

The Journey of Green Finance in India (2012–2023): Growth, Challenges, Policy Evolution and Future Prospects

Dr. Harshita Gupta¹

Aditya Gupta²

¹ Devi Ahilya Vishwavidyalaya, Indore

² Indian Institute of Technology, Patna

Abstract

Over the past decade, green finance has emerged as one of the defining themes of India's economic and environmental policy. This paper explores the journey of green finance in India between 2012 and 2023, starting with the first disclosure-based regulation implemented by SEBI (Securities and Exchange Board of India) and culminating in the issuance of India's first Sovereign Green Bonds. In order to study the journey of green finance and measure the volume of green bonds, green banking and green financing tools that have emerged during the specified time span, the current study uses a descriptive-analytical approach using secondary data, including regulatory circulars, official central bank publications, multilateral reports, and peer-reviewed literature that was available for the mentioned period. The paper notes that while India has developed a reasonably detailed regulatory regime that includes spanning priority sector lending norms, SEBI's green bond reporting requirements, Business Responsibility Reporting, the Sovereign Green Bond Framework and the Green Deposit Framework — the green finance ecosystem remains limited, bank-dominated, confined to renewable energy, and hampered by the absence of a national green taxonomy for the country, weak verification system and low investor awareness. The paper concludes with policy suggestions related to taxonomy development, blended finance and the deepening of the domestic green bond market, framed within India's Nationally Determined Contributions and its 2070 net-zero commitment.

Keywords: Green Finance, Green Bonds, Sustainable Development, RBI, SEBI, Climate Finance, India, ESG, Priority Sector Lending, Sovereign Green Bonds

Introduction

The global financial system is currently going through a structural reorientation in response to the twin challenges of climate change mitigation and sustainable development. Green finance, defined as the mobilisation of financial resources, instruments and institutional arrangements for projects that also deliver environmental benefits, has moved from the margins of development economics to the centre of mainstream financial policy-making. In the case of India, a fast-growing industrialising economy that is on one hand the third-largest emitter of greenhouse gases in absolute terms and on the other hand, one of the lowest emitters on a per-capita basis, the issue of financing a low-carbon growth pathway without undermining developmental objectives has become a matter of considerable national and international importance.

To comprehend the institutional maturation of green finance in India, the period between 2012 and 2023 is particularly critical. It starts with SEBI's 2012 mandate requiring the top 100 listed companies in India by market capitalisation to prepare a Business Responsibility Report, a significant yet commonly overlooked disclosure intervention that triggered the beginning of environmental, social, and governance (ESG) reporting in Indian capital markets.

When the RBI expanded Priority Sector Lending in 2015 to cover small renewable energy ventures and social infrastructure, it did more than tick a policy box. It embedded green investment into the very architecture banks

use to decide who gets credit and who doesn't. It includes the introduction of Yes Bank as the first Indian issuer of a labelled green bond in 2015 and the subsequent gradual development of corporate green bonds during the decade. It covers India's ratification of the Paris Agreement in 2015 and the submission of the first Nationally Determined Contribution (NDC), which were subsequently enhanced in 2022 in response to the "Panchamrit" commitments which were made at the 26th Conference of the Parties (COP26), which was held in Glasgow in November 2021. It ends with the historic issuance of India's first Sovereign Green Bonds, worth INR 8,000 crore, in January 2023, thereby formally embedding green finance into the fiscal architecture of the Indian state.

A clear period of this eleven-year window has been taken into consideration for the analysis since in this period green finance evolved in India from a voluntary corporate governance add-on to a structured, multi-instrument, multi-regulator ecosystem involving multiple players like the RBI, SEBI, the Ministry of Finance, public sector financial institutions such as the Indian Renewable Energy Development Agency (IREDA), and even the increasingly active class of private issuers and institutional investors.

The paper holds a threefold objective. Firstly, an effort to systematically document the development of green finance policy in India during the study period through situating regulatory achievements within their wider economic and international context. Secondly, it attempts, to the extent that reliable secondary data permits, to document the growth of green finance instruments, particularly green bonds, green bank lending and green deposits, over the period. Thirdly and finally, there is an in-depth examination of the structural and institutional barriers that have limited the scale and depth of the green finance market in India, and derives forward-looking policy recommendations consistent with India's stated climate commitments as they existed at the end of 2023.

The case of India is also instructive in granting a distinctive pathway to green finance market development, one led significantly by prudential and disclosure-based regulatory intervention rather than by a dedicated green finance statute or a single apex green finance institution. This is different from other jurisdictions that formed dedicated green investment banks or full-fledged green finance legislation at the outset; India's approach was incremental, proceeding sector by sector and regulator by regulator, with the RBI addressing the banking channel through credit-allocation norms and SEBI addressing the capital markets channel through disclosure requirements. Even though it has been criticised in the academic literature for leading to fragmentation, this approach is also constrained by the need to fit a rather novel policy objective within an existing multi-layered financial regulatory structure in a large and diverse economy. Therefore, understanding how this incremental approach unfolded and its consequences for market scale and depth is of interest not only to Indian policymakers but also to other large emerging economies confronting similar institutional constraints.

The paper is structured as follows. Section 2 reviews the relevant literature published during the study period. Section 3 describes the method. Section 4 includes a brief conceptual framework for green finance. Section 5 traces the evolution of India's policy chronologically between 2012 and 2023. Section 6 analyses growth trends across major instruments. Section 7 undertakes a sector-wise review. Section 8 discusses the principal challenges confronting the ecosystem. Section 9 offers a brief comparative perspective. Section 10 outlines upcoming prospects and policy recommendations, and Section 11 concludes.

Literature Review

The four themes in the body of academic literature on green finance in India that emerged during the study period can be organised as: conceptual work, policy-oriented studies, market-sizing analyses, and barrier-identification studies. In the conceptual realm, Bahl (2012) offered one of the earliest Indian articulations of green finance as the financing of eco-friendly activities, green technology, and associated infrastructure, establishing the foundation for the RBI's subsequent regulatory use of the concept. The Green Finance Study Group, established under China's 2016 G20 presidency, provides an internationally recognised definition of green finance as investment that generates environmental benefits for sustainable development. This definition has been widely

adopted by subsequent Indian scholarship (Volz, 2018). Reddy (2018) further extended this discussion by framing green finance explicitly as financial support for sustainable development inside the Indian institutional context.

Cross-country reviews also confirm that there was a strong influence of internationally developed conceptual vocabulary on the works of Indian scholars during this period. In Ozili (2022), a literature review of universal aspect identified recurring themes across the green finance field, strategies to increase green financing, efforts to make green investment profitable, employing the use of technology and policy to encourage it, and the role of regulators and financial institutions themes that map closely onto the path of Indian policy discussed in Section 5. According to Akomea-Frimpong et al. (2021), in a review of 46 studies on green finance at bank level, identified green securities, green investment, climate finance, carbon finance, green insurance, green credit and green infrastructure bonds as the major products offered by banks globally, this was very close to the range of products Indian banks and public financial institutions progressively adopted between 2015 and 2023. In an early policy-oriented contribution, Berensmann and Lindenberg (2016) outlined the principal actors, challenges and policy recommendations relevant to green finance market development in developing nations, a theme that later appeared in India-specific barrier studies.

According to Volz (2018), a widely cited Asian Development Bank Institute study on the state of green lending and investment across Asia mapped green financial governance initiatives, market innovations, and barriers to green investment across the region. The early regulatory steps for green finance in India were compared with those of other advanced nations, including China, Japan, and South Korea. Examining green finance, energy efficiency, and renewable energy through a panel study, Rasoulinezhad & Taghizadeh-Hesary (2022) have established a positive association between development in green finance and energy efficiency and in renewable energy deployment, similar to that in India, where green loans and non-fossil fuel generation have increased, as explained in section 6.3. Previous panel work by Zhou, Tang and Zhang (2020) on China's provinces provided an empirical template linking green finance development to environmental and economic outcomes at the sub-national level, later adapted by Indian scholars examining state-level green finance flows.

A second view of literature follows the direct progression of policies. One of the most credible on this issue was the RBI's own research bulletin (Reserve Bank of India, 2021) that provided one of the most authoritative accounts of the development and challenges of green finance in India, documenting rising search interest in green finance-related terms, the structure of green bond issuances by issuer type, and the small share around 0.7 per cent of green bonds within India's bond issuance since 2018. A third thread focused on measuring market growth. According to various analyses based on data collected from sources like Bloomberg and the Climate Bonds Initiative, Indian companies issued \$6.11 billion (approx.) in green bonds during January to November 2021, the strongest year for the segment since Yes Bank's inaugural 2015 issuance, with issuers such as Greenko, ReNew Power, JSW Hydro and Adani Green Energy driving volumes (REGlobal, 2022). In addition, the complementary work by World Bank (2023) placed aggregate Indian green bond issuance at approximately \$21 billion by February 2023, of which 84 per cent originated from private-sector issuers, pointing to the still-limited role of sub-sovereign and municipal issuance, notwithstanding early examples such as the Ghaziabad Nagar Nigam bond of 2021 and the Indore Municipal Corporation bond of 2023.

A fourth element concerned the barriers and enablers to the diffusion of green finance. Using multi-criteria evaluation approaches, researchers identified financial, legal, and regulatory barriers as the most major deterrents to the growth of green finance and green investment in India, whereas technological innovation and the development of the clean energy sector were identified as the most promising enablers. In related research using Interpretive Structural Modelling, regulatory inadequacies were identified as the basic barrier from which secondary constraints — data gaps, low investor awareness, high costs, and the unavailability of green products — cascaded, with green washing risk compounding the resulting opacity. Salzmann (2013), in an even wider context of sustainable finance, emphasised the need to integrate corporate social responsibility dimensions more comprehensively into financial practice, a recommendation well-suited to India's Business Responsibility and Sustainability Reporting framework.

Another implicit idea of the literature concerns the institutions involved and responsible for market development rather than the instruments themselves. Several studies emphasised the disproportionate role of public financial institutions, IREDA, PFC, REC and NABARD, relative to purely commercial banks and capital market intermediaries in sustaining green finance flows during the early years of the study period, before commercial and corporate participation broadened materially after 2017. Hence, this particular focus is of very crucial because it suggests that a significant portion of green finance mobilisation in India remained to rely on institutions with sovereign characteristics, i.e., quasi-sovereign entities that operate under direct or indirect government ownership, rather than on fully market-driven private capital allocation, despite the extensive disclosure and regulatory architecture which is built by institutions like RBI and SEBI over the period. Putting up all the pieces together, this literature derives on three conclusions that are pertinent to the present study: firstly, green finance flows in India significantly increased but still remained insufficient when compared to the country's climate investment needs; secondly, regulatory framework was progressively strengthened through a sequence of interventions by RBI and SEBI ; and thirdly, as of 2023 certain organizational constraints like the lack of a unified taxonomy, a weak verification infrastructure and an insufficient investor base.

Research Methodology

Based on the availability of secondary data, this study uses a descriptive-analytical research design. In order to maintain consistency between the period of study and the data employed to study it, its temporal scope is narrowed to January 2012 and December 2023, and all citations that were either published or issued within this window. Primary regulatory documents (RBI circulars comprising the 2015 PSL guidelines, the 2019 revision, the 2022 Sovereign Green Bond Framework and the 2023 Green Deposit Framework; SEBI circulars like the 2012 Business Responsibility Reporting mandate and the 2017 green bond disclosure norms; and Government of India policy statements such as Union Budget speeches and Press Information Bureau releases on India's NDC); literature like peer-reviewed and working-paper published between the period of 2012 and 2023; and financial-market data on green bond issuance amounts compiled using data sourced by Bloomberg. Institutional reports from the RBI, the World Bank and the Climate Bonds Initiative; peer-reviewed and working-paper literature published between 2012 and 2023; and financial-market data on green bond issuance values gathered using Bloomberg-sourced statistics.

Along with descriptive analyses of the amount of issuance of green bonds, priority sector loan statistics, and the development of renewable energy capacity, the study uses qualitative thematic analysis to track evolution of policy chronologically. Because of the given absence, during the research period, of a unified Indian government database on green finance flows, the study combines multiple secondary sources rather than relying on a single authoritative dataset, and this limitation is clearly stated.

Conceptual Framework: Understanding Green Finance

Green finance is not just a single instrument but instead a cross-cutting characteristic that can be incorporated to conventional instruments like loans, bonds, deposits, equity, insurance, and budgetary expenditure — when the underlying use of proceeds is oriented towards environmentally beneficial outcomes. The widely cited definition by Green Finance Study Group states that it is a financing that generates environmental benefits for sustainable development, like lower pollution, greenhouse gas mitigation, enhanced resource efficiency, and climate adaptation (Volz, 2018). Four classes of instruments are generally recognised in the Indian context, First, green lending, mainly bank credit for renewable energy and energy efficiency projects, often channelled through Priority Sector Lending. Second, green bonds, whose proceeds are earmarked for environmentally qualifying projects, issued by corporates, public financial institutions, municipal bodies and, since 2023, the sovereign. Third, green equity and investment funds, including ESG-themed mutual fund schemes. Fourth, public and quasi-public green finance, comprising budgetary allocations and concessional or blended finance extended through institutions such as IREDA, the Power Finance Corporation (PFC), the Rural Electrification Corporation (REC) and NABARD.

Indian green finance literature suggests that debt instruments account for roughly half of total green finance flows, equity for about a quarter, and government and budgetary expenditure, including that routed through public sector undertakings, for the balance (Reddy, 2018). This composition stresses the centrality of the banking system, rather than capital markets, in India's green finance architecture, a structural feature that recurs throughout this paper.

It is also useful, for the purposes of the analysis that follows, to distinguish between green finance as a supply-side phenomenon, the availability of labelled instruments, regulatory systems and institutional capacity to originate and verify green transactions, and green finance as a demand-side phenomenon, indicating the willingness of investors, depositors and borrowers to seek out and price such instruments differently from conventional alternatives. Much of the Indian policy activity documented in Section 5 addressed the supply side of this equation through instrument creation and disclosure mandates, while comparatively little attention was directed, at least until the 2023 Green Deposit Framework, toward directly stimulating retail and institutional demand. This asymmetry between supply-side and demand-side policy attention recurs as a theme in the challenges discussed in Section 8.

Policy Evolution of Green Finance in India, 2012–2023

The Fundamental Phase (2012–2014)

The origins of India's formal green finance began with a 2007 circular issued by RBI requesting banks to act responsibly and incorporate sustainability in institutional practice, but it was only in 2012 that the first concrete disclosure obligation was introduced. The top 100 listed companies by market capitalisation on the NSE and BSE were mandated by SEBI to issue an annual Business Responsibility Report, requiring disclosure against principles that included environmental accountability. Although this measure predated the formal adoption of the term “green finance” in Indian regulatory discourse, it was the first systematic institutionalisation of environmentally relevant disclosure among largest listed companies in India, giving springboard for the more elaborate ESG regime that followed a decade later.

At the same time, Public financial institutions were expanding their role in financing renewable energy. In 2013, Credit Enhancement Scheme was launched by IIFCL to improve the bankability of energy-efficient infrastructure, while institutions like IREDA, PFC, REC and NABARD continued to expand direct and refinanced lending to solar and wind generation in line with their sectoral mandates. Consequently, while in the time public financial institutions were already involved in what would later be recognised as green finance activity in substantive terms well before the term gained regulatory currency, this activity was nowhere tracked or reported using a common taxonomy, making it difficult for researchers as well as for policymakers to construct a continuous time series of green finance flows extending back before 2015.

Institutionalisation Through Priority Sector Lending and the First Green Bond (2015)

At time around the year 2015 India's green finance journey saw its most important turning point. RBI revised its PSL guidelines, and included small renewable energy projects — solar-based power generators, biomass-based power generators, windmills, micro-hydel plants, non-conventional energy-based public utilities, and remote village electrification — along with social infrastructure as categories provided for priority-sector lending (RBI, 2021). Thus, the new law required banks to allocate 40% of net bank credit to a priority sector and construct a scheme of providing renewable energy financing, rather than relying on banks' discretion in granting loans. The report states that the total bank credit for the unconventional energy sector reached about INR 36,543 crore which is nearly 7.9 % of the total power sector credit as against approximately 5.4 % in the year March 2015.

The establishment of the India Innovation Lab for Green Finance under the Global Innovation Lab for Climate Finance was seen in the same year to mandate the pilot rooftop solar financing facilities, peer-to-peer lending

platforms for clean-energy SMEs, and foreign-exchange hedging facilities to de-risk large-scale foreign investment in renewables (Prakash et al., 2016). At the same time, Yes Bank became the first Indian bank to issue India's first labelled green bond, with the aim to finance infrastructure for renewable energy, reductions in emissions and tree-planting, marking the widely acknowledged inception of India's green bond market. Globally, India's Intended Nationally Determined Contribution, submitted to the UNFCCC on 2nd October 2015 prior to the Paris Agreement, stated eight goals, of which three carried precise measurable targets for 2030: enhancing the proportion of green electricity generation to 40% of the total installed capacity; reducing the emissions intensity of its GDP by 33-35% below the 2005 levels; and creating 2.5 to 3 billion tonnes of CO₂-equivalent additional carbon sink by increasing forest cover (Press Information Bureau, 2021). This Nationally Determined Contributions described above would set the formal reference guideline for India's climate finance mobilisation initiatives for the subsequent seven years.

Market Consolidation and Sustainability Networks (2016–2019)

Between 2016 and 2019, policy emphasis shifted from core rule-making toward market consolidation and institutional networking. In 2016, the Indian Banks' Association joined the Sustainable Banking and Finance Network, then comprising 86 member institutions across 66 countries, with India subsequently placed within the "developing" sub-stage of the network's "implementation" category. In May 2017, SEBI issued a circular specifying disclosure requirements for the issuance and listing of green debt securities on Indian exchanges, providing an India-specific reference point that had previously depended on international voluntary standards such as the ICMA Green Bond Principles. This circular catalysed a wave of issuances by public financial institutions including IREDA (2017, 2019), REC (2017) and PFC, alongside continued corporate issuance. The Companies Act, 2013, which requires listed boards to convene at least annually to discuss risk-management strategy, was increasingly interpreted during this period as encompassing environmental and climate risks within corporate governance.

In August 2019, the RBI further revised its 2015 PSL guidelines, permitting banks to expand on-lending exposure to non-banking financial companies (NBFCs) for priority-sector purposes, including renewable energy, therewith indirectly widening the channels through which smaller and distributed renewable projects financed by NBFCs could access priority-sector-linked credit.

Deepening Regulatory Architecture Amid the Pandemic (2020–2021)

The COVID-19 pandemic did not halt the institutional deepening of green finance policy, though it did slow the initial pace of corporate green bond issuance before a strong rebound. The RBI continued to promote renewable energy lending through existing PSL guidelines and, in 2021, published a discussion paper on climate risk and sustainable finance, signalling a rising recognition of climate change as a source of financial and macroeconomic risk requiring supervisory attention. Its January 2021 bulletin noted that cumulative Indian green bond issuance since January 2018 stood at approximately \$8 billion, constituting only about 0.7 per cent of total Indian bond market issuance, modest in absolute terms, but comparing favourably with several advanced and emerging economies on a relative basis (Reserve Bank of India, 2021).

Corporate green bond issuance rebounded strongly in 2021: Indian corporates issued approximately \$6.11 billion during January–November alone, the strongest annual volume since 2015, led by JSW Hydro, Greenko, ReNew Power and Adani Green Energy (REGlobal, 2022). In November 2021, the State Bank of India listed \$650 million in green bonds simultaneously on the India International Exchange and the Luxembourg Stock Exchange, while Ghaziabad Nagar Nigam became the first Indian municipal body to issue a green bond, raising the equivalent of \$20 million.

At COP26 in Glasgow, Prime Minister Narendra Modi announced five climate commitments collectively

described as “Panchamrit”: achieving 500 gigawatts (GW) of non-fossil energy capacity by 2030; meeting 50 per cent of energy requirements from renewables by 2030; reducing total projected carbon emissions by one billion tonnes between then and 2030; reducing carbon intensity by 45 per cent by 2030 relative to 2005 levels; and achieving net-zero emissions by 2070 (Press Information Bureau, 2021). These pledges substantially raised the ambition baseline against which subsequent green finance policy would be assessed.

Sovereign Entry and Institutional Maturation (2022–2023)

The final phase observes the most important developments. In August 2022, the Union Cabinet approved a new version of the NDC redefining the Panchamrit pledges into two revised quantitative targets. Primarily, the goal on reduction of the emissions-intensity target from 33–35% to 45% by the year 2030, and secondly increasing the non-fossil capacity target from 40% to approximately 50% by the year 2030. The updated version of NDC also introduced “Lifestyle for Environment” (LiFE), a concept referring to demand-side behavioural approach to facilitate sustainable consumption, while confirming the net-zero target of 2070 without formalizing it in quantitative terms.

Indian Finance Minister Nirmala Sitharaman announced in her Union Budget speech for 2022–23, which was delivered on 1 February 2022, that the Indian Government would issue Sovereign Green Bonds as part of its market borrowing programme, with proceeds to be deployed in public-sector projects that reduce the carbon intensity of the economy (REGlobal, 2022). In November 2022, the formal Sovereign Green Bond Framework was published which emphasized eligible project categories aligned with ICMA principles; CICERO Shades of Green assessed the framework as a “medium shade of green” (World Bank, 2023). On 25th of January 2023, India issued its the first part of the inaugural Sovereign Green Bonds, at the value of INR 80 billion (around \$980 million), in the form of five-year bonds at the rate of 7.1% and ten-year bonds at the rate of 7.29%; a second, equivalent part of these bonds was issued on 9 February 2023, bringing total of these bonds to the value around INR 160 billion, or approximately \$2 billion (Structured Finance in Brief, 2023; Dezerv, 2023). The Reserve Bank of India suggested to exempt these bonds from the limits on investments by foreign investors in government bonds to make foreign investments by foreigners in these bonds easier.

Another aspect is the issuance by the Reserve Bank of India (RBI) of a notification on April 11, 2023, on the green deposit framework which was applicable from June 1, 2023, and which made it mandatory for regulated banks, commercial banks, small finance banks, and deposit-taking NBFCs to utilize the green deposit proceeds for the specified green activities after independent third-party verification. Initially optional for the financial year 2023-2024, use of green deposits will become mandatory after April 11, 2023, thus making RBI one of the first central banks to institute the green deposit framework. At the same time, Securities and Exchange Board of India (SEBI) has issued another consultancy scheme for mutual funds to encourage investment in ESG and the necessity to comply with the disclosure requirements.

By the end of the year 2023, the Indian green finance landscape was relatively mature and developing, with measures in place across the banking (PSL and green deposits), capital market (disclosure policies for green bonds and ESG mutual funds), and government financial sectors (government green bonds), all managed by the RBI, SEBI, and the ministry of finance. Taken as a whole, the 2022–23 period can be read as the moment at which India’s green finance policy shifted from a largely reactive, market-following posture — in which regulators responded to green instruments already being issued by corporates and public financial institutions — toward a more proactive, market-shaping posture, in which the sovereign itself created new reference instruments

and actively sought to widen participation among both domestic retail depositors and foreign institutional investors.

Growth Trends in Green Finance Instruments, 2012–2023

Green Bonds

Green bond issuance in India expanded from a single symbolic 2015 transaction to a cumulative market of approximately \$21 billion by February 2023 (World Bank, 2023). Of this total, private-sector issuers accounted for approximately 84 per cent, exhibiting the continued dominance of corporate renewable energy developers, most prominently Greenko, which used proceeds to fund hydro, solar and wind projects across several states, over public and sub-sovereign issuers. A separate estimate by the Centre on Global Energy Policy placed cumulative issuance at \$19 billion as of 20 March 2023, of which only about 13 per cent was rupee-denominated prior to the sovereign issuance, pointing to the historical reliance on foreign-currency debt. India ranked fourth among emerging-market and developed Asian economies by cumulative issuance as of early 2023.

The composition of issuance also diversified: from early dominance by financial institutions such as Yes Bank, IREDA, PFC and REC, the market broadened to include developers such as ReNew Power, Adani Green Energy and JSW Hydro, alongside India's first municipal issuer, Ghaziabad Nagar Nigam (2021), followed by the Indore Municipal Corporation, which issued approximately \$87 million in 2023. According to REGlobal (2022), 2021 saw the significant rise in the levels of corporate issuance till the time of writing this study, totaling \$6.11 billion. However, the introduction of sovereign to the market in January 2023 was a turning point, not only in terms of quantitative terms but also in terms of quality. The first 2 issuances of the sovereign, valued to a total of INR 160 billion achieved an average pricing 'greenium' of nearly 9 bps below equivalent conventional government bonds by March 2023, which is quite consistent with the 'greenium' obtained by other emerging market sovereign issuers as part of their green bond issuances. According to Bank of America, Indian companies have the ability to raise \$25 billion cumulatively from 2022 to 2024, in line with expectations of green bond issuance to gain momentum in the future (REGlobal, 2022). If indeed this growth becomes reality, it would mean that the green bonds market in India would effectively be nearly three times bigger just two years after the end of this research period.

Green Banking and Priority Sector Lending

Because Indian green finance has historically been bank-dominated, trends in priority-sector-linked renewable energy credit offer an important complementary lens. Following the 2015 PSL inclusion, outstanding bank credit to the non-conventional energy sector rose to approximately 7.9 per cent of outstanding power-sector bank credit, compared with roughly 5.4 per cent as of March 2015. By January 2023, RBI data indicated that outstanding bank credit to the green energy sector had grown by more than 100 per cent year-on-year, rising from nearly INR 2,073 crore in 2021 to nearly INR 4,191 crore in 2022, signalling an accelerating, if still numerically modest, reallocation of bank credit toward renewable energy lending.

Renewable Energy Capacity as a Downstream Indicator

India's installed non-fossil electricity generation capacity, encompassing renewables, large hydro and nuclear power, rose to approximately 174 GW by June 2023, the third-largest absolute increase globally over that period after China and the United States, averaging roughly 12 GW of non-fossil capacity added per year since 2015. Non-fossil sources thus accounted for approximately 43 per cent of India's total installed generation capacity by mid-2023, already exceeding the stated 40 per cent by 2030 target in India's 2015 NDC, even as fossil fuels continued to account for approximately 73 per cent of actual electricity generation, reflecting coal's continued base-load role.

Sustainability Disclosure and ESG Investment Vehicles

In addition to growth in specific instruments, the period of analysis witnessed steady broadening of disclosure and investment-vehicle infrastructure. It evolved from the limited legislation of the Business Responsibility Reporting in 2012 covering the top 100 listed companies to SEBI's rules for disclosure of green bonds in 2017 and, by 2023, a newly dedicated category of ESG mutual fund with associated disclosure obligations. This development marks a wider shift in Indian securities regulation from voluntary, reputation-based approach to sustainability reporting to directing toward more structured, rule based, comparable, and eventually product-specific ESG norms.

Sector-Wise Analysis

The banking sector gained the significant importance as a channel for green finance throughout the period of the study, reflecting the bank-dominated character of Indian credit markets. The RBI's had used the mandatory Public Sector Lending as the primary policy tool that led to the green banking sector emerging as a less voluntary product-differentiation strategy and more as a compliance embedded within existing credit-allocation obligations. Public sector banks such as SBI have developed distinct green finance identities, such as dual-listed green bond issuance in 2021 and the 2023 Green Deposit Framework which is the first formally regulated green-labelled retail liability product in India, aiding the growth of green finance beyond institutional investors toward retail depositors.

SEBI's regulatory trajectory displays a consistent logic of incremental disclosure-based intervention: from company-level non-financial reporting in 2012, to instrument-specific green bond disclosure in 2017, to product-specific ESG fund regulation in 2023. This shows a regulatory philosophy favouring market-based disclosure over mandatory allocation, in contrast to the RBI's more directive PSL approach in banking. The small size of the corporate green bond market relative to the overall corporate bond market — approximately 0.7 per cent as of 2021 — suggests that, although foundational, this disclosure-based approach had not, by 2023, translated into large-scale capital reallocation.

Public financial institutions — IREDA, PFC, REC and NABARD — served as consistent engines of green finance throughout the period, both through direct lending and, from 2017 onward, their own green bond issuances. IREDA, in particular, has been described in Indian literature as having played a role analogous to that of a national green bank, given its exclusive sectoral mandate well before “green finance” entered the mainstream regulatory vocabulary.

Finally, the sovereign's own entry into the green bond market in January 2023 represents the most significant sectoral development of the closing phase. Beyond its fundraising function, the sovereign programme served two additional purposes: establishing a domestic rupee-denominated green yield curve to serve as a pricing point of reference for future issuance, and signalling government commitment intended to catalyse private capital mobilisation, consistent with technical assistance provided by the World Bank's Sustainable Finance and ESG Advisory Services (World Bank, 2023).

Challenges and Barriers to Green Finance in India

While there has been a significant institutional development, the literature has identified some of the persistent structural issues hindering the development of India's green finance ecosystem in 2023.

Lack of a unified green taxonomy. During this phase in question, there has been no single government approved classification in India identifying which activities can be classified as “green,” unlike jurisdictions such as the European Union, which developed a formal Taxonomy. Instead, Indian issuers have had to rely on different instruments, such as the ICMA Green Bond Principles, SEBI's sector-specific disclosure requirements, or in the case of the sovereign programme, a custom framework, making transactions costly and comparisons complicated.

Greenwashing as a risk and lacking verification mechanisms. The issues created by the absence of the taxonomy in question and lack of capacity for actual verification have resulted in situations conducive to greenwashing. Indian green banking literature noted the absence of a formal green credit rating system as a specific factor discouraging banks from more aggressively promoting sustainability-linked lending, since the lack of standardised metrics made claimed environmental outcomes difficult to verify.

Regulatory fragmentation. Green finance policy was pursued through parallel, only loosely coordinated interventions by the RBI (through PSL and green deposits) and SEBI (through disclosure-based capital market regulation), without a single overarching statutory framework. This breakup produced uneven definitions, disclosure formats and compliance expectations across financial system segments.

Concentration in renewable energy. Green finance flows were heavily concentrated in solar and wind generation, with limited financing directed toward water management, waste management, green buildings, sustainable transport and climate adaptation — signaling both the relative bankability of renewable energy project frameworks as well as the explicit sectoral orientation of instruments such as PSL.

Narrow investor base: The Indian green bond market lacked dedicated domestic institutional vehicles with an explicit green mandate; as of early 2023, no Indian mutual fund had a dedicated green-bond mandate, despite parallel growth in ESG-themed equity funds. This limited secondary secondary market liquidity as well as left the market disproportionately reliant on a narrow pool of foreign institutional investors and banks holding to maturity.

High certification costs with limited pricing differentiation. Third-party verification and second-party opinions added to issuance costs without consistently translating into an observable “greenium” for smaller corporate issuers lacking the economies of scale available to sovereign or large public-sector issuers. Currency and tenor mismatches. A large portion of pre-2023 issuance was foreign-currency-denominated, exposing issuers with rupee-denominated revenues to currency mismatch risk, while relatively short corporate bond tenors compounded asset-liability mismatch relative to the long-duration nature of renewable energy assets.

Limited public awareness: Google Trends-based analysis in RBI research indicated that public search interest in green finance-related terms in India remained comparatively low relative to several advanced and emerging economies, suggesting retail and public awareness remained underdeveloped even as institutional infrastructure matured. Considered together, these eight challenges are not independent of one another; several studies applying structural modelling techniques found that regulatory and taxonomic gaps functioned as root-cause barriers from which most of the remaining constraints — greenwashing risk, investor prudence, thin liquidity and elevated verification costs — cascaded as downstream consequences. This suggests that policy steps targeted at the fundamental layer of definitional and regulatory clarity may yield disproportionately large benefits for the ecosystem, relative to interventions aimed narrowly at any single downstream symptom, such as investor awareness or certification costs.

A Brief Comparative Perspective

Placed in comparative context, India's green finance journey exhibited both distinctive strengths and notable gaps relative to peer economies. India's cumulative green bond issuance of approximately \$19–21 billion by early 2023 made it the leading emerging Asian market, excluding China (World Bank, 2023). In absolute terms, however, India's market remained an order of magnitude smaller than China's, where the government alone issued green bonds worth approximately \$76 billion in FY22 (Dezerv, 2023) — underscoring the distance remaining between India and the world's largest emerging-market green bond issuer. Among the nineteen emerging-market sovereigns that had issued green, social or sustainability bonds since 2016, cumulative emerging-market sovereign issuance stood at approximately \$74 billion by end-2022, representing only about 2 per cent of total global issuance, a context within which India's inaugural \$2 billion sovereign programme represented a meaningful but early-stage contribution.

Forthcoming Prospects and Policy Recommendations

Building following the trajectory documented above, several forward-looking priorities emerge from the literature reviewed. Development of a national green taxonomy. The single most frequently recommended reform is establishing a comprehensive, government-endorsed green taxonomy, analogous to the EU Taxonomy, that provides a consistent basis for classifying eligible green activities across banking, capital markets, and public finance, there upon decreasing the risk of greenwashing and lowering transaction costs for issuers and verifiers.

Deepening rupee-denominated green bond markets: Building on the 2023 sovereign issuances, the continued expansion of rupee-denominated green bonds — by the sovereign, by municipal bodies following Ghaziabad and Indore, and by domestic corporates — was identified as a priority to reduce currency mismatch risk and establish a more liquid domestic green yield curve. Expansion of green retail products. The 2023 Green Deposit Framework represented an early step toward mobilising retail savings; continued development of retail-accessible green products, alongside public information campaigns, was identified as important for broadening the investor base beyond institutional and foreign participants.

Blended and concessional finance mechanisms: Given the higher perceived risk and longer payback periods characteristic of green infrastructure, literature recommended greater use of blended finance structures — combining concessional public or multilateral capital with commercial capital, of the kind piloted through the India Innovation Lab for Green Finance from 2015 onward — to improve risk-adjusted bankability, particularly outside renewable energy generation.

Sectoral diversification: Given the concentration of flows in renewable energy documented in Section 8, the literature has called for dedicated financing instruments and disclosure standards for green buildings, sustainable transport, water and waste management, and climate adaptation infrastructure to diversify the market's thematic composition.

Conformity with long-term climate targets. With India's updated 2022 NDC and its 2070 net-zero commitment establishing the policy horizon against which green finance mobilisation would need to be assessed in subsequent years, the RBI's own 2022–23 Report on Currency and Finance estimated financing requirements of at least 2.5 per cent of GDP annually through 2030, alongside its wider assessment that a balanced policy intervention pathway could substantially reduce India's projected 2030 carbon emissions relative to a no-policy-action baseline.

Taken together, these six priorities are mutually reinforcing rather than independent: taxonomy development lowers the cost of retail product design, deeper rupee markets make blended finance structures easier to scale, and sectoral diversification is more readily achieved once a credible classification system exists to certify green activities in the non-renewable energy sector. A coordinated sequencing of these reforms, rather than piecemeal implementation, is therefore likely to be more effective in translating India's foundational decade of green finance institution-building into the scale of capital mobilisation required by its own stated climate targets.

Conclusion

Between 2012 and 2023, India saw significant shifts in terms of its green finance system. Initially focused on narrow disclosure-based corporate governance requirement and gradually evolving to a multi-instrument, multi-regulator ecosystem encompassing priority sector lending, labelled green bonds, green deposits, ESG-themed mutual funds and, even sovereign green bond programme. This process was constant but impactful regulatory interventions by the RBI and SEBI, aligned with India's evolving international climate commitments, over time from its 2015 NDC through the COP26 Panchamrit pledges to the enhanced 2022 NDC. In terms of numbers, the incremental increase in issuance of green bond from a single 2015 transaction to a cumulative market of approximately \$19–21 billion by early 2023 — while the credit for green banking between 2021 and 2022 doubled, indicating genuine, if still modest relative to India's climate financing needs, deepening of the market. Meantime, the review of this study suggests that as of 2023 India's green finance ecosystem remained hampered by the lack of a unified taxonomy, poor verification infrastructure, and uneven distribution across sectors in renewable energy, a small number of domestic institutional investor base, and also persistent currency and tenor mismatches in issuance. Overcoming all these hindrances— by introducing proper taxonomy, enhancing Indian markets for rupee-denominated loans, creating more opportunities in terms of retail participation, blended finance mechanisms and sectoral diversification will play a paramount role in the process of establishing an adequate Indian green finance ecosystem, ensuring that it gets to the scale needed for fulfilling India's own declared commitments to achieve net-zero emissions as well as its NDC. In this aspect, one needs to understand that the period under analysis correctly, as it represents not just the final stage of India's journey towards the development of green finance ecosystem but also its formative decade.

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