

22.11.1. Green Building

- Buildings are one of the major pollutants that affect urban air quality and contribute to climate change.
- Human Habitats (Buildings) interact with the environment in various ways. Throughout their life cycles, from construction to operation and then demolition, they consume resources in the form of energy, water, materials, etc. and emit wastes either directly in the form of municipal wastes or indirectly as emissions from electricity generation.
- Green building is the essence of which would be to address all the pollution related issues of a building in an integrated and scientific manner.
- A green building depletes as little of the natural resources during its construction and operation.
- The aim of a green building design is to:
 - Minimize the demand on non-renewable resources and maximize the utilization efficiency of these resources when in use, and
 - Maximize reuse and recycling of available resources
 - Utilization of renewable resources.
- It costs a little more to design and construct a green building.

- However, it costs less to operate a green building that has tremendous environmental benefits and provides a better place for the occupants to live and work in.
- It maximizes the use of efficient building materials and construction practices; optimizes the use of on-site sources and sinks by bio-climatic architectural practices; uses minimum energy to power itself; uses efficient equipment to meet its lighting, air-conditioning, and other needs; maximizes the use of renewable sources of energy; uses efficient waste and water management practices; and provides comfortable and hygienic indoor working conditions.
- It is evolved through a design process that requires all concerned (the architect and landscape designer and the air conditioning, electrical, plumbing, and energy consultants) to work as a team to address all aspects of building and system planning, design, construction, and operation.
- They critically evaluate the impacts of each design decision on the environment and arrive at viable design solutions to minimize the negative impacts and enhance the positive impacts on the environment.
- In sum, the following aspects of the building design are looked into in an integrated way in a green building:
 - Building system designed in a way to efficiently use HVAC (heating ventilation and air conditioning), lighting, electrical, and water heating.
 - Integration of renewable energy sources to generate energy onsite.

- Selection of ecologically sustainable materials (with high recycled content, rapidly renewable resources with low emission potential, etc.) for Water and waste management.
- Indoor environmental quality (maintains indoor thermal and visual comfort and air quality)

22.11.2. Green Rating for Integrated Habitat Assessment (GRIHA)

- GRIHA is a Sanskrit word meaning - 'Abode'.
- GRIHA has been conceived by TERI and developed jointly with the Ministry of New and Renewable Energy, Government of India.
- The green building rating system devised by TERI and the MNRE is a voluntary scheme.

Objective

- The primary objective of the rating system is to help design green buildings and, in turn, help evaluate the 'greenness' of the buildings.

Aim

- The rating system aims to achieve efficient resource utilization, enhanced resource efficiency, and better quality of life in the buildings.

Rating Tool

- GRIHA is a rating tool that helps people assess the performance of their building against certain nationally acceptable benchmarks and is suitable for all kinds of buildings in different climatic zones of the country.
- Going by the old adage 'what gets measured, gets managed', GRIHA attempts to quantify aspects such as energy consumption, waste generation, renewable energy adoption, etc. so as to manage, control and reduce the same to the best possible extent.
- It will evaluate the environmental performance of a building holistically over its entire life cycle, thereby providing a definitive standard for what constitutes a 'green building'.
- The rating system, based on accepted energy and environmental principles, will seek to strike a balance between the established practices and emerging concepts, both national and international.
- The guidelines/criteria appraisal may be revised every three years to take into account the latest scientific developments during this period.

The basic features

- The system has been developed to help 'design and evaluate' new buildings (buildings that are still at the inception stages).
- A building is assessed based on its predicted performance over its entire life cycle - inception through operation.
- The stages of the life cycle that have been identified for evaluation are:

Rating system

- GRIHA rating system consists of 34 criteria categorized under 4 categories.
- They are
 1. Site Selection and Site Planning,
 2. Conservation and efficient utilization of resources,
 3. Building operation and maintenance, and
 4. Innovation points.
- Eight of these 34 criteria are mandatory, four are partly mandatory, while the rest are optional. Each criterion has a number of points assigned to it.
- It means that a project intending to meet the criterion would qualify for the points. Different levels of certification (one star to five stars) are awarded based on the number of points earned. The minimum points required for certification is 50.

The benefits

- On a broader scale, this system, along with the activities and processes that lead up to it, will benefit the community at large with the improvement in the environment by reducing GHG (greenhouse gas) emissions, reducing energy consumption and the stress on natural resources.
 - Reduced energy consumption without sacrificing the comfort levels
 - Reduced destruction of natural areas, habitats, and biodiversity, and reduced soil loss from erosion etc.
 - Reduced air and water pollution (with direct health benefits)

- Reduced water consumption
- Limited waste generation due to recycling and reuse
- Reduced pollution loads
- Increased user productivity
- Enhanced image and marketability

The challenges

- The Indian building industry is highly de-centralized with people and/ or groups engaged in design, construction, equipment provision, installation, and renovation working together.
- Each group may be organized to some extent, but there is limited interaction among the groups, thus disabling the integrated green design and application process.
- Hence, it is very important to define and quantify sustainable building practices and their benefits.
- It is also important to separate the role of different participants in ensuring that the building consumes minimal resources over its entire life cycle and leaves behind a minimal environmental footprint.