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LANDSCAPE OF GREEN BUILDINGS AND ITS MARKETING OPPORTUNITIES IN INDIA

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Abstract: Green Buildings are structures which use processes that are environmentally responsible and resource-efficient throughout a building's life-cycle. They have enormous benefits. This paper addresses the entire concept of green buildings and also focuses on the problems associated with them which mainly include higher construction cost, higher sales and rent costs, convenience and sales related issues and the splitting of benefits between the owner of the building and the residents of the building. Further, the paper aims to provide solutions to the problems. Some of the solutions that can be adopted include reducing the construction cost of the buildings, region specific utilisation of green materials, change in government policies and scope for getting the carbon credits.

Keywords: Carbon Credits, Green Materials, Resource, Life-cycle, Sales, Green Buildings

I. INTRODUCTION

Green Buildings are structures which use processes that are environmentally responsible and resource-efficient throughout a building's life-cycle.

Key Criteria for a Green Building include the following:

- Energy efficiency
- Indoor Environmental quality
- Sustainable Site Planning
- Material and resources
- Water efficiency
- Innovation [1,2]

II. GREEN BUILDING CERTIFICATIONS:

Major Green Building Certifications in India are as follows:

Certification System	Performance Indicators	Registration Costs
GRIHA	It is comprised	Rs. 3Lakh+

	of seven performance areas: site, water, energy, health, materials, equity and beauty.	
LEED	LEED is comprised of five key areas: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality	USD 1200-1500

III. MARKET OPPORTUNITIES IN INDIA

Initially the cost of green buildings in India was very high as most of the materials needed to construct green buildings were imported. In 2013, most of the material and technology providers were located out of India. There are mainly 5 kinds of market opportunities:

3.1. Building construction: The industry is growing exponentially as and this presents huge opportunity in new and innovative design approaches.

3.2. Materials: There is an opportunity to develop 'green' materials such as fly ash, wall and roof insulation, high performance glass, paints etc. in India. In addition, innovative use of waste materials is of relevance.



3.3. Technologies: Development of new technologies such as solar air conditioning, heat recovery wheels, radiant cooling, integrated photo voltaics etc. should be done.

3.4. Testing facilities: Testing facilities for various materials such as glass, adhesives, Paints, Insulation, Labelling equipment etc. need to be developed.

Overall, there is an opportunity of USD 120 billion by 2015 as reported by IGBC. [3]

IV. WHY GREEN BUILDINGS?

4.1. Energy Savings: Energy can be saved to a large amount. This can be beneficial for both the buyer as well as the tenant. The saved energy can then be put into better uses such as development of more effective design materials etc.

4.2. Emissions reduction: Green buildings uses techniques such as solar energy, day lighting which help in increasing energy efficiency and reducing harmful emissions.

4.3. Lower O&M and refurbishment costs: Since green buildings are generally made up of materials which have a higher life cycle, maintenance costs for these buildings are lower. These can be realized by both the tenant and buyer. The tenant would realize these during the stay duration. The owner would realize these depending on the rent agreement or after the tenant has vacated the building. [4]

4.4. Easy to secure finance: It may be easier to secure finance for green buildings given the incentives provided by firm and government to promote green buildings. [4]

4.5. Higher sales price: Developers can derive higher sales price for green buildings as illustrated in the graph below. The higher prices in the U.S. range from 0-30%. In turn, the buyers can get higher rent incomes or capital gains out of these buildings as mentioned above. In addition, studies have shown that these buildings in the U.S. tend to rent out faster than conventional buildings thus reducing loss of rent when building is lying vacant. [4]

4.6. Health and productivity: Health and well-being is one of the major concerns in the world today. It has been seen that green buildings have a positive impact on health and productivity. For instance, green buildings provide adequate daylight which on the one hand saves energy and on the other helps in fighting diseases and better recovery. [4,5]

4.7. Design and construction costs: Green buildings need not necessarily lead to higher construction costs especially when adequate cost control programs are in place. In addition, technological advancement is leading to decreases in these costs. These are offset in the long run by lower lifecycle operating costs. [4]

4.8. Most green materials cost the same as conventional materials given adequate planning. For instance, a renewable bamboo floor installs the exact same way as a traditional wood floor. In fact some green materials actually cost lower than conventional materials. [6]

V. EXAMPLES OF GREEN BUILDINGS IN INDIA

5.1. DLF- Green Technology Demonstration Project: This is a unique pilot project in energy efficient buildings at Gandhinagar. It enables direct comparison between an energy efficient building and a similar conventional building. [7]

5.2. Radisson Hotel Kolkata: This uses PV cell and Light Power Density < 8 watt per sq.ft, efficient building envelope design and 100% landscaping on roof areas. [8]

VI. LIMITATIONS OF GREEN BUILDINGS

6.1. Higher construction costs: Design and construction costs have been found to be in the range of -0.4% to 17% when compared to conventional buildings. The cost varies depending upon the level of 'green' in the buildings. However, as can be seen from the graph below, the premiums have been decreasing gradually. [4, 9]

6.2. Higher sales and rent costs: For the buyers and tenants, a 'green' premium may drive down demand for these buildings. Many buyers have funds for real estate and are on a tight budget. Hence, it creates accounting difficulty when these costs are not offset with benefits later. This increased the resistance to buy. [10]

6.3. 'Convenience' and 'comfort' related issues: There are numerous 'convenience' and 'comfort' issues related to daily use of those buildings. For instance, adding natural daylight brings in more light and more glares and hence shades or overhangs are needed. Certain green finishes may need to be special-ordered and may have longer delivery times. Using natural ventilation to cool homes will not be as precise as air-conditioning. [6]

6.4. 'Green' is not defined region specific: ECBC defines that if glass is used in buildings, it is green. This may be true for Western countries where glass



usage prevents energy loss. However, in countries like India, where the climate is generally hot, this will do the reverse. A recent study by IIT-Delhi in Jodhpur, Delhi and Chennai found that energy use increased with increase in glazed area, irrespective of the glass type used in the building. [11, 12]

There are accusations that this is promoted by glass manufacturers. For instance, Saint-Gobain Glass incidentally is also the founding member of the Indian Green Building Council, promoted by industry association CII. The green code is built for their business to thrive. [11, 12]

6.5. Split of the benefits: It is the owner who generally pays for the buildings and the occupants who seek the benefits. The owner or the developer for that matter may not be interested in buying or developing these building unless he is sure that he can get high rental incomes. The tenants may not be willing to pay for these since

Real estate rents are already very high and people tend to overlook indirect savings

They are not aware of all benefits [10]

VII. RECOMMENDATION TO DIFFERENT STAKEHOLDERS

7.1. Reduce the construction cost of the building: Technological innovation in efficient devices and materials is driving down the building costs. For the developers, it is necessary to plan well in advance. In addition, there is a need to ask different stakeholders as to what they need so that only those requirements are met and no excessive additional costs for non-needed elements is not added.

7.2. Awareness regarding life cycle costs of green buildings versus other buildings is needed. It is human nature to see the upfront costs and not see the long term benefits. Hence, it becomes imperative to generate awareness regarding the costs for the life cycle of the buildings especially in a country like India where environmental consciousness still needs a shot in the arm.

For this, it is important to do adequate and transparent life cycle assessments and publish those studies.

Also, awareness regarding 'green' constructed buildings and 'green' refurbished buildings should be made for the tenants.

7.3. Establishing institutions: Establishing adequate certification systems and making the certification process faster, cheaper and easier is needed. In addition, there is a need to establish

adequate research centers so that the cost of these buildings can be driven down using technological advancements. Also, there is a specific need to do post occupancy research to find what works and also to create awareness. In addition, adequate monitoring systems should be set in place.

7.4. Region specific utilization of green materials is needed. For instance, for India materials which do not trap energy rather which reflect energy should be considered green. Hence, there is a need to develop a framework which should include factors like climate, demographics, social requirements, cultural requirements etc. Based on this, green building specifications should be decided in a transparent and unbiased manner.

7.5. Government initiatives can play a key role in this area. Green buildings can be promoted by providing adequate tax subsidies to tenants. In addition, having an office in a green building can contribute towards the company's CSR activities. In addition, mandates by the government on standards followed can go a long way. For instance, minimum energy performance standards for new commercial buildings with connected load of 100 kW and above, as well as for retrofitting of existing buildings, Energy Conservation Building Code (ECBC) can be mandated. More stringent energy standards are needed both for green and non-green buildings.

7.6. Scope for getting carbon credits from green buildings need to be explored. In addition, who should reap these carbon benefits out of all stakeholders also needs to be explored.

7. It should be ensured that **institutions in charge of regulating this industry are neutral.** For instance, it is not fair if glass manufacturers sit on the board of IGBC since that would lead to a highly biased decision.

VIII. CONCLUSION

There is a need to address the chicken and egg problem of what will develop first: the allied and support industries or the green building industry itself. For that, there are 2 suggestions. First of all, government policy can play a critical role in that. If the government provides adequate support in the form of tax incentives, they will develop. This will greatly help in reducing the cost of these buildings. In addition, some amount of backward integration can be done in the form of diversification, acquisition or simply supply contracts. For instance, these large developers can have supply contracts and work with small manufacturers of allied industries to develop products as required by them.



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