

GreenBuild: Scaling India's Sustainability Potential

Glossary of Terms

LEED	Leadership in Energy and Environmental Design
CASBEE	Comprehensive Assessment System for Built Environment Efficiency
G-SEED	Green-Standard for Energy and Environmental Design
GRIHA	Green Rating for Integrated Habitat Assessment
BEE	Bureau of Energy Efficiency
BREEAM	Building Research Establishment Environmental Assessment Method
USGBC	United States Green Building Council
CII	Confederation of Indian Industry
IGBC	Indian Green Building Council
TERI	The Energy Research Institute
IWBI	International WELL Building Institute
BPE	Building Performance Evaluation
EPI	Energy Performance Index
OM	Operation and Maintenance
GDP	Gross Domestic Product
SEBI	Securities and Exchange Board of India

Aim

The aim of this scalability report is to provide an overview of Green Building rating systems, which later focuses on Indian context followed by its various developmental phases along with the benefits of Green Building, barriers for its implementation and recommendations to overcome these barriers to a degree, which, in turn, lays the foundation for burgeoning future expansion needs.

Objectives

- 1) Review the Green Building rating systems.
- 2) Examine Green Building Movement in Indian context.
- 3) Analysed benefits of and barrier to Green Building and make recommendations.

Scope

The scalability report heavily focused on LEED rating system only along with a brief introduction of WELL practice in India's rapidly growing sustainable market. While other rating systems are equally important, play pivotal role in sustainable built environment and requires attention; explain them in detail is beyond the scope of this document, however.

Introduction

India is one of the second fastest growing economies in the world having construction industry as the second largest contributor after agriculture; India's construction market will takeover Japan's construction industry by 2030 on a global scale and subsequently, will become a "new engine of global construction". This high-speed change, however, comes at a great environmental cost. Buildings in India account for up to 41% of the total final energy consumption and with a continuous rapid growth in urbanisation, the figures are likely to increase. Currently being the third largest economy of the world, the energy consumption has already doubled since the year 2000 [1]. Consequently, sustainable development and green buildings have become the need of the hour for India.

The need to address this growing concern has rapidly taken up by many countries, many of which have adopted to various techniques of green certification and rating system. For example, Japan with Comprehensive Assessment System for Built Environment Efficiency (CASBEE), Australia with Green Star, Korea with Green - Standard for Energy and Environmental Design (G-SEED), India with Green Rating for Integrated Habitat Assessment (GRIHA) and Bureau of Energy Efficiency (BEE), et cetera. Although, not all of them are standardised and vary quite differently over numerous projects depending upon the scope of the certification. There are about 150 certification systems and methodologies used for assessment and benchmarking to date by which these system impact design [2].

Green Building Movement

The Green Building movement and the first ever environmental classification system was introduced in the United Kingdom (UK) known as Building Research Establishment Environmental Assessment Method (BREEAM). According to some authors, Leadership in Energy and Environmental Design (LEED) was inspired by BREEAM system. It was created by United States Green Building Council (USGBC) to promote green movement and to provide holistic benchmarking system having set of standards for both residential and commercial projects. It has now partners in more than 167 countries and valued trillion dollar industry worldwide.

In India, this movement gained momentum after the formation of Confederation of Indian Industry (CII), which later formed Indian Green Building Council (IGBC). Apart from LEED, there are various green rating systems that the buildings adapt to in order to prove proficiency in the sustainable building category. However, not all of them mandate the type to complete building performance evaluation (BPE). A brief description of different green rating systems in India are as follows;

LEED India:

The LEED India has been developed by IGBC in 2006. It is a voluntary, consensus-based, market-driven rating system and has six key areas, namely 1) sustainable site, 2) water efficiency, 3) energy and atmosphere, 4) materials and resources, 5) indoor environmental quality, 6) innovation in design and 7) regional priority with each constitutes 23.63%, 9.1%, 31.82%, 12.73%, 13.63%, 5.45% and 3.64%, respectively [3]. It awards certification along four different levels: Certified (40-49 points), Silver (50-59 points), Gold (60-79 points) or Platinum (80+ points) for new construction, existing buildings, commercial interiors, core and shell, neighbourhood development and homes projects. However as per 2018, LEED conducts certifications solely under USGBC and IGBC functions separately.

IGBC:

The IGBC is a part of CII and was formed in the year 2001. The service by IGBC includes development of new green building rating programs, certification services, training programmes, et cetera. IGBC awards ratings to new buildings, existing buildings, residential societies, healthcare, SEZ, landscape and new and existing mass rapid transit system [4].

GRIHA:

GRIHA is developed by The Energy Research Institute (TERI). It is the national rating system of India for any completed construction. The assessment tool measure BPE in terms of energy consumption, waste generation, renewable energy, et cetera. GRIHA has stressed upon maximising conservation of resources as well as enhancing efficiency of the system and operation. It works on a star rating system from 1 star to 5 star for the most efficient project [5]. Further, it requires two-step verification process, where the information provided for rating is evaluated via live monitoring before awarding the final rating to the building [3].

BEE:

BEE developed its own rating system for the buildings based on a 1 to 5 star scale, where more stars equate to more energy efficiency. BEE has developed the Energy Performance Index (EPI); the unit of kilo watt hours per square meter per year is considered for rating the building with more emphasis on air conditioned and non-air conditioned office buildings.

Green Building Market Activity

The urbanisation in India comes with rising waste and greenhouse gas emissions due to energy and water consumption. As a consequence, it is essential to provide green and healthier built environment by embracing to green practices. USGBC recently announced top ten countries for LEED market outside the US, where India ranked third right after China and Canada holding the first and second position, respectively. India has reported unprecedented growth since the LEED India charter. **Figure 1** represents the growth of the number of LEED projects registered and certified between 2005 and 2019's as of this moment. It is evident that the LEED registered projects have remarkably increased by more than 107x and projects certified by more than 136x since the year 2005. Furthermore, one study suggests that the market expects to grow 55% by 2021 as shown in **figure 2**. Moreover, it can be seen in **figure 3** that the number of LEED Gold has outnumbered other levels by more than half followed closely by LEED Platinum. In addition, the report shows that the LEED industry is dominated by corporate sectors mostly in development of commercial projects like office space. In brief, present state of LEED in India has 2,832 projects in total having covered 132,868,440 GSM area.

Similarly, IGBC works independently of USGBC and help organisation to get certified for green buildings. As shown in **figure 4**, IGBC has strong influence in seven selected states, namely 1) Maharashtra, 2) Uttar Pradesh, 3) Karnataka, 4) Tamil Nadu, 5) West Bengal, 6) Telangana and lastly 7) Gujarat with 1333, 441, 407, 402, 305, 304 and 280 projects each, respectively [4].

Figure 1 LEED Achievement 2005-2019 (Source: USGBC, 2019)

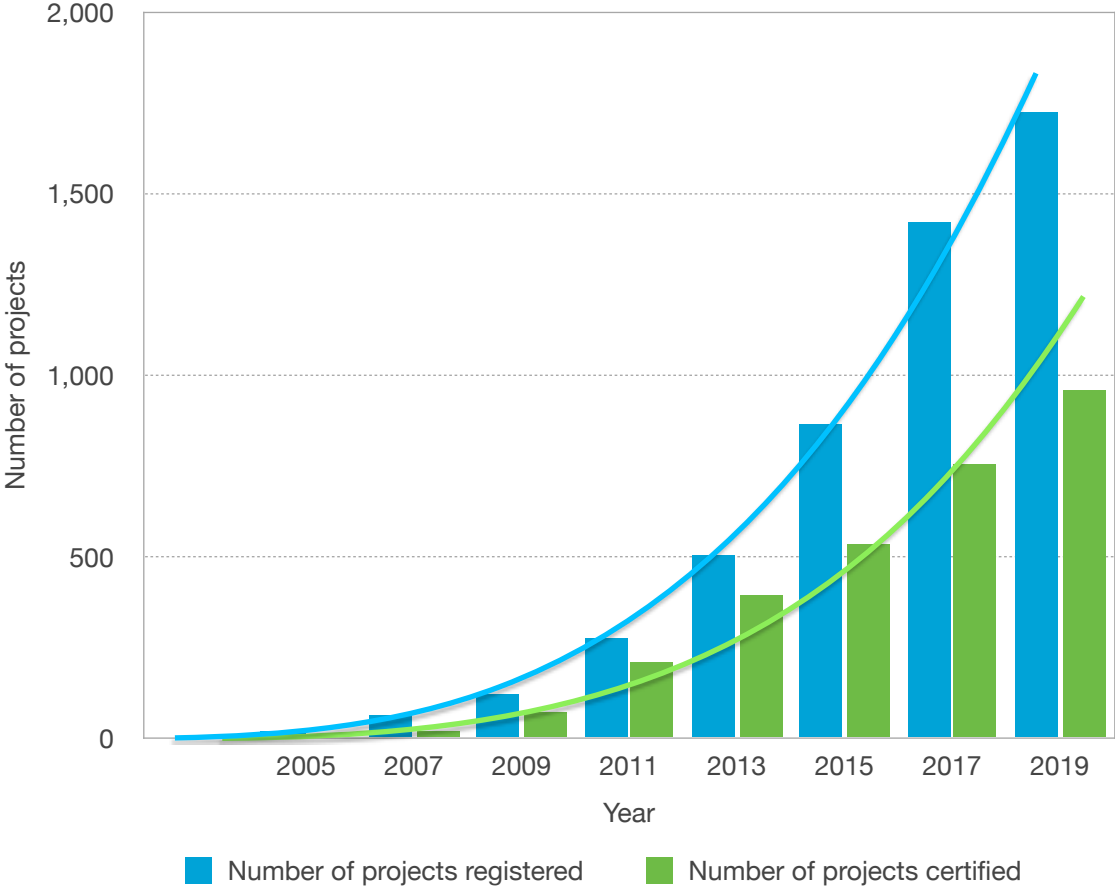


Figure 2 Expected Growth in Green Building Market (Source: Dodge Data & Analytics, 2018)

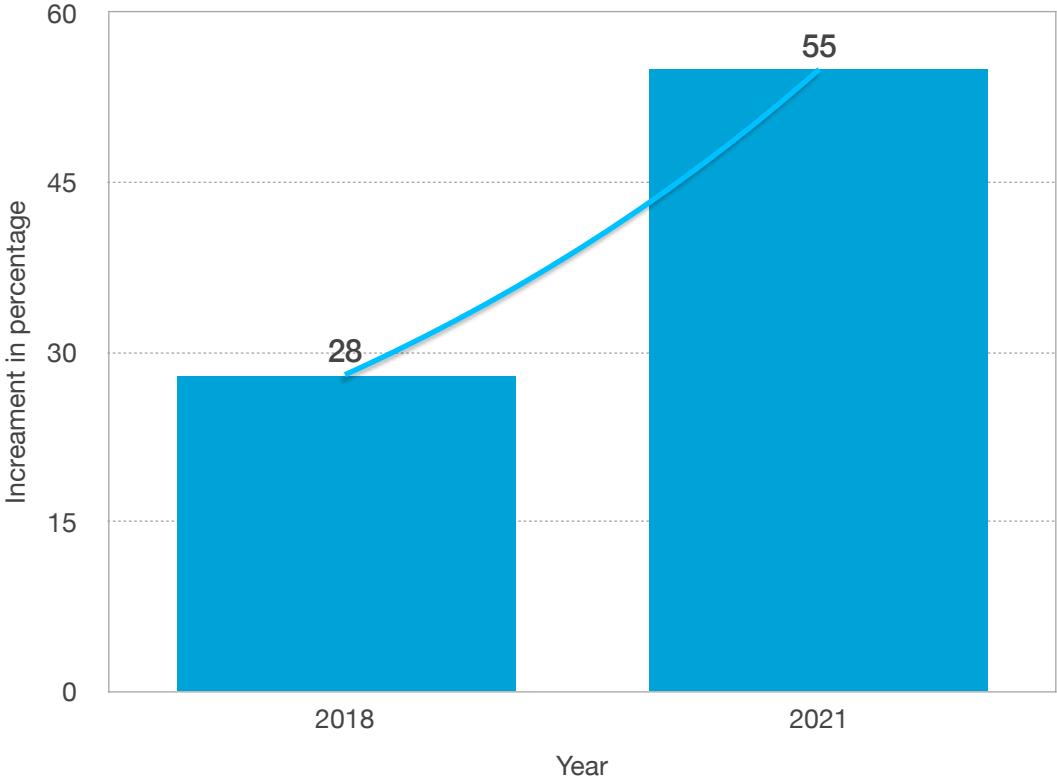


Figure 3 LEED Certification (Source: USGBC, 2019)

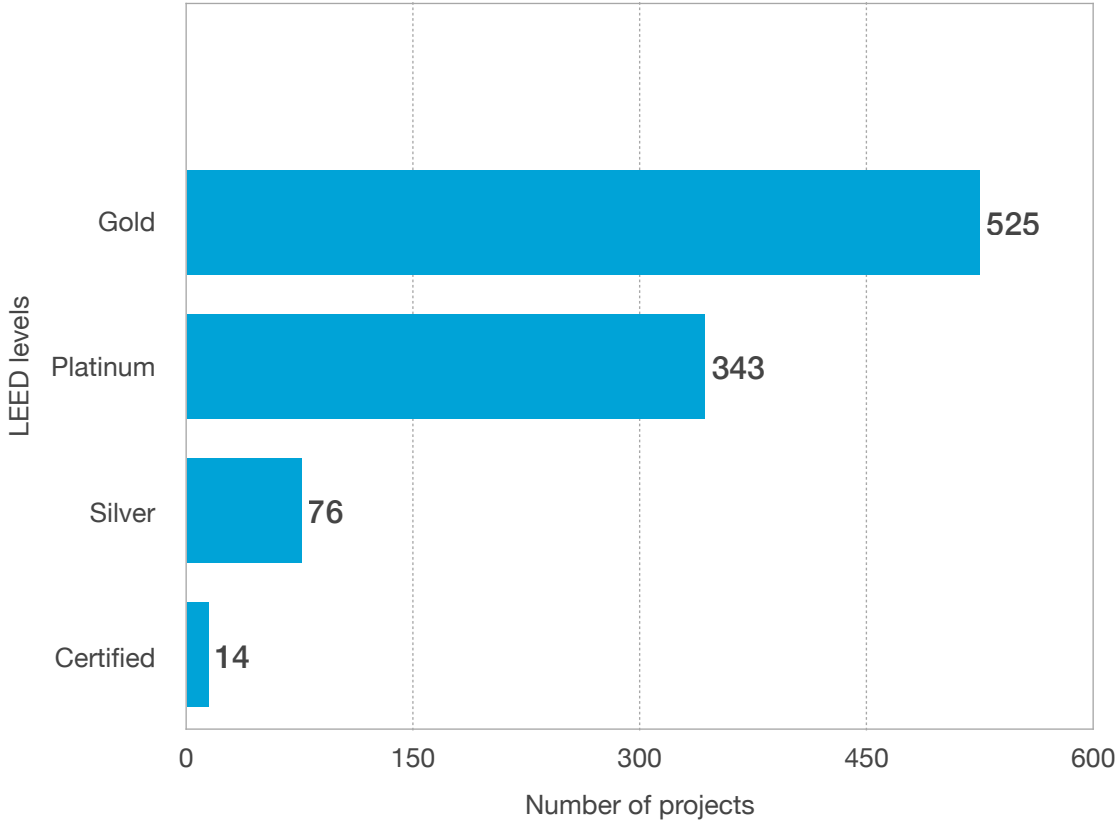
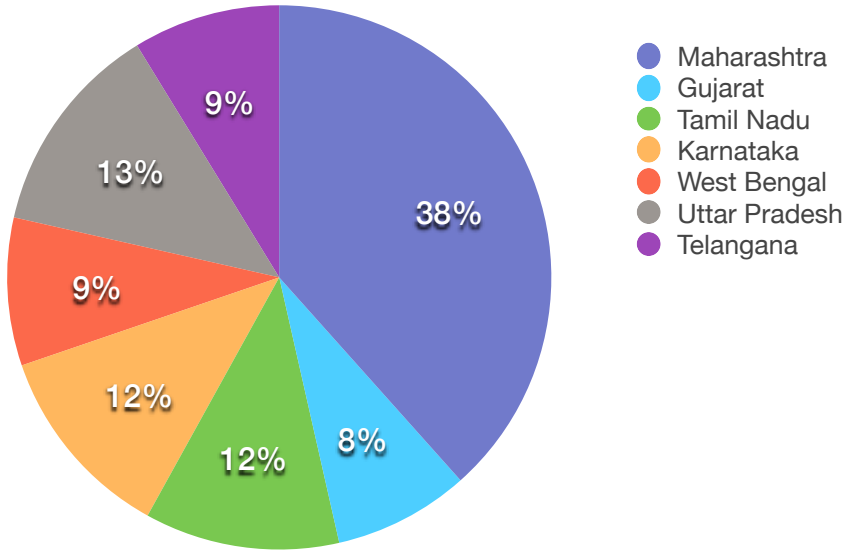
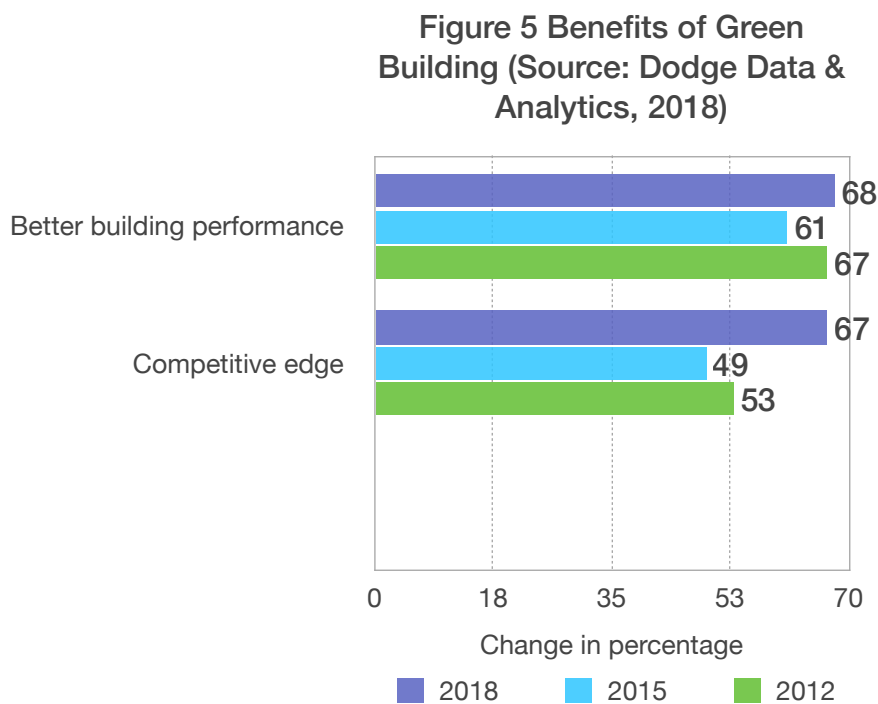


Figure 4 IGBC Strong Hold States (Source: IGBC, 2018)



Benefits of Green Building

Green buildings are not only environmental-friendly but also cost-effective in the long-term. In general, these benefits are both tangible and intangible. The considerable cost gain is in the form of saving water and energy waste. LEED certified buildings can save up to 20-30% in energy and 30-50% in water over the lifecycle of the building, which brings down its operation and maintenance (OM) costs, which, in a way, is advantageous for developers. As far as payback period is concerned, it would take anywhere between 5-7 years for investors/developers to recoup their initial investment. In addition, green certified buildings also offer a great face value and as a result, can bring up company's reputation. It is worth noting that building performance and competitive edge however have been considered as the most important in Indian market, if not globally [6]. These benefits have been significantly constant between the year 2012-2018 except a decreased spike in between as shown in **figure 5**.



From tenants' viewpoint, green buildings come with reduced OM costs. For example, one can save about 40% on electricity bills in a space designed with green concepts in mind. Moreover, it contributes to increased asset value over a period of time and provides better indoor air quality, natural lighting and better comfort level which resultantly, affect occupants' health and well-being and help improve their productivity. This concept further introduced as WELL by International WELL Building Institute (IWBI).

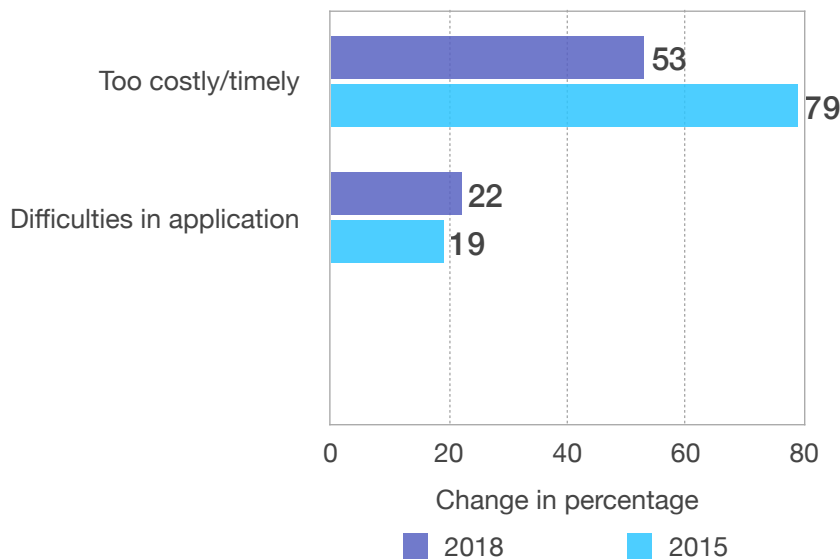
The WELL Building Standard focuses more on occupants' health and well-being, and is responsible for measuring, certifying and monitoring the building's features having correlation to human health. Generally, those who have already engaged in LEED practices, ideally incorporate WELL principles as well due to its holistic approach. The WELL concept is new in its entity in Indian market, however, there are some real estate giants who started taking advantage of it. Tata Housing, for example, promised to build 20 million square feet of housing using both LEED and WELL.

Barriers for Green Building

There are barriers to go green like, lack of awareness in which India accounts for 50% of the global average of 32%. That being said, according to government agencies and sustainable consultants, despite having multiple advantages, it is difficult to build residential spaces using green building principles because of lack of awareness amongst buyers and their buying decision, which is driven by price over greenness and other intangible benefits. Therefore, it is advisable to target corporate sector, for example, HSBC, Hiranandani and Unilever have their corporate houses LEED certified. In contrast, a report by Dodge Data & Analytics (2018) suggests 48% development of the global 30% average in newly build high-rise residential sector.

Moreover, factors such as costs, time constraints and difficult application process are other cause to create more hurdles as given in **figure 6**. To elaborate, each region has its own climatic condition and therefore, requires tailored solution for it. This task could be daunting, especially due to difficulties in understanding domain knowledge and documentation processes. For instance, having constructed green buildings could increase initial project cost by 5-15% with the payback period of 5-7 years, however, if the planning has been integrated properly and all the LEED aspects have been incorporated from the beginning then there would be little to no increase in initial cost, according to some developers.

Figure 6 Top Barriers to Green Building (Source: Dodge Data & Analytics, 2018)



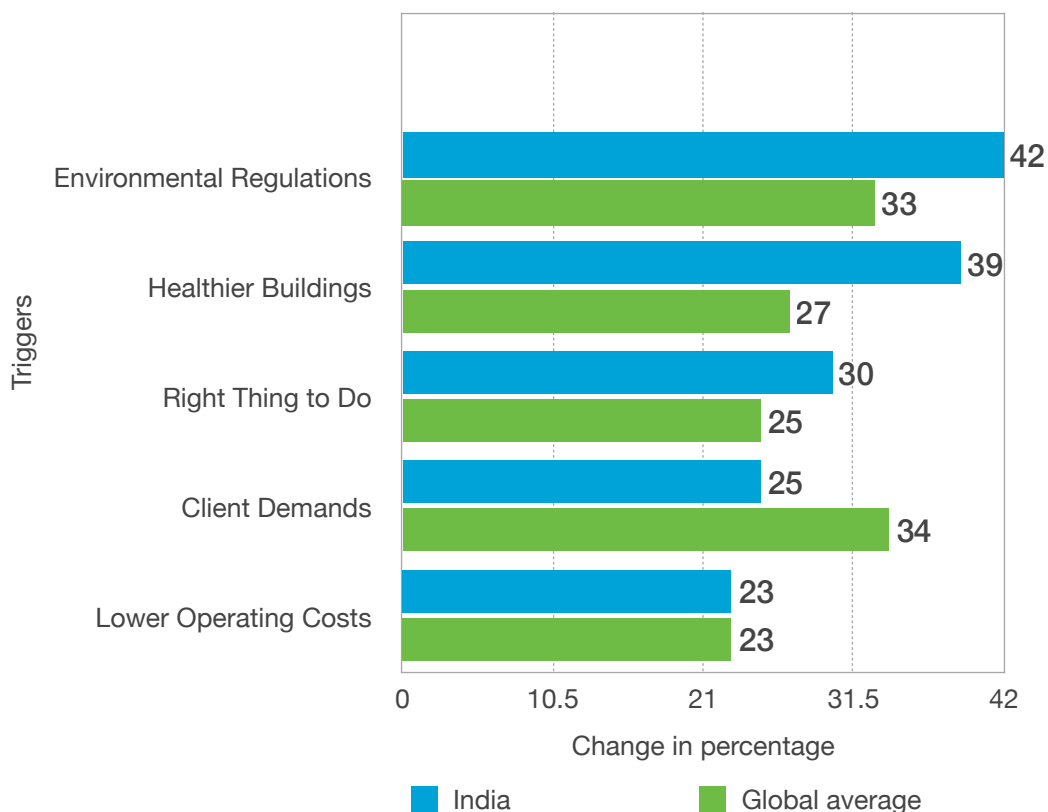
Recommendations

In order to nudge industry, it is crucial to find solutions to above explained barriers. Ordinarily, benefits should be put in practice such as higher value, higher occupancy rates, higher rental rates, and increased productivity have proven track in global context. In India, however, **figure 7** offers evidentiary triggers to move forward with the green movement at descent rate. In addition to these triggers, there are several other factors to push the market forward. For example, India's Gross Domestic Product (GDP) expects to grow with an average of 7% every year till 2023 starting from the year 2018. Moreover, government has started providing subsidies along with other intervention to invigorate private sectors' participation in green initiative.

Furthermore, International Finance Corporation - group backed by World Bank showed current green market in India in low dip, however suggesting high growth potential in coming years. Additionally, Securities and Exchange Board of India (SEBI) has decided to issue green bonds to help with capital needed for initial investment in renewable energy. This will result in massive green investment [7]. For instance, in 2016 India has \$3 billion floating in green bond making it the 7th largest in the world. In fact, PNB Housing Finance has already raised nearly \$70 million. However, out of all only 14 % of green bond utilised in reducing carbon footprint, which further leaves huge untapped potential [8].

Moreover, the author likes to propose the 'Triple Bottom Line' approach to create economical, financial, social and environmental values. It requires rigorous case studies to learn from and apply it in similar projects, nevertheless.

Figure 7 Top Triggers to Go Green
(Source: Dodge Data & Analytics, 2018)



Conclusion

To conclude, India is urbanising breathtakingly, which has fuelled environmental challenges. The way forward is to use available resources sustainably to shape built environment so that these challenges can be mitigated to a degree. Taking everything into consideration, India ranked third by USGBC for actively using LEED and holds huge potential for future LEED projects with an expected 55% growth rate by 2021. However, the presented barriers need tailor-made solutions and thus, begs a question on how to use different triggers effectively to solve each obstacle.

Reference

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