Green Building

Outline

- ➤ What is Green Building?
- ➤ Why is Green Building Important?
- > Three aspects of new project planning
- **≻**Obstacles
- ➤ Support for Green Building?

What is Green Building?

- > USEPA definition:
 - ☐ "Green or sustainable building is the practice of creating
 - □ healthier and more resource-efficient models of
 - □ construction, renovation, operation, maintenance, and demolition."
- ➤ More than just installing solar panels on your roof

Why is Green Building Important?

- > Construction waste
 - 8000lbs of waste are typically thrown into a landfill during the construction of a 2000sqft home in USA
- > The buildings are a problem
 - a consume more than twice as much energy as all the cars in the US
 - ☐ Buildings account for 68% of total electricity consumption in the US
 - ☐ Buildings use 80% of total drinking water consumption in the US
 - ☐ Indoor levels of pollution are commonly 2 to 5 times higher than outdoor pollution levels

- > Construction
 - □ Reduce the amount of waste generated at a construction site
- Design
 - ☐ Building design details will help to reduce construction materials, and energy/water requirements when completed
- ➤ Material Selection
 - □ Careful selection of construction materials will leave less of an environmental impact

- > Construction
- Construction waste accounts for 10 to as much as 30% of municipal waste stream
- ➤ Goal: Reduce / Reuse / Recycle
 - ☐ Building design based on standard sizes of materials
 - ☐ Buy higher quality to reduce rejects
 - ☐ Recycle (use scraps)
 - ☐ Train crew
 - ☐ Renovate an existing building

- > Design
- ➤ Goal: To design the building so that it requires less energy/water and is healthier for inhabitants when it is complete and in use
 - ☐ Air ducts for an efficient and healthy air flow
 - ☐ Insulation
 - ☐ Windows designed for maximum daylight
 - ☐ Passive Solar Control
 - ☐ Solar Cells
 - ☐ Heat Exchanger for climate control system
 - ☐ Location

- > Materials
- ➤ Goal: Choose materials that have low environmental costs and do not contribute to indoor air pollution
 - ☐ Engineered Lumber (recycled and reclaimed material)
 - □ Doors and Windows (energy and placement)
 - ☐ Floor Coverings (recycled with no off-gassing)
 - □ Roof Materials (Reflective and light)
 - ☐ Energy Efficient Appliances

Support for Green Building

- ➤ LEED (Leadership in Energy and Environmental Design)

 ☐ Green Building Rating System
 ☐ Voluntary
- > India
 - □GRIHA system
 - □Rating system by Indian Green Building Council (https://igbc.in/igbc/redirectHtml.htm?redVal=showratingSysnosign)

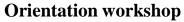
- Five 'R' philosophy of sustainable development
 - **□**Refuse
 - **□**Reduce
 - **□**Reuse
 - □ Recycle
 - **□**Reinvent

- ➤ 'What gets measured, gets managed, GRIHA attempts to quantify aspects, such as:
 - □ Energy / power consumption (in terms of electricity consumed in kWh per square meter per year)
 - ☐ Water consumption (in terms of litres per person per day)
 - ☐ Waste generation
 - ☐ Renewable energy integration

- > GRIHA
 - \Box Current version is v. 2019.
 - Previous version is v. 2015.
 - \square assesses building out of 30 criteria and awards points on a scale of (100+5)
 - 100 points for defined criteria
 - 5 points extra for innovation criterion
- > Eligibility
 - ☐ All new construction projects with built up area more than 2500 m² (excluding parking, basement area, and typical buildings) are eligible for certification under GRIHA v.2019.

GRIHA Certification

Online registration on GRIHA website



For info regarding GRIHA rating

Due Diligence I & II

I – Site visit by GRIHA Council official after project reaches plinth level; 2nd site visit by officials to validate internal finishes, electrical, plumbing, and mechanical components installed (post completion of the building structure work).

Submission of documents & preliminary evaluation

Rating renewal for next 5 years may also be obtained.



Additional due diligence:

Green awareness drive for residents living in there



Final due diligence and final evaluation (valid for 5 years)

https://www.grihaindia.org/griha-rating

Section	Criteria points
1. Sustainable Site Planning	12
2. Construction Management	4
3. Energy Efficiency	18
4. Occupant Comfort	12
5. Water Management	16
6. Solid Waste Management	6
7. Sustainable Building Materials	12
8. Life Cycle Costing	5
9. Socio-Economic Strategies	8
10. Performance Metering and Monitoring	7
11. Innovation	5

UHIE – Urban heat island Effect

GRIHA v.2019			
Section	Criterion No.	Criterion Name	Maximum Points
1. Sustainable Site Planning	1	Green Infrastructure	5
	2	Low Impact Design	5
	3	Design to Mitigate UHIE	2
2. Construction Management	4	Air and Soil Pollution Control	1
	5	Top Soil Preservation	1
	6	Construction Management Practices	2
3. Energy Efficiency	7	Energy Optimization	12
	8	Renewable Energy Utilization	5
	9	Low ODP and GWP Materials	1
4. Occupant Comfort	10	Visual Comfort	4
	11	Thermal and Acoustic Comfort	2
	12	Maintaining Good IAQ https://ww	6 w.grihaindia.org/g

Rating Threshold

GRIHA V 2019 Rating Thresholds	GRIHA Rating
25-40	*
41-55	**
56-70	***
71-85	***
86 or more	****

GRIHA v.2019 fees

Built-up Area (sqm)	Fees
Till 10,000 sqm	Rs 3,74,000 + GST
For every sqm above 10,000	Rs 7.5/sqm + GST

^{*}A maximum fee of Rs 15,00,000 + GST only to be charged from projects not withstanding of built up area.

Obstacles

- >93% of consumers worry about their home's environmental performance.
 - ☐ However, only 18% are willing to pay more to reduce the impact.
 - ☐ There are higher initial costs for Green Building but returns may be realized in long run.
- Customers are concerned they would be sacrificing comfort

Bibliography

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