

**ENVIRONMENTAL SUSTAINABILITY REPORT**  
**INDIAN INSTITUTE OF MANAGEMENT- LUCKNOW**

**Prepared Under the Guidance of**

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**EXECUTIVE SUMMARY**

**SUBMITTED TO**

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The Energy and Resources Institute

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## EXECUTIVE SUMMARY

The environment sustainability report focuses on estimating resource footprints and greenhouse gas (GHG) emissions of both the campuses of the Indian Institute of Management Lucknow (IIML) located geographically at Lucknow and Noida in the state of Uttar Pradesh and covering an area of more than 200 acres and 20 acres respectively. It additionally involves identification of opportunities for reducing ecological footprint. The exercise is based on a mixed method approach involving analysis of qualitative and quantitative data and information collected through questionnaire-based surveys; insights drawn from the secondary literature and supplemented with onsite assessment. The surveys and onsite assessment have been carried out by a team designated from the New Delhi office of The Energy and Resource Institute (TERI) in accordance with a broad guideline provided by the Centre for Business Sustainability (CBS), a centre of excellence at IIML. The baseline year that has been considered for the assessment is 2023.

The scope includes assessment of - energy consumption and GHG emissions; solid waste generation and utilization; water consumption and wastewater treatment; paper consumption and inventorisation of carbon sink. Given that this is a first of its kind endeavour towards baseline inventorisation of GHG emissions of IIML, the focus has been confined to scope 1 and scope 2 emissions to begin with. While carrying out the assessment of resource footprint, the scope has been confined to academic blocks, student hostels, hostels accommodating trainees and precludes electricity consumption at staff quarters.

For estimation of carbon sequestration potential, a non-destructive approach has been adopted that includes measuring tree diameter at breast height (DBH). However, given the study site feasibility and resource constraints, the biomass-diameter regression model has also been used to estimate the biomass wherever tree height is not available. The robustness of the exercise has been ensured through insights drawn from secondary literature coupled with a rapid appraisal that helped in identifying species that can facilitate both pollution abatement and groundwater recharge.

Scope 1 emission, as singled out for the institute, includes emissions arising from consumption of primary fossil fuels like petrol and diesel in vehicles owned by the institute, and consumption of LPG for cooking. Emissions from purchased electricity i.e., indirect emissions (as defined in Scope 2) have been estimated using the grid emissions factors for the electricity procured and used in academic blocks; student hostels; hostels accommodating trainees and areas for common lighting. For estimating Scope 2 emission the electricity consumption has been arrived at by subtracting the electricity consumption in staff residential facilities from the overall electricity consumption. The sum of scope-1 and scope-2 emissions provided for the total annual GHG emissions for the year 2023 in both the campuses. The net GHG emission for the aforementioned year has been eventually calculated by deducting the estimated carbon sequestration potential of the vegetation of both the campuses from the total GHG emission.

In addition to the above, an exercise has been carried out to estimate the emissions avoided through adoption of diverse mitigation measures by the institute such as making use of solar power

generated within the campus from the rooftop solar panels on a standby basis and use of electric vehicles for transportation primarily within the Lucknow campus. To estimate avoided emission, the aggregate annual output from the rooftop solar panels has been considered along with the grid emission factor provided by the Central Electricity Authority (CEA), Ministry of Power, Government of India.

For the Lucknow campus, Scope 1 emissions have been calculated as 123.26 tCO<sub>2</sub> eq. This comprises of emissions arising from diesel, petrol, and liquefied petroleum gas (LPG) consumption. Scope 2 emissions came to around 2,863 tCO<sub>2</sub> eq., based on aggregate electricity consumption. Going down further to the disaggregate level, the lion's share of Scope 1 emissions could be attributed to LPG consumption for cooking (87%) with the absolute annual consumption hovering around 36,100 kg. Similarly, for the Noida campus, Scope 1 and Scope 2 emissions have been estimated as 42.83 tCO<sub>2</sub> eq. and 2,143.35 tCO<sub>2</sub> eq., respectively. Diesel consumption (16,000 liters/year) by the five DG sets at the Noida campus accounted for the lion's share (97%) of Scope 1 emissions. Cumulatively, GHG emissions from the Lucknow and Noida campuses amounted to 2,986 tCO<sub>2</sub> eq. and 2,186 tCO<sub>2</sub> eq., respectively, totaling 5,172 tCO<sub>2</sub> eq for the year 2023.

Based on the existing green cover in both the campuses, the carbon sequestration potential has been estimated at 158 tCO<sub>2</sub> eq. and 51.4 tCO<sub>2</sub> eq. for the Lucknow and Noida campuses respectively. This resulted in a reduction of campus emissions by 5.3% and 2.3% for the Lucknow and Noida Campus respectively, amounting to a reduction of 4% of the cumulative emissions. The combined net GHG emissions for 2023 considering both the campus has been estimated as 4,963.34 tCO<sub>2</sub> eq.

Besides GHG emissions, other resource footprints that have been calculated include water usage, solid waste generation, and paper consumption. Due to the substantial variation in geographical area and student populations, the resource consumption patterns of the Lucknow and the Noida campuses have been observed to be significantly different.

For water consumption, the assessment reveals that the Lucknow campus used 175,000 liters, whereas the Noida campus used 25,650 liters per day in 2023. In terms of solid waste generation, the Lucknow campus produced 180 tons annually (equivalent to 15 tons per month), while the Noida campus generated approximately 22 tons annually (1.8 tons per month). Additionally, the analysis of paper consumption indicated that the Lucknow campus utilized 2,088,000 standard A4 sheets annually, whereas the Noida campus consumed 450,000 sheets annually pertaining to the year 2023.

One of the notable initiatives of the institute at both the campuses was the setting up of wastewater treatment facility. The wastewater treatment capacity of the Lucknow facility is 4,00,000 liters/day, and that in Noida comes to 1,20,000 liters/day. The treated water is used for application in horticulture, thereby avoiding additional dependence on groundwater or water supplied by the concerned parastatal agency.

In addition to water treatment, the Lucknow campus of IIML takes pride in initiating ten artificial groundwater recharge pits with a combined capacity of 700 cubic meters, alongside two natural pits capable of storing 27,320 cubic meters of water, aiding in water conservation. Moreover, the presence of natural wetlands bolsters the ecological resilience of the campus. These wetlands not only store water but also sequester carbon dioxide, thereby aiding in GHG emission reduction.

Regarding solid waste management, the Lucknow campus of the institute has implemented various waste segregation practices with assistance from local NGOs and students. An approximate average of 550 kg of waste is segregated for recycling per month. Furthermore, the campus has embraced renewable energy sources by installing 400 KW rooftop solar panels, which generated 571,751 kWh of electricity in 2023, leading to reduction in fossil fuel-based electricity consumption from the grid and avoidance of 406 tCO<sub>2</sub> eq. GHG emissions. Plans are underway to install an additional 80 KW capacity of rooftop solar panels to further prune emissions in the coming years. The Lucknow campus also operates two electric golf carts for transportation within the premises, contributing to sustainable mobility within the campus.

The campus administration at both the campuses of IIML has prioritized native tree species in their plantation drives, promoting ecological balance and providing essential ecosystem services such as pollution control and groundwater recharge. Given their location in an industrial belt and a region with limited rainfall (average yearly rainfall < 1000 mm), the campuses play a critical role in maintaining the balance in the ecosystem of the respective areas where they are located.

Based on the assessment, the following interventions have been singled out as potentially effective in accelerating the institute's transition to net zero carbon emissions and beyond. While the effort towards launching solar panel as a standby source of electricity in the Lucknow campus is a step in the right direction, there exist considerable potential to replicate the same in Noida campus besides increasing the installed capacity in Lucknow campus. In view of decarbonizing mobility in both the campuses, there is potential for replacing existing internal combustion engine (ICE) based vehicles currently used for official travel in both the campuses with electric vehicles (EVs) that could be powered by renewable electricity. The introduction of metering and monitoring in the high-water consumption hotspots within the campus premises could also facilitate tracking and reducing the water consumption footprint significantly. Additionally, for optimized recycled gray water usage, installing filtration systems and adhering to maintenance schedules could be useful for integrating recycled water into the flushing systems in the toilet facilities in the campuses. A thorough examination of slurry composition, including nutrient content and chemical properties could be useful in exploring their suitability as fertilizer for usage by the horticulture department to facilitate further enhancement of vegetation cover. Both the campuses also need to adopt or continue the practice of waste segregation and recycling along with real time monitoring of waste composition and recycling rates. Last but not the least, with both the campuses boasting of a rich and diverse flora and fauna, an effort towards maintenance and continued augmentation of green cover through planting of native species, wetland ecosystem upkeep, and establishing butterfly gardens can foster biodiversity and ecosystem services and can also make the landscape of campus conducive for environmental and socially conscious process of learning.