



## Manipal University Jaipur, Campus

Location	: Dehmi Kalan, Jaipur
Site Area	: 20 Acres (Total 66 Acres)
Built up Area	: Admin. Block – 21,113.1 m <sup>2</sup> Academic Block – 35,668.6 m <sup>2</sup>
Air-conditioned Area	: Admin. Block – 10,060 m <sup>2</sup> ; Academic Block – 16764.6 m <sup>2</sup>
Non Air- conditioned Area	: Admin. Block – 11,053.1 m <sup>2</sup> ; Academic Block – 18904.0 m <sup>2</sup>
Energy Consumption Reduction	: Admin. Block – 81.5%, Academic Block – 72.9% , Campus – 76.14% (Compared to GRIHA benc mark)
Water Consumption Reduction	: 88.7% (Compared to GRIHA base case)
EPI	: Administration Block – 20.9 KWh/ m <sup>2</sup> /year; Academic Block – 30.58 KWh/ m <sup>2</sup> /year; Campus – 26.99 KWh/ m <sup>2</sup> /year
Renewable Energy	: Rated capacity of solar PV installed on site is 270.0 KW
GRIHA provisional rating	: 5 Stars
Year of completion	: October 2014

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

### 🌀 Sustainable Site Planning

- Landscaping planned to minimize urban heat island effect based on Irradiation and Wind Studies
- Swales and wetlands designed for 100% recharge of rainwater
- Almost 95% of construction waste reused or recycled

### 🌀 Reducing water consumption

- Use of low-flow fixtures and fittings help reduce building water use by as much as 59%
- Extensive use of native trees and shrubs along with drip irrigation and micro sprinklers help reduce landscape water use by as much as 84%
- 100% tertiary treatment of waste water and 100% reuse of treated waste water for flushing and landscaping

### 🌀 Reducing energy consumption (compared to GRIHA benchmarks) while maintaining occupant comfort.

- **For achieving visual comfort:**
  - » All fenestration designed to provide glare free usable daylight in most areas
  - » As this is a daytime use building, it has been designed to run only on daylight. Most of the spaces run on daylight throughout the year. (Spaces designed to achieve daylight levels of about 150lux)
  - » Projectors in the classroom have been selected to work with the available daylight so that blinds could be avoided.
- **For achieving thermal comfort:**
  - » All rooms have buffer spaces outside in form of corridors or jalis in order to reduce solar gains into the rooms and maximise comfort
  - » Optimized shading based on orientation in order to provide complete shading in all spaces throughout the year while maximizing daylight.
  - » GRC jalis used on the East and West facades to maximize shading
  - » High performance selective used to reduce solar gains further
  - » Different types of glazing used in different sections based on shading and orientation to ensure a balance between daylight and solar gains
  - » Number of openable windows calculated based on use and orientation of each space. Low level and high level openable windows provided on both sides of the rooms to both cross ventilation and stack ventilation
  - » Double wall with insulation in the cavity provides both thermal mass and insulation to maximize thermal lag
- **For energy efficiency**
  - » Designed for Mixed mode ventilation, with natural ventilation in winters, and evaporative cooling in summer (in academic block)
  - » HVAC system designed to provide free cooling in winter
  - » Chiller efficiency further improved by providing evaporative cooling pads around them
  - » 100% LED lighting across campus
  - » Occupancy and daylight sensors provided in all classrooms and faculty rooms.

### 🌀 Use of low enetrny materials

- 16.6% reduction in structural steel and 15.2% reduction in structural concrete by quantity was achieved by using efficient building technology.
- Use of hollow concrete and AAC blocks for better insulation and lower embodied energy.
- 43.3% reduction in embodied energy in non-structural application from GRIHA base case.

### Integrated Design Team

Client	: Manipal University Jaipur
Coordinator	: Mr Santosh Kamath/ Mr Naveen Kumar
Principal Architect	: Sundaram Architects Pvt Ltd
Landscape Architect	: Masterplan Landscape Architects
Project Management Consultant	: Diligent PMC
Structural Consultant	: TRC/ Sundaram Architects Pvt Ltd.
Electrical Consultant	: Sundaram Architect Pvt Ltd
Green Building Design and Certification	: TerraViridis Environmental Design Consultancy