

Indian Institute of Technology

Location	: Kanpur, Uttar Pradesh
Site area	: 17345 m^2
Built-up area	: 4240 m^2
Air-conditioned area	: 1912 m^2
Non Air-conditioned area	: 2328 m^2
Energy consumption reduction	: 41% reduction from GRIHA benchmark
Water consumption reduction	: 70% reduction from GRIHA benchmark
EPI	: 45.43 KWh/ m^2/year
Renewable energy installed on site	: 13.86 KW
GRIHA rating	: 5 Stars

The following strategies were adopted to reduce the impact of the proposed building on natural environment:

- Sustainable Site Planning:
  - Dust screens provided around construction area to prevent air pollution.
  - Top soil stored and preserved for later use.
  - Existing trees preserved & protected on site.
- Reduction in water consumption (compared to GRIHA benchmark):
  - Existing trees preserved & protected on site.
  - 62% reduction in building water consumption by use of low-flow fixtures.
  - 50% reduction in landscape water consumption by minimizing lawn area and planting native species of trees and shrubs.
  - Only 17% paved area to promote water percolation and reduce heat island effect.
  - Rain water harvesting system designed for reuse and recharge.
  - Waste water treated and reused for landscape water requirement.
- Reduction in energy consumption (compared to GRIHA benchmark) while maintaining occupant comfort:
  - For achieving visual comfort
    - 40% window to wall ratio for optimal natural lighting.
    - External shading and efficient glazing systems to reduce solar heat gain and glare-free day-light.
    - ECBC compliant energy efficient artificial lighting design.
    - Day lighting in common circulation areas through integration of skylights.
  - For achieving thermal comfort
    - Day lighting in common circulation areas through integration of skylights.
    - Optimization of building design as per local climate of Kanpur via sun path analysis, predominant wind direction, and existing vegetation.
    - ECBC compliant building envelope to reduce space conditioning loads in AC spaces and to meet thermal comfort in non-AC spaces.
    - Natural ventilation in common areas through integration of ventilators.
    - Roof shaded by bamboo trellis and solar panels to reduce direct solar heat gain.
    - Water cooled chiller as per system efficiency recommended in ECBC
    - VFD (Variable Frequency Drives) installed in AHUs (Air Handling Units)
    - Low energy strategies include integration of external water body to cool condenser water loop, integration of thermal energy storage and earth air tunnels to reduce chiller capacity.
- Renewable energy technologies installed on site:
  - 30% annual energy requirement for internal artificial lighting met by solar energy.
  - 100% annual energy requirement for hot water met by solar thermal hot water systems.
- Use of low-energy/green materials:
  - Portland Pozzolona Cement with fly-ash to reduce embodied energy of the building

Integrated Design Team:

Architect:	Kanvinde Rai and Chowdhury Architects and
Landscape Design:	Mr Yogesh Kapoor
Mechanical/Electrical/Plumbing:	Kanwar Krishen Associates Pvt. Ltd.
Green Building Design & Energy Consultant:	The Energy and Resources Institute
HVAC consultant:	Gupta Consultants and Associates