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Beyond Certification: The Landscape of Green Building Rating Systems in India

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India's green building rating systems are transforming the construction sector and the Indian skylines by pushing them to higher environmental responsibility. This research paper focuses on their role in the industry, impact, effectiveness and current legal status. The research analyses the quantitative environmental benefits of such green construction in terms of reduced energy and water usage and lower carbon emissions. It also analyses the economic advantages of higher property value, lower operations costs, and the positive impact on human life. However, the research also examines the feasibility challenges in financing the certification for developers, especially for affordable housing. The paper presents a detailed look at the Green Building Code of India, which is embedded in multiple sections of ECBC and the National Building Code. There are also guidelines by IGBC, TERI-GRIHA, and BEE, which require in-depth analysis to understand the complexities within the sector. While there are government initiatives to improve these systems, complying with them is only in the initial stages, which impacts their effectiveness. Hence, the paper analyses the effectiveness of such codes, guidelines and rating systems in solving the issues within the construction industry. The research also analyses various government policies promoting green building practices and suggests legal aspects that can be improved upon. Moving beyond the general rating system, the research also examines the different rating systems that operate within India by highlighting their weaknesses. Finally, the research also recommends how the various rating systems and laws can be modified to keep pace with advancements in the industry and effectively address the sustainability challenges within India. This comprehensive study of green building rating systems aims to show their crucial role in the Indian construction sector for creating a

sustainable industry. The paper helps establish areas for improvement for policymakers, developers, and the Indian construction industry to make better decisions to promote greener skylines in India.

Keywords: *GBRs, construction sector, sustainability, environmental benefits.*

INTRODUCTION

India's green building movement is increasingly being seen as a key trend in the country's construction industry. From cradle to grave, this is a concept that aims to minimise negative environmental impacts while enhancing positive ones. This entails things like optimal use of resources during the erection process and energy efficiency during operation. However, it does not come without challenges. The first barrier is limited funding since most financiers prefer quick returns, whereas green buildings bring long-term advantages. Besides, inadequate information regarding the costs associated with green buildings makes developers and potential customers hold back their support for this idea. Again, there exists a crucial gap in the verification of certified buildings' performance promises. Indeed, there are not enough strong systems through which building owners can be sure that their structures have achieved what they claim concerning energy efficiency. Lastly, including sustainability characteristics in affordable housing schemes poses a special challenge due to higher initial expenses linked with establishing such types of houses

The objective of this research is to look into India's green building sector. The purpose is to analyse these problems and give suggestions that can be put into action. This research will investigate the environmental and economic advantages of green building practices, evaluate the existing Indian green building rating systems, and find out which challenges are stopping its widespread use. Recommendations for going green about low-cost housing projects should not be left out in any case. Additionally, it would enable the country to develop a more sustainable and healthier future for its people by understanding the value of sustainable development and overcoming these obstacles. These benefits include shrinking India's ecological footprint, mitigating climate change, and fostering green jobs, leading to economic growth within the sector.

GREEN BUILDING AS A CONCEPT

In the age of the Anthropocene, it is sufficient to argue that humanity needs to transition away from building based on the optimisation of needs to serve a single purpose of constructing cost-efficient buildings at a fast pace. Branden Allenby and Mikhail Chester argue that such approaches to engineering buildings need to change to become more holistic and sustainable in nature based on the latest scientific approaches to greener buildings¹. According to a 2019 report by the International Energy Agency (IEA), eleven per cent of the world's energy-related carbon emissions are from constructing buildings and the materials used for the construction². India's construction sector alone emits seventeen per cent of the nation's greenhouse gases, as per a 2019 report³. Since the construction sector is one of the four major sectors responsible for carbon emissions, curbing these emissions will play a pivotal role in helping India attain its net-zero carbon emissions by 2070⁴.

According to the US Green Building Council (UNGBC), green building is not simply a form of architecture but rather a concept that first aims at acknowledging and understanding that artificial environments built by humans have profound impacts on the surrounding natural environment along with the people who cohabit these structures. Green building aims to increase the positive impacts on the entire life cycle of a building while also negating all of the damages that its construction and maintenance might cause. It has also been described as an ever-evolving, dynamic term that shows the human practices of integrating environmental sustainability in the construction of buildings⁵.

¹ Braden R. Allenby and Mikhail Chester, 'Reconceptualizing Infrastructure in the Anthropocene' (2018) 34(3) *Issues in Science and Technology* <<https://issues.org/reconceptualizing-infrastructure-in-the-anthropocene/>> accessed 08 June 2024

² UN Environment Programme, *Global Status Report for Buildings and Construction* (2019)

³ Niyati Gupta and Steffi Olickal, 'India's Shift to Low-carbon Construction Must Not Leave Workers Behind' (*World Resources Institute*, 02 January 2024) <<https://www.wri.org/insights/india-just-transition-low-carbon-construction>> accessed 08 June 2024

⁴ Shilpa Elizabeth, 'Decarbonisation of building and construction sector imperative to achieve India's net. zero target.' *The Hindu* (14 September 2023) <<https://www.thehindu.com/news/cities/bangalore/decarbonisation-of-building-and-construction-sector-imperative-to-achieve-indias-net.-zero-target./article67302971.ece>> accessed 08 June 2024

⁵ Arijit Sinha et. al., 'Sustainable development and green buildings' (2013) 64(1) *Drvna Industrija* <<http://dx.doi.org/10.5552/drind.2013.1205>> accessed 08 June 2024

While government recognition for green buildings and rating systems might have been a recent development, the concept itself is not new in the Indian scenario. Ancient Indian buildings have demonstrated ways of passively cooling the interiors using water and winds as architectural elements⁶. However, as a product of colonialism, contemporary Indian architecture decided to opt for steel and cement instead as they gave a perception of modernity⁷. The shift is now gradually back to the original methods but now requires a deeper understanding of the concept because buildings are being used for various scenarios, unlike in the past. This shift also requires certification standards because buildings are becoming skyscrapers that have to adhere to certain industry guidelines, and architects have to ensure that best practices are being used in construction. It is imperative to ensure that architects follow proper legal standards and motivations, as India has yet to create infrastructure for 25 million residents in cities alone by 2030⁸.

THE RISE OF GREEN BUILDING IN INDIA

According to a 2023 joint report⁹ by the Confederation of Indian Industry (CII) and the CBRE Group, forty-six per cent of all new developments in the first half of 2023 were certified green and global and domestic industries prefer sustainable office spaces over traditional buildings. Along with it, India has doubled its amount of green-certified stock in the last seven years, pushing the demand for green buildings higher. According to a 2019 report by the International Finance Corporation (IFC), the green building sector will create an investment opportunity of almost \$25 trillion in emerging markets like India, which will also result in higher investment and faster sustainable development¹⁰. According to Mintel, Indian consumers have increased engagement in sustainability practices within a short period due to concerns about the

⁶ Krishna Kumar Saini et. al., 'Historical Perspective and Concept of Green Building in India - A Review' (2017) 4(11) Journal of Emerging Technologies and Innovative Research

<<https://www.jet.ir.org/papers/JET.IR1711126.pdf>> accessed 08 June 2024

⁷ A G Krishna Menon, 'The Invention of the Modern Indian Architect' (*ARCHPlus.net*)

<<https://archplus.net/de/news/3905-the-invention-of-the-modern-indian-architect/>> accessed 08 June 2024

⁸ Argenio Antao et. al., 'Fundamentals: Construction Industry Must Change' (*Colliers International*, 15 December 2022) <<https://www.colliers.com/en-in/news/press-release-construction-costs-update>> accessed 08 June 2024

⁹ CBRE Research, *India Mid-Year Market Outlook 2023: Decoding The Growth Prospects* (2023)

¹⁰ International Finance Corporation, *Green Buildings A Finance And Policy Blueprint For Emerging Markets* (2020)

environment¹¹. All of the above factors contribute to a growing trend of adopting green building in India by consumers and builders alike.

GREEN BUILDING RATING SYSTEMS

To keep up with this demand and to bolster the efforts of green building, national and international standards have been set up by construction authorities, international organisations, and even governments¹². These are termed as Green Building Rating System (GBRS). GBRSs are market-driven standards that assess buildings based on various aspects and encourage the adoption of such standards¹³. They help guide construction projects throughout their life cycles, all from designing to constructing. Most GBRSs follow the same principles when evaluating projects like water management, energy conservation, materials used, and the site at which the constructions take place. These principles help form frameworks that set definite thresholds for performance, which also need to be met for a project to be certified by the GBRS. Such frameworks can guide construction projects to even exceed the minimum thresholds and inform the people of the performance of the buildings.

Green Rating for Integrated Habitat Assessment (GRIHA): GRIHA is India's national rating system, which is controlled by the GHRIA Council. It was adopted by India's Ministry of New and Renewable Energy (MNRE) as the National Rating System of India (NRS) in 2007. GRIHA was first conceived by Teri and then developed further on by MNNRE. The NRS follows a building through the three states to evaluate them: the pre-construction stage, planning and construction stage, and operation and maintenance stage. It rates buildings up to five stars based on thirty-four criteria like preservation of the landscape, enhancing energy efficiency, and reduction of air pollution¹⁴.

¹¹ 'Growing Number of Indians Want to Contribute to Environmental Sustainability Report' *Economic Times* (18 August 2022) <<https://travel.economictimes.indiatimes.com/news/research-and-statistics/research/growing-number-of-indians-want-to-contribute-to-environmental-sustainability-report/93630404>> accessed 08 June 2024

¹² Ming Shan and Bon-gang Hwang, 'Green building rating systems: Global reviews of practices and research efforts' (2018) 39(8) *Sustainable cities and society* <<https://doi.org/10.1016/j.scs.2018.02.034>> accessed 08 June 2024

¹³ Lia Marchi et. al., 'Green Building Rating Systems (GBRSs)' (2021) 1(4) *Encyclopedia* <<https://www.mdpi.com/2673-8392/1/4/76>> accessed 08 June 2024

¹⁴ Ministry of New and Renewable Energy, *GRIHA Manual GRIHA (Green Rating for Integrated Habitat Assessment) Introduction to National Rating System – GRIHA* (GRIHA India, 29 September 2010)

Green New Buildings Rating System: This system has been set up by the Indian Green Building Council (IGBC) as a voluntary and consensus-based programme. IGBC is a part of the Confederation of Indian Industry (CII) and collaborates with governmental authorities at the central and state levels. IIGBC sets the standards according to the National Building Code and the Ministry of Environment, Forest and Climate Change (MoEFCC).

Indian Bureau of Energy Efficiency (BEE): BEE has developed an Energy Conservation Building Code (ECBC), which mandates minimum energy efficiency standards for buildings that have a footprint larger than one thousand square meters. BEE also rates commercial buildings on a scale of five stars¹⁵. The rating is solely based on the actual energy usage performance of the buildings¹⁶.

WHY NOT BLUE BUILDINGS?

Ever since there has been a rise in global trade and an influence by the Western nations to create large international corporations, the trend has been to achieve such international stature in all facets of business. This has been transformed into architects relinquishing building styles that have been developed over centuries to suit local climates. Beginning in the 1920s and gaining popularity in the 1970s, the International Style of architecture advocates for the use of glass and concrete to construct buildings¹⁷. However, as described by Shomos Uddin, these tall glass structures are an 'environmental nightmare'¹⁸. This is because blue buildings and other new architectural styles that lay off the vernacular architecture are the culprits for the spike in energy usage. Since the year 2000, the energy needed to cool our buildings has doubled because the glass skyscrapers overheat from their design and need more air conditioning to remain cool¹⁹. Blue buildings also need to replace their glass every thirty to forty years, which creates large amounts of waste and contributes to higher carbon emissions. The glass used for these buildings

¹⁵ Patricia Alphonso, 'What are the Green Building Rating Systems in India?' (*Bitrax Media*, 23 August 2019) <<https://media.bitrax.com/what-are-the-green-building-rating-systems-in-india/>> accessed 08 June 2024

¹⁶ Scheme For Bee Star Rating for Office Buildings 2009

¹⁷ Tori Campbell, 'Concrete & Glass: Buildings that Defined the International Style' (*Artland Magazine*) <<https://magazine.artland.com/concret.e-glass-buildings-that-defined-the-international-style/>> accessed 8 June 2024

¹⁸ Sophia E, 'Everyone needs to stop building giant glass skyscrapers right now' (*WIRED*, 11 November 2019) <<https://www.wired.com/story/stop-building-glass-skyscrapers/>> accessed 08 June 2024

¹⁹ IEA, *Tracking Clean Energy Progress* (2023)

is paneled together with plastic which also makes it impossible to recycle the materials. According to Philip Francis Oldfield, these building styles are part of the ‘Third Energy Generation’, which marks a rise in these international style buildings that are like sealed boxes requiring more mechanical conditioning and artificial lighting to maintain daily operations²⁰. Blue buildings have gone global and reached countries like India and Egypt, which have fared much worse due to their climate. There are also economic disadvantages because glass is more expensive when compared to other building materials. There is a threat to individuals since glass has safety concerns, like being fire-prone, since no authority in India, like the BEE, standardizes the glass quality of blue buildings²¹.

Green buildings provide a range of benefits that solve most of the issues blue buildings face. The tangible benefits fall under two major categories:

Environmental and Social Benefits: Green building significantly reduces the energy consumption of buildings as they make use of designs that rely on daylighting and passive ventilation²². They also integrate technological solutions like sensor motion energy-efficient lighting for buildings. Green building emphasises energy generation as well with the use of renewable sources like solar and wind energy²³. According to the USGBC, LEED buildings require twenty-five per cent less energy than their conventional counterparts. Green buildings save over thirty-seven per cent of water compared to baseline waste usage²⁴. These advantages have spillover effects, like reduced pressure on local energy grids. It also reduces the reliance on fossil fuels as the energy consumed is lower, and green building even helps generate energy in multiple instances. According to the UGBC, green building also reduces the amount of waste generated during construction which typically gets discarded in landfills. The reduced reliance

²⁰ Philip Oldfield et. al., ‘Five energy generations of tall buildings: an historical analysis of energy consumption in high-rise buildings’ (2009) 14(5) *The Journal of Architecture* <<http://dx.doi.org/10.1080/13602360903119405>> accessed 08 June 2024

²¹ Disha Singh, ‘Reflection on Glass’ (*Down-to-earth*, 15 December 2012)

<<https://www.downtoearth.org.in/environment/reflections-on-glass-39703>> accessed 08 June 2024

²² Jithin JK, ‘The Future is Here: Environmental Benefits of Green Buildings’ (*KNOWESG*, 19 March 2023)

<<https://www.knowesg.com/featured-article/the-future-is-here-environmental-benefits-of-green-buildings>> accessed 08 June 2024

²³ Giovanni Valle, ‘8 Ways that Green Buildings Save Energy’ (*BuilderSpace*, 19 June 2022)

<<https://www.builderspace.com/8-ways-that-green-buildings-save-energy>> accessed 08 June 2024

²⁴ Cheng-Li Cheng et. al., ‘Evaluation of Water Efficiency in Green Building in Taiwan’ (2016) 8(6) *Water*

<<https://doi.org/10.3390/w8060236>> accessed 08 June 2024

on fossil fuels helps improve air quality, and the higher inflow of natural air also helps improve indoor air quality²⁵. Green building also means sustainable usage of land, which improves biodiversity and protects the natural environment²⁶. A conventional building that was converted to a green building in Kuwait witnessed water savings of forty-six per cent, eighty-six per cent lower light consumption, and a reduction in greenhouse gases of over sixty-five thousand kilograms per year²⁷. Reduced carbon emissions improve air and water quality for humans, which creates a more comfortable and liveable environment.

Economic Benefits: Buildings and tenants benefit from lower operational and maintenance costs along with increased productivity of the workers. They increase occupancy and rental rates due to a higher demand by consumers, which also increases property value and drives down insurance costs²⁸. According to a report, commercial green buildings increase the building value by more than seven per cent and increase the return on investment by over six per cent. According to a report by the ILO, green building requires specialised workers, for which the construction workforce especially has to be up skilled leading them to have opportunities to earn a higher wage. According to Cushman and Wakefield, green buildings in the US with certification have a higher resale value and are considerably more profitable than their traditional counterparts²⁹. According to a 2018 study, every dollar used to improve green infrastructure and mitigation activities saves six dollars in response and recovery costs³⁰. Certification authorities often work closely with state and central governments to provide

²⁵ Rahul Aeron, 'Green buildings for better air quality & lean power bills' *The Pioneer* (04 January 2024) <<https://www.dailypioneer.com/2024/columnists/green-buildings-for-better-air-quality--lean-power-bills.html>> accessed 08 June 2024

²⁶ Henry Akexandre et. al., 'Comparing green structures using life cycle assessment: a potential risk for urban biodiversity homogenization?' (2012) 17(8) *International Journal of Life Cycle* <<http://dx.doi.org/10.1007/s11367-012-0462-3>> accessed 08 June 2024

²⁷ A.D. Alsulaili and others, 'Environmental and economic benefits of applying green building concepts in Kuwait' (2019) 22(4) *Environment, Development and Sustainability* <<https://doi.org/10.1007/s10668-019-00352-1>> accessed 08 June 2024

²⁸ Jennifer Senick et. al., 'The Financial Benefits of Green Building' (*Greenbaum Rowe, Smith & Davis LLP*, 03 May 2011) <https://www.greenbaumlaw.com/media/publication/10_Financial.pdf> accessed 08 June 2024

²⁹ 'Green Is Good: Sustainable Office Outperforms in Class A Urban Markets' (*Cushman and Wakefield*, 08 August 2021) <<https://cwrealkapital.no/wp-content/uploads/sites/2/2017/07/Green-is-Good-Part-1.pdf>> accessed 08 June 2024

³⁰ Laura Lightbody and Matthew Fuchs, 'Every \$1 Invested in Disaster Mitigation Saves \$6' (*Pew Trusts*, 11 January 2018) <[https://www.pewtrusts.org/en/research-and-analysis/articles/2018/01/11/every-\\$1-invested-in-disaster-mitigation-saves-\\$6](https://www.pewtrusts.org/en/research-and-analysis/articles/2018/01/11/every-$1-invested-in-disaster-mitigation-saves-$6)> accessed 08 June 2024

government incentives to green-rated projects. MoEFCC of the Indian government allows a fast-track environmental clearance for construction projects that have a provisional IGBC certification. The State of Uttar Pradesh provides fifty per cent reimbursement on the IGBC certification fee to hotels that obtain an IGBC certification. The State of Kerala has allowed a fifty per cent tax reduction for one-time building tax and a twenty per cent reduction in property tax. Countries like Romania are even experimenting with green mortgages to improve homeownership of green building houses.

CHALLENGES

As investors primarily focus on short-term payback and benefits, it can become difficult to obtain private financing for green projects as they emphasise a long-term payback time for the project³¹. According to a report by the International Finance Corporation, there is an investment opportunity of over \$24 trillion in emerging countries by 2030 but only \$400 billion was spent on green building in 2017. These financial incentives are important from the early stages of green building, without which people often do not shift to green building³². Another financial hindrance to green building is the competition for green or renewable sources of energy. The Indian government heavily (and increasingly each year) subsidises the cost of coal³³ more than renewable energy which artificially lowers the price of energy using coal. While new efficient buildings are being constructed in India, the share has not gone over even ten per cent³⁴ as the country still operates majorly from old buildings which are hard to renovate and lack the will or financing to do so. The problem is exacerbated for affordable housing due to the high upfront

³¹ Sanghyo Lee et. al., 'A Financing Model to Solve Financial Barriers for Implementing Green Building Projects' (2013) *The Scientific World Journal* <<https://doi.org/10.1155/2013/240394>> accessed 08 June 2024

³² Francis Lanme Guribie et. al., 'Demand for green building in Ghana: a conceptual modeling and empirical study of the impediments' (2022) 22 *Construction Innovation* <<https://ouci.dntb.gov.ua/en/works/9JvPwAA9/>> accessed 08 June 2024

³³ 'India's Energy Subsidies High; Fossil Fuel Subsidies More Than Renewables: Report' *The Wire* (14 March 2024) <<https://thewire.in/energy/indias-energy-subsidies-high-fossil-fuel-subsidies-more-than-renewables>> accessed 08 June 2024

³⁴ Manish Goel, 'The Market. Share Of Green Buildings In India Is Steadily Increasing' *Construction Times* (12 January 2024) <<https://constructiontimes.co.in/the-market-share-of-green-buildings-in-india-is-steadily-increasing#>> accessed 08 June 2024

cost and ability for homeowners to pay more for green buildings³⁵. While there are multiple challenges to face in the green building movement, governments have started to take initiatives for greater change. To overcome the financial barriers, India has various schemes like the SUNREF program which is developed and supported by the French Development Authority. It aims to provide not just funding assistance but also technological assistance to all public and private projects. India's schemes like UJALA have been able to achieve greener buildings with even non-subsidised distribution programs of LED lights. According to Avneesh Sood, the other big challenge for green building in India is the lack of awareness and education, along with misinformation about the costs of green building. According to a survey of over two thousand buildings in Bengaluru, eighty per cent of respondents raised concerns about the lack of awareness and unavailability of information as a key reason. This knowledge gap exists even in civil engineers and contractors who make decisions about major structural designs³⁶. The Ministry of Housing and Urban Affairs has also stressed the promotion of green building and the construction costs associated with it³⁷.

LEGAL STATUS

More builders and buyers are becoming receptive towards green buildings with the motivation to create a safe environment. The final challenge faced by the green building movement is the lack of motivation or incentives for all developers to start building with the environment in mind. There are multiple institutional frameworks set up by the Indian government to tackle these issues. The Government of India has developed new policies and aimed to revise multiple existing policies to instil the idea of green building within them. The following are the key pieces of legislature in India:

³⁵ Kathy MC, "Green, Affordable" Housing: A Contradiction in Terms? (*Federal Reserve Bank of St. Louis*, 20 June 2008) <<https://www.stlouisfed.org/publications/bridges/summer-2008/green-affordable-housing-a-contradiction-in-terms>> accessed 08 June 2024

³⁶ Chiranjeevi Kulkarni, 'Green Building progress hindered by knowledge gaps, says study' *Deccan Herald* (25 September 2023) <<https://www.deccanherald.com/india/karnataka/green-building-progress-hindered-by-knowledge-gaps-says-study-2699288>> accessed 08 June 2024

³⁷ 'Need to promote construction of green buildings in India: Government' *Economic Times* (25 June 2021) <<https://realty.economictimes.indiatimes.com/news/industry/need-to-promote-construction-of-green-buildings-in-india-government/83831078>> accessed 08 June 2024

National Action Plan on Climate Change:³⁸ The plan was initiated in 2008 to help identify key mechanisms to address climate change. Two of the eight national missions are the 'National Mission on Sustainable Habitat' and 'National Mission on Enhanced Energy Efficiency'. These helps increase awareness about and create sustainable city infrastructure like buildings.

Energy Conservation Act (2001):³⁹ This act provides a framework for more efficient energy use with institutional arrangements and regulatory mechanisms. One of the five goals is to achieve efficient energy usage based on its 'Energy Conservation Building Codes⁴⁰'. It was under this act that the Bureau of Energy Efficiency (BEE) was established by the Ministry of Power.

National Building Code (2016):⁴¹ NBC is the main authority that regulates the construction sector in India, and it is operated by the Bureau of Indian Standards (BIS) and the Ministry of Consumer Affairs. In the revised code, provisions have been made to ensure buildings are more energy-efficient and sustainable as per the code.

Energy Conservation Building Code (2017): The ECBC provides a comprehensive framework to meet minimum standards of energy efficiency for newly constructed buildings. Twenty-two Indian states have mandated ECBC in India to hold construction projects mandatorily accountable for their energy usage. However, it is only a voluntary requirement for existing buildings, and all buildings are rated on a five-star scale.

Eco Niwas Samhita:⁴² It is developed by BEE and the Ministry of Power. The code applies to all residential buildings built over certain criteria. Part one of the code requires proper ventilation of buildings in all climate regions. Part two requires minimum standards of efficiency in the energy structures of the building.

Most of the legislature relies upon rating buildings on a scale like the green buildings rating system, which has also been used as a national tool. However, these systems have their own

³⁸ Anjali Marar, 'Why India is launching a national framework for climate services' *Indian Express* (8 October 2023) <<https://indianexpress.com/article/explained/explained-climate/national-framework-for-climate-services-nfcs-8972568/>> accessed 08 June 2024

³⁹ The Energy Conservation Act 2001

⁴⁰ Energy Conservation Building Code (ECBC) 2017

⁴¹ National Building Code of India 2016

⁴² Eco-Niwas Samhita 2018

issues. It is necessary to address these because policies by the government to promote green buildings depend on these scales, which is why one needs to evaluate the performance-based usage of the tool. India lacks effective mechanisms to ensure that green buildings perform according to their claims before the building's operational periods. There are no legal checks on whether the buildings perform according to their promised goals of energy efficiency⁴³.

LEARNING FROM THE GLOBAL EXPERIENCE

According to a report by Mireya Navarro, GBRS-rated buildings have not achieved their promised energy claims and underperform according to their design specifications. Even the USGBC acknowledges that more than half of LEED-rating buildings do not qualify for the star label, and most buildings do not keep their energy consumption in check after they become operational⁴⁴. LEED is a strict enforcer of their ratings and even has third verification, unlike India yet fails to keep its approved projects in check. It is legitimate to question the efficacy and true sustainability of certified projects in India as they have tax-cut incentives to claim certification without following the due requirements. Most ratings rely on energy models and energy simulations, which only make predictions and do not measure usage. These energy simulations seem to be overwhelmingly inaccurate in their predictions, and the results vary significantly depending on building operations⁴⁵. Developers have an active incentive to promise highly efficient operations during documentation for additional FAR.

⁴³ Anumita Roychowdhury et. al., 'Green-Building Rating: Overrated' (*Sustainable Building Program Team*, 11 April 2012) <https://cdn.cseindia.org/userfiles/green_building_rating.pdf> accessed 8 June 2024

⁴⁴ Mireya Navarro, 'Some Buildings Not Living Up To Green Label' *The New York Times* (30 August 2009) <<https://www.nytimes.com/2009/08/31/science/earth/31leed.html>> accessed 8 June 2024

⁴⁵ Jiaqi Yu et. al., 'Building Energy Prediction Models and Related Uncertainties: A Review' (2022) 12(8) *Buildings* <<https://doi.org/10.3390/buildings12081284>> accessed 08 June 2024

INDIA'S FUTURE CONSIDERATIONS AND RECOMMENDATIONS

India needs to shift its focus beyond ensuring features for green buildings at the time of design to ensure the operation of the buildings in the specified manner. Institutions and key frameworks need to be set up to verify if the construction project has achieved its expected performance. A shift towards accountability will ensure more transparent systems and better tools that can adjust to the inaccuracies of energy simulation programs. The same has been the case with LEED certification in the US, which now requires all finished projects to provide water and energy bills for the first five years. If a building fails to do the same or achieve the minimum standards, the certification from LEED can be withdrawn. The LEED council has declared that its priority is to improve the performance of the buildings and reduce carbon emissions.

It might be imperative for India to reconsider its policy on gifting additional FAR as it is irreversible if a project is completed and even hard to annul if not completed. India can offer other incentives that operate based on continuous performance, such as a reduction in water or electricity bills. India can also increase the number of green buildings by raising awareness to highlight the benefits and eradicate misconceptions among builders and buyers. It can also do this by making compliance standards higher and mandatory, along with agencies and regulatory mechanisms to keep them in check.

To improve the availability of affordable housing with green building, an emphasis on government aid is needed. The government can offer lower-interest loans in collaboration with banks for buyers of green building construction. Ministries can form policies to standardise designs and specifications of the material required for greater and easier availability of products. They can also encourage better pricing for developers to purchase such materials in bulk. We also need to increase the capacity of workers by providing proper training and creating programs to upskill them. Currently, India lacks a skilled labour force that can ensure demand is kept up with the expanding market. If there is a sufficient workforce, it can be utilised to build affordable housing as well, instead of just high-rise construction.

The country can create public-private partnerships to encourage the development of such projects and ensure the adoptability of such architectural designs. India should also aim to

modify its existing rating systems to focus on the easy achievement of goals for green buildings. It should also lay a higher emphasis on the sharing of knowledge and technology in the industry. A higher emphasis on long-term policy and stability of construction projects can increase India's skylines with new green buildings.

CONCLUSION

India's green building movement can change the country's construction sector and its environmental footprint. Although it has many benefits, including reduced energy and water use, lower carbon emissions, and better occupant health and property value, there are some stumbling blocks to its widespread adoption. Green building rating systems such as GRIHA, IGBC and ECBC have been instrumental in creating awareness and setting benchmarks. However, the efficiency of these systems can be improved by having strong verification mechanisms that would ensure that buildings meet their intended performance during operation. It is important to shift from only focusing on green features during design but also actively monitoring a building's actual performance after construction. Moreover, incentive structures should be revised. Changing from irreversible incentives like additional FAR to performance-based rewards such as reduced utility bills would create a way of rewarding genuine green practices.

For India to speed up its green building journey, an all-encompassing approach is necessary. The government's enhanced support using financial aid, greening affordable housing projects and standardising green building materials is a must. This will be accompanied by extensive awareness campaigns aimed at dispelling misconceptions about the cost-effectiveness in the long run of going green among builders, potential buyers and the general public. Furthermore, it is crucial to have a skilled labour force that can effectively implement these practices. While public-private partnerships can facilitate knowledge and technology sharing for this purpose, it is paramount that the government maintain a long-term policy focus on the sector, which guarantees stability and predictability.

India can boost its green building footprint significantly by addressing these challenges and implementing these recommendations. Consequently, this will not only lead to a more

sustainable future environment but also enable new economic opportunities, better health, and better well-being for her people. It will also establish India as a global leader in terms of the green building movement.