

ENERGY AUDIT REPORT



Kristu Jayanti (Deemed to be University) Bengaluru

PREPARED BY

NISARGA

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Energy Audit Report

**Kristu Jayanti
(Deemed to be University),
Bengaluru**

By,

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ENERGY AUDIT CERTIFICATE

This Certificate is Presented to

**Kristu Jayanti
(Deemed to be University)
Bengaluru**

Our team of Environmental Engineers have analyzed Clean and Green Energy practices followed by the Institution.



PRADEEP N V

B.E., M.TECH. (ENV. ENGG.)

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AUDIT PERIOD: : 2024 - 2025



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Acknowledgement

We express our gratitude for calling upon us for this audit, mainly the Kristu Jayanti (Deemed to be University), Vice Chancellor Rev. Fr. Dr. Augustine George who was the driving force behind this work. Green Audit Committee members, Green Audit Committee and all the team members, who were ever helpful and supported us with all the inputs needed for this audit. We thank all the teaching, non-teaching and students for helping us in conducting this audit.

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About the Institute

Kristu Jayanti (Deemed to be University), formerly Kristu Jayanti College (Autonomous), Bengaluru, was established in 1999 and is recognized under Section 3 of the UGC Act, 1956. Managed by the Carmelites of Mary Immaculate (CMI), the University offers 62 programmes across Arts, Science, Management, Commerce, and Law through 17 departments under 6 schools. The institution is NAAC reaccredited with an 'A++' grade (CGPA 3.78) and ranked 34th in NIRF 2025. With DBT Star College status and ACBSP-accredited management programmes, the University is known for academic excellence, innovation, and holistic development. Today, it stands as a vibrant centre of learning with 650+ faculty members, 15,000+ students, and a 50-acre green campus.

Vision

'Light and Prosperity': To provide intellectual and moral leadership by igniting the minds of youth to realize their potential and make positive contributions leading to prosperity of the society and the nation at large.

Mission

To provide educational opportunities to all aspiring youth to excel in life by nurturing academic excellence, fostering values, creating civic responsibility, inculcating environmental concern and building global competencies in a dynamic environment.

Introduction to Institutional Energy Audit

In accordance with the National Assessment and Accreditation Council (NAAC) framework, which emphasizes sustainability, environmental responsibility, and efficient resource utilization, the Energy Audit functions as a vital quality assurance mechanism within the institution. Educational institutions operate as complex systems with continuous energy demand arising from academic infrastructure, laboratories, libraries, hostels, administrative offices, and auxiliary services. The increasing scale of operations necessitates a structured approach to energy management to ensure optimal utilization, reduced environmental impact, and long-term financial sustainability.

The Energy Audit provides a comprehensive evaluation of energy consumption patterns across the campus, enabling the institution to identify inefficiencies, minimize wastage, and enhance operational performance. This initiative reflects the institution's proactive commitment to sustainable development, climate action, and responsible consumption, thereby contributing to both national priorities and global sustainability agendas.

Methodology and Phases of Energy Audit

The Energy Audit was carried out using a systematic and phased methodology to ensure reliability, accuracy, and relevance of findings.

Phase I: Preliminary Energy Audit

This phase involved a walk-through assessment of the campus to gain an overall understanding of energy usage patterns. Key activities included:

- Review of historical electricity consumption data
- Identification of major energy-consuming areas and equipment
- Observation of operational and behavioral practices influencing energy use

- Identification of immediate and low-cost opportunities for energy conservation

Phase II: Detailed Energy Audit

The detailed audit phase focused on in-depth analysis and evaluation, including:

- Detailed examination of electrical systems and connected loads
- Analysis of operational schedules and equipment efficiency
- Assessment of energy-intensive processes across academic and residential facilities
- Evaluation of renewable energy potential and long-term efficiency improvements

This structured methodology ensured that the audit outcomes were data-driven and aligned with institutional sustainability objectives.

Need and Relevance of Energy Audit

The conduct of an Energy Audit is a critical component of institutional governance and sustainability, as emphasized under quality benchmarks and the United Nations Sustainable Development Goals. The audit supports the institution in multiple dimensions:

- **Energy Accountability:** Enables systematic monitoring and documentation of energy consumption patterns.
- **Operational Excellence:** Identifies inefficiencies in infrastructure and operational practices, facilitating informed decision-making.
- **Environmental Stewardship:** Supports reduction of greenhouse gas emissions and mitigation of climate change impacts.
- **Financial Sustainability:** Helps optimize recurring expenditure and enhances cost-effectiveness of operations.

- Global Alignment: Reinforces the institution's contribution to international sustainability goals and responsible institutional practices.

Goals and objectives of Energy Audit

1. Comprehensive Energy Profiling: To document and analyze energy consumption across academic blocks, laboratories, hostels, administrative units, and common facilities.
2. Efficiency Improvement: To identify avoidable losses and promote energy-efficient systems and practices.
3. Renewable Energy Orientation: To assess institutional readiness and potential for adoption of renewable energy sources.
4. Stakeholder Sensitization: To encourage responsible energy usage through awareness and participation of students, faculty, and staff.

Objectives of the Energy Audit

1. Consumption Analysis: Detailed evaluation of electricity bills, metering data, and equipment usage patterns to understand demand trends.
2. Performance Benchmarking: Comparison of institutional energy consumption with prescribed norms and best practices followed by similar institutions.
3. Resource Optimization: Identification of opportunities for reducing energy intensity through technological upgrades and improved operational control.
4. Sustainability Education: Integration of energy conservation awareness into institutional culture and daily practices.

Benefits of Energy Audit

The Energy Audit offers multifaceted benefits aligned with quality indicators and global sustainability principles:

- **Economic Benefits:** Reduction in electricity expenditure through improved efficiency and elimination of wastage.
- **Infrastructure Sustainability:** Enhanced operational lifespan of electrical and mechanical systems through optimized usage.
- **Regulatory Compliance:** Adherence to statutory requirements related to energy efficiency and environmental protection.
- **Institutional Culture:** Development of a campus-wide culture that values conservation, efficiency, and sustainability.
- **Reputation and Visibility:** Strengthening of institutional credibility as a socially responsible and environmentally conscious organization.

Alignment with United Nations Sustainable Development Goals (UN SDGs)

The Energy Audit initiative strongly aligns with the following UN Sustainable Development Goals:

SDG 7 – Affordable and Clean Energy

The audit promotes efficient energy use and encourages the adoption of renewable energy sources, contributing to affordable, reliable, and sustainable energy access within the campus.

SDG 9 – Industry, Innovation, and Infrastructure

By assessing and improving energy infrastructure, the institution fosters resilient systems and encourages the integration of modern, energy-efficient technologies.

SDG 11 – Sustainable Cities and Communities

The campus functions as a micro-community. Optimizing energy usage supports sustainable campus development and responsible urban resource management.

SDG 12 – Responsible Consumption and Production

The audit emphasizes judicious use of energy resources, reduction of wastage, and promotion of sustainable consumption patterns among stakeholders.

SDG 13 – Climate Action

Through reduced energy consumption and carbon emissions, the institution actively contributes to climate change mitigation and environmental protection efforts.

Executive Summary of Energy Audit

The Energy Audit conducted at the institution provided a comprehensive assessment of energy consumption across academic, residential, and administrative facilities. The audit highlighted existing consumption patterns, identified areas of inefficiency, and emphasized the need for systematic energy management. The initiative demonstrates the institution's commitment to sustainable development, environmental responsibility, and continuous quality improvement as envisaged by global sustainability frameworks.

Expected Outcomes and Institutional Impact

Economic Impact: Significant reduction in annual energy expenditure through improved efficiency.

Environmental Impact: Measurable reduction in carbon footprint, supporting green campus initiatives.

Operational Impact: Improved reliability and performance of energy systems, resulting in reduced maintenance burden.

Academic and Social Impact: Enhanced awareness and participation of students and staff in sustainability initiatives, contributing to holistic institutional development.

Audit Methodology

The Green, Energy, and Environment Audit was conducted in three systematic phases:

- Submission of Audit Questionnaire to the Institution
- Campus walkthrough and Data Analysis
- Report Preparation and Submission

Step 1: Submission of audit questionnaire

A comprehensive audit questionnaire was provided to the key stakeholders of the institution to facilitate data collection. The questionnaire covered the following domains:

- Institutional details
- Infrastructure specifications
- Waste management practices
- Energy management systems
- Eco-club structure and activities
- Water resource management
- Green cover and biodiversity details

Data collection was conducted in collaboration with the institution's teaching and non-teaching staff, ensuring comprehensive and accurate responses.

Step 2: Campus walkthrough and data analysis

A thorough Campus walkthrough (physical inspection) of the institution was undertaken to assess various campus facilities. This included identifying resource consumption patterns, evaluating waste management practices, and examining best practices such as rainwater harvesting and solar power systems.

Institutional representatives actively participated during the inspection process, demonstrating enthusiasm and a proactive approach in understanding and adopting the recommendations provided.

Initial meeting was conducted before starting Campus walkthrough. Subsequently, with the support of Mr. Binu with his team and our team conducted a detailed campus tour to collect essential data and perform a thorough assessment.

Step 3: Report Preparation and Submission

The audit process was completed within one month. The collected data was meticulously analyzed by the expert team at Nisarga Eco Consultants. A detailed audit report, including observations and actionable recommendations, will be submitted to the institution for implementation.

Infrastructure and college details

- The institution is equipped with adequate and well-planned infrastructure to effectively support both curricular and co-curricular activities. The campus comprises a comprehensive range of academic, administrative, and support facilities, including classrooms, auditoria, library, departmental rooms, staff rooms, laboratories, and designated ladies' rooms.
- The library is adequately stocked with sufficient reading and reference materials to meet student academic requirements. Administrative areas such as the administrative office, Principal's chamber, office rooms, and departmental offices are strategically located and are well ventilated, ensuring a conducive working environment.
- The institution is supported by a reliable water supply system comprising borewells, underground water tanks, and overhead water storage tanks.
- Information and Communication Technology (ICT) infrastructure is robust, with a total of 1,774 computers installed across offices, the principal's chamber, departmental rooms, and the library. These systems are supported by high-speed internet connectivity through four leased ISP lines with bandwidth capacities of 500 Mbps, 200 Mbps, 200 Mbps, and 100 Mbps, ensuring seamless digital access across the campus.
- The campus spans an area of 185,649.7 sq. m, with a built-up area of 74,702.2 sq. m. The institute houses 188 classrooms and 38 staff rooms comprising a total of 748 cabins. Additionally, there are 60 well-equipped and adequately ventilated laboratories catering to various academic disciplines.
- The institution also offers extensive facilities for academic interaction and events, including 12 auditoria, 4 conference halls, 5 conference rooms, 3

panel rooms, 3 council rooms, 2 training halls, along with specialized spaces such as a conclave hall, plenary hall, senate hall, board room, and discussion room. Two student lounges with adequate amenities are available for student use.

- To promote physical fitness and overall well-being, the campus is equipped with sports facilities and gymnasiums.

Energy Audit Details

Energy Management and Audit Overview

Energy auditing constitutes a critical component of sustainable infrastructure management in educational institutions. Given the scale and diversity of electrical loads—ranging from academic blocks and laboratories to administrative areas and support facilities—systematic evaluation of energy consumption is essential. Effective energy conservation directly contributes to the reduction of greenhouse gas emissions, operational costs, and dependence on conventional fossil-fuel-based power sources. Adoption of Bureau of Energy Efficiency (BEE) 5-star rated equipment and integration of renewable energy systems are key strategies employed to enhance overall energy efficiency within the campus.

Key Observations

- The institution receives its primary electrical supply from BESCO, supplemented by an on-site rooftop solar photovoltaic (PV) system, ensuring partial energy self-sufficiency.
- A grid-connected solar rooftop power plant has been commissioned as part of the institution's commitment to clean and sustainable energy generation. This initiative significantly reduces dependence on grid electricity and promotes the use of non-conventional energy sources.
- A total of 200 solar PV modules, each rated at 250 Wp (TATA make), have been installed, resulting in an aggregate installed capacity of 50 kWp. The system was commissioned on 23 January 2016. The electrical energy generated is utilized for internal campus consumption, with surplus power exported to the utility grid through net-metering arrangements.
- To ensure uninterrupted power supply during grid outages, the campus is equipped with four diesel generator (DG) sets of capacities 125 kVA, 200 kVA, 250 kVA, and 400 kVA. The average diesel consumption across all

DG sets is approximately 850 litres per month, indicating their use primarily as backup systems.

- The sanctioned contract demand for the institution is 750 kVA, under the HT-2C tariff category, applicable to educational institutions.
- A 1000 kVA power transformer, manufactured by Classic Technolines Pvt. Ltd., has been installed to adequately cater to the campus load requirements and ensure operational reliability.
- Energy-efficient lighting solutions have been widely adopted across the campus. Conventional lighting fixtures have been systematically replaced with LED bulbs and LED tube lights, resulting in substantial reductions in electrical energy consumption.
- The architectural design of the buildings effectively maximizes the use of natural daylight in classrooms, staff rooms, libraries, and common areas, thereby minimizing reliance on artificial lighting during daytime hours.
- To further optimize energy usage, over 234 automated sensor-based lighting systems have been installed in strategic locations such as corridors, washrooms, and low-occupancy areas.
- A comprehensive inventory detailing electrical and electronic equipment—including computers, laptops, printers, water pumps, elevators, and other utility systems—is documented and analyzed in subsequent sections of this report.

Recommendations

- The institution has already implemented several best-in-class energy conservation measures, reflecting a proactive approach toward optimal energy utilization and sustainability.
- To strengthen awareness and encourage responsible energy usage among students and staff, it is recommended that additional informational signage, posters, and energy-saving labels be displayed prominently in classrooms, laboratories, and common areas.

Table No. 1: Basic information regarding power supply and its management

Sl. No.	Parameters	Response
1.	Source of electricity. HESCOM/Solar panels	BESCOM/Solar
2.	If Solar, Type of Solar system (On Grid/Off Grid/Hybrid)	On grid
3.	No. of Solar Panels	200 panels
4.	Capacity of Solar Panels	250 W
5.	Solar Power Specifications (Area covered/Solar plant Capacity/year of installation etc.)	Tata power solar 50 kW and 10 kW 30.01.2016
6.	Transformer Capacity	500 kVA, 11kV / 433 V. ONAN
7.	Capacity of back generators	200 kVA, 125 kVA and 250 kVA
8.	Contract Demand	500 kVA
9.	Power factor correction	70 kVAR capacitor
10.	Type of connection	HT2C2

Solar Insolation Characteristics of Bengaluru, Karnataka

Solar insolation over Bengaluru refers to the quantity of solar energy incident on a horizontal surface, expressed as the monthly average of daily global solar radiation. This parameter is a critical indicator for evaluating the technical feasibility and performance potential of solar energy systems, including photovoltaic (PV) installations, solar thermal applications, and hybrid renewable energy solutions.

Definition of Solar Radiation

Solar radiation is the flux of electromagnetic energy emitted by the sun and transmitted through the Earth's atmosphere to the surface. For energy assessment purposes, it is commonly quantified in kilowatt-hours per square meter per day (kWh/m²/day). This metric represents the usable solar energy available for conversion into electrical or thermal energy.

Monthly Average Daily Solar Radiation

The monthly average daily solar radiation represents the mean solar energy received per day over the course of a specific month. This value integrates daily fluctuations and accounts for meteorological influences such as cloud cover, atmospheric moisture, aerosol concentration, and seasonal sun-angle variations. It serves as a standardized parameter for long-term solar resource assessment and system design optimization.

Solar Resource Potential of Bengaluru

Bengaluru is situated at a latitude of approximately 12.97° North, placing it within the tropical belt. This geographic advantage ensures relatively consistent solar availability throughout the year. The city's climatic classification as a tropical savanna climate further supports favorable conditions for solar energy

deployment, making Bengaluru a highly suitable region for rooftop and ground-mounted solar installations.

Determinants of Solar Radiation in Bengaluru

Latitude and Solar Geometry:

Bengaluru's proximity to the equator results in higher solar elevation angles and reduced seasonal variation in day length, thereby enabling steady solar radiation levels across most months of the year.

Seasonal Influence:

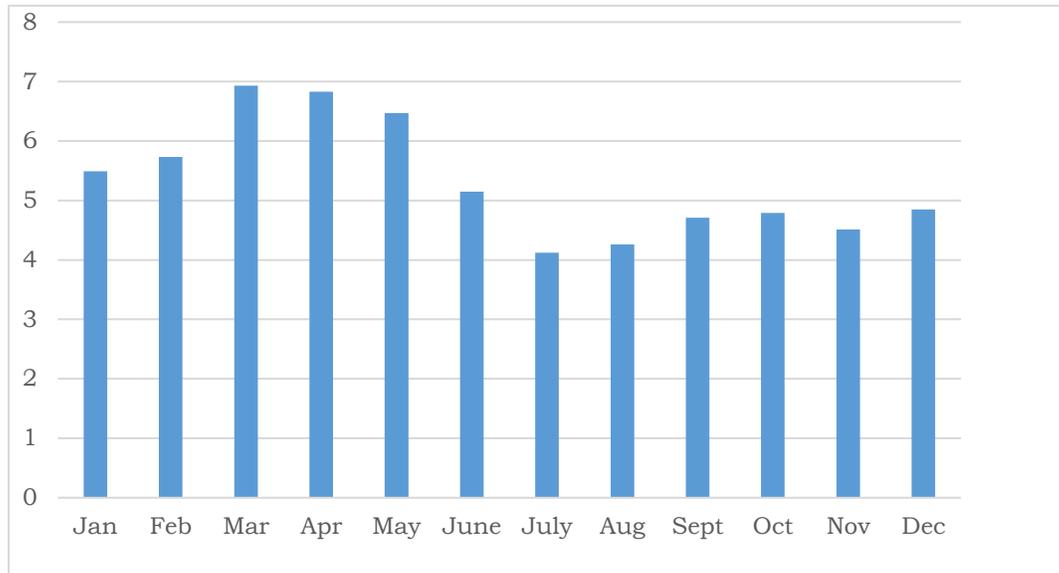
Solar radiation levels typically reach their maximum during the pre-monsoon summer months (March to May), attributed to clearer skies and extended sunshine duration. Conversely, during the southwest monsoon period (June to September), solar insolation decreases due to persistent cloud cover and frequent precipitation.

Atmospheric and Environmental Factors:

The transmission of solar radiation to the ground surface is influenced by atmospheric constituents such as suspended particulate matter, haze, humidity, and cloud density. Elevated air pollution levels and overcast conditions can attenuate incoming solar radiation, thereby impacting solar energy yield.

Typical Solar Insolation Levels for Bengaluru

The average daily global solar radiation over Bengaluru demonstrates moderate seasonal variability, remaining within a favourable range throughout the year. Monthly average values generally fall within 4.5 to 6.5 kWh/m²/day, indicating strong and reliable solar energy potential suitable for efficient photovoltaic system operation.

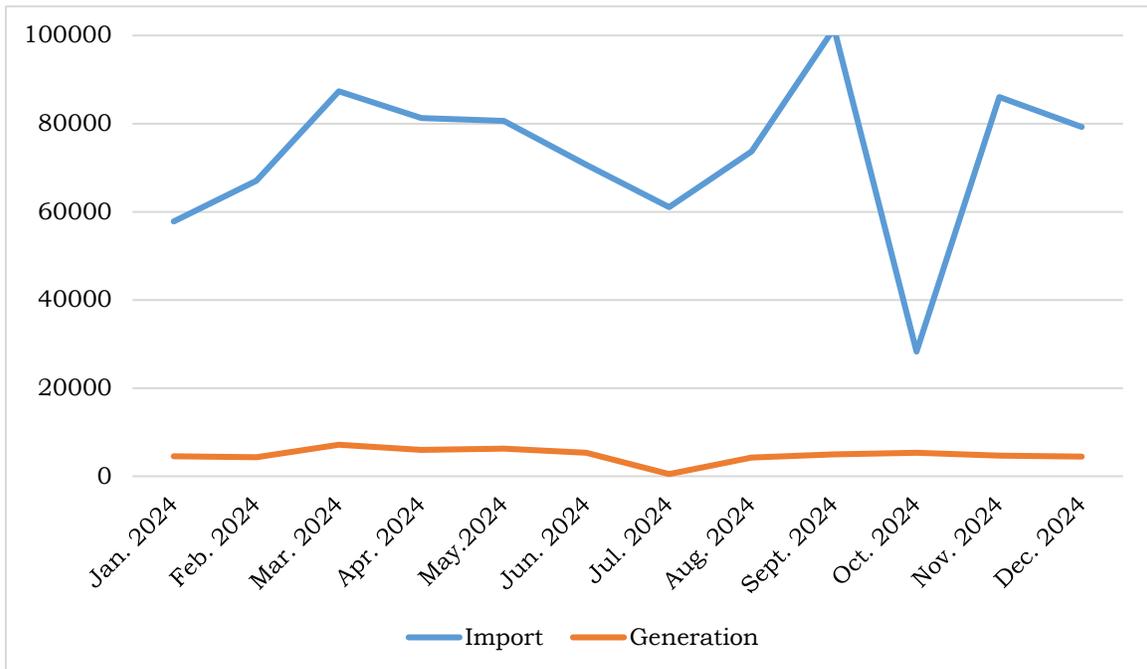


Graph No. 1: Monthly average daily solar radiation over Bengaluru, Karnataka

(Ref.: Solar Radiation Resource Assessment, Solar Radiation DPR, Karnataka Renewable Energy Devolvement Ltd.)

Energy consumption from grid and renewable energy generated from solar panels

The below graph shows the detailed energy consumption patterns. Units imported from the grid and units generated from the institution has been represented above. Highest grid consumption was in the month of Sept. 2024 and lowest was in the month of Oct. 2024.



Graph No. 2: Energy consumption and generation patterns

Key Technical Interpretation

- The institution operates under HT supply with net-metered solar integration, indicating advanced energy infrastructure.
- Solar generation consistently offsets part of grid demand, reducing dependence on BESCO power.
- Zero export readings indicate maximum captive utilization of solar energy, which is ideal for institutional campuses.
- Seasonal variation in both import and generation aligns with:
 - Academic calendar
 - Monsoon impact
 - Solar radiation availability

The college consumes energy in primarily 5 areas namely Air conditioners, Lighting, Fans, Blower and pumps in STPs and Passenger lift among others. The college also has four captive DG sets of 200 KVA, 125 KVA, 400 KVA and 250 KVA. UPS with 69% of contract demand is also installed; Solar photovoltaic panels are installed on the roof top. It has successfully generated energy of 57,760 KWh for 2024.

The total annual energy consumed per person is 51.8 kWh and per unit area is 11.7 kWh/Sqm, for the period of Jan. 2024 to Dec. 2024 which is appreciable.

Transformer and Electrical Distribution System

The institution receives power from BESCO grid at 11 kV and steps it down to 440 V using following transformer

Table No. 2: Transformer specifications

Sl. No.	Specification	Details
1	Rating kVA	500
2	Voltage	11,000 / 433
3	Type	ONAN
4	Phase	3
5	% Impedance	5%
6	Oil in Ltrs	400
7	Vector Group	Dyn - 11

The institute has made alternate arrangement during power cuts. Four captive DG sets of 200 KVA, 125 KVA, 400 KVA and 250 KVA have been installed and are used based on demand.

Electrical and Electronic Load Assessment and Segregated System Analysis

A comprehensive inventory of electrical and electronic equipment installed across the campus was undertaken to assess the connected load, operational characteristics, and energy demand profile of various end-use systems. The loads have been classified into functional categories such as IT and office equipment, lighting systems, air-conditioning systems, ventilation, vertical transportation, and water management systems. This segregation enables precise evaluation of energy consumption patterns and identification of optimization opportunities.

1. Information Technology and Office Equipment Load

The institution is equipped with a significant number of IT and office-related devices to support academic and administrative activities.

- **Desktop Computers:**

A total of 1,541 desktop systems are installed, with a cumulative connected load of approximately 100.17 kW. These systems represent a major share of the plug load and operate primarily during academic and office hours.

- **Laptops:**

42 laptops are in use, contributing marginally to the overall load due to their lower power ratings compared to desktops.

- **Printers, Copiers, and Scanners:**

The campus utilizes 84 printers, 7 photocopying machines, and scanners at various departments. These devices operate intermittently but contribute to peak demand during working hours.

- **Projectors:**

190 projectors with a total connected load of 15.2 kW are installed in classrooms and seminar halls, primarily used during teaching sessions.

Technical Observation:

IT and office equipment loads are predominantly daytime operational loads and coincide with peak academic activity, influencing demand-side management strategies.

Recommendations:

- Enable power management settings (sleep/hibernate modes)
- Replace desktops with energy-efficient thin clients where feasible
- Centralized shutdown policy after working hours

2. Lighting Load Analysis

Lighting constitutes a critical component of campus energy consumption. The institution has undertaken substantial modernization of lighting infrastructure.

- LED Bulbs:
830 LED bulbs are installed with an aggregate connected load of 7.47 kW.
- LED Tube Lights:
A total of 2,828 LED tube lights are operational, accounting for 56.56 kW of connected load.
- Street Lighting:
52 LED street lights with a total connected load of 14.2 kW provide outdoor illumination and safety during nighttime hours.
- Fans:
1,865 ceiling fans contribute approximately 121.23 kW to the connected load and are extensively used for ventilation.

Technical Observation:

The migration to LED lighting has significantly reduced lighting energy intensity. Combined with daylight utilization and sensor-based controls, the lighting system reflects high energy efficiency standards.

Recommendations:

- Further integration of occupancy sensors and daylight sensors
- Replace older fans with BEE 5-Star / BLDC fans
- Implement zonal lighting control for large classrooms and corridors
- Ensure all outdoor lighting is LED-based
- Introduce automatic astronomical timers
- Evaluate feasibility of solar street lights

3. Air Conditioning System Load Analysis

The campus is equipped with 82 air-conditioning units with a combined cooling capacity of 422 TR (Tons).

- These systems cater to critical spaces such as computer laboratories, server rooms, administrative offices, and selected classrooms.
- Air-conditioning represents one of the highest demand-intensive loads, contributing substantially to peak electrical demand.
- The AC systems are typically operated during daytime hours and are sensitive to occupancy and ambient temperature conditions.

Technical Observation:

Given the high connected tonnage, air-conditioning systems significantly influence maximum demand charges. Scope exists for efficiency enhancement through operational controls, temperature set-point optimization, and periodic maintenance.

Recommendations:

- Replace conventional units with 5-Star / Inverter-based ACs
- Maintain thermostat settings at 24–26°C
- Introduce occupancy-based or timer controls in seminar halls and offices
- Conduct annual cooling load reassessment to eliminate over-sizing
- Integrate AC operation with solar generation hours

4. Water Heating and Domestic Electrical Loads

- Geysers:

29 electric geysers with a combined connected load of 58 kW are installed in hostels and utility areas. These loads are typically intermittent and concentrated during morning and evening peak periods.

- Refrigerators:

23 refrigerators are installed with a total storage capacity of 6,716 litres, contributing to continuous base load consumption.

Recommendations:

- Replace electric geysers with solar water heating systems
- Introduce timer-based control for electric backup heaters

5. Water Pumping and STP System Load Analysis

Water management systems form a critical part of campus infrastructure and include borewell pumps, submersible pumps, and sewage treatment plant (STP) equipment.

Table No. 3: Details of submersible pumps

Pump Type	Number	Power Rating	Operating Hours
10 HP Pumps	6	7.5 kW each	3 hours/day
5 HP Pumps	5	3.67 kW each	2 hours/day
2 HP Pumps	2	1.47 kW each	5 hours/day
1 HP Pumps	2	0.73 kW each	6 hours/day

These pumps are used for groundwater extraction and water distribution across the campus.

Table No. 4: Details of sewage treatment plant (STP) loads

Equipment	Number	Power Rating	Operating Hours
STP Blowers	4	2.19 kW	12 hours/day
STP Pump 1	4	2.19 kW	6 hours/day
STP Pump 2	8	2.19 kW	16 hours/day
STP Pump 3	2	2.19 kW	8 hours/day

Technical Observation:

STP systems operate for extended durations and form a continuous process load, making them ideal candidates for energy-efficient motors and scheduling optimization.

Recommendations:

- Replace standard motors with IE3 / IE4 efficiency motors
- Introduce VFDs for pumps with variable flow requirements
- Optimize pumping schedules to off-peak hours

6. Vertical Transportation Load (Lifts)

- The campus is equipped with 18 elevators, which operate intermittently based on occupancy and building height.
- Though the operating duration is limited, lifts contribute to peak demand due to high starting currents.

Recommendations:

- Install regenerative VVVF drives
- Optimize elevator dispatch logic during peak hours

7. Overall Load Characteristics – Technical Summary

- The campus load profile comprises a mix of continuous base loads (refrigerators, servers, STP equipment), daytime operational loads (IT

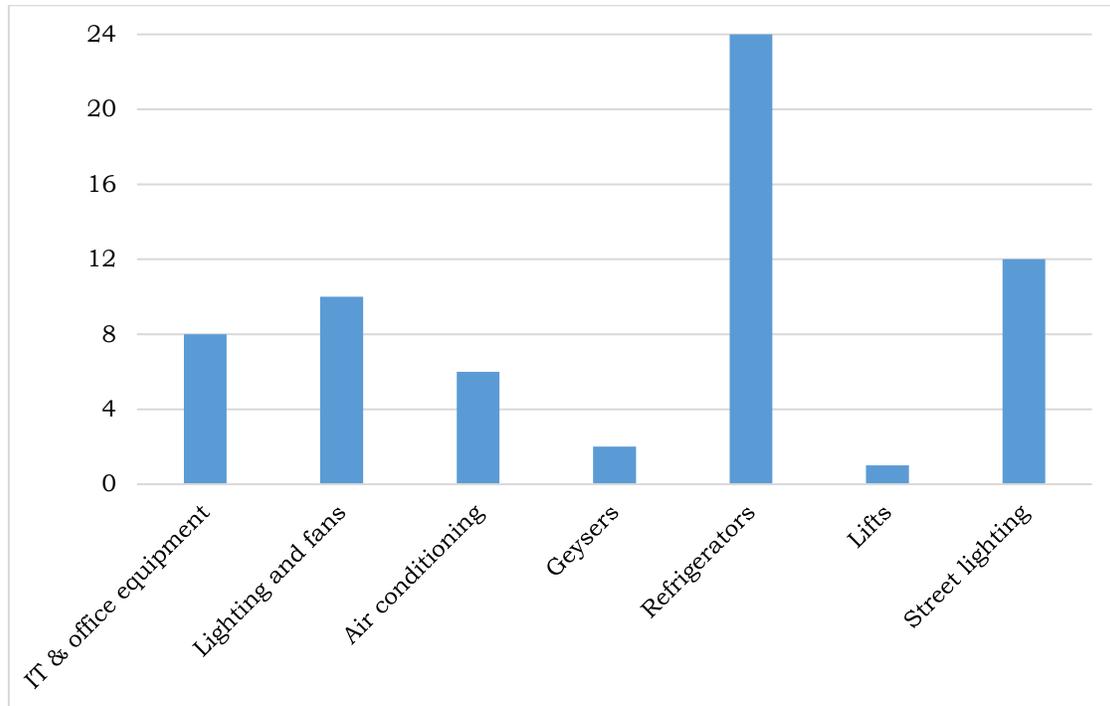
equipment, lighting, ACs), and intermittent high-demand loads (lifts, pumps).

- Lighting and ventilation loads dominate the connected load by volume, while air-conditioning and water pumping systems dominate demand intensity.
- Adoption of LED lighting, efficient fans, and solar power integration has substantially improved the overall energy performance of the institution.

Load Analysis

1. Assumptions Adopted for Energy Estimation

Where exact operating hours were not available, standard institutional operating patterns were adopted, which is a common and accepted practice in preliminary and detailed energy audits:



Graph No. 3: Assumed average operating hours per day

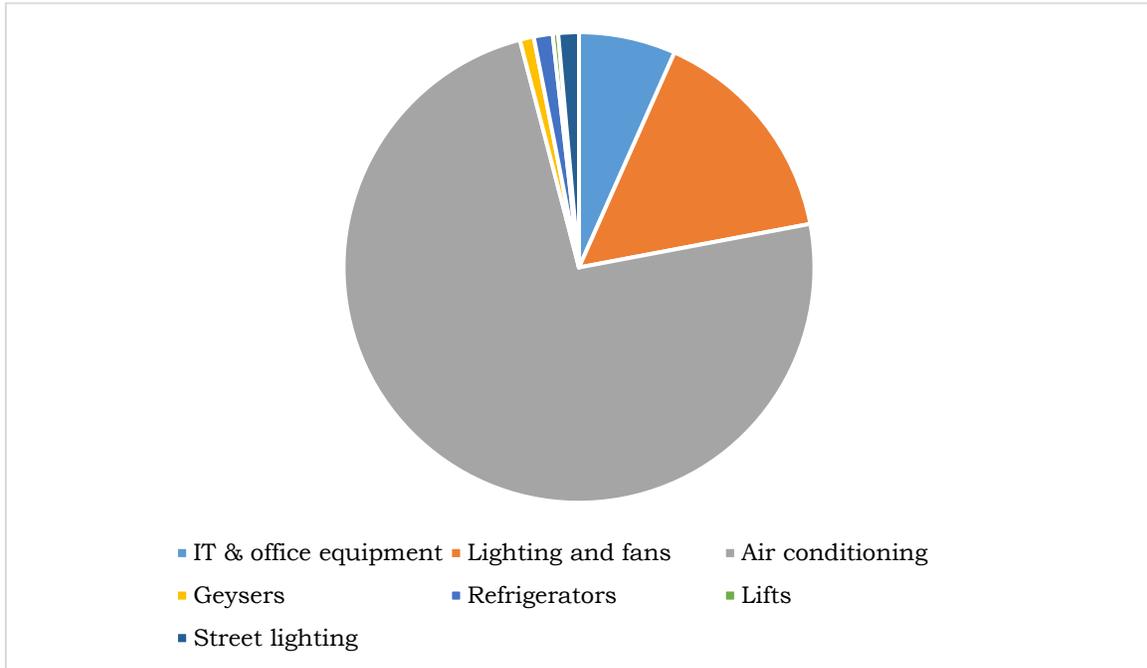
These assumptions reflect actual campus usage patterns and can be fine-tuned if sub-metering data is available.

2. Connected Load Summary – System-wise

Table No. 5: Details of connected load and operating hours

Sl. No	Category	Connected Load (kW)	Operating Hours (h/day)
1	IT & Office Equipment	100.17	8
2	Lighting & Fans	185.26	10
3	Air Conditioning (422 TR)	1,484.17	6
4	Geysers	58.00	2
5	Refrigerators	6.50	24
6	Lifts	45.00	1
7	Street Lighting	14.20	12

3. Category-wise Energy Consumption Estimation (Daily Basis)



Graph No. 5: Daily energy consumption (kWh/day) across various categories

Key Technical Insight

- Air Conditioning alone accounts for ~72–75% of total daily electrical energy consumption, making it the most critical system for demand and energy optimization.
- Lighting and fans form the second largest energy consumer, despite efficient LED adoption, due to volume and long operating hours.

Monthly and Annual Energy Consumption Projections

Based on the connected load assessment and standard institutional operating assumptions, the total estimated daily electricity consumption of the campus is approximately 12,046 kWh/day

Using this baseline, monthly and annual projections have been derived.

A. Category-wise Energy Consumption Projections

Table No. 6: Category wise daily, monthly and annual energy consumption in kWh

System Category	Daily Energy (kWh)	Monthly Energy (kWh)	Annual Energy
IT & Office Equipment	801	24,041	2,92,496
Lighting & Fans	1,853	55,578	6,76,199
Air Conditioning	8,905	2,67,151	32,50,340
Geysers	116	3,480	42,340
Refrigerators	156	4,680	56,940
Lifts	45	1,350	16,425
Street Lighting	170	5,112	62,196
Total	12,046	3,61,392	43,96,936

Carbon Footprint Assessment (CO₂ Emissions)

Methodology

- Grid emission factor (India average): 0.82 kg CO₂ per kWh (as per CEA/BEE norms)
- CO₂ emissions calculated using: Energy Consumption (kWh) × Emission Factor

A. Annual CO₂ Emissions – System-wise

Table No. 7: Category wise annual energy consumption and CO₂ emissions

System Category	Annual Energy (kWh)	CO ₂ Emissions (kg/year)
IT & Office Equipment	2,92,496	2,39,847
Lighting & Fans	6,76,199	5,54,483
Air Conditioning	32,50,340	26,65,278
Geysers	42,340	34,719
Refrigerators	56,940	46,691
Lifts	16,425	13,469
Street Lighting	62,196	51,001
Total	43,96,936	36,05,488 kg CO ₂ /year

Converted Value

- ≈ 3,606 tonnes of CO₂ per year

B. Carbon Footprint Reduction Potential (Indicative)

If the recommended energy conservation measures are implemented, the following conservative reduction scenario is achievable:

Table No. 8: Carbon emission reduction potential

Measure Area	Expected Reduction
HVAC optimization	20%
Lighting & fans efficiency	25%
Pumps & motors (VFDs, IE3 motors)	15%
IT load management	10%

C. Estimated Impact

- Potential energy savings: ~15–18% overall
- Annual energy reduction: ~6.5–7.5 lakh kWh
- CO₂ reduction: ≈ 530–615 tonnes CO₂ per year

Students using Institution Bus

The institution operates a dedicated transportation system to facilitate safe and reliable commuting for students from different localities across Bengaluru. The fleet of buses follows planned routes covering multiple points within the city, ensuring convenient access to the campus. This initiative not only enhances student mobility and punctuality but also reflects the institution's commitment to environmentally responsible transportation by reducing the dependence on individual vehicles.



The institutional bus facility contributes significantly to environmental sustainability through the following outcomes:

- **Lower Per-Capita Emissions:** Collective transportation substantially reduces carbon emissions per student when compared to the use of private vehicles. The consolidation of travel into shared buses helps limit the overall release of greenhouse gases.
- **Improved Urban Air Quality:** A reduced number of individual vehicles on the road leads to lower emissions of harmful pollutants such as particulate matter, nitrogen oxides, and carbon monoxide, thereby supporting cleaner air in densely populated urban areas.
- **Efficient Energy Utilization:** Buses consume less fuel per passenger than private cars, resulting in more efficient use of energy resources and reduced dependence on fossil fuels.
- **Mitigation of Traffic Congestion:** The use of institutional buses decreases the volume of private vehicles during peak travel hours, easing traffic congestion and minimizing fuel wastage caused by idling.
- **Support for Sustainable Urban Development:** By offering organized transport services, the institution helps discourage uncontrolled urban expansion and supports responsible land-use practices that protect green and open spaces.
- **Strengthening Public Transport Culture:** Regular use of shared transport encourages students to value and adopt public transportation systems, contributing to better utilization of existing infrastructure and promoting long-term improvements.
- **Cultivation of Environmentally Responsible Behavior:** Continuous exposure to sustainable commuting practices instills environmental awareness among students, positively influencing their transportation choices even beyond their academic tenure.

In summary, the institutional transport facility serves as an effective measure to reduce environmental impact while promoting sustainable mobility, aligning with the institution's broader objectives of environmental stewardship and responsible campus management.

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Solar panels have been placed on the rooftop to
convert solar energy into electrical energy



Diesel Generator (alternate source) during power cut

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Energy Audit Report



Green Protocol posters have been put across campus



Climate clock has been installed displaying temperature rise.

Electronic notice board has been put to display current event and achievements.



Electric vehicle



Electric vehicle charging point/station

Kristu Jayanti (Deemed to be University), Bengaluru
Energy Audit Report




NISARGA ECO CONSULTANTS
Srinivasam, Plot No. 97,
Malini Nagar, Kanbargi Road,
Belagavi-590016

Measurement of PM 1,
PM 2.5, PM 10, Light intensity, Noise, EMR, HCOH, TVOC

Annexure – 1: Eco-Club/Green Club Activities

Table No. 9: List the activities conducted by Eco-club/Green club/NSS

SL. NO.	TITLE	DATE
1	International E-Waste Day - Digital Poster Awareness Program	14 October 2025
2	Energy Efficiency Day - Digital Poster Awareness Program	05 October 2025

International E-Waste Day - Digital Poster Awareness Program

Date: 14 October 2025

The Centre for Environment Enrichment and Sustainability (CEES), Kristu Jayanti (Deemed to be University), observed International E-Waste Day on October 14, 2025, to promote awareness about the responsible disposal and recycling of electronic waste.

The initiative highlighted the growing concern of e-waste pollution and emphasized the importance of sustainable electronic consumption. The awareness poster carried the message — “Don’t trash your tech, recycle it! Give your gadgets a second life!” — urging individuals to adopt environmentally responsible practices in managing discarded electronics.

Through this awareness program, CEES aimed to educate students and faculty about the environmental and health hazards posed by improper e-waste disposal, while promoting recycling, reusing, and refurbishing electronic devices. The initiative reinforced the university’s commitment to sustainability and environmental stewardship by encouraging the community to contribute to a cleaner and greener planet through mindful e-waste management.



Energy Efficiency Day - Digital Poster Awareness Program

Date: 05 October 2025

The Centre for Environment Enrichment and Sustainability (CEES), Kristu Jayanti (Deemed to be University), observed Energy Efficiency Day on October 5, 2025, through a digital poster awareness program. The initiative aimed to highlight the importance of energy conservation and the role of mindful consumption in building a sustainable future.

The digital poster emphasized that the cleanest form of energy is the energy saved through efficient use and conscious practices. It encouraged the university community to adopt sustainable habits such as reducing energy wastage, utilizing renewable sources, and promoting energy-smart technologies.

Through this awareness initiative, CEES sought to inspire students and faculty to become active participants in the global movement towards energy efficiency. The program reinforced the message that a greener and more sustainable future depends not only on generating renewable energy but also on conserving and using it wisely.



Annexure – 2: Detailed energy consumption statement by BESCOM



BANGALORE ELECTRICITY SUPPLY COMPANY LIMITED
(Wholly Owned Government of Karnataka Undertaking)

office of the
Assistant Executive Engineer (Ele),
E9 Sub-Division, Magawara, Bengaluru.
Date: 20/12/2024

Letter No: AEE/ESSD/AAO/A/ 2688

: DETAILED ENERGY CONSUMPTION STATEMENT :

Sl.	BILLING MONTH	TARIF	CD (KVA)	IMPORT READING					EXPORT READING					NET IMPORT CONSUMPTION	GENERATION READING				
				PRESENT READING	PREVIOUS READING	DIFF	CONSTANT	CONSUMPTION	PRESENT READING	PREVIOUS READING	DIFF	CONSTANT	CONSUMPTION		PRESENT READING	PREVIOUS READING	DIFF	CONSTANT	CONSUMPTION
1	JAN-2024	HT2C(i)	480	1827.2	1804.09	23.1	2500	57775	13.79	13.79	0	2500	0	57775	10704	10614	90	50	4500
2	FEB-2024	HT2C(i)	480	1854.02	1827.2	26.8	2500	67050	13.79	13.79	0	2500	0	67050	10791	10704	87	50	4350
3	MAR-2024	HT2C(i)	480	1888.96	1854.02	34.9	2500	87350	13.79	13.79	0	2500	0	87350	10934	10791	143	50	7150
4	APR-2024	HT2C(i)	480	1921.48	1888.96	32.5	2500	81300	13.79	13.79	0	2500	0	81300	11054	10934	120	50	6000
5	MAY-2024	HT2C(i)	480	1953.74	1921.48	32.3	2500	80650	13.79	13.79	0	2500	0	80650	11179	11054	125	50	6250
6	JUNE-2024	HT2C(i)	480	1982	1953.74	28.3	2500	70650	13.79	13.79	0	2500	0	70650	11285	11179	106	50	5300
7	JULY-2024	HT2C(i)	480	2006.41	1982	24.4	2500	61025	13.79	13.79	0	2500	0	61025	11383	11285	98	50	4900
8	AUG-2024	HT2C(i)	480	2035.88	2006.41	29.5	2500	73675	13.79	13.79	0	2500	0	73675	11468	11383	85	50	4250
9	SEP-2024	HT2C(i)	480	2076.52	2035.88	40.6	2500	101600	13.79	13.79	0	2500	0	101600	11568	11468	100	50	5000
10	OCT-2024	HT2C(i)	480	7.18	0.11	7.07	4000	28280	0.06	0.06	0	2500	0	28280	11674	11568	106	50	5300
11	NOV-2024	HT2C(i)	480	28.69	7.18	21.5	4000	86040	0.06	0.06	0	2500	0	86040	11768	11674	94	50	4700
12	DEC-2024	HT2C(i)	480	48.51	28.69	19.8	4000	79280	0.06	0.06	0	2500	0	79280	11857.4	11768	89.4	50	4470



Assistant Account Officer
E9 Sub-Division, Bengaluru.



Assistant Executive Engineer(Ele)
E9 Sub-Division, Bengaluru.

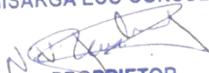
Disclaimer

The audit team has prepared this report for Kristu Jayanti (Deemed to be University), Bengaluru based on the input data provided by the Kristu Jayanti (Deemed to be University), representatives, supplemented by the expert team's best judgment.

The carbon footprint calculations provided in this report are based on standard data and values obtained from various research papers and articles. These calculations are intended to provide an understanding of carbon emissions and should be considered as indicative estimates rather than precise measurements. They may not reflect absolute accuracy due to variability in emission factors and contextual differences.

While every effort has been made to ensure accuracy, the details in this report have been compiled in good faith based on the information gathered. The recommendations are made using our best judgment; however, no representation, warranty, or undertaking, express or implied, is made. The audit team accepts no responsibility for any direct or consequential loss arising from the use of the information, statements, or forecasts in this report.

For NISARGA ECO CONSULTANTS


PROPRIETOR

