

A Review on Green Building

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ABSTRACT—

The main objective of this paper is to give an overview an existing building to make it a perfect eco-friendly building. Its main goal is to preserve the resources like raw materials, energy, and water, fight against global warming, minimize the waste and other pollutions an maximize the whole life cycle performance and utilization of natural resources. The Green building is also called as sustainable building. It also to bring the comfort and health to occupants using materials of high sanitary and environmental quality, both for the actual construction and for the insulation.

KEYWORDS: Green building, Sustainable building, global warming, eco-friendly.

1. INTRODUCTION:

The main concept of creating structures and processes that are environmentally responsible and resource-efficient throughout a building life cycle from siting design, construction, operation, maintenance, renovation, and de-construction. It is the one which uses less water, optimizes energy efficiency, and conserves natural resources. When compared to traditional buildings, produces less waste, and gives occupants healthier spaces.

The worlds of construction and design are changing rapidly as the global desire for sustainable building increases.

There are so many famous green buildings in India. They are:

1. CII - Sohrabji Godrej green Business Centre:

It was established in the year of 2004 and it is in Hyderabad, India.

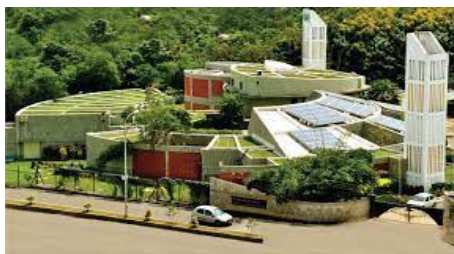


Fig-1: CII-Godrej green center

2. ITC Green Centre:

It is the world's largest platinum rated green office building. it was established in the year of 2003 and it is in Gurgaon.



Fig-2: ITC Green Centre

3. Suzlon Energy Limited:

It was established in 1995 and it is in Pune. It is one of the leading renewable energy solution providers. Suzlon has installed more than 19.5 GW of wind energy over the previous 20 years in 17 nations on six continents.



Fig-3: Suzlon energy building

4. Solar air conditioning-Turbo energy limited:



5. Indira Gandhi international airport- Delhi T3:



PRINCIPLES OF CONSTRUCTING GREEN BUILDINGS:

There are five types of principles of green buildings. They are:

1. Site selection and planning:

- The site should be environmentally responsible
- Orientation of building is best
- Surface of land will not be any slopes and it should be minimized
- Quality and quantity of water is considered
- The surrounding waterways, nearby farmland and protected wetlands must be taken as main considerations in the decision.
- Leadership in Energy and Environmental Design (LEED) is a certification that is provided for buildings with green qualities and sustainability.

2. Energy efficiency:

Improving the energy performance of existing buildings is important to increasing our energy independence. By using of Net Zero Energy concept, significantly reduce our dependence on fossil-fuel on

energy.

3. Protect and conserve water:

A sustainable building design and construction minimizes the impact on freshwater stock by making optimal use of water. Additionally, when feasible, water recycling on specific on-site projects should be encouraged via sustainable building design and construction.

4. Optimize building space and material usage:

The utilization of natural resources (and the demand for them) is growing along with the global population. A sustainable building is one that uses materials in the most efficient and environmentally friendly way possible during the entire life cycle.

5. Indoor Environmental Quality (IEQ):

The health, comfort, and productivity of building occupants are significantly impacted by the indoor environmental quality (IEQ).

6. Optimize operational and maintenance practices:

The need for new or updated sustainable building designs that balance with safe, secure, and productive environments for building owners.

CONSTRUCTION OF GREEN BUILDINGS:

There are 9 steps to construct a green building. they are:

Step-1: program planning and needs assessment:

Firstly, we need to prepare the execution plan. the execution of plan must involve the following parameters in consideration.

- Budget for the entire construction
- Materials required
- The site and its landscaping
- Facilities to be provided like water, electricity, air quality and water disposal
- Including of plants and vegetation
- Site planning and assessment.

Goal-setting and customer needs analysis are two other crucial components of program planning. For instance, a residential building amenity won't be the same as those for a school building.

Step-2: team selection and formation:

The selection of a team is crucial since they will pioneer the full construction of green buildings and ensure long-term sustainability. The members must be familiar with the concepts of green design principles, norms and regulations.

The team must include following:

- Designers and architects
- Engineers
- Builders or contractors
- Construction workers
- Building inspector

The qualities that you need to check among the members are:

- Experience in green design principles
- Ability to simulate and integrated and green design
- Knowledge of energy conservation techniques

Step-3: designing of planned site:

Designing of site is the stepping stone for building construction. There are certain factors are to be considered. They are:

- Analyzing of climatic conditions, type of soil and topography of the site.
- Make plans to ensure the building strength and durability.
- Keep the area's diverse ecology intact.
- Provide the greenways like walking trails and cycle trails.
- Plan for rainwater collection to conserve water and reuse it.

Step-4: building design for adaption and accommodation:

The buildings need to be configured and designed efficiently for temperature regulation and controlling the thermal mass. They are:

- Utilization of existing plantations and enhance the greenery
- Control of the winds to balance the air pressure.
- Make sure there is access to sunshine and space for natural ventilation.
- To regulate and balance the needs for cooling and heating, create an HVAC zone (heating, ventilation, and air conditioning).
- Select buildings materials like **Protherm smart bricks** that help in controlling

temperature fluctuations.

Step-5: designing of building support systems:

Electricity, waste disposal, lightning, ventilation and other support systems of a building must be appropriately designed for green buildings

The desired objectives are:

- Select recycled, locally manufactured and environment friendly materials for construction.
- Create flexible floors providing appropriate spacings for longer life.
- Arrange windows to capture the fresh air and light to reduce artificial heating and cooling as well as reduce the lighting load.
- Solar wall and PV panels can be used for renewing the energy resources.
- For managing the air quality, use carbon dioxide sensors, trees, movable windows, and enough ventilation.
- Using water efficient toilet fixtures and other wastewater treatment technologies to be adopted.

Step-6: interior design:

Along with the building support systems, the interiors must be designed efficiently for including high energy preservation and conservation.

The points that considered are:

- Create separated areas for collecting waste products that can be recycled.
- When finishing indoor spaces, choose materials with low air pollution emissions.
- The location must be far from polluted places to ensure that the air there is fresh.

Step-7: specifications documentation and drawing:

Creating the design drawings and specifications is a crucial activity as it will be referred by the builders and construction workers throughout the entire life.

The specifications that need to be present mandatorily are:

- Landscaping to maintain the natural habitat and eco-diversity of the living species and plants.
- Energy efficient systems like water, lightning and ventilation etc.,
- Water features of the site including re-utilization of water, infiltration basins etc.
- Indoor air quality.
- Methods and facilities that conserve water.

- Regulation of the disposal of trash.
- To be used are green products and resources.

Step-8: Building construction and authorization:

The next phase is to start the building after the design is completed and the specifications are documented.

The points to be noted during the construction process are:

- Controlling soil erosion.
- Protect the ecology, paying particular attention to rare and threatened species.
- By using reuse and recycling measures, waste disposal can be decreased.
- Ensure preservation of top-soil.

Step-9: verification and maintenance:

After the construction is completed, the buildings must be verified and authorized to ensure they meet the desired standards.

Certain safety and security aspects must be examined before occupants of green buildings, including:

- Ensure no harmful fumes exist
- Check for any leakages
- Scrutiny the walls, doors and windows for any cracks occurred.

The key points you must focus on the maintenance. They are:

- Regular monitoring of landscaping and the site premises.
- Deep cleaning and pest control.
- At regular intervals, inspect the ventilation, heating, and air conditioning systems. Check the durability of the exterior walls.
- Verify the durability of the outer walls.

CONCLUSION:

The green building concept represents both the present and the future of architecture. More people need to adopt the green building concept because it is cost-effective, healthy, and most importantly, environmentally responsible. There are many sustainable building materials and energy options available to reduce environmental effect. This trend, which is being followed not only by emerging nations but also by industrialized ones, is the savior of our generation's future.

REFERENCES:

1. **A Review on Zero Energy Buildings, J. Sree Naga Chaitanya**, International Journal of All Research Education and Scientific Methods (IJARESM), ISSN: 2455-6211 Volume 9, Issue 7 July -2021, Impact Factor: 7.429.
2. **Study on Smog Eating Buildings, J. Sree Naga Chaitanya**, International Journal of All Research Education and Scientific Methods (IJARESM), ISSN: 2455-6211 Volume 9, Issue 7 July -2021, Impact Factor: 7.429,].
3. Green Building: A New Wave in India.Vol3 Issue12 3781-3790,2015
4. Yan Ji and Stellioplainiotis (2006): Design for Sustainability. Beijing: China Architecture and Building Press. ISBN 7-112-08390-7
5. U.S. Environmental Protection Agency. (October 28, 2009). Green Building Basic Information. Retrieved December 10, 2009, from <http://www.epa.gov/greenbuilding/pubs/about.htm>
6. Green Building: A New Wave in India.Vol3 Issue12 3781-3790,2015
7. <https://us.sunpower.com/what-green-building/>.
8. Al-Ali Z.S. Analysis of project costs for green buildings in the UAE: A case study, The British University of Dubai, Faculty of Business. 2014.
9. Abuamer E., Boolaky M. Consumer behavior towards green building: a study in Abu Dhabi. International Journal of Business Administration. 2015;6(3):72-83.
10. Jordan Green Building Council. Your guide to green building in Jordan, green building informative booklet. 2017. https://rise.esmap.org/data/files/library/jordan/Energy%20Efficiency/Jordan_Guide%20to%20green%20building%20in%20Jordan.pdf
11. Smith T. Green building project example. 2010.http://www.deland.org/Pages/DeLandFL_Building/GreenPresentation.pdf
12. Aghili N., Mohammed A.H., Shean-Ting L. A Review on green building index: management criteria, Department of Real Estate, University Teknologi Malaysia, Johor, Malaysia. 2016.
13. Building Construction Authority (BCA), Green Building Platinum Series. Building Planning and Massing. 2010.

14. Aliagha G.U., Hashim M., Sanni A.O., Ali K.N. Review of green building demand factors for Malaysia, Journal of Energy Technologies, and Policy. 2013;3(11).