



## Green building: Energy efficient and environment friendly building

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### Abstract

India is second largest populated country and facing many problems related to energy and environment. Green building is one of the solutions which can be helpful in decreasing the energy demand and improving the environmental quality. Green buildings are designed to decrease the adverse effects of the built environment on human being and natural environment by using optimum energy, conserving natural resources and using the recycled water by providing healthier environment for human beings. The basic aim of the green buildings is to reduce the overall impact on the human being and environment. This paper focuses on the importance of green buildings in improving the environmental quality.

*Keywords: Energy, Environment, Green building, Human health, Natural resource.*

### Introduction

India is experiencing growth in the population, energy demand and environmental problems. Due to raising population, the energy demand and environmental problems are also increasing in many folds. In India the energy consumption in buildings is for heating, ventilation and air conditioner accounts for between 45 and 65 percent of total electricity consumption. Construction sector of India emits about 22 percent of the total annual emission of CO<sub>2</sub> which is very harmful for the environment. So to manage the real situation a new emerging concept in India i.e. green building this is helpful in environment protection. Green building is also known as sustainable building which is responsible for environment protection and energy efficient. In other words, green building design involves finding the balance between homebuilding and the sustainable environment. The green building practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. It is an opportunity to use the resources efficiently while creating healthier environment that improve human health, and provide cost savings.

### Rating system of green buildings

Leadership in energy and environmental design (LEED) is a set of rating systems for certifying green building in various aspects which are design, Construction, operation, and maintenance of green buildings, which was developed by the U.S. Green Building Council (USGBC). To receive LEED certification, projects have to reach minimum criteria and earn points to achieve different levels of certification. Currently, India has 2190 LEED registered buildings and 398 LEED certified buildings with 1.26 billion square feet buildup area. The Indian Green Building Council (IGBC) provides LEED ratings to structures of green building. The Green Rating for Integrated Habitat Assessment (GRIHA) is the national rating system of India. It has been developed by TERI (The Energy and Resources Institute) and adopted by the Ministry of New and Renewable Energy, Government of India. GRIHA is a design evaluation system for green building which assesses the environmental performance of buildings on scale of 0-104. On the basis of number of points scored, a building can be rated between 1 & 5 stars.

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### Material and Methods

This research paper is fully descriptive and analytical in nature. In this paper attempt has been



taken to find out the importance of green buildings. The data of this paper is purely based on secondary sources according to the need of this study.

It has been discussed under the different subheads like; scope and importance of green buildings, features of green buildings, advantages and disadvantages of green buildings.

### **Scope and Importance of Green Buildings**

Chaudhari *et al.*, 2013 concluded that green building reduces energy consumptions in different ways. Decrease embodies energy of the building through the efficient design, use of recycled, recyclable and local materials and recycling construction waste. Green building reduces energy consumption by strategically placing windows and sunlight can eliminate the need for electrical lighting during the day time. High quality insulation decreases temperature regulation costs in both seasons i.e. summer and winter. Green building consumes less water as compared to traditional or conventional building. Bai and Ravindra 2014 also concluded that the concepts of green building help to reduce the pollution from environment. Green building is economically, health wise and most important environmentally responsible idea that more people need to adopt. Through educating, making eco friendly products more readily accessible and reliable, and by providing government incentives it is possible to encourage more people to adopt green building. Khosla and Singh 2014 concluded that energy efficiency is one of the simplest, quickest, cheapest and cleanest ways to address the energy and environmental challenges. The adoption of simple energy efficient measures in buildings can reduce a significant amount of energy consumption. Mokal *et. al.*, 2015 studied features of all construction material which have social, economic benefits or construction industry and human health and are used green construction. It reduces adverse effects on environment like environmental pollution content, greenhouse gas emission, resource depletion, soil pollution, health hazards, ozone depletion etc. Hence there is a huge scope to use the eco-friendly materials for the best future and healthy life of coming generation. Nangare and Warudkar 2015 showed that installing green building technologies can be cost-efficient in the long run. It can create jobs and expand the local tax

base to create economically competitive communities.

### **Features of green buildings**

Some features of green building which makes them green or environmental friendly are listed below:

Recycled and environmental friendly material, use

of renewable energy sources for lighting system, recycled non-toxic material, scope of natural day lighting, and use of recycled water, orientation of building: North – South and energy-efficient air conditioning design.

### **Cost effectiveness**

Initial cost of a green building is 3-8 percent more than the traditional or conventional buildings. But, the cost is recovered within 2-3 years through use of natural lighting and savings in maintenance costs. Due to reduction in operational costs, the total cost of green building is invariably lesser than the conventional building. Life cycle cost of energy efficient buildings is lower than the any conventional buildings.

### **Benefits of green building**

Buildings have very great impact on the environment, human being, and the economy. The acceptance of green building concept can increase the economic and environmental performance of buildings. Research continues to identify and clarify all of these benefits of green building as it can be helpful to achieve the maximum benefits at the lowest prices. Green building has the following benefits: Green building reduces environmental impact through energy efficiency and waste recycling during the entire life cycle of the building. It reduces construction waste by approximately 50 percent compared with that of similar conventional buildings. It has lower operational cost resulting from efficient resource use through reduction in energy and water requirements. It improves health through better indoor air quality and energy costs can be reduced by 25 - 30 percent in green buildings by using the natural resources. Green buildings provide financial benefits in terms of energy and water savings, reduced waste, improved indoor environmental quality, greater employee coort/productivity,



reduced employee health costs and lower operations and maintenance costs.

Lesser or none availability of construction materials, high construction cost, requirement of skilled workers and advanced technologies.

### Disadvantages of Green Buildings

### Conclusion

Due to increasing population energy demand and environmental problems are also increasing in India. Green building concept is the very simplest and efficient option to these problems i.e. energy demand and environmental problem. Green building is a viable option to maintain the environmental quality and human health through the features of energy efficiency, recycling of water, orientation of building and natural resources.

### References

Bai, V. and Ravindra. 2014. "Energy Efficient and Green Technology Concepts". *International Journal of Research in Engineering and Technology*.:3(6),pp:253-258.

Chaudhari, J. R. Tandel, K. and Patel, V. K. 2013. "Energy Saving of Green Building Using Solar Photovoltaic

Systems". *International Journal of Innovative Research in Science, Engineering and Technology*.: 2(5), pp:1407-1416.

Khosla, S. and Singh, S.K. 2014. "Energy Efficient Buildings". *International Journal of Civil Engineering Research*.:5(4), pp:361-366.

Mokal, A.B. Shaikh, A.I., Raundal, S.S. Prajapati, S.J. and Phatak, U.J. 2015. "Green Building Materials – A Way towards Sustainable Construction". *International Journal of Application or Innovation in Engineering & Management*.:4(4), pp: 244-249.

Nangare, P. and Warudkar, A. 2015. "Cost Analysis of Green Building". *International Journal of Scientific Engineering and Research*. : 3(6), pp:40-42.

