

Active Use of Energy Harvesting Concepts

IIT Mandi is committed to advancing a low-carbon and energy-efficient campus by actively integrating renewable energy technologies, smart energy management systems, and sustainable infrastructure into its campus development. The Institute continuously adopts innovative energy harvesting solutions to optimize resource utilization, reduce greenhouse gas emissions, and strengthen long-term environmental sustainability.

- **Renewable Energy Generation:** A 0.5 MW grid-connected Solar Photovoltaic (PV) Plant has been commissioned at the North Campus hostel complex. Further, approximately 3.5 MW of rooftop solar PV capacity is being developed through the Solar Energy Corporation of India (SECI), significantly enhancing the Institute's renewable energy portfolio.
- **Smart Energy Monitoring:** Advanced smart energy metering systems have been installed across academic, residential, and administrative buildings for real-time monitoring, analysis, and optimization of electricity consumption, enabling data-driven energy conservation.
- **Solar-Powered Campus Infrastructure:** Approximately 30% of the campus street lighting is powered through standalone solar lighting systems, promoting the active utilization of clean and renewable energy.
- **Energy-Efficient Lighting:** The Institute has achieved 100% adoption of LED lighting, substantially reducing electricity consumption, maintenance requirements, and carbon emissions.
- **High-Efficiency HVAC Systems:** Energy-efficient HVAC infrastructure incorporating Variable Frequency Drives (VFDs), Variable Refrigerant Volume (VRV) technology, centralized chillers, and high-efficiency hot water generation systems ensures optimized cooling performance with reduced energy demand.
- **Heat Pump Technology:** Energy-efficient heat pumps are deployed for continuous hot water supply in hostels, delivering 40–50% energy savings compared to conventional water heating systems.
- **Sustainable Mobility:** IIT Mandi promotes clean transportation through the use of electric vehicles and dedicated EV charging infrastructure, supporting the transition towards a low-emission campus.
- **Efficient Electrical Distribution:** Optimally designed 33/11 kV electrical distribution infrastructure with energy-efficient transformers minimizes technical losses and enhances the reliability and efficiency of power distribution across the campus.
- **Sustainable Infrastructure Planning:** All upcoming campus development projects are planned with a strong focus on renewable energy integration, energy-efficient building systems, climate-responsive design, and environmentally sustainable construction practices.

Through these initiatives, IIT Mandi has established a comprehensive energy management framework that combines renewable energy generation, energy harvesting, intelligent monitoring, efficient energy utilization, and sustainable infrastructure development, reinforcing the Institute's commitment to becoming a smart, energy-efficient, and environmentally sustainable campus.