

Green Building for Healthy Living and Better Environment

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Abstract - *A healthy living and environment plays a major in an individual's life. Buildings make the world's largest contribution to this growing menace. The globe is in an urgent need of sustainable and a smart development as the problem of pollution and global warming is rapidly increasing all over the world.*

The green building is a sustainable system that utilise optimum use of the natural resources throughout its lifecycle. It includes planning, designing, maintaining till demolition and recycle. The successful implementation of the green building design and construction is constrained by time, cost and risks associated, all of which determine the level of adoption.

In the developed countries like United States of America, Russia, Australia, United Kingdom, there are already strict measures been taken to achieve a sustainable development and also rules and regulations are been made by their respective governments to support and achieve a sustainable and an eco-friendly development of their nations. However, in country like India, we are far behind in achieving a sustainable development and eco-friendly constructions. Also, there is a lack of awareness amongst the people about this global issue.

This paper gives the overview of green building and how and where we are lacking in adoption of this system and how we can implement this method which is need of the hour.

Key words: *Green building, environment, High performance building, Renewable energy, Energy efficiency*

1. INTRODUCTION

Buildings are not only investments or something which is considered as fiscal benefit. It cannot be taken as mere four walls and a roof. The building environment can have both negative and positive impacts on the occupant's quality of life. Reducing these problems through green building design often improves health and performance. In addition to reducing risks and discomforts, buildings should also contain features and attributes that create positive psychological and social experiences. [1] Heavy industrialization, urbanization, population explosion, and intensive growth of IT are the prime energy consumers in modern cities accounting up to 40 to 45% energy consumption. Urbanization is growing on a faster pace throughout the world resulting into multifarious environmental problems of serious nature. [2] Increasing concentration of greenhouse gases and consequent global warming are the alarming problems the world is facing today. Green building concept is one such an effort made to fulfil the above mentioned issue which is strategically planned and designed. [3] The origin of Green building can be traced back to the late nineteenth century. [4]

Environmental Protection Agency (EPA) of USA defines green building as follows –“Green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from siting to design, construction, operation, maintenance, renovation and deconstruction”. [5]

The aim of a green building design is to minimize the demand on non-renewable resources, maximize the utilization efficiency of these resources, when in use, and maximize the reuse, recycling, and utilization of renewable resources. [6]

1.1 Need of green building

Buildings account for more than 41% energy consumption in developed countries. [3]

Increasing concentration of greenhouse gases and consequent global warming are the alarming problems the world is facing today. Clearly fossil fuel being finite. There is an urgent need to improve the energy efficiency of the Indian construction sector, as various appliances and other systems use more Energy. Urbanization is growing on a faster pace throughout the world resulting into multifarious environmental problems like air pollution, heat island, adverse health effects, waste disposal, water and noise pollution.

To address a portion of the ecological issues, presentation of green building is a stage towards environmental protection. Moreover, green buildings provide a sense of belongings to nature, save energy consumption by providing cooling effect and provide better environmental conditions. [3]

1.2 Characteristics of a Green Building are Minimal disturbance to vegetation and landforms, use of recycled and environmental friendly non-toxic building materials, efficient use of water and energy with use of eco-friendly equipment. Use of renewable energy, plays a major role. Good Indoor air quality for human safety and comfort and effective controls and building management systems. [6]

1.3 The essence of Green Building

Planning building orientation by creating longer axis in east west direction, placement of non-habitable like verandas, store rooms and staircases should be made on east and west direction. Integrating screens to allow natural ventilation and cross ventilation to cool the building. Designing recessed windows on the south façade to avoid direct sun radiation on the windows. Using ceilings which reflect the natural light and bring it deep into the room. Using green roofs and green walls for better cooling effect, designing rainwater harvesting and proper waste management.

1.4 Benefits of Green Building

Efficient technologies, Easier maintenance, Return on investment, Improved indoor air quality, Energy and Water efficiency, Reducing waste, and environmental pollution, Protecting inhabitant wellbeing and enhancing efficiency, Temperature moderation, Water conservation, Improved health and lifestyles.[6]

1.5 Demerits of Green Building

Initial cost is high, Lack of accessibility of materials in the market, time consuming. Availability of skilled worker is limited. [3]

People are not opting due to lack of information and incorrect perception regarding materials. Availability of required materials for green buildings is difficult and complex. There is lack of support from government in terms of the incentives grants. Turmoil in the real estate industry makes it difficult for people to choose green building due to financial constraints. In the Indian context, government must also include town planning, sanitation and relevant social infrastructure to play a role. Added to these above mentioned is lack of professional knowledge for facilitation of Leadership in Energy and Environmental (LEED)/ Green Star Rating System (GRIHA) certification and consultancy services is still present.[3]

1.6 The green building rating systems in India: Leadership in Energy and Environmental Design Rating System (LEED), Green Star Rating System (GRIHA).[3]

Leadership in Energy and Environmental Design Rating System (LEED) INDIA

LEED, a product of the U.S. Green Building Council (USGBC), provides a complete framework for assessing building performance and meeting sustainability goals within 6 category rating system. The categories are: sustainable sites, water efficiency, energy & atmosphere, materials & resources, indoor environmental quality and innovation & design. There are 69 possible points and four certification levels. Basic LEED Certification requires 26 to 32 points; LEED certified silver level requires 33 to 38 points; LEED certified Gold level requires 39 to 51 points; and LEED certified platinum level requires 52 to 69 points. . [3]

GRIHA : Green Star Rating System Formed by The energy And Resources Institute (TERI), INDIA, it identifies projects that have demonstrated a commitment to sustainability by designing, constructing or owning a building to a determined standard. TERI (GRIHA) certification system consists of 34 criteria of the rating under 4 categories namely site selection and planning, building planning and construction, building operation and maintenance, innovation. Different levels of certification (one star to five star) are awarded based on the number of points earned. The minimum points required for certification is 50. Building scoring 50 to 60 points, 61 to 70 points, 71 to 80 points, and 81 to 90 points will get one star, two stars, three stars and four stars respectively. A building scoring 91 to 100 points will get the maximum rating i.e. five stars. . [3]

RECOMMENDATIONS

Government should make mandatory that all the Government buildings should be green buildings. Create awareness among people, Government should encourage with rebate and subsidy, The Building by-laws should have stringent rules and regulations. Make the materials available. Material manufacturing companies should train labourers. Green building laws and codes in our country are voluntary. Till date, India does not have an effective and comprehensive green building code. .[7]

CONCLUSION

The environmental impacts of buildings are enormous. Conventional buildings use large amounts of energy, land, water, and raw materials for their construction and operation. They are responsible for large greenhouse gas (GHG) emissions as well as emissions of other harmful air pollutants along with generation of large amounts of construction and demolition (C&D) waste and have serious impacts on plants and wildlife. [8] In today's era where energy crisis is a major problem, green buildings give a brilliant and promising solution. These are designed to use minimum energy. All the systems for cooling, heating, ventilating are designed such that they require very less energy. Hence green building is the need of the hour for healthy living and better environment.

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