

RATING SYSTEMS IN INDIA--

IGBC, GRIHA;
LEED;GEM

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BUILDINGS --AS CONSUMERS OF RESOURCES

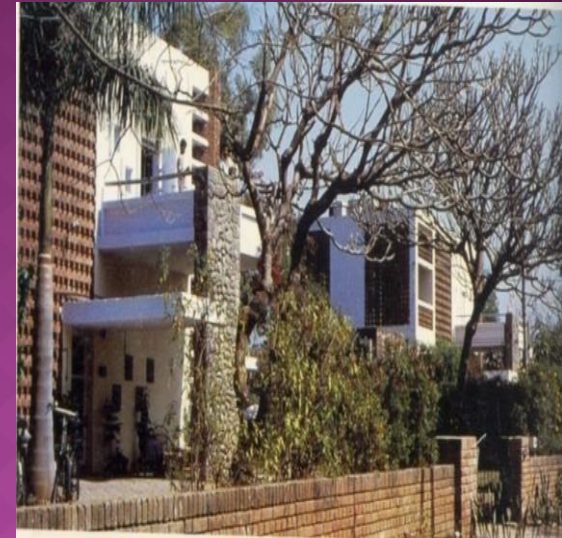
• Built environment- significantly impact environment
/consumption of resources/generators of waste/climate
change/rising temperature:

- 16% of world's fresh water withdrawal.
- 25% of wood harvested.
- 30% of consumption of raw material.
- 50% of global energy consumption.
- 35% of world's CO2 emission
- 40% of Municipal solid waste.
- 50% of Ozone depleting CFC's still in use.
- 30% of residents having sick building syndrome

• --70% of global warming outcome of ;

• --built environment & transportation

-- Majority of existing buildings--- low concern for energy conservation



DEFINING- GREEN BUILDINGS

DEFINITION:

- "A green building is one which uses less water, optimises energy efficiency, conserves natural resources, generates less waste and provides healthier spaces for occupants, as compared to a conventional building."



RATING

FOR

NEW BUILDINGS

RATING OF GREEN BUILDINGS

- **Rating is a tool :**
- **to assess level of greenness in a building**
- **Helps designers/assessor to apply green concepts**
- **define methodologies for promoting sustainability in diverse climatic zones**

Rating system-- for certifying Green Buildings.

- **is a framework for assessing building performance**
- **against set criteria & standard points of references**

Rating helps in—

- Assessing energy/water/resources- performance of building**
- Evaluating environmental performance of a building --**
- Providing standard for a 'green building'.**
- Establishing balance between practices / emerging concepts to make them sustainable**

GREEN BUILDINGS- GLOBAL RATINGS

- ◉ Globally - all nations have rating system to evaluate green buildings
- ◉ -- **British uses - BREEAM** (Building Research Establishment Environmental Assessment Method)- first rating system in world
- ◉ (LEED)- Leadership in Energy and Environmental Design- second rating systems developed -in U.S.G.B C
- ◉ **World Green Building Council ---uses EDGE** (Excellence in Design for Greater Efficiencies)
- ◉ -- **Green Star -- used in Australia**
- ◉ **Green Building Index (GBI)-- used in Malaysia.**
- ◉ **LEED - used by Canada,**
- ◉ **DGNB-- used by--Germany)- Deutsche Gesellschaft für Nachhaltiges Bauen e.V.,2007**
- ◉ **CASBEE -- by Japan-- Comprehensive Assessment System for Built Environment Efficiency**

INDIAN RATING SYSTEMS

India Presently uses 4 RATING SYSTEMS-- FOR GREEN BUILDINGS-

- ◎ **IGBC**-Indian Green Building Council-
-accounts for > 90%India's green rated buildings
- ◎ **GRIHA**-Green Rating for Integrated Habitat Assessment
- ◎ **LEED**-Leadership in Energy and Environment Design
- ◎ **GEM**- Green and Eco-Friendly Movement

◎ **INDIAN GREEN
BUILDING COUNCIL-
IGBC-- RATING
SYSTEM FOR NEW
GREEN BUILDINGS**

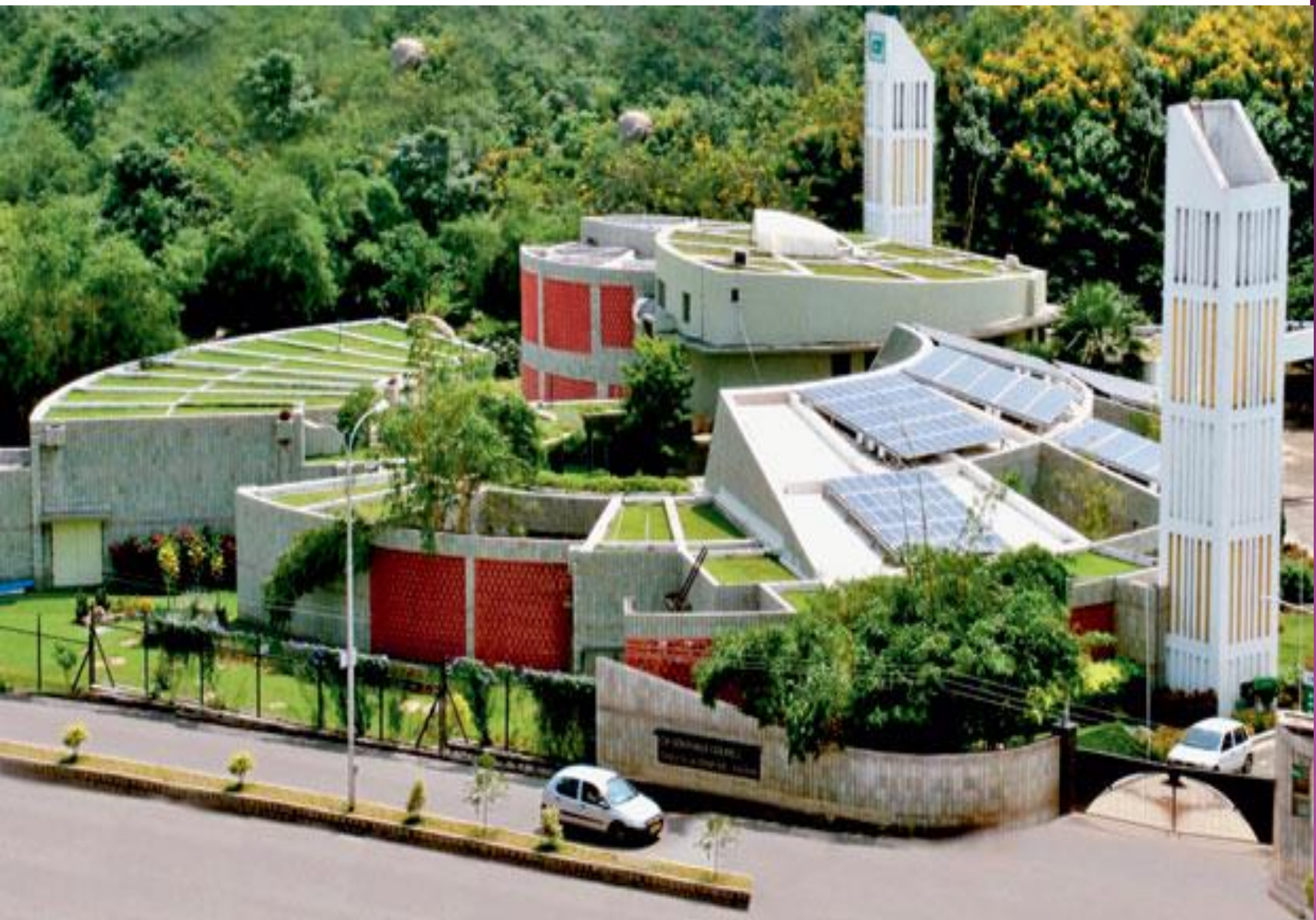
INDIAN GREEN BUILDING COUNCIL (IGBC)

- ◉ Indian Green Building Council (IGBC)--
 - ◉ - one of Centre of excellence of Confederation of Indian Industry (CII)
 - ◉ - founded in 2001.
 - ◉ non--profit research based organisation
 - ◉ -- offices -CII-Sohrabji Godrej Green Business Centre, Hyderabad
 - ◉ -- India's first LEED certified Platinum Rated Green building
 - ◉ --agreement with- LEED for using--Green Building Standard from USGBC.
 - ◉ Developed independent rating system-- based on Indian context
 - ◉ -- defined Vision for green buildings
 - ◉ -- Ensure sustainable built environment for all
 - ◉ -- Make India global leaders in sustainable built environment by 2022.
- (achieved 10.22 bsft of green footprints by 2023)

INDIAN GREEN BUILDING COUNCIL(IGBC)

- ◉ IGBC Rating systems are;
- ◉ -voluntary
- ◉ - consensus based
- ◉ - market driven- building programs
- ◉ - Based on five natural elements- Panch-bhutas
- ◉ Blend of ancient architectural practices and
- ◉ Modern technological innovations
- ◉ Following national codes- NBC; ECBC
- ◉ Covering practically all typologies of buildings- 31 Ratings-- Residential, commercial, industrial, institutional, healthcare, metros, townships, villages, landscape, logistics, towns, SEZs
- ◉ Rating system applicable in all 5 climate zones
- ◉ National by choice-Global in performance
- ◉ IGBC has 100-point based system comprising of 52 parameters -including 12 core points,-- which are mandatory& 40 others
- ◉ Four levels of certification -certified, silver, gold and platinum
- ◉ -- awarded based on number of points earned.
- ◉ -- minimum points required for certification - 40
- ◉ - Certification valid for 3 years from date of issue.
- ◉ Require revalidation after three years.

GODREJ SOHRAB JI BUILDING- HYDERABAD- INDIA'S FIRST PLATINUM RATED BUILDING



INDIAN BUSINESS SCHOOL- MOHALI



SUZLON ONE EARTH - PUNE



IGBC RATING SYSTEMS

An important development in the growth of green building movement in India is the launch of the following IGBC Green Building Rating Systems:

IGBC Green New Buildings

IGBC Green Existing Buildings

IGBC Green Homes

IGBC Green Residential Societies

IGBC Green Interiors

IGBC Green Healthcare

IGBC Green Schools

IGBC Green Factory Buildings

IGBC Green Data Center

IGBC Green Campus

IGBC Green Villages

IGBC Green Townships

IGBC Green Cities

IGBC Green Existing Cities

IGBC Green SEZs

IGBC Green Landscapes

IGBC Green Mass Rapid Transit System

IGBC Green Existing Mass Rapid Transit System

Government Incentives to IGBC Projects

IGBC Green Affordable Housing

IGBC Health and Well-being Rating

IGBC Green Resort Rating

Renewal of IGBC Green Rating

IGBC Green Service Building

All the IGBC rating systems are voluntary, consensus based, market-driven building. The rating systems are based on the five elements of the nature (Panchabhutas) and

Quick

OVERVIEW AND PROCESS OF RATING

- ◎ IGBC Green New Buildings rating system
- ◎ -- addresses green features under following 7 categories:
 - ▣ Sustainable Architecture and Design
 - ▣ Site Selection and Planning
 - ▣ Water Conservation
 - ▣ Energy Efficiency
 - ▣ Building Materials and Resources
 - ▣ Indoor Environmental Quality
 - ▣ Innovations and Development

Parameters for Evaluating Green Buildings(52= 10 Mandatory+42 Others)

i. Sustainable Architecture & Design- 5/5

- Integrated design approach,
- Site preservation,
- Passive Architecture

ii Site Selection and Planning - 14/14

- basic amenities, --proximity to local transport, natural topography, tree preservation, heat island reduction, low emitting vehicle,
- outdoor light pollution, facilities for construction workers etc

iii. Water Conservation -- 18/19

- Rain water harvesting - roof/non-roof,
- efficient plumbing fixtures, Sustainable landscape design ,
- waste water treatment/recycling, water metering

iv Energy Conservation --28/30

- use of Chloro-fluoro-carbon-free equipment,
- Minimum energy consumption , enhanced energy efficiency,
- On/off site renewable energy generation,
- energy saving measures in appliances / other equipment
- energy metering and management



PARAMETERS FOR EVALUATING GREEN BUILDINGS:

○ V. Building Materials/Resources- 16/16

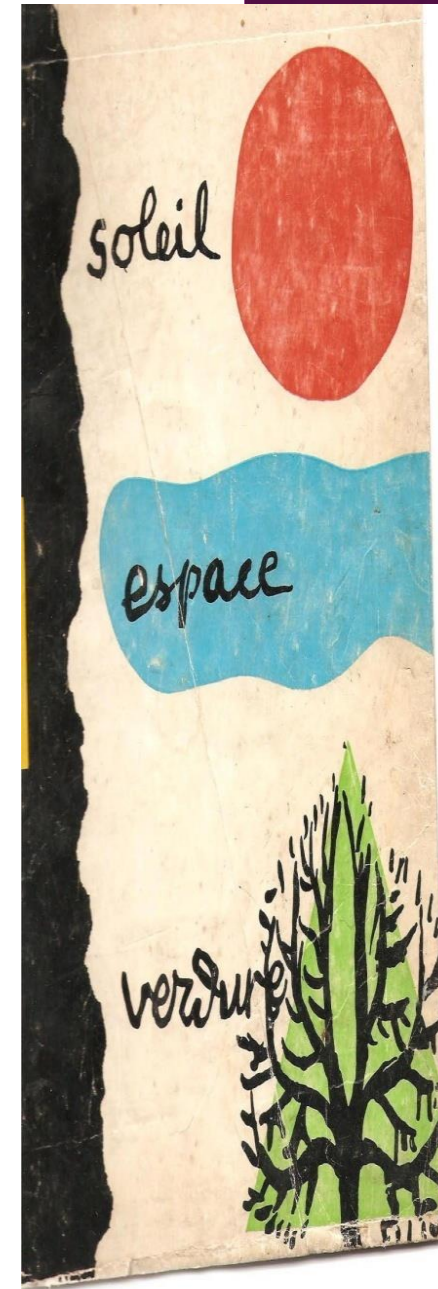
- handling of construction waste materials,
- reuse of salvaged materials,
- using green building materials, products and equipment
- organic waste management- post occupation,
- waste segregation- post occupation

○ vi Indoor Environment Quality- 12/9

- tobacco smoke control,
- fresh air ventilation ,
- CO2 monitoring,
- low emitting compound materials, paints and adhesives,
- Day lighting,-- outdoor view,
- indoor/outdoor pollution
- Indoor Air Quality management during construction,
- Indoor Air Quality testing after construction/ before occupation

vii. Innovations and Development -- 7/7

- Innovations in design process,
- optimisation of structural design,
- Waste water reuse during construction.
- IGBC accredited professional



IGBC Green New Buildings Rating System Checklist		Points Available	
		Owner-occupied Buildings	Tenant-occupied Buildings
Modules		100	100
Sustainable Architecture and Design		5	5
SA Credit 1	Integrated Design Approach	1	1
SA Credit 2	Site Preservation	2	2
SA Credit 3	Passive Architecture	2	2
Site Selection and Planning		14	14
SSP Mandatory Requirement 1	Local Building Regulations	Required	Required
SSP Mandatory Requirement 2	Soil Erosion Control	Required	Required
SSP Credit 1	Basic Amenities	1	1
SSP Credit 2	Proximity to Public Transport	1	1
SSP Credit 3	Low-emitting Vehicles	1	1
SSP Credit 4	Natural Topography or Vegetation	2	2
SSP Credit 5	Preservation or Transplantation of Trees	1	1
SSP Credit 6	Heat Island Reduction, Non-roof	2	2
SSP Credit 7	Heat Island Reduction, Roof	2	2
SSP Credit 8	Outdoor Light Pollution Reduction	1	1
SSP Credit 9	Universal Design	1	1
SSP Credit 10	Basic Facilities for Construction Workforce	1	1
SSP Credit 11	Green Building Guidelines	1	1
Water Conservation		18	19
WC Mandatory Requirement 1	Rainwater Harvesting, Roof & Non-roof	Required	Required
WC Mandatory Requirement 2	Water Efficient Plumbing Fixtures	Required	Required
WC Credit 1	Landscape Design	2	2
WC Credit 2	Management of Irrigation Systems	1	1
WC Credit 3	Rainwater Harvesting, Roof & Non-roof	4	4
WC Credit 4	Water Efficient Plumbing Fixtures	5	5
WC Credit 5	Wastewater Treatment and Reuse	5	5
WC Credit 6	Water Metering	1	2

RATING OF NEW GREEN BUILDINGS

Modules		Points Available	
		Owner-occupied Buildings	Tenant-occupied Buildings
Energy Efficiency		28	30
EE Mandatory Requirement 1	Ozone Depleting Substances	Required	Required
EE Mandatory Requirement 2	Minimum Energy Efficiency	Required	Required
EE Mandatory Requirement 3	Commissioning Plan for Building Equipment & Systems	Required	Required
EE Credit 1	Eco-friendly Refrigerants	1	1
EE Credit 2	Enhanced Energy Efficiency	15	15
EE Credit 3	On-site Renewable Energy	6	8
EE Credit 4	Off-site Renewable Energy	2	2
EE Credit 5	Commissioning, Post-installation of Equipment & Systems	2	2
EE Credit 6	Energy Metering and Management	2	2
Building Materials and Resources		16	16
BMR Mandatory Requirement 1	Segregation of Waste, Post-occupancy	Required	Required
BMR Credit 1	Sustainable Building Materials	8	8
BMR Credit 2	Organic Waste Management, Post-occupancy	2	2
BMR Credit 3	Handling of Waste Materials, During Construction	1	1
BMR Credit 4	Use of Certified Green Building Materials, Products & Equipment	5	5
Indoor Environmental Quality		12	9
IEQ Mandatory Requirement 1	Minimum Fresh Air Ventilation	Required	Required
IEQ Mandatory Requirement 2	Tobacco Smoke Control	Required	Required
IEQ Credit 1	CO ₂ Monitoring	1	1
IEQ Credit 2	Daylighting	2	2
IEQ Credit 3	Outdoor Views	1	1

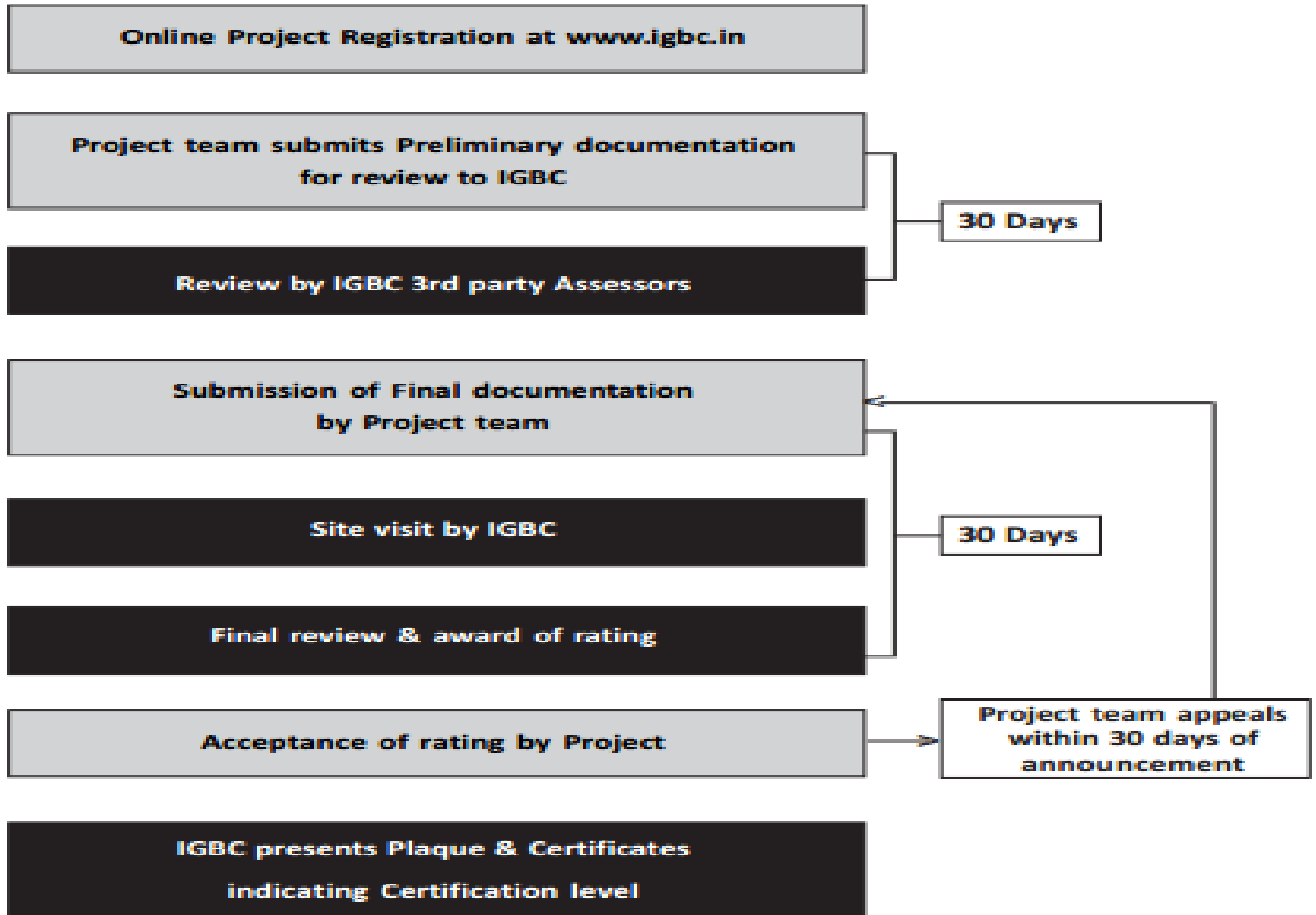
RATING OF NEW GREEN BUILDINGS

Modules		Points Available	
		Owner-occupied Buildings	Tenant-occupied Buildings
IEQ Credit 4	Minimise Indoor and Outdoor Pollutants	1	1
IEQ Credit 5	Low-emitting Materials	3	3
IEQ Credit 6	Occupant Well-being Facilities	1	-
IEQ Credit 7	Indoor Air Quality Testing, After Construction and Before Occupancy	2	-
IEQ Credit 8	Indoor Air Quality Management, During Construction	1	1
Innovation and Development		7	7
ID Credit 1	Innovation in Design Process	4	4
ID Credit 2	Optimisation in Structural Design	1	1
ID Credit 3	Waste Water Reuse, During Construction	1	1
ID Credit 4	IGBC Accredited Professional	1	1

The threshold criteria for certification levels are as under:

Certification Level	Owner-occupied Buildings	Tenant-occupied Buildings	Recognition
Certified	40 - 49	40 - 49	Best Practices
Silver	50 - 59	50 - 59	Outstanding Performance
Gold	60 - 74	60 - 74	National Excellence
Platinum	75 -100	75 - 100	Global Leadership

Certification Process



FEE - CERTIFICATION- FEB 15, 2020

Membership Category	Base Fee				Additional fee for Projects with multiple buildings including common basements
	5,000 sq.m & below	5,001 sq.m to 20,000 sq.m	20,001 sq.m to 50,000 sq.m	50,001 sq.m & above	For each building with built-up area 5,001 sq.m and above
	Flat Fee (INR)	Based on sq.m (INR)	Based on sq.m (INR)	Flat Fee (INR)	Flat Fee (INR)
IGBC Founding Member	1,80,000	INR 2,15,000 plus INR 11.25 per additional sq.m over & above 5,000 sq.m	INR 4,25,000 plus INR 11.25 per additional sq.m over & above 20,000 sq.m	8,25,000	50,000
IGBC Annual Member	1,90,000	INR 2,30,000 plus INR 11.50 per additional sq.m over & above 5,000 sq.m	INR 4,40,000 plus INR 11.50 per additional sq.m over & above 20,000 sq.m	8,40,000	50,000
Non-Member	2,00,000	INR 2,40,000 plus INR 11.50 per additional sq.m over & above 5,000 sq.m	INR 4,50,000 plus INR 11.50 per additional sq.m over & above 20,000 sq.m	8,50,000	50,000

* Fee is exclusive of Goods and Services Tax (GST)

* The fee structure is applicable to both Owner-occupied and Tenant-occupied projects

* Parking areas need not be considered as part of the built-up area

* Registration, Precertification, Provisional Certification and Certification fees are non-refundable

* Membership discounts can be availed only if the Project Owner or Developer is a member of IGBC

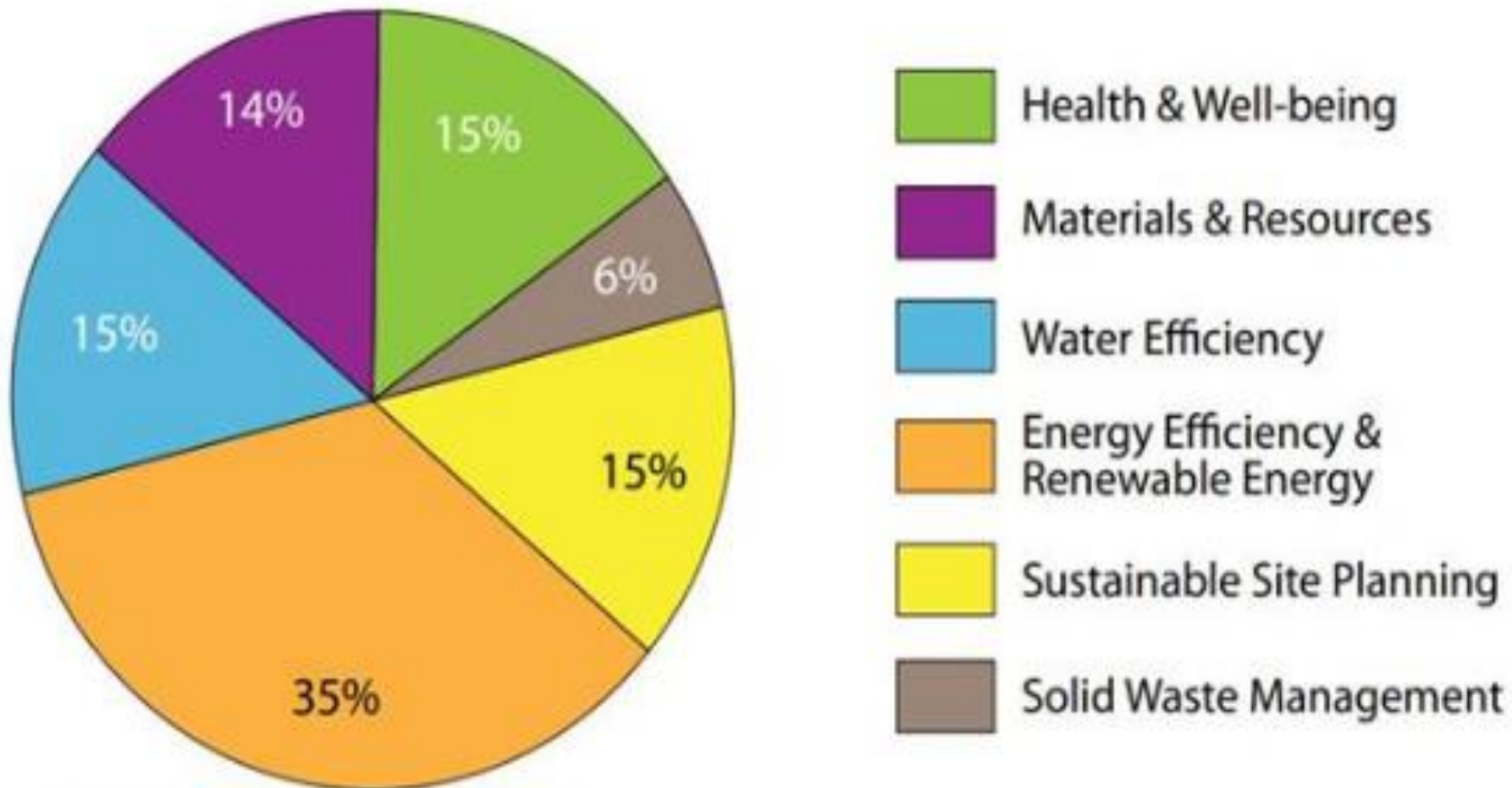
○ Green Rating
for Integrated
Habitat
Assessment---
GRIHA

GREEN RATING FOR INTEGRATED HABITAT ASSESSMENT- GRIHA-- INTRODUCTION

- Green Rating for Integrated Habitat Assessment (GRIHA)
- jointly developed by TERI(The Energy and Research Institute) /Ministry of New and Renewable Energy, Government of India.
- A green building design evaluation system
- Buildings rated in a three-tier process.
- i. Online submission of documents-- as per prescribed criteria
- ii. Site visit
- iii. Evaluation of building by team of professionals/ experts from GRIHA Secretariat.
- GRIHA rating system consists of 34 criteria
- --Broadly categorised in four different sections.
- (1) Site selection and site planning,
- (2) Conservation and efficient utilization of resources-- Energy/ water/building material/waste management
- (3) Building operation and maintenance
- (4) Innovations.
- Rating awarded based on stars- 1 to 5, depending on score
- Minimum score needed - 50

GRIHA RATING

Figure 1: Weighting of various criteria as per GRIHA



Source: Majumdar, M. (2008).TERI



GRIHA (Green Rating for Integrated Habitat Assessment)

India's own green building rating

2000

- TERI conducted over 100 building audits
- TERI Retreat constructed as Green building

Rail Nirman Nilayam, Secundrabad



2007

- MNRE adopts GRIHA as National Rating system for green buildings
- ECBC code released in India



Ministry of New and Renewable Energy, Govt

Grand Chola, ITC Hotels Limited, Chennai



Administrative building for PCNTDA, Pune



2009



Government of India



- Committee of secretaries: 3 star GRIHA mandatory for all Govt. Buildings
- CPWD adopts GRIHA
- Acknowledged as an innovative tool by UN



Akshay Urja Bhawan HAREDA, Panchkula



2011

- GRIHA adopted by PCMC (Premium discounts to developers and property tax rebate for buyers announced in PCMC for GRIHA rated projects)
- EC linked to GRIHA pre-certification
- Committee of secretaries recommends up scaling of GRIHA
- ADaRSH and CREDAI sign MoU



SIDBI Training Center, Bhubaneswar



2013

- Launch of GRIHA LD rating for large development
- GRIHA app launched for android
- GRIHA new user friendly metro design website launched
- GRIHA adopted in Noida (FAR incentive for GRIHA rated projects in Noida)
- GRIHA adopted in Greater Noida (FAR incentive for GRIHA rated projects in Greater Noida)



- SVA GRIHA adopted by PCMC (Premium discounts to developers and property tax rebate for buyers announced in PCMC for SVA GRIHA rated projects)
- GRIHA adopted in Punjab (FAR incentive for GRIHA rated projects in Punjab)
- GRIHA adopted in Kerala



WVIP Circuit House, Pune



2015

- Launch of GRIHA & GRIHA LD v.2015
- Government of West Bengal, Department of Municipal Affairs adopts GRIHA
- FAR for GRIHA projects in Rajasthan
- FAR for GRIHA projects in Punjab
- FAR for AUDA (Ahmedabad urban development authority).

SDB 7&8, Infosys Limited, Chennai



Fortis Memorial Research Institute, Gurgaon



SABIC Research & Technology Pvt. Ltd, Bangalore



Panedas Residence, Guatemala City



Indira Paryavaran Bhawan, New Delhi



Manipal University Campus, Jaipur



2005



- TERI GRIHA released indigenous green building rating of INDIA

- National mission on sustainable habitat launched



- Evaluators' and trainers' programme launched



SVA GRIHA
GRIHA product catalogue

GRIHA LD



- Launch SVA GRIHA rating for Buildings less than 2,500 sq.m
- GRIHA product catalogue launched
- Guidelines for large development launched
- Concessional rate of interest for GRIHA rated projects by SIDBI



- Launch of GRIHA Prakitri rating for existing day schools
- GRIHA app for iOS launched
- MoUD, Delhi Division, Govt FAR incentive for GRIHA rated projects
- MoU signed between USGBC and TERI
- Sikkim adopts GRIHA



United Nations
Framework Convention on
Climate Change

GRIHA recognized as India's own green building rating system in **INDIA'S INDC** submitted to **UNFCCC**.

DEVELOPED BY SUPPORTED BY

2008

2010

2012

2014



GRIHA RATING SYSTEMS

1. GRIHA AH (Affordable Housing)

- GRIHA AH Version 1 feasibility checklist

2. - GRIHA EB (Existing Buildings)

3 GRIHA

- EB Version 1 feasibility checklist -
- GRIHA V 2019 feasibility checklist
- GRIHA V 2015 feasibility checklist -
- GRIHA Version 3 self- evaluation checklist -
- GRIHA Version 2 self -evaluation checklist -

4. GRIHA for Existing Day Schools

- GRIHA Version 2 self evaluation checklist -

5GRIHA LD

- GRIHA LD V 2015 feasibility checklist -
- GRIHA LD self evaluation checklist

- 6 SVA GRIHA--SVAGRIHA self evaluation checklist -

7.GRIHA for Cities

- GRIHA for CITIES self evaluation checklist -

GRIHA RATING

GRIHA is a 100 point system consisting of some core points, which are mandatory, while the rest are optional

Different levels of certification (one star to five stars) are awarded based on the number of points earned. The certification is 50.

Points achieved	GRIHA Rating
50-60	★
61-70	★ ★
71-80	★ ★ ★
81-90	★ ★ ★ ★
91-100	★ ★ ★ ★ ★

Criterion 1	Site Selection
Criterion 2	Preserve and protect landscape during construction/compensatory depository forestation.
Criterion 3	Soil conservation (post construction)
Criterion 4	Design to include existing site features
Criterion 5	Reduce hard paving on site
Criterion 6	Enhance outdoor lighting system efficiency
Criterion 7	Plan utilities efficiently and optimize on-site circulation efficiency
Criterion 8	Provide minimum level of sanitation/safety facilities for construction workers
Criterion 9	Reduce air pollution during construction

GRIHA RATING

Criterion 10	Reduce landscape water demand
Criterion 11	Reduce building water use
Criterion 12	Efficient water use during construction
Criterion 13	Optimize building design to reduce conventional energy demand
Criterion 14	Optimize energy performance of building within specified comfort limits
Criterion 15	Utilization of fly-ash or equivalent industrial/agricultural waste as recommended by BIS in building structures
Criterion 16	Reduce embodied energy of construction is reduced by adopting material efficient technologies and/or low-energy materials
Criterion 17	Use low-energy materials in Interiors
Criterion 18	Renewable energy utilization
Criterion 19	Renewable energy based hot water system
Criterion 20	Waste water treatment
Criterion 21	Water recycle and reuse (including rainwater)
Criterion 22	Reduction in waste during construction
Criterion 23	Efficient Waste segregation

GRIHA RATING

Criterion 24	Storage and disposal of wastes
Criterion 25	Resource recovery from waste
Criterion 26	Use of low-VOC paints/adhesives/sealants
Criterion 27	Minimize ozone depleting substances
Criterion 28	Ensure water quality
Criterion 29	Acceptable outdoor and indoor noise levels
Criterion 30	Tobacco and smoke control
Criterion 31	Provide at least the minimum level of accessibility for persons with disabilities
Criterion 32	Energy audit and validation
Criterion 33	Operation and Maintenance
Criterion 34	Innovation Points

 **SVA GRIHA**

SVAGRIHA (SMALL VERSATILE AFFORDABLE- GRIHA

- -- SVAGRIHA - a simplified, faster, easier/ more affordable green building rating system
- -- functions as a design cum-rating tool.
- --for projects with built-up area < 2500 sqm.
- -- help in designing /rating of individual residences, small offices, commercial and institutional buildings.- except Industries
- -Rating based on 14 criteria-- analyzed using software tool-- comprising simplified calculators.
- -- Calculators filled for areas / quantities of materials by architect/consultant-- using information from construction drawings -
- When completed-- tool will inform architect/consultant number of points achieved -- in particular criterion/ overall points.

SVAGRIHA (SMALL VERSATILE AFFORDABLE- GRIHA

- ◉ *Precertification rating* --For assess performance at designing stage, /avail incentives from local local authorities, wherever applicable, was was introduced..
- ◉ *Rating Process*
 - *Registration*
 - *Submission of drawings, declarations and other documents as required (quantity estimates) to GRIHA Council*
 - *Assessment/review as per SVAGRIHA*
 - *Feedback to project team*
 - *mandatory for each project to achieve a certain number of minimum points in each category as mentioned in the SVAGRIHA manual.*
 - *Award of letter and certificate*

SVAGRIHA (SMALL VERSATILE AFFORDABLE- GRIHA --EVALUATION

SVAGRIHA evaluates projects on the following 14 criteria:

Criterion number	Criterion name	Points
1	Reduce UHIE and maintain native vegetation cover on site	6
2	Passive architectural design and systems	4
3	Good fenestration design for reducing direct heat gain and glare while maximising daylight penetration	6
4	Efficient artificial lighting system	2
5	Thermal efficiency of building envelope	2
6	Use of energy efficient appliances	3
7	Use of renewable energy on site	4
8	Reduction in building and landscape water demand	5
9	Rainwater harvesting	4
10	Generate resource from waste	2
11	Reduce embodied energy of building	4
12	Use of low-energy materials in interiors	4
13	Adoption of green Lifestyle	4
14	Innovation	2
Total		50

SVAGRIHA (SMALL VERSATILE AFFORDABLE- GRIHA --EVALUATION

- Achieving SVAGRIHA rating-- project must achieve
 - 50% points in each category
 - ensuring project reduces overall environmental impact
 - not just impact through energy / water.

Category	Maximum points	Threshold points
Landscape	6	3
Energy	21	11
Water & waste	11	6
Materials	8	4
Others	4	1

SVAGRIHA (SMALL VERSATILE AFFORDABLE- GRIHA --EVALUATION

Project scoring

Points	Rating
25-30	★
31-35	★ ★
36-40	★ ★ ★
41-45	★ ★ ★ ★
46-50	★ ★ ★ ★ ★



○ Leadership in
Energy and
Environmental
Design -- LEED

LEED CERTIFICATION

- ◉ Under LEED 2009, there are 100 possible base points-
- ◉ Criteria- 65 in all, 7 mandatory and 58 others
- ◉ distributed across six credit categories:
- ◉ -- Sustainable Sites
- ◉ -- Water Efficiency
- ◉ --Energy and Atmosphere",
- ◉ -- Materials and Resources",
- ◉ --Indoor Environmental Quality", and
- ◉ --Innovation in Design".
- ◉ Up to 10 additional points may be earned-- four for Regional Priority Credits, and six for Innovation in Design
- ◉ **Certification level**
- ◉ Buildings can qualify for four levels of certification:
- ◉ **Certified:** 40-49 points
- ◉ **Silver:** 50-59 points
- ◉ **Gold:** 60-79 points
- ◉ **Platinum:** 80 points and above

LEED CERTIFICATION

Evaluation Criteria of LEED India

CREDIT	Description	Maximum Points	Points Targeted
SS	Sustainable Sites	13	11
SS P1	Erosion & Sedimentation Control	Mandatory	Mandatory
SS CR 1	Site selection	1	1
SS CR 2	Development density & Community connectivity	1	1
SS CR 3	Brownfield Redevelopment	1	0
SS CR 4.1	Alternative Transportation: Public Transportation Access	1	1
SS CR 4.2	Alternative Transportation: Low emission & alternative fuel refuelling stations	1	1
SS CR 4.3	Alternative Transportation: Parking capacity	1	1
SS CR 5.1	Reduced site disturbance: Protect / restore habitat	1	1
SS CR 5.2	Reduced site disturbance: Development footprint	1	0
SS CR 6.1	Stormwater design: Quantity control	1	1
SS CR 6.2	Stormwater design: Quality control	1	1
SS CR 7.1	Heat Island Effect, Non-roof	1	1
SS CR 7.2	Heat Island Effect, roof	1	1
SS CR 8	Light pollution reduction	1	1

LEED CERTIFICATION

WE	Water Efficiency	6	5
WE CR 1.1	Water efficient landscaping: reduce by 50%	1	1
WE CR 1.2	Water efficient landscaping: no potable use or no irrigation	1	0
WE CR 2	Water efficiency in AC systems	1	1
WE CR 3	Innovative wastewater technologies	1	1
WE CR 4.1	Water use reduction: 20% reduction	1	1
WE CR 4.2	Water use reduction: 30% reduction	1	1
EA	Energy & Atmosphere	17	15
EA PR 1	Fundamental Building Systems Commissioning	Mandatory	Mandatory
EA PR 2	Minimum Energy Performance	Mandatory	Mandatory
EA PR 3	CFC reduction in HVAC & R equipment	Mandatory	Mandatory
EA CR 1	Optimize Energy Performance	10	9
EA CR 2	Onsite Renewable Energy: 2.5%,5%,7.5%	3	3
EA CR 3	Additional Commissioning	1	1
EA CR 4	Ozone Depletion	1	1
EA Cr 5	Measurement & Verification	1	1
EA Cr 5	Green Power:50%	1	May Be
MR	Material & Resources	13	4
MR PR 1	Storage & Collection of Recyclables	Mandatory	Mandatory
MR CR 1.1	Building Reuse:maintain 75% of existing walls, floors and roof	1	0
MR CR 1.2	Building Reuse:maintain 100% of existing walls, floors and roof	1	0

LEED CERTIFICATION

MR CR 1.3	Building Reuse:maintain 100% shell + 50% non shell	1	0
MR CR 2.1	Construction waste management: Divert 50% from disposal	1	1
MR CR 2.2	Construction waste management: Divert 75% from disposal	1	1
MR CR 3.1	Resource reuse: 5%	1	0
MR CR 3.2	Resource reuse: 10%	1	0
MR CR 4.1	Recycled content: 5%	1	0
MR CR 4.2	Recycled content: 10%	1	0
MR CR 5.1	Regional materials:20%	1	1
MR CR 5.2	Regional materials:50%	1	1
MR CR 6	Rapidly renewable materials:5% of building materials	1	0
MR CR 7	Certified wood:50% of wood based materials	1	May Be

LEED CERTIFICATION

EQ	Indoor Environmental Quality	15	13
EQ PR 1	Minimum IAQ Performance	Mandatory	Mandatory
EQ PR 2	Environmental Tobacco Smoke Control	Mandatory	Mandatory
EQ CR 1	Outdoor air delivery monitoring	1	1
EQ CR 2	Increased ventilation	1	1
EQ CR 3.1	Construction IAQ management plan: during construction	1	1
EQ CR 3.2	Construction IAQ management plan: before construction	1	1
EQ CR 4.1	Low emitting materials: adhesives & sealants	1	1
EQ CR 4.2	Low emitting materials: paints	1	1
EQ CR 4.3	Low emitting materials: carpet	1	1
EQ CR 4.4	Low emitting materials: Composite wood & Agrifiber products	1	1
EQ CR 5	Indoor chemical & pollutant source control	1	1
EQ CR 6.1	Controllability of systems: Lighting	1	1
EQ CR 6.2	Controllability of systems: Thermal Comfort	1	1
EQ CR 7.1	Thermal Comfort: Design	1	1
EQ CR 7.2	Thermal Comfort: Verification - 6 to 18 months	1	1
EQ CR 8.1	Daylight : daylight for 75% of spaces	1	0
EQ CR 8.2	Views: Views for 90% of spaces	1	0
	Innovation & Design Process	5	5
CR 1.1	Innovation in Design	1	1
CR 1.2	Innovation in Design	1	1
CR 1.3	Innovation in Design	1	1
CR 1.4	Innovation in Design	1	1
CR 2	LEED Accredited Professional	1	1
	TOTAL POINTS	69	53

LEED has 4 levels of certificates



Less Points

More Points

○ **GEM Rating - Green and Eco-Friendly Movement-----**

○ **SUSTAINABILITY CERTIFICATION PROGRAM-**

○ **ASSOCHAM-**
Association of Chambers and Trade Associations

GEM-SUSTAINABILITY CERTIFICATION PROGRAM

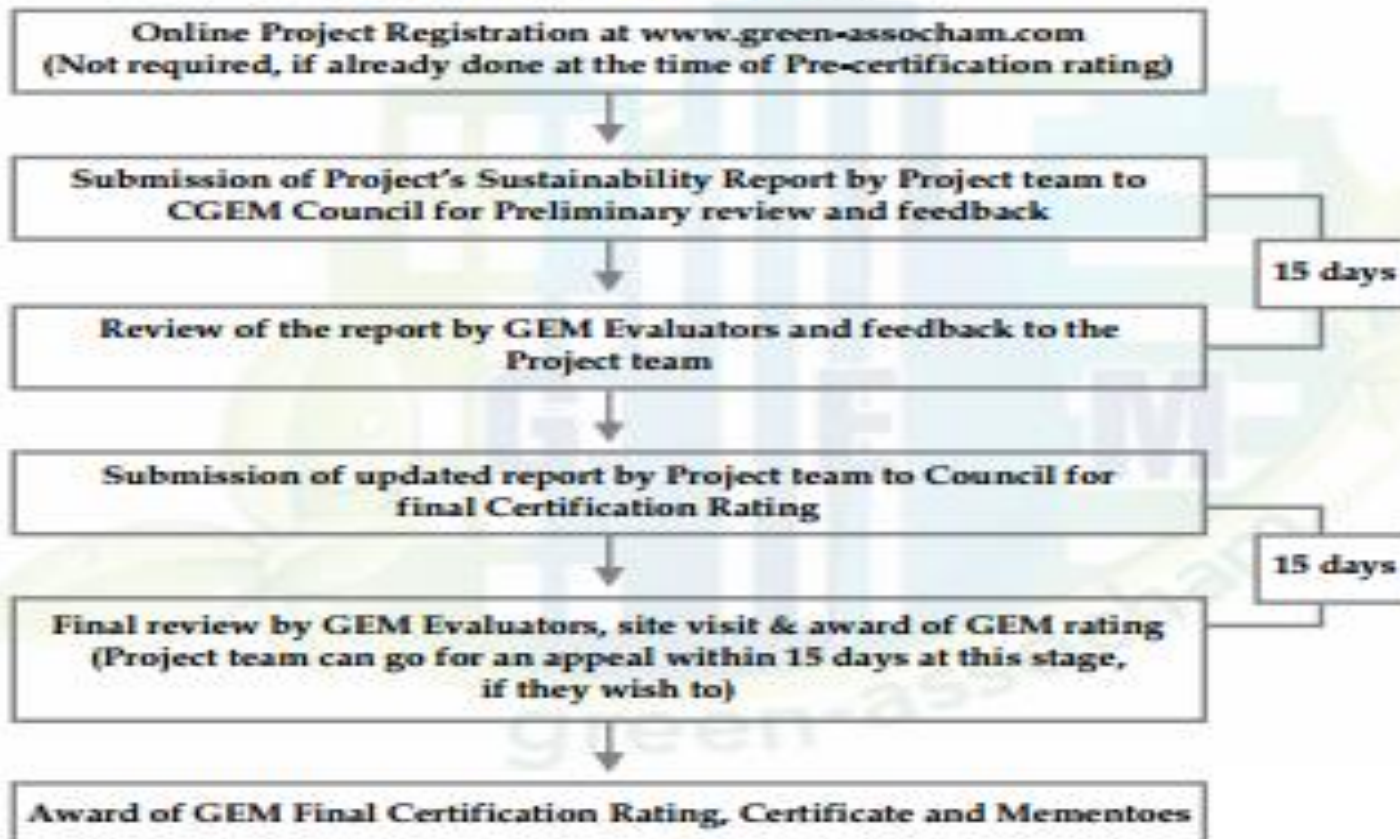
- ◉ **ASSOCHAM** has launched the “**GEM Sustainability (Green) Certification Program**”- **Green and Eco-Friendly Movement**
- ◉ -- to promote environment friendly green building design and construction.
- ◉ **GEM Sustainability Certification Rating Program**--- based upon **BEE ECBC 2017** and **NBC 2016**.
- ◉ award Sustainability Certification Rating to;
- ◉ -- Housing, - Urban Developments, -- Residential, Commercial, -- Hotels, College, Universities, Schools, -- Factory buildings and related developments. **GEM Sustainability Certification Rating -- Twenty Eight Principles**
- ◉ . Points awarded for each Suggested requirement achieved.
- ◉ Scale-- 0-130 point .
- ◉ Project -- achieve **GEM 1 to GEM 5** rating levels
- ◉ --depending upon project design -including building architectural and elevation design, materials used during construction, HVAC, lighting and plumbing system designs, water and energy consumption of the building.
- ◉ --all Essential Principle requirements must be fulfilled along with a minimum number of Principle points.
- ◉ **GEM 5** -- highest achievable rating

GEM-SUSTAINABILITY CERTIFICATION PROGRAM

Final Certification Rating Process

Council will firmly evaluate the documentation within Thirty days timeframe.

Final Certification Rating Process



GEM-SUSTAINABILITY CERTIFICATION PROGRAM

GEM Sustainability Certification Rating Program – Points List

GEM Sustainability Certification Program - Points List

S. No.	Principles	Description	Maximum Points
1	Principle-1	Government Approved Plans	E
2	Principle-2	Construction Management Best Practices	E
3	Principle-3	Parking for Building Occupants	E
4	Principle-4	Landscape Best Practices	4
5	Principle-5	Preserve and Plant Trees Onsite	2
6	Principle-6	High Albedo Materials - Roof and Non-roof	6
7	Principle-7	Rainwater Harvesting - Recharge and/ or Reuse	4
8	Principle-8	Install Low Flow Water Fixtures	7
9	Principle-9	On-site Treatment of Grey & Black Water & Reuse for Flushing	6
10	Principle-10	Irrigation Best Practices	3
11	Principle-11	Measurement of Energy and Water Consumption	6
12	Principle-12	Post-occupancy Waste Management	4
13	Principle-13	Onsite Conversion of Organic Waste	4

GEM-SUSTAINABILITY CERTIFICATION PROGRAM

14	Principle-14	Amenities for fundamental needs and daily commute	6
15	Principle-15	Best Practices for Universal Building Design	5
16	Principle-16	Reduced Exposure to VOC	3
17	Principle-17	No Use of Halogenated Hydrocarbons	2
18	Principle-18	Sustainable Development of Construction Engineering	12
19	Principle-19	Local Sourcing of Construction Materials	6
20	Principle-20	Judicious use of hard wood and soft wood	4
21	Principle-21	Energy Management Best Practices	12
22	Principle-22	Efficient Electric Equipment and Systems	5
23	Principle-23	Use of Imperishable Energy Resources	8
24	Principle-24	Optimal Use of Natural Light	6
25	Principle-25	Healthy Indoor Air Quality	6
26	Principle-26	Training and Capacity Building of Project Team	2
27	Principle-27	Activities for Corporate Social Responsibility	2
28	Principle-28	Going the Extra Miles	5
		Total Points	130

GEM-SUSTAINABILITY CERTIFICATION PROGRAM

GEM Levels

- ◉ GEM 1- All essential requirements and 40 - 49 points--
- ◉ GEM 2--All essential requirements and 50 - 64 points
- ◉ GEM 3-- All essential requirements and 65 - 84 points
- ◉ GEM 4-- All essential requirements and 85 - 104 points
- ◉ GEM 5-- All essential requirements and 105 points or above

◎ Incentives for Green Buildings

Government Incentives for IGBC Projects



सत्यमेव जयते
Ministry of Environment, Forest
& Climate Change



सत्यमेव जयते
गुजरात सरकार
Government of Gujarat



सत्यमेव जयते
राजस्थान सरकार
Government of Rajasthan



Government Incentives for IGBC Projects

S No	State	Incentive details
1	Haryana	9%, 12% & 15% Additional FAR on Silver, Gold & Platinum rating
2	Rajasthan	7.5%, 10% & 15% Additional BAR on Silver, Gold & Platinum rating respectively; 50% cost reimbursement for Green measures
3	West Bengal	10% Additional FAR on Gold or above rating
4	Uttar Pradesh	5% Additional FAR on Gold or above rating 50% IGBC fee reimbursement for hotel/resorts
5	Maharashtra Pune Municipal Pimpri Chichwad Municipal Corp.	Upto 7% additional FAR 3%, 5%, 7% Additional FAR on Silver, Gold & Platinum rating Upto 50% Discount in Premium for Developers & upto 15% Discount in Property tax for Occupants
6	Andhra Pradesh	20% reduction in Permit fees and stamp duty fees on property transfer within 3 years
7	Himachal Pradesh	10% Additional FAR on Gold or above rating
8	Jharkhand	3%, 5%, 7% Additional FAR on Silver, Gold & Platinum rating
9	Punjab	5% Additional FAR on Gold or above rating & 100% reduction in building scrutiny fees
10	Gujarat	up to 50% of consulting charges for industrial project; 50% IGBC fee reimbursement for hotel/resorts
11	Kerala	0% reduction in One time building tax, up to 1% reduction in Stamp duty and up to 20% reduction in Property tax

*Except MGCM, Municipal Corp. included in MMR, New Mumbai notified area, NAINA, MIDC, MIHAN, Hill Stations, MADC, MSRDC, PCNTDA, Eco Sensitive Zone areas, Lonavala Municipal Council



GOV. INCENTIVES TO GREEN BUILDING PROJECTS

Ministry of Environment, Forest and Climate Change - MoEFCC— fast track environmental clearance for certified green building projects

◉ **Government of Punjab**

- PUDA-- additional 5% (FAR)-- free of charge-
- 100 %exemption of building scrutiny fee- for Gold rated buildings

◉ **Urban Development Dept, Govt of Rajasthan**

- ◉ -- additional free 7.5%, 10% and 15% FAR
- ◉ for Silver, Gold ,Platinum rated projects

◉ **Government of West Bengal**

- additional 10% FAR -- Department of Municipal Affairs
- additional 10% FAR -- Gold -- Government of West Bengal (New Kolkata Development Authority) .

- ◉ Green building projects in **MSME sector**-- financial assistance at concessional rates-**Small Industries Development Bank of India (SIDBI)**

Government of Maharashtra--Urban Dev Department—

-- additional FAR of 3%, 5% ,7% for Silver, Gold and Platinum respectively.

Public Works Department (PWD)-- renovation of existing buildings / development of all new government buildings in Maharashtra --carried out as per IGBC Green Building Rating system

GOV. INCENTIVES TO GREEN BUILDING PROJECTS

- **Government of Uttar Pradesh—**
 - Additional 5% FAR-- free of charge --for Gold rated Buildings
 - Additional 5% FAR free- Greater Noida Industrial Dev Authority --for gold rated projects
- **Government of Andhra Pradesh**
 - 25% subsidy-- on fixed capital investment for buildings-MSME /large projects
- **Municipal Administration and Urban Dev Department:**
 - 20% Reduction on Permit Fees
 - If property sold within three year--, one-time reduction of 20% on Duty on Transfer of Property
- **Government of Himachal Pradesh --**
 - -- additional 10% FAR for projects rated Gold / Platinum
- **Urban Dev and Housing Department, Jharkhand—**
 - -- additional FAR of 3%, 5% , 7% for Silver, Gold , Platinum buildings.
- **Government of Haryana (Town & Country Planning Department),**
 - --additional FAR -6%, 9% , 12% for Silver, Gold , Platinum buildings
- **Industries Commissionerate, Government of Gujarat**
 - -- 50% of consulting charges or Rs. 2.50 Lacs, whichever is less,
 - -- for Industrial building >2,000 Sq. Mts. built up area which obtain green rating
- **Pune Municipal Corporation (PMC),Pune Metro Region Dev Authori --**
 - offers an additional FAR of 3%, 5% and 7% for Silver, Gold and Platinum .

 ***Thanks***