

GREEN BUILDINGS FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

Global sustainability goals have led to the development of the green building movement. Sustainable development and green buildings are often used interchangeably. Although sustainable development and green buildings are related, they are not the same. Increase in demand of houses which lead to consumption of more energy, resources and raw materials which are responsible for the rise in carbon content in air which are harmful to environment and human health. Nowadays we are facing various environmental impacts due to which we need to build with more sustainable materials which will lead to reduction of impacts on environment. This paper provides an overview of how green building relates to sustainable development practices and deals with the various energy saving concepts which can be incorporated at the time of planning, designing, construction and execution stage to have energy efficiency in buildings keeping in mind the cost perspective.

Key Words: *sustainability, green buildings, environment, sustainable development.*

Introduction

Sustainability has become increasingly important in the building industry in recent years. A movement has occurred to construct buildings in a more efficient and sustainable manner by reducing energy use and the costs associated in operating and maintaining the buildings. A green building is an outcome of a design philosophy which focuses on increasing the efficiency of resource use; energy, water, and materials while reducing the impact on human health and the environment during the building's lifecycle, through better design, construction, operation, maintenance and removal.

Urbanization is growing on a faster pace throughout the world resulting into multifarious environmental problems of serious nature. These problems include air pollution, heat island, adverse health effects, water and noise pollution, waste disposal, social and economic. To address a portion of the ecological issues, presentation of green building idea in major urban area is a stage towards environmental protection. Green structures are by and large sustainable structures which provide better environment and restrict negative effects. Moreover, green buildings provide a sense of belongings to nature, save energy consumption by providing cooling effect, reduce heat island effect and provide better environmental conditions.

Green building is a concept incorporating a wide spectrum of solution and best practices. It is an outcome of design philosophy which emphasizes on optimum utilization of resources and increases the efficiency of resource utilization. Green building also referred as sustainable building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from sitting to design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability and comfort. The basic objectives of these kinds of buildings are;

- Efficient use of energy, water and other resources
- Human satisfaction
- Reducing waste, pollution, environmental degradation and better waste management.

Green Techniques

Emphasis of four 'R's:- The four R's which forms the basis for sustainable construction includes:

Reduce: Lower quantity of building material, resources, and embodied energy.

Reuse: Construction materials that are practical and structurally sound are reused.

Recycle: Recycled materials are used, and home is designed for recyclables.

Renewable: Energy from natural and renewable sources are emphasized upon. These four R's are the essence of green construction.

Green building may be conceptually defined as the tool of increasing efficiency of buildings resources in the form of energy, water and materials while reducing building impacts on human health and the environment.

Environment friendly innovative technologies like energy efficient materials, intelligent gadgets, energy efficient doors and windows, solar water heating and generating power, rain water harvesting are used by many developers in different parts all over the country, but now more and more builders and developers are going in for projects that promote an eco-friendly life style.

The green buildings may have multidimensional benefits either directly or indirectly, some of which are reflected here under:

- Efficient technologies
- Easier maintenance
- Return on investment
- Improved indoor air quality
- Energy efficiency
- Water efficiency
- Reducing waste, contamination and environmental pollution
- Efficiently utilizing resources, water and different assets
- Protecting inhabitant wellbeing and enhancing efficiency
- Waste reduction
- Temperature moderation
- Water conservation
- Economical construction for poo
- , • Healthier lifestyles and recreation

- Improved health.

Demerits of Green Building

Though there are significant benefits of green building yet some disadvantages also observed which are listed as under:

- Initial cost is high.
- Lack of availability of materials.
- Need of more time to construct.
- Need skilled worker.

Building sector has emerged as one of the largest primary energy consumer throughout the world. Population growth and housing demand has forced policymakers to compromise on the environmental friendly aspects of the buildings from last two decades. Global warming and climate change issues has now forced the policy makers to have a fresh thought on the energy and resource consumption of modern buildings. Throughout the world greenness of building has become the synonym of environmental and sustainable building.

Various Energy Saving Concepts

Site Selection- Although site selection is usually based on price, a poor decision can preclude several sustainable features. Making the most out of what the site has to offer can be the difference between a high performance building and traditional one.

Orientation- Proper orientation allows for passive solar gain and day lightning. In the northern hemisphere, south facing windows have the greatest exposure to the sun. West facing windows need to be carefully designed, as the low angle of the setting can cause overheating.

Walls and Roof- the envelope of the building is a significant determinant of how much energy is required to heat and cool it. The challenge in designing the foundation, walls and roofs is to minimize conductive heat loss/gain while minimizing uncontrolled movement of air into the building.

Energy Efficient Appliances- Use of energy efficient and eco-friendly appliance reduces utility cost. While purchasing new electrical appliances always look for BEE star rating. More stars indicate more efficiency. The small additional initial installation cost will be compensated many times over by the savings and the occupants comfort.

Heating, Air-Conditioning and Ventilation- Reducing the heat load of the structure allows for the installation of a smaller heating and cooling system. The importance of high quality ventilation systems is often overlooked during the design phase, but is a fundamental consideration in green building.

Waste reduction- Green architecture also seeks to reduce waste of energy, water and materials during construction. One goal should be to reduce the amount of material going to landfills. Well-designed buildings also help reduce the amount of waste generated by occupants as well, by providing on-site solution such as compost bins to reduce matter going to the landfills.

METHODOLOGY

As the energy required for manufacturing of cement and other construction material is more so it is major contributor to the consumption of our total energy source. Using such materials described below with their benefits towards environment. Following are the materials which can be used for green buildings according to their local availability, benefits, cost and durability.

Lime

Lime is the chief material which replaces the cement in building construction. It gives the good air quality by absorbing the carbon and emitting oxygen in the atmosphere. By looking at the ancient construction we can make it out the durability of lime in terms of quality and life of it as it gets strengthened by time to time .

Sand Lime Bricks

Sand Lime Bricks replaces the conventional bricks in the market of construction industry. The main constituents of sand lime bricks are sand, lime, fly ash, water. Using sand we can achieve the adhesiveness to hold the particles together. Its brittleness helps us to recycle it and reuse in other works.

Eco-Friendly Tiles

An Eco-friendly tile replaces the conventional flooring and uses less energy in their production. It is cheap as compared to the conventional tile. They are available as per the client requirement in various patterns and also easy to place. This tile improves performance of indoor environment quality. Tiles are replaced by the eco-friendly tiles. Eco-friendly tiles are cheap in cost as compared to regular tiles.

Coloured Lime Plaster

Though low VOC (Volatile Organic Compounds) paints are available but by using coloured lime plaster as paint it reduces the painting for whole structural life. It is maintenance free, washable and water proof. Its shine and glossiness increases as the time passes. It gives better aesthetics look than conventional painting work. Regular paints are replaced by coloured lime plaster. This is very cheap and long lasting as compared to regular paints.

Reflectasol Glass

Reflectasol glass gives better indoor quality than the normal clear glass. It keeps the inner temperature cool in hotter summers which reduce the energy consumption. This glass reduces the solar heat gain but allows the optimum lighting through the day which reduce electricity load. It is a good resistant of U.V rays which reduces the cause of skin retention of occupants. It also gives privacy as compared to the normal clear glass.

Wood as a building material

Wood is a material of choice in many countries for residential and light commercial buildings. 90 % of the residential buildings in the US are wood-frame construction. Japan is also not far behind. The use of wood in green buildings fits well with the previously mentioned criteria for green building materials. Wood is a renewable resource, manufactured in nature using a large quantity of solar energy. Hence, no fossil fuels are required for manufacturing of wood. When waste wood is burned, it provides an independent source of energy. Energy from waste wood is solar energy, which has been stored in the wood for a

few years. Another reason for building in wood is the increase in the pool of carbon stored in wood and wood products. This is very important from a climate change standpoint. Within the green building sector, the wood industry must innovate and try to improve their market by creating a niche for new structural products.

Conclusion

Green buildings are today the most widely used form of architecture. Creating green buildings is an important focus of building owners and even governments worldwide. In India some world class Sustainable building is considered as a way for the building industry to move towards protecting the environment. Green Buildings have constructed in past few years, but still the concept of green buildings for general masses is in infancy stage. Present work is an attempt in the direction to make people, communities and general public aware about the advantages of green buildings for sustainable environmental development and management. Sustainable building is considered as a way for the building industry to move towards protecting the environment. The promotion of sustainable building practices is to pursue a balance among economic, social, and environmental performance in implementing construction projects.

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