

## **GREEN BUILDINGS**

**Sunil Chaudhary, Vaibhav Singh Patel , Nikhil Kumar Chandra**

*IIMT College of Engineering, Gr. Noida, Dr. Abdul Kalam Technical University.*

### **ABSTRACT**

*A green building, which is also known as a sustainable building is designed to meet some objectives such as occupant health; using energy, water, and other resources more efficiently; and reducing the overall impact to the environment. It is a chance to use resources efficiently while creating healthier buildings that improve human health, build a better environment, and provide cost savings. All the development projects lead to overconsumption of natural resources. Global warming is a serious problem facing the world today as well as the world in the future. In order to stop or reverse this problem, society must change, learning to alter what they use in order to be less harmful to the environment. Making buildings “green” would greatly impact this problem. There are many ways for this to be done and more ways are being developed rapidly. As these new developments arise, the cost reward for green building becomes more logical for the consumer.*

**Keywords:** *Sustainable building, human health, natural resource, energy, etc*

### **I. INTRODUCTION**

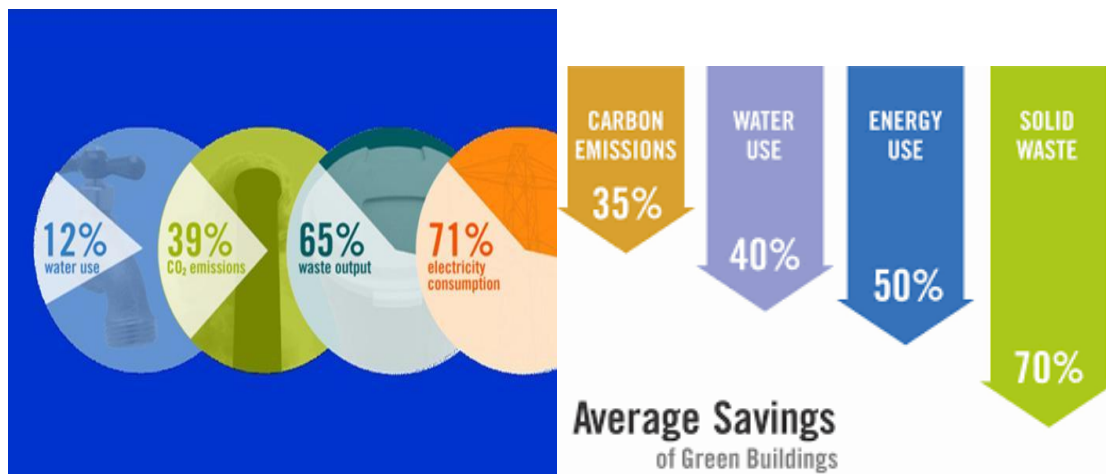
Green building (also known as green construction or sustainable building) refers to both a structure and the using of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition. In other words, green building design involves finding the balance between homebuilding and the sustainable environment. This requires close cooperation of the design team, the architects, the engineers, and the client at all project stages. The Green Building practice expands and complements the classical building design concerns of economy, utility, durability and comfort. Green building also known as green construction or sustainable building. It is a way of enhancing the environment.



It benefits humans, the community, and the environment in order to reduce resource consumption while enhancing quality of life. This ultimately results in reduction of green house gases which will help to reduce green house effect. This paper presents an overview of application of modern green infrastructure construction technology which makes a significant impact on conservation/proper utilization of resources like land, water, energy, air, material thereby reducing the overall cost of construction as well as adverse impacts of climate change.

## II. WHY IT IS NECESSARY TO MAKE THE BUILDINGS GREEN?

We are developing with sky rocketing pace. We are loading our atmosphere with thousands of pounds of CO<sub>2</sub> every year. To offset this CO<sub>2</sub>, more trees need to be planted. As per the estimates, in US only, to offset the huge amount of CO<sub>2</sub>, trees need to be planted on 2.15 billion acres of land!!(The total land in US is 2.3 billion acres). So just planting trees is not at all enough. Research and studies show that the Buildings have significant amount of contribution in polluting the environment. According to US Green Building Council's study of Environmental impact of buildings (2007), Buildings in the United States contribute 38.9 percent of the nation's total carbon dioxide emissions, (including 20.8 percent from the residential sector and 18.0 percent from the commercial sector) 39 percent of total energy use, 12 percent of the total water consumption, 71 percent of total electricity consumption.



## III. PRINCIPLES OF GREEN BUILDING

- Sustainable Site Design
- Water Quality and Conservation
- Energy and Environment
- Indoor Environmental Quality
- Materials and Resources

## IV. INDIAN GREEN BUILDING COUNCIL

The Indian Green Building Council (IGBC) was formed in the year 2001 by Confederation of Indian Industry (CII).The aim of the council is to bring green building movement in India and facilitate India to become one of the global leaders in green buildings by 2015

## V. IGBC RATING SYSTEM

IGBC has developed green building rating programmers' to cover commercial, residential, factory buildings, etc Each rating system divided into different levels of certification is as follows:

1. Certified? to recognize best practice
2. Gold to recognize national excellence
3. Platinum to recognize global leadership

## VI. GREEN BUILDING PROJECT IN INDIA

- a) Suzlon Energy Limited-Pune
- b) Biodiversity Conservation India-Bangalore
- c) Olympia Technology Park-Chennai
- d) Rain tree Hotels-Chennai
- e) Rajiv Gandhi International Airport-Hyderabad
- f) Hiranandini-BG House, Powai
- g) ABN Amro Bank, Chennai
- h) Palais Royale at Worli, Mumbai
- i) Punjab Forest Complex, Mohali

## VII. DIFFERENT FROM OTHER BUILDINGS

The design, maintain and construction of buildings have tremendous effect on our environment and natural resources. Green Building is different from the other buildings because it use a minimum amount of nonrenewable energy, produce minimal pollution, increases the comfort, health and safety of the people who work in them. It also minimize the waste in construction by recovering materials and reusing or recycling them

## VIII. INCREASING GREEN BUILDINGS IN INDIA

Today more than 1053 green buildings (as on April2011) are being constructed all over India. Of which 147 green buildings are certified and fully functional

## SCOPE OF GREEN BUILDING CONCEPT IN INDIA -



### IV. BENEFITS OF GREEN BUILDING



Buildings have a large effect on the environment, human health and the economy. The successful adoption of GREEN BUILDING developed can maximize both the economic and environmental performance of the buildings.

#### 1. ENVIRONMENTAL BENEFITS

Protect bio diversity and eco systems, improve air and water quality, reduce waste streams, conserve natural resources.

#### 2. ECONOMIC BENEFITS

Reduce operating cost, create, expand, and shape markets for green product and services, improve occupant productivity.

### 3.SOCIAL BENEFITS

Enhance occupant comfort and health, heighten aesthetic qualities, minimize strain on local infrastructure, Improve overall quality life.

### 4.NATURAL RESOURCES

According to surveys conducted in 2006, 107.3 million acres of total land area is developed, which represents an increase of 24 percent land covering green buildings over the past 3 years.

In terms of energy, buildings accounted for 39.4 percent of total energy consumption and 67.9 percent of total electricity consumption.Reduce operating costs Create, expand, and shape markets for green product and services Improve occupant productivity.

### V. EXISTING GREEN BUILDINGS IN INDIA

- a) Earth Air Tunnels & Passive Cooling I Aquamall Water Solutions, Dehradun
- b) Thermal Storage I TCS Techno Park & Grundfos Pumps in Chennai
- c) District Cooling System I RMZ Ecospace, Kolkata(d)Radiant Cooling Technology I Infosys
- d) Green and Solar Reflectance Indexroof in Hotel Leela Palace, New Delhi
- e) Hybrid HVAC System I Olympia Tech Park, Chennai A sample calculating for normal building has been evaluated as below

| S.No. | Particulars      | Green buildings |         | Normal buildings |         |
|-------|------------------|-----------------|---------|------------------|---------|
| 1     | first cost       | 340             | 14-20%  | 2 80             | 1 2-16% |
| 2     | Operating cost   | 900             | 4 0-50% | 1 900            | 7 5-80% |
| 3     | Maintenance cost | 240             | 5 -20%  | 1 80             | 4-13%   |
|       | <b>Total</b>     | 1480            |         | 2 360            |         |

|   |
|---|
| life cycle cost comprises for 40 yrs. life span, 20,000sqft area building @1400 Rs./sqft construction |
| Total expected benefits over life cycle of the building Rs. 880 lacs.                                 |
| Yearly benefits Rs.22 lacs (37.3%)  |

### VI. REALITIES

**Perception:** Green buildings are costlier. The cost could be slightly higher than a conventional building, but, this. The cost could be slightly higher than a conventional building, but, this needs to be seen with a different view. An ideal building has life cycle of average 40 years and all the cost are to be considered which are initial, construction, operating, maintenance

## VII. CONCLUSION

This research identified the exciting developments taking place on the technology front and analyzes their implications for intelligent and green buildings, highlighting examples of “best in class” buildings employing green and intelligent technologies. These buildings are dynamic environments that respond to their occupants? changing needs and lifestyles. This research provided documented evidence to educate and influence end-users, building owners, architects, and contractors that a “greener building” can be achieved using intelligent technology and that this “greening” will provide a tangible and significant return on investment .to all of the above going ‘GREEN’ IS THE ONLY.

## REFERENCES

- JHI
- <http://www.igbc.in>
- <http://www.greenbuilding.in>
- <http://www.bp.in>
- <http://www.geoexchange.org>
- <http://www.usgbc.org>
- <http://www.google.com>