

Green Building Movement in India – Catalysts and Course

Synopsis

The Green Building Movement spearheaded by CII Godrej GBC since 2001 has come a long way. With a meagre green building footprint of 20,000 sq.ft in 2003, today green buildings of over 25 million sq.ft are being constructed all over India. More than 100 buildings have been registered in India under the LEED rating program. There has been tremendous learning from the construction of various green buildings. This paper captures the lessons learnt over the years.

LEED India NC (New Construction), a fully indigenous rating to suit the National context has been launched effective 1 Jan 2007. LEED India CS (Core & Shell) has also been launched effective Sep 2007. The Indian Green Building Council (IGBC) would administer the LEED India rating system.

While designing these buildings as Green, there have been many challenges and alongside these challenges there have been enormous opportunities for various stakeholders – architects, builders, developers, manufacturers and others. The market for green building materials and products is estimated to reach Rs.15000 Cr by 2010. Service providers from India will have opportunities to offer green building services to other countries as well.

The Indian green building movement is surging ahead and well poised to reach greater heights, in the years to come.

1.0 What is a Green Building?

‘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 appearance of a Green Building will be similar to any other building. However, the difference is in the approach, which revolves round a concern for extending the life span of natural resources; provide human comfort, safety and productivity. This approach results in reduction in operating costs like energy and water, besides several intangible benefits. Some of the salient features of a Green Building are:

- ❖ Minimal disturbance to landscapes and site condition
- ❖ Use of Recycled and Environmental Friendly Building Materials
- ❖ Use of Non-Toxic and recycled/recyclable Materials
- ❖ Efficient use of Water and Water Recycling
- ❖ Use of Energy Efficient and Eco-Friendly Equipment

- ❖ Use of Renewable Energy
- ❖ Indoor Air Quality for Human Safety and Comfort
- ❖ Effective Controls and Building Management Systems

2.0 Benefits of Green Buildings



L&T EDRC - 1, Chennai, Silver rated

A Green Building can have tremendous benefits, both tangible and intangible. The immediate and most tangible benefit is in the reduction in operating energy and water costs right from day one, during the entire life cycle of the building. The energy savings could range from **25 – 40 %** depending on the extent of

green specifications. Other tangible savings would be **reduction in first costs and enhanced asset value**. Intangible benefits of Green Buildings include **increasing productivity of occupants' health, safety benefits and a green corporate image**. Several Corporate are now seeing Green Building Rating as a tool to enhance marketability.

3.0 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.



Hiranandani - BG House, Mumbai, Platinum rated

4.0 Leadership in Energy and Environmental Design (LEED) Rating System

The LEED green building rating system evaluates environmental performance from a whole building perspective over a building's life cycle, providing a definitive standard for what constitutes a green building. LEED is a measurement system designed for rating new and existing commercial, institutional and high-rise residential buildings. **The LEED rating system is the most versatile and widely adopted rating system in the world. Around 15 to 20 countries, the world over have adopted this rating system.** Different buildings fall under different rating programs. Green buildings registered in India include **corporate office complexes, IT parks, hospitals, Government offices, educational institutions, airport, hotels etc.**

Table 1: Different LEED Rating Systems

LEED Rating System	Type of Building
LEED for New Construction	All new high-rise buildings
LEED for Core & Shell	Rented out commercial buildings
LEED for Commercial Interiors	Tenant or self-occupied spaces
LEED for Existing Buildings	All existing buildings

5.0 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 about 8-10 %.

Table 2: Typical payback period in the recently constructed green buildings in India

Building	Year awarded	Built-in Area (Sq.ft)	Rating Achieved	% increase in cost	Payback (years)
CII-Godrej GBC, Hyderabad	2003	20,000	Platinum	18 %	7
ITC Green Centre, Gurgaon	2004	1,70,000	Platinum	15 %	6
Wipro, Gurgaon	2005	1,75,000	Platinum	8 %	5
Grundfos Pumps, Chennai	2005	40,000	Gold	6 %	3
Technopolis, Kolkata	2006	72,000	Gold	6%	3
Spectral Services Consultants Office, Noida	2007	15,000	Platinum	8%	4
HITAM, Hyderabad	2007	78,000	Silver	2%	3

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 and Hyderabad Institute of Technology and Management.

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.

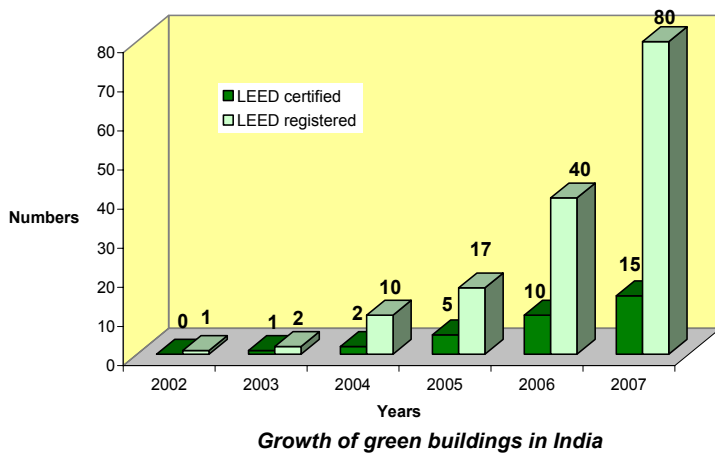
This kind of an approach also ensures that an apple-to-apple comparison is made while evaluating two green buildings, whether conditioned or not.

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 synchronised with that of the building. This has been amply demonstrated in all the LEED rated green buildings in India and Dubai.

6.0 Green Building Movement in India:



India is witnessing tremendous growth in infrastructure and construction development. The construction industry in India is one of the largest economic activities and is growing at an average rate of 9.5% as compared to the global average of 5%. As the sector is growing rapidly, preserving the environment poses lot of challenges and at the same time presents opportunities. The construction sector therefore needs to play its role and

contribute towards environmental responsibility. The Green Building movement in India is a step in this direction – to minimise the negative impact of construction activity on the environment.

The Green Building movement in the country spearheaded by CII has gained tremendous impetus over the last six years. With a modest beginning of **20,000 sq.ft** of green footprint in the country in the year 2003, today about 80 green buildings with a footprint of over **25 million sq.ft** are being constructed in India.

The rapidity of the green building movement can be seen by the spiraling growth of clearly measurable green building criteria as indicated in the following table.

Table 3: Green Building Movement – The growing numbers

No	Criteria	2001	Till Date
1	CEOs & senior people involved	50	≈ 2000
2	No. of professionals trained on LEED rating	10	≈ 2500
3	No. of registered Green Buildings	1	80
4	Built – in Area (sq.ft)	0	25 Million
5	Green Building products & equipment	5	50
6	IGBC Membership	0	79

With respect to the above measurable criteria, India ranks fourth in the world after USA, Australia and Canada.

7.0 Green Building Movement – The Catalysts

As with any change, a series of catalytic events were instrumental in advancing the Green Building Movement. The following are some of the key factors which enabled advancing the movement:

- ❖ Platinum rating for CII Godrej GBC Building
- ❖ Indian Green Building Council (IGBC) & Local Chapters
- ❖ Launch of Green Building Services
- ❖ Market Transformation
- ❖ Green Building Congress
- ❖ LEED India Rating

7.1 Platinum rating for CII Godrej GBC Building



CII – Godrej GBC, Hyderabad, Platinum Rated

The establishment of **CII – Sohrabji Godrej Green Business Centre** in Hyderabad in 2001 provided an impetus to develop Green Building competence and capability in the country. The Centre’s building was the **first Platinum rated green building** under the LEED rating system, outside the USA. It was also the greenest building in the world at that point of time. CII Godrej GBC could retain this position for about one-and-half years.

The platinum rating for CII Godrej GBC became a source of inspiration and sparked off considerable enthusiasm in India, leading to several other buildings registering for the LEED green building rating.

7.2 Indian Green Building Council & Local chapters

To further advance this movement there was a felt-need to bring like minded people together for pursuing Green Building activities. This resulted in the formation of the Indian Green Building Council (IGBC) in August 2001. The council is represented by all stakeholders of construction industry comprising of **Corporate, Government, and Nodal agencies, Architects, Developers, Product manufacturers, Institutions, etc.**

The vision of Indian Green Building Council is to usher in a green building revolution in India and to become one of the world leaders in green buildings by 2010.

Today the council is strong with about 80 formally registered members and about 16 founding members.

Local Chapters



Mr. Jamshyd N Godrej hands over LEED India copy to Shri Jayaraj M Phatak, Municipal Commissioner, Greater Mumbai at Mumbai Chapter Launch Meet

To facilitate the penetration of Green Building concepts throughout the country, Local Chapters with a mission to reach out the IGBC vision at the regional levels have been launched in **Bangalore, Chennai, Delhi, Kolkata and Mumbai**. The main objective of this is to enable faster reach of green building concepts to wider sections of stakeholders and to provide a platform for networking at the regional level.

The agenda of these chapters are:

- ❖ To engage all stakeholders in the green building movement
- ❖ To evolve strategies to adopt green practices in their respective states
- ❖ To interact with State Government and local bodies and generate awareness on green building concepts.

7.3 Launch of Green Building Services



IGP Office, Gulbarga, Gold rated

CII Godrej Green Business Centre launched green building services in the year 2003. The Centre hand-holds projects going for green buildings, offering technical advisory services. The Centre is involved in providing LEED rating facilitation and advisory services. As of date, 15 green buildings in India have achieved the coveted LEED rating. Green buildings registered

include **corporate office complexes, IT parks, hospitals, Government offices, educational institutions, airport, hotels etc.**

New services were also introduced as a result of penetration of green building concepts in the country. These services include **III Party commissioning, energy simulation and LEED facilitation.** Other agencies have been trained in these services with the aim of capacity building for the country. There is an imminent need of such consultants as the movement is heading towards greater heights. **These numbers need to increase by hundreds from the current handful of available consultants.**

Green building services have been extended to other countries like **Dubai and Sri Lanka** which presents opportunities for the architects and other consultants in these countries.

7.4 Market Transformation

Stakeholders now are demanding for green buildings from consultants and architects. This has also resulted in increased demand for green building materials and products.

Many new materials and services have been introduced as a result of this movement. Some of these materials and equipments include **High performance glass, Wall & Roof insulation, Low VOC paints, adhesives & sealants, CRI certified carpets, FSC Certified wood, high albedo roofing material, Fly ash blocks, Eco-friendly chemicals waterless urinals, high CoP chillers, CO2 sensors, root zone treatment plants, wind towers.** The market potential of green building materials and equipment is estimated to be about **Rs 15000 crores by 2010.**

The adoption of green building materials is increasing over the years. There is also a change in the mindsets of the stakeholders. Earlier, there was a general perception that materials with recycled content were inferior in quality. Vendors would go on the defensive when asked for the recycled content in their product. It had a negative connotation. However with increased awareness on green materials and their advantages, this trend is rapidly changing.

The cost of green building materials and equipment is also showing a decreasing trend.

For example, waterless urinals which would cost around Rs. 14000 in 2001 are today available for Rs. 6000. The cost of many other materials would also show a decreasing trend as the movement accelerates.

7.5 Green Building Congress

Another platform which has sensitised key people on the Green Building Movement is the Green Building Congress. The broad objective of organizing Green Building Congress has been to create awareness on green building concepts and to expose the participants to the latest global trends. Display of



Dr. APJ Abdul Kalam, the then President of India at Green Building Congress 2005

green building products and technologies form part of this event. The event provides a platform for networking and provides opportunity for exploring new business prospects. This event has played a key role in market transformation of green products and equipment.



Smt. Sheila Dikshit, Hon'ble CM of Delhi at Green Building Congress 2005

The event has grown in size and stature over the years and has attracted the stalwarts of the industry. The table below indicates the tremendous growth of this event over the last few years.

Table 5: Green Building Congress over the years

Parameters	2001	2004	2005	2006
Participants	250	350	750	800
Green products on display	25	30	50	60
Visitors	2000	4000	5000	5000

7.6 LEED - India



Launch of LEED – India by ISRO Chairman at Green Building Congress 2006, Bangalore

An important development in the growth of the Green Building Movement has been the launch of LEED – India Green Building rating system effective 1 Jan 2007. LEED India rating system has been designed to suit the National priorities.

The LEED-India adopts a number of Indian Codes and Standards. For example, now the reference codes are the National Building Code, MoEF guidelines and the Energy Conservation Building Code of the BEE.

Many projects have already registered under LEED – India. LEED - India assessors, faculty and facilitators have been trained. Continuous efforts are being made in this direction. Release of LEED – India Core and Shell and launch of LEED AP exam in India are to follow shortly.

8.0 The Movement – Where is it heading?



Spectra Services Consultants Office Building, Noida, Platinum rated

As more developers, owners, consultants, architects and vendors are participating in the nationwide green building movement, the movement is gathering rapid pace. The combined effort of individuals and organizations to move towards green buildings is having a remarkable effect.

To advance towards achieving the vision of IGBC, the following specific quantifiable goals have been set:

- ❖ To have 1000 registered Green Buildings by 2010
- ❖ Facilitate tapping Green Building materials market of Rs.15000 Cr by 2010
- ❖ Develop 5000 LEED Accredited Professionals by 2010
- ❖ Launch of IGBC Green Homes Rating by 2008
- ❖ Pilot & launch of other LEED products like LEED Core & Shell (LEED CS) by 2007 and LEED Neighbourhood (LEED ND) by 2008

Efforts taken in this direction would help convert this growing movement to a national trend and establish India as one of the world leaders in green buildings and technologies.

9.0 Conclusion:

With the growing awareness on green buildings, the green building movement is well poised to reach greater heights. The penetration of green building concepts and the quantum jump in the green building footprints offers many challenges and at the same time presents tremendous opportunities. The stakeholders of the construction industry need to be well equipped to measure up to these opportunities.



Hyderabad Institute of Technology & Management, Hyderabad, Silver rated

There is an imminent need for the stakeholders to involve in the green building movement through the IGBC and local chapters.

As more green building activities are being initiated to further green the movement, the country is well positioned to emerge as one of the world leaders in green buildings.