IITH's Campus-Scale Practices Shaping the Future of Sustainable Academic Campuses

KID: 20250411 | Mr Vinay Kumar

Institutions of higher education today are increasingly called upon to demonstrate how academic excellence can be aligned with environmental responsibility at scale. At Indian Institute of Technology Hyderabad, this challenge is being addressed by treating the campus itself as a living laboratory for sustainability, where planning, infrastructure, governance and everyday practices function as an integrated system. With an ambitious yet carefully structured goal of becoming a Net Zero campus by 2030, IIT Hyderabad is embedding sustainability into the design and daily life of the campus through campus-scale interventions spanning clean energy generation, energy-efficient design, water-sensitive planning and biodiversity stewardship—offering a replicable model for future-ready academic institutions.

A Campus Designed with Sustainability at Its Core

From its master planning stage, IIT Hyderabad has approached development with long-term environmental responsibility in mind. Infrastructure growth has been carefully aligned with natural systems, ensuring that built spaces coexist with ecological processes. This integrated approach allows the campus to function not just as an academic institution, but as a self-sustaining ecosystem that responds to regional climate, geology and biodiversity.

Turning Parking Spaces into Power Stations

At the core of IIT Hyderabad's Net Zero journey lies a decisive transition towards renewable energy. The Institute has reimagined conventional infrastructure—particularly parking areas and rooftops—as productive clean energy assets. By installing solar panels over parking sheds and buildings, the campus has avoided land-use trade-offs while maximising renewable energy generation.

Currently, IIT Hyderabad operates a 0.95 megawatt (MW) solar power plant, and an additional 3.5 MW solar project is nearing completion. Once fully commissioned, the total installed solar capacity will reach 4.45 MW, supported by over 9,400 solar panels across the campus. This solar expansion is expected to meet a substantial share of the Institute's electricity requirements, significantly reducing dependence on grid power and lowering carbon emissions—an essential step towards achieving Net Zero by 2030.

Efficiency Before Expansion

While renewable generation is critical, IIT Hyderabad has placed equal emphasis on reducing energy demand. Guided by recommendations from Energy Efficiency Services Limited (EESL), the campus is replacing conventional ceiling fans with high-efficiency models across academic, residential and administrative buildings.

Student hostels showcase another forward-looking intervention: an advanced radiant cooling system based on Japanese design principles. Using chilled water pipes embedded in ceilings and floors, the system maintains indoor comfort at around 25°C with significantly lower energy consumption compared to conventional air-conditioning.

Architectural design elements, including window placements that minimise direct heat gain, further enhance thermal efficiency.

Reinforcing these efforts, several academic and residential buildings on campus have received GRIHA certification, underscoring IIT Hyderabad's commitment to nationally recognised green building standards.

Water Security Through Nature-Led Engineering

Located in a region characterised by hard rock geology, IIT Hyderabad has adopted a science-driven, nature-integrated approach to water management. The campus seamlessly blends natural contours with engineered infrastructure to capture monsoon runoff, recharge groundwater and support non-potable reuse. A network of lakes, bio-swales and artificial ponds anchors this system. The International Guest House Lake functions as both a stormwater storage and groundwater recharge structure, while an extensive bio-swale network spanning nearly 14.84 km slows runoff, filters sediments and enhances percolation. Together, these systems provide a combined water storage capacity of over 4.79 crore litres, significantly reducing reliance on external water sources.

Beyond functionality, these water bodies have evolved into ecological assets—supporting aquatic life, attracting birds and regulating the campus microclimate.

Building a Biodiversity Oasis

IIT Hyderabad's sustainability vision extends well beyond infrastructure into ecological stewardship. Over the past six years, sustained tree plantation drives, encouraged by successive Directors, have transformed the campus landscape. Thousands of trees planted through monthly and monsoon plantation initiatives have strengthened carbon sequestration and ecological resilience.

The results are visible. The campus today hosts a rich diversity of flora and fauna, with over 60 species of birds documented, including a growing presence of peacocks. This biodiversity has been formally captured in a dedicated publication on the birds of IIT Hyderabad. More recently, a butterfly garden has been established as a micro-habitat to support pollinators.

Landscaped spaces such as fruit gardens, Ficus Island and the Neem Trail further reflect a deliberate effort to create interconnected ecological zones, ensuring that development enhances, rather than displaces, nature.

Governance, Education and Leadership in Sustainability

Sustainability at IIT Hyderabad is not incidental—it is institutionalised. A dedicated Sustainability Committee oversees planning, coordination and monitoring of initiatives across energy, water, biodiversity and waste management, ensuring continuity and accountability.

Strengthening this foundation is the Greenko School of Sustainability, which plays a central role in advancing sustainability education, interdisciplinary research and policy engagement. The School focuses on critical areas such as energy transition, climate action, circular economy and sustainable development, preparing future leaders to address complex environmental challenges at scale.

Living Sustainability Every Day

The Institute's Net Zero vision is reflected in daily campus life. IIT Hyderabad actively promotes non-motorised transport, financially supporting students to purchase bicycles at the time of admission. E-vehicles cater to internal mobility needs, reducing emissions from conventional transport.

Waste management follows a circular economy approach. Solid waste is segregated at source, recyclables are recovered, organic waste is converted into compost and vermi-compost for campus gardens, and food waste from mess facilities is processed into biogas to fuel kitchens—closing the loop between consumption and resource recovery.

A Living Laboratory for a Sustainable Future

Together, these interventions—solar-powered infrastructure, energy-efficient buildings, water-sensitive design, biodiversity conservation, institutional governance and sustainable lifestyles—position IIT Hyderabad as a living laboratory for sustainability. The campus demonstrates how technology, policy and nature can work in tandem to address climate challenges in real-world settings.

Articulating this long-term vision, Prof. B. S. Murty, Director of IIT Hyderabad, notes, "Our Net Zero goal is not a standalone target. Sustainability and biodiversity are part of the soul of IIT Hyderabad. From how we design our buildings and energy systems to how we conserve water and nurture ecosystems, the campus is envisioned as a living laboratory where technology and nature coexist to create solutions for a sustainable future."

As solar panels rise over parking spaces, water flows through green corridors, and biodiversity thrives alongside academic pursuits, IIT Hyderabad is demonstrating how higher education institutions can lead India's transition to a low-carbon, climate-resilient future—one campus at a time.

Mr Vinay Kumar
Public Relations Officer, IITH