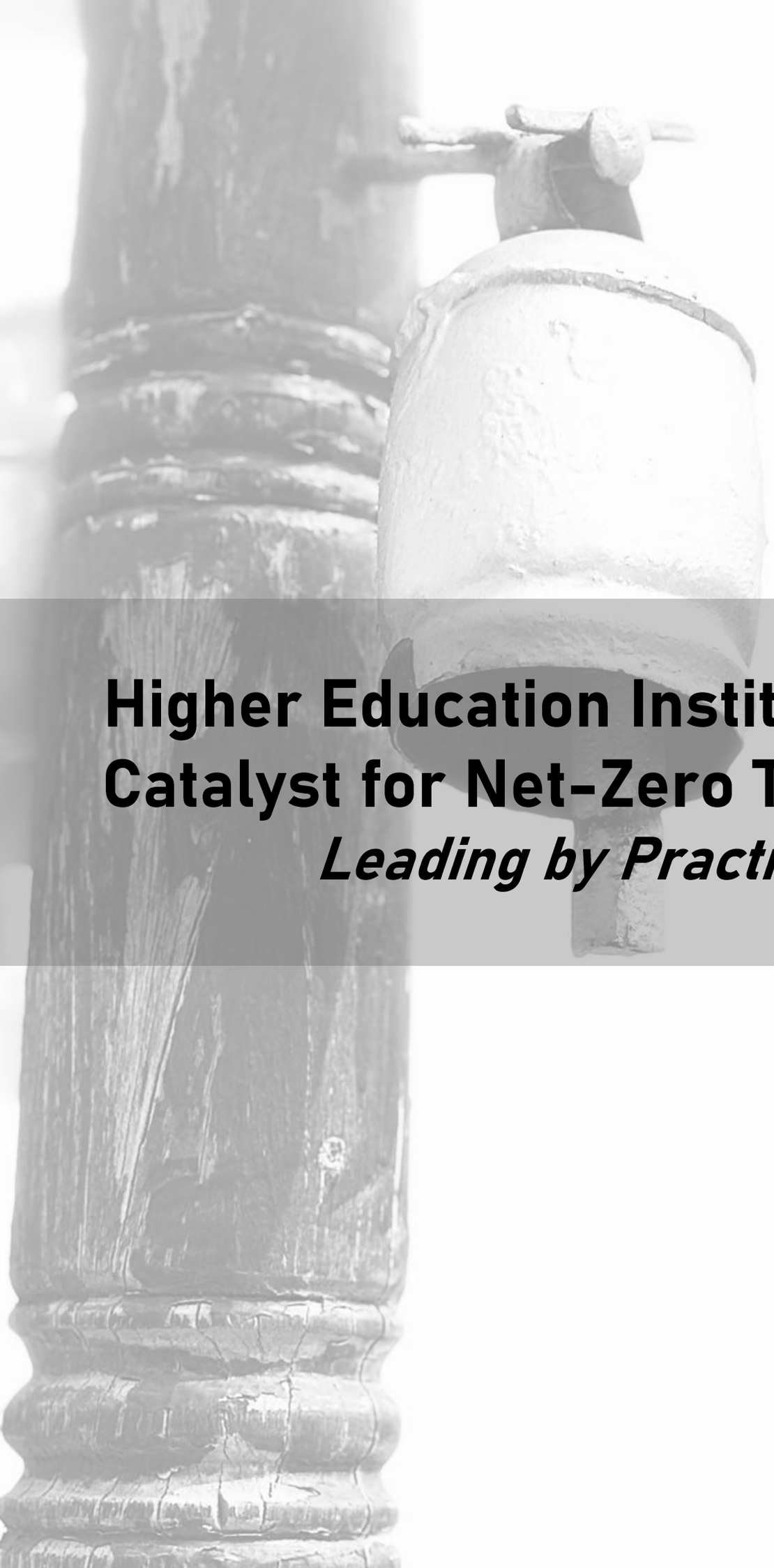


Higher Education Institutes as a Catalyst for Net-Zero Transition

Leading by Practice

Higher Education Institutes as a Catalyst for Net-Zero Transition

Leading by Practice

Editors

Shaleen Singhal

Namya Sharma

Sagarmoy Phukan

Higher Education Institutes as a Catalyst for Net-Zero Transition: Leading by Practice

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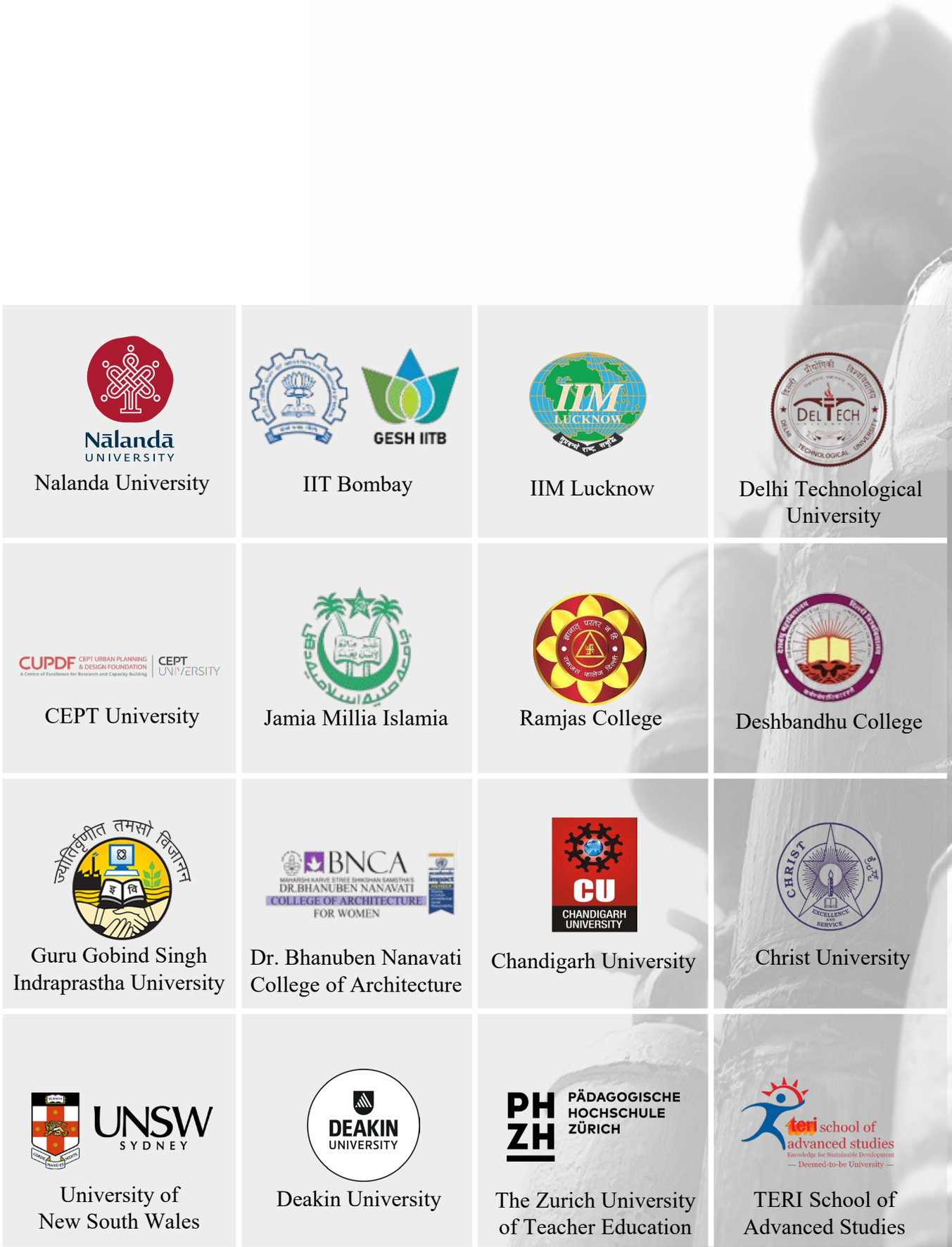
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Printed in India



The Bells of Hope



Nalanda University

IIT Bombay

IIM Lucknow

Delhi Technological University

CEPT University

Jamia Millia Islamia

Ramjas College

Deshbandhu College

Guru Gobind Singh Indraprastha University

Dr. Bhanuben Nanavati College of Architecture

Chandigarh University

Christ University

University of New South Wales

Deakin University

The Zurich University of Teacher Education

TERI School of Advanced Studies

Sixteen institutes ringing the bells of hope towards a HEI-led ecosystem for net-zero transition

Preface

Shaleen Singhal
Namya Sharma
Sagarmoy Phukan

Net-zero transition towards low carbon and resilient future has become a global imperative, and Higher Education Institutions (HEIs) have the potential to play a pivotal role in driving this change. This case compendium, **'Higher Education Institutes as a Catalyst for Net-Zero Transition: Leading by Practice'**, has been conceived as a practical resource for the higher-education sector. The conceptualisation of this work has evolved through reflection on the growing imperative for carbon emission reduction and recognition of the critical role HEIs can play in advancing decarbonisation within the higher education sector and beyond. Through interactions with HEIs, sectoral experts and key stakeholders, we recognised the need to document leading case examples that show how institutions are translating net-zero ambitions into action through technology adoption, governance reforms, curriculum integration and stakeholder engagement. Anchored in the belief that inspiration is most effective when grounded in practice, this compendium documents case exemplars from HEIs to promote structured knowledge sharing, peer learning and context-specific adaptation beyond one-size-fits-all approaches.

The compendium has been developed in alignment with the ethos of TERI School of Advanced Studies (TERI SAS), with the clear goal of supporting India in accelerating the decarbonisation pathway. Under its mandate to advance sustainability research, TERI SAS has been actively pursuing this agenda over the past two years through collaborative knowledge co-production and engagement with HEIs and sectoral stakeholders. As part of this effort, TERI SAS have also spearheaded relevant initiatives and provided platforms for dialogue and exchange on carbon neutrality and green transition pathways.

This initiative builds on momentum from the thematic track **"***Building Leadership for Carbon Neutrality (Net-Zero) in Higher Education Institutions*" convened by the Emerson Centre of Excellence for Sustainability Studies at TERI SAS at the 24th World Sustainable Development Summit in March 2025. It advances the agenda from dialogue to application by curating set of cases that illustrate various pathways toward low-carbon and net-zero campuses. We sincerely appreciate the participating HEIs and commend their commitment to advancing national priorities by undertaking these initiatives despite several challenges.

Significance of this Compendium

The higher education sector is uniquely positioned to catalyse climate action by driving systemic change across academics, behaviour and campus operations, even as institutions navigate diverse transition challenges. By presenting practical, scalable and replicable approaches, grounded in governance, curriculum and research, this compendium provides a structured evidence base to support institutional action and foster cross-institutional learning and collaboration. Just as the Bells of Hope signify optimism and a collective commitment to sustainability, the success stories of the sixteen HEIs presented in this publication similarly emerge as a powerful metaphor, bells of hope that resonate through their contributions to knowledge, innovation and leadership essential for advancing the HEI-led ecosystem in India towards a net-zero future.

Preface

Purpose and Intended Use

In alignment with this intent, the case compendium is designed to advance the following outcomes:

- Showcase practice-based evidence by highlighting how institutional sustainability commitments are being translated into action.

- Communicate efforts undertaken by leading HEIs to achieve carbon neutrality across key sectors of the net-zero transition, such as waste and water management, energy decarbonisation, research and development and related domains.

- Strengthen the science – policy - practice interface and enable knowledge sharing and peer learning by communicating institution-wide strategies and action plans that can inform and inspire broader institutional adoption.

Overall, this Compendium is both a reflection of ongoing institutional commitment and an invitation to collective progress. Through this work, we intend to bring to the forefront the vital contributions of HEIs in advancing net-zero transitions, which are often underacknowledged. By bringing together diverse, practice-based experiences from HEIs, this compendium reinforces their pivotal role not only within campuses but across the wider socio-economic landscape. Through research, innovation and community engagement, HEIs can shape policy, industry practices and public behaviour. The pathways documented here are neither prescriptive nor exhaustive; rather, they offer grounded presentations of what is possible when intent is matched with informed action, collaborative learning and sustained effort. As we advance towards our long-term net-zero vision, it is our hope that these cases will continue to inspire, guide and empower institutions to lead with purpose, shaping higher education as a cornerstone of a sustainable future.

Acknowledgements

This case compendium represents a collaborative academic endeavour shaped by the collective contributions of individuals and institutions committed to advancing net-zero transitions.

The research team gratefully acknowledges all contributing authors for their research intent, analytical depth and commitment to documenting diverse institutional case exemplars on net-zero pathways. Their contributions constitute the intellectual backbone of this publication and reflect a shared dedication to translating sustainability ambitions to actions.

The team acknowledges the forward looking leadership of Higher Education Institutions: CEPT University (Ahmedabad), Chandigarh University (Mohali), Christ University (Bengaluru), Deshbandhu College, University of Delhi (Delhi), Dr. Bhanuben Nanavati College of Architecture (Pune), Delhi Technological University (Delhi), Guru Gobind Singh Indraprastha University (Delhi), Indian Institute of Management (Lucknow and Noida Campus), Indian Institute of Technology Bombay (Mumbai), Jamia Millia Islamia University (Delhi), Nalanda University (Rajgir), Ramjas College, University of Delhi (Delhi), TERI School of Advanced Studies (Delhi) in India, as well as PH Zurich (Switzerland), Deakin University (Australia) and the UNSW (Australia) for demonstrating their innovative initiatives towards achieving net-zero objectives.

The research team also expresses sincere appreciation to the World Sustainable Development Summit (WSDS) 2026 and WSDS 2025 for the platform for dialogue, reflection and collaboration and the panellists for their valuable contributions to the thematic sessions on net-zero transitions. These forums underscore the need to advance net-zero initiatives and emphasise the pivotal role of Higher Education Institutions in driving climate action, thereby significantly enriching the discourse on net-zero implementation.

The team acknowledges the contributors of the working paper on net-zero transitions in Higher Education Institutions and also the continued engagement of Dr Sapan Thapar, TERI School of Advanced Studies (TERI SAS) and Dr Suneel Pandey, TERI, with the research team. The team also appreciates the assistance from Dr Rajshree Mathur and students at TERI SAS, Ms Christy Sunny, Ms Hrittika Paul and Mr Ritwik Dev in the preparation of this compendium.

The research team and staff of the Emerson Centre of Excellence for Sustainability Studies acknowledge the CSR support from Emerson Electric Co. (India) Pvt. Ltd. to TERI SAS, enabling impactful sustainability initiatives through collaborative engagement.

This compendium stands as a testament to collaborative scholarship and a shared commitment to shaping a low-carbon future.

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Introduction

Climate change is one of the grand challenges the world is facing today (Ika et al., 2024). With global average temperatures exceeding the 1.5°C threshold above pre-industrial levels in recent years (2023 - 2024), the need to systematically evaluate and mitigate climate change contributing factors has become critical (United Nations, 2026). Greenhouse gas (GHG) emissions from various anthropogenic activities are the primary drivers of rising global surface temperatures; therefore, their mitigation needs special focus. In this context, the net-zero framework becomes increasingly pertinent. Net-zero refers to a state in which GHG emissions are reduced to near zero, with any residual emissions balanced through atmospheric removal via natural sinks or technological interventions (United Nations, 2024a). Within this global transition towards a low-carbon future, Higher Education Institutions (HEIs) emerge as critical actors, not only as centres of research and innovation advancing sustainable technologies, but also as catalysts for broader societal transformation that extends beyond emissions reduction across their own campuses (Kopp et al., 2026). The pursuit of net-zero has evolved from a long-term ambition into an immediate priority across sectors, including higher education.

The international sustainability declarations and milestone agreements, including the Talloires Declaration (1990), the Kyoto Declaration (1993) and the Paris Agreement (2015) have established the necessity to reduce global GHG emissions by 45% in 2030 and achieve full carbon neutrality by 2050 (Alghamdi et al., 2019; Findler et al., 2018; Kalluri et al., 2023). These frameworks have emphasised the role of non-state actors, including HEIs, in supporting climate action through knowledge creation, capacity building and innovation leadership (Leal Filho et al., 2025; UNFCCC, 2023). Especially the Paris Agreement, adopted under the United Nations Framework Convention on Climate Change (UNFCCC), outlined a long-term temperature goal of limiting global warming to well below 2°C while pursuing efforts to restrict it to 1.5°C above pre-industrial levels (UNFCCC, 2015; United Nations, 2024b). For implementation of this objective, the Agreement has translated national aspirations for climate neutrality into structured and measurable commitments through Nationally Determined Contributions (NDCs), that rely on implementation by national and institutional actors, including universities (UNFCCC, 2023). Additionally, for accelerated and inclusive action, the United Nations had also launched the Race to Zero campaign in 2020 to mobilise state and non-state actors toward achieving net-zero emissions latest by 2050 (CHLC, 2025). HEIs play an enabling and demonstrative role in the shift toward a low-carbon economy, creating pathways and influencing broader societal transitions as net-zero commitments gain global recognition.

Announced and committed to achieving net-zero GHG emissions by 2070 at the Conference of the Parties (COP26) in 2021, India subsequently reaffirmed this pledge at later COPs, including COP29 in 2024, underscoring its intent to pursue decarbonisation pathways aligned with national growth and development (PIB, 2023). Guided by the principle of common but differentiated responsibilities, India's net-zero ambitions represent a balanced approach that aligns developmental aspirations with climate responsibility (PIB, 2024). However, achieving net-zero transitions require integrated efforts that prioritise energy and resource efficiency for production, research for low-carbon technologies and behavioural changes of stakeholders (Ferdous et al., 2024). Several actors become vital contributors across these sectors like, academia and industries contribute through technological innovation and resource flow management, governmental bodies guide strategic decision-making, financial institutions enable low-carbon economy sustenance, while communities and individuals shape consumption patterns and behavioural norms that influence the overall trajectory of the transition.

Within this multi-stakeholder ecosystem, HEIs emerge as pivotal actors and catalysts for the net-zero transition, having dual responsibilities in advancing this transformation. Firstly, by incorporating sustainability practices, providing exemplary pathways and embedding environmental awareness in learners' minds, HEIs not only decarbonise their own operations but also diffuse solutions across the wider economy and society (Giannetti et al., 2023; Kiehle et al., 2023). Secondly, HEIs spearhead research and development of decarbonising technologies and are recognised as key drivers of innovation and social change (Bhargavi & Gurusamy, 2024; Mbithi et al., 2021).

Building on their role, HEIs have the potential to create impacts beyond their own institutional boundaries and lead by example in advancing India's national climate action. This broader influence is reinforced through Mission LiFE (Lifestyle for Environment), which emphasises environmentally responsible lifestyles rooted in behavioural change, moderation and collective action (MoEF&CC, 2021). Mission LiFE positions institutions, including universities, as key enablers of sustainable values and practices across society. This role is further strengthened by the National Education Policy (NEP) 2020, which mandates the integration of environmental sustainability into higher education curricula, institutional governance and campus operations (MoE, 2020). Complementing these efforts, the University Grants Commission's U75 Net-Zero Universities initiative advances time-bound emission-reduction pathways across HEIs, encouraging institutions to adopt measurable climate action aligned with NEP 2020. Together, these policy instruments position HEIs as critical actors and implementation platforms in India's net-zero transition.

Several sustainability-focused academic and research institutions have been examining decarbonization pathways through research and development to support HEIs in achieving net-zero (SDSN et al., 2022; Singhal et al., 2025). The present initiative builds on this foundation by translating research insights into structured and actionable pathways for HEIs. The Emerson Centre of Excellence for Sustainability Studies working paper, *'Developing a Net-Zero Transition Framework for HEIs (2025),'* articulated the need for structured and scalable net-zero approaches for Indian HEIs by proposing a holistic Net-Zero Transition Framework. The framework identified three strategic pathways: physical infrastructure development, stakeholder behavioural change and institutional policy and governance strengthening across eight priority action domains: energy, transport, materials, waste, water, land use, curriculum and research. The Net-Zero Transition Framework, as shown in the figure, provides a structured approach for HEIs to plan their transition towards achieving their net-zero goals.

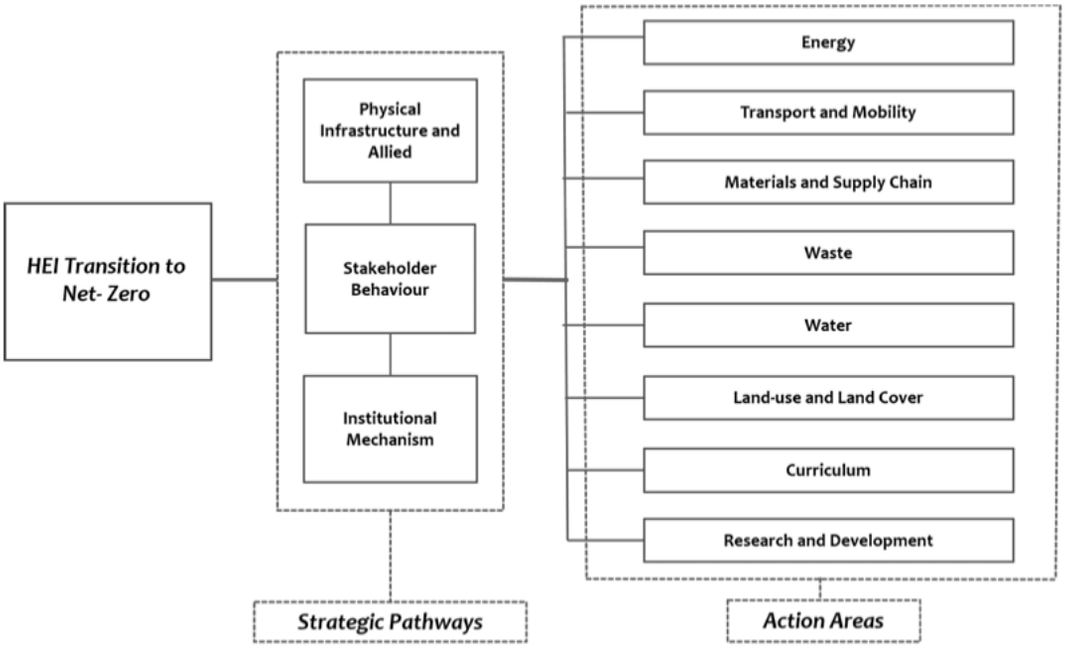


Figure: *Net-Zero Transition Framework for HEI's: Linking Strategic Pathways with Key Action Areas (Singhal et al., 2025)*

Despite growing momentum, HEIs continue to face persistent barriers in advancing their sustainability and net-zero agendas. While many universities globally have adopted sustainability commitments, progress remains uneven and fragmented (Basheer et al., 2025; Hassan & Ahmad, 2025). In practice, several HEIs have spearheaded the transition initiatives through efforts such as expanding green cover through plantation drives, installing rooftop solar systems, improving waste and water management, retrofitting buildings and upgrading energy-intensive services, as their green audit reports reflect. Yet, these efforts are often implemented as isolated interventions, underscoring the need for a more holistic and integrated application of measures to achieve institutional sustainability goals. Additionally, emissions from HEIs are typically concentrated in a few critical domains, including electricity and energy use in buildings and laboratories, academic and student travel, procurement of materials and food and waste generation (Paredes-Canencio et al., 2024; Tsai et al., 2025). These challenges are further compounded by fragmented governance structures and siloed decision-making, which frequently prevents whole-of-institution alignment and limit the effectiveness of decarbonisation efforts.

In alignment with this objective, the case compendium showcases the evidences by HEIs in strengthening the science, policy and practice interface towards net-zero transitions. This initiative adopts a structured, research-driven methodology to collate and synthesise sustainable transition pathways for HEIs pursuing net-zero goals. This publication is an interim outcome of an ongoing research initiative by the Emerson Centre of Excellence for Sustainability Studies on enabling HEIs toward net-zero. By demonstrating the best practices from HEIs leading the transition, this publication marks a further step toward developing a comprehensive framework towards net-zero.

Introduction

The study adopted a comprehensive methodological approach combining a scoping literature review, unstructured interactions with stakeholders and experts, selection of case exemplars, institutional engagement and analytical assessment. Peer-reviewed literature, global climate agreements and policy documents were reviewed to identify prevailing approaches of campus decarbonization, with an emphasis on institutional mechanisms, technological and behavioural change interventions. This was further affirmed through study visits and interactions with HEIs to understand ground realities, interactions with other stakeholders provided industry, public policy, consulting and think tanks perspectives on the theme, building on the momentum initiated at World Sustainable Development Summit 2025 (WSDS, 2025). The editorial and research team then undertook institute-level rapid appraisal to identify HEIs based on the criterion grounded in demonstrable engagement into sustainability and decarbonisation transitions. The criteria included documented emission-reduction initiatives, integration of sustainability into curriculum and research, infrastructure interventions, proactive institutional leadership and evidence of institution-wide sustainability strategies.

Primary inputs were obtained through structured consultations with faculty members and research staff, who were invited to submit a brief two-page summary of cases of their respective HEIs using an indicative template with the objective of developing a concise and effective communication product. The invited HEIs had the provision to prepare a case study focused on one or more of their net-zero initiatives and/or present an overarching approach of their institution. The relevant publications, including sustainability reports, audit findings and internal policy documents were reviewed to contextualise the inputs from the respective HEIs. The editorial and research team synthesised the collected data using the Net-Zero Transition Framework across three strategic pathways and eight action domains, developing a standardised yet flexible documentation proforma to ensure structured case narratives while retaining contextual nuances. Final formatting and standardisation were undertaken to ensure coherence across entries, while maintaining the integrity of institutional content.

Collectively, this approach enabled an informed synthesis that shall facilitate scalable and context-sensitive net-zero transition pathways for HEIs, translating research into practical insights and serves as a resource for HEIs, practitioners, researchers and policymakers. This case compendium aims to encourage HEIs and build a lasting community committed to a resilient, low-carbon future. In doing so, it reaffirms the pivotal role of HEIs as catalysts of societal transformation, strengthening the foundation for a collective and sustained transition toward climate neutrality. Further, this endeavour unfolds through the sixteen messages presented in this compendium, beginning with an overarching message that frames the shared vision and then guiding the reader through distinctive initiatives across specific sectors. Each message reinforces the role of HEIs as societal transformers leading net-zero transitions through leadership, innovation, knowledge development and systemic action, thereby strengthening momentum in the global journey toward decarbonization. Together, they chart a forward-looking pathway, signalling that these learnings need to be embraced in practice to build a resilient and low-carbon future.



DRIVERS FOR NET-ZERO TRANSITION

As influential stakeholders in the net-zero transition, HEIs play a critical role in shaping behaviours, technologies, and systems across society (Button, 2009; Ma et al., 2023). Through integrated action on energy decarbonisation, sustainable mobility, circular material flows, waste management, and green campus initiatives, HEIs can foster awareness and pro-environmental behaviour among their communities. By strategically leveraging curricula, procurement policies, and research outputs, they can influence key stakeholders, including students, faculty, suppliers, and industry partners, thereby strengthening the broader sustainability ecosystem (Bentil et al., 2024; Christou et al., 2024; Cruz et al., 2017; Friman & Salminen, 2023; Herth & Blok, 2023; Sima et al., 2022).

Ancient Wisdom to Net-Zero Futures: An Integrated Sustainability Model at Nalanda University

By Manoj Kumar

Brief Context and Rationale:

Nalanda University is an international, residential, research-oriented institution established by an Act of the Indian Parliament in 2010, inspired by the legacy of the ancient Nalanda Mahavihara. Located in Rajgir, Bihar, the University integrates sustainability into its academic vision, campus design, and institutional practices through climate-responsive infrastructure, renewable energy use, water conservation, and biodiversity preservation.



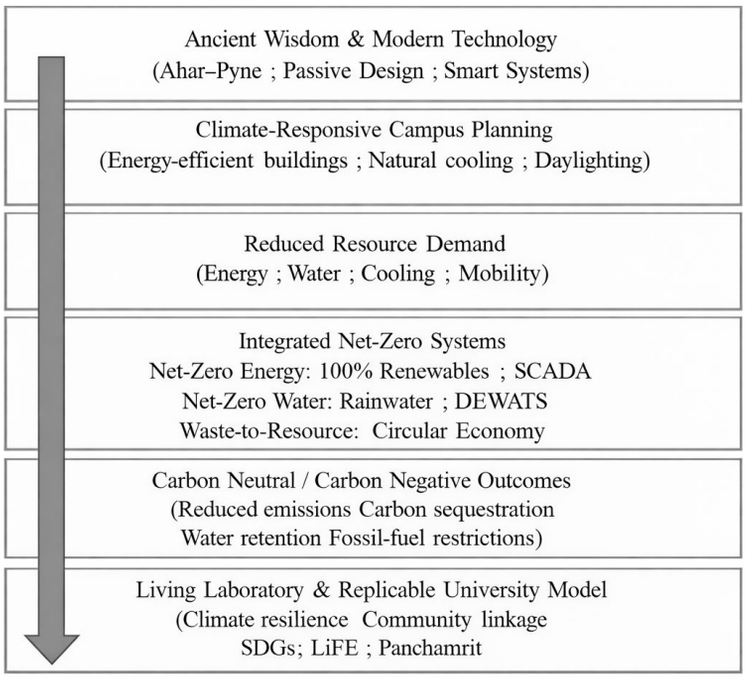
Net-Zero Administrative Block – Heritage Integrated Design



Climate-Responsive Academic Spine

The initiative(s) presented in this case example address the growing need for higher education institutions to resource-vulnerable region, Nalanda University aligns global sustainability frameworks with local realities through policy, pedagogy, and community engagement.

University Website: https://www.nalandauniv.edu.in



Strategic Framework for the Nalanda University Net-Zero Living Laboratory



9 Mw_{dc} Solar Farm : renewable and green Energy y generation on campus



40 Hectares of Waterbodies: traditional Ahar & Pynes helps on-campus rainwater harvesting and management

Net-Zero Energy:

- ✓ Microclimatic resilient campus integrated with ecosystem.
- ✓ Advanced SCADA-enabled real-time energy monitoring.
- ✓ Fossil-fuel vehicle restrictions within the campus.
- ✓ Renewable captive power generation meets full demand.

Net-Zero Water:

- ✓ Revival of the ancient **Ahar-Pyne system.**
- ✓ 100+ acres of water bodies for rainwater harvesting.
- ✓ Zero groundwater extraction policy.
- ✓ 450 KLD DEWATS Phytoremediation system *(Canna indica).*
- ✓ Flushing and sewage water are reused for irrigation with aquatic and natural treatment methods.
- ✓ Flood and drought resilient water design.

Waste Management:

- ✓ Decentralised wastewater treatment (DEWATS).
- ✓ Waste-to-resource approach for landscaping.
- ✓ Waste to wealth and circular economy.
- ✓ Waste management policy to avoid landfill challenges and convert challenges into opportunities.

Carbon Neutral / Negative Approach:

- ✓ Hybrid renewable energy architecture.
- ✓ Large-scale water retention improving regional groundwater table.
- ✓ Reduced cooling demand through passive design
- ✓ Fossil fuel mobility restriction.
- ✓ Landscape-driven carbon sequestration.



Net-Zero" campus operations with United Nations Sustainable Development Goals (SDGs)

Table 1: Campus Load & Supply Plan (micro level)

Campus Demand	Average Units	On Campus Captive Generation	Remark
Day Demand	12 K Units per Day	Fulfilled through Solar	It is forecasted that the annual electricity demand will be approximately 1.6 crore units once the University reaches its peak capacity.
Night Demand	11 K Units Per Day	Mostly through Net-Metering with Grid	
Peak Hours	7 K Units Per Day	Not Allowed through Govt Grid , Therefore, Own ESS means Mini Grid through BESS is being developed along with installation of the additional solar PV system on parking and building roofs	

Table 2: Annual Energy Balance (macro level)

Campus Electricity Commitment up to July 2025	
Annual Consumption	68 Lacs Units
Annual Generation	78 Lacs Units
Surplus /Export	Approx 10-20 Lacs Units

Nalanda University's net-zero commitment has Won significant awards for sustainable campus excellence:

1. GRIHA Exemplary Performance awards: 2017, 2018, 2019].

2. **GRIHA LD 5-Star Rating:** 2020.

3. **Acknowledged globally in 2022 for** pioneering sustainable campus

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Acknowledgement

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- CM Nitish Kumar Praises Nalanda University's Eco-Friendly Campus Plan," *Patna Press*, Jul. 8, 2025.



ANCHORS OF NET-ZERO ECOSYSTEMS IN CITIES

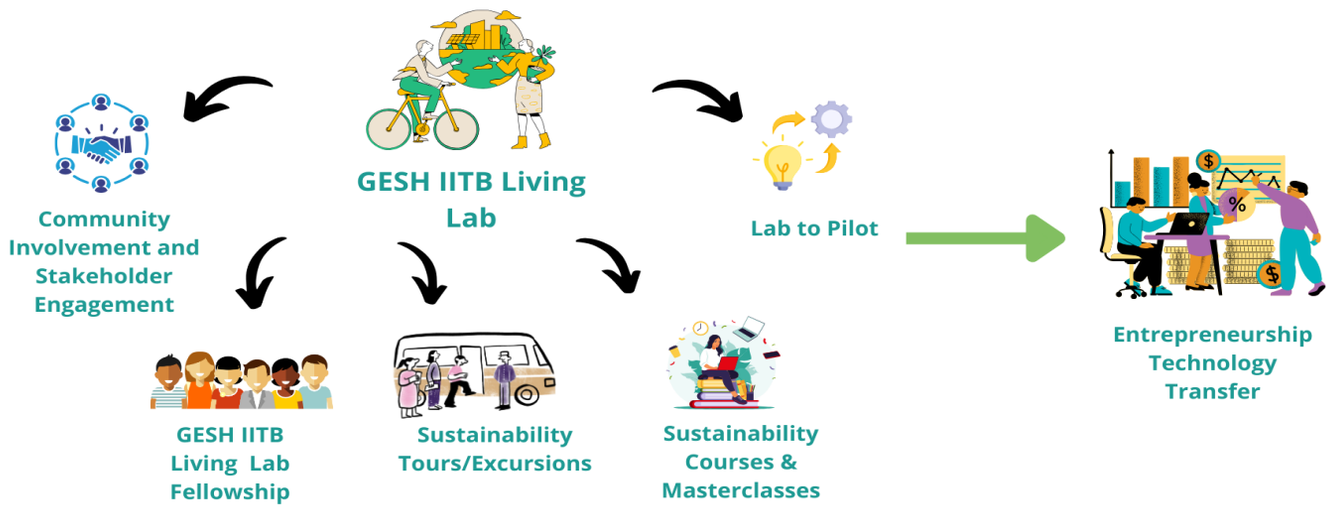
As major landholders, employers, and innovation hubs, HEIs can function as anchor institutions that shape urban sustainability trajectories (Button, 2009; Ma et al., 2023). They can facilitate prioritisation of investments in renewable energy, sustainable mobility, green buildings, and efficient water systems, thereby influencing local markets, suppliers, and municipal planning norms (Cruz et al., 2017; Li et al., 2022). HEIs also attract green businesses and contribute to technological innovations through R&D that support city-wide decarbonisation (Abuzeinab et al., 2024). By aligning campus transitions with urban climate strategies, HEIs can stimulate low-carbon development and strengthen regional progress toward national net-zero goals.

IIT Bombay- Campus as a Living Lab

Creating a campus that thinks, learn and acts for sustainability

By Vaishnavi Gupta, Sreejesh Warrier, Matrika Ghimiray, Wazeem Nishad and Sanjay Mahajani

IIT Bombay spans nearly 500 acres and functions as a self-contained micro-community, with hostels, academic buildings, utilities, transport systems, and shared services. Home to over 25,000 people with 13000 students and rich biodiversity, the campus offers a unique setting that mirrors real urban systems. This scale makes it an ideal testbed for sustainability pilots and an experiential learning space for students.



The GESH IITB Living Lab Program by IIT Bombay Research Hub for Green Energy and Sustainability bridges the gap between theoretical sustainability research and on-ground action. It provides a structured platform for students, faculty, and campus operations to co-create and test solutions in real campus conditions, turning the campus into a "**living classroom**" where infrastructure, policies, and daily practices become opportunities for learning, innovation, and impact.

Living Lab Projects

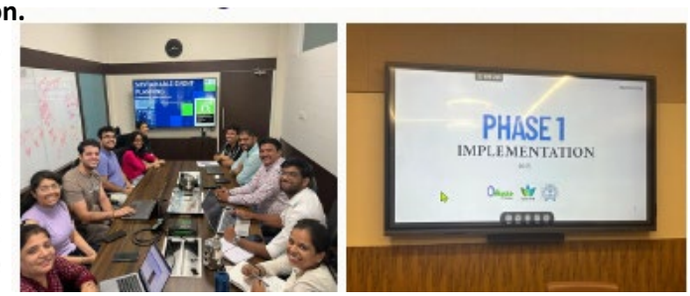
4	15	25	50+	100+
Pilots	Projects	Fellows	Stakeholders	Volunteers

Interventions undertaken by students under the **four key themes** of GESH Living Lab Projects are:

1. Behavioural and Social Interventions

Projects under this theme focus on driving sustainability through culture change and everyday practices on campus. Major outcomes of last cohort include the institute-wide **No Banner Policy** and the piloting and design of the **Green Cup Inter-Hostel Sustainability Competition.**

Additionally, a **Sustainability Culture and Literacy Assessment framework** is being designed, and a year-round awareness campaign is running to strengthen sustainability consciousness across campus. **Students** are also developing **guidelines** for **sustainable workplaces and eateries** and are creating reporting frameworks and protocols for conducting sustainable events.



No Banner Policy: Transition from PVC Banner to Digital Banner

2. Waste Management and Circularity

- Identified institutional, behavioural, and operational gaps in hostel **food waste**, proposing system-level solutions including structured data collection and stronger accountability.
- Assessed performance and challenges of **wet waste systems** handling ~90% of campus waste.
- Piloted the **Repeda**l model to **refurbish and reuse abandoned bicycles**.
- Conducted **waste characterisation** studies and developed material recovery facility proposals to improve segregation and material recovery.

3. Water Management

- Assessed IIT Bombay's **current water demand** and developed a roadmap for efficient **water use and reuse**.
- Audited existing rainwater harvesting and greywater systems to identify technical and operational gaps, and proposed revival and optimization strategies.
- Developed a **demand map** of the campus water supply and sewage network to support **data-driven planning** by the Estate Office.
- Installed **water meters** across campus to enable efficient monitoring and management.



Water Demand Mapping & Auditing: Installation of Water Meters

4. Energy and Climate

Students are developing an institute-wide **Carbon Footprint Calculator** to quantify IIT Bombay's Scope 1, Scope 2, and Scope 3 emissions, providing a foundation for setting **Net-Zero targets** and planning targeted **decarbonization pathways**. Alongside this, they are proposing **energy management strategies** such as chiller optimization and are conducting building-level energy audits in collaboration with IEAC, supporting data-driven improvements in campus energy efficiency.

Outcomes

- Development of **three pilot plants** and promoting **experiential learning** through hands-on projects, field visits, and educational tours.
- Building **sustainability leaders** with systems thinking and strategic decision-making skills
- Supporting the IIT Bombay in achieving sustainability goals, including improved Sustainability rankings

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Acknowledgement

Stanford Doerr School of Sustainability, Dean Infrastructure Planning & Support Office, IIT Bombay



DATA-DRIVEN ACCOUNTABILITY FOR NET-ZERO TRANSITION

HEIs play a crucial role in promoting transparent and data-driven accountability in their sustainability strategies (Amhaimedi et al., 2023; Dukes et al., 2023; Goldfischer et al., 2024). HEIs need to adopt an internationally recognised reporting framework such as the GHG Protocol and Global Reporting Initiative (GRI) to ensure transparent and regular disclosure of their emissions. They can position themselves as benchmark setters and provide open access to their sustainability dashboards. By doing so, they not only enhance their institutional capacity and accountability but also provide replicable models for peers to accelerate their Net-Zero transition.

IIM Lucknow's Integrated Approach to Net-Zero

By Sriram S and Ashish Aggarwal)

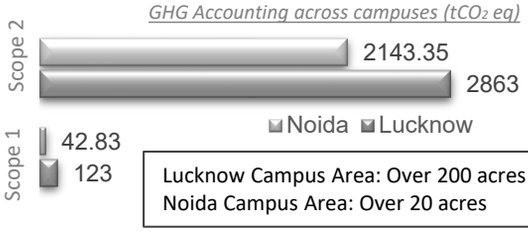
IIM Lucknow builds sustainability into leadership by shaping value-driven, entrepreneurial minds that seek practical solutions to social and environmental challenges. In 2005, it became the first IIM to open a satellite campus in Noida, focused on executive education with strong industry interface.

Strategic Key Areas towards a Net-Zero Campus

Energy

- Scope 1 & 2 **GHG accounting** done.
- **400kW rooftop solar** (Lucknow) avoiding **406 tCO_2 eq** in 2023.

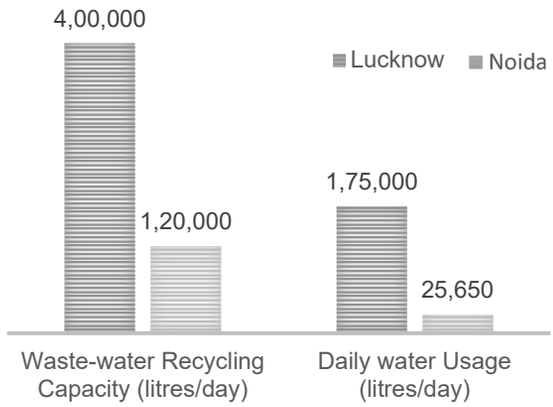
GHG Accounting across campuses (tCO_2 eq)



Lucknow Campus Area: Over 200 acres
Noida Campus Area: Over 20 acres

Water

Water Use & Treatment Profile (Litres/day)



- Treated water reused for horticulture**.**
- **10 artificial recharge pits** and **2 natural pits** are used for groundwater recharging**.**

Waste

- Solid waste **monitoring,** Lucknow **(180 tons/yr)**, Noida **(22 tons/yr)**.
- Out of that, **550kg is segregated and recycled.**
- Annual paper consumption tracked for both campuses.

Transport

Electric golf carts for internal campus mobility (Lucknow)

Curriculum

- Post Graduate Programme in Sustainable Management (**PGP-SM**)
- International Immersion & Projects

Built-environment

- Native tree in **plantation drives**.
- **60 species of birds** are sighted in the IIML campuses, including **39 species of trees in Lucknow , while Noida has 44.**



IIM Lucknow (Noida Campus)

Research & Development

- **Centre for Business Sustainability:** Primary R&D pillar for sustainability research.
- Faculty publish peer-reviewed research on sustainability themes

Sanrakshan: IIM Lucknow's Sustainability Business Conclave

- **Sanrakshan** fosters sustainability awareness, innovation, and leadership among future managers.
- The 2025 edition, hosted at the Noida Campus, expanded its scope by engaging leaders from technology, manufacturing, finance, and lifestyle sectors under the *Viksit Bharat 2047* theme.



Sanrakshan 2025: Conceptual Overview



StartUp Mela, Sanrakshan 2025



Panel Discussion; Sanrakshan 2025

- Sanrakshan highlights IIM Lucknow's commitment to sustainability by connecting dialogue, student action, and industry engagement. It mirrors the institute's wider efforts across operations, curriculum, and research, reinforcing IIM Lucknow's integrated approach to responsible and future-ready management education.



Plantation by PGPSM Students

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STRATEGIC LEADER FOR NET-ZERO TRANSITION

The leadership and management of HEIs play a very important role in executing net-zero actions. Their decisions by pledging for Net-Zero can send structural signals that drive coherent, campus-wide change (Christou et al., 2024; Ferrari et al., 2023). They can bring mandates such as low-carbon travel management, renewable energy source installations and can introduce interdisciplinary sustainability curriculum to accelerate the transition (Guerrero-Lucendo et al., 2022; Lee & Lee, 2022). Strong governance and management can transform HEIs into coordinated, scalable catalysts for Net-Zero transitions.

Advancing Net-Zero Goals in DTU through Environment-friendly Practices

By Pragya Yadav, A. K. Haritash and Prateek Sharma

Delhi Technological University (DTU) is a major public technical University with a lush green sprawling campus of **164 acres** located in National Capital Territory of Delhi. Densely populated urban campus with **14000 students**, DTU generates around **4 MT of solid waste/day** and **0.55 MLD wastewater**.



Aerial view: DTU Campus

On-campus initiatives that align with India's Net-Zero goals:

- Enhancement of natural carbon sinks.
- Decentralized waste management to reduce landfill emissions.
- Energy production through waste and wastewater treatment. employing low-energy vermifiltration to reduce dependency on fossil fuels.

Solid waste Management

1. Waste-to-Energy Plant

The **1 TPD waste-to-energy** plant at DTU,

- Processes **300–600 kg/day** of food waste collected from cafeterias and hostels avoiding landfill emissions.
- **Eliminates fuel emissions** associated with off-campus transportation.
- Generates **1 kWh/hour** of net electricity and has a capacity to produce **150 kg/day of compost**.
- Promotes **resource recovery.**



Anaerobic decomposition-based Waste to Energy Plant (1.0 TPD capacity)

2. Aero-bin Composting

- Approach - **Aerobic composting**
- Output - Generated **compost** used for horticulture purposes while **avoiding landfill emissions** from anaerobic degradation



In-house food waste composting

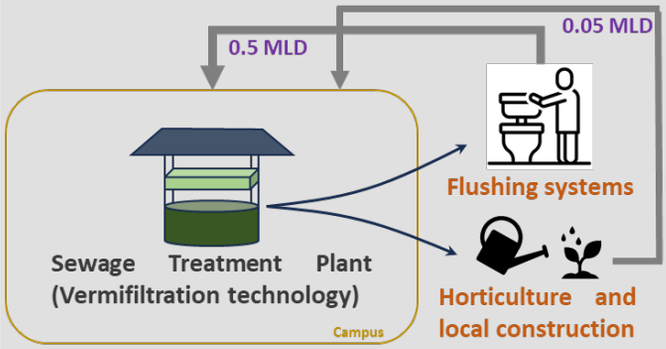


Aerobic composters for food waste

Water Conservation

3. Vermifiltration based Wastewater Treatment

- **Low energy treatment** of wastewater with **minimal** sludge generation
- Wastewater reuse **reduces** groundwater demand and indirect emissions.



Vermifiltration Technology in on-campus Sewage Treatment Plant





Treated Wastewater Recirculated On Campus

Energy Efficiency

4. Energy Sourcing





Solar Panels Installation in Institute Building

Reducing carbon emissions and reliance on fossil fuels through -

- Installed rooftop solar panels generating approx. **1000 KW** power.
- **Solar hot water systems** in newly constructed hostels.

5. Campus Mobility

- Low-emission **electric carts** and **CNG powered buses** operational in campus
- Restricted entry of commercial vehicles

6. Tree Cover

- **92153.47 m²** existing green cover
- **2,500 trees** planted with Indian Pollution Control Association (IPCA)
- Relocation of 111 trees from the construction site.

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1. **Delhi Technological University.** (n.d.). *Delhi Technological University*. https://dtu.ac.in/
2. **Delhi Technological University.** (2024, April). *DTU green audit report*. https://iqac.dtu.ac.in/audits/DTU%20Green%20Audit%20-2025%20.pdf



MOTIVATORS FOR SUSTAINABILITY

HEIs are great motivators with far-reaching impacts. The support by HEI leadership to small initiatives by the student community can instil a sense of pride in them, thereby facilitating long-term behaviour change. Beyond students, HEIs can also influence the family members of both staff and students to adopt technologies such as solar roof-tops and solar heaters, along with influencing their waste management, circularity practices and consumption patterns. This makes HEIs a strong community stakeholder to create an impactful and meaningful transition to Net-Zero.

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Water Infrastructure as a Shared Space: Water Harvesting Kund

By Tushar Bose, Mona Iyer and Adarsh Joseph



Students engaged by a classical Indian music performance at the Kund, as one of the many uses of this piece of infrastructure.

Project Overview

Inspired by traditional stepwells of Gujarat, the Kund at CEPT University is embedded in the landscape responding to the climate and the context. During the monsoon, runoff from the campus is directed into this stepped basin, where it is stored, allowed to percolate, and used to recharge the groundwater rather than being drained away. What makes it special isn't just function, but intent. The stepped edges slow the water, reduce erosion, and increase infiltration.

The open form allows evaporative cooling and improves the microclimate. Normally, it is a part of daily campus life and on occasions, this piece of infrastructure becomes a beloved space for gatherings and cultural activities.

At CEPT, the Kund is a living demonstration that sustainability can be rooted in vernacular wisdom and be responsive to contextual needs. It quietly reinforces the university's pedagogy linking systems thinking with spatial articulation.



Kund during normal days (captured in October 2021)



Kund during monsoon (captured in July 2022)

Concept

Traditionally stepwells have addressed the challenge of water conservation in the arid Ahmedabad climate while functioning as a community space all year round. Learning from this system, the Kund is a rainwater harvesting system at CEPT University. It is a detention pond of approximately 1300m3, engineered to collect runoff water from across the campus and let it seep in through the percolation well.

System Design

The water accumulated at the rooftops (32%), paved (38%) and unpaved (30%) areas is channeled to the Kund through a system of open and underground drains. The water remains stored there until it is percolated through. For the 2021 monsoon, the Kund recharged more than **5,700 m³** of stormwater, offsetting **80 days** of annual water consumption for drinking.

Water Infrastructure as a Shared Space

The Kund architecturally expresses the stormwater management system while making its hydrological processes visible. For most of the year, this is a space for students to sit, sketch, pause and congregate for music and drama with minimal appropriations. It is to the students what stepwell is to a community– passive rainwater harvesting solutions articulated as an active open space.

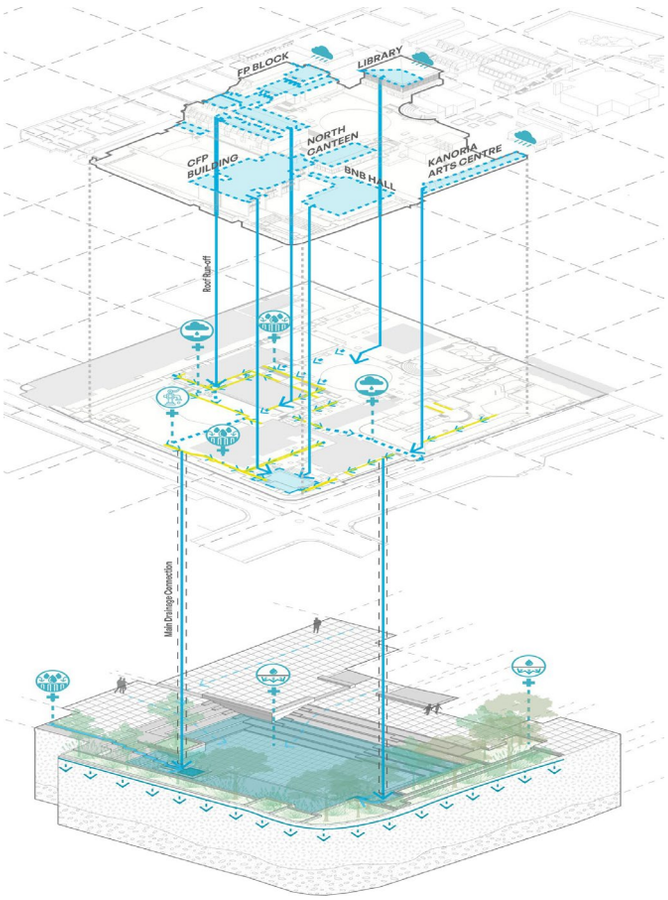
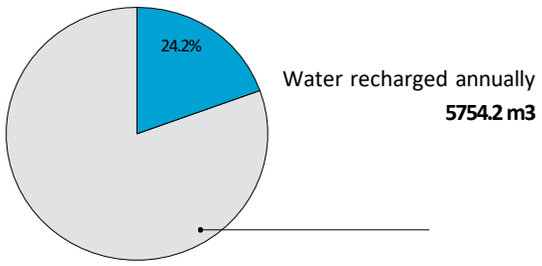


Diagram detailing the stormwater network connecting the university campus to the Kund



24% of the estimated annual consumption of drinking water at CEPT (23760 m3) can be fulfilled by the Kund.

References

Bose, T., Iyer, M., & Joseph, A. (2025). Performance analysis of the CEPT Kund system as campus blue infrastructure [Unpublished manuscript].

Acknowledgement

The authors acknowledge CUPDF's Mohit Kapoor for project coordination, Suyash Rai for feedback during different stages of the study, and Mitali Vadher for content layout and design. They also acknowledge CEPT University's support for data, measurements and mapping.



PROMOTING CLEAN ENERGY TRANSITION

As mini cities, HEIs require a significant amount of energy to operate. Presently, HEIs are deploying renewable energy systems such as solar photovoltaic panels, wind installations, and biomass-based heating to efficiently reduce their emissions (Kiehle, 2021; Sima et al., 2022; Vourdoubas, 2024). To make the transition to Net-Zero, HEIs need to retrofit and integrate energy-efficient technologies and passive building architecture, Heating Ventilation Air Conditioning (HVAC) system, and mechanisms such as reflective roofing to further improve their energy efficiency (Jain et al., 2017; Kourgiozou et al., 2021).

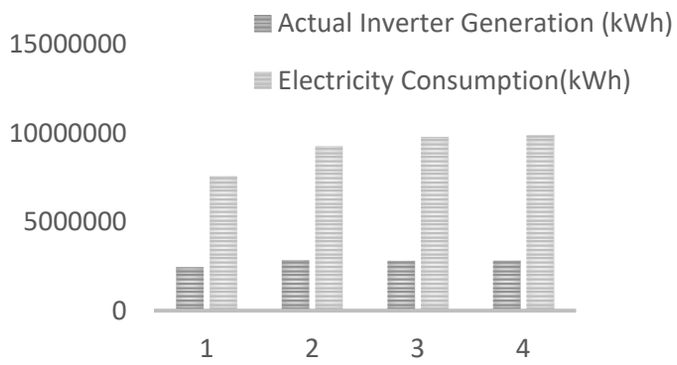
Nature-Positive Campus: Sustainability and Biodiversity at JMI

By Hina Zia

- Jamia Millia Islamia (JMI), a prestigious public central university in New Delhi, is not only known for its diverse, inclusive campus, fostering academic excellence and holistic student development but also known as a leader in the field of sustainability (www.jmi.ac.in)
- There is a dedicated **Sustainability Policy** with KPIs to track the progress. Some of the measures focused on the approach to Net-Zero and promotion of biodiversity are highlighted below:

Academic Engagement in Sustainability

Students from various programs such as Architecture work on actual performance and simulations through electives such as LEED Lab, High Performance Buildings on existing and under construction projects within the campus.



Solar PV electricity generation versus consumption, JMI (2022-25)



Aerial view of the roof top solar PVs, JMI

Energy Conservation

Extensive use of rooftop solar PV throughout the campus. The University commissioned a 2.25 MWp rooftop solar power plant in 2018, one of the largest among Indian universities. Installed by SunSource Energy under the RESCO model at zero upfront cost to the university, it covers over 54 buildings in the campus.

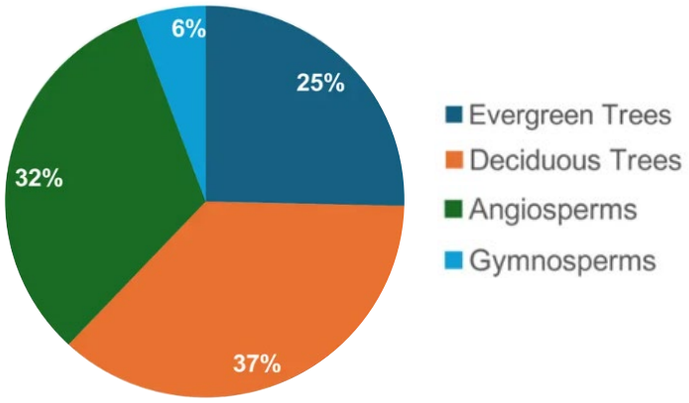
Built Environment	
New Buildings	**Old Buildings**
All newly proposed or under-construction buildings are required to adopt a defined sustainability performance target, achieving a minimum GRIHA four-star rating for enhanced environmental efficiency and accountability.	Energy audits, replacement of CFL based lighting to LED based lighting, procurement of energy efficient appliances and equipment (through a robust procurement policy) and behavioral changes through awareness campaigns.

Biodiversity Conservation

The green area of the university is spread over 65% of the land, making it one of the greenest universities of the Capital. Huge diversity in Jamia flora has greatly helped to maintain diversity of fauna and keep a balance in various eco systems of the varsity.

***Flora*:** The campus has a very rich and diverse plant cover. It includes fruit trees like mango, jamun, guava, papaya, fig, mulberry, and lemon, along with medicinal plants such as neem, arjun, baheda, ficus species, and eucalyptus. Ornamental plants like gulmohar, plumeria, bougainvillea, champa, kaner, and seasonal flowers enhance the green landscape. Large trees like shisham, teak, bamboo, and acacia form dense green patches.

Fauna: This rich vegetation supports diverse wildlife on campus. Common mammals include squirrels, mongoose, and chameleons, especsuch as parrots, peacocks, pigeons, hornbills, woodpeckers, owls, kingfishers, drongos, mynahs, lapwings, kites, eagles, and many songbirds. Together, they help maintain ecological balance and a healthy campus. The campus is a haven for birds



Classification of Trees, JMI



Diverse flora of JMI



Labelling of trees in JMI with QR code



Diverse fauna of JMI

References

- JMI, 2025. Sustainability Policy, Jamia Millia Islamia.



TRANSFORMING CLIMATE LITERACY

The HEIs' influence over their stakeholder behaviour is immense. They can influence the stakeholder community through curriculum and research. The HEIs can close the attitude–behaviour gap through practical climate education that can transform students and staff into active sustainability participants. The HEIs can introduce participatory tools like gaming and hackathons into the curriculum and embed pro-environmental behaviour norms into their campus activities, such as circular economy practices, energy and waste focused sustainable consumption and production appr oaches and adopting sustainable transport choices. (Al Kez et al., 2024; Kalluri et al., 2023; Singhal et al., 2022; Tang, 2022).

Way Forward with NetZero Transition at Ramjas College University of Delhi

By Mayanglambam Ojit Kumar Singh and Amit Bhattacharya

Founded in 1917 by Rai Kedar Nath, Ramjas College is one of the oldest constituent colleges of the University of Delhi. It has grown into a modern campus with strong academic traditions, advanced facilities, and an inclusive educational environment. The college promotes holistic development beyond academics through diverse courses and co-curricular activities. Recognized as an eco-sensitive institution, Ramjas integrates sustainability practices into campus life and has been honoured as an "**Eco-Conscious Champion Institute**."



Campus Infrastructure: Ramjas College

Renewable Energy

312.84 kWp rooftop solar PV system (since Dec 2019) generating **337,600+ units/year** — saving **~20% on electricity costs** (**₹10.5 lakh annually**). **80% LED lighting** and sensor-based lights campus-wide.

Water Management

3 integrated systems: replenishment, neutralization, and centralized purification. **Rainwater harvesting** restored underground aquifer at **40–50 ft depth**. Chemistry lab wastewater treated via **3-stage neutralization tanks.**

Waste Management

Waste segregation, paper recycling unit, composting from tree shed parts, plastic-free campus campaign, e-waste governance via government-authorized firms, and dedicated e-waste storage room.

Green Campus

287 full-grown trees, 469 semi-grown trees, 10,352 hedge plants, and 348,481 sq ft of lawns. Herbal/medicinal garden maintained by skilled gardeners. Green Audit and Energy Audit conducted regularly.

Carbon Footprint at a Glance

Total Emissions: 700.18 tons CO_2/year (electricity, LPG/PNG, diesel)

Total Absorption by Campus Flora: 24.29 tons CO_2/year

Net Emissions after sequestration: 675.9 tons CO_2/year

Environmental Curriculum

Compulsory Environmental Studies paper for all students. Environment-related electives in Botany, Chemistry, Zoology, and History. Skill Enhancement Courses in Sustainable Tourism, E-Tourism, and Sericulture. Value Added Courses in Ayurveda & Nutrition, Ethics & Culture, and Constitutional Values.

- Ramjas College extends its sustainability mission beyond campus through award-winning student enterprises, cutting-edge research, and deep community engagement across adopted villages.



Biodiversity on Campus



Student Experiential Learning



Student-Led Waste Management Initiative

Biodiversity & Awareness

Student-led documentation of bird diversity, pollinator diversity, and ecological roles of detritivores. Herbal/medicinal garden on campus. Workshops like **'Nadi Ko Jano'** and a documentary on Gender Sensitive Water Management. Recognition by the Department of Forest.

Enactus Student Projects

Project Swabun – sanitation & composting.
Project Khwab – zero-waste personal care products.
Project Waraq – biodegradable seed-based cutlery.
Project Inayat – aquatic hyacinth conversion to restore water ecosystems. Winners of KPMG Business Ethics Grant 2020

₹170L+

Research Grants

Funded by DBT, DST, ICPR, DU and others across **5 active research centres -**Fungal Biology, Molecular Biology & Genomics, and Medicinal Plant labs.

101

Saplings Planted

Mission Aarohan tree plantation drive, 2021–22, led by NSS and Eco Club volunteers.

5

Villages Adopted

Under **Unnat Bharat Abhiyan**, with ongoing environmental awareness and upliftment initiatives.

5

SDGs Addressed

SDG 3, 8, 11, 12, and 15 — spanning health, decent work, sustainable cities, responsible consumption, and life on land.

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Acknowledgment

We extend our sincere thanks to Prof. Ajay Kumar Arora (Principal, Ramjas College) and Prof. Ruchika Verma (IQAC Coordinator, Ramjas College) for their constant administrative guidance and assistance, which made this academic work possible.



EDUCATING FOR NET-ZERO FUTURES

As educators and incubators for future generations, HEIs can embed sustainability and climate principles across curricula through a whole-institution approach (Christou et al., 2024). Interdisciplinary, problem-based and experiential learning, such as serious games, guided walks and STEM-based simulations, can help students become active creators of low-carbon solutions (Iyer-Raniga et al., 2022; Kalluri et al., 2023). Integrating courses such as those focused on life cycle assessment and carbon and water footprint dimensions, along with eco-labelled programmes and sustainability frameworks like STARS and EMAS, will equip students to be net-zero professionals. Climate change and sustainability-focused certificate courses and degree programs with emphasis on public policy, science & technology, and management dimensions, shall cultivate a diverse cadre of sustainability professionals.

Strategic Pathways to Achieve Net-Zero

By Sunil Kayesth and Aditya Saxena

Deshbandhu College, University of Delhi envisions learners possessing a scientific temper, producing research for sustainability, social progress, and optimal resource utilization. The college achieved, all India 13th Rank under College's Category in NIRF ranking 2025, and A++ in NAAC grading with CGPA 3.65

Key areas of Sustainability

Achieving Net-Zero through strategic energy initiative

Degraded land converted into economical sustainable ecosystem, composting unit, Solar panels on roof top, rainwater harvesting system, smart classes, LED lights, waste segregation, MoU for E-waste and paper waste, BS-6 and EV Vehicles, Local tree species along boundary wall

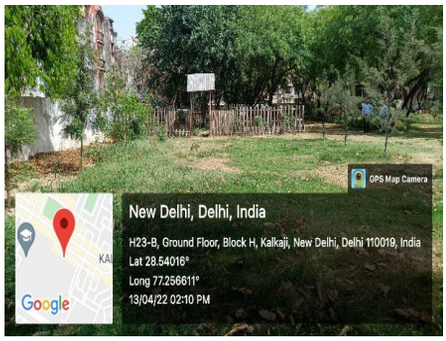
Energy

Solar power (**72.36kW**) **fulfills 65% of energy demand**, significantly advancing Net-Zero goal.

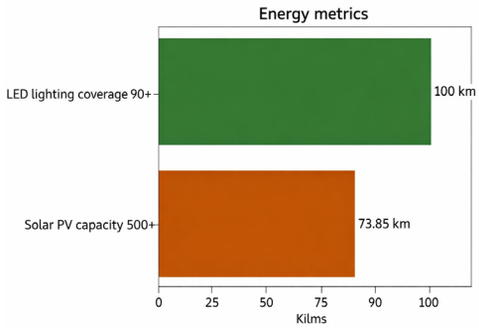


Rooftop solar panels





Conversion of degraded land



Built Environment

Earth & construction waste developed into green belt and unique biodiversity Park (1.63 lakh sq ft, more than 5000 trees and plants) with ground water recharge.

60% Green cover including more than 40 bird houses.

Transport & Mobility

Carbon footprint reduction through sustainable transport (BS-VI vehicles, EV, cycles and public transport)



Waste Management at Deshbandhu College

Water

- ✓ **3 rainwater harvesting plants (1 lakh lit)** captured around 36% of total campus annual precipitation
- ✓ **Monitored** Campus Water usage
- ✓ **Utilize Greywater**/ Rainwater
- ✓ Installed **Water saving Devices**



Rainwater Harvesting Plant

Highlighting research and innovations related to sustainability and Net-Zero



Research & Development Cell: An overview

i4 Centre (Inspire Interdisciplinary Ideas for Innovations

The i4-Centre transforms student-centric ideas into innovative, interdisciplinary knowledge solving real-world sustainability and scientific challenges (more than 50 minor projects, 200 students, 50 faculty, 25 research publications)

Viksit Bharat 2047 Vision

Deshbandhu College empowers students through research, entrepreneurship and innovation to drive India's 2047 Viksit Bharat goals.

Zero energy feasibility for existing building demonstrated under the Nearly Zero Energy Buildings programme of the Bureau of Energy Efficiency

Curriculum

- Mandatory "Environmental Science: Theory into Practice" course and more than 20 elective courses for all UG students
- Targeted Skill Enhancement Courses on sustainability and environment, such as *E-Waste Management* and *Green Chemistry*

- International and National Conferences, Seminars and Workshop conducted on key areas of sustainability
- Green commerce panel discussion on integrating environmental ethics into business and economic models.

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CATALYSING LOW-CARBON INNOVATION

As major energy consumers, HEIs are well-positioned to develop and demonstrate scalable low-carbon solutions on their campuses (Dukes et al., 2023). They can integrate and test innovative technologies and governance approaches, such as smart energy systems, insulation upgrades, and climate wedge strategies, to accelerate institutional decarbonisation while generating transferable lessons for wider society(Alghamdi et al., 2019; Goldfischer et al., 2024). With the growing application of AI, HEIs can further advance this agenda by deploying AI-enabled waste sorting, optimised water management systems, and improved renewable energy integration (Ávila et al., 2017; Qu, 2023), positioning campuses as living laboratories for low-carbon transformation.

The GGSIPU Campus Pathway- Transition to Net-Zero

By Rajshree Mathur

Guru Gobind Singh Indraprastha University is a Higher Education Institution (HEI) with a strong technical orientation. The University has been accredited with an A++ grade by the National Assessment and Accreditation Council (NAAC), reflecting its commitment to academic excellence and institutional quality.



Guru Gobind Singh Indraprastha University, East Campus

Institutional Vision for Sustainability and Net-Zero Transition

The University's vision is anchored in advancing sustainability and supporting India's net-zero commitments. It seeks to systematically reduce operational emissions through renewable energy adoption and efficient infrastructure, enhance resource efficiency across water, waste, and energy systems, and embed sustainability within academic curricula and research. By integrating environmental responsibility into governance, teaching, and campus operations, the University aligns its institutional growth with national climate goals and broader low-carbon development pathways.

Energy Efficiency & Renewable energy

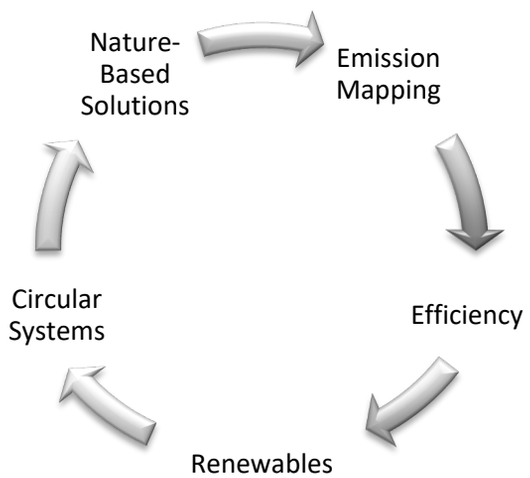
Energy Demand Reduction Pathway	
Intervention	**Emission Impact**
LED retrofits	Reduced electricity demand
Solar PV	Displacement of fossil fuel electricity
Passive cooling	Reduced AC load
Solar water heaters	Lower grid consumption



Solar panels producing renewable electricity.

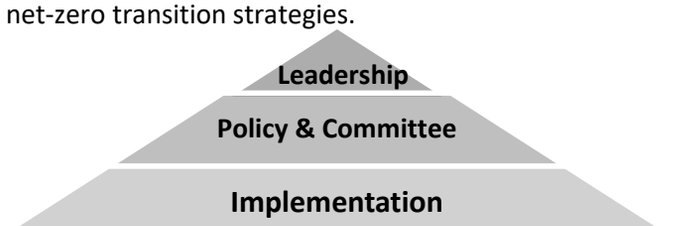
The Dwarka and Surajmal Vihar campuses of the university represent a progressive model of sustainable campus planning and energy-efficient design. Both campuses have been strategically developed to ensure that their total energy consumption remains lower than the energy generated on-site. As a result, these campuses function as net-positive energy environments, contributing surplus electricity back to the public power grid.

Net-Zero Transition Framework



Leadership & Governance

Strong governance frameworks guide sustainability through institutional policies, committees, and coordinated decision-making. Inclusive stakeholder engagement—encompassing faculty, students, staff, and service agencies—ensures accountability, shared ownership, and the effective integration of environmental considerations into daily campus operations and long-term net-zero transition strategies.

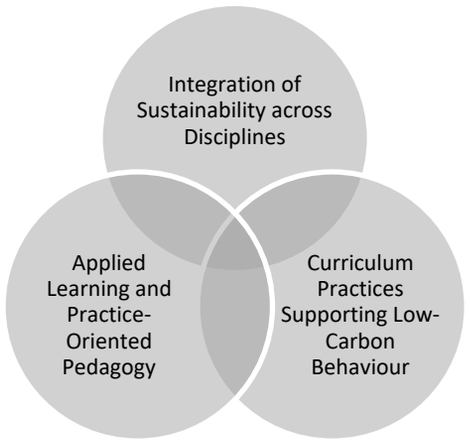


Low-Emission Mobility

GGSIPU promotes low-emission mobility through walkable campus planning, shared transport, and public transit accessibility. Optimized institutional transport reduces per-capita emissions, while proximity to metro and bus networks encourages sustainable commuting. Adoption of electric vehicles, charging infrastructure, shaded pathways, and traffic management enhances safety, comfort, and environmental performance.

Curriculum as Net-Zero Multiplier

Interdisciplinary integration
Higher Education Institutions support India's net-zero transition by integrating sustainability across disciplines. At GGSIPU, climate change, renewable energy, resource efficiency, and environmental governance are embedded within diverse programmes. Applied learning, studio projects, and field engagement develop systems thinking and low-carbon problem-solving skills, while digital academic practices promote resource-efficient, environmentally responsible behaviour.



Waste & Circular Systems



Water and Wastewater Management for Climate Resilience

- Rainwater harvesting
- Recharge pits
- Groundwater conservation
- Sewage Treatment Plant
- Reuse for landscaping
- Greywater recycling

Resource Efficiency & Cost Rationalization

Sustainability aligns with financial prudence.

Initiative	Financial Benefit
LED retrofits	Reduced electricity bills
Solar energy	Long-term cost savings
Waste reduction	Lower disposal cost
Digitalisation	Reduced material procurement

- ***Indian HEIs are not just infrastructure hubs—They are climate transition multipliers.***
- ***Universities can become visible and credible contributors to India's Net-Zero future.***

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Acknowledgement

We thank the Dean of USAP, Dr. Neerja Lugani, and Professor Dr. Charu Nangia for their valuable support and assistance in facilitating access to information pertaining to the University campus.



RESEARCH & CAPACITY ENHANCEMENT

They should prioritise and adequately fund research on clean energy, carbon capture, circular economy models, and low-carbon materials, while using campuses as living laboratories to pilot and demonstrate scalable solutions. Although research and development can be energy-intensive, adopting sustainable operational protocols can ensure that HEIs contribute meaningfully to national and global decarbonisation through innovation, knowledge generation, and policy guidance (Salas et al., 2021). By embedding sustainability and climate literacy across disciplines, HEIs can equip students with skills in emissions accounting, energy transitions, and climate policy. Furthermore, collaborative research networks among institutions can amplify impact and accelerate progress toward India's net-zero ambitions.

Moving Towards Net-Zero

By Namrata Dhamankar



Campus Infrastructure: BNCA

Maharshi Karve Stree Shikshan Samstha (MKSSS), a landmark educational campus in Pune, has been systematically advancing environmental audits across its institutional units to track energy, water, and waste performance. Within this ecosystem, Dr. B.N. College of Architecture for Women (BNCA) has, since 2015, aligned its academic and operational practices with net-zero principles.

Recognising campuses as resource-intensive micro-urban systems, BNCA integrates shared campus strategies with building-level actions. Regular environmental audits, covering five MKSSS institutions, combine site inspections, stakeholder consultations, surveys, and instrument readings, while actively engaging students in hands-on sustainability assessment and data-driven environmental management practices.

Waste Management



Vermicompost Pits at BNCA

- Food waste generated is approx. 200kgs/month and sanitary napkin waste of 800 napkins/month at the campus level.
- Vermi-Compost pits generate compost, which feeds into the landscape on site.
- Sanitary napkins are put in the incinerator machine and collected through chutes from the hostel building.
- Paper/dry waste is sent for recycling at the end of every semester to scrap vendor.



Natural Gas facilities in campus for cooking

- Natural Gas as an alternative to LPG for cooking is installed at hostels and canteens since August 2024, with a possibility of reducing greenhouse gas emissions by 85.5%.
- A biogas plant is also installed on the Campus. It can process 500kg of organic waste daily. The generated gas is utilised to fuel 2 cylinders, each weighing 14 kg daily.



Biogas Plant on campus

- Students conduct regular e-waste collection drives in the campus as part of NSS activities.
- E-waste is sent to authorized collection vendor on an annual basis from every institute on campus.

Water Conservation

- The institute has provision of one rainwater harvesting tank of 20,000 liters of water.
- STP system has been installed at the new hostel building for 50 KLD.



Grey Water recycle Plant on the MKSSS Campus

- Bore wells, STP recycled water and rainwater is all used for landscape watering purpose on campus.
- Aerators and low flow fixtures are installed in all new renovations and extensions done across institutes.
- Water meters have been installed in canteen and hostel buildings on campus to monitor water consumption.

Energy Efficiency

- BNCA has provided 4 charging points for electric vehicle charging for staff and students to encourage using EV for commuting to college.
- The installed solar capacity of solar PV panels at BNCA rooftop is 90.4 KW. The overall installed capacity at the MKSSS campus is 600KW with the net metering system at campus level. The solar system has been in operation since November 2021.

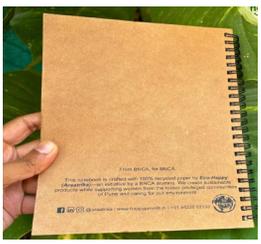


Solar Panels Installation on rooftops on institutional buildings.

Landscape

- Tagging of Trees on Campus- Separate unique QR codes and URLs are developed for individual trees on campus giving information about that tree at a single click. The project aims to promote awareness of the importance of trees in urban ecology and biodiversity in an educational campus.

Initiatives



Handmade recycled paper notebook

- Many initiatives are run by the students' forums and groups at and by BNCA. These include celebrating World Environment Day, organizing plantation and cleanliness drives, conducting a Wood Waste Workshop to promote sustainable material use and upcycling, and hosting a Know Your Carbon Footprint workshop to raise environmental awareness, to name a few.
- Clothes donation, Dairy making from all one side used drawing sheets and plastic recycling amongst others.

Acknowledgment

I would like to specially thank Dr. Anurag Kashyap, Principal BNCA, Dr. Sujata Karve, HOD (EA) and Dr. Prajakta Kulkarni and the entire management of MKSSS for their support in undertaking the various initiatives for a carbon neutral campus.



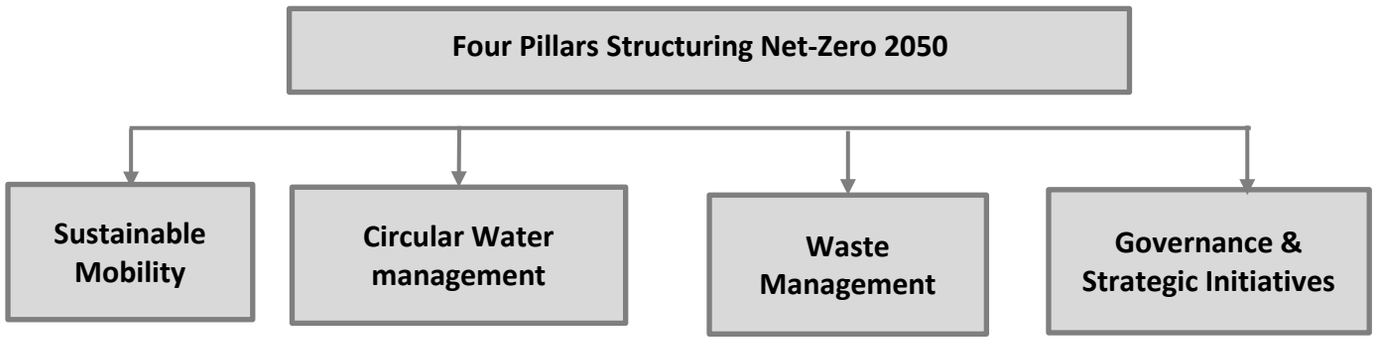
CHAMPIONING SUSTAINABLE MOBILITY SYSTEMS

HEIs can transform their campus mobility systems towards Net-Zero through behavioural interventions of their stakeholders. They can influence commuting choices of stakeholders by incentivising the usage of public transport and provisioning of bicycles and e-vehicles for their community. They can also promote EV-parking only to reduce dependencies on fossil fuel-based vehicles (Cruz et al., 2017). HEIs can play an important role in shaping the social and infrastructure safety and sustainability of transport mobility (Baig et al., 2022; Hancock & Nuttman, 2014) and raise the significance of non-motorised transport and bike sharing systems in cities (Kumar et al., 2017). Through research in areas such as smart traffic management systems, low carbon fuels, and metro stations and property values (Singhal & Tyagi, 2021) HEIs can translate their efforts into wider community benefits.

Net-Zero 2050 Rooted in Campus Action

By Anurag Varma and Vikas Chand Sharma

Chandigarh University (CU) has implemented a multidimensional operational strategy to facilitate institutional decarbonisation, integrating technical infrastructure with structured governance. The university brings together innovation and sustainability to create a resilient, net-zero campus model that other higher education institutions can realistically replicate. Chandigarh University has established a dedicated *Sustainable Development Goals Centre*, bringing together sustainability officers and domain experts to drive meaningful environmental and community impact initiatives.



1. Sustainable Mobility

- Campus-wide EV fleet across 150 acres reducing Scope 1 emissions and noise pollution
- Solar PV-powered charging with fast-charging and battery-swapping hubs for grid independence
- EV-only internal transit including e-rickshaws, buggies, golf carts, and buses
- Public transport integration lowering commuter carbon footprint
- Elimination of Internal Combustion Emissions (ICE) from campus achieving 90% operational efficiency



Ideanta – Electric Buggies

Vehicle Category	Best For	Capacity	Numbers deployed
E-Rickshaw	Student/ Staff	4	39
Electric Buggy	VIP/Guests	6	2
Indeanta buggy	Student/ Staff	11	7



Vermicompost Plant

2. Smart Solid Waste Management & Resource Recovery

- Wealth-from-Waste model serving 28,000+ people across 150 acres with dual-stream segregation
- On-site composting and clinical color-coded waste management (130 kg/month)
- Near-zero landfill organic waste and fertilizer self-sufficiency
- 300 tonnes recycled via authorized vendors ensuring full non-organic recycling

3. Circular Water Economy – 1.5 MLPD Zero-Discharge Model

- Decentralized zero-discharge water management system treating and reusing all campus wastewater while integrating rainwater harvesting
- 4.5 MLPD SBR-based STP across three campuses, supported by 10+ recharge wells and porous runoff systems for aquifer replenishment
- 1,043,471 KL recycled (July 2024–June 2025), with major reuse for irrigation and landscaping
- Significant reduction in groundwater withdrawal through closed-loop water reuse



Rain water recharging system

4. Governance, Curriculum, and Strategic Initiatives

Governance

- Formal Carbon Emission Reporting (Baseline: 5.4 million kgCO_2e)
- Institutional sustainability monitoring framework

Infrastructure Action

- Solar scale-up: 56,700 → 544,623 kWh (860% growth)
- Renewable contribution to 16.9 million kWh annual demand
- 2 KM green belt development



Solar panel installations on campus buildings

Academic & Student Engagement

- Mandatory Environment Training Course integrated into undergraduate curriculum since 2016.
- Over 28,000 students trained in sustainability and environmental stewardship practices.
- Tree plantation drives conducted under **Jyot-e-Haryaval Mission** strengthening campus biodiversity.

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Acknowledgement

Special thanks to Col. Sanjeev Bakhshi (Retd), Senior Director Administration, and the Department of Administration for their leadership and operational support in these initiatives.



DECARBONISING THE SUPPLY CHAIN

HEIs can decarbonise their supply chains by systematically addressing Scope 3 emissions and reshaping procurement practices. They should begin with spend- and activity-based emissions inventories to map carbon hotspots across goods, services, energy, and waste. Procurement policies must prioritise low-carbon and local suppliers, embed sustainability clauses, and require transparent emissions reporting and science-based targets. HEIs can promote circular economy principles through take-back schemes, recycled materials, reduced paper use, and low-emission logistics. By influencing suppliers, contractors, and service partners to adopt low-carbon standards (Herth & Blok, 2023) Institutions extend their climate impact beyond campus. Integrating sustainability into curricula can further shape stakeholder behaviour toward responsible consumption and long-term supply chain transformation.

Sustainable Praxis and Transformation of Young Minds

Fr Biju K C, Savitha K L, Meyaren Mollier, Madhurima Ghosh

CHRIST (Deemed to be University) integrates sustainability into campus operations through structured waste management and resource-efficient practices. At the Central Campus, Parivarthana (established in 2008) functions as a decentralized waste management system aligned with the zero-waste objective. Waste is segregated at source into biodegradable, recyclable, and non-recyclable categories. Organic waste from hostels and cafeterias is composted and reused for campus landscaping, while dry waste and e-waste are handed over to authorized recyclers, promoting resource recovery and landfill reduction. At the Yeshwanthpur Campus, Solution 360 (initiated in 2023) manages composting through systematic segregation and organic waste processing and active involvement of Blue and Green Scouts in monitoring segregation and composting practices. The entire Christ university campus supports sustainability through WTP, solar panels, an in-house sewage treatment plant (STP) as a part of circular economy process.

Waste Segregation

- Daily waste generated: **1000 - 1200 kg**
- Annual dry waste: **70,000+ kg**
- Revenue from dry waste recycling:**₹5 lakh per year**

Water Treatment Plant

- Wastewater recycled daily: **1.5 - 2 lakh liters**
- Purity level achieved: **98%**

Biogas Generation

- Infrastructure: **4** composting tanks **(1500 kg capacity each)**
- Annual compost production: **2,500 - 3,000 kg**
- Annual revenue: **₹1,00,000**



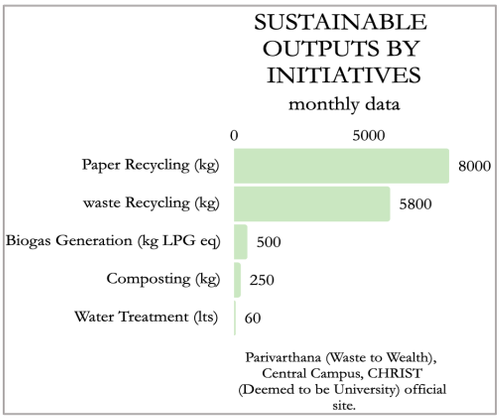
Waste segregation and recycled paper goods produced under the Parivarthana initiative

Paper Recycling Unit

- Inputs: Answer sheets, question papers and newspapers
- Production capacity: Up to **2 lakh recycled products per month.**

Composting Unit

- Food waste processed annually: **1.3 - 1.5 lakh kg**
- Biogas tanks: **2 × 150 kg** and **1 × 200 kg**
- LPG equivalent produced: **5,500 - 6,000 kg per year**
- Annual value: **₹5+ lakhs**



Other Initiatives

- Awareness programs and capacity-building initiatives promote student engagement in sustainability through campaigns, training and waste audits.
- Women-led Self-Help Group (formed in 2019) promoting financial independence, skill development and inclusive growth



Processing waste paper into recycled pulp at Parivarthana



Wet waste composting through Solution 360 and wastewater treatment infrastructure (Christ Yeshwanthpur Campus)

Waste Management

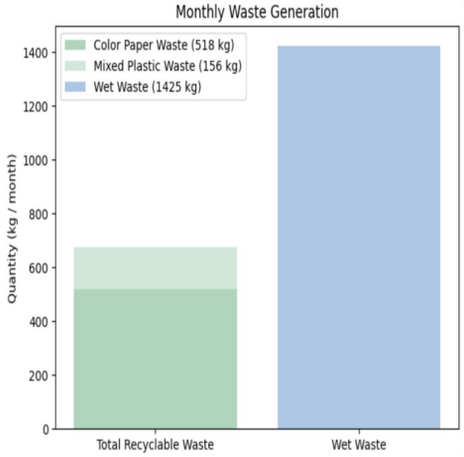
- **3-bin system**: Wet, Dry and Plastic
- Supported by Blue and Green Scouts in segregation and the final check by the housekeeping Staff
- Dry waste: Recyclable and non-recyclable
- Recyclable waste**: 674 kg/month**
- (handed over to Trash to Cash)
- Non-Recyclable **Waste:15-18 bags**
- (handed over to Bengaluru Solid Waste Management Ltd)
- Wet waste: composting unit at "Solution 360"
- Compost Produced: **568 kg**

Solar Panel

- Number of Solar Panels: **672**
- Power Generation Capacity: **400 KWH**
- System Type: Grid-connected

Sewage Treatment Plant

- Wastewater received (monthly): **13,344 KLD**
- Water recycled: **50%**
- Reuse areas: Gardens and Flush Tanks



Monthly waste generation, Christ (Deemed to be University), Yeshwanthpur Campus



On-campus solar panels generate renewable energy (Christ Yeshwanthpur Campus)

References

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LIVING LABS FOR NET-ZERO TRANSITION

HEIs serve as real-world “living laboratories” where Net-Zero strategies can be developed in collaboration with other organisations and tested across energy, mobility, water, waste, and land use dimensions under controlled yet complex campus conditions (Hernández-Diaz et al., 2021). By piloting smart energy systems, circular waste models, nature-based solutions, and green infrastructure initiatives, HEIs create replicable low-carbon templates for cities and industries to learn from (Kumar & Singhal, 2022). Their integration of research, operations, and experiential learning accelerates innovation diffusion and reduces adoption risks for external stakeholders, thus positioning HEIs as influential catalysts in broader net-zero transitions (Christou et al., 2024).

UNSW: Net-Zero in Action

UNSW Environmental Sustainability

By Melissa Nouel Himiob, Mylene Turban and Isaac Gunther

The University of New South Wales (UNSW) in Sydney, Australia, is committed to achieving Net-Zero emissions by 2050, in line with science-based targets. This commitment is embedded in UNSW's Strategic Pillar 6: *"Be an exemplar climate-resilient, nature-positive, Net-Zero emissions university that empowers our community."*

2025
30% emission reduction*

2030
50% emission reduction

2050
Net-Zero emissions

***Achieved in 2024!**

UNSW's transition to Net-Zero emissions is guided by three themes: climate action, living campuses, and resource efficiency. The below selected initiatives directly support and advance this transition.

Climate Action

Goal: Take urgent action to achieve Net-Zero emissions across our operations and value chain

Campuses Powered by 100% Renewable Electricity

- All UNSW campuses have been powered by 100% renewable electricity since 2020, making UNSW the first Australian university to fully transition.
- Renewable energy is supplied through a combination of on-site solar installations (1.53 MWp total capacity) and off-site solar generation in south-western NSW.



On-site solar installations at UNSW produce up to 1.5 MWp of renewable energy.

Fully Electrified Campuses by 2030

- UNSW's electrification program is phasing out gas-powered systems in favour of high-efficiency electric alternatives powered by renewable energy.
- Stage 1 rollout was completed in early 2025, with full campus electrification on track by 2030.
- Up to 100% gas reduction is being achieved across key facilities at UNSW.



UNSW electrification program has reduced gas usage by up to 100% across key sites.

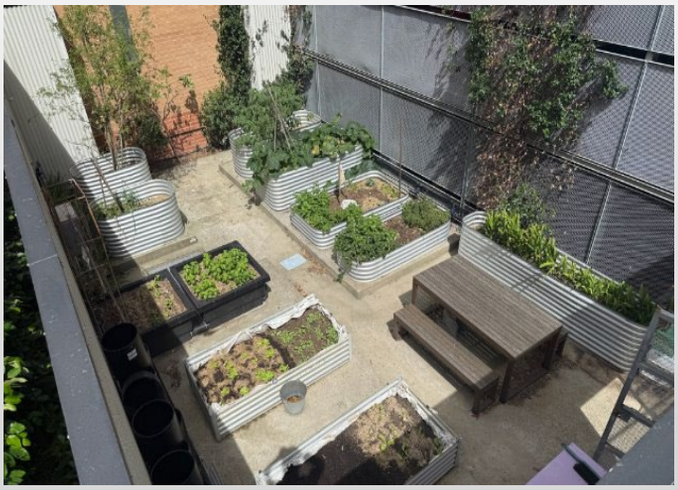
Emissions Transparency and Engagement

- Interactive carbon dashboards allow faculty-level emissions comparisons, helping to identify travel and supply chain reduction opportunities, and engage staff in emission reduction efforts.

Living Campuses

Goal: Create healthy, resilient places for learning and research where people and nature thrive

- New buildings designed for low energy use, low global warming potential refrigerants, and future-proof planning.
- Nature value net gain in 2024, in line with our pledge with Nature Positive Universities, of which UNSW is a founding member.
- Urban gardening initiatives support year-round growth of fresh, organic food for staff and students.
- Climate Fresk workshops have engaged 160 participants in science-based learning, encouraging climate action.
- The Laboratory Efficiency Assessment Framework (LEAF) supports over 100 laboratories in embedding sustainable practices within research spaces.



Urban garden programs support year-round fresh food growth for staff and students.

Resource Efficiency

Goal: Conserve resources by reducing consumption, prioritising reuse and managing waste responsibly

- Waste stream refinement targets 85% landfill diversion for general waste.
- Sustainable Procurement Frameworks engage suppliers to follow best practices and promote responsible purchasing decisions.
- Reuse programs extend the life of textiles, e-waste, furniture, and laboratory equipment.
- Water conservation initiatives, along with world-leading infrastructure on campus, replenish water sources, reduce flood risk and improve water quality.



BYO cup discounts at UNSW retailers supports waste reduction and re-use culture.

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1. UNSW Environmental Sustainability, 2022. *Environmental Sustainability Plan 2022-24* (Report). University of New South Wales. https://www.sustainability.unsw.edu.au/sites/default/files/documents/UNSW_Environmental-Sustainability-Plan-2022_v2.1.pdf
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The Estate Management Environmental Sustainability team would like to acknowledge the contribution of faculty, staff, and students advancing UNSW's Net-Zero transition.

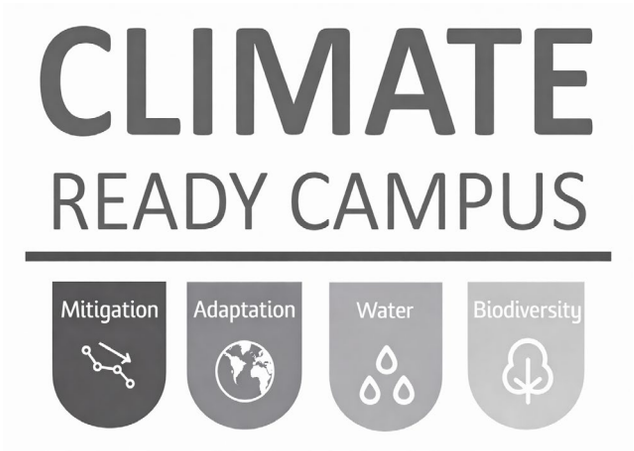


PROMOTING CLIMATE-RESPONSIVE BUILT ENVIRONMENT

HEIs are reducing their carbon footprint from the built environment by designing and expanding their green cover, creating walkable campuses, and reducing ecosystem disruption while developing green field projects (Sima et al., 2022; Yuan et al., 2024). HEIs with large campuses are well-positioned to supplement nature-based (Mishra, 2026) solutions such as biotic carbon sequestration, further enhance carbon capture and position HEIs as catalysts for demonstrating climate-responsive architecture and planning (Anantsuksomsri et al., 2024; Jain et al., 2017). The research and operational strategies by HEIs can contribute towards low-carbon commercial buildings (Sharma et al., 2022, Batra & Singhal, 2017) and ecologically sensitive industrial planning (Singhal & Kapur, 2002).

Climate Ready Campus Vision

By Zoe Paisley



Deakin's Climate Ready Campus vision embeds climate action across four pillars: Mitigation, Adaption, Water and Biodiversity to strengthen resilience across Deakin's campuses and operations.

It is an integrated, systems-based approach that transforms the Waurn Ponds Campus into a real-world test bed for practical, long-term climate solutions.

MITIGATION

- ✓ Scope 1 and 2 emissions fully mitigated
- ✓ 100% renewable electricity
- ✓ 7.25MW solar microgrid
- ✓ Energy efficiency upgrades in the built environment delivered
- ✓ Battery storage research



Deakin University Solar Microgrid- 7.25MW

ADAPTATION

- ✓ Climate adaptation planning
- ✓ Climate scenario modelling (Australian Tertiary Education Sector)
- ✓ Flood resilience works
- ✓ Low carbon materials
- ✓ Indigenous plantings



Australia's first hydrogen fuel cell facility at Deakin University

WATER

- ✓ Converted chain of ponds into a functioning wetlands system
- ✓ Implemented flood mitigation WSUD projects
- ✓ Reduced reliance on drinking water for irrigation with recycled water pipeline



Converted wetlands, Waurn Ponds Campus

BIODIVERSITY

- ✓ Established biodiversity corridors
- ✓ Planted 69,000 aquatic plants within wetlands
- ✓ Developed Habitat Restoration Plans
- ✓ Creating habitats to attract and protect threatened species



Community Tree Planting Day

OUTCOMES

Real-World Solutions

Waurn Ponds Campus hosts place-based projects that can be measured, refined and scaled, embedding renewable energy, climate-resilient infrastructure, water-sensitive design and ecological restoration into everyday operations.

Connecting Action and Learning

The Climate Ready Campus vision links operations, teaching and research - showing how universities can advance net-zero thinking while preparing campuses and graduates for a climate-resilient future.

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Scan for video

Acknowledgement:

Deakin University acknowledges the Traditional Custodians of all the unceded lands, skies and waterways on which Deakin students, staff and communities come together.



STEWARDS OF NATURAL RESOURCE MANAGEMENT

HEIs must act as proactive stewards of natural resources by embedding sustainability across teaching, research, campus operations, and community engagement. They can design interdisciplinary programmes in natural resource stewardship, ecological restoration, and climate adaptation to prepare future leaders in conservation. (Singh et al., 2023). Along with that, campuses must prioritise responsible resource management by adopting solar energy, and water and waste recycling, while transparently reporting their emissions.

PH ZH PÄDAGOGISCHE HOCHSCHULE ZÜRICH

Civic Hacking: Education for sustainability Development Through Data Literacy

By Thomas Schmalfeldt, Irene Lampert and Adrian Degonda

The Zurich University of Teacher Education (PHZH), as largest teaching education institute in Switzerland, envisions a future of sustainable development through rigorous synthesis of transformative pedagogy & pioneering research.

Strategic Framework :
In its sustainability policy, the PHZH has set out three goals derived from its overarching strategy:

- Advancing education for sustainable development
- Developing a sustainable university
- Actively shaping networks & exchanges on sustainability and education

Conceptual Foundations: Civic Hacking as an Educational Approach



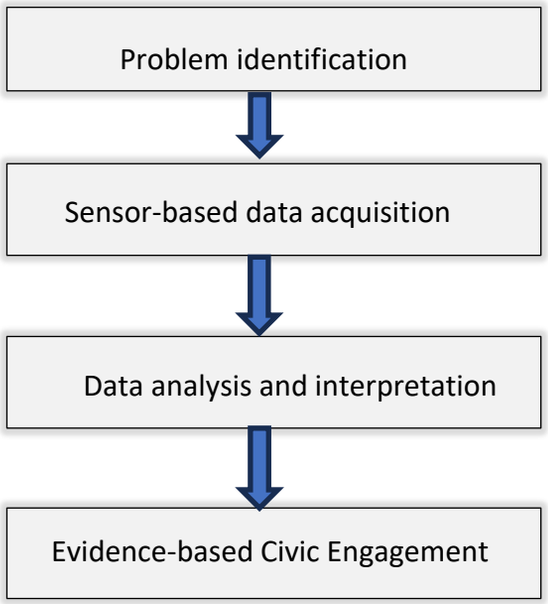
Campus Infrastructure: PHZH

Civic Hacking

Bridging Technology & Sustainability

Pedagogical framework for the Civic Hacking process.

- PH Zurich addresses sustainability through civic hacking, treating digital technology as both a contributor to ecological problems and a tool for civic and political empowerment.
- Students identify real-world environmental and social challenges and respond to them using data-driven digital tools. This approach is developed for teacher education and designed to be transferable to schools.
- Civic hacking builds key sustainability competencies, including systems thinking, anticipatory competence, and strategic action, supported by question-driven data that enables participation and bridges everyday and scientific understandings of environmental change.



Civic Hacking Process

Technical implementation of the civic hacking process includes the following steps.

- **Data Collection:** Our civic hacking approach is largely based on collecting different types of data. Environmental data in water, air, or soil is collected using Calliope mini single-board computers, which are already in use in many schools.
- **Sensor Integration:** Calliope mini are suitable because they have several built-in sensors (e.g., temperature, brightness, acceleration). Various external sensors can also be connected via a plug-in system (e.g., CO_2, fine dust, air or soil moisture).
- **Power and Operation:** The Calliope mini can be operated autonomously over longer periods with external power sources such as batteries, solar panel, or rechargeable batteries.
- **Data Storage:** Data can be stored directly on the Calliope mini or SD cards. It can also be transferred to computer via USB or via a Wi-Fi module.



Calliope mini with an external sensors for measuring soil moisture (above) and CO_2 concentration (below)

Research

- The civic hacking approach is a part of the curriculum for secondary school computer science teachers. They learn how to use the Calliope mini and explore possible application scenarios in the field of ESD.
- At PHZH, various materials for using the Calliope mini in the context of civic hacking in the classroom have been developed and are continuously being empirically evaluated.
- Our publications on civic hacking are currently available in German, with English-language articles to follow

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CO-PRODUCING KNOWLEDGE FOR NET-ZERO

HEIs must step forward as decisive knowledge creators to drive transformative net-zero transitions. Drawing on their scientific credibility and convening power, they should actively bridge government, industry, and civil society to align ambition with action (Filho, Brandli, et al., 2023; Salas et al., 2021). HEIs must lead co-produced, evidence-based net-zero roadmaps that integrate campus living labs, industry innovation, and community priorities to ensure locally grounded and scalable solutions. By forging strong university–industry R&D partnerships and embedding citizen engagement, they can translate research into deployable technologies and socially legitimate pathways. Through authoritative policy briefs, open-access data, and sustained multi-stakeholder dialogues, HEIs can shape regulations, influence investment, and anchor long-term decarbonisation trajectories at national and global scales.

Knowledge and Solutions for Net Zero Transition

By Sagarmoy Phukan, Shilpa Vats, Ramkishore Singh and Shaleen Singhal

The TERI School of Advanced Studies strives to accelerate the transition towards a more sustainable world through the creation of knowledge and human capacity by offering academic programmes and undertaking advanced research and capacity-building activities that are unique and have societal relevance, with strong support from the parent institution, TERI. The School has demonstrated academic and research excellence in addressing complex dimensions of sustainable development since its founding in 1999. The School's 'green campus' in New Delhi is designed to enhance learning while showcasing concepts of a modern green building. Equipped with world-class energy-efficient and digital infrastructure, the campus has a minimal carbon footprint.

Built Environment

Energy-efficient passive solar design:

- Terrace insulation using vermiculite & PUF, topped with China mosaic for heat reflection.
- Louvres and shadings to control the intensity of incoming solar radiation and natural light.
- Shading devices to block heat gain on windows to reduce energy demand.



Well-lit basement using lightwells



Building design for efficient natural air circulation and natural light

Energy



48 kWp solar rooftop system



Battery energy storage system (BSES)



Earth Air Tunnel (EAT) for Air Conditioning



Solar water heating system (1500LPD)

Energy-saving measures include

- Use of energy-rated fixtures and appliances, Variable refrigerant volume (VRV) systems, Battery Energy Storage System (BESS).
- The institute has installed a solar rooftop that offsets 15% energy drawn from the grid, while its Earth Air Tunnelling infrastructure reduces the air conditioning load.



TERI SAS Campus

Waste Management

Regular e-waste drivers & textile recycling drives are conducted on campus.

ICWMR Centre works with stakeholders advancing research & practice on waste management.

The institute works on researching multiple dimensions of waste, such as identifying low-carbon transition pathways for MSMEs through circular economy practices, resource efficiency strategies and valorization of biodegradable waste in Delhi NCR for recovering energy.

Rain Water Harvesting

- Rainwater harvesting drains across the campus to collect rainwater and recharge the groundwater table.
- To soften the extracted groundwater, TERI SAS uses a natural zeolite-based Ion-exchange method.



Rainwater harvesting slots in campus





e-Bus Shuttle Service, and the bus stop near the TERI SAS campus for public accessibility transport

Sustainable Transport & Mobility

- e-Bus Shuttle Services to TERI SAS for the last mile connectivity of students and staff to metro stations.
- The School provides bicycles for students to commute short distances.

Education towards Sustainability

- The institute creates a cadre of potential sustainability leaders through multi-disciplinary UG, PG & PhD programmes with strong industry and societal connections with its motto of 'knowledge for sustainable development'. Emphasis is on varied dimensions, including public policy, science & technology, humanities and management dimensions. The school was awarded '*Most Innovative Curriculum*' at the India Today Aspire Education Summit Awards, 2012.
- TERI SAS draws strength from the ethos and cultural traditions of India and collaborates with leading global institutions to meet expectations of transforming the academic landscape.
- Sustainability hackathons are organised regularly for school and college students.

Research and Training

TERI SAS conducts multidisciplinary research focused on building capacity for Net-Zero through interdisciplinary programs. The following research related to Net-Zero is currently ongoing at TERI SAS:

- Azonian Carbon Capture Project (Vertical carbon capture *designed to capture up to 0.5 tonnes of CO_2 annually.*
- Net-Zero transition in Higher Education Institutions by Emerson CoE.
- Sustainable Habitat training for professionals in collaboration with GRIHA & TERI.



Vertical carbon capture tower in the campus

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Conclusion

Higher Education Institutions (HEIs) play a vital role in the transition toward net-zero, not only as centres of knowledge, but also as active leaders in advancing climate action, fostering innovation and driving sustainable societal transformation. The sixteen case exemplars and the messages presented in this case compendium reinforce this role by demonstrating that net-zero transitions within HEIs are not merely aspirational ideals, but practical and achievable realities. They demonstrate that climate commitments translate into measurable impact when embedded across energy, water, waste, land use, mobility, governance, research and curriculum. This publication underscores that systemic, institution-wide approaches are essential for long-term decarbonisation and for enabling HEIs to fulfil their dual mandate of transforming campuses while catalysing broader societal change through education, research and policy engagement.

Across the case exemplars from leading HEIs, diverse approaches show how these institutions are advancing net-zero transitions. Institutions such as the Indian Institute of Technology Bombay, Mumbai exemplifies stakeholder behavioural change through its 'campus as a living lab' model, linking student-led initiatives to waste, water, energy, and carbon accounting. Nalanda University, Rajgir, integrates ancient knowledge systems with modern technology across energy, water, waste, land use and mobility within a unified net-zero framework. Indian Institute of Management Lucknow, Noida and Lucknow campus reflects an integrated institutional approach that combines key sectors such as energy, transport, curriculum development and research, supported by sustainability-focused management education. Guru Gobind Singh Indraprastha University, Delhi, and Chandigarh University, Mohali, advance net-zero transitions primarily through infrastructure-led strategies. Their approach places strong emphasis on energy, transport, waste and water systems, including solar PV deployment, EV-based campus mobility, circular water management and formal sustainability governance structures. A systems-focused approach is evident at Delhi Technological University, Deshbandhu College (University of Delhi), Delhi, B. N. College of Architecture for Women, Pune and Christ University, Bangalore, where waste, energy and water interventions are important aspects of decarbonization efforts. These initiatives include waste-to-energy and biogas systems, rooftop solar installations, decentralised wastewater treatment, and built-environment decarbonisation. Jamia Millia Islamia University and Ramjas College (University of Delhi), Delhi, integrate land-use, energy, waste and biodiversity management initiatives with institutional policies, green procurement norms and curriculum-embedded sustainability learning. TERI School of Advanced Studies, Delhi positions curriculum innovation, collaborative research and resource-efficient building as central pillars of its net-zero strategy. CEPT University, Ahmedabad, demonstrates how water and land-use infrastructure rooted in indigenous knowledge can strengthen climate resilience, pedagogy and campus life.

Internationally, Deakin University in Australia advances a systems-based 'Climate Ready Campus' approach, integrating mitigation, adaptation, water and biodiversity to strengthen resilience across its campus operations. UNSW in Australia advances its net-zero transition guided by climate action, living campuses and resource efficiency, underpinned by science-based targets and clean energy adoption. Meanwhile, PH Zurich in Switzerland highlights the critical role of curriculum and research in driving behavioural and societal change beyond campus boundaries. Such international case exemplars highlight the global approaches toward net-zero transition and their capacity-strengthening efforts.

This case compendium raises the significance of strengthening the science, policy and practice interface for upscaling the efforts through HEIs-led ecosystem towards net-zero transitions. Documentation and synthesis of case exemplars draw attention towards the key priority areas for action and the need to turn scientific research into effective implementation. Insights from one-on-one engagements with several HEIs enriched the curation of this publication by deepening our understanding of sectoral realities and roadblocks. Through this synthesis, we realise that there are emerging opportunities available in systematically addressing Scope 3 GHG emissions, particularly through the decarbonization of materials and procurement supply chains and in integrating net-zero objectives into long-term institutional planning and governance.

As a publication synthesising research-informed initiatives by HEIs, this compendium communicates curated success stories to diverse stakeholders. The pathway to net-zero in higher education requires collective effort and sustained institutional commitment. The exemplars presented here serve as practical models from which other HEIs can learn and adapt, while the distilled messages outline clear directions for action. The sixteen HEIs leading the way *ring the bells of hope for a sustainable future*, demonstrating that through continued collaboration and shared learning, HEIs can catalyse societal transformation beyond their own campuses toward a low-carbon future. Overall, this case compendium represents another meaningful step toward that vision, bringing together present efforts and urging collective action to accelerate the transition to a resilient and sustainable future.

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The net-zero transition towards a low-carbon and resilient future has become a global imperative, with Higher Education Institutions (HEIs) emerging as drivers of campus transformation while acting as catalysts for wider societal change. This publication, 'Higher Education Institutes as a Catalyst for Net-Zero Transition: Leading by Practice', presents a curated synthesis of case exemplars from sixteen HEIs, showcasing how sustainability commitments are translated into action. This compendium would enable knowledge sharing for strengthening the science, policy and practice interface towards a sustainable future.