GRIHA

Green Rating for Integrated Habitat Assessment

Workshop
On
Energy Efficiency in Building Sector and HCFC Phase out
09/11/2017
Residential & Commercial Buildings consume 37% of total electricity.
Relevance

India’s AC Stock Projection - 2015 to 2035

Room AC stock increase ~ 7 times in 20 years
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Central AC stock increase ~ 11 times in 20 years
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Source: Fairconditioning & Chaturvedi V, Sharma M, Chattopadhyay S, and Purohit P. HFC emission scenarios for India. CEEW report
Ozone Depleting Substances in a building

- Refrigeration
- Building Insulation
- HCFCs in Buildings
- HVAC
- Fire Extinguisher
recognized as an “innovative tool” for sustainable development by the United Nations.

Recognized as a “tool for implementing RE in the building sector” by ‘The Climate Reality Project’ - an organisation founded by Mr. Al Gore.

UNEP-SBCI has developed the “Common Carbon Metric” (kWhr/sq m/annum), for international building energy data collection-based on inputs from GRIHA (among others).

GRIHA has been recognized as India’s own green building rating system and part of mitigation strategy for combating climate change in INDIA’s INDC submitted to UNFCCC.
Key Differentiators of GRIHA Rating System

Adaptive to Indian climate & construction practice
- Design led and climate responsive.
- Gives importance to Indian adaptive thermal comfort conditions.
- Rates AC, non-AC buildings as well as hybrid buildings.
- CPWD has adopted GRIHA in their works manual.

Credible & Transparent
- It is a performance based rating system that awards rating only after performance verification.
- It is ethical, dependable & transparent.

Socially inclusive
- It is the only rating system that is socially inclusive and talks about welfare of construction workers and service staff.

Smart and traditional
- Focuses on local solutions and promotes traditional design principles for providing comfort to occupants.
GRIHA adoptions and incentives

Government Adoption

1. Ministry of New & Renewable Energy (MNRE) has supported and endorsed GRIHA Rating.

2. Ministry of Environment and Forests (MoEF), facilitates fast track environmental clearance for GRIHA pre certified projects

3. Government of Sikkim has adopted GRIHA for all government and semi-government structures

4. Haryana, Delhi, Uttar Pradesh, West Bengal, Rajasthan have announced additional FAR (Floor Area Ratio) for GRIHA Rated Projects.

5. PMC & PCMC have announced property tax rebates for GRIHA Rated Projects.

Number of registered projects: 991
Registered built up area > 40 million m²
GRIHA can rate all types of habited buildings. The building types include but are not limited to offices, retail spaces, institutional buildings, hotels, hospital buildings, healthcare facilities, residences and multi-family high-rise buildings.

**GRIHA Rating variants**

- **New Buildings**
  - SVA-GRIHA (Small Versatile Affordable)
    - 100 m² < Built-up-area < 2,500 m²
  - GRIHA
    - 2,500 m² < Built-up-area
  - GRIHA LD (Large Development)
    - 50 Hectares < Built-up-area

- **Existing Buildings**
  - GRIHA EB (Existing Buildings)
    - 2,500 m² < Built-up-area
  - GRIHA for Day time Schools
GRIHA and HCFC phase out

GRIHA version 2015 : New buildings

• Mandatory compliance : Low ODP materials

• All the insulation used in building should be CFCs and HCFCs free

• All the refrigerant in the HVAC and refrigeration equipment should be CFCs free

• The fire suppression systems and fire extinguishers installed in the building are free of Halon.
GRIHA and HCFC phase out

GRIHA for Existing Buildings

- Mandatory compliance: Low ODP materials

- It is mandatory that all HVAC equipment should be CFC free and all insulation should be CFC and HCFC free

OR

- Submit a phase out plan for HCFC/CFC using equipment present in the building.

- The criterion also mandates that fire fighting equipment are Halon-free
Energy Efficiency

- Radiant Cooling Technology
- 56% reduction in annual energy consumption as compared to a conventional building
- 79% of the total area is day-lighted
- ECBC compliant energy efficient artificial lighting system
- ECBC Compliant envelope to reduce space conditioning loads
- 33% of annual energy requirement for artificial lighting met by solar energy.
- Total installed capacity of renewable energy system at site is 45kWp

53.12% reduction in landscape water consumption

A series of Watersheds, along the contours have been developed into permanent water bodies in order to channelize and collect Storm water run-off.

The capacity of the STP installed on site is 90 KL/day.
Laboratory, IIT Kanpur

- Trees preserved and protected
- Solar PV and Solar Thermal systems
- N-S Orientation with shading (roof/window)
- Outdoor solar lights
- Lesser paving
New Integrated Passenger Terminal at Chandigarh Airport

Savings from GRIHA Benchmarks:
- More than 50% in electrical energy
- 39% in irrigation water demand
- 67.36% in building water use

Green Features:
- Designed for optimal solar orientation with appropriate shading to minimize heat gain and maximize energy efficiency.
- The glass area is limited to 58% of the façade area and the roof is well insulated.
- The central air-conditioning of this building is controlled by variable frequency drive (VFD) and advanced building management system (BMS) for high efficiency.
Savings from GRIHA Benchmarks:

- EPI – 20.45 kWhr/m²/annum
  More than 80% in electrical energy
- RE installed on site – 16 kWp
- 37% in irrigation water demand
- 51% in building water use
THANK YOU

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