Centurion
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Institutional Monitoring and Assessment of Low-Carbon Energy Consumption

Measure the amount of low carbon energy used across the university

Centurion University, for all its six campuses in Odisha, has strengthened its institutional framework for measuring, tracking, and reporting low-carbon energy usage across all campuses The University integrates renewable energy systems, smart monitoring infrastructure, energy audits, and climate-responsive dashboards to ensure accountability and continuous improvement.

Measurement Approach

- Smart Meters & Dashboards – All rooftop solar systems and energy-efficient infrastructure are connected with smart meters for real-time monitoring.
- Annual Energy Audits – Campus-wide audits assess grid electricity consumption, renewable contribution, and efficiency gains.
- Aurassure Integration – Environmental monitoring systems are integrated with campus energy dashboards for sustainability planning.
- Low-Carbon Infrastructure – LED retrofits, HVAC optimization, solar-powered irrigation systems, EV charging stations, and smart agriculture systems contribute to low-carbon transition.
- Digital Monitoring – Centralized dashboards track campus energy performance and renewable share progression.
- Energy-efficiency measures are implemented separately from low-carbon energy accounting. These include LED lighting, smart controls, HVAC optimisation, building automation, occupancy/daylight controls and energy-efficient equipment.

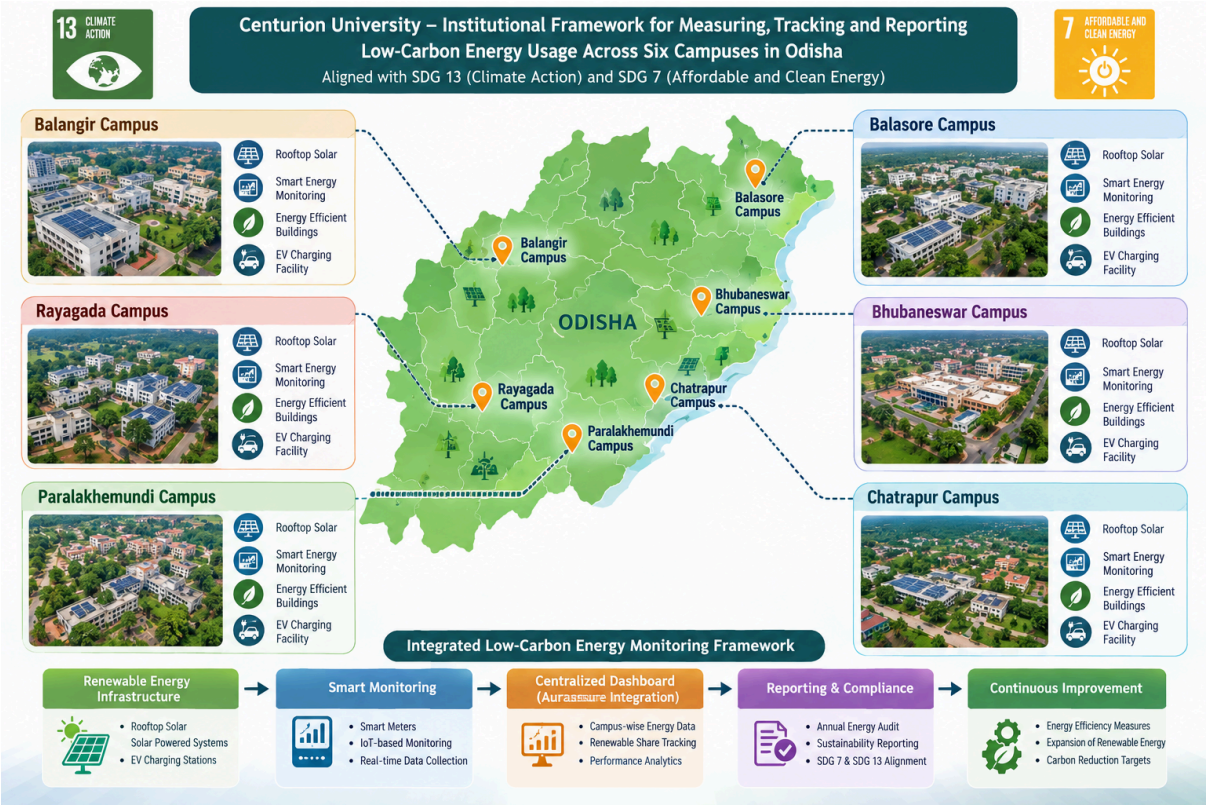
2025 Progress:

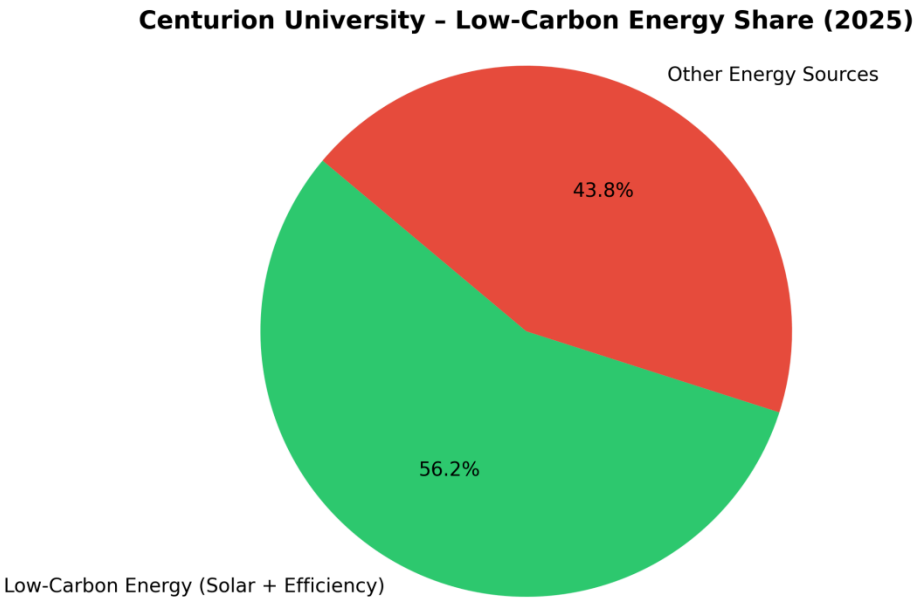
- Total Electricity Consumption: ~8.99 GWh (32364 GJ)
- Low-Carbon Energy: ~5.05 GWh (18180 GJ)
- Low-Carbon Energy Share: 56.17% of total consumption
- The University's 2025 documentation reports an estimated 30–40% reduction in lighting electricity consumption associated with LED and related efficiency interventions.
- 150+ kW rooftop solar added across campuses.
- Expansion of EV charging infrastructure and solar-integrated smart agriculture systems
- Verified through annual energy audit and Annual Sustainability Report (2025)

2025 Enhancements Implemented

- Integration of EV charging stations to support green mobility transition
- Biochar production system introduced for carbon sequestration and waste-to-wealth initiatives
- Food waste-to-energy and bioenzyme systems expanded under circular economy initiatives

- IoT-based vanilla dome automation and speed breeding chambers integrated with renewable systems
- Advanced energy dashboards deployed for real-time monitoring and reporting
- Expansion of climate literacy and sustainability-linked student projects





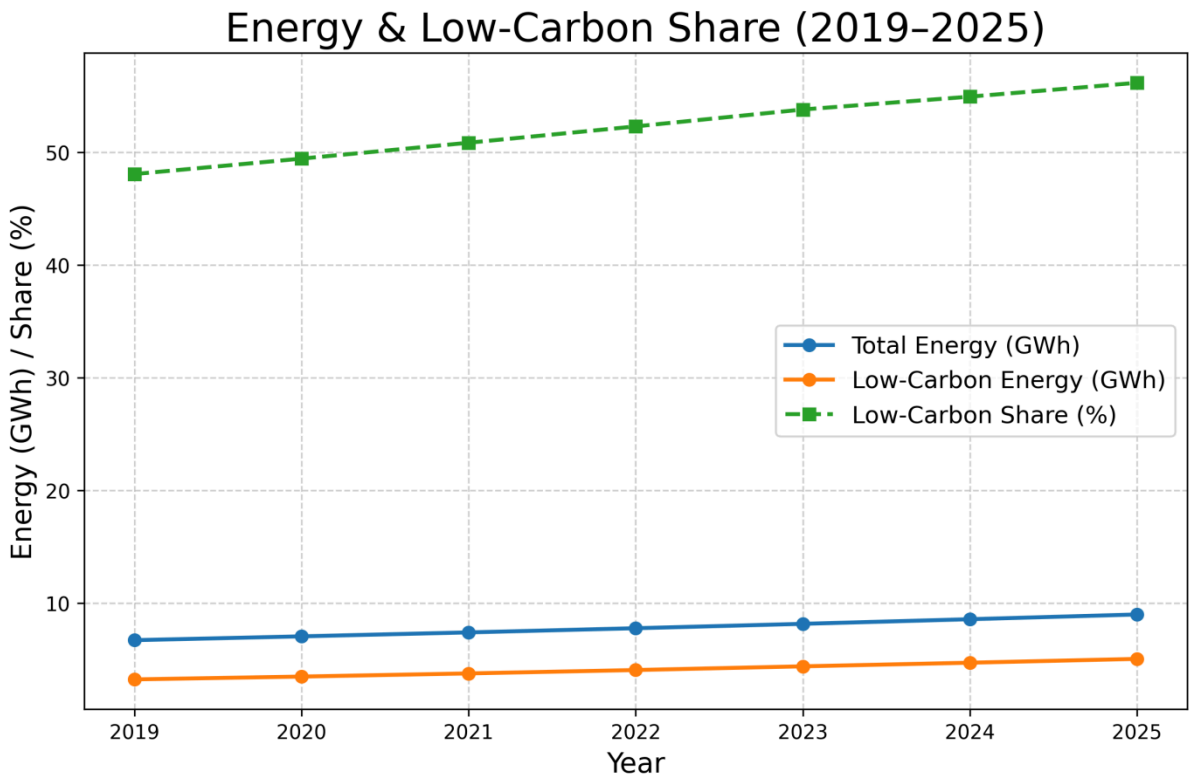


Table: Energy & Low-Carbon Share (2019–2025)

Year	Total Energy (GWh)	Total Energy (GJ)	Low-Carbon Energy (GWh)	Low-Carbon Energy (GJ)	Low-Carbon Share (%)
2019	6.71	24156	3.23	11628	48.07
2020	7.05	25380	3.48	12528	49.44
2021	7.4	26,640	3.76	13536	50.85
2022	7.77	27972	4.06	14616	52.30
2023	8.16	29376	4.39	15804	53.80
2024	8.57	30852	4.71	16956	54.94
2025	8.99	32364	5.05	18,180	56.17

Trend: The University's low-carbon energy share increased from **48.07% in 2019 to 56.17% in 2025**, representing an increase of approximately **8.1 percentage points**, despite growth in overall institutional energy demand.

Projection of Energy Use and Low-Carbon Transition (2025–2035)

Centurion University has developed a long-term roadmap for sustainable energy transition aligned with SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action). Based on verified 2025 institutional energy audit data, the University projects a gradual increase in overall energy demand due to campus expansion, advanced research infrastructure, digital learning systems, smart agriculture technologies, EV charging systems, and increased residential occupancy across campuses.

Simultaneously, the University aims to significantly enhance its renewable and low-carbon energy contribution through solar expansion, energy-efficient systems, smart monitoring, and sustainable infrastructure upgrades. In 2025, the University recorded approximately 8.99 GWh of total electricity consumption, of which approximately 5.05 GWh was derived from renewable and low-carbon sources, contributing to a 56.17% low-carbon energy share. Through phased implementation of rooftop solar systems, smart energy management, energy-efficient appliances, LED retrofits, solar-powered irrigation systems, and EV charging infrastructure, the University projects continuous growth in renewable energy contribution till 2030 and 2035. The institution plans to expand decentralized solar infrastructure across multiple campuses, integrate advanced smart metering systems, deploy AI-assisted energy optimization tools, and strengthen waste-to-energy and bioenergy initiatives including biochar and biogas systems. The roadmap also includes sustainable transportation interventions through electric mobility integration and solar-assisted charging stations.

Projected Energy Transition Roadmap

Year	Projected Total Energy Use (GWh)	Projected Low-Carbon Energy (GWh)	Projected Low-Carbon Share (%)
2025	8.99	5.05	56.17
2030	10.50	7.10	67.62
2035	12.20	9.40	77.05

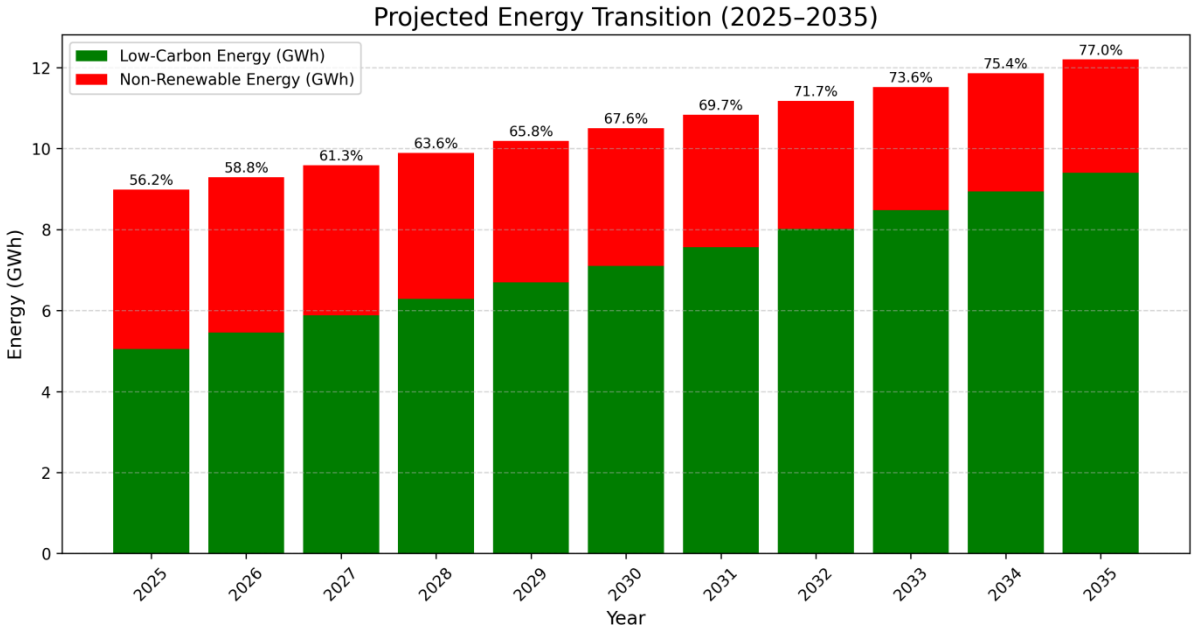
The University anticipates that by 2030, nearly two-thirds of institutional energy demand will be supported through renewable and low-carbon systems. By 2035, CUTM targets more than 75% low-carbon energy integration through a combination of solar expansion, smart energy management, energy-efficient infrastructure, and decentralized sustainable technologies. This projected transition is expected to significantly reduce institutional greenhouse gas emissions, strengthen energy resilience, reduce dependence on conventional grid electricity, and support the University's long-term carbon neutrality and climate action commitments. The roadmap also supports experiential learning, sustainability research, and community demonstration models through the CUCAF framework and campus living laboratories.

The projections are based on:

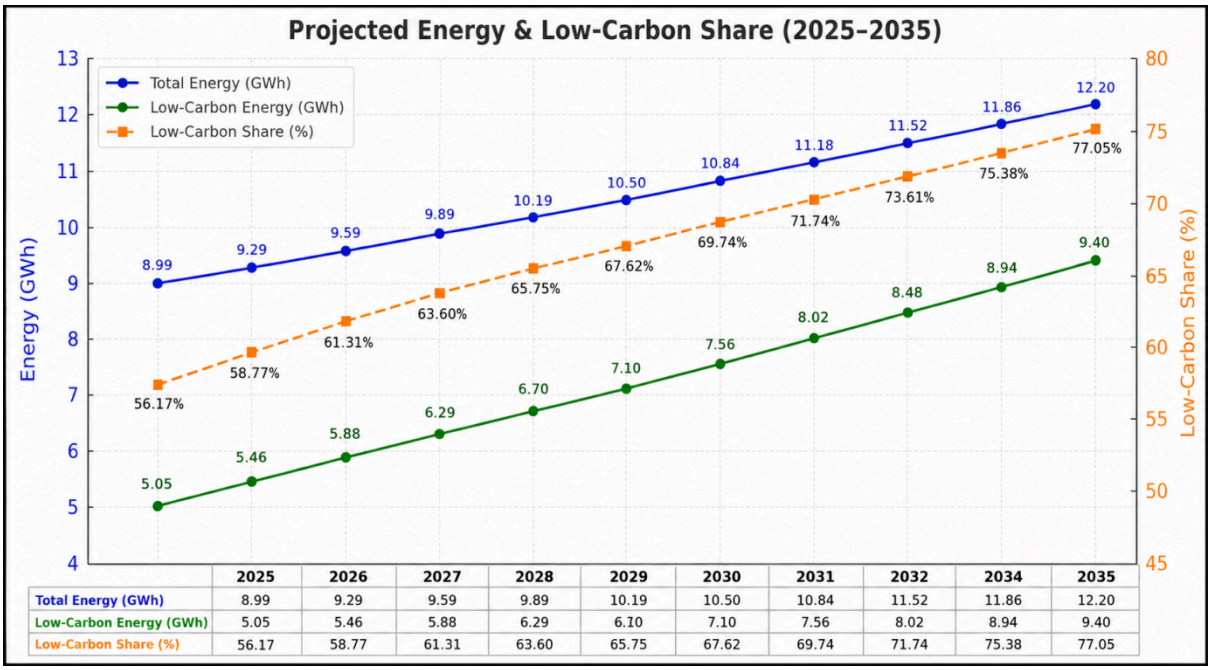
- Verified 2025 institutional energy audit data
- Campus infrastructure expansion trends
- Planned renewable energy installations
- Smart campus and EV integration plans
- Annual sustainability and carbon reduction targets
- Low-carbon technology deployment roadmap

These projections demonstrate Centurion University's commitment toward measurable, data-driven, and scalable climate action aligned with global sustainability frameworks and institutional carbon neutrality goals.

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Year	Total Energy (GWh)	Total Energy (GJ)	Low-Carbon Energy (GWh)	Low-Carbon Energy (GJ)	Low-Carbon Share (%)
2025	8.99	32364	5.05	18180	56.17
2026	9.29	33444	5.46	19656	58.77
2027	9.59	34524	5.88	21168	61.31
2028	9.89	35604	6.29	22644	63.60
2029	10.19	36684	6.70	24120	65.75
2030	10.50	37800	7.10	25560	67.62
2031	10.84	39024	7.56	27216	69.74
2032	11.18	40248	8.02	28872	71.74
2033	11.52	41472	8.48	30528	73.61
2034	11.86	42696	8.94	32184	75.38
2035	12.20	43920	9.40	33840	77.05



	2025	2026	2027	2028	2029	2030	2031	2032	2034	2035
Total Energy (GWh)	8.99	9.29	9.59	9.89	10.19	10.50	10.84	11.52	11.86	12.20
Low-Carbon Energy (GWh)	5.05	5.46	5.88	6.29	6.10	7.10	7.56	8.02	8.94	9.40
Low-Carbon Share (%)	56.17	58.77	61.31	63.60	65.75	67.62	69.74	71.74	75.38	77.05

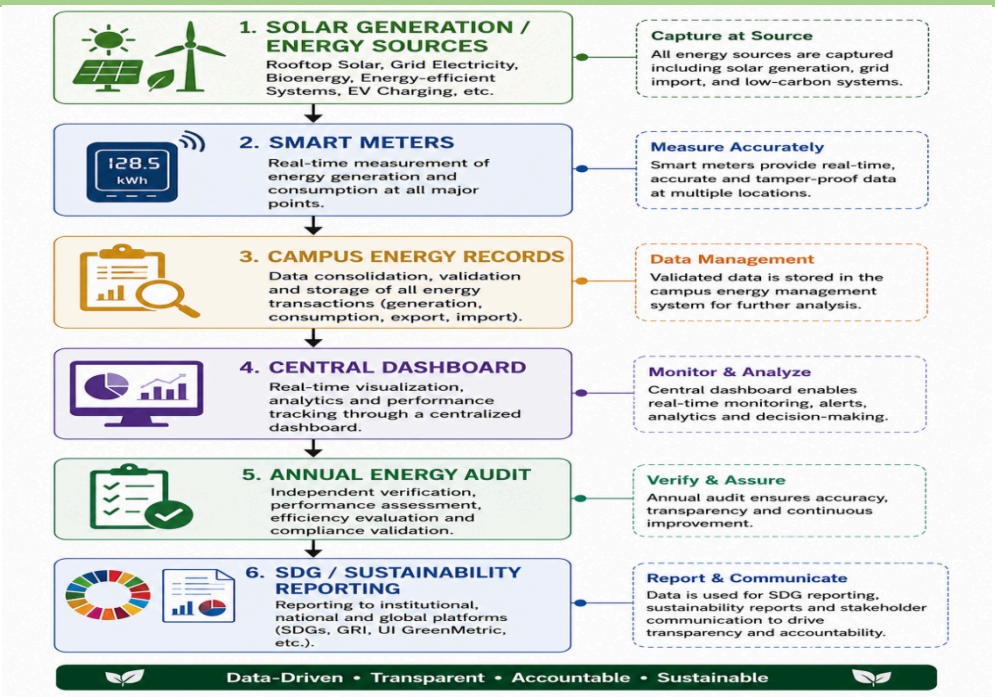
Community and Academic Integration

- Energy data used in student projects, climate literacy modules, and sustainability research
- Shared with local government bodies and DISCOM authorities through CUCAF framework.
- Supports climate-smart agriculture demonstrations and renewable energy training.
- Integrated into institutional sustainability reporting and SDG monitoring systems
- **CALP for Problem Solving:** CUTM's CALP initiative can provide a platform for students to engage with real-world community challenges related to climate change, energy conservation, renewable energy adoption, and sustainable development.
- **Experiential Learning:** Students can apply academic knowledge through community-based projects, energy-awareness activities, and practical demonstrations of low-carbon technologies.
- **Community Outreach:** Climate literacy and energy-efficiency awareness activities can be undertaken with farmers, local communities, self-help groups, and other stakeholders, subject to documented programme activities.
- **Research and Innovation:** Campus energy data and low-carbon technology demonstrations can support student projects, applied research, and innovative solutions for reducing energy-related emissions.
- **SDG Alignment:** CALP activities can contribute to SDG 13 (Climate Action) and SDG 7 (Affordable and Clean Energy), with outcomes documented through participation records, project reports, outreach activities, and measurable results where available.

The University not only measures its low-carbon energy use but also reports and validates it annually, with 2025 data showing that over half (56.17%) of total campus energy now comes from low-carbon

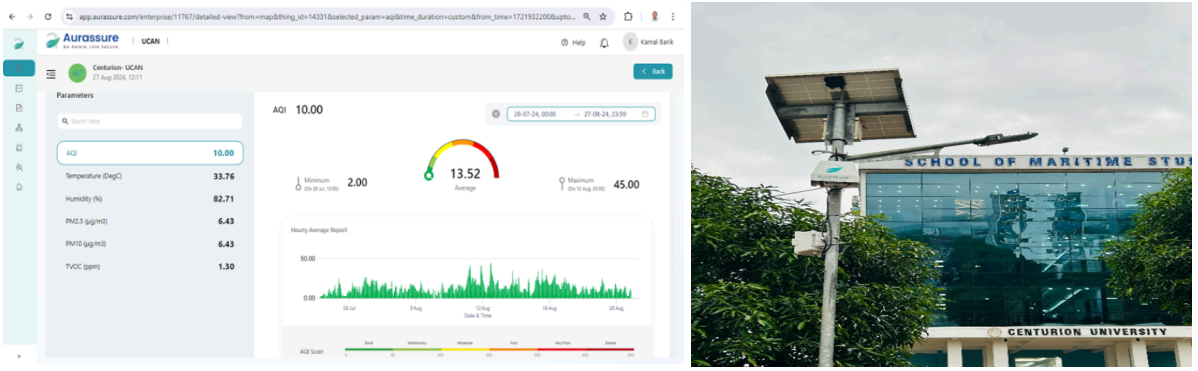
sources. This tracking mechanism underpins both institutional climate targets (carbon neutrality by 2035) and broader SDG 13 commitments.

Real-Time Environmental Monitoring at Centurion University



The Aurassure environmental monitoring system has been set up within the campus of Centurion University as part of its commitment to climate resilience and sustainability. By leveraging real-time, sensor-based data on air quality, weather, water, and noise levels, the system enables the university to monitor its environmental footprint, support smart infrastructure planning, and provide actionable insights for energy conservation and disaster preparedness. The system continuously monitors and records crucial indicators such as air temperature (°C), humidity (%), particulate matter (PM2.5 and PM10 in µg/m³), and total volatile organic compounds (TVOC in PPM)—with updates captured every minute.

This on-campus deployment serves not only as a live lab for students and researchers but also as a strategic tool for community outreach, policy advocacy, and collaboration with local authorities and NGOs working on climate action.



Aurassure system installed inside the Campus

Energy Data Coverage, Calculation Method and Verification

Centurion University tracks institutional energy consumption and low-carbon energy contribution through energy records, smart-meter monitoring, renewable-energy data and periodic energy audits. For the 2025 reporting period, the reported institutional energy consumption was approximately 8.99 GWh (32,364 GJ), while the reported low-carbon energy contribution was 5.05 GWh (18,180 GJ), equivalent to 56.17% of total energy consumption.

The low-carbon share is calculated as the low-carbon energy contribution divided by total energy consumption, multiplied by 100. To support transparent reporting, the University should maintain a source-wise breakdown of renewable and other eligible low-carbon energy, distinguish energy generated from energy consumed, and separately record electricity savings resulting from energy-efficiency measures.

The annual reporting record should identify the campuses and energy sources covered, the reporting period, meter and audit records used, and any estimation or data gaps. Historical performance is reported separately from future projections. The reported 2025 results provide the baseline for the University's projected low-carbon energy shares of 67.62% by 2030 and 77.05% by 2035.