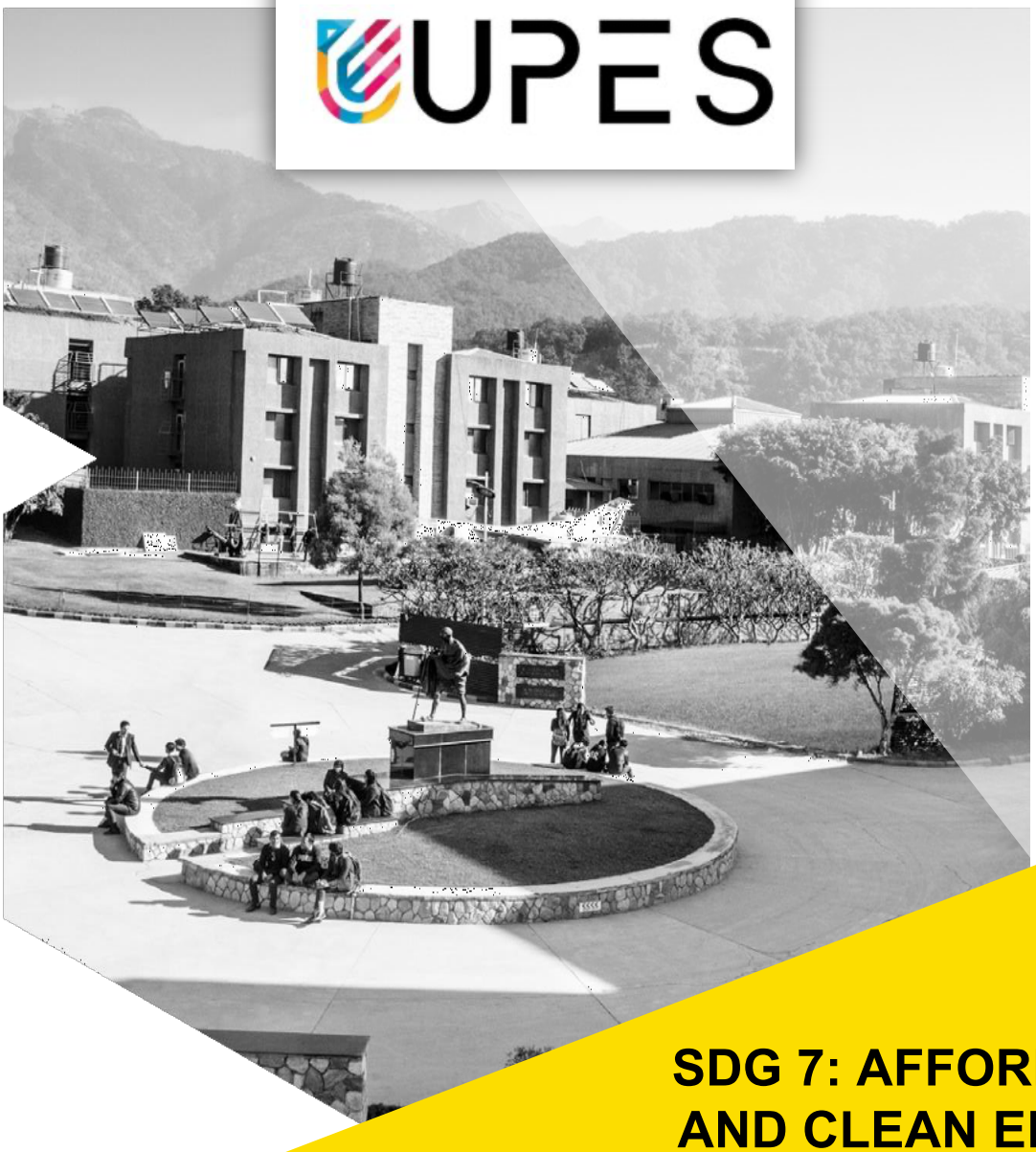
SUSTAINABLE DEVELOPMENT GOALS

UPES



SDG 7: AFFORDABLE AND CLEAN ENERGY

2025

Table of Contents

UPES Energy Efficiency Plan and Initiatives

Energy Efficiency Strategies and Initiatives at UPES

UPES has implemented a range of **campus-wide energy-saving measures** to reduce overall consumption. All conventional lighting fixtures are being retrofitted with **LED lighting** to cut electricity use, supported by a policy to replace old lamps for improved efficiency upes.ac.in. The university also maintains a **unity power factor** at its power substations (near 1.0) to eliminate transmission losses, ensuring **zero energy loss** in distribution upes.ac.in. In addition, UPES invested in on-site **renewable energy** generation: a **100 kW solar power plant** was installed, which in the last five years has supplied roughly **8% of the campus's total electricity demand** upes.ac.in. This solar infrastructure not only reduces reliance on grid power but also serves as a training and project facility for students upes.ac.in. The campus uses **solar thermal systems** as well – solar water heaters with a capacity of 61,500 liters meet hot water needs, further curbing electrical consumption for water heating upes.ac.in.

UPES's **green building practices** complement these technology upgrades. New buildings and renovations are designed to high efficiency standards (e.g. in compliance with India's ECBC code), incorporating features like daylighting, efficient insulation, and modern HVAC systems. One major academic building earned a **GRIHA 4-Star green building rating**, demonstrating a ~**40% reduction in annual energy use** compared to a conventional design grihaindia.org. This was achieved through measures such as maximizing natural light (45% of area day-lit), using energy-efficient lighting and glazing, and optimizing the building envelope grihaindia.org. On-site solar panels in that project provide ~30% of the building's lighting electricity, and solar hot water systems meet over 95% of hot water demand grihaindia.org. These initiatives illustrate UPES's commitment to **integrating energy efficiency in infrastructure**, from lighting and equipment upgrades to sustainable architecture.

The university also explores **innovative clean energy solutions** on campus. For example, UPES students and researchers developed a **"solar tree" installation** (a tree-shaped solar panel structure) to generate power on campus, along with prototypes like an electric bicycle powered by renewable energy upes.ac.in. A student-built electric cart ("U-BAHN") now provides campus transport using an efficient battery and motor system, showcasing home-grown solutions for cutting fuel use upes.ac.in upes.ac.in. Through such projects and pilot implementations, UPES fosters a culture of **energy innovation** while directly reducing campus energy consumption and emissions.

Energy Efficiency Targets and Performance Metrics

UPES has set **clear performance metrics** and goals as part of its energy efficiency plan, even if some targets are implicit. Rather than a single numeric reduction goal, the plan comprises multiple focused objectives. One key target is achieving **100% LED lighting coverage** on campus – by replacing all conventional bulbs, the university aims to significantly lower lighting power demand upes.ac.in. Electrical systems are tuned to maintain a **unity power factor (1.0)**, which is effectively a target of **zero reactive power loss**, ensuring maximum efficient use of supplied energy upes.ac.in.

The university also tracks the **share of renewables** in its energy mix as a metric of progress. With the 100 kW solar plant operational, about **8% of UPES's total electricity consumption is now met by solar energy** (measured over the past five years) upes.ac.in. This achievement serves as a baseline for further increasing renewable contribution. In fact, UPES has signaled a long-term **100% renewable energy pledge** under its SDG initiatives upes.ac.in, indicating an aspirational target to power the entire campus with clean energy in the future. While timelines for this pledge are not specified publicly, it aligns with global SDG 7 aims of expanding renewables and doubling energy efficiency improvements upes.ac.in.

UPES uses building-level performance as another metric of success. The GRIHA-certified campus building mentioned earlier, with ~40% less energy usage than conventional benchmarks, is a tangible **performance benchmark** grihaindia.org. By comparing new projects against baseline consumption, the university quantifies efficiency gains (e.g. kWh per square meter reduced). These data points – percentage of energy from renewables, number of efficient fixtures installed, improvement in building energy indices – all serve as **KPIs for energy efficiency**. They enable UPES to monitor progress year over year instead of relying on a single reduction percentage. Overall, the institution's targets focus on continuous improvement: **increasing energy savings and renewable usage** steadily to shrink the campus carbon footprint, in line with India's and global sustainability goals upes.ac.in.

Implementation Timelines and Monitoring Systems

UPES's energy efficiency plan is backed by an **implementation roadmap** and monitoring mechanisms to ensure progress. Many initiatives have already been executed in recent years as part of a rolling action plan. For instance, the lighting retrofit policy was put into effect and **conventional lights are in the process of being completely replaced** by LEDs (an ongoing project with substantial completion) upes.ac.in. The solar power plant became operational and over a five-year period delivered measurable results (8% of total power supply) upes.ac.in, indicating the timeline and impact of that project. Similarly, the solar water heaters and power factor correction equipment were deployed campus-wide, and their benefits (energy saved, losses avoided) are tracked continuously.

To guide and coordinate these efforts, UPES formulated a **Climate Action Plan** that outlines strategies to reduce greenhouse gas emissions and energy use. This plan emphasizes steps like promoting renewables, improving efficiency, and building climate resilience on a university-wide scale upes.ac.in. Implementation is overseen by dedicated sustainability committees (such as the **Sustainability Cluster** in the School of Engineering) which set milestones and review progress. There are systems in place for **monitoring energy consumption and identifying wastage** in real time. In particular, the campus has adopted **smart energy management systems** to monitor usage patterns and optimize power consumption in facilities upeswebsitecdn-prod-hphqfhc0b8h2ffhf.a02.azurefd.net. These systems, along with regular energy audits, help pinpoint inefficiencies so that corrective actions can be taken (for example, adjusting HVAC operation or scheduling equipment usage during off-peak hours). Efforts like this directly address SDG 7.2.5, which calls for identifying and reducing energy wastage on campus.

Progress is tracked through both technical and administrative means. **Energy data (electricity, fuel use)** is recorded and analyzed periodically by the facilities management team. The university also **monitors its carbon footprint** and publishes these metrics, reflecting its commitment to transparency in sustainability performance upeswebsitecdn-prod-

hphqfhc0b8h2ffhf.a02.azurefd.net. Implementation timelines are aligned with academic years and budget cycles – e.g., phasing in LED installations building by building, or ramping up solar capacity as funding allows – and are adjusted based on intermediate results. To engage the campus community, UPES hosts events like the annual *Sustainability Fair*, where updates on green initiatives are shared. In 2022 the university unveiled its first **Sustainability Report** during this fair, indicating the milestones achieved and upcoming action plans garhwalpost.in. Through such forums, stakeholders learn about progress (for example, how much energy has been saved or what new projects are underway) and can provide input. This iterative implementation and feedback process ensures the energy efficiency plan is **on track and adaptively managed** over time.

Certifications and Alignment with Frameworks

UPES's energy efficiency endeavors are closely aligned with **national and international sustainability frameworks**. On the infrastructure front, the university adheres to recognized **green building standards**. Achieving the GRIHA 4-Star rating for its campus development is a testament to this alignment – GRIHA (India's Green Building Rating) assessed that the UPES building in question consumes ~42.7% less energy than a typical benchmark building, thanks to its sustainable design and technologies grihaindia.org. Features like extensive daylight use, high-performance glazing, and ECBC-compliant insulation and lighting were incorporated to meet the certification criteria grihaindia.org. By securing a GRIHA rating (comparable in rigor to LEED or IGBC certifications), UPES demonstrates compliance with **green architecture principles** and a commitment to third-party validation of its energy efficiency claims. The campus also installed **100 kWp of solar PV** as part of this project, fulfilling GRIHA's requirement for onsite renewables – this system alone supplies about 30% of the building's annual lighting energy needs grihaindia.org. Such certifications ensure that UPES's buildings align with broader sustainability goals and government energy conservation guidelines.

In terms of operational practices, UPES aligns with the **ISO 50001 Energy Management System** framework. While not explicitly stated if the university is fully certified, it has taken steps to build capacity in this area. Notably, UPES organized India's first workshop on **ISO 50001 Lead Auditing** for its M.Tech students and staff at the campus's Management Development Centre linkedin.com. By training participants in ISO 50001 (which provides a systematic approach to managing energy performance), the university is integrating international best practices into its energy management procedures. This suggests that UPES is working toward an energy management system that continually improves efficiency – a core tenet of ISO 50001. Additionally, the university's **academic curriculum and research** reinforce these frameworks: programs in **Power Management (Green Energy)** and **Clean Energy Technologies** educate future practitioners on standards like ISO, and centers like the **Centre for Energy, Environment, and Sustainability Studies (CEESS)** focus on aligning research with national energy policy and global sustainability agendas upes.ac.in upes.ac.in.

UPES's commitments are also framed by the **UN Sustainable Development Goals (SDGs)**, particularly SDG 7 (Affordable and Clean Energy) and SDG 12 (Responsible Consumption & Production). The institution has a dedicated SDG coordination effort and publicly reports on various SDG indicators. For example, UPES's SDG 7 report highlights its contributions to improving energy efficiency and increasing renewable energy on campus upes.ac.in upes.ac.in. Its SDG 12 initiatives include waste reduction and efficient resource use, which complement energy-saving efforts. The university has **published a Sustainability Report** (as evidenced by SDG 12.4.1) to disclose its environmental performance upes.ac.in, likely aligning with **GRI**

(Global Reporting Initiative) standards for transparency. By aligning with these frameworks – GRIHA for buildings, ISO 50001 for energy management, and SDGs/GRI for reporting – UPES ensures its energy efficiency plan is **in harmony with national goals and global best practices**. This multi-framework approach also lends credibility to its initiatives and facilitates external benchmarking of its progress.

Sustainability Reporting and Achievements in Energy Efficiency

UPES actively **documents and publicizes** its sustainability and energy efficiency achievements through official reports and publications. A comprehensive **Sustainability Report** was first released in October 2022, during the Sustainability Fair, showcasing the university's progress on various green initiatives garhwalpost.in. This report (and subsequent updates) provides a transparent account of energy consumption trends, reduction efforts, and impact metrics. For instance, it highlights that UPES implemented LED lighting retrofits campus-wide and **virtually eliminated inefficient lighting** as a source of energy waste upes.ac.in. It also reports on the outcomes of the solar power project – noting that a significant portion of campus electricity (8%) is now generated from UPES's own solar plant, thereby cutting down on grid electricity use and associated emissions upes.ac.in. Such achievements are framed within the context of the university's climate action goals, giving stakeholders a clear picture of how energy efficiency contributes to carbon footprint reduction.

In addition to standalone sustainability reports, UPES produces **SDG-specific reports and climate action updates** that reference energy efficiency. The university's SDG 7 ("Affordable and Clean Energy") report details the measures taken on campus: it explicitly mentions that *"UPES has adopted energy-saving measures, including LED lighting, energy-efficient buildings, and smart energy management systems"* as part of its commitment to clean energy upeswebsitecdn-prod-hphqfhc0b8h2ffhf.a02.azurefd.net. It further notes the installation of solar panels on campus which *"reduce dependency on conventional energy sources"* upeswebsitecdn-prod-hphqfhc0b8h2ffhf.a02.azurefd.net. These documents serve to celebrate milestones (for example, completion of the LED retrofitting drive or the commissioning of the solar tree pilot) and to set new goals (such as expanding renewable capacity or improving building efficiency). The **Climate Action Plan** PDF released by UPES reinforces these points, outlining strategic initiatives like sustainable campus infrastructure and energy conservation campaigns, and it underscores the university's resolve to *"mitigate greenhouse gas emissions, promote renewable energy, and build climate resilience"* through concrete actions upes.ac.in upes.ac.in. Together, the SDG reports and climate action plan function as a roadmap and tracking tool, against which UPES measures its yearly progress in energy efficiency and sustainability.

Performance metrics in these reports illustrate the gains from UPES's energy efficiency plan. For example, the university reports the total energy saved from efficiency projects and renewable generation. It also monitors reductions in per-student or per-square-meter energy usage as an indicator of improved efficiency over time. By publishing these figures, UPES demonstrates accountability to its goals. The reporting process is aligned with global frameworks: the sustainability report's structure likely mirrors GRI or similar standards, covering energy, emissions, water, waste, etc., thereby contextualizing energy efficiency within broader environmental performance. The regular release of updates (through newsletters, the university website, and events) ensures that achievements like *maintaining a*

unity power factor, saving 30+ million liters of water by eliminating wasteful RO systems, or cutting building energy use by nearly half are recognized and built upon upes.ac.in thecsruniverse.com. In summary, UPES not only has an energy efficiency plan in place but also a robust **reporting and review mechanism**. This allows the institution to celebrate its sustainability milestones, learn from each phase of implementation, and continuously enhance its strategies in pursuit of greater energy efficiency and a low-carbon campus future.