

Real Estate Financing for Green and Sustainable Buildings in India

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ABSTRACT

In the present context of climate change, rising energy costs, and government regulations that push for eco-friendly practices, expanding green real estate in India demands robust financial mechanisms. This paper examines existing certification systems, financial instruments, and regulatory frameworks governing green real estate. Through policy analysis, it identifies key challenges including technical and institutional barriers, declining investor confidence due to awareness and transparency gaps, low market demand limited by insufficient incentives, and disproportionate investment in energy over real estate. To address these pitfalls, this study recommends actionable steps to diversify green investments, strengthen financing infrastructure, and improve policy enforcement such as the development of a standardized green taxonomy, a national green credit program, and a regulated green secondary market to improve liquidity. The paper also calls for stronger coordination through public-private partnerships and multi-level governance, alongside technical capacity-building initiatives for key stakeholders. Through a comparative analysis of state-wise incentives promoting green building construction in India, this study sets the stage for further research to evaluate the effectiveness of local green policies. Finally, it outlines the future scope of green real estate in India through the lens of behavioural economics.

Keywords: Green building; Green finance; Green real estate; India climate policy; Sustainable urban development

INTRODUCTION

With climate change concerns on the rise, concerted efforts towards integrating the principles of sustainability into traditionally carbon-intensive sectors have become critical. An important field in this study is real estate development. The UN Environmental Program and Global Alliance for Buildings and Construction (2024) revealed

that the buildings and construction sector consumed 32% of global energy and accounted for 34% of the total carbon dioxide emissions (1). The report also specified that 18% of emissions resulted from manufacturing building materials and products such as steel, cement, and glass. A McKinsey and Company report highlights that, being a significant source of emission, real estate has the potential to accelerate global decarbonization efforts (2). This can be achieved through collaboration between various stakeholders – investors making net-zero commitments, regulators establishing reporting standards, government passing emission laws, employees demanding action, and tenants demanding sustainable buildings. In this manner, real estate development plays a crucial role in achieving

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the *United Nations Sustainable Development Goals*, particularly facilitating the growth of sustainable cities and communities.

To facilitate sustainable development in the real estate sector and support net-zero transitions, significant financial investments are required. In fact, McKinsey and Company research estimates this amount to be approximately \$9.2 trillion annually (2). The growing intersection between sustainability, urban development, and financial economics makes green real estate financing an important area of study. As stated in a key publication by Giampiero Bambagioni, Vice Chair of the UNECE Committee on Urban Development Housing and Land Management, green financing refers to “environment-oriented financial products or services, such as mortgages, loans, insurances or bonds, which recognize the value of the environment and its natural capital and seek to improve human well-being and social equity while reducing environmental risks and improving ecological integrity” (3). In the context of real estate, green finance deals with allocation of investments towards energy-efficient buildings, renewable energy sources, and other eco-friendly construction initiatives. Currently a developing economy, the journey of India towards becoming a developed nation relies heavily on urban development. For instance, the Government of India launched the Pradhan Mantri Awas Yojana on 25th of June, 2015 to promote access to affordable housing among the low and moderate-income citizens of the country (4). This mission even encourages local bodies and developers to follow sustainability guidelines, thus supporting green housing.

Presently, strategic finance is the missing link between sustainability goals and on-ground implementation. While sustainability-linked housing schemes and policies are present, limited research exists on how financial instruments can be aligned with long-term green goals in India's real estate sector. Thus, this paper offers a novel policy-finance approach to evaluating green real estate, which acts a unique lens for the broader green policy framework in India. By integrating economic theory into policy analysis, this study suggests ground-level reforms to guide green real estate financing in India. Hence, through a qualitative analysis of Indian policies that advance and incentivize green building construction, this paper evaluates the effectiveness of present policy frameworks, discusses the challenges to green financing in India, and provides recommendations to accelerate growth in the green real estate sector. Finally, the study highlights the significance of real estate financing for green buildings in achieving global sustainability.

LITERATURE REVIEW

Green Movement in India

The first clear expression of the green movement in India is believed to be the Chipko Movement, a concerted effort against deforestation originating in 1973 in the Himalayan region of Uttarakhand. Following in its footsteps, there have been several efforts to preserve nature and wildlife such as the Bishnoi Movement in Rajasthan and the Appiko Movement in Karnataka. Movements opposing the construction of dams such as the Narmada Bachao Movement have also been crucial towards integrating the cause of water management in the overall strive for conservation. These movements laid the foundation for ecological consciousness in India by mobilizing public support and placing sustainability on the political agenda (5). Over time, the evolving sentiments towards environmental responsibility led to a shift in policy thinking which emphasized the integration of sustainability goals in national development plans. This trend is highlighted in the real estate sector as initiatives such as the Energy Conservation Building Code, the Eco Niwas Samhita, and IGBC-related projects gain prevalence. Hence, the advent of green buildings is a promising proliferation of the green movement in India.

Definition of Green Buildings

A green building, or sustainable building, is one which conserves natural resources, efficiently utilizes water and energy resources, uses sustainable materials, reduces and manages waste, and improves indoor environment quality (6). The key features of green buildings are as follows:

1. *Sustainable sites*: A green building incorporates strategies to protect and restore natural habitats, enhance biodiversity, and execute environmentally-responsible construction plans.
2. *Water efficiency*: A green building ensures sustainable usage of water resources by adopting rainwater harvesting systems and greywater harvesting systems.
3. *Energy efficiency*: A green building reduces the demand for active energy systems by employing passive design strategies and operates largely on renewable energy.
4. *Sustainable materials*: A green building uses reused and recycled materials, regional materials, rapidly renewable materials, durable materials, and water efficient materials that have lower costs on maintenance and energy consumption.
5. *Waste management*: A green building utilizes waste

segregation, recycling, and composting systems.

6. *Improved indoor air quality*: A green building enhances indoor air quality by employing proper ventilation systems, air filtration systems and low-VOC paints and materials.

Green Building Certification Systems in India

A green building certification system evaluates green buildings across various parameters of sustainability throughout their lifecycles. The major green building certification systems in India are summarized in Table 1 (6).

Green Financing Instruments in India

A green financing instrument refers to a financial tool used to incentivize and promote sustainable development in traditionally carbon-intensive sectors such as real estate. The key green financing instruments issued in India are summarized in Table 2 (7, 8).

Challenges to Green Real Estate Financing in India

Challenges to the development of green real estate financing in India include lack of awareness and skill, regulatory barriers such as delay in approvals and inadequacy of mandatory laws to implement green

building norms, and higher upfront costs compared to conventional buildings (6). Due to lack of awareness among buyers about the benefits of green construction and lack of skill among developers, contractors, and architects about the requirements and implementation of sustainable design principles, the growth of this industry is hindered. Further, green procurement, renewable energy systems, and certifications can significantly increase the upfront costs. In addition to monetary expenses, the time and resource cost of green building construction is also high. The infancy of Indian green bond market, existing market practices and regulatory frameworks which are inconsistent and lack standardization, and other technology and currency-related risks associated with green investment contribute to a decline in investor confidence (8, 10). Such institutional, regulatory, and market barriers coupled with lack of financial incentives for green investment result in low market demand for green financing and construction.

METHODS AND MATERIALS

This research is a comprehensive review of existing literature, including academic articles, government

Table 1. Overview of Major Green Building Certification Systems in India

<i>Rating system</i>	<i>Related organizations</i>	<i>Criteria and award system</i>	<i>Examples</i>
Green Rating for Integrated Habitat Assessment (GRIHA)	Developed by <i>The Energy and Resources Institute</i> (TERI), endorsed by <i>Ministry of New and Renewable Energy</i> (MNRE)	Point-based rating system that evaluates buildings across 34 environmental parameters	Centre of Environmental Sciences and Engineering (CESE), IIT Kanpur, Suzlon One Earth in Pune, Fortis Hospital in New Delhi, Common Wealth Games Village in New Delhi
Indian Green Building Council (IGBC)	Indian parallel to the <i>United States Green Building Council</i> (USGBC)	Launched the IGBC AP exam among other assessments of green buildings to classify them as <i>certified</i> (good practices), <i>silver</i> (best practices), <i>gold</i> (outstanding practices), <i>platinum</i> (national excellence), <i>super platinum</i> (global leadership)	CII-Sohrabji Godrej Green Business Centre (Platinum), ABN Amro Bank in Ahmedabad (Platinum), Anna Centenary Library Building in Chennai (Gold), American Embassy School in Delhi (Gold), Birla International School in Jaipur (Gold)
Bureau of Energy Efficiency (BEE)	Set up by the <i>Government of India</i>	Developed a 5-star rating scale to evaluate energy efficiency, developed the Energy Performance Index (EPI), launched the Energy Conservation Building Code (ECBC)	Reserve Bank of India's buildings in Delhi and Bhubaneswar, CII Sohrabji Godrej Green Business Centre

reports, policy documents, and industry publications, to provide a foundational understanding of the present framework of green financing policies in India. Through a descriptive policy analysis, this research evaluates the effectiveness of Indian green policies, identifies pitfalls, and provides feasible recommendations critical to shaping the future of green real estate.

Sources were selected based on relevance to green finance, real estate, and sustainable construction practices in the Indian context. In order to ensure that the study reflected present policy frameworks, documents published between 2015 to 2024 were majorly selected. Additionally, preference was given to peer-reviewed articles, official government publications (such as Ministry of Power, Ministry of Finance, Ministry of Housing and Urban Affairs, Ministry of New and Renewable Energy, Reserve Bank of India, etc.), and publications by reputed

organizations (such as United Nations Environment Program, McKinsey and Company, Indian Green Building Council, The Energy and Resources Institute, Bureau of Energy Efficiency, etc.).

A thematic coding strategy was utilized to extract and classify key insights from the selected material across parameters such as (1) overview of policy framework, (2) barriers to adoption and implementation of green policies, (3) involvement of stakeholders, and (4) effective utilization of financial mechanisms. Documents were further evaluated for credibility by cross-referencing information from other sources and prioritizing data with numerical evidence, government backing, and widespread citation in existing literature. This structured approach to data collection and analysis enabled the identification of inefficiencies in the existing policies and the development of evidence-based recommendations.

Table 2. Key Green Financing Instruments Issued in India

<i>Financing instrument</i>	<i>Definition</i>	<i>Typical investor</i>	<i>Typical borrower</i>
Green Bonds	A bond issued in the market exclusively for financing or refinancing green projects	Institutional investors, investment managers, governments, corporate investors	Financial corporations, non-financial corporations, government-backed entities, sovereign development banks
Green Loans	A loan, corporate or consumer, issued in the market exclusively for financing or refinancing green projects	Retail banks, financial institutions	Corporations, homeowners
Green Mortgages	A preferential financial arrangement given when purchasing or renovating a building meeting certain environmental standards (for e.g. energy efficiency, green building certification)	Retail banks, mortgage lenders	Homeowners
Green Securitization	A securitization backed by a green collateral (for e.g. electric vehicle loans)	Institutional investors, impact investors, bank and asset managers, government entities	Renewable energy companies, real estate developers
Carbon Credits	A cap on carbon emissions set by the government that can be traded between companies to earn profits	A company operating below the emission limit	A company exceeding the emission limit
Green Real Estate Investment Funds (REIFs)	An actively managed capital pool used to finance income-generating and developmental green projects	Impact investors, institutional investors, retail investors, high-net-worth individuals	Real estate developers
Green Real Estate Investment Trusts (REITs)	A public, passively managed capital pool used to finance income-generating green projects	Institutional investors, retail investors, high-net-worth individuals	Real estate developers

Note: Table has been adapted from Green Real Estate Financing Market Report 2024 (9).

National Action Plan on Climate Change (NAPCC)

The *National Action Plan on Climate Change* (NAPCC), released by the Prime Minister on 30th of June, 2008, outlines the national strategy to resolve climate change challenges as identified by the Expert Committee on Impact of Climate Change set up by the Ministry of Environment & Forests in June 2007. The policy emphasizes sustainable development through eight national missions. These include National Solar Mission, National Mission on Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Eco-system, National Mission for a Green India, National Mission for Sustainable Agriculture, and National Mission on Strategic Knowledge for Climate Change (11).

The *National Mission on Enhanced Energy Efficiency* (NMEEE) plays a key role in promoting green real estate by setting foundation for the *Energy Conservation Building Code (ECBC)* and the *Smart Cities Mission*. It consists of four major initiatives as follows (12, 13):

- i. *Perform, Achieve and Trade (PAT)* aims to improve energy efficiency in energy intensive sectors. Under this scheme, India set energy-saving targets of 1.06 MTOE in Cycle III (116 entities, 6 sectors), 0.6998 MTOE in Cycle IV (106 entities, 8 sectors), and 1.276 MTOE in Cycle VI (135 entities, 6 sectors), making significant contributions despite the pandemic disruptions.
- ii. *Energy Efficiency Financing Program (EEFP)* provides a platform to interact with financial institutions and project developers of energy efficiency projects.
- iii. *Market Transformation for Energy Efficiency (MTEE)* accelerates shift towards energy efficient appliances. For instance, the Bachat Lamp Yojna (BLY) saved 3.598 billion units of energy per year by replacing 29 million bulbs with compact fluorescent lamps.
- iv. *Framework for Energy Efficient Economic Development (FEEED)* helps in the development of fiscal instruments to promote energy efficiency.

The plan been praised for mission-specific ambition, especially in the Solar Mission and Enhanced Energy Efficiency Mission. Such schemes, being coherent with existing policy frameworks and incorporating built-in review mechanisms, have clear future targets, strong technological focus, and potential for measurable climate impact. This is contrasted with other missions under the plan, which emphasize environmental sensitivity, highlight the vulnerability of their respective sectors, and

acknowledge the need for national prioritization of their objectives. Yet, they are limited by budget constraints, immeasurable outputs, broad agendas, poor institutional capacity, inadequate local consultation, data limitations, and lack of clear operational frameworks. In order to realize the full benefits of this program, it is crucial to facilitate political coordination across states, expand traditional knowledge and overcome scientific uncertainty through increased funding in research, address climatic variability for region-specific adaption, and encourage participation of local communities (14).

Energy Conservation Building Code (ECBC) & Eco-Niwas Samhita (ENS)

The *Energy Conservation Building Code (ECBC)* was first launched by the Bureau of Energy Efficiency in 2007 and later updated in 2017 to provide minimum requirements – including requirements on building envelope, heating, ventilation and air conditioning, interior and exterior lighting, electric power and motors, and renewable energy systems – for the energy-efficient design and construction of buildings. It also aimed to achieve the goals outlined in the *Electricity Act, 2001* (15). It is applicable to buildings or building complexes that have a connected load of 100 kW or greater or a contract demand of 120 kVA or greater and are intended to be used for commercial purposes. Key features include three-tiered energy performance standards, mandatory integration of renewable energy systems, mandatory passive design integration, and technology-neutral approach. For residential buildings, the Ministry of Power launched the *Eco Niwas Samhita* in December 2018 to set minimum building envelope performance standards to limit heat gains (for cooling dominated climates) and to limit heat loss (for heating dominated climates). It also ensured adequate natural ventilation and daylighting potential (16).

The implementation of ECBC is hindered due to design and technical barriers, infrastructural challenges, and enforcement barriers. Specifically, the lack of integrated technology and aesthetics, lack of awareness about building physics and energy simulation, and lack of domain expertise pose challenge to the success of this policy. These barriers are further amplified due lack of incentives, awards, and recognition. Local implementation is made difficult due to inadequacy of product performance specifications including access to necessary equipment and technology, absence of product testing facilities, and insufficiency of effective compliance mechanisms (17).

According to Garg (2020), consumer psychology plays

a pivotal role in the implementation of ECBC due to its voluntary nature. End users at the community level must shift from thinking as consumers to responsible citizens, which calls for continuous evaluation of the environmental impact of individuals on the society as revealed in a study by Eva H et al. (2010). As stated by Lawrence (1982), student communities, when trained and made to feel responsible for energy conservation, can significantly contribute to the adoption of energy policies. I Khan et al. (2016) introduced the KABP model (Knowledge, Attitude, Behaviour, Practice) with human behaviour and attitude at the core and emphasized awareness and motivation through policy. Finally, findings of Yun et al. (2011) and Azizi et al. (2015) suggest that energy-success saving in homes relies on occupant behaviour, a phenomenon that is favourable among aware and informed occupants. In a report published by the Prayas Energy Group in 2016 based on a study conducted by the Government of India in 2014 to analyse the energy consumption patterns in Indian homes, the vitality of consumer education alongside technology and tariff was highlighted for the success of energy-related policies. Hence, human intervention to shift the attitude regarding energy usage must be balanced with technological advancements in the ECBC (18).

Sovereign Green Bonds (2022-23)

The Union Budget 2022-23 announced the issuance of Sovereign Green Bonds (SGrBs) to reduce the carbon intensity of the economy (19). The framework for issuance of SGrBs is designed to comply with the *International Capital Market Association (ICMA) Green Bond Principles (2021)* across four major components as follows:

- i. *Use of Proceeds*: The Government of India will use the proceeds from SGrBs to finance and/or refinance expenditure (in parts or whole) for green projects falling under the 'Eligible Categories'. These include renewable energy, energy efficiency, clean transportation, climate change adaptation, sustainable water and waste management, pollution prevention and control, green buildings, sustainable management of living natural resources and land use, and terrestrial and aquatic biodiversity conservation.
- ii. *Project Evaluation and Selection*: The Green Finance Working Committee (GFWC) – chaired by the Chief Economic Advisor, Government of India and composed of relevant ministry representatives and experts including a climate specialist from Niti Aayog – was established to review and approve projects for green funding. The process of selection of green projects is initiated by ministries including MoEFCC, MoHUA, MoAFW, MNRE, and others who identify projects and submit them for internal evaluation to the GFWC. Next, the GFWC curates a final list of eligible projects to whom the Budget Division will issue bonds.
- iii. *Management of Proceeds*: The proceeds are deposited to the Consolidated Fund of India (CFI) in line with the regular treasury policy, and then funds from the CFI are made available for eligible green projects by the Public Debt Management Cell (PDMC). The Ministry of Finance even maintains a Green Register including the details of green bond issuance, proceeds generated, and allocations made to eligible projects including information about the eligible projects.
- iv. *Reporting*: The Department of Economic Affairs under the Ministry of Finance coordinates the preparation of annual Allocation Reports to provide investors with transparent data on the allocation of proceeds of SGrBs as well as on the environmental impact of projects funded by the proceeds.

This Green Bond Framework has been reviewed by CICERO which has issued an independent Second Party Opinion flagging pitfalls such as broad and vague project categories and lack of quantified thresholds for energy efficiency improvements and green building certifications. The report also warns about the inclusion of projects posing high climatic risks related to biofuels, solid biomass, and bioenergy plants in the eligible category and potential support for monoculture plantations instead of natural forests (20).

Though sovereign green bonds are exclusively issued by the central government, green bonds can be issued by various entities including corporations, governments, and international organizations. The issuance of green bonds in India from FY 2015 to FY 2021 is highlighted in Figure 1 (21). The growth of the Indian green bond market shows inconsistencies with the growth of the global green bond market, as indicated by the graphs. Additionally, the issuance of sovereign green bonds increased from ₹16,000 crore in FY 2022-23 to ₹20,000 crore in FY 2023-24.

In 2021, 90% of the green bond proceeds were utilized in financing the renewable energy sector (22). This disproportionate allocation may be due to the presence of a robust framework for energy-related policies such as the National Mission on Enhanced Energy Efficiency (NMEI) under the National Action Plan on Climate

Change (NAPCC). With the introduction of sovereign green bonds dedicated to financing green infrastructure, the trend in use of proceeds for FY 2022-23 changed as shown in Figure 2 (23).

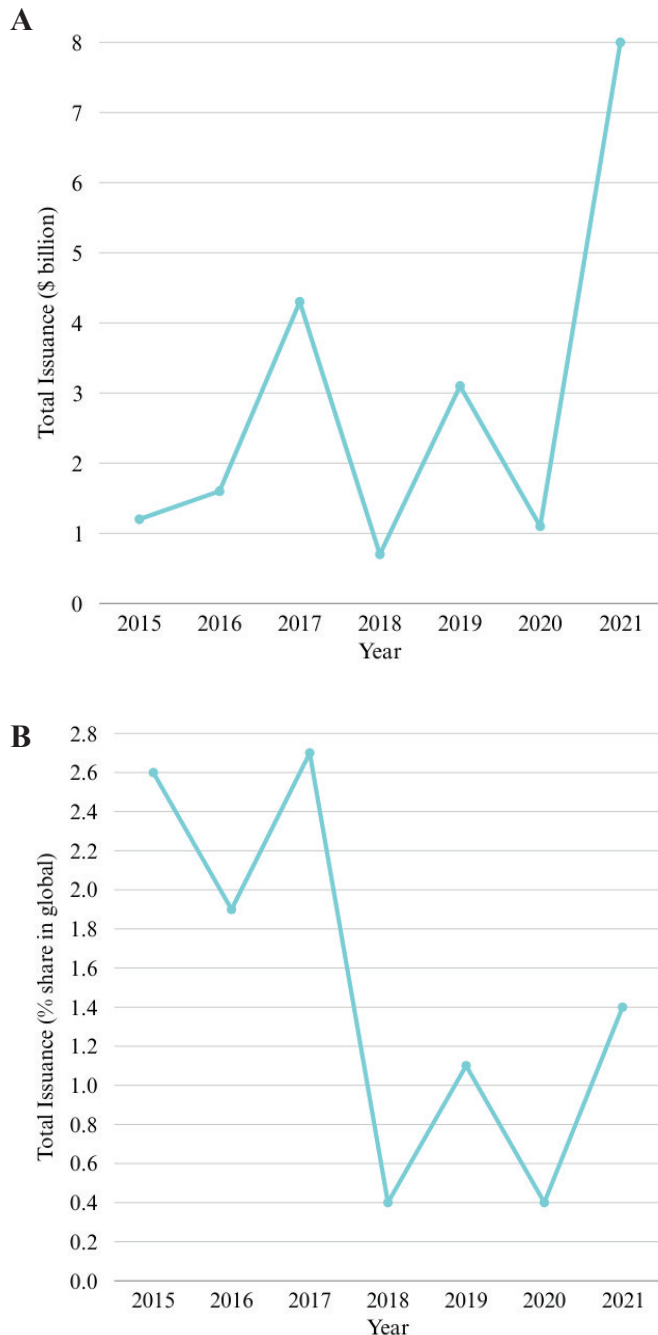


Figure 1. Graph Show Total Issuance of Green Bonds in India from 2015-2021. (A) Total issuance of green bonds in India in \$ billion from 2015-2021 and (b) total issuance of green bonds in India as percentage share in global issuance from 2015-2021.

Globally, green bonds often offer a “greenium”—a premium allowing issuers to borrow at lower rates—of 7–8 basis points. In contrast, Indian SGrBs typically achieve just 2–3 basis points, making them less attractive to return-seeking investors. The lack of concentrated measures to support the development of green bond market in India, lack of sectoral diversification in bond issuance, and lack of methodologies and frameworks for evaluating diverse projects in the Indian context further impedes the growth of green bonds and discourages investment. The lack of accepted taxonomies, especially of the definition of “green,” opens wide inconsistencies in the interpretation of what constitutes a green bond (24). This raises further concerns about greenwashing.

Foreign investors are less interested in Indian green bonds due to changing value of returns as a result of fluctuating exchange rates and illiquidity of the market. As stated by Kumar (2022) and Weber & Sarvade (2019), this situation is worsened due to currency hedging costs associated with debt instruments such as green bonds (25). Additionally, according to Azhgaliyeva et al. (2019), there is a lack of awareness about Indian green bonds among foreign investors. Interested investors are discouraged due to limited investment pipelines, insufficient availability of data, and lack of Indian green bond indices, listings, and ratings. Regressive domestic policies also pose a

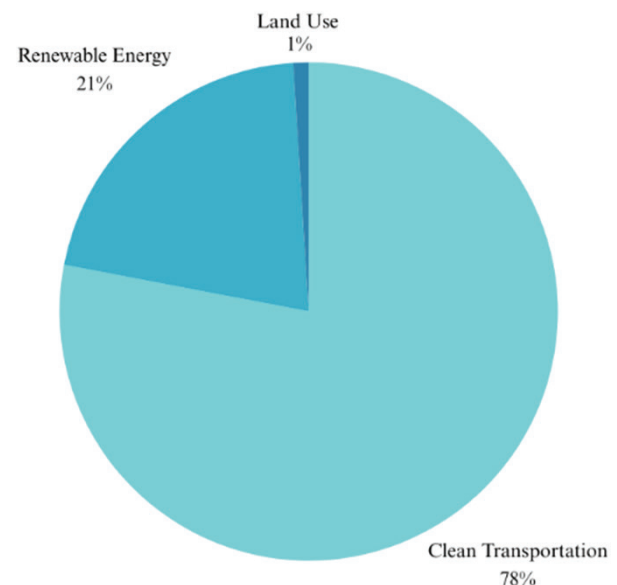


Figure 2. Pie Chart Showing Sector-Wise Use of Proceeds from Sovereign Green Bonds in FY 2022-23.

challenge to the development of green bonds in India. For instance, as stated by Arif et al. (2022), the *Insurance Act* in India does not allow insurance companies to invest in assets that have a credit rating below AA. This, in turn, prevents investment in several green infrastructure and energy projects.

To accelerate the growth of the green bond market in India, key challenges such as lack of robust taxonomy, lack of fiscal incentives, lack of standardization, regulatory barriers, and nature of bond issuance need to be addressed (26).

Inclusion of Green Finance in Priority Sector Lending

The *Framework for Acceptance of Green Deposits*, released by the Reserve Bank of India on 11th of April, 2023 and effective from 1st of June, 2023, aims to promote the issuance of green deposits by regulated entities (REs), address greenwashing concerns, and help augment flow of credit to green projects in order to achieve India's sustainability goals. Additionally, the framework also classifies green projects which facilitate the adoption of renewable energy, improve energy efficiency, promote clean transportation, help in climate change adaptation, manage sustainable water and waste, prevent and control pollution, involve construction of green buildings, manage natural resources, and protect terrestrial and aquatic biodiversity (i.e., the eligible categories as prescribed by the Sovereign Green Bond framework) as part of Priority Sector Lending (PSL) (27).

Further, the Reserve Bank of India has included bank loans up to a limit of ₹30 crore to borrowers for purposes like solar based power generators, biomass-based power generators, wind mills, micro-hydel plants, and for renewable energy based public utilities, viz., street lighting systems and remote village electrification under PSL classification. For individual households, the loan limit is ₹10 lakh per borrower (28).

Tax and State Incentives

The Government of India has undertaken several policy initiatives to promote green building construction. Under the *Income Tax Act*, developers of LEED-certified buildings are eligible to receive up to 100% depreciation on expenses related to building features like solar panels, rainwater harvesting systems, and waste management infrastructure. Through the *Indian Renewable Energy Development Agency (IREDA)*, the Government of India offers low-interest loans for the construction of green-certified projects. The *Ministry of Environment, Forest and Climate Change (MoEFCC)*, Government of India,

offers fast-track environmental clearances for green buildings that are precertified or provisionally certified by IGBC (29,30).

Table 3 summarizes state-wise incentives for IGBC-related projects (30). The data indicates that while northern states have a stronger focus on urban expansion through additional floor area ratio benefits, southern states offer more industry-driven green incentives. An intersection of regulatory enforcement and financial support is observed in the western states, especially for tourism and industry.

RESULTS

The above policy analysis reveals legislative and executive challenges in the existing green policy framework. Spanning regulatory, financial, institutional, and behavioral domains, such barriers limit the country's progress in achieving sustainability agendas and climate resilience in the real estate sector. The results from the policy analysis are summarized in Table 4.

DISCUSSIONS

From the above results, five key areas where improvement is necessary emerge. These include strengthening green finance architecture, broadening the scope of sovereign finance, strengthening governance and implementation, incentivizing green market participation, and building technical capacity and infrastructure. The following discussion provides appropriate policy recommendations to address these challenges for the development of the green real estate sector in India.

Immediate action is required in order to build investor confidence by addressing existing shortfalls in awareness and transparency. To establish measurable thresholds in green policies, address concerns related to greenwashing, and enhance visibility of green loans, it is imperative to develop standardized green taxonomy as well as green bond indices and listings as outlined in Table 4 under SGrBs. Also, a regulated green secondary market should be established to buy and sell green securities, enabling better liquidity and exit opportunities for investors. Efforts to stimulate market demand — including green bond premium or “greenium” returns, low-interest green loans and mortgages, additional floor area benefits, performance-linked green insurance discounts, green lease contracts to co-benefit tenants and owners, sustainability-linked REIT incentives such as tax rebates and fee reductions, and fast-track environmental clearances — should also continue, addressing the weak investor interest and low adoption

Table 3. State-Wise Incentives for IGBC-Related Projects

State/UT	Incentives for IGBC-rated Projects
Punjab	5% additional FAR (Local Govt – Town Planning) 5% (Silver), 7.5% (Gold), 10% (Platinum) additional FAR + 100% scrutiny fee waiver (Housing & Urban Dev.)
Rajasthan	Additional FAR: 0.075 (Silver), 0.10 (Gold), 0.15 (Platinum) (Urban Dev. Dept.) 50% reimbursement (max ₹50L) for green measures (MSME, RIPS 2019)
West Bengal	10% additional FAR for Gold or higher IGBC rating (Kolkata Municipal Corp & NKDA)
Uttar Pradesh	10% additional FAR for Gold or above (Housing & Urban Planning) 5% additional FAR (GNIDA) for Gold or above 50% IGBC fee reimbursement (max ₹10L) for green-rated hotels/wellness resorts (Tourism Policy 2022–2032)
Andhra Pradesh	25% subsidy on fixed capital investment (excluding land, consultancy, etc.) for IGBC-rated industrial buildings (Industries Dept.) 20% reduction in stamp duty if sold within 3 years and certified by IGBC (MA&UD Dept.)
Himachal Pradesh	10% additional FAR for Gold or Platinum IGBC-rated buildings (Town & Country Planning)
Jharkhand	Additional FAR: 3% (Silver), 5% (Gold), 7% (Platinum) for IGBC-rated projects (Urban Development & Housing Dept.)
Haryana	Additional FAR: 9% (Silver), 12% (Gold), 15% (Platinum) (Town & Country Planning Dept.)
Maharashtra	Additional FAR: 3% (Silver), 5% (Gold), 7% (Platinum) for IGBC-rated buildings (UDD, PMC, PMRDA) Mandatory IGBC compliance for new and renovated govt buildings (PWD) Integrated Township projects must have minimum IGBC Silver rating (UDCPR)
Goa	10% additional FAR for IGBC Precertified/Provisionally Certified projects Completion Certificate issued only after IGBC certification (must be renewed every 5 years)
Gujarat	50% IGBC fee reimbursement up to ₹10L for green-rated hotels/resorts (Tourism Policy) 50% consultancy fee reimbursement (max ₹2.5L) for IGBC-rated industrial buildings (Industries Dept.) IGBC fee reimbursement up to ₹3L or 50% (Climate Change Dept.)
Tamil Nadu	25% subsidy on cost of environmental protection infrastructure for IGBC-rated industrial projects (TN Industrial Policy 2021)

Table 4. Key Pitfalls in India's Green Real Estate Policy Framework

Policy/Instrument	Intended Outcome	Key Pitfalls Identified
National Action Plan on Climate Change (NAPCC)	Mainstream climate policy across sectors	Uneven mission strength; vague goals; limited budgets; weak institutions; low local participation; lack of operational clarity
Energy Conservation Building Code (ECBC)	Mandate energy efficiency standards in commercial buildings	Voluntary nature; poor state-level implementation; lack of technical skills and incentives
Eco Niwas Samhita (ENS)	Ensure residential energy efficiency	Low adoption due to lack of awareness; limited enforcement; behaviour-dependent
Sovereign Green Bonds (SGRBs)	Finance green infrastructure projects	Lack of project diversity; low greenium; risk of greenwashing; weak investor interest
Green Finance in PSL and Green Deposit Framework	Increase credit access for green projects	Modest loan limits; limited uptake; early-stage institutional awareness
Tax and State Incentives	Encourage green building through financial rewards	Fragmented and uneven across states; lacks national-level uniformity

noted in Table 4 under SGrBs, ENS, and tax incentives.

To overcome enforcement barriers, co-finance green projects, and transfer knowledge, it is crucial to foster collaboration on two major fronts, namely private-public partnerships and multi-level governance as mentioned in Table 4 under NAPCC and ECBC, which cite weak institutions, vague goals, and poor state-level implementation. This includes policy alignment and coordinated execution across the central, state, and urban local bodies. Additionally, to expand access to green financing instruments, it is crucial for state governments to join forces under the central legislature for the effective implementation of green schemes as outlined in Table 4 under Green Finance in PSL and Green Deposit Frameworks, which note limited uptake and early-stage institutional awareness. This can be achieved through the creation of a national authority on green finance development.

Furthermore, the central government should diversify their use of sovereign green bond proceeds to include green real estate, urban retrofitting, and resilient infrastructure expanding beyond the narrow project diversity identified in Table 4 under SGrBs. This can be achieved through strategic collaboration between financial advisors to the central government, urban planning authorities, and policymakers. Modelled on the environmental, social, and governance principles, the Government of India should also introduce sovereign social bonds to centrally address socioeconomic inequity and sovereign sustainability bonds to align with global initiatives. Green objectives may also be integrated into the *Smart Cities Mission* launched by the Prime Minister in 2015 to promote sustainable cities that drive economic growth and improve standard of living.

Another initiative that may be undertaken by the central government is the national green credit program. Under the green credit program, modelled on carbon credits, corporations can earn tradeable credits for displaying exemplary commitment to green compliance. This includes green certification, spreading awareness about green adoption among employees, and achieving sustainability benchmarks in business practices.

Finally, to build technical capacity at all levels, it is important to educate various stakeholders such as architects, builders, engineers, and local contractors in green design and energy modelling directly addressing the lack of technical skills identified in Table 4 under ECBC and ENS. This can be achieved through the creation of certified training programs and green skill development centres. Through the development of a

national repository of certified green materials and products, green procurement can also be expanded. Additionally, to support design optimization tailored to regional climate and geography, climate-specific green simulation facilities should be enabled mitigating regional gaps and capacity limitations as mentioned in Table 4.

CONCLUSION

This research aimed to evaluate the effectiveness of green real estate financing policies in India. The analysis revealed that financial incentives such as tax rebates, additional floor area ratio benefits, and fee reimbursements have encouraged adoption of green buildings. Yet, limited access to green bonds, low investor confidence, and technical and institutional challenges remain significant barriers. These findings emphasize the need for robust and transparent policy frameworks, awareness and skill-building programs, and targeted financial instruments to scale sustainable building practices. This study was limited by the dependence on secondary data from government and institutional reports, which although credible may not fully indicate real-time market conditions. Additionally, the analysis is limited to national-level investments and does not account for the impact of regional variations on the state-wise construction of green buildings. Future research could address these limitations and explore the effectiveness of regional green real estate financing policies and schemes. Further, the discussion on adoption of green buildings could be examined from the lens of behavioral economics, particularly assessing the role of harnessing consumer psychology to drive green building construction at the local level.

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