International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 06 | June 2022 www.irjet.net p-ISSN: 2395-0072

A Brief Overview of GRIHA and IGBC Rating Systems

Monika Sharma [1]

[1]*Assistant Professor, Jagannath University, Jaipur, Rajasthan, India*

Abstract -*Rapid urbanization and development pose a variety of ecological challenges around the world. The construction sector contributes significantly to pollution and environmental hazards. Architects and designers are focusing on green building design to minimize the negative impact of the construction sector on the environment and the planet. Green buildings optimize the use of natural resources, save energy, electricity, water and fossil fuels, increase thermal comfort for users, manage waste during and after construction and produce required energy on site itself. To examine the standard and accuracy of green building, green building rating system are developed on national and international levels. Green building rating system is an analytical framework designed worldwide to give ranking to buildings which meets the benchmarks in terms of their sustainability and environment standards. There are various green rating systems used worldwide, viz. LEED, BREEAM, GREEN STAR, ESTIDMA, CASBEE, GRIHA, IGBC and many more. This study is conducted to understand the prominent characteristics of eminent green building assessment tools of India- GRIHA & IGBC. The main idea behind this study is to find out in detail about the characteristics, likeness, and variability between these two rating systems. The data for this study is collected from various secondary sources such as journals, magazines, GRIHA and IGBC manuals and their websites*

***Key Words*: Energy, GRIHA, Green building rating, IGBC, Sustainability**

1.INTRODUCTION

India is a developing country and we are experiencing a rapid rate of development in terms of buildings and infrastructure. By 2050, rapid development and building are predicted to quadruple. As per 2021 Global status report for buildings and construction, the construction sector accounts for 36% of global final energy consumption and 37 % of energy related carbon di oxide emissions. Construction sector has become a predominant factor in global climate change. Here comes in account the role of green building and sustainable development in city planning. Green buildings use 40-50% less resources than traditional buildings. They make optimum use of resources, save water, reduce operating cost of building and also do social justice with site workers. Worldwide there are many agencies which give green rating to buildings. In India three predominant agencies which rate buildings on the basis of their energy efficiency and impact on environment are- GRIHA and IGBC.

2. GRIHA (GREEN RATING FOR INTEGRATED HABITAT ASSESSMENT)

GRIHA rating emphasizes laying the foundation of construction processes with passive design strategies that contribute towards developing cost-effective and resource-efficient projects. GRIHA integrates various relevant Indian codes for construction, energy, water, materials, and waste management and thus, acts as a tool to facilitate implementation of the same [1]. It is developed by TERI (The energy resource institute) which focuses on the energy, environment, and long-term development in 2005. It is managed by GRIHA Council and is headquartered in New Delhi. The Ministry of New and Renewable Energy (MNRE) validated GRIHA as the national rating system of India in 2007.

2.1 Performance parameters

GRIHA v. 2019 is divided into ten environmental sections, which are further split into 29 criteria, covering all the requisite parameters required to be addressed while making a 'green building'. An additional section on 'innovation' is a part of the rating system that rewards the project team for walking an extra mile to achieve environmental and social sustainability [1]. Each criterion have some specific maximum points which can be awarded if the parameter is followed completely. All these performance parameters are given below: -

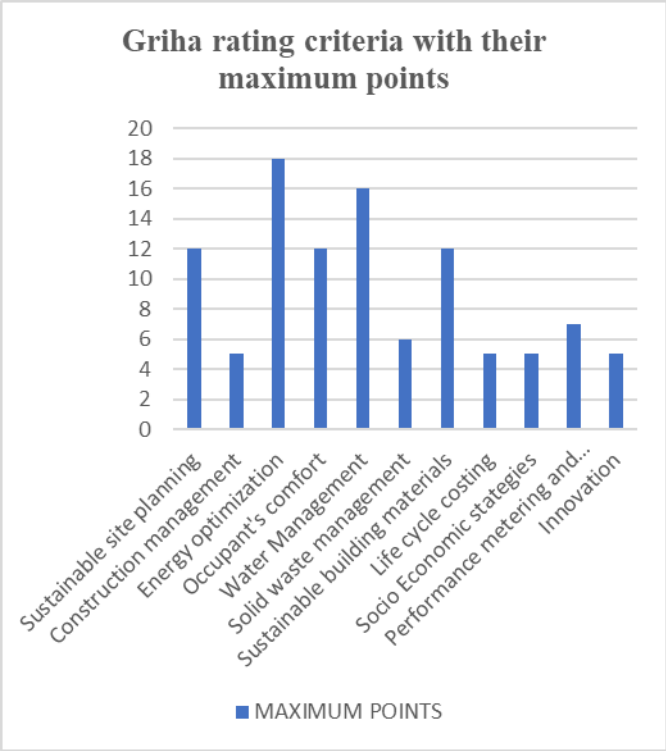
1. Sustainable Site plan
2. Construction management
3. Energy optimization
4. Occupant's comfort
5. Water management
6. Solid waste management
7. Sustainable building materials
8. Life cycle costing
9. Socio economic strategies
10. Performance metering and monitoring
11. Innovation

All the performance parameter criteria of GRIHA have been divided into point-based criterion and mandatory criterion. It is compulsory to follow all mandatory criterion in order to be eligible for green rating.

Given below is the list of mandatory criteria under all parameters in GRIHA rating system-

1. Project commissioning
2. Operation and maintenance protocol
3. Site plan as per bylaws
4. Mandatory tree provisions
5. At least 6 provisions to minimize air and soil pollution during construction
6. All insulation used in building envelop and HVAC system are CFC and HCFC free
7. Fire suppression system should be halon free
8. Interior wall and ceiling finishes should have low volatile organic compound
9. Water quality norms for drinking and domestic use
10. Strictly adher to all govt. notified waste management rules
11. Safety measures for construction workers
12. Clean water and hygiene for construction workers
13. Crèche for children of construction workers
14. Tobacco control, Prohibit during entire construction phase

Table 1 : GRIHA rating criteria



2.2 GRIHA Rating threshold

GRIHA provides star rating from one star to five star. Building needs to achieve at least 25 points out of 105 to attain one star rating. All rating points of GRIHA are shown below in table-

Table 2 : GRIHA rating points

Rating	Points
One star	25-40
Two-star	41-55
Three-star	56-70
Four-star	71-85
Five- star	86 & more

2.3 Assessment Process & Rating fees

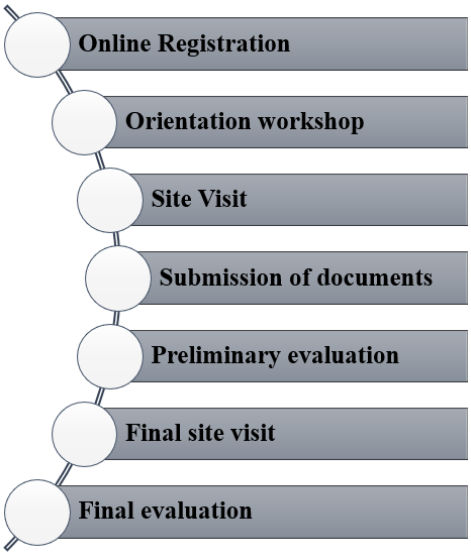


Figure 1 : GRIHA Assessment process

GRIHA council charges a fee of 3 lakh 74 thousand excluding GST for project having built up area up to 10,000 Sqm for GRIHA rating and evaluation. For buildings having an area more than 10,000 sqm, 7.5 Rs is charged for every other additional sqm.

2.4 Non-financial benefits of GRIHA

GRIHA rated buildings are basically buildings which are environmentally sensitive and causes less harm to the environment. They save energy, electricity water and resources. GRIHA rated buildings have other benefits as well. Government of India has provided some non-beneficial benefits to GRIHA rated buildings to encourage them to go for green building certification and help environment.

Some of the benefits provided by govt of India to GRIHA buildings are given below-

- The **Ministry of Environment and Forests** (MoEF) accepts GRIHA Precertification for fastrack environment clearance.
- Maharashtra, Punjab,Himachal, Noida, Rajasthan, West Bengal, Haryana and Uttar Pradesh govt. provides additional FAR to GRIHA rated Buildings.
- Kerala govt. provides incentives on stamp duty, building tax and property tax.
- Sikkim and Maharashtra Govt has made it compulsory for all govt. and semi govt. buildings to have minimum 3 star GRIHA rating.

3. IGBC (Indian Green Building Council)

IGBC Green New Buildings rating system® is a voluntary and consensus-based program. The rating system has been developed based on materials and technologies that are presently available [2]. Indian green building council is formed in 2001 by CII (Confederation of Indian Industry). It has its headquarter in Hyderabad, Telangana. The vision of the council is, "To enable a sustainable built environment for all and facilitate India to be one of the global leaders in the sustainable built environment by 2025".

3.1 Performance parameters

As per IGBC Green new building rating system, green rating is given on the basis of 07 environmental criteria's which are further divided into sub sections. Each criteria have some specific maximum points which can be awarded if the parameter is followed completely. There are total 100 points that can be earned. Maximum 28 points can be earned from energy efficiency section.

The 7 Criteria of green building performance are given below-

1. Sustainable architecture and design
2. Site selection and planning
3. Water Conservation
4. Indoor Environment quality
5. Building materials and resources
6. Energy efficiency
7. Innovation and design

Mandatory criteria of IGBC

1. Site plan as per local building bylaws
2. Soil erosion control on site
3. Rain water harvesting system
4. Water efficient plumbing fixtures
5. Ozon depleting substances
6. Minimum energy efficiency
7. Commissioning plan for building equipment system
8. Segregation of waste post occupancy
9. Minimum fresh air ventilation
10. Tobacco smoke control on site

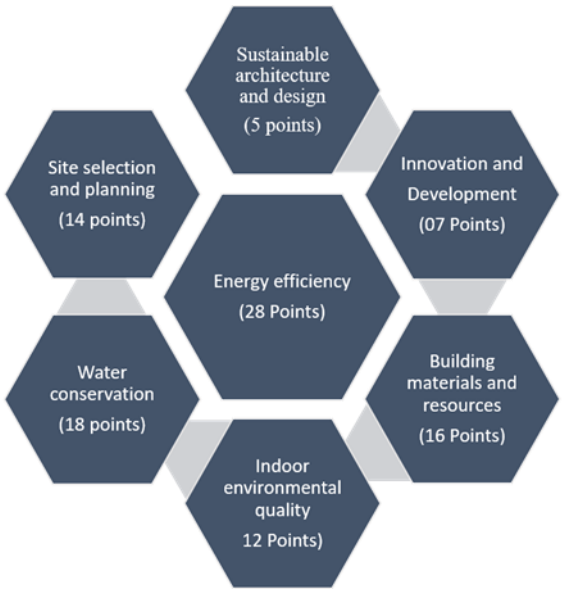


Figure 2: IGBC rating parameters

2.2 IGBC Rating threshold

3.2 IGBC Rating threshold

IGBC provides rating from certified level to platinum rating. Buildings needs to achieve at least 40 points to certify for IGBC rating. All rating threshold are shown in the table.

Table 3 : IGBC rating points

Rating	Points
Certified	40-49
Silver	50-59
Gold	60-74
Platinum	75-100

3.3 Assessment Process & Rating fees

IGBC has discount available on verification fee for its members. There are different fee criterias for IGBC founding members, IGBC annual members and non-members. IGBC charges a minimum fee of 2 Lakhs for project having an area of 5,000 sqm or below for non – members which is excluding the registration fee of certification.

4. OBSERVATIONS

	GRIHA	IGBC
Birth year	2005	2001
Headquarter	New Delhi	Hyderabad
Developed by	TERI (The energy resource institute)	CII Godrej
Rating Validity	05 years	03 Years
Total building footprint	5250 hectares	58807 hectares
Projects rated	2000	4800
Certified Professionals	898	5677

4.2 NON-FINANCIAL BENEFITS OF IGBC AND GRIHA

STATES	GRIHA	IGBC
Kerala	• Exemption on stamp duty • 50% off on building tax • Rebate on property tax for 2 years	Same as GRIHA
Maharashtra	• Additional 3%, 4% & 5% FSI on 3, 4 & 5 Star Buildings respectively	Same as GRIHA
Tamil Nādu	• Eligible for 25% subsidy on cost of setting up environmental protection.	Same as GRIHA
Himachal	• 10% additional FAR of 4& 5 star buildings	Same as GRIHA
Gujrat	Certified buildings will get reimbursement of 50% of the fees paid for the certification in resort and hotel buildings.	Same as GRIHA
Punjab	Additional 5%, 7.5% & 10% FSI on 3, 4 & 5 Star Buildings respectively & 100% rebate on building scrutiny fee.	Additional 5%, 7.5% & 10% FSI on silver, gold & platinum rated Buildings respectively and 100% rebate on building scrutiny fee.
Noida	5% additional FAR for 4 & 5 star buildings.	Same as GRIHA
Rajasthan	Additional 7.5 %, 10% and 15 % FAR on 3, 4 and 5 star buildings respectively	Same as GRIHA
Sikkim	• 3 star rating is must for all govt and semi govt. buildings.	-
West Bengal	Additional 10 % FAR to 4 & 5 star buildings	Same as GRIHA
Haryana	Additional 3,6,9,12 & 15 % FSI on 1,2,3,4 & 5 star building respectively	Additional 9,12 & 15 % FSI on Silver, Gold and platinum rated buildings respectively
Uttar Pradesh	• 5 % additional FAR for 4 & 5 star buildings	Same as GRIHA
Andhra Pradesh	20% reduction on permit fees	Same as GRIHA

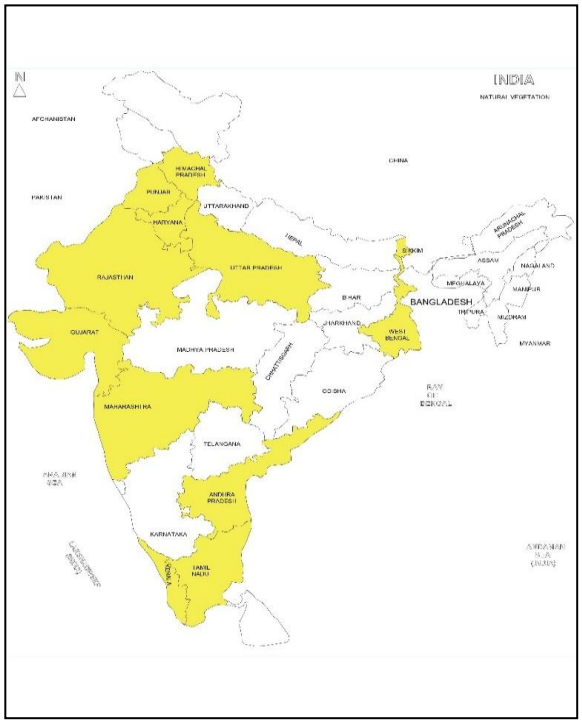


Figure 3 : Map showing states which provide incentives to green buildings

4.3 GRIHA and IGBC mandatory provisions

MANDATORY PROVISIONS	GRIHA	IGBC
Tree preservation measures	✓	✕
Measures to minimize air and soil pollution	✓	✓
Adherence to requirements of ECBC 2017	✓	✓
Rain water harvesting	✕	✓
BEE star labelled equipments	✓	✓
CFC and HCFC free insulation and building envelop	✓	✓
CFC & HCFC free refrigerent in HVAC and refrigeration	✓	✓
Halon free fire supression system	✓	✓
Simulation for DA	✓	✕
Skylight roof ratio not exceeding 5% & SHGC for skylight not exceeding .35	✓	✕
Artificial lighting design as per NBC	✓	✓
Water efficient plumbing fixtures	✕	✓
Project in accordance with thermal comfort requirements	✓	✕
Low VOC & lead free interior wall and ceiling finishes	✓	✕
Water quality norms for drinking and domestic use	✓	✕
Adherence with all govt. notified waste management rules	✓	✓
Favorable conditions for workers	✓	✕
Tobacco smoke control on site	✓	✓
Third party commissioning for the systems	✓	✓
Source metering requirements	✓	✕
Service group for O&M of building systems after installations	✓	✕
Clause in contract documents for training of O&M	✓	✕
Minimum fresh air ventilation	✕	✓

5. Conclusion

This study is conducted to know the two most predominant green rating systems of India. Both these rating systems are designed with vision of creating environment sustainability and natural harmony. Though the idea behind these rating systems is the same, there is a difference in how these are executed, their popularity, and rating parameters.

IGBC is the first green rating system of India for sustainable building and environment. Earlier, it was popular with the name of LEED-India. It was only rating system of India until GRIHA was introduced in 2005. GRIHA was completely backed by Indian government and declared as government rating system of India in 2007. Though it became popular in Indian construction sector, it still has much less building footprint than IGBC. IGBC has certified double the no. of projects rated by GRIHA. Also, in terms of certified professionals, GRIHA has much less no. of certified professionals than IGBC.

One thing that comes in favour of GRIHA is that rating given by GRIHA is valid for 5 years but IGBC has its rating validity for 3 years.

GRIHA is meticulously designed with broad no. of mandatory criteria. It is designed totally as per indian climate and its characteristics whereas IGBC follows the criteria and standards taken by LEED which are more successful and suitable for International conditions.

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