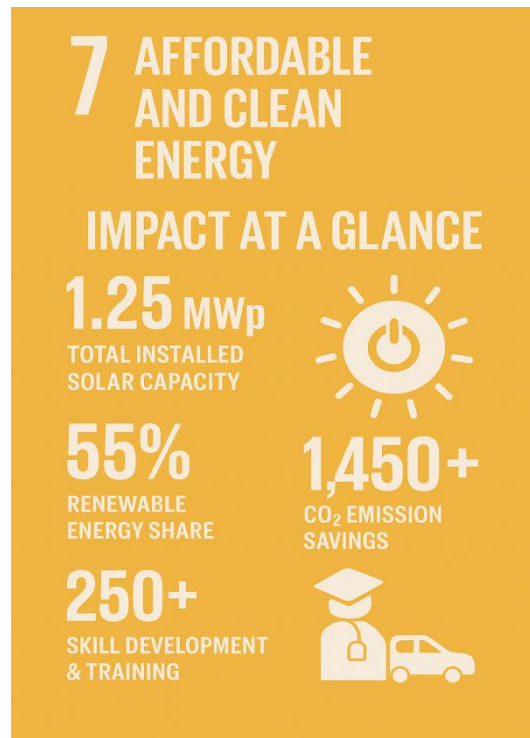


## Energy Efficiency and Conservation Plan

Aligned with SDG 9 (Innovation & Infrastructure) and SDG 13 (Climate Action)

### 1. Overview: Institutional Commitment to Energy Efficiency

Centurion University implements a comprehensive Energy Efficiency and Transition Plan (2024–2035) to systematically reduce energy consumption, enhance renewable energy integration, and achieve net-zero operational emissions by 2035. The strategy covers campus infrastructure, research, community extension, and digital monitoring, integrating sustainable technologies across academic and operational domains.



### 2. Institutional Energy Governance

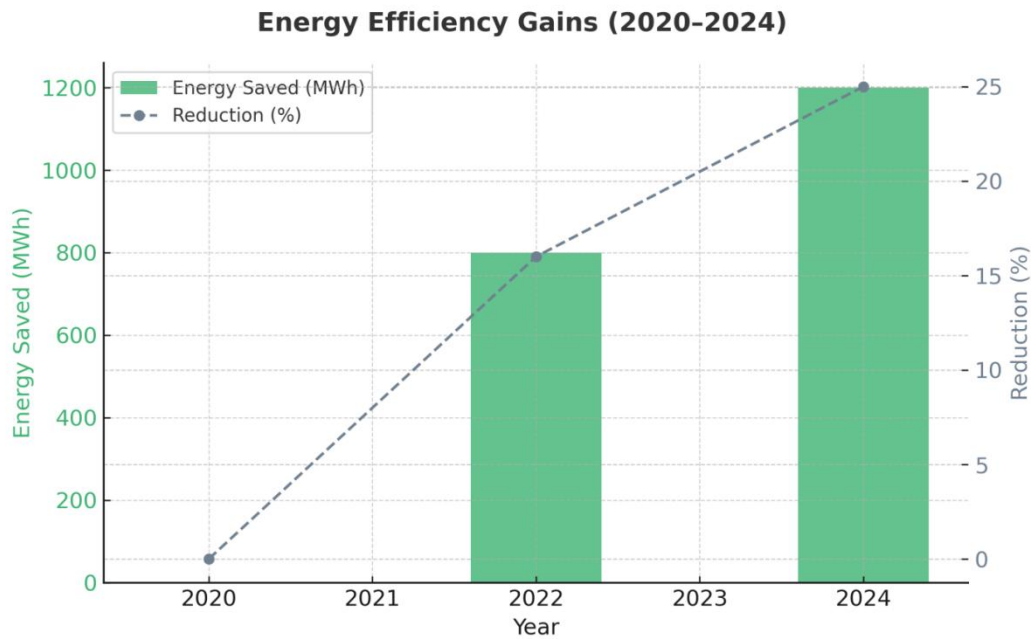
#### Governance Mechanism:

- **Energy Planning Committee (EPC):** Annual audits and energy performance tracking.
- **Smart Campus Monitoring:** IoT-enabled dashboards across 5 campuses.
- **Green Procurement Policy:** Prioritization of high-efficiency electrical and HVAC systems.

#### Scope Reporting:

Centurion University adheres to the Business Responsibility and Sustainability Reporting framework for Scope 1 & 2 emissions under India's Corporate Carbon Target System (CCTS).

- Scope 1 (Direct Emissions): Campus generators, biogas plants, and vehicles.
- Scope 2 (Indirect): Purchased electricity.
- Scope 3 (Value Chain): Monitored under pilot study (2025 onwards).



### 3. Energy Efficiency Infrastructure (2024)

Component	Description	2024 Status	Target 2030	SDG Link
<b>Clean Energy Infrastructure</b>	Rooftop & ground-mounted solar + microgrids	1.25 MWp	2.0 MWp	7.2 / 13.2
<b>Energy Saved through LEDs, HVAC, Smart Controls</b>	Campus-wide retrofitting	1.2 GWh/yr	2.0 GWh/yr	7.3
<b>Renewable Energy Share</b>	% of total campus energy	42%	80%	7.2
<b>CO<sub>2</sub> Emission Reduction</b>	Annual avoided emissions	1,450 tCO <sub>2</sub> e	Net Zero 2035	13.2
<b>EV Integration</b>	EVs & charging points	75 EVs / 16 points	100 / 25	7.3 / 13.2

Component	Description	Target Outcome
<b>1. Clean Energy Infrastructure</b>	<ul style="list-style-type: none"> <li>● Installation of decentralized solar microgrids, solar street lights, and rooftop panels in rural areas.</li> </ul>	<ul style="list-style-type: none"> <li>● Reduce grid dependency and provide reliable, clean electricity to underserved communities.</li> </ul>
<b>2. Solar-Powered Irrigation Systems</b>	<ul style="list-style-type: none"> <li>● Deployment of solar pumps and drip irrigation systems for small and marginal farmers.</li> </ul>	<ul style="list-style-type: none"> <li>● Enhance agricultural productivity while reducing water and energy usage.</li> </ul>
<b>3. Solar Dryers and Food Processing</b>	<ul style="list-style-type: none"> <li>● Provision of portable solar dryers to women SHGs and fisherwomen for drying fish, fruits, and vegetables.</li> </ul>	<ul style="list-style-type: none"> <li>● Improve product shelf life, reduce post-harvest losses, and generate additional income.</li> </ul>
<b>4. LED Lighting and Smart Appliances</b>	<ul style="list-style-type: none"> <li>● Replacement of conventional lighting with energy-efficient LED bulbs, smart fans, and IE3 motors.</li> </ul>	<ul style="list-style-type: none"> <li>● Reduce household and institutional energy consumption.</li> </ul>
<b>5. Skill Development &amp; Training</b>	<ul style="list-style-type: none"> <li>● Training local youth and SHGs in solar installation, maintenance, and energy auditing.</li> </ul>	<ul style="list-style-type: none"> <li>● Build green livelihood opportunities and ensure local support for energy systems.</li> </ul>
<b>6. Partnerships and Financing Models</b>	<ul style="list-style-type: none"> <li>● Collaboration with NGOs, CSR partners, and government schemes (e.g., PM-KUSUM, UJALA) for funding and scalability.</li> </ul>	<ul style="list-style-type: none"> <li>● Ensure affordability, accessibility, and expansion of clean energy solutions.</li> </ul>
<b>7. Digital Monitoring and Feedback</b>	<ul style="list-style-type: none"> <li>● Use of IoT and IT-enabled platforms to track energy use, system maintenance, and user feedback.</li> </ul>	<ul style="list-style-type: none"> <li>● Improve transparency, system performance, and community satisfaction.</li> </ul>
<b>8. Community Awareness Campaigns</b>	<ul style="list-style-type: none"> <li>● Conduct workshops, street plays, and demo sessions on the benefits of clean energy and conservation.</li> </ul>	<ul style="list-style-type: none"> <li>● Increase awareness and adoption of sustainable energy practices at the grassroots level.</li> </ul>
<b>9. Sustainable Agricultural Practices</b>	<ul style="list-style-type: none"> <li>● Promotion of solar polyhouses, water-efficient irrigation, and reduced chemical inputs for climate-resilient farming.</li> </ul>	<ul style="list-style-type: none"> <li>● Reduce agricultural carbon footprint and enhance farmer incomes.</li> </ul>
<b>10. Policy Alignment &amp; Reporting</b>	<ul style="list-style-type: none"> <li>● Align projects with SDG-7, SDG-11, and NEP 2020, and prepare documentation for audits, academic research, and replication.</li> </ul>	<ul style="list-style-type: none"> <li>● Ensure compliance, showcase impact, and build a replicable model of sustainable rural development.</li> </ul>

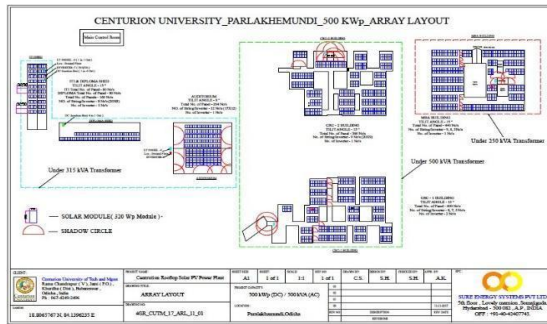


Fig-01: Solar Panels Array Layout at Centurion University

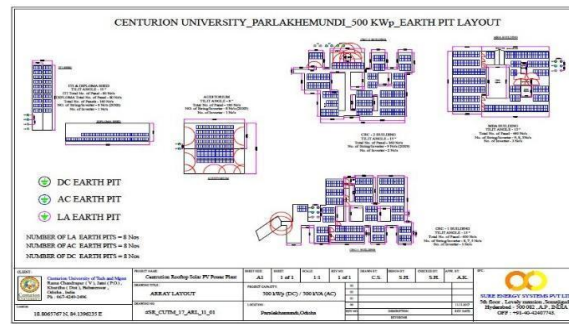


Fig-02: Solar Panel Earth Layout at Centurion University



Fig-01 Centurion University PV array at top of Building



Fig-02: Solar Panels Fixed in the top of the Main Building at Centurion University

## 4. Energy Efficiency Interventions

### 4.1 Clean Energy Systems

- Solar Microgrids: Decentralized units for hostels, labs, and academic blocks.
- Solar Trees: 10 functional across campuses powering LED corridors and EV stations.
- Biogas Units: 250 kg/day organic waste → 20 kWh/day renewable power (~5 tCO<sub>2</sub>e avoided).

### 4.2 Energy-Efficient Campus Infrastructure

- LED Replacement: >4,000 fixtures replaced, saving 80% lighting energy.

- Smart HVAC: Central optimization yielding 18% efficiency gain.
- Green Buildings: 30% lower energy intensity through daylighting, natural ventilation, and micro-forests.

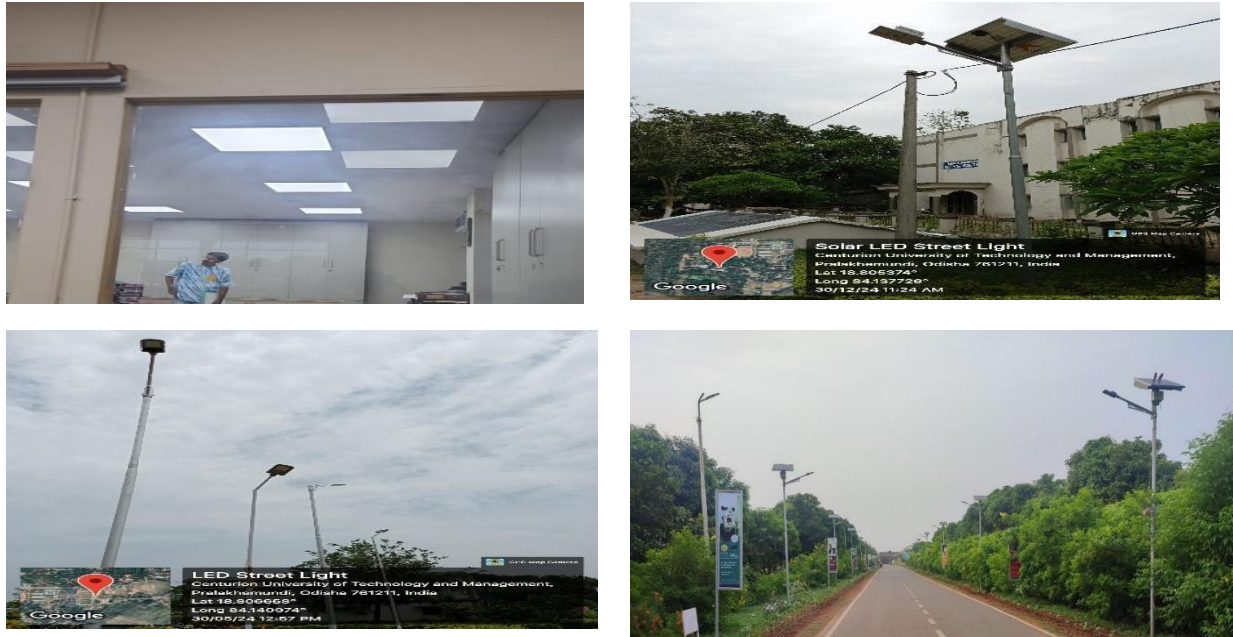


Fig:03 Solar Street Lights, LEDs Installed inside the Campus

### 4.3 IoT-Based Smart Energy Management

- Real-time dashboards for solar generation, energy consumption, and carbon metrics.
- Predictive maintenance alerts for grid stability and energy optimization.

## 5. Community and Research Linkages

Centurion University extends energy efficiency learning through **research, demonstration, and rural outreach.**

- Solar-Powered Agricultural Systems: Over 20 solar irrigation and 10 solar dryer units installed for local farmers.
- Smart Polyhouses: IoT-enabled domes reducing energy use by 40–50%.
- Student Training: 250+ students trained in renewable energy auditing and installation (2024).
- Women SHG Training: 100+ women trained under solar entrepreneurship programs (linked with OSDA).

## 6. Monitoring & Impact Summary (2024)

Indicator	2020 Baseline	2024 Value	Target 2030	Unit	% Change (2020–2024)
Renewable Share	15%	42%	80%	%	+180%
Energy Saved	–	1.2	2.0	GWh	—
Grid Import	4,000	2,300	1,000	MWh	–43%
CO <sub>2</sub> Avoided	500	1,450	Net Zero	tCO <sub>2</sub> e/yr	+190%
EV Integration	10	75	100	Vehicles	+650%

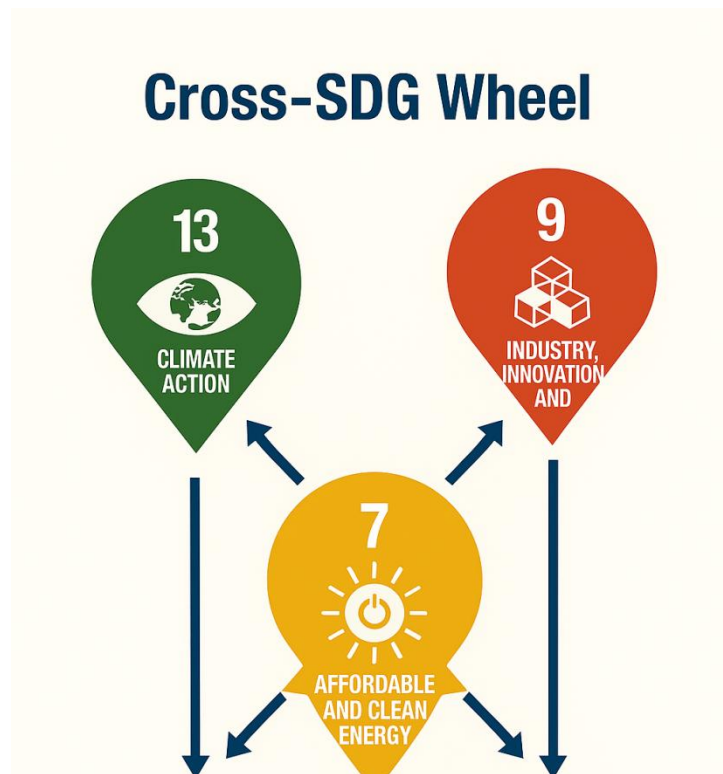
## 7. Cross-SDG Integration

### SDG 7 ↔ SDG 9 (Innovation):

Smart Microgrid R&D Lab, 2 patents on energy analytics, 3 clean-tech start-ups incubated.

### SDG 7 ↔ SDG 13 (Climate Action):

Renewable generation avoids 1,450 tCO<sub>2</sub>e annually under the university's Carbon Neutrality Roadmap (2035).



## **8. Future Roadmap (2025–2035)**

- 2 MWp Solar by 2028.
- Full EV campus fleet by 2030.
- Carbon-neutral certification by 2035.

## **9. Conclusion**

Centurion University's institutional energy efficiency plan demonstrates a data-driven, multi-layered approach integrating technology, education, and outreach. With measurable progress toward renewable energy, reduced grid dependency, and emission mitigation, the university stands as a national model for energy-smart campuses advancing SDG 7 and its interlinked goals.