



## University of Petroleum and Energy Studies, Dehradun

<b>Location</b>	: Bidoli, Dehradun, Uttarakhand
<b>Site Area</b>	: 1,08,717 m <sup>2</sup>
<b>Built up Area</b>	: 33,787.34 m <sup>2</sup>
<b>Air-conditioned Area</b>	: 11792 m <sup>2</sup>
<b>Non Air- conditioned Area</b>	: 26476 m <sup>2</sup>
<b>Energy Consumption Reduction</b>	: 42.73% from GRIHA benchmark
<b>Water Consumption Reduction</b>	: 33.16% from GRIHA benchmark
<b>EPI</b>	: 35.22 kWh/m <sup>2</sup> /year
<b>Occupancy hours</b>	: 24 hours (Residential) & 10 hours (academic)
<b>Renewable energy installed on site</b>	: 100kWp
<b>GRIHA final rating</b>	: 4 Stars

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

### 🌍 Sustainable Site Planning:

- Barricading of the site to prevent air pollution.
- Existing trees preserved and native species of trees planted
- Top soil preserved and protected for later use
- Minimum damage to the existing topography of the site

### 🌍 Reduction in water consumption (compared to GRIHA benchmark):

- Reduction in building water consumption by use of low-flow fixtures : %
- 33.16% reduction in landscape water consumption by using native species and efficient irrigation systems
- Waste water treated and re-used for landscape water requirement
- More than 50% of the paved area topped with loose aggregate to allow penetration of water

### 🌍 Reduction in energy consumption (compared to GRIHA benchmark) while maintaining occupant comfort:

- 40% reduction in annual energy consumption as compared to a conventional building
- 45% of the total area is day-lighted
- External shading and efficient glazing systems to reduce solar heat gain and glare-free day-light
- ECBC compliant energy efficient artificial lighting system
- ECBC Compliant envelope to reduce space conditioning loads

### 🌍 Renewable energy technologies installed on site:

- 30.1% of annual energy requirement for artificial lighting met by solar energy
- Total installed capacity of 100kWp
- 95.3% annual energy saved by solar hot water system

### 🌍 Use of low-energy/green materials:

- Use of Portland Pozzolona cement in structural concrete to reduce embodied energy of the building
- Use of low energy kota stone in flooring
- Energy savings of 54% in structural application and 22% for non-structural applications.

### Integrated Design Team:

Client	: University of Petroleum & Energy Studies, Dehradun
Architect	: Design Associates Inc.
HVAC System	: Daikin India
Electrical Consultant	: Design Centre Consulting Engineers Pvt. Ltd.
Interiors	: Godrej Interio, IRGO
GRIHA Rating Consultant	: GreenTree Building Energy (P) Ltd.

Building performance as per audit report:

### 🌍 Energy

- Energy generated through solar PV - 127814 KWh/year.
- Final EPI achieved - 34 KWh/m<sup>2</sup>/year.
- Reduction in EPI from proposed case - 45%.
- Thermal comfort is met as per NBC 2005.

### 🌍 Water and waste

- Portable water test report indicates conformity to IS code
- Treated water test report indicates conformity to IS code

### 🌍 Noise level

- Outdoor noise levels are within acceptable limits as per CPCB.
- Indoor noise levels are within acceptable limits as per NBC 2005.