDGs). Green Bonds promote sustainable financing by the use and production of renewable energy, i.e. directing financial resources towards a robust and greener future, thereby lessening global emissions. Considering the significant impact of “Green Bonds” on the production and emission of renewable energy, it is pertinent to understand and analyse the impact of “Green Bonds” in the attainment of sustainable development.

Sustainable development mechanisms have been adopted to utilise financial products that have a direct impact on SDGs to boost capital for achieving sustainable goals, for instance, reducing hunger, eliminating poverty, improving education and medical facilities, which are successfully achieved through effective capital allocation (Bhutta et al., 2022). Green bonds are seen as an effective and viable instrument for achieving sustainability. This is because businesses contributing to sustainable development raise capital from various sources; green bonds are one such mechanism that facilitates their capital raising for environmentally friendly projects. Over the period of time, the success and promotion of green bonds are seen as one of the effective instruments to fund environmentally friendly projects and achieve sustainable development goals (Su & Lin, 2025). In its nascent stage, the green bond market was dominated by a small number of development bank issuers with relatively modest issuance volumes; nevertheless, these early green bond issuances laid critical groundwork by depicting that environmental objectives could be embedded within fixed-income instruments without

materially compromising financial performance, thereby helping establish green bonds as credible tools within sustainable finance (Lebelle et al., 2020).

In simple terms, green bonds are “specialised debt instruments” that finance sustainable projects for environmental protection and preservation, thereby providing financial security to these projects. There is no uniform definition given to green bonds, however, according to Principles (GBP, 2018), a green bond is “*any bond instrument where the proceeds will be exclusively applied to finance or re-finance, in part or in full, a new and/or existing eligible green projects and which are aligned with the four core components of GBP*”. Bloomberg defines green bond as “*financial security to finance projects to minimize the impact of greenhouse gas (GHG) emissions*” (Bansal et al., 2023).

With time, the intricate relationship between green bonds and sustainability gained importance in contributing towards environmentally sustainable projects. Since their introduction in the late 2000s, ‘green bonds’ have developed from niche multifaceted instruments into a conventional asset class, reinforced by growing demand from investors, international standards and regulatory interventions. The need for green bonds is seen from the utilisation of its capital/proceeds for financing technologically advanced projects and for most productive uses that facilitate in mitigating the adverse effects of industrialisation and improving the way of living and bringing prosperity in the society. Moreover, it is argued that SDG goals restructured the dynamics of the world economy and necessitate the introduction of exceptional financial instruments to provide capital for eco-friendly projects (Gianfrate & Peri, 2019) (Gupta, n.d.). Theoretically, the proceeds from green technologies have been utilised for projects referred to as ‘green projects’ and have proved to be a medium for achieving a low-carbon economy, facilitating the reduction of ecological degradation by minimising the gap between the demand and needs of financing. However, in practice, significant challenges subsist in the large-scale deployment and effective integration of such projects, primarily owing to concerns relating to their commercial workability, risk-adjusted returns, technological immaturity and nascent stage of green innovation ecosystem (Bansal et al., 2023).

This paper studies the evolution of green bonds, evaluates their development in India, and examines their relevance and legal operations in the Indian context. The paper argues that while India has made substantial progress in implementing green bonds, continued growth requires stronger arrangements, financial incentives, and regulatory harmonisation to ensure effective standing and long-term impact.

Methodology

The policy-based and doctrinal study is undertaken to trace the Standardisation and regularisation of green bonds, study India’s regulatory framework, and enumerate the challenges and existing opportunities available in this field.

Review of Literature

Historical Development

In the formative phase, green bonds emerged as thematic debt instruments, normatively distinct from traditional bonds as their proceeds were earmarked for environmentally sustainable projects. The initial years of the development of the market were backed by Multilateral Development Banks (MDBs) such as the World Bank and the European Investment Bank, who played a critical role in mitigating credit risk, establishing credibility in green bonds, and setting standards for reporting and transparency. The green bond market was originally designed for and targeted institutional investors with ESG mandates, but subsequently expanded alongside the growth of environmentally responsible investments, witnessing increased participation from municipal bodies, sovereign issuers and corporate entities. resulting in the diversification of instruments and issuers, and geographical spread (Sengupta, Bhattacharjee, et al., 2025). Empirical studies derived from green bond issuance in the countries associated with the Belt and Road Initiative highlight that there is a positive relation between green bond issuance and macro-economic performance, contributing to an estimated annual economic growth of 4.9% and a 17% enhancement in economic recovery rate, thereby underscoring their dual environmental and development

significance (Ansar et al., 2025) A significant development is further seen with the signing of Paris Agreement by 188 countries in 2015, emphasising the rising temperature leading to climate change. Other documents, such as UNFCCC (United Nations Framework Convention on Climate Change), too accentuated on having innovative means to reduce the effect of climate change and to achieve the emission target by 2030 of 33-35% (Veer Singh & Kumar Shrivastava, 2024).

The first 'green bond' called as 'Climate Awareness Bond' (CAB), was issued by the European Investment Bank (EIB) in 2007, earmarking the proceeds for climate-related projects. Later in 2008, the World Bank's 'green bonds' programme was taken up to further the development of the issuance of green bonds (Bansal, 2020). Subsequently, jurisdictions such as the European Union and China introduced regulatory and taxonomy-based frameworks to support green finance, incorporating green bond finance into broader climate policy objectives and enhancing investors' confidence (Su & Lin, 2025). In the later years of the 2010s, green bonds had become a conventional financing tool, expanding rapidly and contributing significantly to various sectors, such as funding renewable energy, sustainable water management, clean transport and climate-resilient infrastructure and by 2020, became a fundamental component of the sustainable finance ecosystem in conjunction with socially and sustainably connected bonds (Demebele et al., 2021). However, despite remarkable growth, the available literature narrates dogged challenges, such as, inconsistency with the definition of "green bonds", limited evidence of long-term financial outperformance, cost verification, fragmented reporting standards, investors' opinion on green premium and scrappy standards (Gupta, n.d.). To overcome the existing challenges, in 2014, the International Capital Market Association (ICMA) formulated the Green Bond Principles (GBP), which marked a milestone for the global evolution of green bonds. The GBP formulated structured guidelines designed around four core components (a) Use of Proceeds, (b) Process for project evaluation and selection, (c) Management of Proceeds and (d) Reporting (Lebelle et al., 2020).

These Principles (GBP) are voluntary process guidelines that address investors' concerns regarding green washing and laid down key components involved in launching a credible Green Bond for the issuers, clarifying the approach for issuance of a green bond, recommend transparency, disclosure and promote integrity in the development of the Green Bond market, they aided investors by promoting availability of information necessary to evaluate the environmental impact of their Green Bond investments, assisted underwriters by offering vital steps that will facilitate transactions that preserve the integrity of the market, thereby accelerating market growth and facilitated entry of corporate and sovereign issuers into the market (GBP 2025, n.d.).

Green bonds in Indian Terrain

India's entry is marked by the issuance of the first-ever green bonds in the year 2015 by Yes Bank which raised INR 1000 crore for financing renewable energy projects. The subsequent issuance of green bonds by financial institutions and public sector entities marks the alliance of India's capital market with the global sustainable finance market, reinforcing market confidence and thereby establishing green bonds as a viable financial tool (Patidar, 2023). India's position in the green bond market was further strengthened with the joining of a network that supported the adoption of the International Sustainability Standards Board (ISSB) standards in emerging markets (IBRD, 2025). The Securities and Exchange Board of India (SEBI) played a crucial role in institutionalising green bonds by issuing the Green Bond Guidelines, inspired by ICMA Green Bond Principles, in 2017. These Principles defined qualified green projects, provided for the submission of periodical reports, laid down disclosures for the use of proceeds to ensure transparency, prevented greenwashing and enhanced investor protection. Additionally, the RBI (Reserve Bank of India) supported the issuance of green bonds by strengthening the corporate bond market and acknowledging climate-related financial risks (Bansal et al., 2023). Number of other implementors connected with different other entities, for instance, SIDBI joined as a member of the Montreal Protocol to save the ozone layer, IDFC as a member of Equator Principles, NABARD as an associate of UNFCCC and affiliated with NIE (National Implementing Entity) and SBI as a member to Carbon Disclosure Project. Other initiatives undertaken by GoI to encourage investments in green projects were: tax incentives for investors, longer repayment plans and a lower rate of interest on loans undertaken for green projects. The Indian Government, in order to achieve the green project target by 2030, issued guidelines related to emission control and energy efficiency (Bansal, 2020). A range of private and public sector players have also joined the league of prominent issuers in India's green bond market under Climate Bond Initiatives, 2022. Further, Sovereign Green Bonds were

issued in 2023, indicating the country's dedication to climate finance and sustainable development (Kumar & Kundalia, 2023). In 2024, the Government of India raised INR 440 billion in green bonds, remarkably outperforming other classes of sustainable finance issuers. In June 2025, the Reserve Bank of India announced the release of INR 5,000 crore in 30-year sovereign green bonds at an interest rate of 6.98%. This is part of a larger government securities auction totalling INR 30,000 crore (Durga et al., 2025).

These initiatives relating to the issuance of green bonds have highlighted a sturdy governmental commitment to channelling sustainable finance and showcase India's strong commitment to climate action goals. Despite these initiatives, there are some structural challenges that India faces in the implementation and effective execution of green bonds. The next sections highlight some of the existing structural changes present in the Indian economy of green bonds.

Green bonds, social bonds, and sustainability linked loans are key instruments channeling funds toward renewable energy, social inclusion, and governance improvements. Globally, sustainable investment assets surged from \$12 trillion in 2015 to an estimated \$100 trillion by 2025, driven by regulatory initiatives and shifting investor preferences

Some of the Key instruments to channel funds towards sustainability include Green Bonds, Social bonds and sustainability linked bonds. The world at large has seen huge rise in sustainable investments with the market reaching \$3.3 trillion in 2024 (UNCTAD, 2024)

Globally the concept of green bonds was introduced in the year 2007 with initial thrust coming from supranational organisations such as European Investment Bank and the world bank. India subsequently followed suit keeping in view India's Nationally Determined Contributions (India's Updated First Nationally Determined Contribution Under Paris Agreement, 2022) document that impresses upon the fact that India requires USD 2.5 trillion for meeting its climate goals. As per the India Sustainable Debt State of the Market 2024. The Indian green bond market is the fourth largest emerging market source of green finance globally, after China, South Korea, and Chile. The existing channels of investment are inadequate to meet India's green finance needs thus necessitating new channels of investment and innovative financial instruments. The issuance of green bonds are governed under the Issue and Listing of Debt Securities Regulations, 2008. (*Disclosure Requirements for Issuance of Green Debt Securities*, 2017).

Regulatory Framework for Green Bonds in India: Green Bond market in India has grown from its inaugural since 2015 to 2023 primarily due to progressive regulatory interventions by SEBI. Multiple institutional actors have shaped the green bond market in India. While SEBI serves as a regulator for the capital market the Reserve Bank of India oversees banking participation.

The regulatory framework for Green Bonds was set up in India through the SEBI guidance note on Green Securities in 2017. Although the public issue of debt securities and listing of the securities and issues through public offer or private placement is guided by the SEBI (Issue and Listing of Debt Securities) Regulations 2008. (Sengupta, Bhattacharjee, et al., 2025). As per the 2017 note a debt security shall be considered as green debt security if funds raised through issuance of the debt securities are to be utilised for project(s) and/or asset(s) falling under any of the following broad categories: (*Disclosure Requirements for Issuance of Green Debt Securities*, 2017)

- a. Renewable and sustainable energy including wind, solar, bioenergy, other sources of energy which use clean technology etc.
- b. Clean transportation including mass/public transportation etc.
- c. Sustainable water management including clean and/or drinking water, water recycling etc
- d. Climate change adaptation
- e. Energy efficiency including efficient and green buildings etc.
- f. Sustainable waste management including recycling, waste to energy, efficient disposal of wastage etc.

Disclosures in the offer Document for Green Securities

The issuer of the securities has to make a number of disclosures as per its circular of 2017 (*Disclosure Requirements for Issuance of Green Debt Securities, 2017*) in the offer document mentioning the environmental objectives of the issue of green debt securities and a brief about the decision-making process that issuer has followed for determining the eligibility of projects and assets for which assets are being raised through issuance of green debt securities. In addition, the regulation also requires the issuer to provide details of the project(s) and/or asset(s) or areas where the issuer, proposes to utilise the proceeds of the issue including systems and procedures to be employed for tracking the deployment of the proceeds of the issue.

Third Party Review

The issuer may also optionally appoint an independent third-party certifier for certifying the processes including project categories eligible for financing by green debt securities etc. The issuer shall after listing the green debt securities make continuous disclosures under Listing obligations and Disclosure regulations 2015. The disclosures shall be regarding the utilisation of the proceeds of the issue externally verified by an auditor along with details of the unutilized proceeds with the half yearly and annual financial results. Certain additional details are also required to be provided by the issuer along with the annual report providing lists of the projects and assets to which proceeds of the Green Debt securities have been allocated including a brief description of such projects and the amounts disbursed.

Qualitative Performance indicators and wherever feasible quantitative performance measures of the environmental impact of the project and assets are also required to be divulged in the annual report where quantitative performance measures of the environmental impact of the project cannot be ascertained then the said fact may be appropriately disclosed along with reasons for non-ascertainment of the impact on the environment.

The regulations delineate responsibilities of the issuer that include maintaining a decision-making process to determine the continuing eligibility of the projects/assets, a statement on the environmental objectives of the green project and a process to determine whether the project meets the eligibility requirements and utilise the proceeds only for the stated purpose. The issuer is also required to utilise the proceeds of the issue only for stated objectives. In case the issuer meets any of the globally adopted standards for the issuance of Green Debt securities including measuring the environmental impact, identification of the projects and utilisation of the proceeds.

Revision of the Green Bond Debt Securities Framework 2023

The 2017 guidance note of SEBI emphasized voluntary compliance with the international principles; this was a cautious approach to regulate an emerging market segment. However, due to the voluntary nature of the guidelines the adherence to the guidelines was not encouraging amidst growing instances of greenwashing. In order to address these concerns SEBI came out with its most comprehensive revision to the Green Debt securities framework. These revisions mark an important shift from voluntary to more prescriptive regulation.

The 2023 revision introduced the following changes: expanding the definition of Green Securities to include pollution prevention and control, eco-efficient products, and transition finance. This recognized that climate finance must encompass not only pure green projects but also transition finance. SEBI also introduced various categories of green securities, blue bonds for sustainable water management and marine sector projects, yellow bonds for solar energy initiatives and transition bonds for the activities supporting shift to sustainable operations. This allows the investors to align their investments with specific sustainable objectives. Enhanced disclosures are required to be filed by the issuer to be provided in the offer document at the time of issuance of GDS including details of taxonomies, green standards. On the basis of the third-party review issuer is required to make disclosures with respect to environmental aspect of the project. The issuers of GDS are also required to make disclosures of certain aspects of the BRSR report in the annual report. The guidelines explicitly address Greenwashing concerns also and prohibit the issuer from making unsubstantiated environmental claims.

The Sovereign Green Bond Framework

Another significant milestone was reached when the Government of India issued the Sovereign Green Bond framework in 2023. The same was announced by the government through the Union Budget of 2022-23. While not a regulatory tool per se. It is an important policy initiative. The framework has been adopted keeping in mind India's ambitious Nationally determined contribution under the Paris agreement. As per the latest NDC to be

implemented from 2021 to 2030 India has committed to reduce carbon emissions intensity of its GDP by 45 per cent by 2030 which includes achieving 50 percent cumulative electric power installed capacity from non-fossil based energy resources by 2030. (*Framework for Sovereign Green Bonds*, n.d.) The government has also announced the National Hydrogen Mission for generating hydrogen from green energy resources with the aim to use hydrogen blended with CNG as a transportation fuel and an industrial input to refineries. While India's climate actions so far have been largely financed by domestic resources it is endeavouring to generate additional funds and transfer technology.

The Union Budget 2022 outlined the ambition of the government to mobilize resources for green infrastructure by issuing green bonds. The issue of green bonds will help the government to tap additional finance for use in public sector projects that are aimed to reduce carbon intensity of the economy. The framework essentially sets the core obligations of issue that is the Government of India. The framework complies with International Capital Market association and Green Bond Principles (*Green Bond Principles*, 2025)

Core Principles of the Sovereign Green Bonds 2022

The framework classifies a green project on the basis of 4 parameters i.e. A project that encourages energy efficiency in resource mobilization, reduces carbon emissions and greenhouse gases, promotes climate resilience and adaptation, values and improves natural eco systems and biodiversity especially in accordance with SDG principles. The proceeds from the Sovereign green bonds will be used to finance eligible entities defined in the framework. The green category projects cover renewable energy, energy efficiency, clean transportation, climate change adaptation, sustainable water and waste management, pollution prevention and control, green buildings, sustainable management of living natural resources and land use, Terrestrial and Aquatic Biodiversity Conservation. All eligible green expenditure will include public expenditure done by the government in the form of investment, subsidies, grants-in-aid or tax foregone, R & D expenditures in public sector projects that help in reducing carbon intensity of the economy and enable country to meet its Sustainable Development Goals. It is interesting to see that equity is only allowed in Metro projects under 'Clean Transportation' category. The metro projects are funded through special purpose vehicles as such most of the country accesses their public funding through equity access in these projects. The eligible expenditures are limited to government expenditures that occurred twelve months prior to issuance an effort would be made to ensure that all the proceeds get allocated to the designated projects within 24 months following issuance. Any expenditure already financed or refinanced by dedicated source will be excluded to ensure suitable oversight and avoid double counting. The devolution of funds will be in tranches and shall be dependent on achievement of physical targets. The framework excluded around seven projects dealing with new or existing extraction, production and distribution of fossil fuels, nuclear power generation, direct water incineration, alcohols, weapons, tobacco, gaming or palm oil industries, renewable energy products generating energy from biomass using feedstock originating from protected areas and hydropower plants larger than 25 MW. Expenditures aimed at CNG allowed as eligible expenditure when used in public transportation projects.

The framework proposes a Green Finance working committee with representation from various ministries. The committee is chaired by the chief economic adviser. It selects the projects eligible for green finance after a review within 24 months. The committee is expected to prepare an annual report on the allocation of proceeds to the eligible entities along with details of the financed projects status of their implementation and unallocated proceeds. The committee is also required to assess and report separately on the impact of the projects with respect to reducing carbon intensity and benefits of the project

An annual report on the allocation of proceeds to the eligible projects along with description of projects financed, status of implementation, and unallocated proceeds will be brought out under supervision of green finance working committee. Relevant ministries are required to come up with a list of eligible entities after conducting an internal review and submit the same to the working committee. The members of the committee will evaluate the list of submitted projects on the basis of their adherence to the bond framework and alignment with green objectives. The Ministry of finance will look into the economic aspect of the assessment. The committee is also required to identify new eligible green expenditures every successive year. Once the finance bill is passed finance ministry is required to inform the Reserve Bank of India regarding the eligible expenditures for which green bonds

can be used. The proceeds from the issuance of green bonds will be deposited to the Consolidated fund of India and then funds will be made available for eligible green projects.

Corporate Bond Measures of RBI

The Reserve Bank of India has introduced a number of measures to strengthen the corporate green bond market through third amendment to Foreign Exchange Management (Debt Instruments) Regulations 2024. The regulations allow a Person Resident in India permission to purchase Sovereign Green Bonds issued by Government of India in the International Financial services centre. The amount of amount of consideration for these bonds by PROI will be paid out of inward remittance from abroad through banking channels or out of funds held in a foreign currency account maintained as per regulations issued by RBI and/or the International Financial services authority. The amendment allows the PROI's to remit the sale and maturity proceeds of these instruments out of India(*The Gazette of India Extrordinary*, 2024)

ESG Debt Securities Framework

While India has an already established framework for Green Debt securities ESG received the mush anticipated attention through SEBI's ESG framework. The instruments like social bonds, Sustainability bonds and sustainability linked bonds aim to address not only environmental goals but also other goals like inclusive development, gender equity, access to health and education and corporate accountability. With this move India has taken a strategic step toward scaling our domestic market to compete with international frameworks.(Framework for Environment, Social and Governance (ESG) Debt Securities (Other than Green Debt Securities), n.d.)

The Securities and Exchange Board of India in February 2025 has come out with a framework for issuance of social bonds, sustainability bonds and sustainability linked bonds which along with green debt securities will be called Environmental, Social and Governance (ESG) Debt securities. The said framework has been finalised in consultation with Indian standard forum (ISF). The debt securities shall be labelled as social bonds or sustainability bonds or sustainability linked bonds only if the funds raised through the issuance of these bonds are to be utilised for financing projects or assets aligned with any of the following recognized standards or fall under the definitions given under ICMA principles (*Green Bond Principles*, 2025), Climate bond standards, European Union standards, any framework or methodology specified by any financial regulator in India. A per the framework Social bonds means a debt security used for raising funds that intend to address or mitigate specific social issue or seek to achieve positive social outcomes falling under affordable basic infrastructure, access to essential services, affordable housing , employment generation and programmes designed to prevent or alleviate employment, food security and sustainable food systems, socioeconomic advancement and empowerment any other category as may be specified by the board from time to time.

The framework eliminates purpose washing under ESG instruments by mandating disclosure, alignment and third-party assessment. With this move SEBI aims to protect investors and ensure accountability in the debt instruments market and facilitate India's entry into the international market.

Result and Discussion: Structural Challenges in India and way forward

India's approach towards regulating green securities balances international standards with domestic commitments. However, there are certain limitations in the frameworks design and implementation. The framework lacks a legally binding taxonomy that provides clear, quantitative threshold for project eligibility that is present in the EU taxonomy regulation. Thus, allowing significant discretion to the issuers in determining what qualifies as a green debt security. (Ramakrishna etal, 2023). The introduction of different sub-categories without prescribing a technical criterion for each category runs the risk of the labels becoming marketing tools. The principles are voluntary and prescriptive in nature without any enforcement standards. The only metrics for impact measurement is a third-party review, potentially undermining investor confidence further issuers can opt out of the review by providing an explanation since the framework does not list out the contours of an acceptable explanation. Moreover India 's domestic verification market still remains underdeveloped. The framework does not establish a centralized registry for green bond issues. Making it difficult for regulators, investors to track data.

The Indian green bond market faces regulatory inconsistencies that hinder its growth. The lack of standardized definitions and frameworks creates confusion and limits the market's scalability additionally there is a significant risk of greenwashing, where funds raised through green bonds may not be used for genuinely sustainable projects. This risk is exacerbated by the absence of stringent regulatory oversight.

India's significance for green bonds is affected by dual challenges of environmental sustainability and economic development. Green bonds act as an effective tool to bridge the financial gap without burdening public finances despite extensive capital requirements for climate-resilient infrastructure, clean mobility and renewable energy (Veer Singh & Kumar Shrivastava, 2024). The issuance of green bonds allows Indian firms to demonstrate a commitment to Environmental, Social, and Governance (ESG) principles. Despite signalling limited long-term valuation effects, it plays an important role in enhancing corporate goodwill and mapping firms with global investment guidelines (Su & Lin, 2025)

The regulatory framework in India contributed to the advancement of the green bond market; however, the market remains relatively smaller when assessed against global standards and continues to represent a marginal share of the domestic corporate bond market. There are diversified challenges, such as cost authentication, restricted domestic institutional participation, limited domestic investors' awareness, risk of greenwashing due to uneven enforcement, and the lack of dependability on green projects, which continue to restrict growth. Moreover, studies have suggested that the issuance of green bonds in India is attracting oversubscription and diversified investors, but the long-term financial benefits for issuers remain unsettled (Kumar, n.d.) (Patience Okpeke Paul & Toluwalase Vanessa Iyelolu, 2024). Other problems that are faced are a lower sovereign credit rating, due to which Indian corporates end up paying a higher coupon rate of around 7.5-10% INR for green bonds in comparison to global standards, which is 2.5-6% USD (Kumar, 2022). According to the IMF report of 2023, the Indian market has faced an illiquid corporate debt market and greater instability, negatively influencing the demand among foreign investors as compared to many other developing nations. Lack of green bond index and availability of insufficient data for corporate green bonds are some other factors that keep foreign investors away from Indian green bonds (Datta, 2024) (Kumar & Kundalia, 2023)

All these factors indicate that although green bonds have potential growth in the green market, India needs stronger policy regulations and fiscal incentives to ensure better strategic development and incorporation of green bonds for a constant market growth and robust taxonomies.

Conclusion and Implication

The study concludes that green bonds have emerged as a pivotal financial instrument in advancing environmental sustainability and mobilising capital towards climate-resilient development in India. The evolution of the green bond market reflects a growing alignment between financial systems and sustainability objectives, particularly in facilitating investments in renewable energy and low-carbon infrastructure. While India has made notable progress through regulatory initiatives and policy frameworks, challenges such as lack of standardisation, concerns of greenwashing, limited investor awareness, and underdeveloped secondary markets continue to impede the full potential of green bonds.

Furthermore, although green bonds contribute significantly to financing environmentally sustainable projects, their direct impact on measurable environmental outcomes remains an area requiring deeper empirical assessment. The study highlights that a robust regulatory ecosystem, enhanced transparency, and greater stakeholder participation are essential for strengthening the credibility and effectiveness of green bonds in India.

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