



## Green Buildings in India: Lessons Learnt

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### 1.0 Introduction

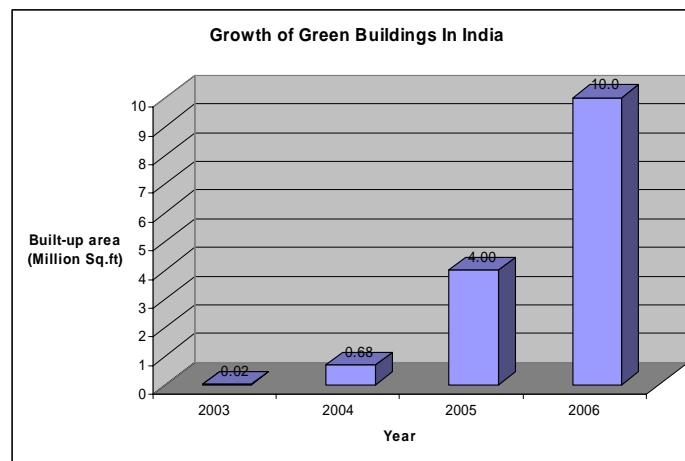
‘A Green building should create delight when entered, serenity and health when occupied and regret when departed’ – Perhaps this is one of the most inspiring definitions of a Green building, articulated in the book ‘Natural Capitalism’.

The concept of green buildings is not as nascent as we think it is. For example, our own ancestors worshipped the five elements of nature - Earth as ‘Prithvi, Water as ‘Jal’, Agni as ‘Energy’, Air as ‘Vayu’, and Sky as ‘Akash’.

Today through the LEED (Leadership in Energy & Environmental Leadership) green building rating system, we are rediscovering the Indian ethos.

The Green building movement has gained tremendous momentum during the past 3-4 years, since the CII- Godrej GBC embarked on achieving the prestigious LEED rating for its own centre at Hyderabad. The Platinum rating awarded for this building sparked off considerable enthusiasm in the country.

From a humble beginning of 20,000 sq.ft of green footprint in the country in the year 2003, to a staggering 10 million sq.ft expected by end 2008, green buildings are well poised to reach scalar heights. Today a variety of green building projects are coming up in the country – **residential complexes, exhibition centers, hospitals, educational institutions, laboratories, IT parks, airports, government buildings and corporate offices**



*Fig 1 : Growth of Green buildings in India*

## **2.0 Why people are attracted towards a green building**

This question has been posed to several occupants of a green building. Of all the many reasons, three top reasons often cited by those occupying these buildings are the following:

**Operational Savings:** Green buildings consume at least 40-50 % less energy and 20-30 % less water vis-à-vis a conventional building. This comes at an incremental cost of about 5-8 %. The incremental cost gets paid back in 3-5 years time.

**Daylights & Views:** Working in environment with access to daylight and views provides connection to the exterior environment. This has a soothing effect on the mind. Various studies prove that the productivity of people who have access to day lighting and views is at least 12-15 % higher.

**Air Quality:** Green buildings are always fresh and healthy. Every green building will have to purge continuous fresh air to meet the ASHRAE 62 requirements. The green buildings use interior materials with low volatile organic compound (VOC) emissions. A typical office building would require purging of fresh air of about 15 cfm/person which provides a fresh ambience inside the building.

## **3.0 Perceptions and Realities**

Having covered on the benefits it is also important to know that people have different perceptions on green buildings; some are correct and some are otherwise. It is important to look at these:

### **Perception #1: Green buildings are costlier**

**Reality:** Considerable research and analysis has been carried out with regard to the cost impacts of a green building. The cost could be slightly higher than a conventional building. But then, this needs to be seen with a different paradigm.

The question is how do we compare the costs? There needs to be a baseline cost for all comparisons to be alike.

The incremental cost is always relative and depends on the extent of eco-friendly features already considered during design. The incremental cost would appear small if the baseline design is already at a certain level of good eco-design; It would appear huge if the base design has not considered green principles.

The second and rather a critical paradigm is to look at the incremental cost in relation to the life cycle cost. This kind of an approach could be revealing. Who knows,

buildings would last for a 50 years or 60 years or 100 years!. Over its life cycle, the operating cost would work out to 80-85 % while the incremental cost which is a one-time cost is only 8-10 %.

The table below captures the typical payback period in the recently constructed green buildings in India.

<b>Building</b>	<b>Built-in Area (Sqft)</b>	<b>Rating Achieved</b>	<b>% increase in cost</b>	<b>Payback (Yrs)</b>
CII-Godrej GBC	20,000	Platinum (56 points)	20 %	7 years
ITC Green Centre, Gurgaon	1,70,000	Platinum (52 points)	15 %	6 years
Wipro, Gurgaon	1,75,000	Platinum (57 Points)	8 %	5 years
Grundfos Pumps, Chennai	40,000	Gold (42 Points)	6 %	3 years

There is a decreasing trend in the incremental cost over the years. This trend would continue and we all look forward to the day when the cost of a green building is lower than a conventional building.

### **Perception # 2: Green buildings have to be air-conditioned**

**Reality:** Green building concepts and the LEED rating can be applied for non-air conditioning buildings. It has been applied on three such buildings in India viz., IGP office, Gulbarga, the Royal Engineering College, Hyderabad and LIC office, Shimoga.

While performing the energy analysis using software tools, such buildings will input the same cooling system both in the baseline and the proposed design. This ensures that the building is recognised for any of the other energy efficiency measures incorporated, for example - the envelop, lighting, roof insulation etc.,

This kind of an approach also ensures that an apple-to-apple comparison is made while evaluating two green buildings, whether conditioned or not.

### **Perception # 3: Green buildings take more time**

**Reality:** There is a general perception that going the green way may affect the project schedules. This was perhaps the case for the CII-Godrej GBC building when it was the first time that a green building rating tool was being applied in the country.

The design in this case took about one-and-half years while the construction was completed in about 9 months !

Thanks to the Green building movement; now there is so much of capacity building that has happened in the country. Now, there is absolutely no difference in the time involved in constructing a green building vis-à-vis a normal building. The time schedule for the rating can be synchronized with that of the building. This has been amply demonstrated in buildings like the Wipro in Gurgaon and Grundfos in Chennai.

#### **4.0 Typical ingredients for success**

**The LEED rated buildings in the country have demonstrated certain similar characteristics which have contributed immensely to their success:**

- ❖ **Integrated design efforts** : Incorporating green design is not the effort of one individual design member. It requires an integrated effort on the part of all the team members the architect, builder, consultants and the vendors. Achieving the final rating becomes easier when every member is committed to the green design principles
- ❖ **Top level commitment** : The commitment has to come from the top decision makers from the owner's side. Projects with such top level commitment do exceedingly well. Commitment and passion of the architect to deliver a green also is critical.
- ❖ **Perseverance and determination**: Achieving a LEED rating and particularly the Platinum rating requires a high level of perseverance. To avoid any disappointments, projects should ensure that they attempt for atleast 5-7 additional points than the threshold required for a particular rating.

#### **5.0 Market Transformation**

The construction of the CII-Godrej GBC at Hyderabad, as a green building has enabled a wonderful market transformation in the country. Building owners and developers today demand green buildings from the designers.

New products like the waterless urinals were first introduced at the GBC building. Today we have other buildings also installing these urinals. These urinals which were purchased in 2003 ,at Rs.14000/- for the Centre are now available for Rs.6500/-.

Other products introduced include flyash bricks, recycled carpets, high albedo roofing materials, high performance glass, certified wood, low VOC paints high COP chillers and CO2 sensors.

Green building footprint worth Rs.2000 Crore would be constructed in the country by 2008, of which the market for green building materials & equipment will be Rs 1500 Crore.

## **6.0 Lessons from Past Experiences**

**With about 40 buildings coming up in the country there have been some key learning in applying the LEED rating system. A few of them are the following:**

- ❖ Have the commitment of the entire design team to deliver the rating. Define the role and accountability of each design member. This can be a good strategy to ensure easy implementation
- ❖ Conceive green by design. Otherwise projects may end up in not being able to apply for certain credits. For example, it would be almost impossible to achieve daylight credit if the depth of the building has been designed more than 4-5 m.
- ❖ Freeze the baseline costs right at the beginning so as to realistically evaluate incremental cost due to green aspects. Otherwise, green design can be a easy scapegoat to account for incremental cost due to other factors
- ❖ Use energy simulation tool right at design stage to decide on material and equipment selection. If this is not taken care initially, it may turn out to be an academic exercise
- ❖ Certain material related credits viz., low VOC paints, adhesives, sealants, appear easy. So also a few construction related credits like managing construction waste and building flush out. But these require close monitoring and proper documentation ; otherwise a project can lose out on these.

## **7.0 LEED India – Indigenised Rating System for India**

Eco or green design principles are universal; it cannot be one for USA, one for India and one for Japan. Most of the green building rating systems touch on the same chord – conservation of resources. But the LEED rating system has turned out to be the most versatile and robust. After considering various rating systems, the Indian Green Building Council (IGBC) decided to adopt the LEED rating system.

The IGBC is working in India to indigenise the LEED rating system to include the local factors. 'LEED India' rating which considers local Indian codes and standards is in an advanced stage of development. The LEED India will follow the following standards:

- ❖ NBC guidelines for:
  - ❑ Erosion & sedimentation control
  - ❑ Rain water harvesting
  - ❑ Safety for workmen during construction
- ❖ MoEF guidelines for large projects
- ❖ CPCB norms for DG set emissions
- ❖ Wild Life Institute of India, Dehradun to define Endangered species
- ❖ Environmental Information System (ENVIS) for Wet lands preservation
- ❖ ECBC for energy baselines

In a major boost to the LEED rating system, General Services Administration (GSA) USA recently compared 5 rating systems and found the LEED system to be the most credible among five systems evaluated.

The five rating systems evaluated were: 1) Building Research Establishment's Environmental Assessment Method (BREEAM); 2) Comprehensive Assessment System for Building Environmental Efficiency (CASBEE); 3) GBTool; 4) Green Globes US; and 5) LEED.

## **8.0 Conclusion**

The green building experiences in India have been exciting and challenging as well. Since its introduction in 2001, the LEED rating has emerged as a very useful tool in designing a green building.

The LEED rating provided opportunities to introduce new products and materials. The easy availability of most of the green materials and equipment in the country has made it easier for the designers to adopt local materials to a very large extent. Now there is an imminent need for service providers, who would be required in large numbers, not in hundreds but thousands, as the movement is heading to reach greater heights.

The green building movement is here to stay for the benefit of individuals, society and the country at large.