

A Way to Reduce our Environment foot print-Green Constructions

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ABSTRACT

The built environment has a vast impact on the natural environment, human health, and the economy. At least one third of all energy related CO₂ emissions are from construction sector. Green construction 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.

Faced with an increasing scarcity of resources, the construction subsector which directly impinged on the viability of the sector, there was an increasing focus on “Green Building as a solution. As a result, India has emerged as one of the world’s top destination for green buildings and has implemented a number of home rating scheme and building codes, which open a wide range of opportunity in construction, architecture and engineering design, building materials and equipment manufacture. By adopting green building strategies, we can maximize both economic and environmental performance. However, the most significant benefits can be obtained if the design and construction team takes an integrated approach from the earliest stages of a building project. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Green building is also known as a sustainable or high performance building. Green Homes are healthier, more comfortable, more durable and more energy efficient and have a much smaller environmental footprint than the conventional homes. Green buildings improve productivity and trade energy. It presents exciting new challenges for environmental stewardship. Green building can help electricity utilities by reducing peak demand. It inspire not only innovation but also raises the quality and standards of building generally.

Keywords: *Green Building, Energy efficiency, Environmental Footprint, Better Productivity*

1. INTRODUCTION

Our daily and routine activities have a vast impact on surroundings. A person who washes his car daily waste a lot of water every day. Going from home to office everyday by car emits plenty of

CO². Cooking, bathing, generation of waste, use of various appliances for comfort future increase burden on nature. These are some very common examples. If we think of industrial level the pressure exceeds much more. Construction sector is one such sector. Buildings are one of the heaviest consumers of natural resources and account for a significant portion of the greenhouse gas emissions that affect climate change. In the U.S., buildings account for 38% of all CO₂ emissions, 73% of electricity consumption. In short constructing a home for could be relaxing and a happy moment for a human but not for nature. It means that building sector accounts for major increase in environment footprint. So what is the solution? Solution is 'go green' in every aspect. 'GREEN CONSTRUCTIONS' offers vast opportunities to reduce burden on nature and also to lessen our environment footprint. As per U.S.G.B.C. record, by 2015, an estimated 40-48% of new non residential constructions by value will be green, equating to a \$120-145 billion opportunity. More than 2.8 billion sq ft are LEED- certified (as of January 1, 2014) in U.S. and 41% of all residential building starts in 2012 were green, as compared to 2% of all non residential buildings starts in 2005. India is also emerging as one of the top destinations of green constructions. India has significant opportunity to go the green way and concerted efforts by all the stakeholders is the need of the hour, vice-chairman of Indian Green Building Council (IGBC), Bharat Kamat says. One survey reveals that built space in India will increase 5-fold from 20,000 million sq ft in 2005 to over 100,000 million sq ft in 2030. This growth will put enormous pressure on various resources such as energy, water, minerals and will have a discernible impact on the environment. Hence by adopting green construction strategy, we can contribute a lot for conservation as well as for sustainability.

2. NEEDS FOR GREEN CONSTRUCTIONS

The green building boom is well in progress, with around ten percent of new homes expected to be green houses by the year 2015. This rise in green building is not just thanks to increased environmental awareness, and also to increased perception of the benefits of green building, including serious cost benefits. Here are the most important reasons the green construction boom is only going to get larger. A green home consumes less energy, reduced upkeep cost, reduced water usage, reduced heating cost and more. Normally a green house owner consumes 50% less energy and 50% less water than a normal non green home. Green homes also provide better health benefits and hold their prices over a long run than conventionally built houses in their neighbourhood.

3. ISSUES RELATED TO GREEN CONSTRUCTIONS

3.1 Market impact in India

Today, constructing green buildings is technically feasible and economically viable, says Syed Beary, Chairman, the Indian Green Building Council-Bangalore. IGBC has recently crossed 2

billion square foot in india. That by 2022 (India @75), IGBC aspires to cross over 10 billion sq. ft of green building footprint and in the process consolidate its global leadership position in green buildings is something that speaks of a huge responsibility. But with over 2,400 green building projects in the country, the dream has turned a reality a year earlier, ranking India as the country with the largest green footprint in the world after the U.S. (Green Building Council). (Source- THE HINDU)

3.2 An overview at international level

Green constructions are increasing internationally. At the end of year 2013 , 42% of all square footage per suing LEED certification exist outside U.S. In 2015,project expectation in four countries are

- a) Brazil - 83% of firms planning new green commercial projects
- b) Singapore - 69% of firms planning green renovation projects
- c) United Arab Emirates - 73% of firms planning green institutional projects
- d) United Kingdom - 65% of firms planning green renovation projects

3.3 Energy consumptions in building sector

Energy consumptions is the major impact on the sustainability of the environment. TERRI accounts for energy consumption in various sectors like agriculture, transport, building sector etc. It has been found the energy consumption in building sector (residential and commercial sectors) is consistently rising at a rate of 8% annually and hence increases from a low of 14% to nearly 33% in 2004-2005. (Source-BEE)

Table 1: Final energy consumption in India in building sector (residential and commercial) in MTOE (million tonns of oil equivalent)

YEAR	ENERGY CONSUMPTION
1980-81	5.6
1986-86	8.9
1990-91	12.6
1995-96	15.3
2000-01	24.1
2005-06	32.6
2010-11	43.43

Source: MoC2011, MoPNG 2010,TERI (variousyears)

Green constructions consume less energy. Compared to average commercial building the LEED certified buildings consume lesser energy (25%), emits lesser green house gases (34%), consumes lesser water(11%) and also have lower maintenance costs(19%).

3.4 Water consumption

Buildings use 13.6% of all potable water, or 15 trillion gallons per year. A water efficient construction decreases energy use by 10-11%, save 11-12% of operating cost and reduce water use by 15%. Use of water efficient fixtures not only increase water efficiency of a building but also reduces greenhouse gas emissions. Retrofitting 1 out of 100 american homes with water efficient fixtures could avoid approximately 80,000tons of GHG emissions,the equivalent of removing 15,000 cars from the road for one year.¹⁸

3.5 Materials used

Buildings use 40% of raw materials globally (3 billion tons annually)²The EPA estimates that 170 Million tons of building-related construction and demolition (C&D) debris was generated in the U.S. in 2003, with 61% coming from non-residential and 39% from residential sources³. They also estimated that 250 million tons of municipal solid waste was generated in the U.S. in a single year²¹.

Green buildings consume less energy and fewer resources and hence accounts for lesser solid waste generation.

3.6 Rating for green constructions

Green constructions movement is gaining momentum in country under LEED rating system the most widely accepted benchmark for green building over the world. In the words of U.S.G.B.C. LEED is national, consensus based, market driven building rating system designed to accelerate the development and implementation of green building practices. In short, it is the leading edge system for designing, certifying and constructing the world's greenest and best buildings. The rating system has been developed based on materials and technologies that are presently available. The objective of LEED rating system for New Buildings is to facilitate the creation of water efficiency, handling of waste, energy efficiency, and environmentally friendly buildings

Confederation of Indian industry (CII) formed IGBC in year 2001.IGBC has licensed the LEED green building standard from USGBC. Till date the following green building rating systems are available under IGBC:

- LEED India for new construction (LEED India NC)

- LEED India for core and shell(LEED India CS)
- IGBC green homes
- IGBC Green Factory building
- IGBC Green SEZ(Special economy zone)

IGBC-LEED prepared a check list for various particulars such as site selection and planning, water efficiency ,energy efficiency, materials and resources ,innovation and design, indoor environmental quality etc. For each type particular mandatory requirements and credit points are assigned. Based upon the points earned by a green construction, certifications like gold, silver, platinum is awarded to it. The table 2 showing the above said features is shown as follows:

CHECKLIST FOR IGBC GREEN CONSTRUCTIONS				
PARTICULARS	GREEN SEZ		GREEN HOME	
	M	C	M	C
SITE PRESERVATION AND RESTORATION	Local Regulations Soil Erosion control	16	-----	-----
SITE PLANNING AND DESIGN	TobaccoSmoke Control	25	Local Regulations Soil Erosion control	8
WATER EFFICIENCY	Rainwater Harvesting, 25% Waste Water Treatment, 100%	15	Rainwater Harvesting, 50% Water efficient fixtures	20
ENERGY EFFICIENCY	Minimum Energy Efficiency	30	CFC free Equipment Minimum energy performance	22
MATERIALS AND RESOURCES	Segregation of Waste	10	Separation of waste	13
INNOVATION AND DESIGN PROCESS	-----	04	-----	04
INDOOR ENVIRONMENTAL QUALITY	-----	-----	Tobacco smoke control	13
TOTAL POINTS		100		80

Source---IGBC check list(Abbreviations-M-mandatory,C-credit points) IGBC green home data is for the projects with interiors.

3.7 Barriers for green constructions

- Lack of awareness about green buildings.
- Limited availability of local materials and equipments.
- Combating the cost of higher cost of green buildings which new cost is Only around 2% higher of conventional buildings.
- Performance evaluation tools to measure and verify the needs of green buildings under occupation.

3.8 Conclusions

Green constructions provide the best opportunity to create low carbon and sustainably built environment. Green buildings save 30-40% of energy consumptions, reduce operation cost and also enhance good health. This technology not only benefits mankind , society and country but also shows global environment concerns on large scale.

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