

ITC Green Centre

Buiding: ITC Green Centre

Location: Gurgaon, India

Floor Area: 1, 70,000 Sq.Ft

Architect: Rajender Kumar & Associates,
New Delhi, India
www.rka.com



Significance: Platinum Rated green building

Rated by: USGBC-LEED (US Green Building Council -
Leadership in Energy and Environmental Design)
through CII IGBC, Hyderabad
www.igbc.in

Year: 2004

Points Scored: 52/69

Building Energy simulation done by: Visual DOE 2

Energy consumption Statistics

- Normal building of similar area – 35,00,000 kWh/year
- ITC Green Centre – 20,00,000 kWh/year
- Annual Energy Savings Rs. 9 Million
- % increase in initial cost - 15%



About ITC

India's most valuable corporations with a market capitalization of US\$ 10 billion. Ranked by Forbes as one of 'World's Best Big Companies', ITC contributed over Rs. 6600 crore to the exchequer, in 2004-08. ITC's core businesses, products and brands include

- FMCG - Cigarettes, Branded Packaged Foods, Lifestyle Retailing, Greeting, Gifting and Stationery
- Hotels
- Paperboards, Specialty Papers and Packaging
- Agri Business

ITC social & ecological commitment

ITC endeavors to minimize the direct and indirect environmental impact of its business operations. ITC strives to be a

- 'Carbon Positive' Corporation - use of environment friendly fuels, renewable energy and large-scale afforestation have enabled the Company to sequester 85.6% of the carbon dioxide emitted by its operations in 2004-05
- 'Water Positive' , Zero Water Discharge & Solid Wastes corporation

The ITC Green Centre Project:

The ITC Green Centre houses the headquarters of ITC's Hotels Business and was declared the world's largest Platinum rated Green Building when it was certified in 2004.

- The project was conceived to be a "Green building" in sync with ITC's commitment towards a "Greener" tomorrow.
- Unique character to the building is that it got the Platinum rating at a time when the rating was not customized to suit Indian conditions and priorities.
- Since most of their projects were rated Gold, ITC decided to go a step ahead and try for the platinum rating. It may sound like a short step forward, but it took the company a lot of time and effort to get all the nuances of a platinum-rated green building right.

Green Materials

- The first hurdle was acquiring green materials like green wood obtained from sustainable forests and low-volatility organic compounds for construction, which at that time were not easily available in the country. Here, ITC received help from USGBC, which helped it source the materials. Numerous energy sensitivity exercises had to be conducted with ITC design and architecture consultants and employees, sensitizing them with issues of environment conservation.

Why Glass?

During the project design it was targeted to cut down the energy consumption significantly, compared to a conventional building. At ITC Green Centre, energy consumption has been slashed by as much as 51% through design integration alone. In fact, in daytime, unlike other office buildings, artificial light is not consumed at all here. The glazing for the building has been designed to maximize the effect of natural light, largely eliminating the need for artificial ones.

At the same time, the window glass, while allowing light inside, does not allow heat. This, not only keeps the office cool from inside during the day, but also decreases the load on air-conditioners

Architect's requirements from glass

According to Ar.Rahul Kumar of Rajender Kumar and Associates who were the architects of this project, when they started working on the facades they needed a company which gave them enough options to test out the designs and do the energy modeling analysis.

Saint-Gobain with its expertise to address such situations could work closely with the architect and the client and provided them various options of modern sustainable glazing.

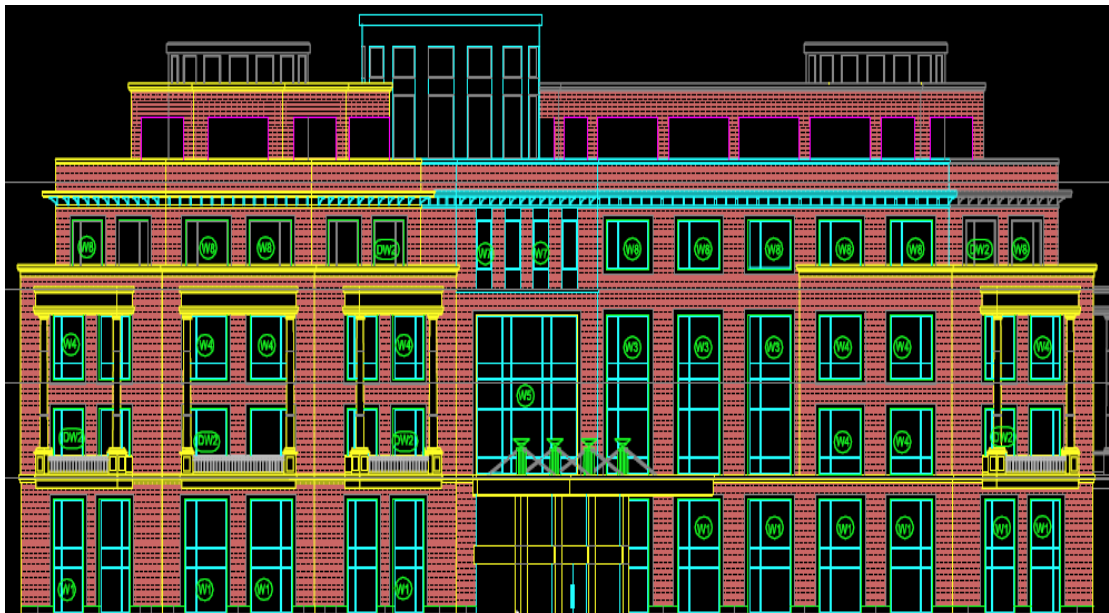
Challenges of sustainable glazing

It is always an interesting challenge to work out a sustainable glazing design for tropical climatic conditions. While doing modern office buildings one has to ensure that the light penetrates deep into the interior spaces and at the same time keep the heat out.

ITC could achieve the twin proposition of lending in abundant natural light yet cutting down the heat gain in the interiors with advanced high performance glazing solutions.

Design Intent:

- High energy efficiency of the façade with optimum light transmission
- On the Northern side, the glass solution was required to give a higher light transmission due to the orientation of the building



Frontal elevation showing façade design

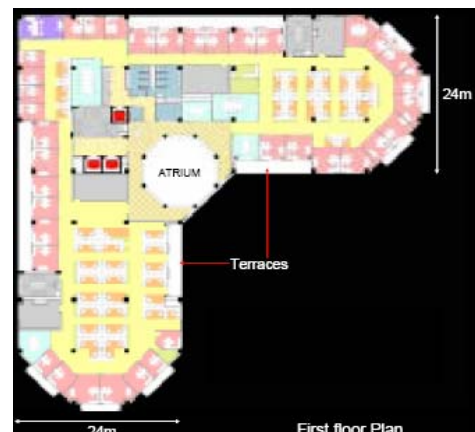
The Green Building norms emphasize on daylight (natural lighting) and unrestricted vision as they both are linked to human health and productivity. Glass is the only material which can help to achieve these requirements.

Building Design:

By giving the 'L' shape configuration the width of the floor Plate is reduced for the same amount of floor plate area thereby allowing natural light to penetrate deep into the 'interior spaces

The building is a composition of three parts.

- Two office wings are held together by a central atrium that as an ensemble creates a large L-shaped figure focused on an exterior landscaped court.
- The L-shape blocking ensures that part of the façade is always shaded.
- The L-shape office wings end into hexagonal ends that make a very strong presence on the approach roads.



- The atrium joins the different functions of the building and connects them into an ensemble encouraging a sense of community and interaction.
- The octagonal atrium has side light from the top to provide a glare – free natural lighting in the interior without allowing direct heat gain from the roof.
- Interior roller shades to reduce Heat gain

Glass solution for day-lighting & energy efficiency strategy:

1. Saint-Gobain's Cool-lite Blue Green double glazed with Ekologik which has very low solar factor (SF) and U-Value with optimal light transmission
2. The north side with Parsol Green double glazed with Ekologik with higher light transmission and low solar factor (SF) and U-Value to maximize daylighting

Client's view on Saint Gobain

“Saint-Gobain has looked at this entire job beyond that of a glass vendor. They kept the end goal & objective in mind; that they are partners in delivering a Platinum Rated Building”

Mr.Alwyn Naronha (VP – Projects -ITC)

MATERIALS USED

Carpet

CRI Green Level certified

Recycled content of 60%

Source : Bealuie of America , US

High Reflective Roof Coating

Energy Star certified

Emissivity of 0.94.

Source : Energy Seal Coatings, US

Lighting Fixtures & Lamps

Efficient light fixtures with electronic ballast , source : Philips

T5 & CFL lamps , Source : Osram

Autoclaved Aerated Concrete (AAC) Block

55% Flyash content

Source: BILT Infrastructure Ltd.

Double Glazed Windows

U value 1.9 w/m² K

Glass by Saint Gobain

Portland Pozzolana cement

26% pozolana

Source : BIRLA Plus

Ready Mix Concrete (RMC)

Fly ash (3.36%)

Source : Birla RMC

Medium Density Fibreboard (MDF)

85% rapidly renewable materials

(eucalyptus which is grown with in ten years life cycle)

15% recycled material

Source : Nuwud

Salient features of Platinum rated ITC Green Centre

Sustainable Site

1. Alternative Transportation: Parking, shower & changing facilities for bicyclists, pool cars with charging facility.
2. Storm Water Management: Rainwater recharge pits to ensure zero discharge into municipal drainage.
3. Heat Island Effect: 80% underground parking. More than 75% of the terrace has been insulated and coated with the reflective high albedo roof paint.
4. Light Pollution Reduction: Minimum exterior lighting to limit night sky pollution.

b) Water Efficiency

1. Water Efficient Landscaping: Native plants, high efficiency irrigation system and 100% recycled water for irrigation.
2. Innovative Waste Water Technologies: Fluidized Aerobic Bioreactors (FAB) sewage treatment plant provided.
3. Water Use Reduction: 40% reduction in water usage over base case.

c) Energy & Atmosphere

1. Energy: Exceeds ASHRAE 90.1 base case standards by 51%.
2. Envelope: External wall of 250mm thickness. Autoclaved Aerated Concrete Blocks, double glazed windows, 75mm-thick extruded polystyrene roof insulation. Extruded polystyrene (XPS) is a type of insulation material with a high R-value, good moisture resistance, high structural strength and low weight. Extruded polystyrene is used extensively as thermal insulation in industrial, commercial and residential construction
3. HVAC: Chillers of COP 6.1, double skinned AHUs, VFDs, VAVs, Heat Recovery Wheel.

4. Hot Water: Solar thermal technology.
5. Ozone Depletion: All HVAC equipment are free from CFC / HCFC / Halons.

d) Materials and Resource

1. Storage and Collection of Recyclables: Separate storage bins provided at each floor level for different recyclable materials such as paper, cardboard, glass, plastic and metals.
2. Resource Reuse: More than 10% of the building materials are refurbished / salvaged from other sites.
3. Recycled Content: Fly ash based cement; Fly ash based AAC Blocks, acoustic ceiling, glass, ceramic tile, MDF cabinets, etc.
4. Regional Materials: More than 40% of the building materials are from within 500 miles of the project site.
5. Rapidly Renewable Materials: Such as medium density fibre board.
6. Certified Wood: New woods used are certified under the Forest Stewardship Council, US.

e) Indoor Environmental Quality

1. Environment Tobacco Smoke Control: Designated smoking rooms are provided at convenient locations with separate exhausts.
2. CO2 Monitoring: Sensors at various locations monitor CO2 levels.
3. Low Emitting Materials: Low VOC levels of adhesives / sealants used for carpets / composite woods / paints.
4. Daylight and views: Views to external glazing from at least 90% of regularly occupied areas.

f) Innovation and Design Process

1. Green Education: Educating visitors, construction workers, employees, consultants on sustainability.

Highlights of the building

1. Use of glass which has 19% recycled content helped ITC to get points in recycle content.
2. Use of other recycled and recyclable resources, with materials like fly ash based cement etc. More than 10% of the building materials used are recycled, refurbished or salvaged from other sites
3. 40% of the total raw materials used were procured within 500 miles of the project site such as double glazed glass façade and window framing, 250mm thick auto-claved and aerated concrete block wall
4. Daylight and views: Views to external glazing from at least 90% of regularly occupied areas
5. Use of solar photo voltaic for emergency lighting
6. Use of green material to reduce heat gain from rooftop / building envelope with high performance glazing and proper insulation material
7. CFC/HCFC free HVAC equipment is used to combat ozone depletion.
8. Installation of solar hot water system and solar concentrator for kitchen
9. Use of green material to reduce heat gain from rooftop / side walls. Low cost version of this idea is to paint the rooftop white or roll out gunny bags in summer

GREEN FEATURES OF THE BUILDING

- Fly Ash based cement used
- Autoclave Aerated Concrete (AAC) Blocks
- Double glazed windows with low-e coating
- Rain water harvesting
- Water saving techniques
- CFC, HCFC & Halon free air- conditioning system
- Energy efficient lighting (T5 lamps with electronic ballast, high efficient luminaires)
- Water efficient landscaping
- Sewage treatment plant and waste water recycling.
- Use of Low VOC, rapidly renewable & certified materials
- Eco friendly house keeping chemicals & practices
- Carbon dioxide (co2) monitoring indoor chemical & pollutant source control (Dedicated copy printer room with independent exhaust) indoor air quality (iaq) system.
- Optimized energy performance through efficient designs light pollution reduction ozone protection (by using cfc, hcfc & halon free refrigerants) water use reduction storm water management
- Use of recycled materials
- CO₂ monitoring systems in AHU (operates when internal co2 is 530ppm Or more than external atmosphere)20 days flush out of entire building air prior to occupation

Team Players of Platinum rated ITC Green Centre

Owner Project Management	M/s. ITC Ltd.
Architects & interior designers	M/s. Rajender Kumar Associates (RKA)
Structural Consultant	M/s. V. G. Associates
Electrical consultant	M/s. Kanwar Krishnan Assoc P. Ltd.
HVAC Consultant	M/s. Spectral Consultants Pvt. Ltd.
Landscape consultant	M/s. Design Cell
LEED facilitator	M/s. Confederation of Indian Industry
Energy consultant	M/s. The Energy & Resources Institute
Commissioning agency	M/s. Environmental Design Solutions
Plumbing consultant	M/s. Deolalikar Consultants (P) Ltd.
Structural peer review	M/s. IIT, Delhi
Materials Testing & Research	M/s. Shriram Institute for Indl. Research

View's on ITC Green centre

“Encouraging employees living in the vicinity to cycle to work or, for those living far, to form car pools. Today, 70 per cent of the staff uses car pool”

“We had a cost over-run of 12 per cent,” adding that similar projects undertaken after this one saw reduced costs of 4-7 per cent. "Actually, now the cost of such a building would be lower than that of a normal office building,” – Khatri