



ACCELERATING THE GROWTH OF GREEN BONDS IN INDIA

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1. Introduction

India's sensitivity to climate change and its determined push towards 'green growth' for its economy has been backed by its commitment to reach net zero emissions by 2070 and to achieve an emissions intensity reduction of 45 percent below 2005 levels by 2030 (Government of India, 2022). Meeting such ambitious commitments requires substantial financial support and mobilization through investment in clean technologies, fuels, and sustainable infrastructure. Crucially, India would need an estimated USD 12.7 trillion to reach net zero by 2050 – an approximated requirement of over USD 470 billion annually (BloombergNEF, 2023). This staggering amount cannot be met by the lone public sector and would require catalyzing private finance and institutional investment into climate initiatives.

An emerging financial instrument that holds the potential to attract private investors is green bonds. Green bonds can simply be defined as fixed-income debt securities that offer interest to their lenders over a fixed period after which the principal amount is repaid. Representing a 'socially responsible' form of investing, green bonds are identical to their conventional counterparts, except for the specific allocation of their proceeds to financing or re-financing 'green' projects (Agarwal & Singh, 2018). Since the issuance of the first 'climate awareness bond' by the European Investment Bank in 2007, the green bonds market has sprouted to a cumulative global issuance of USD 2.334 trillion by 2023, with about 18 percent of the total sum, worth USD 420.6 billion being issued in 2023 alone (as of October 2023)¹ – highlighting the exponential growth pattern of the financial instrument. Despite the emerging global relevance of green bonds, they still occupy only a scanty share of the Indian bonds market. In India, the overall green bonds' issuances with an approximate worth of USD 21 billion (as of February 2023; World Bank, 2023) make only 3.8 percent of the total outstanding domestic corporate bonds with a cumulative worth of over USD 500 billion (The Economic Times, 2023).

With the increasing allocation of Corporate Social Responsibility (CSR) funds towards green projects and green capital pools, avenues for private investment in climate financing seem more potent than ever. Coupled with the current nascent stage of green bonds market in India, it begets the opportunity to accelerate the growth of the domestic green bonds market, similar to the global trend, through strategic market and policy interventions. Furthermore, as long-term clean energy and infrastructure investments require 'patient capital' with long term returns, application of financial instruments such as green bonds can unfold to be wonderfully attractive to institutional investors such as pension funds, insurance companies, and mutual funds (Weber & Sarvade, 2019).

Against this backdrop, this brief explores the scope of green bonds, particularly within the Indian context. It focuses on understanding the enablers of green bond issuance and consequent drivers of demand from private investors, to suggest strategies to accelerate the growth of the green bonds market in India.

¹ The cumulative issuance figure only accounts for green bonds aligned with the Climate Bonds Initiative's defining principles. Source: (n.d.) Climate Bonds Initiative. <https://www.climatebonds.net>

2. The Suitability of Green Bonds

The market dissemination of any financial instrument essentially hinges upon two key factors – (a) its compatibility with existing market configurations and (b) the benefits it offers to buyers or sellers (Monk & Perkins, 2020). Green bonds perform particularly well against these determinants because of their identical structure to conventional corporate bonds, alongside the variety of opportunities they package for green financing. A strong demand enabler for green bonds remains that it is a supplementary innovation that fits into the technical finance regime without requiring any foundational changes in the market.

Being a debt instrument, green bonds come with their risks in terms of their exposure to currency inflation and the dependence on the issuer's credibility. However, if covered adequately through risk mitigation and market ecosystem development, green bonds can help mobilize significant financing – particularly for a transitioning economy like India's where climate financing needs would grow rapidly, and the growth potential of the instrument rests largely untapped. Significantly, a financial instrument can emerge to be sustainable if it possesses the ability to reflect its practical incentives, leverage public interventions to scale up, hold potential for standardization, and has the capacity to utilize data for cost-effectiveness (Jachnik et. al, 2015). Structurally, green bonds can cover all these bases adequately, if backed by market development and policy support.

The suitability of green bonds can also be understood in terms of the opportunities they offer to issuers and investors. The simplest opportunities that green bonds provide relate to their 'green' association, in terms of providing a substantial source for long-term green financing, facilitating the greening of several sectors of an economy, and enhancing the issuers' reputation (Moid, 2017). For issuers, green bond issuances have tended to be value-enriching, evoking positive stock price responses for their firms, and consequently leading to improvements in firm value, stock liquidity, and the environmental and financial performance of issuing firms (Arif et al., 2022; Verma & Bansal, 2021; Flammer, 2020; Tang and Zhang, 2020). Furthermore, the diversification potential of green bonds tends to sustain high demand and thus provides issuers with opportunities to attract large amounts of capital at a favorable rate.

On the other hand, from the investors' standpoint, green bonds provide medium and long-term equity investors the potential to diversify their portfolios. Institutional investors such as pension funds or insurance companies can also utilize green bond investments due to their long-term nature and low-risk profiles (Tomfort, 2023). In phases of economic downturn, particularly, investors tend to be keener on minimizing losses than realizing associated gains (Hwang and Satchell, 2010). In this regard, green bond indices serve as a remarkable diversifier, hedging and safe-haven asset for long-term investors (Arif et al., 2022). Thus, green bonds can potentially gain a significant boost from institutional investors while providing them with low-risk, long-term diversification benefits.

Conclusively, the variety of opportunities that can be potentially availed by the development of the green bonds market for investors and issuers alike, coupled with the green financing requirements in India, expedite the need to strategize policy and market interventions that can accelerate the growth of green bonds in India.

3. The Landscape for Green Bonds in India

3.1 History of Green Bonds Issuances in India

India has long had a strong scope for green financing. As early as 2016, the Climate Bonds Initiative reported that India had about USD 15.7 billion of unlabeled climate-aligned bonds used toward low carbon transport and renewable energy assets (Climate Bonds Initiative, 2017). Officially, India entered the green bonds market in 2015 with the YES Bank issuing the first green bond with a maturity period of 10 years for financing renewable energy projects (Agarwal & Singh, 2018). Since then, several banks and corporates have entered the green bonds market such as the EXIM bank, IDBI Bank, Axis Bank, PNB Housing Finance, ReNew Power, NTPC, IREDA, Greenko, etc. Several of these issuances have also been listed on international exchanges such as the London Stock Exchange and the Singapore Exchange. Table 1 enlists selected key milestones around the issuance of green bonds in India.

The private sector has largely led the issuance of green bonds in India, covering as much as 84 percent of the total share (World Bank, 2023) – signifying considerable public sector inactivity around the instrument and its overall slow growth in India. Figure 1 elaborates on the share of green bond issuances from various Indian entities. Besides, in terms of project financing through green bonds in India, the dominant share has been directed to the energy sector – hinting at a concentration on clean energy financing and an unexplored potential for financing sustainable initiatives in other sectors, despite the regulatory leeway to do so. Table 2 (annexure) provides details on the variety of sectors covered by green bond financing in India.

Table 1: Milestone Issuances of Green Bonds in India

Issuer	Milestone	Year	Amount
YES Bank	First green bond issuance in India.	2015	USD 260 million
Greenko	First high-yield green bond issuance in India. Greenko is also the highest cumulative issuer of green bonds in India.	2016	USD 500 million
NTPC	Issuance of a corporate green 'Masala' bond.	2016	INR 2000 crores (USD 300 million)
Ghaziabad Municipal Corporation	First local civic body in India to issue a green bond (The Hindu Business Line, 2021).	2021	USD 20 million
Indore Municipal Corporation	First city to enlist municipal green bonds on the National Stock Exchange's (NSE) debt securities platform (Vats, 2023).	2023	USD 87 million
Government of India	First sovereign bond in two tranches of 5 and 10-year tenors.	2023	USD 1 billion

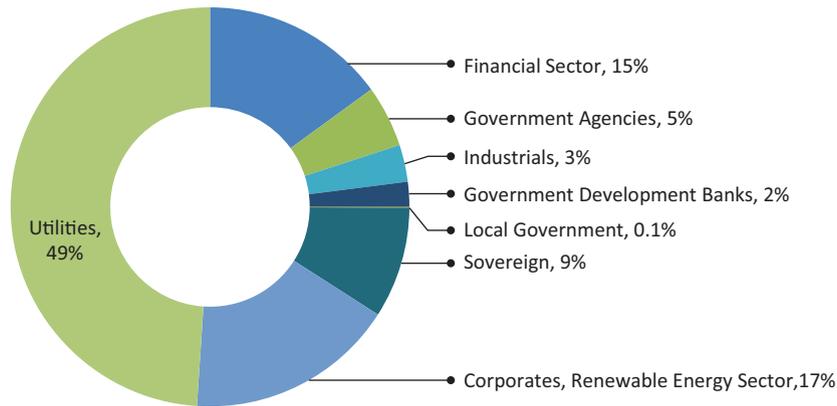


Figure 1: Green bond Issuances in India by type of issuer

Source: World Bank, 2023

3.2 Existing Regulations for the Green Bonds Market in India

At the core of the global green bonds market, the 'Green Bond Principles' (GBP) are set out by the International Capital Market Association (ICMA) to provide the guidelines for the issuance of green bonds. These are supported by the Climate Bond Initiative (CBI) which provides the classification of green bonds into certified green bonds, labelled bonds aligned with the CBI definitions of 'Green', and those un-aligned with it. CBI-labelled bonds are required to have at least 95% of proceeds dedicated to green assets and need specific disclosure of information on projects financed (Tomfort, 2023). In addition to these international voluntary guidelines and standards, regulations around the bond market have also been developed under several national and regional jurisdictions- such as that of China, France, and India.

In India, the green bond market is regulated by the Securities and Exchange Board of India (SEBI) which issued the 'Disclosure Requirements for Issuance and Listing of Green Debt Securities' in 2017 and further strengthened it by aligning it with the GBP and involving the concepts of blue and yellow bonds in 2023 (The Economic Times, 2023). Additionally, the Sovereign Green Bonds Framework has also been established by the government of India to streamline the selection and monitoring process of projects funded by sovereign green bonds (Government of India, 2023). The framework established by SEBI mandates the issuers of green bonds to disclose the environmental objectives of their issuance, procedures to track the deployment of proceeds, and the assets or the project through which the proceeds of green debt securities are to be utilized (Raju et al., 2022; Kumar, 2022). It also defines the categories under which funds can be raised as green debt securities:

- » Renewable energy (wind, solar, bio, or other energy sources using clean technology).
- » Clean transportation.
- » Sustainable water management systems.
- » Energy efficiency and green buildings.
- » Sustainable waste management.
- » Biodiversity conservation.
- » Any other category specified by the SEBI over time.

3.3 Challenges for the Green Bonds Market in India

Despite the promising prospects, the issuance of green bonds in India has progressed slowly over the last few years. At the macro level, the Indian bond market is currently in a nascent stage. A lower sovereign credit rating (BBB-) has long coerced Indian corporates to pay higher coupon rates on green bonds than the international standards (Arif et al., 2022; Kumar, 2022). Historically, Indian green bonds have averaged a coupon rate in the range of 2.75-6% for USD-denominated issuances, and in the range of 7.5-10% for INR-denominated issuances. This difference has been a result of currency risk associated with the Indian rupee, i.e., greater hedging costs due to the volatility of the currency and low liquidity and trading within the Indian secondary market (Kumar et al., 2019). For instance, the two tranches of the sovereign green bonds issued by the government of India in 2023 were able to initially obtain a 'greenium' or a price advantage for the local currency issuance – reflecting cheaper financing costs and suggesting a strong appetite for green bonds among domestic investors (Climate Bonds Initiative, 2023); but the lack of trading activity and the consequent illiquidity has led to issuance losing its greenium (Acharya, 2023).

The volatility of returns due to exchange rate fluctuations and the illiquidity of the market have affected demand among foreign investors as well, which is further exacerbated when currency hedging costs associated with debt instruments such as green bonds are considered (Kumar, 2022; Weber & Sarvade, 2019). In the prevalence of considerable awareness gaps surrounding Indian green bonds in the international market, such risks have discouraged foreign investment in Indian green bonds. Even when interested, foreign investors have struggled with limited investment pipelines, insufficient availability of data, and a lack of green bond indices, listings, and ratings for Indian green bonds (Azhgaliyeva et al., 2019).

The insufficiency of data about Indian green bonds can also be accredited to the issue of missing standardization of methodologies and reporting in India, and the consequent threat of greenwashing. Without a common taxonomy on 'green', determining the qualification of varied assets as eligible to be financed through the market has remained dubious (Agarwal & Singh, 2018). Crucially, the efficacy of a green bond varies depending upon the nature of the projects it funds. Thus, standardization of assessment procedures becomes tricky to establish and requires meticulous consideration. In the case of early-developing bond markets such as India's, fiscal incentives play a crucial role in mitigating issuance costs as well as investment risks. Decisively, fiscal incentives such as tax rebates for green bond investors, and subsidization of issuance costs for issuers remain absent. Consequently, investors enjoy no benefits from investing in green bonds over their vanilla counterparts, and issuers encounter discouraging additional costs of green bonds' issuance (such as third-party verification and reporting).

Lastly, certain regressive domestic regulations have also undercut the growth of investments in the green bonds market. For instance, the Insurance Act in India prohibits investments in assets below AA credit rating, thereby preventing insurance companies from investing in several green infrastructural and energy projects (Arif et al., 2022). Contrastingly in July 2023, the Pension Fund Regulatory and Development Authority (PFRDA) allowed pension funds to invest in sovereign green bonds. Such regulatory changes are required within the Indian context to enable institutional investors to diversify their portfolios, as well as to channel retail investment into profitable green assets (Ojha, 2023). Importantly, to catalyze institutional investment into green bonds, their issuance size needs to be adequate as well. Currently, a

mismatch persists in the size of small green projects such as rooftop solar, or energy efficiency initiatives and the interest of institutional investors who seek to invest in large issuance sizes (Agarwal & Singh, 2018; Tomfort, 2023). Thus, the nature and size of green projects have also impeded the utilization of green bonds in India.

Largely, only energy and banking sector firms have ventured strongly into the market, while the other sectors have trod cautiously (Abhilash et al., 2023). The consequent concentration of issuances in specific sectors such as renewables and energy has weakened their popularity among the wider investor base. As individual issuances, these have faced project-centric risks such as poor asset quality, and poor financial management and reporting (Kumar, 2022). Thus, the development of the green bonds market in India requires the redressal of several key challenges – missing taxonomy, regulatory bottlenecks, lacking fiscal incentives, and the nature of issuances.

4. Enablers of Demand, Supply, and Greenium for Green Bonds

Strategizing policy and market interventions to accelerate the growth of the green bonds market in India requires an understanding of factors that drive the demand and supply of green bonds, as well as the factors that enable their green premium (greenium) over regular corporate bonds. The demand for green bonds is influenced by an interplay of several factors such as the green appetite among investors, size of the bond, timing of issuance, its yield and credit risk, market support, and sectoral diversification of issuances (Weber & Sarvade, 2019; Monk & Perkins, 2020). Market enablers and directive policy support in several global markets have been successful in nudging these factors positively and boosting the scope of green bonds. China, the largest issuer of green bonds in Asia, for instance, has rolled out several policy initiatives over the last decade to support the growth of the green bonds market. This includes the Bond Connect Scheme in 2017 to attract foreign investment, collaboration with the Luxembourg Stock Exchange to list out price information for green bonds, and 25 percent tax exemptions on interest incomes to retail investors (Guha, 2019).

Importantly, the green bonds market is voluntary. In such markets, increased transparency through disclosures, establishment of standards, and awareness generation are key to reducing information asymmetries, building investor confidence and reducing the cost of capital. Harmonization of reporting standards can help develop legitimacy within the market and benchmark accountability on the part of investors and issuers. Importantly, the desirability of green bonds and their premium on coupon rates isn't simply a result of environmental awareness among investors, but rather emerges due to beneficial external certifications associated with them (Tomfort 2023; Flammer, 2020). This can further be seen by the differential pricing and market reaction to certified and uncertified bonds in India – where the announcement of certified green bonds has witnessed a collectively positive stock market response for issuing firms, whereas the announcement of non-certified green bonds has been met with negative market reactions (Zala & Vel, 2020).

Thus, the facilitation of verification procedures, either through harmonization of standards, or through direct subsidization of issuance cost can prove to be strongly effective for green bond issuances. Corroborative evidence can be found in various global markets. Singapore, for instance, has enabled green bonds' issuers to offset up to SGD 100,000 of costs incurred on obtaining third-party verification through its 'Green Bond Grant Scheme' and has witnessed a considerable jump in green bond issuances (Guha, 2019). Similarly, Hong Kong has subsidized the certification of green bonds for eligible issuers by bearing the cost of external reviews. Other than the subsidization of issuance cost, the involvement of large actors such as multilateral development banks (MDBs) and other international institutions has also helped build the legitimacy of green bond issuances in certain instances and driven demand. For instance, a strong signal in the international market for green bonds first came in 2013 with the issuance of USD 1 billion bond by IFC. The landmark issue was particularly notable for amplifying the overall issuance scale worldwide (Monk & Perkins, 2020).

The demand for green bonds in the capital market is best reflected by their potential ability to obtain a 'greenium'. Greenium or green-premium can simply be understood as the savings made by an issuer due to a lower coupon rate payment to investors on a green bond, as compared to that for conventional bonds. It reflects the willingness of investors to forego a share of their returns (accept a lower yield) to acquire benefits offered by green bonds (Bibhudatta, 2023). In the simplest terms, investor confidence drives greenium. This investor confidence can be evoked either by the terms of issuance itself, or by the macro-level market conditions.

Enablers of greenium for individual issuances relate to the credibility of issuers such as proven creditworthiness and transparency in reporting. Green credibility of issuers and external verification strongly enhance the pricing of a green bond (Pietsch & Salakhova, 2022, Fatica et al., 2021; Kapraun et al., 2021). Particularly, bonds that align with established principles (such as ICMA's GBP) exhibit larger greenium – signifying the need for adequately green-aligning the bonds' purpose. Moreover, involvement with longstanding sustainability initiatives also has a positive influence on the creditworthiness of issuers and consequently, the greenium for issuances. For instance, larger greenium has been observed for bonds issued by banks which have been a part of the *UNEP Financial Initiative* (Pietsch & Salakhova, 2022). Thus, at the individual issuance level, in addition to issuer credibility, external verification and linkages with sustainability initiatives tend to amplify the benefits associated with green bonds.

Macro-level enablers, on the other hand, are associated with the credibility of the domestic capital market and the sovereign policy support and regulations. Fiscal incentives, green taxonomies, and reporting regulations, all positively affect the pricing of green bonds. Greenium in the primary and secondary markets is also positively affected by environmental awareness among consumers and low corporate tax rates. On the other hand, it is negatively affected by coupon tax rates within the sovereign, and investors' risk aversion (Agliardi and Agliardi, 2019). Fostering a facilitative policy and market ecosystem thus becomes vital to enabling a price advantage for green bonds. Crucially, the influence of internal and external factors on the pricing of green bonds showcases the requirement of appropriate regulatory measures, standards, and fiscal incentives to boost issuer credibility, and build investor confidence and awareness – all of which are fundamental to channelizing greater institutional and retail investment into green bonds.

5. Measures for Expanding the Green Bonds Market in India

The policy opportunities to accelerate the growth of the green bonds market in India come from three potential aspects – (1) development of the market through necessary regulations and support structures for issuers, (2) awareness building among investors, and (3) policy and fiscal incentivization of engagement with the green bonds market, for issuers as well as investors. Considering the aforementioned challenges of the Indian green bonds market as well the enabling factors that catalyze their growth, the following recommendations for accelerating the growth of the green bonds market in India have been laid out in terms of (a) Taxonomy and Standardization of Reporting and Disclosures, (b) Fiscal and Policy Levers, (c) Awareness Building Measures, and (d) Innovative Issuance Strategies.

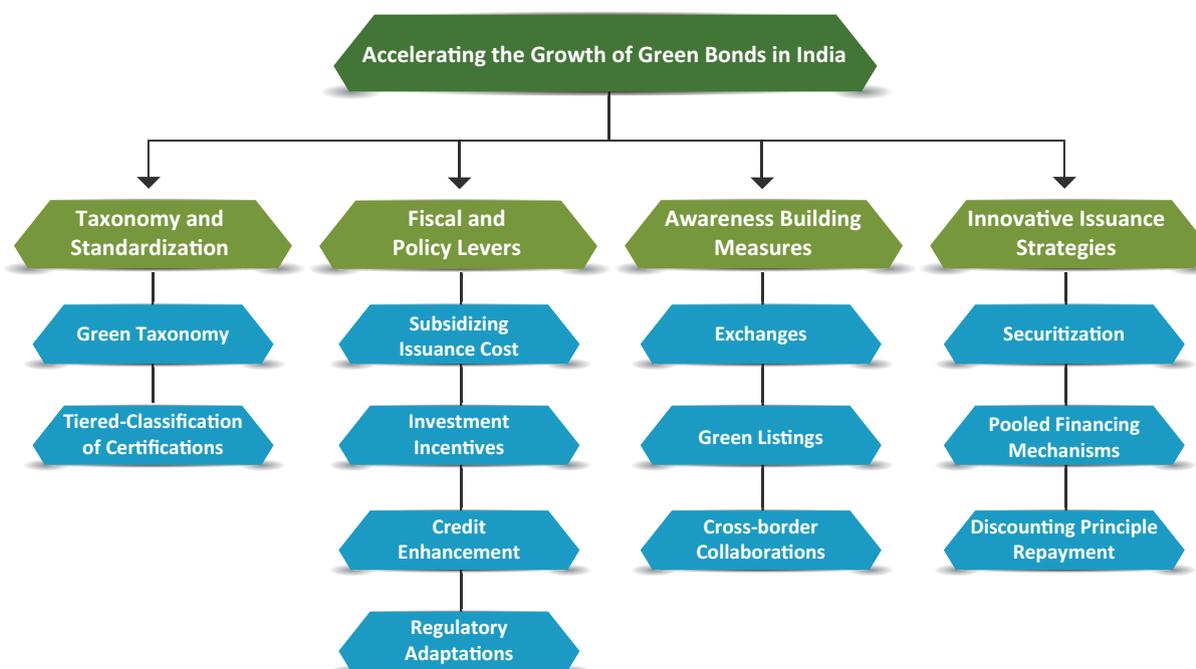


Figure 2: Recommendations to Accelerate the Growth of Green Bonds in India

5.1 Taxonomy and Standardization

The development of robust frameworks around establishing a **green taxonomy** and defining reporting mandates is paramount to providing transparency and overcoming greenwashing concerns associated with the green bonds market in India. In fact, the requirement of a green taxonomy is central to the development of any green financial product in India. The development and strengthening of reporting frameworks shall cover two aspects – (1) catering to the domestic market’s unique requirements, and (2) harmonization with international standards. This is pertinent since disparities in international

and domestic standards can decisively restrain cross-border investments. The development of green taxonomy and the enforcement of reporting mandates would also facilitate awareness generation around the green bonds market since it would enable clear signaling around green bond issuances on listings and exchanges – enabling investors to assess risks minutely. Thus, a green taxonomy and reporting mandates shall aid harmonization within the regulatory environment of issuers, as well as investors.

Importantly, the development of green taxonomy and certification standards must consider the variation that green bonds offer in terms of their environmental impact (Flammer, 2020). Instead of a basic one-dimensional classification of green bonds as certified or non-certified, a **tiered classification system** shall be adopted. *CICERO*, for instance, evaluates bonds as Light, Medium, and Dark Green in its framework to provide investors better insights on the quality and risks associated with each bond (Agarwal & Singh, 2018). Strikingly, a tier-based classification approach for green and other sustainability-linked bonds would enable the diversification of issuances across sectors, and thereby attract a wider investor base. For instance, hard-to-abate such as steel and cement have largely been unable to deploy green bonds to raise capital due to the transitional nature of their projects which do not meet the ‘completely green’ criteria, and the high capital requirements for green technologies which are often not in the commercial stage of deployment (Maino, 2022). A tier-based classification approach can help these sectors leverage finance for cleaner pathways of production which might not be 100 percent green and thus earlier excluded from the binary certification standards of the green bonds market. Significantly, it would equip such sectors to adopt ‘brown-to-green’ models of transitioning, by securing certifications on their ‘brown’ balance sheets and utilizing proceeds towards green pathways. A tiered classification of green bond certifications would also enable investors to better match their risk/return preferences to suitable green bonds and consequently signal investors’ preferences to bond issuers. Additionally, it would allow the application of differential tax exemptions for investors across different tiers and allow differential coupon rate offerings and favorable bond pricing for issuers.

5.2 Fiscal and Policy Levers

A catalytic boost to the growth of green bonds requires the generation of a cost and an investment advantage for issuers and investors, respectively. For a bond market such as India’s where the market development is still in its early stage, it is vital to introduce these advantages through fiscal and policy interventions.

(a) **Fiscal Levers** – Foremost, the issuance of green bonds can be encouraged by **subsidizing the issuance cost**. A need for third-party verification for green bonds adds to their cost of issuance. To ensure the interest of firms in issuing green bonds, it is important to offset this additional cost through fiscal measures. A green bond fund or a grant scheme, as implemented by other Asian nations such as Singapore and Malaysia, can be explored for the Indian market as well. Subsidization of costs shall either cover a proportion of the issuance cost or cover the cost of obtaining external certification for green bonds. Covering certification costs can significantly bolster the supply of green bonds in India as cost-effective external certifications remain a considerable hurdle to smooth issuances.

Another measure to subsidize the issuance cost of green bonds would be lowering the coupon rate offerings while maintaining the appeal of the bonds. This can be done by stimulating the demand side through **investment incentivization** and formulating fiscal incentives as **tax benefits** such as

exemptions and credits for retail investors, to popularize green bonds over taxable conventional bonds. The tax exemption for recipients under the Green SRI Sukuk Grant Scheme in Malaysia provides an example of a tax-based incentive (Moid, 2017). Corresponding evidence in India comes from a tax-free bond issued by the Indian Renewable Energy Development Agency Limited (IREDA) in 2016 which was oversubscribed by more than five times (Agliardi & Agliardi, 2018). The provision of tax rebates and incentives would also help popularize green bonds as an investment avenue over several other competing investment options.

(b) Policy Levers – The issuance of green bonds can also be amplified through policy measures such as **credit enhancement**, by providing guarantees or partial credit funds for green bonds. In the Indian green bonds market where the credit ratings hover low, credit enhancement could reduce associated risks with new technologies and sectors and help improve the credit ratings of issuances. A successful example of such an occurrence comes from ReNew Power's green bond issue in 2016 which was guaranteed jointly by the Asian Development Bank (ADB) and the India Infrastructure Finance Company Ltd. (IIFCL). The guarantee helped increase its credit rating from BBB to AA+ and consequently attracted oversubscription. (Agarwal & Singh, 2018). Moreover, credit enhancement measures shall also be vital to attracting institutional investment into green bonds in India, since institutional investors often face restrictions in terms of bond credit ratings, they are allowed to invest in. When backed by guarantees and risk coverage, the credit rating of several green bond issuances would improve and thus unlock the potential of leveraging institutional investments. Credit enhancement is generally provided by public sector entities or financial institutions. However, to support the rapid growth of the green bonds market, India should seek to leverage support from MDBs such as the World Bank to facilitate such schemes for green bond issuers, or particularly to back its sovereign green bond issuances. As financiers, MDBs could support the de-risking, as well as the scaling up of private investments in India's emerging capital market. Furthermore, they could also play the role of 'product champions' by developing hype and awareness around the issuance of green bonds in the domestic as well as international markets (Monk & Perkins, 2020; Gupta, 2023).

Lastly, certain **regulatory adaptations** are needed to enable market development for green bonds in India. These regulatory changes require adaptations from financial and public sector institutional authorities. First, beyond establishing green investment guidelines, regulators such as SEBI and the RBI should set portfolio-level mandates for priority sector lending targets for banks, alongside ESG disclosure mandates for corporates, and social and infrastructure investments for insurers to boost capital investments in the domestic market. In addition, the RBI should also consider an extension of its priority sector lending guidelines to incorporate sectors enlisted by the SEBI guidelines as eligible to raise green debt securities. Second, following the PFRDA's regulation to allow pension funds to invest in sovereign green bonds, greater regulatory changes through the PFRDA and the Insurance Regulatory and Development Authority (IRDA) should be looked at. Allowing insurance and pension funds to invest a certain percentage of their portfolio in green bonds would help the market grow enormously. Accompanied by structural support from credit enhancement and guarantees (through MDB pipelines), the risk perception of institutional investors could be minimized, and institutional investment flows be unlocked. Lastly, development finance institutions (DFIs) such as the Industrial Finance Corporation of India (IFCI) and the Export-Import Bank of India (EXIM) can engage in international collaborations to develop currency risk hedging products such as currency swaps,

long-term deals, and currency hedging funds to overcome currency risks and make Indian green bonds more lucrative in international markets.

5.3 Awareness Building Measures

A dynamic instrument such as green bonds requires transparency and legible discernibility among the investor base to uphold its price advantage for raising capital. Consequently, awareness building becomes a key requirement for the development of the green bonds market. Crucially, **exchanges** can serve as robust intermediaries between issuers and investors and enable transparency for green bonds. As platform providers, exchanges need to be empowered and capacitated to provide much needed visibility to the issuance of green bonds in India, as well as to boost their trading. This is particularly important for Indian green bonds to counter the possibility of secondary market inactivity and the consequent illiquidity which leads to the bonds losing their greenium.

In addition, the development of dedicated channels for the listing of green bonds on national exchanges needs to be undertaken. Globally, dedicated green listing channels have been undertaken by several exchanges such as the Mexican Stock Exchange (BMV), Borsa Italiana, and the London Stock Exchange (LSE), etc. The National Stock Exchange (NSE) in India also provides specific indices on sustainability-linked bonds and sovereign green bonds which help investors match their preferences to specific green securities (Agarwal & Singh, 2018). This could be expanded to include non-sovereign green bonds as well. Upon the enlisting of green bonds, exchanges should be further strengthened and be allowed the leeway to exclude bonds which have failed to match their reporting requirements, until they meet their compliances. This would ensure the quality of green bonds' lists and indices. A further step to piquing the interest of investors around green bonds would be presenting ESG performance metrics of issuing firms alongside their green bond listings, which would help investors assess the overall sustainability performance of issuers and their credibility.

Beyond the listing on national exchanges, cross-border collaborations must be pursued to popularize the appeal of Indian green bonds. These collaborations could be undertaken to either negotiate the listing of green bonds on global indices to attract foreign investors, or with global green financing initiatives to promote the visibility of Indian green bonds. Significantly, global collaborations can also be leveraged to ensure coordination with international standards and thereby support the development of reporting standards and taxonomy as well.

5.4 Innovative Issuance Strategies

Innovative issuance strategies must be pursued to overcome the problem of small project sizes of green initiatives in India which lack feasibility for the application of green bonds to raise capital.

- (a) **Securitization** can be an effective measure to reduce the risks associated with small projects by enhancing their credit ratings and ensuring steady aggregated income flows. Thus, it can help smaller projects to collectively reach an issuance scale in which institutional investors are interested to invest in. Asset-based securitization (ABS) is a common practice in the U.S.A., Canadian, Australian, and EU markets (Azhgaliyeva et al., 2019; Kumar et al., 2019). It works to raise capital through the aggregation of several small projects by tapping into the strength of cash flows derived from reliable assets, instead of focusing on credit ratings. Similar securitization should be explored in the Indian

context to raise capital through green bonds. It could be engaged by public-sector banks, financial institutions, local governing bodies, and corporates such as the National CSR fund (Guha, 2019). Notably, green bonds raised by these institutions could leverage institutional investments, as well as attract retail investors and deposits of self-help groups (SHGs). In turn, raised green bonds could be utilized to fund projects focused on sustainable infrastructure development in the concerned cities and towns.

- (b) Sub-national Pooled Financing Mechanisms (SPFMs)** – Securitization and pooling of funds can be encouraged through Sub-national Pooled Financing Mechanisms (SPFMs) as well. An SPFM aggregates its members’ financial needs into a pooled financing agency (PFA), which is later responsible for issuing debt and distributing the proceeds from its borrowings to its members (Nassiry, 2018). In India, a pooling initiative has been undertaken in the past through the Pooled Finance Development Fund (PFDF) Scheme for small urban local bodies in 2006 to raise money from bond markets, but the issuance under the scheme has remained very low at only INR 13.53 billion (USD 226 million) as of 2020 (Kumar et al.2019). However, with the emerging involvement of municipal bodies (such as those of Ghaziabad and Indore) in the green bonds market through issuances, a revamped scheme for SPFMs in India could help scale up financing for sustainable infrastructure, energy, water, and waste management programs at the city-level. Importantly, a revamped SPFM scheme should focus on two key initiatives – (1) consolidating finances to minimize perceived risks associated with individual projects; and (2) harmonizing and benchmarking reporting standards for its projects and subsidiaries. A collaborative approach towards monitoring and reporting of proceeds’ utilization for projects funded by SPFMs would not just amplify the cost subsidization for the issuance of green bonds, but also capacitate local governance entities to mobilize investments on their own.
- (c) Discounting the principal repayment** could be another negotiable innovative strategy for sovereign green bonds, in particular. A discount (*disagio*) on the repayment of a bond’s principal amount after its maturity could be based on the amount of GHG reductions achieved by the projects financed by the bond (Tomfort, 2023). The emission reduction could be priced according to the prevailing market standards and the calculated value could be returned to the bond issuer as a discount by an environment sponsor such as the Green Climate Fund (GCF), or by a sponsoring MDB. The notion behind discounting the principal amount is that a high multiplier effect is achieved through climate mitigation investments, and eventually these discounted payments would finance themselves (Tomfort, 2023). While the proposed principal discount could also help improve stringent monitoring and reporting, it would essentially require the development of emission rights and a carbon market. Since these developments are currently far-fetched for the emerging scenario of the Indian market, the discounting of the principal repayment could be allocated through fixed stipulated amounts based on the potential tiered classification of green bonds, their issuance size, and the fulfillment of reporting compliances. Further, discounting could be based on measuring the successful output of financed green projects, wherever possible. This discount shall be extended through the support of MDB-sponsored credit lines. The support of MDBs would once again be central to incentivizing green bond issuances through discounting principal repayments.

6. Conclusion

India's challenge of mobilizing private investments through green bonds stresses the need for robust market development and policy interventions. Currently, Indian green bonds struggle with low credit ratings, small issuance sizes, irregular regulations and reporting standards, awareness gaps, lacking fiscal incentives, and currency volatilities. To address these challenges, domestic regulatory adaptations and fiscal incentives need to be supported by internationally backed structures for credit enhancement, awareness generation and collaborations. In addition, innovative innovation strategies must be pursued to provide scalability to green projects in India and attract institutional investors, as accessing their provision of long-term, patient capital would be central to financing emerging green pathways and technologies.

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Annexure

Table 2: Green Bond Issuing Entities in India and their Sectoral Coverage through Financed Projects

Issuer	Renewable Energy		Energy Efficiency		Low Carbon		Green Buildings		Sustainable Water Management		Sustainable Waste Management		Energy Sector Technologies		Sustainable Land Use	
	Energy	Efficiency	Transport	Buildings	Water Management	Waste Management	Technologies	Land Use								
Axis Bank																
Hero Future Energies																
NTPC Ltd.																
ReNew Power																
Rural Electrification																
IREDA																
Power Finance Corporation																
State Bank of India																
Azure Power																
Soft Bank Energy																
Adani Green Energy																
Jain International Irrigation																
JSW Hydro Energy Ltd																
Yes Bank																

Table 2: Green Bond Issuing Entities in India and their Sectoral Coverage through Financed Projects

Issuer	Renewable Energy	Energy Efficiency	Low Carbon Transport	Green Buildings	Sustainable Water Management	Sustainable Waste Management	Energy Sector Technologies	Sustainable Land Use
Export-Import Bank	█		█					
India Green Energy Holdings	█							
Ghaziabad Municipal Corporation					█			
Punjab National Bank				█				
IL and FS	█							
Greenko	█							
L & T Finance	█							
Energy Efficiency Services Ltd		█						
CLP	█							
Industrial Development Bank	█		█		█		█	
Vector Green Energy	█							
India Cleantech Energy	█							
Indian Railways Finance Corporation			█					
Indore Municipal Corporation	█							



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