




Green Buildings in Indian Cities

CMS Environment Workshop
October 2009



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Indian Green Building Council (IGBC)

- ❖ **Launched by Confederation of India Industry (CII) in 2001**
- ❖ **Pioneering Green Building movement in India**



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Vision of IGBC



- ❖ To usher in a green building movement in India
- ❖ To become one of the world leaders in green buildings by 2010



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Green Building Movement in India

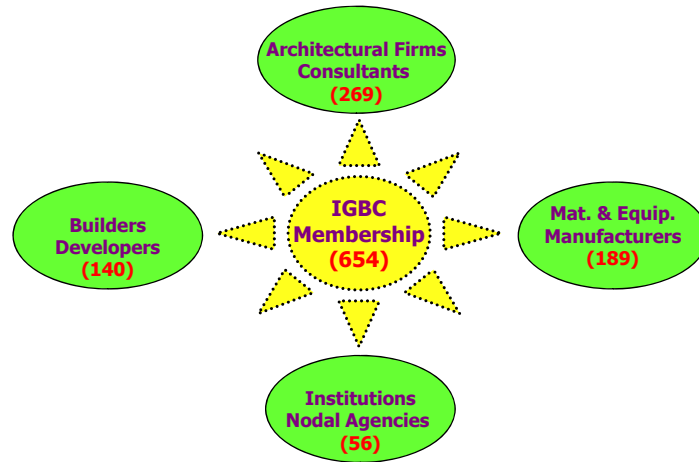
S No	Criteria	2001	→	Till Date
1	CEOs & senior people involved	50		≈ 5,000
2	No. of professionals trained on Green Building concepts	10		≈ 6,000
3	No. of registered Green Buildings	1		425
	Built – in Area (sq.ft)	0		310 Million
4	Green Building products & equipment	5		90
5	IGBC Membership <i>(Founding Members)</i>	0		680 <i>(73)</i>
6	IGBC Local Chapters	0		9



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Growth of Membership



Founding Members : 73



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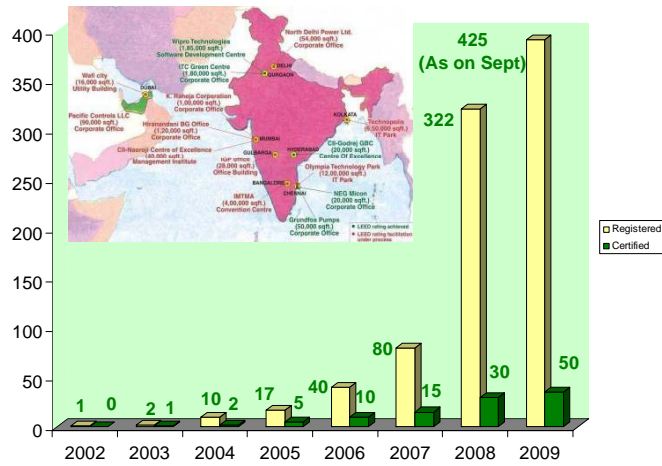


Local Chapters

Chapter	Chairmen
Ahmedabad	Mr Sameer Sinha
Bangalore	Mr Syed Mohamed Beary
Chennai	Mr C N Raghavendran
Delhi	Mr Vidur Bharadwaj
Hyderabad	Mr Anil K Chugh
Kochi	Mr B R Ajit
Kolkata	Mr Rahul Saraf
Mumbai	Mr Ravi Raheja
Pune	Mr Lalit Kumar Jain



Growth of Green Buildings in India



All types of buildings, all over the country :
IT Parks, Offices, Banks, Airport, Convention Centre, Educational institutions, Hotels, Residential, Factories



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Benefits of green buildings

- ❖ **Shift from Green Image to benefits**
- ❖ **Tangible benefits**
 - **Energy savings : 40-50%**
 - **Water savings : 20-30%**
- ❖ **Intangible benefits**
 - **All good aspects associated to green**
 - ❑ **Better Indoor ambience**
 - ✓ **Day lighting & views**
 - ✓ **Improved health and productivity**



CII-Godrej GBC



ITC Green Centre



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Energy Savings Realised

Building	Sq.ft	Normal Building (kWh)	Actual Building (kWh)	% Reduction	Annual Energy Savings (Rs in Lakhs)
Wipro	1,75,000	48,00,000	31,00,000	40%	102
ITC	1,70,000	35,00,000	20,00,000	45%	90
CII Godrej GBC	20,000	3,50,000	1,30,000	63%	9

❖ **Energy consumption depends on**

- Local climate, Density of occupancy, Occupancy schedule, Orientation of the building, Internal loads

WIPRO TECHNOLOGIES, Gurgaon
LEED NC Platinum



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Cost of Green Buildings - Indian Experiences

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

❖ Cost showing a decreasing trend over the years

❖ Incremental Cost lower if base design has already factored normal Green features



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**CII Sohrabji Godrej Green Business Centre, Hyderabad
Platinum Rated**



Building Size : 20,000 sq. ft.

Salient Features

- ❖ *First Green Building in India*
- ❖ *63 % savings in energy consumption*
- ❖ *Zero water discharge building*
- ❖ *100% daylighting and views*



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**Turbo Energy Limited, Chennai
Platinum Rated**



Size : 37,000 sq. ft.

Salient Features

- ❖ *India's Greenest LEED Rated Building, II Greenest in the World*
- ❖ *100% Solar air – conditioned*
- ❖ *In-situ wind turbine of capacity 5kW*
- ❖ *Rs. 40 Lakhs worth of old furniture was reprocessed & reused in the building*

**FLSmith House, Chennai
Gold Rated**



Size : 2,77,703 sq.ft.

Salient Features

- ❖ Installation of Green power equivalent to 100% of annual energy consumption of the building
- ❖ Mass transport facility to employees
- ❖ Enhanced daylight & views

**Odyssey Building – GE India Technology Pvt. Ltd., Bangalore
Gold Rated**

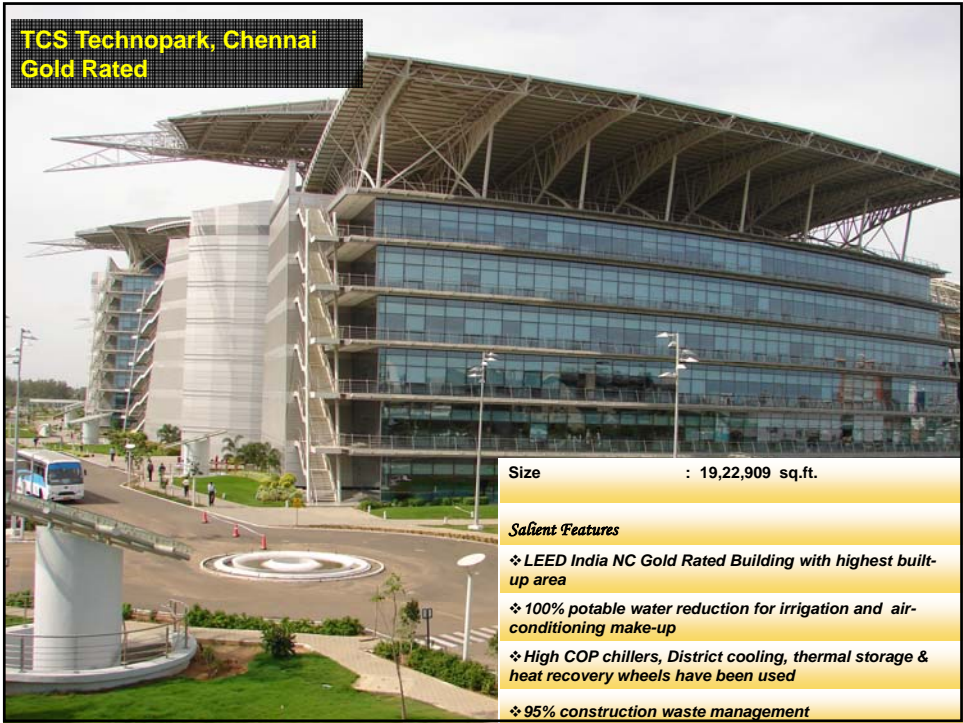


Size : 3,22,000 sq.ft

Salient Features

- ❖ 100% FSC certified wood for new wood components
- ❖ Transportation management plan
- ❖ 46% of water reductions through usage of low flow fixtures

**TCS Technopark, Chennai
Gold Rated**



Size : 19,22,909 sq.ft.

Salient Features

- ❖ LEED India NC Gold Rated Building with highest built-up area
- ❖ 100% potable water reduction for irrigation and air-conditioning make-up
- ❖ High COP chillers, District cooling, thermal storage & heat recovery wheels have been used
- ❖ 95% construction waste management

**Kalpataru Square, Mumbai
Platinum Rated Core & Shell**

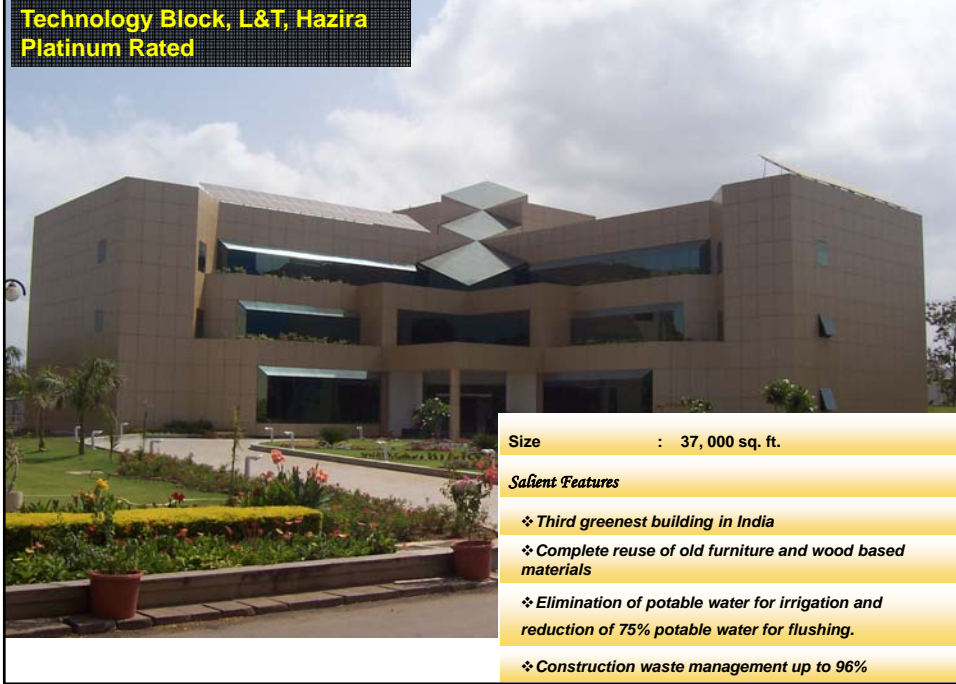


Size : 3,26,937 sq. ft.

Salient Features

- ❖ First Platinum Rated Core and Shell building outside of USA
- ❖ Sourced green power from Biomass power plants
- ❖ High performance glass and water cooled chillers
- ❖ Annual potable water reduction by 65%

**Technology Block, L&T, Hazira
Platinum Rated**

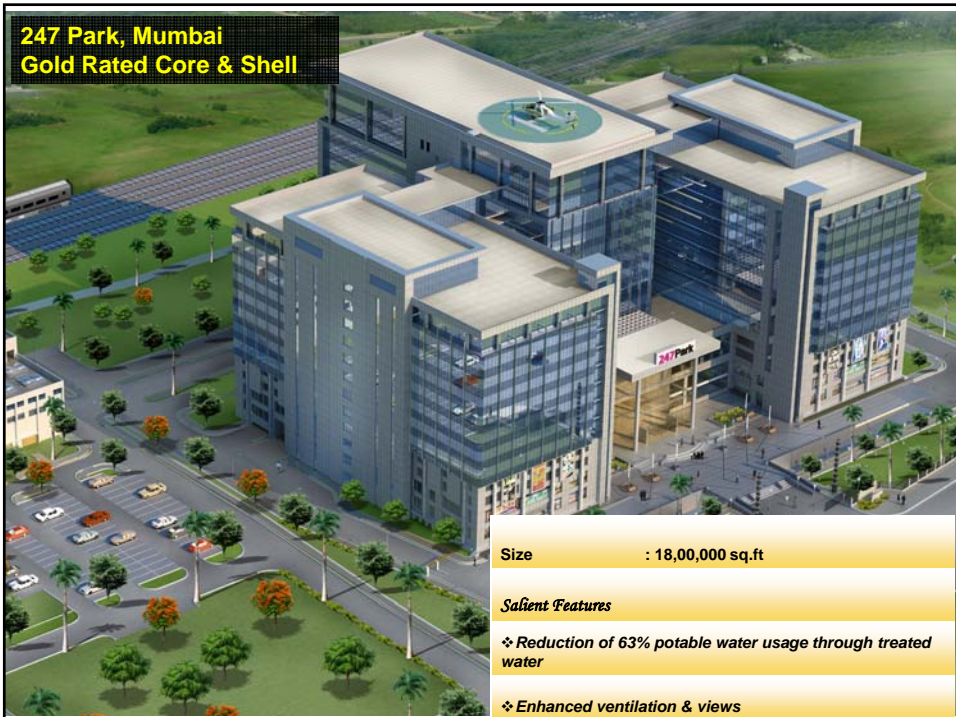


Size : 37,000 sq. ft.

Salient Features

- ❖ Third greenest building in India
- ❖ Complete reuse of old furniture and wood based materials
- ❖ Elimination of potable water for irrigation and reduction of 75% potable water for flushing.
- ❖ Construction waste management up to 96%

**247 Park, Mumbai
Gold Rated Core & Shell**



Size : 18,00,000 sq.ft

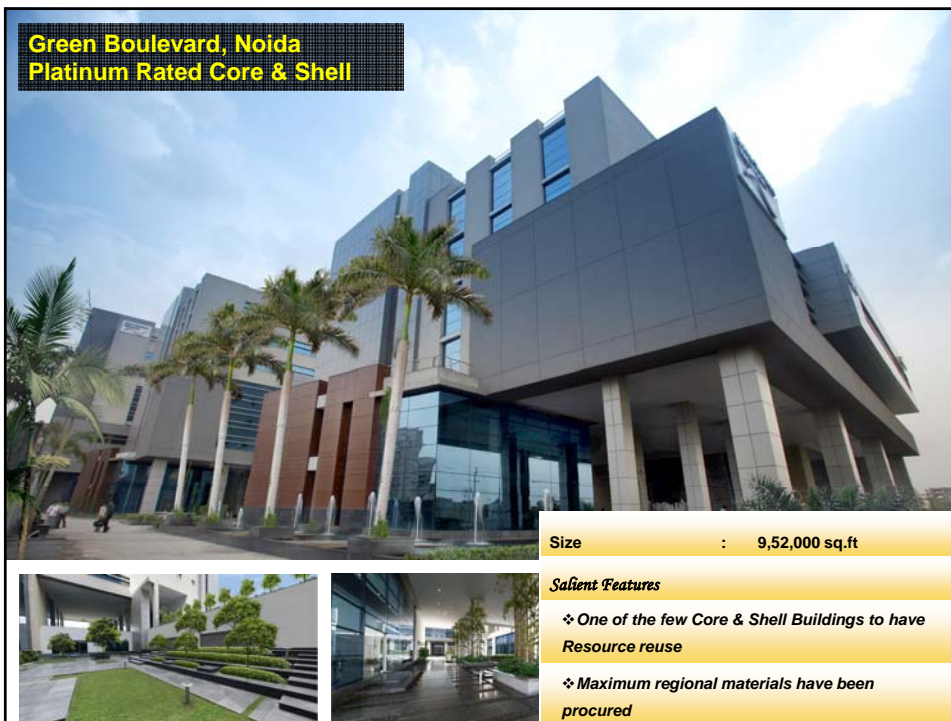
Salient Features

- ❖ Reduction of 63% potable water usage through treated water
- ❖ Enhanced ventilation & views

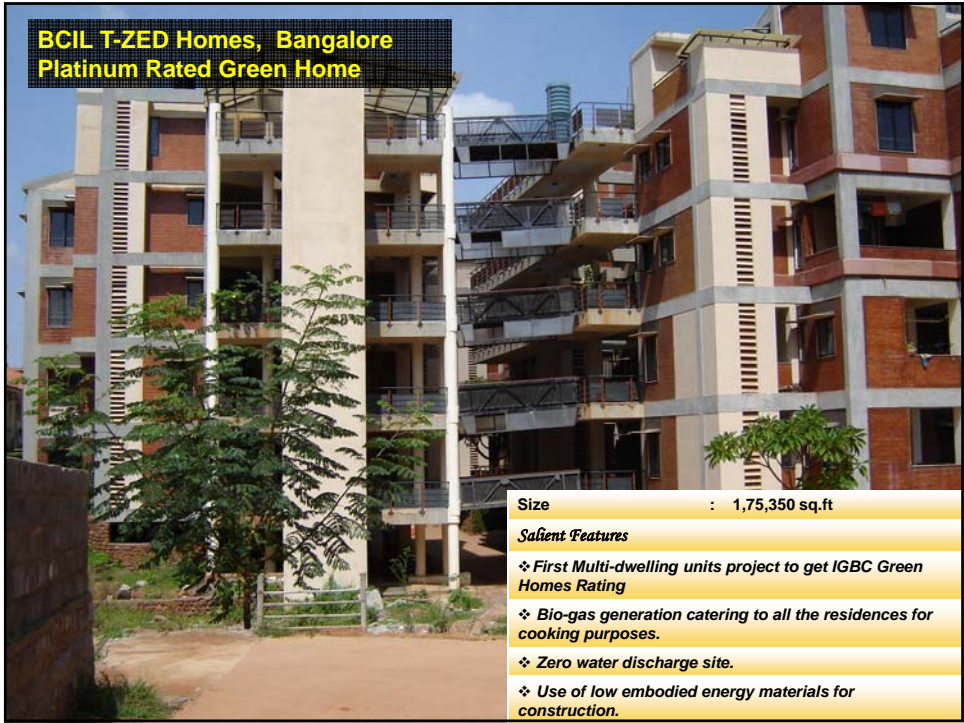
**Fast Track Building 1 & 2, Wipro Technologies, Greater Noida
Gold Rated Green Building**



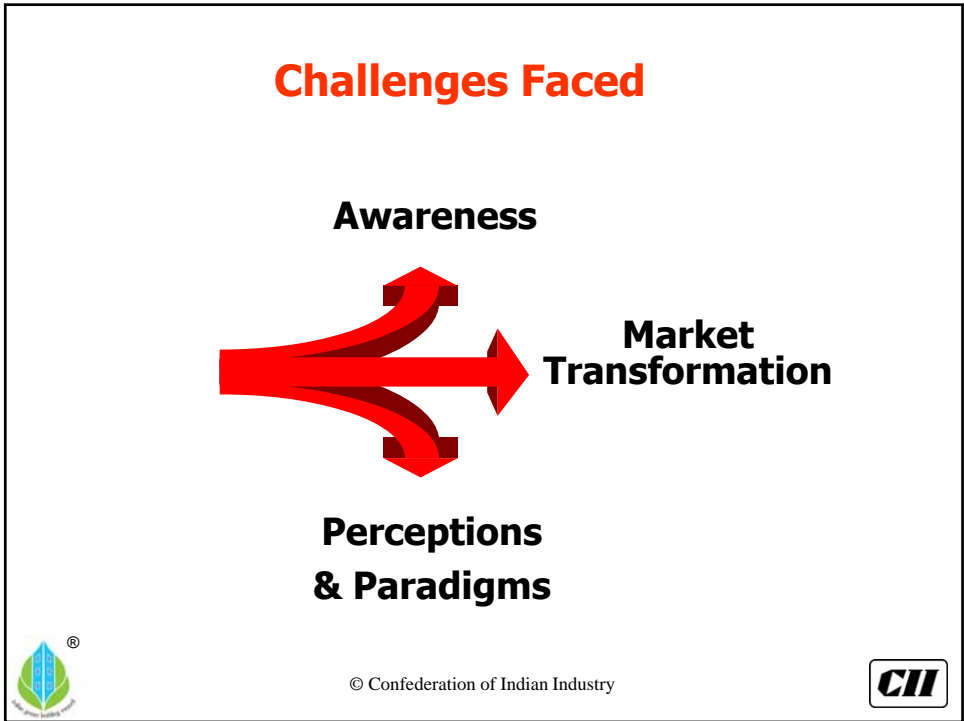
**Green Boulevard, Noida
Platinum Rated Core & Shell**



**BCIL T-ZED Homes, Bangalore
Platinum Rated Green Home**



Size	: 1,75,350 sq.ft
Salient Features	
❖ First Multi-dwelling units project to get IGBC Green Homes Rating	
❖ Bio-gas generation catering to all the residences for cooking purposes.	
❖ Zero water discharge site.	
❖ Use of low embodied energy materials for construction.	



What Facilitated the Change

- ❖ **Indian Green Building Council**

- Involvement of all stakeholders

- ❖ **First Platinum Building**

- CII-Godrej GBC

- ❖ **Green Building Congress**

- India's Flagship event on green buildings



Dr. APJ Abdul Kalam: India's No.1 Citizen at Green Building Congress 2005



Smt. Sheila Dikshit
Hon'ble Chief Minister of Delhi



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Market Transformation

- ❖ **New Materials & Services introduced due to the Movement**

- ❖ **Materials**

- High performance glass
- Wall & Roof insulation
- Low VOC paints, adhesives & sealants
- CRI certified carpets
- FSC Certified wood
- High albedo roofing material
- Flyash blocks
- Eco-friendly chemicals

- ❖ **Equipment / systems**

- Waterless urinals
- High CoP chillers
- CO2 sensors
- Root Zone treatment plants
- Wind towers

- ❖ **New Services**

- III Party Commissioning
- Energy simulation
- LEED Facilitation services



Green Materials & Equipment Business Potential: USD 40 Billion by 2012

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Perception # 1 Green Buildings are Costly

Ground realities

- **CII – Godrej Green Business Centre**
 - ❑ 20% costlier
- **ITC Green Centre**
 - ❑ 15% costlier
- **Wipro Technologies**
 - ❑ 8% costlier



Showing a Decreasing trend; Similar to US



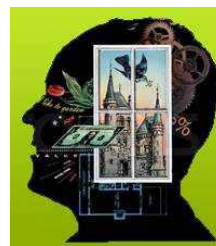
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Green Building - Cost

❖ Typical culture

- **Cost over run**



❖ Green Building rating

- **Vulnerable – Scapegoat**
- ❖ **Need to fix incremental cost & evaluate**

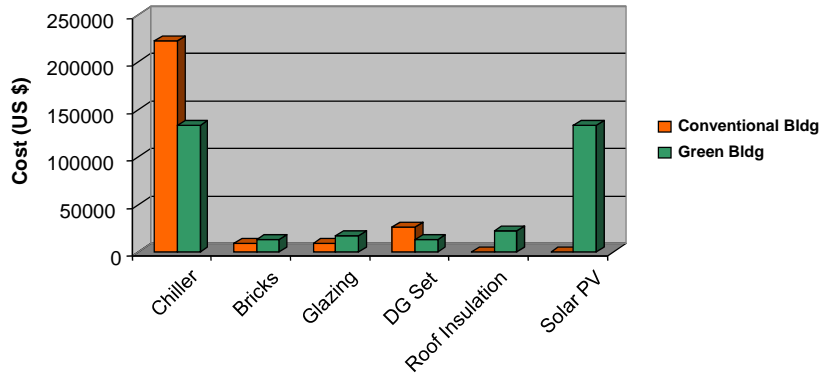


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CII – Godrej GBC

Cost Comparison – energy related equipment & materials



Overall cost of the building	: US \$ 1.8 Mn
Incremental cost vis-à-vis Conventional building	: US \$ 66000
Annual savings in energy cost	: US \$ 18000
Payback Period	: 4 years



Perception # 2

Green Buildings Take More Time

Reality

- Only little additional effort required
- Rating awarded coinciding with the commissioning



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Perception # 3 Green Buildings require Air-Conditioning

❖ Reality

- Non air-conditioned building can also be a Green Building
- Suited for Indian buildings
 - ❑ Eg., IGP Office at Gulbarga
 - ✓ Wind Tower cooling



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Wind tower

❖ Wind tower

- Fresh air intake through towers
 - Thermal mass
 - water spray
 - Drop in air temperature 5 – 7°C
- ❖ Results in 2 – 3 % reduction of air conditioning load



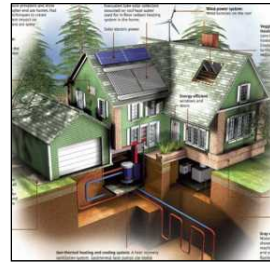
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Green Buildings...

❖ **India will see a paradigm shift in green building design & construction**

- **New design approaches**
- **New materials & equipment**
- **New technologies**



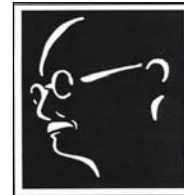
All this will happen with involvement, participation & commitment of all stakeholders



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"The earth can provide for everybody's needs but not for everybody's greed"



- Mahatma Gandhi



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