

IGBC GREEN CAMPUS

CASE STUDY BOOKLET

VOLUME - I



Creating Sustainable, Healthy & Future-Ready Campuses

About CII

Confederation of Indian Industry

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to India's development, partnering with industry, Government, and civil society through advisory and consultative processes.

For more than 125 years, CII has been engaged in shaping India's development journey and works proactively on transforming the Indian Industry's engagement in national development. CII charts change by working closely with the government on policy issues, interfacing with thought leaders, and enhancing the industry's efficiency, competitiveness, and business opportunities through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues. Extending its agenda beyond business, CII assists the industry in identifying and executing corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains, including affirmative action, livelihoods, diversity management, skill development, empowerment of women, and sustainable development, to name a few.

About IGBC

Indian Green Building Council

The Indian Green Building Council (IGBC), part of the Confederation of Indian Industry (CII) was formed in the year 2001. The vision of the council is "To enable a sustainable built environment for all and facilitate India to be one of the global leaders in the sustainable built environment by 2030".

The council offers a wide array of services, which include developing new green building rating programmes, certification services, and green building training programmes. IGBC closely works with several State Governments, the Central Government, the World Green Building Council, and bilateral multi-lateral agencies in promoting green building concepts in the country. IGBC is India's only premier certification body, headquartered in Hyderabad. With a registered green footprint of 16.52 billion sq ft, with 19,070+ projects- sambit adopting IGBC's 33 rating systems, making India the second country with the largest green building footprint in the world. IGBC-rated green projects are encouraged by Central and State government incentives in 15 Indian states. IGBC – National by Choice. Global in Performance.

What is a Green Building?

A Green Building is designed, constructed, operated, and maintained to minimize environmental impacts while maximizing occupant health, comfort, and productivity. Green buildings optimize the use of energy, water, materials, and natural resources throughout their life cycle while reducing carbon emissions and environmental footprints.

By integrating sustainable planning, resource efficiency, and innovative technologies, green buildings contribute towards creating healthier communities and achieving national sustainability goals.

The IGBC Green Campus rating adopts a holistic approach by addressing both green buildings and the supporting campus infrastructure. It promotes resource efficiency, environmental stewardship, occupant well-being, and sustainable operations, enabling campuses to achieve long-term environmental, social, and economic sustainability.



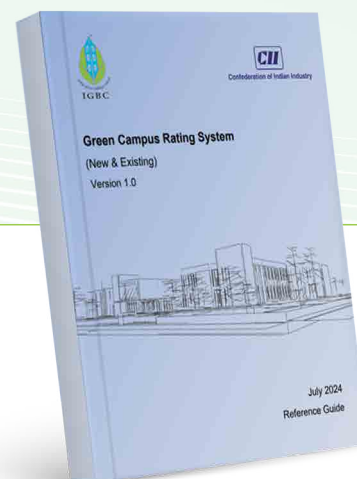
CII-Sohrabji Godrej Green Business Centre

Adopting the green path today is no longer a choice, but an imperative for ensuring a sustainable tomorrow. The vision of the council is to enable a sustainable built environment for all and facilitate India to be one of the global leaders in the sustainable built environment by 2030. CII has adopted a multi-pronged approach to equip the industry with the latest & emerging concepts, tools and skills to gain a competitive advantage in sustainable development.

The CII-Sohrabji Godrej Green Business Centre (CII-Godrej GBC), a CII Centre of Excellence on green business, set up in 2004 in Hyderabad, was a timely step in this direction. Today, the centre offers services covering green buildings, green companies, energy management, green products, and renewable energy. The centre has developed green ratings and certifications, and undertakes audits, advocacy, cleantech projects, capacity building, and outreach initiatives.

Green Campus Rating System

The Green Campus Rating System, first launched in 2015, provides a comprehensive framework for planning, developing, operating, and maintaining sustainable campuses. The rating system enables campuses to integrate environmentally responsible practices while enhancing operational efficiency and occupant well-being.



Green campuses contribute towards addressing national priorities such as:

- Efficient resource utilisation
- Water conservation
- Energy efficiency
- Sustainable transportation
- Reduction in fossil fuel consumption
- Waste management
- Conservation of natural resources
- Biodiversity enhancement

Building on the successful implementation of the pilot version and feedback from over 100+ registered / 90+ certified projects, Version 1.0 was launched for adoption from August 2024, providing an updated framework aligned with current sustainability priorities.

Project Applicability

The rating system is applicable to both **New and Existing** Campuses, including:

- Educational Campuses
- Administrative Campuses
- Corporate Campuses
- IT Parks
- Convention Centres
- Leisure & Recreational Campuses
- Military Campuses
- Religious Campuses
- Institutional Campuses

Key Performance Categories

The IGBC Green Campus Rating System evaluates projects under the following categories:



Site Planning & Design



Sustainable Transportation



Water Conservation



Energy Efficiency



Material & Resource Management



Health & Well-being



Sustainable Operation & Maintenance



Innovation

Certification Levels

Projects are awarded certification based on the total points achieved.

Certification Level Points



50–59
Certified



60–69
Silver



70–79
Gold



80–100
Platinum

Validity The certification is valid for three years from the date of award.

Benefits of the Green Campus Rating System

A Green Campus offers numerous benefits, both tangible and intangible, contributing to sustainability and improved quality of life for occupants.

Primary Tangible Benefits

Energy Savings
20-30%

Water Savings
30-50%

The Green Campus Rating System not only promotes environmental sustainability but also enhances the overall campus experience, fostering a healthier and more sustainable environment for all.

Intangible Benefits



**Improved
Microclimate**



**Reduction in
Urban Heat
Island Effect**



**Enhanced air
quality**



**Promotion of
biodiversity**



**Improved
health, comfort,
and well-being
of occupants**



**Safer and
healthier
campus
environment**



**Conservation of
scarce natural
resources**



**Zero Waste to
Landfill**

The Green Campus Rating System not only promotes environmental sustainability but also enhances the overall campus experience, fostering a healthier and more sustainable environment for all.





CASE STUDIES



LOK BHAVAN BHUBANESHWAR, ODISHA



Site Area
2,14,483.37 sq.m

Project Type
Government Institutional Complex



Water Efficient Plumbing Fixtures

Intent: To minimize the consumption of potable water by incorporating water-efficient plumbing fixtures across campus buildings.

Implementation: Water-efficient fixtures are installed across the campus, with flow rates tested at 3 bar for non-residential blocks and 4 bar for residential blocks to ensure optimal performance.

Impact: Achieved 39.18% reduction in overall water demand through low-flow and low-flush plumbing fixtures across campus buildings.

Green Cover

Intent: To minimize site disturbances, restore green cover, and promote habitat conservation and biodiversity through sustainable landscaping practices.

Implementation: The project has provided green cover and vegetation across the campus in compliance with Option 1: Green Cover and Vegetation and Option 2: Plantation of Tree Saplings, incorporating landscaped areas and tree plantations throughout the site.

Impact: Achieved 80% green cover over the total site area and planted more than 35 trees per acre, enhancing site ecology, promoting biodiversity, and improving the overall environmental quality of the campus.





Ecology & Biodiversity Conservation

Intent: To conserve and enhance biodiversity within the campus by retaining and supporting diverse native and adaptive species, while minimizing impacts on the existing ecosystem.

Implementation: The project has applied under Option 2: Biodiversity Index and conducted a biodiversity assessment within the campus. The campus includes a deer park with over 700 spotted deer, along with a goshala and aviary. The campus supports 2,374 trees across 72 species and 1,063 faunal individuals across 27 species, including mammals, birds, reptiles, fish, turtles and butterflies.

Impact: The campus achieved a Shannon-Wiener Diversity Index (H') of 3.59, demonstrating a high level of species diversity and supporting a diverse native and adaptive ecosystem within the campus.

Organic Kitchen Garden for Sustainable Food Production

Intent: To promote sustainable food production within the campus by cultivating fresh fruits, vegetables, herbs and medicinal plants through organic farming practices.

Implementation: Raj Bhavan Campus has established a dedicated Organic Kitchen Garden for cultivating fresh produce for the Raj Bhavan kitchen. The garden is maintained without synthetic fertilizers, chemical pesticides or herbicides, using organic manure and natural soil enrichment methods. The garden includes a diverse range of fruits, vegetables, herbs and medicinal plants.

Impact: Fresh produce is used in the Raj Bhavan kitchen, reducing dependence on external procurement, transportation emissions and packaging waste. Reuse of organic compost supports soil health, biodiversity and sustainable agriculture.



Green Power

Intent: To encourage the use of both on-site and off-site renewable energy systems within the campus, thereby reducing reliance on fossil fuels and minimizing environmental impacts associated with conventional energy sources.

Implementation: A 635 kWp rooftop solar PV system has been installed across the campus.

Impact: The rooftop solar system generates approximately 107% of the annual energy consumption of the buildings, with annual generation of 9,03,933 kWh against an annual energy consumption of 8,42,797.89 kWh. The initiative reduces dependence on grid electricity and supports the campus towards net-zero energy performance.

Organic Waste Management, Post Occupancy

Intent: To prevent organic waste from reaching landfills and improve sanitation by implementing on-site treatment systems for food and garden waste.

Implementation: The campus generates approximately 18.2 kg/day of food waste and 2,541 kg/year of landscape waste. The organic waste is managed through vermicomposting, cattle feed and mulching, with the manure generated reused for landscaped areas, kitchen gardens and medicinal gardens.

Impact: Achieved 100% on-site treatment and reuse of organic waste, thereby avoiding landfill disposal and promoting resource recovery and nutrient recycling within the campus.





YASHOBHOOMI IICC DWARKA (PHASE - 1), NEW DELHI

Site Area
8,97,200 sqm

Project Type
Convention Centre



High Performance Air-conditioning system

Intent: To reduce energy consumption and enhance thermal comfort by deploying energy-efficient air-conditioning systems.

Implementation: High-efficiency Unitary Air-conditioners, Variable Refrigerant Flow systems, air-cooled and water-cooled chillers have been installed, meeting or exceeding ASHRAE 90.1-2019, ECBC 2017, and BEE Star Rating specifications.

Impact: Achieved 8.75% improvement in Coefficient of Performance (COP: 6.71) and 16.9% improvement in Integrated Part Load Value (IPLV: 7.599), demonstrating enhanced HVAC efficiency in the Convention Center with the use of high-performance chillers.

Organic Waste Management

Intent: To prevent organic waste from reaching landfills and improve sanitation by implementing on-site treatment systems for food and garden waste

Implementation: Two on-site Organic Waste Converters (OWCs) provided with a combined capacity of 1,600 kg/hr, operating 14 hours daily for aerobic treatment of food and garden waste in line with IGBC guidelines.

Impact: Achieved $\geq 95\%$ treatment of food waste (7,405 kg/day) and $\geq 75\%$ treatment of garden waste (18,185.19 kg/day), ensuring landfill diversion, resource recovery, and sustainable on-site waste management.





Water efficient plumbing fixtures

Intent: To reduce potable water consumption by installing water-efficient plumbing fixtures across the campus.

Implementation: Plumbing fixtures provided with reduced flow rates and designed for water efficiency, tested at 3 bar pressure to validate performance and compliance.

Impact: Achieved 35% reduction in average daily water consumption compared to baseline, demonstrating significant water savings through efficient fixture selection.

Universal Design

Intent: To ensure the campus is accessible and inclusive for differently abled individuals and senior citizens by incorporating barrier-free design measures as per NBC 2016.

Implementation: 58 designated accessible parking spaces provided near building entrances with ramps and signage, 26 accessible toilets with grab bars and adequate maneuvering space, lifts with braille buttons and audio announcements, and exterior walkways designed with uniform levels and continuous handrails.

Impact: Achieved safe, dignified, and convenient access for all users, particularly differently abled individuals and senior citizens.



Energy Efficient Lighting Fixtures

Intent: To reduce lighting energy consumption and minimize light pollution, thereby enhancing night sky visibility and promoting a healthier nocturnal environment.

Implementation: Energy-efficient fixtures are installed across all interior, exterior, and parking areas. All luminaires are designed for zero upward light, with exterior LPD below ASHRAE 90.1-2019 baseline.

Impact: Achieved 81.47% reduction in exterior LPD and 51.53% total lighting energy savings, with upward light limited to 2.2%, significantly reducing light pollution and enhancing night sky visibility.

Rainwater Harvesting, Roof & Non-Roof

Intent: To enhance the groundwater table and reduce dependency on municipal water supply through effective rainwater management.

Implementation: Rainwater harvesting system provided in accordance with NBC Part 11, Section 7.2 for surface runoff management, including 22 permeable rainwater harvesting tanks for groundwater recharge.

Impact: Achieved 106.86% of the required rainwater harvesting capacity, with a total storage volume of 11,096 cu.m, enabling effective groundwater recharge and demonstrating robust rainwater management practices.



Landscape Design

Intent: To minimize water consumption by reducing turf usage and promoting the use of native, drought-tolerant, or adaptive plant species in landscaped areas.

Implementation: Landscape strategy focused on eliminating turf grass and selecting 100% native and adaptive species across all landscaped zones.

Impact: Achieved 100% coverage of landscape area (90,925.99 sq.m) with native and adaptive species and 0% turf grass, ensuring water-efficient and sustainable landscaping practices.



AHMEDABAD UNIVERSITY CENTRAL CAMPUS, AHMEDABAD



Site Area
123,719 sq.m

Project Type
Educational Institution



Wastewater Treatment and Reuse

Intent: To reduce pollution and potable water demand by treating 100% of on-site wastewater and reusing it for non-potable applications.

Implementation: An on-site STP of 200 KLD capacity is installed to treat 100% wastewater generated, complying with CPCB/SPCB reuse quality standards.

Impact: Achieved 100% wastewater treatment (120.5 KLD) and reused 96.4 KLD, meeting 100% irrigation and flushing demand, reducing potable water consumption and promoting sustainable water management within the project.

Pedestrian Network

Intent: To provide a safe, comfortable, and well-connected pedestrian network with adequate shading and illumination across the campus.

Implementation: A continuous pedestrian network is provided connecting all buildings, shaded by tree cover and illuminated to 30–100 lux, as per NBC Part 8 Section 1.

Impact: Achieved fully shaded and illuminated pedestrian pathways, ensuring user safety, thermal comfort, and enhanced walkability across the campus.





On-site Renewable Energy

Intent: To reduce environmental impacts associated with fossil fuel consumption by integrating on-site renewable energy technologies.

Implementation: On-site solar photovoltaic systems are installed to offset a significant portion of the grid energy consumption by infrastructural equipment.

Impact: Achieved 75.97% of annual infrastructural energy consumption (432,059 kWh out of 568,730 kWh) through solar PV, significantly reducing reliance on conventional energy sources.

Health & Well Being Facilities

Intent: To enhance the physical, emotional, and spiritual well-being of campus occupants by providing dedicated health, wellness, emergency, and security facilities.

Implementation: Sports and wellness facilities are provided, including football, basketball, volleyball, badminton, tennis courts, security facilities, gymnasium, and spaces for recreational activities.

Impact: Health and well-being facilities have been provided for more than 28% of the total campus occupants (609 out of 2,202), promoting wellness, comfort, and active lifestyles within the campus.



Green Education

Intent: To promote environmental awareness by engaging campus occupants, local communities, and NGOs, thereby encouraging the adoption of eco-friendly practices.

Implementation: A student-led green club is established to conduct sustainability initiatives, outreach programs, and awareness activities.

Impact: Conducted awareness programs, posters, and plantation drives, fostering environmental responsibility and promoting green education within and beyond the campus.

Organic Waste Management, Post occupancy

Intent: To prevent organic waste from reaching landfills and improve sanitation by implementing on-site treatment systems for food and garden waste.

Implementation: An OWC of 300 kg capacity and vermicomposting pits of 27-ton capacity are installed for treating food and garden waste through aerobic processes.

Impact: Achieved 100% treatment of food waste (287.65 kg/day) and garden waste (12,495 kg/day), promoting on-site waste management and a circular resource recovery approach.



Management of Irrigation Systems

Intent: To reduce water demand for irrigation by adopting efficient water management systems and technologies.

Implementation: Efficient irrigation systems are installed, including central shut-off valves, pressure-regulating valves, drip irrigation for over 50% of non-turf areas, and sprinklers for over 75% of turf areas.

Impact: Achieved optimized irrigation water use across landscaped areas, ensuring water conservation and sustainable landscape management within the campus.



HINDUSTAN PETROLEUM MANAGEMENT DEVELOPMENT INSTITUTE, PUNE



Site Area
15,987 sq.m

Project Type
Training & Development Centre



Green Cover or Vegetation

Intent: To promote sustainable landscaping, enhance site ecology, and support biodiversity through provision of adequate green cover.

Implementation: Vegetation is provided over 31.76% (5,073.26 sq.m) of the total site area (15,987.26 sq.m), using native and adaptive species.

Impact: Achieved 75% native/adaptive planting and 25% turf (1,662 sq.m), promoting biodiversity and water-efficient landscaping across the site.

Bicycle Lane Network

Intent: To promote sustainable mobility and reduce dependence on motorized transport by providing safe and convenient bicycle infrastructure.

Implementation: A dedicated bicycle lane network is provided connecting all major buildings, with bicycle parking within 100 meters of each building for easy accessibility.

Impact: Provided 10 bicycles per 240 occupants with maintenance support, encouraging active transportation and reducing reliance on motorized travel within the campus.





Organic Waste Management, Post occupancy

Intent: To prevent organic waste from reaching landfills and improve sanitation by implementing on-site treatment systems for food and garden waste.

Implementation: Four vermicomposting trays (2.59 cu.m capacity) are installed for landscape waste and two Gobble Stack units (60 kg each) for food waste processing.

Impact: Achieved 73% treatment of landscape waste (829 kg of 1,347 kg) and 100% food waste processing on-site, ensuring effective decentralized organic waste management within the campus.

Heat Island Reduction, Non-roof

Intent: To mitigate the urban heat island effect and enhance thermal comfort by reducing heat absorption from non-roof surfaces.

Implementation: Parking areas are shaded with covered structures using high-SRI white cement sheets (SRI 90), and tree cover is provided for non-roof impervious areas.

Impact: Achieved 76% shading (3,670 sq.m of 4,822 sq.m) of non-roof areas, with 100% shaded parking, reducing heat island effect and enhancing thermal comfort.



High-Performance Air-conditioning equipment

Intent: To enhance energy efficiency and reduce environmental impact by installing high-performance air-conditioning systems.

Implementation: Energy-efficient VRV, split, and window air-conditioning systems are installed, selected to exceed ASHRAE 90.1-2010 baseline performance requirements.

Impact: Over 50% of air-conditioned area is served by systems with COP at least 2.5% above baseline, improving HVAC efficiency and reducing energy consumption.

On-site Renewable Energy

Intent: To reduce environmental impacts associated with fossil fuel consumption by integrating on-site renewable energy technologies.

Implementation: A 35 kWp solar PV system and solar hot water system are installed, collectively generating 55,105 kWh annually for infrastructural energy needs.

Impact: Achieved 100% of annual infrastructural energy demand (54,190 kWh) through on-site renewable systems, reducing dependence on conventional energy sources.



Outdoor Views

Intent: To enhance indoor environmental quality and occupant well-being by providing access to outdoor views and natural daylight.

Implementation: Vision glazing is provided between 0.9 m and 2.1 m above finished floor level in regularly occupied areas to ensure visual connectivity to outdoors.

Impact: Achieved 90% of regularly occupied areas with direct outdoor views, enhancing daylight access and visual comfort for occupants.



SBI, NIREEKSHAN BHAVAN INTERNAL AUDIT DEPARTMENT, HYDERABAD

Site Area
15392 sqm

Project Type
Learning & Development Centre

Access to Sustainable Transportation

Intent: To encourage the use of sustainable and low-emission transportation modes, thereby reducing the environmental impacts associated with conventional automobile use.

Implementation: Electric vehicle (EV) charging infrastructure is provided within parking areas to support green mobility adoption.

Impact: Provided EV charging for 25/100 two-wheelers and 9/60 four-wheelers, promoting electric mobility and reducing transport-related emissions within the campus.

Green Power

Intent: To reduce environmental impacts associated with fossil fuel consumption by integrating on-site renewable energy technologies.

Implementation: A 130 kWp on-site solar PV system is installed to offset the project's annual energy demand.

Impact: Achieved 100% of annual energy consumption (463,602 kWh) through solar PV, ensuring clean energy use and eliminating reliance on conventional power sources.





Use of Green Products & Equipment

Intent: To reduce environmental impacts by using eco-labelled green building materials, products, and equipment in campus operations.

Implementation: Green products are used, including organic landscaping inputs, eco-friendly cleaning agents, and recycled paper across operations.

Impact: Achieved use of organic pesticides (neem-based), GreenPro/GS-37 certified cleaning agents, and 100% recycled chlorine-free paper, reducing environmental impact of campus operations.

Management of Irrigation Systems

Intent: To reduce water demand for irrigation by adopting efficient water management systems and technologies.

Implementation: Zone-wise irrigation with drip systems for over 50% of planting beds and sprinklers for 75% of lawns, supported by moisture sensors, pressure regulators, and a central shut-off valve.

Impact: Achieved optimized water use across landscaped areas through efficient irrigation controls, ensuring effective water conservation and sustainable landscape management.



Daylighting

Intent: To enhance visual comfort and reduce dependence on artificial lighting by ensuring adequate daylight illuminance in regularly occupied spaces.

Implementation: Daylight levels are assessed at 0.75 m work plane using a 10-ft grid at 9:00 am, 12:00 pm, and 3:00 pm, as per SP 41 Part 4 Lighting.

Impact: Achieved over 75% of regularly occupied areas within 300–2,200 lux, improving daylight availability, indoor environmental quality, and energy efficiency.

Enhanced Energy Efficiency

Intent: To enhance energy efficiency and reduce environmental impacts associated with energy consumption.

Implementation: High-efficiency motors meeting minimum IE3 and IE4 classes are installed across campus systems.

Impact: Achieved over 50% (3 of 6) IE4-class motors, improving operational efficiency and reducing overall energy consumption.



Lighting Systems

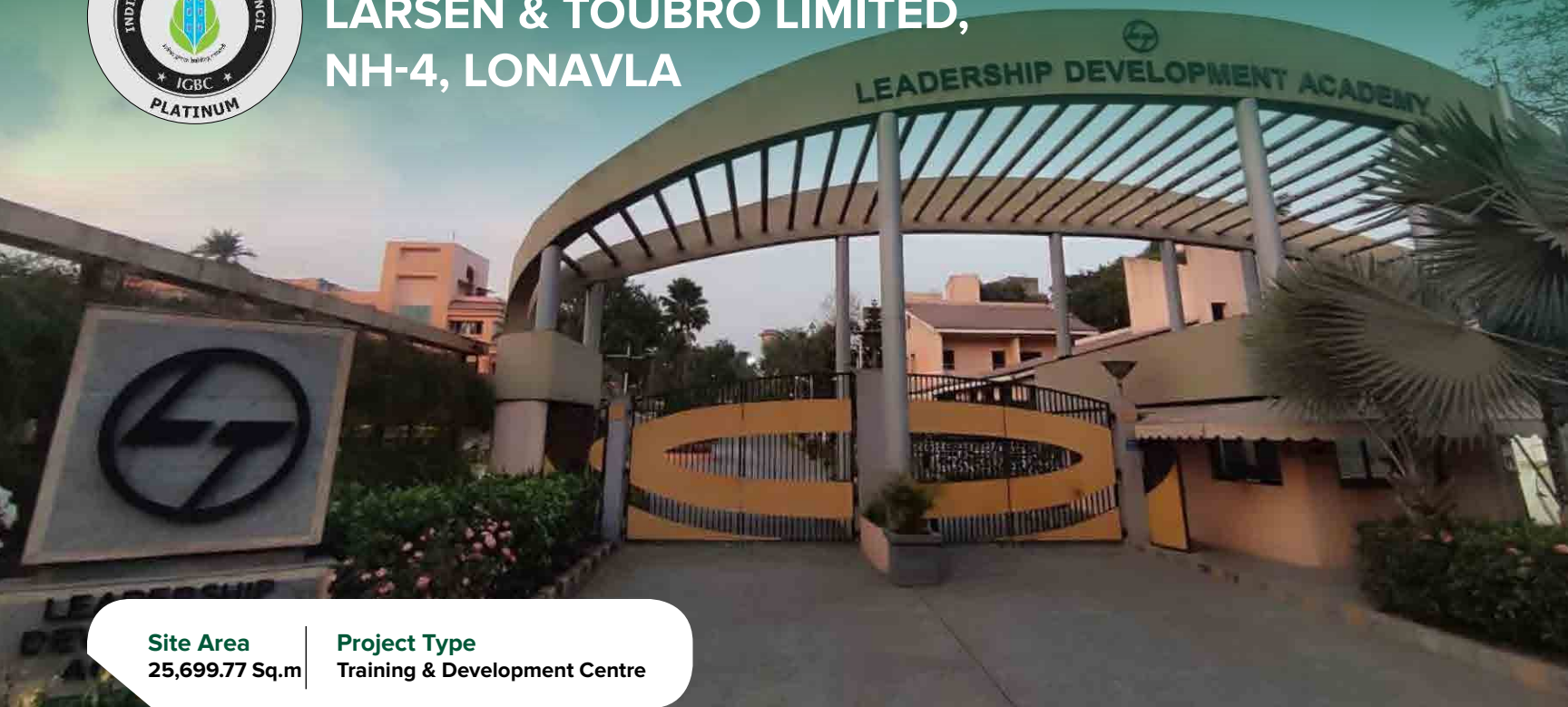
Intent: To improve energy efficiency and reduce lighting power consumption through efficient fixtures and control systems.

Implementation: High-efficiency exterior lighting systems are installed with sensor-based controls for automated operation and reduced energy wastage.

Impact: Achieved 60.31% improvement over ASHRAE 90.1-2019 exterior lighting baseline, enabling optimized energy savings and improved operational efficiency.



LEADERSHIP DEVELOPMENT ACADEMY LARSEN & TOUBRO LIMITED, NH-4, LONAVLA



Site Area

25,699.77 Sq.m

Project Type

Training & Development Centre



Daylighting

Intent: To ensure adequate daylight illuminance in regularly occupied areas, thereby enhancing visual comfort and reducing reliance on artificial lighting.

Implementation: Daylight levels are measured post-installation at work plane height using a 10-ft grid and lux meter at 9:00 am, 12:00 pm, and 3:00 pm, as per SP 41 Part 4 Lighting.

Impact: Achieved over 95% of regularly occupied areas within 300–2,200 lux, ensuring compliance with daylighting criteria and improved indoor environmental quality.

GHG Inventorization and Mitigation Measures

Intent: To conduct Greenhouse Gas (GHG) inventorization for quantifying GHG intensity and implement effective strategies to offset carbon emissions.

Implementation: A detailed GHG accounting study was conducted covering Scope 1 (direct emissions), Scope 2 (indirect energy emissions), and Scope 3 (other indirect emissions) along with mitigation strategies included carbon sequestration by existing trees and sustainable operational practices.

Impact: Achieved 13% reduction in total carbon emissions, with carbon sequestration of 133,611.41 tCO₂e/year from existing trees and total project emissions limited to 250 tCO₂e per capita per year, demonstrating effective climate impact reduction.





Water efficient plumbing fixtures

Intent: To reduce potable water consumption by installing water-efficient plumbing fixtures across the campus buildings.

Implementation: Water-efficient fixtures are installed across the campus, with flow rates tested at 3 bar for non-residential blocks and 4 bar for residential blocks to ensure optimal performance.

Impact: Achieved 50.33% reduction in average daily water consumption across 100% of campus buildings compared to baseline, demonstrating significant water savings through efficient fixture selection.

Use of Green Products & Equipment

Intent: To promote sustainable operations by using eco-labelled green building materials, products, and equipment, thereby minimizing negative environmental impacts.

Implementation: The campus operations incorporate organic pesticides for landscaping and utilize eco-labelled products such as recycled, chlorine-free paper and certified housekeeping chemicals to promote sustainable practices.

Impact: Achieved 100% usage of sustainable paper products and 100% replacement of chemical pesticides with organic alternatives, supporting eco-friendly and responsible campus operations.



Wastewater Treatment and Reuse

Intent : To reduce pollution and potable water demand by treating 100% of on-site wastewater and reusing it for non-potable applications.

Implementation: 35 KLD on-site STP provided for treatment of 100% wastewater generated (25.26 KLD), along with a 500 KLD WTP for additional wastewater treatment from the adjacent campus nalla, ensuring compliance with CPCB/SPCB reuse standards.

Impact: Achieved 90.5% of landscape irrigation and flushing demand met through treated water, demonstrating effective wastewater reuse and sustainable water management across the campus.

Heat Island Reduction, Roof & Non-roof

Intent: Minimize heat island effect to reduce negative impact on the micro-climate.

Implementation: Tree cover and grass pavers provided for shading non-roof impervious areas, with steep-sloped roofs coated in high SRI paint. Flat RCC roofs treated with high albedo paint and integrated with terrace gardens.

Impact: Achieved 82.34% of non-roof impervious area and 80% of total roof area effectively mitigate heat island effect.



Energy and Water Performance Monitoring

Intent: To monitor, manage, and optimize energy and water consumption across the campus, ensuring efficient resource use.

Implementation: Sub-metering provided for key energy systems and water-consuming processes, including HVAC, lighting, pumping, STP, renewable energy, irrigation, and process water, integrated with ACC2 Decoder Controllers and a cloud-based dashboard for real-time monitoring and performance tracking.

Impact: Achieved accurate monitoring of energy and water consumption, enabling identification of inefficiencies and supporting data-driven optimization for conservation across the campus.



UNION BANK KNOWLEDGE CENTRE, BENGALURU

Site Area

158401.63 sqm

Project Type

Training & Development Centre



Health and Well Being Facilities

Intent: To enhance the physical, emotional, and spiritual well-being of campus occupants by providing dedicated health, wellness, emergency, and security facilities.

Implementation: Dedicated wellness and recreational facilities are provided, including gym, yoga hall, indoor games, swimming pool, sports courts, security office, medical room, surveillance, and emergency systems.

Impact: Achieved access for 100% of occupants (752 facilities for 373 users), ensuring comprehensive wellness, safety, and occupant well-being across the campus.

Organic Waste Management, Post occupancy

Intent: To prevent organic waste from reaching landfills and improve sanitation by implementing on-site treatment systems for food and garden waste.

Implementation: Nine vermicomposting beds are installed for post-occupancy garden waste treatment, operated by an in-house team, with compost reused for landscaping.

Impact: Achieved 100% treatment of garden waste (950 kg/day) via vermicomposting, enabling zero organic waste discharge and promoting nutrient recycling within the campus.





On-site Renewable Energy

Intent: To reduce environmental impacts associated with fossil fuel consumption by integrating on-site renewable energy technologies.

Implementation: A 200 kWp on-site solar photovoltaic system is installed to serve infrastructural loads including exterior lighting and centralized pumping systems.

Impact: Achieved 93.63% of annual infrastructural energy demand (128,269 kWh) through solar PV generation (120,103 kWh/year), significantly reducing grid dependence.

Landscape Design

Intent: To minimize water consumption by reducing turf usage and promoting the use of native, drought-tolerant, or adaptive plant species in landscaped areas.

Implementation: Landscape strategy focused on minimising turf grass and selecting native and adaptive species across all landscaped zones.

Impact: Achieved a landscape with 96.54% native/adaptive species and 3.46% turf, reducing potable water demand and enhancing biodiversity, supporting ecological balance.



Rainwater Harvesting

Intent: To enhance the groundwater table and reduce dependence on municipal water supply through effective on-site rainwater management strategies.

Implementation: Rainwater harvesting systems implemented as per NBC 2016 using IMD rainfall data and runoff coefficients, with 2 ponds to capture, store, and recharge stormwater from impervious surfaces.

Impact: Achieved 100% runoff capture (1,894.26 cu.m/day) with 7,639 cu.m storage capacity, enabling groundwater recharge and reducing stormwater discharge.

Water efficient plumbing fixtures

Intent: To minimize the consumption of potable water by incorporating water-efficient plumbing fixtures across campus buildings.

Implementation: Water-efficient fixtures are installed across the campus, with flow rates tested at 3 bar for non-residential blocks and 4 bar for residential blocks to ensure optimal performance.

Impact: Achieved 20.75% reduction in overall water demand through low-flow and low-flush plumbing fixtures across campus buildings.





MAHINDRA RESEARCH VALLEY, (MAHINDRA & MAHINDRA LTD.)



Site Area
505370 sqm

Project Type
Research & Development Facility



Organic Waste Management – Post Occupancy Intent:

Intent: To prevent organic waste from reaching landfills and improve sanitation by implementing on-site treatment systems for food and garden waste.

Implementation: 10 TPD on-site MWC biogas plant installed for treating campus-generated food waste (308.9 kg/day), enabling controlled anaerobic digestion and efficient organic waste processing.

Impact: Achieved 100% on-site food waste treatment with zero waste to landfill. Generated biogas is utilized for DG sets and shuttle buses, while slurry is reused as compost, enabling circular resource recovery through energy generation and nutrient recycling.

Water efficient plumbing fixtures

Intent: To minimize the consumption of potable water by incorporating water-efficient plumbing fixtures across campus buildings.

Implementation: Water-efficient fixtures are installed across all buildings, with optimized flow rates for residential and non-residential areas based on standard operating pressures.

Impact: Achieved 35.06% reduction in potable water consumption, reducing annual demand from 1,77,00,410 litres to 1,09,66,155 litres.





Waste Water Treatment and Reuse

Intent: To treat wastewater generated on-site in accordance with CPCB norms and reuse the treated water for non-potable applications such as landscaping, thereby reducing dependence on freshwater resources and avoiding environmental pollution.

Implementation: 160 KLD on-site STP (FBR type) installed at MRV campus using Extended Aeration Process with Tube Settling for treatment of greywater (29.46 KLD), with compliance to CPCB reuse standards.

Impact: Achieved 100% treatment of on-site greywater, with treated water fully reused for landscaping and surplus demand met through off-site treated water supply, ensuring complete reuse and zero discharge.

Heat Island Reduction, Non-roof

Intent: To minimize the heat island effect and reduce the negative impact on the local micro-climate by providing shading over non-roof impervious surfaces.

Implementation: Tree cover and structural shading are provided across all non-roof impervious areas, with shaded parking integrated through built and landscape elements.

Impact: Achieved 100% shading of non-roof impervious area (2,03,034 sq.m) and 98.08% shaded parking (484 of 494 spaces), significantly reducing heat island effect and improving outdoor thermal comfort.



High-Performance Air-conditioning and Lighting Systems

Intent: To enhance energy efficiency and minimize environmental impacts through the use of energy-efficient HVAC systems, low-impact refrigerants, and efficient lighting solutions.

Implementation: HVAC systems provided with eco-friendly refrigerants R410a and R134a, with optimized ODP and GWP performance, and a system COP of 3.69 exceeding ASHRAE 90.1–2010 baseline along with 100% LED lighting provision across all buildings and with energy-efficient exterior lighting systems.

Impact: Achieved 8.4 combined ODP+GWP (≤ 13 threshold) for HVAC refrigerants and 12.16% higher COP than ASHRAE 90.1–2010 baseline. Reduced LPD by 47.54% for internal lighting and 51.76% for exterior lighting, ensuring high energy efficiency.

Green Power

Intent: To encourage the use of both on-site and off-site renewable energy systems within the campus, thereby reducing reliance on fossil fuels and minimizing environmental impacts associated with conventional energy sources.

Implementation: On-site solar PV systems of 1,221 kWp capacity installed across three locations, along with a 7.5 MW off-site solar facility dedicated to meeting campus energy requirements.

Impact: Achieved 602% of annual energy demand through on-site solar generation (19,68,154 kWh vs. 3,26,891 kWh), with additional off-site renewable supply generating 1,64,25,000 kWh/year, ensuring 100% renewable energy coverage for infrastructural loads.





INDIANOIL INSTITUTE OF PETROLEUM MANAGEMENT GURUGRAM, HARYANA

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INDIANOIL INSTITUTE OF PETROLEUM MANAGEMENT

Site Area
67288.05 sqm

Project Type
Training & Development Centre



Health and Well-Being Facilities

Intent: To enhance the physical, emotional, and spiritual well-being of campus occupants by providing dedicated health, wellness, emergency, and security facilities.

Implementation: Health and well-being facilities provided, including yoga hall, gymnasium, swimming pool, indoor games area, along with healthcare, emergency, and security systems such as dispensary, alarm system, and CCTV surveillance.

Impact: Achieved coverage of 16.3% of campus occupants through health and well-being facilities, supported by integrated healthcare, emergency, and security systems, enhancing wellness, safety, and overall comfort.

On-site Renewable Energy

Intent: To meet the annual energy demand of campus infrastructural equipment through on-site renewable energy, thereby reducing dependence on grid electricity and supporting sustainable energy management.

Implementation: A 287 kWp solar photovoltaic system is installed with inverters and monitoring systems to ensure efficient generation and performance tracking.

Impact: Achieved 100% of annual infrastructural energy demand (1,21,131 kWh) through solar PV generation (3,52,247.20 kWh/year), reducing grid dependency and supporting carbon reduction goals.





Energy Efficiency in Infrastructural Equipment

Intent: To enhance infrastructural energy efficiency by implementing high-performance lighting systems and efficient pumping equipment to reduce overall campus energy demand.

Implementation: Exterior lighting provided with downward-directed fixtures and average LPD, integrated with timer-based outdoor lighting control systems across landscaping areas, parking, pathways, and bicycle lanes. Centralized HVAC systems provided in all buildings with higher efficiency/COP than baseline.

Impact: Achieved 62.8% reduction in exterior LPD with 95.1% downward-directed lighting, reducing energy consumption and light pollution. Timer-based controls optimize operations, while centralized HVAC systems deliver $\geq 7.5\%$ COP improvement, lowering cooling energy demand.

Wastewater Treatment and Reuse

Intent: To reduce potable water demand and minimize wastewater discharge by treating and reusing 100% of wastewater generated on-site for non-potable applications.

Implementation: 80 KLD Sewage Treatment Plant (STP) provided to treat site-generated wastewater, complying with CPCB/SPCB reuse quality standards.

Impact: Achieved 100% treatment of on-site wastewater, generating 20,407 KLA of treated water annually, meeting 55% of non-potable demand for landscaping and cooling towers, and reducing dependence on potable water sources.



Rainwater Harvesting

Intent: To reduce dependence on external water sources and enhance groundwater recharge by capturing and managing 100% of the runoff generated from roof and non-roof areas within the site.

Implementation: Rainwater harvesting system provided to capture runoff from 39,411 sq.m impervious area, with total storage capacity of 2,231 cu.m/day and harvesting capacity of 2,109 cu.m/day.

Impact: Achieved 100% capture of site runoff (2,020 cu.m/day) through on-site rainwater harvesting, managing runoff from roof and non-roof areas while supporting groundwater recharge and sustainable water management.

Heat Island Reduction – Roof and Non-Roof Areas

Intent: To reduce heat island effect and thermal gain through reflective roofing and shading of non-roof impervious areas.

Implementation: Exposed roofs (12,604 sq.m) are treated with ceramic tiles and high-SRI coatings. Parking areas are shaded using GI sheets and trees, and extensive tree cover is provided across non-roof areas.

Impact: Achieved 100% treated roof area, 77% shaded parking, and 81% shaded non-roof impervious areas, significantly reducing heat gain and improving microclimatic conditions.





KODAIKANAL INTERNATIONAL SCHOOL HIGHCLERC CAMPUS, KODAIKANAL



Site Area
56376 sqm

Project Type
Educational Institution



On-site and Off-site renewable energy

Intent: To encourage the use of clean and renewable energy sources and reduce the dependence on conventional grid electricity by integrating on-site and off-site renewable energy systems within the campus.

Implementation: 90 kWp on-site solar PV system installed generating 1,28,520 kWh/year, supplemented by a 2 MW off-site solar PV plant to offset remaining campus energy demand.

Impact: Achieved 296.02% offset of infrastructural load through on-site solar generation and 102.19% of annual combined energy demand through off-site supply, enabling 100% renewable energy use for the campus.

Water efficient plumbing fixtures

Intent: To minimise potable water demand by implementing water-efficient plumbing fixtures across campus buildings.

Implementation: Low-flow fixtures such as closets, urinals, health faucets, and taps are provided, and existing fixtures are retrofitted to meet baseline flow rate.

Impact: Achieved 23.95% reduction in potable water consumption over baseline, improving water efficiency and supporting sustainable resource management.





Landscape Design

Intent: To promote site ecology and reduce landscape water demand through the use of native and drought-tolerant vegetation across the campus.

Implementation: Landscape provided with natural ground cover, drought-tolerant/native plant species, and retention and plantation of over 150 trees across the project site.

Impact: Achieved 46% vegetated cover (26,016.87 sq.m of 56,376.78 sq.m), including 12% native grass and 88% drought-tolerant/native landscaping, significantly reducing irrigation demand and enhancing ecological performance.

Green Education

Intent: To encourage environmental responsibility and strengthen sustainability awareness among students and faculty by integrating education, outreach initiatives and campus-based environmental programs.

Implementation: Sustainability programs are conducted including student participation in Climate & Conservation Congress, Eco-Friendly Practices Committee activities such as Miyawaki forests and composting, and collaboration with Indian Green Building Council for carbon reduction initiatives.

Impact: Enhanced environmental education and student engagement through sustainability practices, carbon sequestration via green cover, and waste-to-compost systems across campus.



Heat Island Reduction, Non-roof

Intent: To reduce heat island effect and improve microclimate by providing shaded surfaces and covered parking within the campus.

Implementation: Shading strategies provided for non-roof impervious areas using existing trees and grass pavers, along with covered parking provisions for majority of parking spaces to reduce heat gain.

Impact: Achieved 75.72% shading of non-roof impervious areas (7,451.88 sq.m of 9,840.46 sq.m) and 72.85% covered parking (51 of 70 spaces), reducing heat gain, improving thermal comfort, and mitigating urban heat island effect.

Energy Efficiency in Infrastructural Equipment

Intent: To enhance infrastructural energy efficiency by implementing high-performance lighting systems and efficient pumping equipment to reduce overall campus energy demand.

Implementation: Energy-efficient exterior lighting provided in compliance with ASHRAE 90.1–2010, integrated with timers, daylight and motion sensors, and solar-integrated systems. High-efficiency pumps (<5 kW, 2 HP, 49 m head) installed for domestic water supply and wastewater management.

Impact: Achieved 27% reduction in exterior lighting power density, optimized lighting performance through automated controls, and 69.9% pump efficiency with power demand below 5 kW, improving overall infrastructural energy performance.





MINDTREE KALINGA CAMPUS, BHUBANESWAR



Site Area
49395.65 sqm

Project Type
IT Campus



Organic Waste Management, Post occupancy

Intent: To prevent organic waste from reaching landfills and improve sanitation by implementing on-site treatment systems for food and garden waste.

Implementation: 75 kg capacity organic waste converter installed for wet waste processing, along with five vermicomposting beds of 200 kg capacity each for garden waste management and on-site composting.

Impact: Achieved 83% wet waste treatment (90 kg/day) and 100% garden waste processing (14 kg/day), ensuring zero organic waste to landfill and full compost reuse.

Energy Efficiency in Infrastructural Equipment

Intent: To enhance energy efficiency and minimize environmental impacts through the use of energy-efficient HVAC systems, low-impact refrigerants, and efficient lighting solutions.

Implementation: Energy-efficient exterior lighting provided with reduced Lighting Power Densities across site areas, along with two 150 TR water-cooled chillers installed with improved performance over ASHRAE baseline.

Impact: Achieved 50.15% reduction in exterior LPD compared to ASHRAE 90.1–2010, and 6% improvement in chiller performance with COP 5.49 over baseline.





Rainwater Harvesting

Intent: To enhance groundwater recharge and reduce dependency on municipal water supply through effective management of roof and non-roof runoff.

Implementation: Rainwater harvesting system provided with one pond of 20,769 cu.m capacity, 3 rainwater sumps, and 78 recharge pits to capture runoff from roof and non-roof areas.

Impact: Achieved 100% runoff harvesting (1,574 cu.m/day) from 49,395.65 sq.m impervious area, with 20,769 cu.m storage capacity, ensuring complete on-site capture, groundwater recharge, and sustainable water management.

Water Efficient Plumbing Fixtures

Intent: To minimize the consumption of potable water by incorporating water-efficient plumbing fixtures across campus buildings.

Implementation: Water-efficient fixtures are installed across the campus, with flow rates tested at 3 bar for non-residential blocks and 4 bar for residential blocks to ensure optimal performance.

Impact: Achieved 24.5% reduction in potable water use, with annual consumption reduced to 96,25,980 litres/year from a baseline of 11,57,60,020 litres/year through water-efficient flow and flush fixtures.



Heat Island Reduction Roof

Intent: To minimize the heat island effect and reduce the negative impact on microclimate by using high-reflective roofing materials across exposed roof surfaces.

Implementation: High Solar Reflectance Index (SRI 96) tiles provided across exposed roof areas to reflect solar radiation and reduce heat gain.

Impact: Achieved coverage of 100% of net exposed roof area (2,503.72 sq.m of 3,129.87 sq.m) with high SRI materials, reducing heat gain, mitigating heat island effect, and improving thermal comfort.

Health and Well Being Facilities

Intent: To enhance the physical, emotional, and social well-being of campus occupants by providing access to health, fitness, emergency, and security infrastructure.

Implementation: Dedicated wellness facilities provided including gymnasium, indoor and outdoor sports areas, along with healthcare and safety infrastructure comprising a pharmacy-cum-first aid clinic, emergency alarm system, CCTV surveillance, and bag scanner facility.

Impact: Achieved coverage of 19% of campus occupants through dedicated health and well-being facilities, supported by integrated emergency and security systems enhancing overall safety, wellness, and comfort.





NATIONAL INSTITUTE OF TECHNOLOGY PHASE-I GOA



Site Area
1,62,663 sq.m

Project Type
Educational Institution



Waste Water Treatment and Reuse

Intent: To treat wastewater generated on-site in accordance with CPCB norms and reuse the treated water for non-potable applications such as landscaping, thereby reducing dependence on freshwater resources and avoiding environmental pollution.

Implementation: 131 KLD on-site STP installed at the campus for treatment of 100% greywater generated, with treated water conforming to CPCB reuse standards.

Impact: Achieved 100% treatment of on-site greywater, with more than 50% of landscaping water demand met through treated wastewater reuse.

Management of Irrigation Systems

Intent: To ensure efficient irrigation, reduce water consumption, and promote sustainable landscape management.

Implementation: Central shut-off valve provided for irrigation control, with drip irrigation systems for planting beds and sprinkler systems for turf areas to ensure efficient and uniform water distribution.

Impact: Achieved drip irrigation coverage for >50% of planting beds and sprinkler irrigation for 75% of turf areas, significantly reducing overall irrigation water demand.





Organic Waste Management

Intent: To prevent organic waste from reaching landfills and improve sanitation by implementing on-site treatment systems for food and garden waste.

Implementation: Three Organic Waste Converters (OWCs) of 500 kg/day capacity each installed within the campus for processing food and garden waste from kitchens, dining areas, and landscaped areas, enabling on-site compost generation for reuse in landscaping.

Impact: Achieved treatment of 75% of food waste (637 kg/day) and 25% of garden waste (2,519 kg/day), reducing municipal waste load and transportation emissions while enabling closed-loop nutrient recycling within the campus.

On-site Renewable Energy

Intent: To reduce environmental impacts associated with fossil fuel consumption by integrating on-site renewable energy technologies.

Implementation: 250 kWp on-site solar PV system installed on campus, generating 3,86,290 kWh annually, designed to offset infrastructural energy loads including external lighting, pumps, and motors.

Impact: Achieved 100% of annual infrastructure energy demand through on-site solar PV generation, eliminating grid dependency for external lighting and infrastructural loads.



Bicycle Lane Network

Intent: To promote sustainable mobility and reduce dependence on motorized transport by providing safe and convenient bicycle infrastructure.

Implementation: Dedicated bicycle lane network provided connecting all major buildings, with bicycle parking facilities within 100 meters of each building for easy accessibility and last-mile connectivity.

Impact: The dedicated bicycle network promotes sustainable mobility by supporting non-fossil fuel transport through 60 bicycles, reducing internal vehicular movement, improving air quality, and enhancing campus walkability and accessibility.

Landscape Design

Intent: To minimize water consumption by reducing turf usage and promoting the use of native, drought-tolerant, or adaptive plant species in landscaped areas.

Implementation: Landscape strategy focused on minimising turf grass and selecting native and adaptive species across all landscaped zones.

Impact: Achieved a landscape composition of 6% turf (3,406.41 sq.m) and 84% drought-tolerant/native planting or low-irrigation barren areas (51,033.20 sq.m), significantly reducing irrigation demand.





ZENSAR TECHNOLOGIES, PUNE

Site Area
44043 sq.m

Project Type
IT Campus



Green Power

Intent: To encourage the use of on-site and off-site renewable energy technologies and minimize environmental impacts associated with the use of fossil fuel-based energy.

Implementation: The project has incorporated 620 kWp of on-site solar photovoltaic systems (350 kWp rooftop and 270 kWp carport) and procures green power through solar energy supplied by Maharashtra State Electricity Distribution Company Limited.

Impact: Achieved 64% of the annual energy consumption through a combination of on-site and off-site renewable energy, reducing dependence on conventional fossil fuel-based electricity and lowering the project's carbon footprint.

Enhanced Energy Efficiency

Intent: To enhance energy efficiency and reduce the environmental impacts associated with energy consumption through the adoption of energy-efficient systems and controls.

Implementation: The project has retrofitted existing pumps and motors with IE3-rated equipment and provided lighting controls for interior spaces, non-emergency exterior and common area lighting, including landscaping, surface and covered parking, pathways, bicycle lanes, and street lighting.

Impact: Achieved 82% lighting load savings compared to the ASHRAE 90.1-2019 baseline, with 48.2% of the connected motor load served by IE3-rated motors and lighting controls covering more than 80% of interior, non-emergency exterior, and common area lighting, significantly reducing overall energy consumption and associated environmental impacts.





Organic Waste Management, Post Occupancy

Intent: To ensure effective waste management, avoid organic waste being sent to landfills, and improve sanitation and health through on-site treatment systems.

Implementation: The project has installed an Organic Waste Composter with a 500 kg/day processing capacity to treat food and garden waste generated within the campus through an aerobic digestion process. A waste-to-energy system is also provided to utilize the biogas generated from the treatment process.

Impact: Achieved 100% on-site treatment of organic waste generated within the campus, with the biogas and manure produced being utilized on-site, thereby reducing waste sent to landfills and promoting resource recovery and sustainable waste management.

Health and Well-being Facilities

Intent: To provide health and well-being facilities that enhance the physical, emotional, and social well-being of campus occupants.

Implementation: The project has provided a range of health and well-being facilities, including a gymnasium, crèche, cafeteria, amphitheatre, indoor and outdoor recreational facilities, along with first-aid/medical clinic, pharmacy, emergency alarm system, and campus-wide surveillance system to support the health, safety, and well-being of occupants.

Impact: Achieved health and well-being facilities catering to 1,083 occupants, representing 32.33% of the total campus population (3,350 occupants), promoting occupant health, safety, recreation, and overall well-being within the campus.



Green Audit

Intent: To ensure sustained performance of building systems and campus facilities through periodic green audits and implementation of continual improvement measures.

Implementation: The project has conducted energy and water audits and implemented action plans to improve resource efficiency. Energy efficiency measures include the installation of rooftop solar PV systems, LED lighting, BMS-enabled monitoring, energy-efficient HVAC systems, and EV charging stations. Water efficiency initiatives include low-flow and sensor-based plumbing fixtures, an on-site sewage treatment plant (STP) with wastewater reuse for landscaping, water monitoring through submetering, leak detection and preventive maintenance, supported by regular awareness and training programs for occupants.

Impact: Achieved continuous improvement in energy and water performance through the implementation of audit recommendations, resulting in enhanced resource efficiency, reduced environmental impact, increased use of renewable energy, effective wastewater reuse, and sustained operational performance across the campus.

Green Cover

Intent: To minimize site disturbances, restore green cover, and promote habitat conservation and biodiversity through sustainable landscaping practices.

Implementation: The project has provided green cover and vegetation across the campus in compliance with Option 1: Green Cover and Vegetation and Option 2: Plantation of Tree Saplings, incorporating landscaped areas and tree plantations throughout the site.

Impact: Achieved 47.93% green cover over the total site area (21,111.19 sq.m. of 44,043 sq.m.) and planted 592 trees (more than 35 trees per acre), enhancing site ecology, promoting biodiversity, and improving the overall environmental quality of the campus.



NOTES

For more details, contact:

Technical Team:

A.Vinuthna

Engineer

durga.vinuthna@cii.in

Ar. Nivedita Dileep

Associate Counsellor

nivedita.dileep@cii.in

Dr. Shivraj Dhaka

Senior Counsellor

shivraj.dhaka@cii.in

Marketing Team:

Mr. Sundeep Vullikanti

Counsellor

sundeep.vullikanti@cii.in