

**Green Bonds for Financing
Climate-Resilient Urban WASH Development
Center for Water and Sanitation (CWAS), CRDF, CEPT University**

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In India, the Nationally Determined Contributions (NDCs) recognise climate-resilient WASH as a core adaptation priority. Meeting these commitments will require substantial investments estimated at nearly USD 2.5 trillion between 2015 and 2030 (MoEFCC, 2022). However, the country's climate finance efforts remain heavily skewed towards energy transition sectors such as renewables and electric mobility, with limited resources directed toward the water and sanitation sectors. This imbalance is particularly concerning given that climate-induced water scarcity will also pose macroeconomic risks. In 2024, Moody's cautioned that India's growing water stress could affect its sovereign credit profile. It highlighted that India's increasing water consumption, driven by rapid economic growth and more frequent natural disasters due to climate change, threatens its credit health. However, climate finance in India is currently focused largely on energy transition-related activities. Given Moody's warning, it is essential that the wider water and sanitation related activities become an important component of the climate finance discussions in India.

City governments in India largely rely on public funds to finance urban water and sanitation infrastructure and services. The Swachh Bharat Mission (SBM) and Atal Mission for Rejuvenation and Urban Transformation (AMRUT) programmes have provided such funds over the last decade. However, budgetary allocations for these programmes have not increased in recent years. To ensure the investments related to climate targets and related concerns, cities will need access to additional funds.

A recent study by the authors suggests that many cities in India are creditworthy and have the capacity to mobilise funds from the capital market. (Center for Water and Sanitation, 2024). This suggests that cities can mobilise funds from the capital market. They raise funds exclusively for environmentally beneficial projects, linking capital markets with climate action objectives. These thematic funds, such as Water and Sanitation Green Bonds, will enable urban local bodies to raise finances for water and sanitation projects.

As per India Sustainable Debt State of the Market Report 2024, India ranks as the fourth-largest emerging market source of aligned GSS+ (green, social, sustainability, and sustainability-linked) debt globally, with cumulative issuance reaching USD 55.9 billion in 2024. This showed an increase of 186% from USD 21.4 billion in 2021. Green instruments were the main instruments, accounting for 83% of total issuance. (Climate Bond Initiative, 2025). However, the bulk of debt issuances was concentrated in renewable energy and transport, with negligible allocations to urban water and sanitation.

This paper analyses the evolving landscape of green and municipal bonds, assesses the related financial and administrative challenges, and identifies opportunities for policy and institutional innovation. By situating India's experience within global best practices, it highlights the steps needed to align green finance instruments with local climate resilience goals and ensure inclusive, sustainable urban growth.

1. Sovereign green bonds do not consider critical needs of the urban sector

India's green finance portfolio was valued at USD 21 billion till February 2023, positioning it as an emerging player in the green finance sector. (Observer Research Foundation, 2024). While India's contribution represents a smaller fraction of the global total, it signifies a growing awareness and commitment to environmental finance within the region. It includes the amount mobilised through various climate-related funds, sovereign green bonds, and carbon credits. The highest contribution to this portfolio is of corporate and municipal green bonds, which is USD 17.6 billion, followed by Sovereign Green Bonds at USD 2.94 billion. Funds mobilised through carbon credits are USD 548 million. More than 84% of the total green bond issuances in India are in the private sector. (Observer Research Foundation, 2024)

The Indian government issues Sovereign Green Bonds (SGrBs) to fund projects with positive environmental impacts. As of early 2025, India had raised nearly ~ USD 6 billion through SGrBs since their launch in FY 2022-23. Most of these funds are allocated and spent for metro projects (MoHUA), new and renewable energy (solar, wind, green hydrogen), railways, and the National Green Mission (for the development of urban forests). (Securities Exchange Bureau of India, 2025). Despite the promising start with significant oversubscription of early issuances, India has struggled to generate strong investor interest, limiting the ability to secure

a meaningful 'greenium'. A major impediment to the growth of India's green bond market is limited liquidity. The relatively small issue sizes, coupled with investors' tendency to hold these bonds until maturity, have significantly constrained secondary market trading, reducing their appeal to a broader investor base. Furthermore, India lacks a robust ecosystem of social impact funds and responsible investment mandates that could otherwise drive demand for green bonds. This effectively transforms these securities into long-term loans rather than tradable instruments. Enhanced transparency and reporting mechanisms are essential, with the Department of Economic Affairs needing to prioritise the timely publication of comprehensive allocation reports, including outstanding reports for previous fiscal years, to build investor confidence. Broadening the investor base beyond institutional investors to include retail participation would require significant incentives and market education, following models from countries like the United States, where tax exemptions have been instrumental in maintaining retail investor interest in municipal bonds.

In this context, it is important to review India's draft Climate Finance Taxonomy, released recently by the Ministry of Finance. It aims to provide a clear framework for identifying sustainable economic activities aligned with the nation's climate goals (Ministry of Finance-Government of India, 2025; p.26). By classifying activities into "climate-supportive" and "transition-supportive" categories, the taxonomy seeks to guide investments towards sectors such as power, mobility, buildings, agriculture, food and water security, and hard-to-abate industries like iron, steel, and cement. A key objective is to prevent greenwashing by establishing science-based, transparent criteria for sustainability. However, the framework currently omits the waste sector, leaving a gap in comprehensive climate finance guidance.

2. Municipal green bonds in India – High costs versus low greenium?

In the recent past, India's municipal green bond market has shown some action. Several cities, including Indore (USD 29 million), Ghaziabad (USD 18 million), Ahmedabad (USD 24 million), Pimpri Chinchwad (USD 12 million), Vadodara (USD 12 million) and Surat (USD 24 million) have issued bonds to finance environmentally sustainable projects. Such projects include renewable energy, water treatment plants, tertiary plant for wastewater treatment, solar power plant, zero-liquid discharge systems, green energy production, solid waste

management and air quality improvement. Significant oversubscriptions of some of these suggest an appetite for municipal green bonds among investors.

In October 2025, the Indian government made municipal bonds eligible as collateral for repo and reverse repo transactions to boost liquidity and increase investor participation. However, the market faces challenges with limited investor awareness and a perceived need for stronger regulatory frameworks and enhanced institutional capacity of municipal governments.

Table 1: Green bonds issued in India

Green Bonds issued in India							
S.No.	City	Year	Project	in INR crore	in million (USD)	Coupon rate	Tenure (in years)
1	Ghaziabad Nagar Nigam	2021	For setting up tertiary water treatment plants and supplying piped water via water meters in Ghaziabad.	150	18.1	8.1%	10
2	Indore Municipal Corporation	2023	Installation and operation of solar power plant	244	29.0	8.3%	3,5,7,9
4	Vadodara Municipal Corporation	2024	Sewage treatment plants	100	12.1	7.90%	5
5	Ahmedabad Municipal Corporation	2024	Sewage water purification, green energy production, and zero-liquid discharge systems	200	24.1	7.90%	5
3	Pimpri Chinchwad Municipal Corporation	2025	Green bridge and green roadway for bicycles	100	12.1	7.85%	4,5
6	Surat Municipal Corporation	2025	Development of solar and wind power plants, procurement of electric buses, other green initiatives	200	24.1	8.00%	4,5
	Total			994	119.5		

Source: SEBI, 2025; Retrieved from <https://www.sebi.gov.in/statistics/municipalbonds.html>

Recent experience of municipal green bonds suggests that the cost of issuing green bonds is higher than the greenium offered to them. The additional processes involved in the issuance of green bonds include stringent initial disclosures, additional reporting requirements, maintenance, third-party verifications and impact assessments to ensure transparency, accountability and credibility of bonds. These make them significantly more expensive than

issuing normal municipal bonds. According to SEBI's updated guidelines, there are more than 20 additional disclosures that must be reported (Securities Exchange Bureau of India, 2023). On the other hand, the greenium on municipal green bonds in India, has been low at only 2 to 6 basis points. Thus, the yield on the green bond would be 0.02% to 0.06% lower than a conventional vanilla bond of similar characteristics and size. (CEEW, 2025). For example, on a USD 11.7 million (INR 100 crore) issue of green bond, a -6 bps lower yield translates to savings in interest costs of USD 0.07 million (INR 70 lakh) over ten years. The additional cost of issuance of the green bond is USD 0.087 million (INR 75 lakhs), which is higher than the actual savings in the form of greenium. While elevating the standards of green bond issuances to global benchmarks, it also introduces complexities that many ULBs find challenging. The need for detailed project reports, impact assessments, key performance indicators for the project, and regular updates increases the administrative burden on ULBs. Furthermore, the involvement of third-party verifiers brings additional costs and dependencies.

Many Urban Local Bodies (ULBs) also lack in-house expertise to navigate the complex requirements of green bond issuance and must rely on external consultants. This results in escalating costs. Estimated expenses range from 1% for private placements to 1–4% for public issues of bond proceeds. In addition, green bonds incur additional costs of at least 0.5% due to verifier or certifier fees. Pre-issuance verification may cost around USD 30,000, and post-issuance verification may be about USD 50,000. Further, the limited number of service providers contributes to fee volatility, underscoring the need to build internal capacities within ULBs.

This increased complexity also raises barriers to entry for smaller ULBs, as they lack the resources to meet the stringent standards without further significant external assistance. Moreover, the absence of a standardised list of credible verifiers and certifiers from SEBI may also lead to uncertainties in the quality and cost-effectiveness of these services.

Support for local bodies for green project pipeline readiness

There is a strong need for supporting ULBs in designing, monitoring, and reporting eligible green projects. Strengthening institutional knowledge, technical expertise, and procedural frameworks enables municipalities to identify, design, and implement bankable and climate-aligned projects that can attract green financing. For example, Sweden's Green City Bonds

program includes a knowledge-sharing platform, where experienced municipal issuers like Gothenburg and Stockholm provide guidance to smaller cities considering green bonds. India would benefit from investing in similar capacity development initiatives targeting urban local bodies, focusing on financial management skills and green bond issuance expertise (UNFCCC, 2024).

Regular workshops on financing for ULBs are also needed. In addition, integrating climate financing avenues, such as carbon credits and water credits, could offer a holistic approach to revenue generation, making green projects more financially viable. Improving the creditworthiness of the cities is crucial. Implementing mandatory cyclical or annual credit rating assessments, conducted by ULBs themselves using the approach developed by CWAS, would ensure adherence to good financial practices (Center for Water and Sanitation, 2024).

3. Enhancing Awareness for Green Municipal Bonds among Analysts and Investors

SEBI's guidelines for green municipal bonds involve adhering to general municipal bond issuance rules and specific Green Debt Security (GDS) regulations. The usual requirements for municipal bonds include (a) the municipality has no negative net worth and no debt defaults in the prior year, and (b) the bond proceeds must be used for eligible green projects like renewable energy, water management, or clean transportation. Additionally, an independent third-party reviewer/certifier is mandatory, and municipalities must meet financial discipline and disclosure requirements.

SEBI has made several efforts in conducting workshops with municipal and state governments, investors, merchant bankers etc; to create awareness about municipal green bonds. As a part of their capacity building strategy for local governments, SEBI has also organised various municipal bond outreach programmes to **strengthen urban financing** and promote **market-based funding avenues** for infrastructure development.

A. Corporate green bonds versus municipal green bonds in India

In India, corporate bonds have significantly higher investor participation compared to municipal bonds. One primary reason is market maturity and awareness. The corporate bond market in India is more developed, with clearer regulatory frameworks, better-rated issuers,

and higher investor confidence. In contrast, municipal green bonds are relatively new and less understood, with only a handful of issuances to date. Municipal green bonds do not offer sufficient financial incentives for yield-focused investors. *“Green bond market in the country, which is projected to need more than \$10 trillion to meet its green goals, accounts for just 3.8% of the overall outstanding corporate bonds worth more than \$500 bn”* (Business Standard, 2025).

On the other hand, there appears to be some international interest in municipal green bonds. The recent issue of Surat Municipal Corporation’s green bond issue drew significant interest from global investors. (CMO-Gujarat, 2025). The bond was oversubscribed by 3.3 times in the retail category (which constituted 15% of the total issue), 7.5 times in the Corporate and High Net-Worth Individual category (which constitutes 25% of the total issue), while the Qualified Institutional Buyer (QIB) (60%) was oversubscribed for 8.82 times. (Times of India, 2025).

B. Creating greater awareness amongst potential 'investors' for green bonds

The limited awareness among potential investors about the environmental and financial benefits of green bonds significantly constrains demand. In India, major institutional investors like the Life Insurance Corporation (LIC) and the Employees' Provident Fund Organisation (EPFO), manage assets of over USD 605 billion. They present a significant opportunity to fund urban green bonds aimed at climate-resilient water and sanitation infrastructure. The Government of India can create a more attractive investment environment for green bonds through targeted incentives and recognition programs. Drawing inspiration from successful international models, particularly the United States (See Box item 1), where tax exemptions on municipal bonds have attracted significant retail investor participation. India could implement similar fiscal incentives specifically for green municipal bonds. Tax benefits such as reduced capital gains tax, income tax deductions for green bond investments, or even tax-free status for returns from certified green bonds, could substantially increase investor appetite and drive up the greenium to more attractive levels. Building awareness among retail investors presents another significant opportunity to expand the investor base and increase demand-driven greenium. Educational campaigns highlighting the dual benefits of financial returns and environmental impact, coupled with simplified investment platforms and lower minimum investment thresholds, could generate interest of retail investors in green bond investments.

Box Item 1: Tax exemptions in green bonds: Experience from USA

In the United States, municipal bonds finance about 70% of infrastructure projects, with tax-exempt status attracting retail investors. Green municipal bonds, enhanced by independent certifications, have further appealed to Socially Responsible and ESG investors by reducing coupon rates and increasing transparency. States like Massachusetts and Washington, D.C., have led in issuing such bonds, bolstering investor confidence through audited reports and disclosure portals. Similarly, Mexico's development bank, Nacional Financiera (Nafin), established a Sustainable Projects Division to integrate green bonds into its operations, attracting global investors and ensuring transparency to mitigate greenwashing risks.

Source: ORF, 2019; SEB, 2017

The Union Budget 2025 recognised the potential of municipal bonds by creating an Urban Challenge Fund worth USD 1.7 billion, aiming to incentivise cities to raise funds through innovative financing. This includes mechanisms like public-private partnerships (PPPs), loans, and, importantly, municipal bonds. However, to realise their full potential, India must broaden the scope of green finance beyond energy, embed climate-resilient WASH in its national financing frameworks, and empower cities through capacity building, incentives, and transparency mechanisms. In addition, the cap on incentives under AMRUT may be amended to enable local governments to promote issuance of municipal/ green bonds through an incremental incentives approach. With strategic reforms and coordinated institutional action, green bonds can evolve from niche instruments into mainstream tools driving climate-resilient urban transformation.

In addition, India should prioritise reaching out to the domestic investor ecosystem to attract green bonds. India's pension funds, managing approximately USD 600 billion and growing at around 10% annually, represent a significant yet underutilised pool of long-term capital for financing the green transition. (The Usthadian Academy, 2025). Currently, most of these assets are concentrated in government securities, with limited exposure to climate-aligned investments. The long-term liabilities of pension funds align naturally with the extended payback periods typical of green infrastructure projects, such as renewable energy, electric mobility, and resilient urban systems. According to the Pension Fund Regulatory and

Development Authority (PFRDA), pension funds in India are permitted to invest in sovereign green bonds (SGrBs). Retail investors will be significantly impacted by the PFRDA's decision to permit funds to participate in sovereign green bonds (Mint, 2023). Pension funds that provide sovereign green bonds have the potential to increase individual investors' knowledge of sustainable investment and promote a more knowledgeable and socially conscious approach to financial decision-making. To unlock this potential, the structural reforms to provide earmarked portfolio targets as small as a fraction (less than 1 percent) to the investors towards the municipal green bonds for rating above AA+ and above for building momentum among institutional investors. (CEEW, 2025) Such measures would help mobilise large pools of domestic capital, improve market liquidity, and reduce reliance on foreign investors, thereby strengthening India's efforts to meet its climate goals.

In April 2024, the Reserve Bank of India (RBI) did not accept any bid at the sale of the first sovereign green bond auction. Bond traders speculate that this decision was because investors were unwilling to pay the premium ("greenium") usually associated with green bonds. Globally, investors are usually willing to accept lower returns for green bonds, as the funds raised are meant for environmentally friendly purposes (Observer Research Foundation, 2024). Despite initiatives and efforts by RBI, like removing the cap for foreign investors in sovereign green bonds and mobilising a fully accessible route for investments by non-residents in government securities, additional structure reforms will be required to push green bond investments in India. However, additional structural reforms, enabling regulatory frameworks, risk mitigation mechanisms and an offer of premium benefits will be needed to build investor confidence and scale green investment from pension portfolios.

4. Way Ahead

Municipal green bonds issued by Urban Local Bodies (ULBs) offer a promising yet underutilised pathway to finance local-level climate-resilient infrastructure. Early issuances in cities such as Ghaziabad, Indore, Vadodara, and Ahmedabad demonstrate both feasibility and investor interest, particularly for water and sanitation projects. However, several barriers hinder the widespread adoption of green bonds in the urban sector. Limited institutional capacity, high issuance costs, stringent disclosure requirements, and weak investor

awareness have constrained market expansion. The small “greenium” in recent issuances also raises questions about cost-effectiveness, particularly for smaller cities with limited fiscal space. Strengthening institutional capacity along with initial support, improving transparency, and creating targeted incentives for investors are therefore essential to unlock their full potential.

As a way ahead, the Ministry of Finance and SEBI should publish periodic allocation and impact reports on sovereign and municipal green bond proceeds to build investor trust and credibility. Introduction of tax exemptions or rebates will attract both institutional and retail investors. Expanding the investor base will improve liquidity and generate stronger greenium effects.

Capacity building is also essential, as municipal authorities require stronger institutional, financial, and technical support to design bankable, climate-aligned projects. Hence, national and state-level capacity-building programs for ULBs through partnerships and collaborations on green bond structuring, credit enhancement, and project monitoring need to be encouraged.

India’s goal of a USD 5 trillion economy can be achieved only when its cities improve their infrastructure and become climate resilient. Green bonds have the potential to help cities move in this direction. This will require more efforts at all levels of government, as well as by market players.

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