

Sathyabama Institute of Science and Technology



Energy Audit

June 2025-May 2026

Prepared by



Centre for Waste Management

Audited by




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EXECUTIVE SUMMARY

The Energy Audit of Sathyabama Institute of Science and Technology was conducted to evaluate the institution's energy consumption patterns, electrical infrastructure, renewable energy utilization, and energy conservation practices. The primary objective of the audit was to assess the efficiency of existing energy management systems, identify opportunities for energy savings, reduce operational costs, and promote sustainable energy utilization across the campus. The assessment also aimed to support the institution's commitment to environmental sustainability by encouraging the adoption of energy-efficient technologies and renewable energy resources.

The audit covered all major campus facilities, including academic buildings, research laboratories, administrative offices, libraries, hostels, healthcare facilities, sports complexes, dining areas, and other supporting infrastructure. A comprehensive evaluation was carried out through site inspections, analysis of electricity consumption records, verification of electrical infrastructure, interaction with facility management personnel, and observation of operational practices. The assessment focused on electricity consumption, connected electrical loads, lighting systems, heating, ventilation and air-conditioning (HVAC) systems, laboratory equipment, water pumping systems, electrical distribution networks, backup power systems, and renewable energy installations.

The findings indicate that the institution has established a well-structured and reliable energy management framework supported by systematic monitoring of electricity consumption, regular preventive maintenance of electrical infrastructure, and the adoption of energy-efficient technologies. The extensive use of LED lighting, energy-efficient electrical equipment, optimized operation of HVAC systems, and continuous monitoring of electrical installations have contributed significantly to improving energy efficiency and reducing unnecessary energy consumption across the campus.

The audit further highlights the institution's commitment to sustainable energy management through the integration of renewable energy initiatives, including solar photovoltaic systems wherever implemented. The utilization of clean energy has reduced dependence on conventional electricity sources, lowered greenhouse gas emissions, and enhanced the


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institution's environmental performance. Regular maintenance, performance monitoring, and effective operational management have ensured the reliable functioning of both conventional and renewable energy systems.

The assessment also demonstrates that the institution has developed a culture of energy conservation by promoting awareness among students, faculty members, technical staff, and administrative personnel. Energy-saving practices, efficient operational scheduling, preventive maintenance, and continuous evaluation of energy performance have strengthened the institution's ability to optimize resource utilization while maintaining uninterrupted academic and research activities.

Overall, the Energy Audit confirms that Sathyabama Institute of Science and Technology has developed an effective and sustainable energy management system that aligns with national energy efficiency initiatives and global sustainability goals. The baseline information generated through this audit provides a valuable framework for monitoring future energy performance, benchmarking institutional progress, and identifying opportunities for continuous improvement.

The recommendations presented in this report focus on strengthening energy monitoring systems, expanding renewable energy utilization, enhancing electrical infrastructure, promoting smart energy management technologies, improving preventive maintenance practices, increasing stakeholder awareness, and conducting periodic energy audits. The implementation of these recommendations will further improve energy efficiency, reduce environmental impacts, enhance operational resilience, and reinforce the institution's commitment to sustainable campus development and responsible energy stewardship.


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CHAPTER 1

INTRODUCTION

1.1 About Sathyabama Institute of Science and Technology

Sathyabama Institute of Science and Technology is one of India's premier multidisciplinary institutions, recognized for its excellence in higher education, research, innovation, and societal development. Since its establishment under Section 3 of the University Grants Commission (UGC) Act, 1956, the institution has consistently maintained high academic standards while fostering innovation, sustainability, and global engagement.

The institution offers a wide spectrum of undergraduate, postgraduate, doctoral, and research programmes across Engineering, Science, Technology, Law, Dental Sciences, Pharmacy, Nursing, Management, Arts and Science, and Allied Health Sciences. Its academic ecosystem is supported by highly qualified faculty, modern pedagogical practices, advanced laboratories, research centres, and state-of-the-art infrastructure that promote interdisciplinary learning and research excellence.

Sathyabama Institute of Science and Technology has been accredited with the highest '**A++**' **Grade** by the National Assessment and Accreditation Council (NAAC), reflecting its commitment to academic quality, research productivity, innovation, and institutional governance. The university continuously adopts contemporary teaching methodologies, outcome-based education, digital learning platforms, and industry-oriented curricula to prepare students for global careers.

The institution has earned significant recognition at both national and international levels. It has consistently secured a position among the leading universities in India in the National Institutional Ranking Framework (NIRF) and has received prestigious rankings from globally recognized agencies such as Times Higher Education (THE) and QS World University Rankings. Furthermore, Sathyabama has been acknowledged among the country's leading institutions for innovation through the Atal Ranking of Institutions on Innovation Achievements (ARIIA).

Research forms one of the core strengths of the institution. Sathyabama has established collaborations with reputed national and international universities, research organizations,

industries, and government agencies, enabling the execution of several multidisciplinary research projects in emerging areas of science and technology. The institution has successfully completed numerous sponsored research programmes funded by national and international organizations, contributing significantly to scientific advancement and technological innovation.

A landmark achievement in the institution's journey was the successful launch of **SATHYABAMASAT**, developed in collaboration with the Indian Space Research Organisation (ISRO), demonstrating its capability in advanced research and space technology. Such accomplishments exemplify the institution's dedication to promoting innovation, entrepreneurship, and research that address real-world challenges.

Under the visionary leadership of its management, Sathyabama Institute of Science and Technology continues to create an inclusive academic environment that nurtures excellence, creativity, ethical values, and social responsibility. The institution remains committed to producing globally competent graduates while actively contributing towards sustainable development through education, research, innovation, and community engagement.

1.1.1 Vision

Be a leading multidisciplinary University, producing world class talents to address global challenges

1.1.2 Mission

- **To attain excellence in Education and Research through effective collaboration with Industries and other International/National organisations**
- **To consistently remain an attractive ecosystem for students and employees, a hub of innovation for researchers and an incubating platform for entrepreneurs**
- **To create an inclusive environment that caters to all forms of diversity**
- **To engage in outreach and community development activities, creating an impact on the society**

1.1.3 Objectives of the Institution


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The institution is dedicated to developing competent professionals equipped with technical knowledge, ethical values, leadership qualities, and social responsibility. Its primary objectives are to:

- Deliver quality education that meets global academic and industrial standards.
- Foster scientific inquiry, critical thinking, innovation, and entrepreneurship.
- Promote interdisciplinary research addressing national and global challenges.
- Encourage lifelong learning, professional excellence, and continuous skill development.
- Develop socially responsible graduates committed to sustainable development and community welfare.
- Strengthen collaborations with industries, research organizations, and international institutions to enhance academic and research excellence.

1.1.4 Core Values

Sathyabama Institute of Science and Technology upholds the following core values that guide all academic, research, and administrative activities.

Integrity

The institution maintains the highest standards of ethics, transparency, accountability, honesty, and professionalism in all its academic, research, and administrative practices.

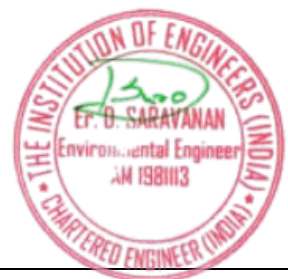
Excellence

The institution strives for excellence through quality education, innovative teaching methodologies, impactful research, and continuous institutional improvement.

Innovation

Innovation is encouraged across all disciplines by promoting creative thinking, research-driven solutions, entrepreneurship, and technology development.


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Sustainability

The institution is committed to environmental conservation and sustainable development through responsible resource management, green campus initiatives, renewable energy adoption, and environmentally conscious practices.

Collaboration

The institution actively promotes partnerships with industries, research organizations, government agencies, and international universities to strengthen education, research, and innovation.

Inclusion and Diversity

An inclusive academic environment is maintained where individuals from diverse cultural, social, and economic backgrounds are provided equal opportunities to learn, grow, and succeed.

Social Responsibility

The institution actively contributes to societal development through outreach programmes, environmental initiatives, community engagement, and technology-driven solutions that improve quality of life.

1.2 Audit Team

The Green Audit was conducted by the Centre for Waste Management and validated by Enviroworks Private Limited, Chennai. The audit team comprised experienced environmental professionals, faculty members, researchers, and technical staff representing multiple academic departments.

The multidisciplinary composition of the audit team ensured comprehensive assessment of environmental practices, energy management systems, campus infrastructure, biodiversity conservation, waste management, water conservation, and sustainability initiatives implemented across the institution.


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The audit methodology included document review, stakeholder consultations, field inspections, data verification, questionnaire-based assessment, and evaluation of environmental management practices. The collaborative approach adopted during the audit enabled objective assessment of institutional performance and formulation of practical recommendations for continual environmental improvement.

The Centre for Waste Management coordinated all audit activities with active support from faculty members, research scholars, technical staff, and student volunteers, reflecting the institution's commitment to participatory environmental management and sustainable campus development. Following are the members associated in the Audit

Audit Team Details

Lead Auditor (Internal): Dr. Dawn S S

Audit Category	Subcategory	Audit In-charge
Carbon Footprint Accounting & Carbon Intelligence	Scope 1 Scope 2 Scope 3 Emissions in the institution	Dr. J. Arun Dr.S.Barani (Department of Electronics & Communication Engineering)
Waste Audit	Biomedical Waste Plastic waste	Dr.N.Nirmala Dr.J.Jayakanth Ms.J. Merlin
	Solid waste including Food Waste Kitchen Waste Paper waste Garden waste	Dr. S.Sujithra Dr. J.Jayakanth Mr.A.Silambarasan
	E-Waste	Dr.J.Jayakanth Dr.M.Subramoniom (Department of Electronics & Communication Engineering)
Green Audit	–	Dr. P.Priyadarshini
Energy Audit	–	Dr. Jayaprabhakar (Department of Mechanical Engineering) Dr.S.Poornapushpakala (Department of Electronics & Communication Engineering) Dr. A. Santhosh
Water Audit	–	Dr.N.Nirmala, Ms. S. Bhuvaneswari, Ms. S.V. Sivashankari


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The team functions with the designated audits. The team has undergone Green, Energy and Environmental Audit training in July 2020 and are upgrading the skills as per requirement. Wasmanpro Environmental Solutions LLP, Chennai provided Audit training. Since then, the team pursues the internal Green, Energy and Environmental Audits periodically.

1.3 Periodicity of Audit

The internal audit team initiated the audit for 2025 – 2026 period in June 2025. Inventories to pursue the audit were revised based on the recommendations given by the external audit team in the previous year's audit report. Each member of the internal audit team is allotted with a particular audit and is supported by student volunteers. The audit takes place during the third week of every month, and compilation of the inventories is done by the in-charge and reviewed by the Lead Internal Auditor. The review of the audit happens quarterly by the External Audit team before the Final Audit report is validated in May every year. The external audit was undertaken by Enviroworks Pvt.Ltd for the year June 2025 to May 2026.


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Chapter 2

ENERGY AUDIT

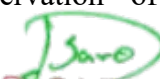
2.1 Introduction

Energy is one of the most valuable resources supporting the academic, research, administrative, residential, and healthcare activities of higher educational institutions. Efficient energy management not only reduces operational costs but also minimizes greenhouse gas emissions, conserves natural resources, and contributes significantly to sustainable campus development. As institutions expand their infrastructure and adopt advanced technologies, systematic monitoring and optimization of energy consumption become increasingly important for achieving environmental and economic sustainability.

An Energy Audit is a systematic assessment of energy consumption patterns, energy distribution systems, and the efficiency of electrical and mechanical equipment within an institution. The primary objective of an energy audit is to identify areas of energy use, evaluate the performance of existing systems, quantify energy losses, and recommend practical measures for improving energy efficiency without compromising operational requirements. The audit provides valuable baseline information for monitoring energy performance, reducing energy wastage, and promoting the adoption of energy-efficient technologies and renewable energy solutions.

The Energy Audit of Sathyabama Institute of Science and Technology was conducted to evaluate the institution's overall energy management practices and identify opportunities for enhancing energy efficiency across the campus. The assessment covered academic buildings, research laboratories, administrative offices, hostels, healthcare facilities, libraries, sports complexes, and other campus infrastructure. Particular attention was given to electricity consumption, electrical distribution systems, lighting efficiency, air-conditioning systems, laboratory equipment, water pumping systems, renewable energy installations, and energy conservation initiatives implemented by the institution.

The audit involved detailed site inspections, analysis of electricity consumption records, interaction with facility management personnel, verification of electrical infrastructure, and observation of operational practices. Existing energy-saving measures, maintenance


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procedures, demand management practices, and the integration of renewable energy resources were also evaluated to assess their effectiveness in improving overall energy performance.

The findings indicate that the institution has established a structured energy management framework supported by energy-efficient lighting systems, regular maintenance of electrical equipment, adoption of high-efficiency appliances, optimization of operational practices, and the utilization of renewable energy wherever feasible. These initiatives have contributed to reducing energy consumption, improving operational efficiency, and minimizing the environmental impact associated with campus energy use.

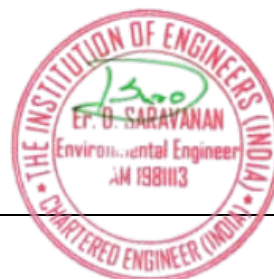
The baseline information generated through this Energy Audit provides a comprehensive framework for monitoring energy consumption trends, evaluating the effectiveness of conservation measures, benchmarking future performance, and identifying opportunities for continuous improvement. The recommendations presented in this chapter are intended to strengthen energy management practices, enhance resource efficiency, promote the use of clean energy technologies, and further support the institution's commitment to sustainable campus operations and environmental stewardship.

2.2. Energy Consumption Assessment

The Energy Consumption Assessment was conducted to evaluate the pattern, distribution, and efficiency of electricity utilization across Sathyabama Institute of Science and Technology. As a multidisciplinary higher educational institution, the campus comprises academic blocks, research laboratories, administrative offices, libraries, hostels, healthcare facilities, sports complexes, dining areas, and other support infrastructure, all of which contribute to the overall energy demand. Understanding the energy consumption profile of these facilities is essential for identifying opportunities to improve efficiency, reduce operational costs, and promote sustainable energy management.

The assessment focused on analysing the institution's electricity consumption using utility records, load inventories, equipment inspections, and operational observations. Information was collected on the energy requirements of major electrical systems, including lighting, heating, ventilation and air-conditioning (HVAC) systems, laboratory equipment, information technology infrastructure, water pumping systems, elevators, and other electrical installations.


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The analysis provided a comprehensive understanding of the campus energy profile and the major contributors to electricity consumption.

A detailed evaluation of monthly and annual electricity consumption was undertaken to identify consumption trends, peak demand periods, and areas with high energy intensity. The audit also examined the effectiveness of existing energy management practices, operational schedules, preventive maintenance programmes, and energy-saving initiatives implemented across the campus. Particular attention was given to the adoption of energy-efficient equipment, optimization of operating hours, and behavioural practices that contribute to reducing unnecessary energy consumption.

The assessment further reviewed the performance of electrical distribution systems, transformers, power factor correction equipment, backup power systems, and metering arrangements to ensure reliable and efficient energy utilization. Wherever applicable, the integration of renewable energy resources and their contribution towards meeting campus electricity demand were also evaluated as part of the institution's commitment to sustainable energy management.

The findings indicate that the institution has established a structured approach to monitoring and managing electricity consumption through regular maintenance of electrical infrastructure, implementation of energy-efficient technologies, and continuous monitoring of energy usage patterns. The use of LED lighting, energy-efficient electrical appliances, optimized operation of air-conditioning systems, and periodic maintenance of electrical equipment have contributed significantly to improving energy efficiency and reducing electricity consumption across the campus.

The Energy Consumption Assessment provides a valuable baseline for monitoring future energy performance, benchmarking consumption trends, evaluating the effectiveness of conservation measures, and identifying additional opportunities for energy savings. The results presented in the following sections form the basis for developing targeted energy conservation strategies, improving operational efficiency, reducing greenhouse gas emissions, and supporting the institution's long-term commitment to sustainable campus development.

2.3. Electrical Infrastructure Assessment


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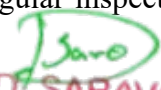
A reliable and efficient electrical infrastructure is fundamental to ensuring the uninterrupted operation of academic, research, healthcare, residential, and administrative activities within a higher educational institution. A well-designed electrical distribution system not only provides a stable power supply but also improves energy efficiency, enhances equipment performance, minimizes transmission losses, and ensures the safety of personnel and infrastructure. Regular assessment of electrical installations is therefore essential for maintaining operational reliability and supporting sustainable energy management.

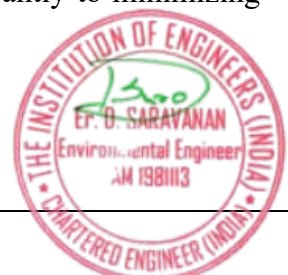
The Electrical Infrastructure Assessment at Sathyabama Institute of Science and Technology was conducted to evaluate the adequacy, condition, reliability, and operational efficiency of the campus electrical distribution network. The assessment covered the major components of the electrical system, including incoming power supply, transformers, substations, distribution panels, switchgear, electrical cabling, power factor correction equipment, backup power systems, metering arrangements, earthing systems, and protective devices. The evaluation aimed to determine the capability of the existing infrastructure to meet the institution's present and future energy demands while ensuring safe and efficient operation.

The audit involved detailed site inspections, verification of electrical equipment, review of maintenance records, and interaction with facility management personnel. Particular attention was given to the condition of transformers, electrical panels, distribution circuits, circuit breakers, protective relays, and emergency power systems. The assessment also examined preventive maintenance practices, equipment loading conditions, voltage stability, power quality, and the effectiveness of safety measures implemented throughout the campus.

The performance of the electrical distribution system was evaluated to identify potential energy losses, overloading conditions, power quality issues, and opportunities for improving operational efficiency. The audit further assessed the adequacy of energy metering systems for monitoring electricity consumption across different campus facilities, enabling better energy management and informed decision-making.

Electrical safety measures, including earthing arrangements, lightning protection systems, insulation integrity, emergency shutdown mechanisms, fire protection provisions, and statutory compliance, were also reviewed to ensure the safe operation of the electrical infrastructure. Regular inspection and maintenance of these systems contribute significantly to minimizing


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operational risks, preventing electrical failures, and extending the service life of critical equipment.

The assessment indicates that the institution has established a robust and well-maintained electrical infrastructure capable of supporting its diverse operational requirements. Periodic preventive maintenance, timely replacement of aging components, efficient load distribution, and continuous monitoring of electrical installations have contributed to maintaining a reliable and energy-efficient power distribution system across the campus.

Overall, the Electrical Infrastructure Assessment demonstrates the institution's commitment to providing a safe, reliable, and sustainable electrical network that supports uninterrupted academic and research activities while promoting efficient energy utilization. The findings presented in this section provide a valuable basis for future infrastructure upgrades, improved energy management, enhanced electrical safety, and the integration of advanced energy-efficient technologies in support of the institution's long-term sustainability goals.

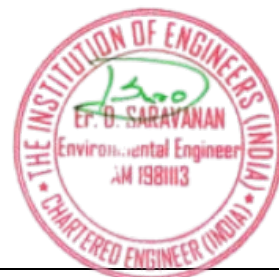



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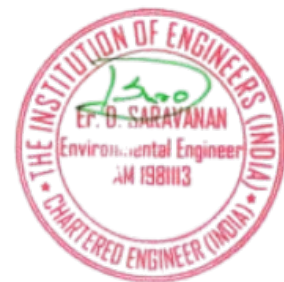


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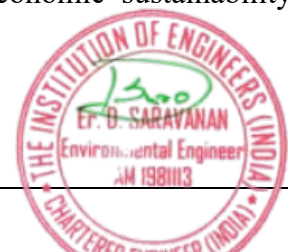


2.4. Renewable Energy Assessment

The integration of renewable energy sources has become an essential component of sustainable campus development and responsible energy management. Renewable energy technologies reduce dependence on conventional fossil fuels, lower greenhouse gas emissions, improve energy security, and contribute to long-term environmental and economic sustainability.

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Higher educational institutions play a significant role in promoting clean energy adoption by integrating renewable energy systems into campus infrastructure while serving as demonstration sites for education, research, and innovation.

The Renewable Energy Assessment at Sathyabama Institute of Science and Technology was conducted to evaluate the implementation, performance, and contribution of renewable energy systems in meeting the institution's energy requirements. The assessment focused on identifying existing renewable energy installations, analysing their operational efficiency, evaluating their contribution to overall electricity demand, and assessing their role in reducing the institution's environmental footprint.

Particular emphasis was placed on renewable energy technologies installed across the campus, including solar photovoltaic (PV) systems and other sustainable energy initiatives, wherever applicable. The assessment examined installed capacity, electricity generation, system utilization, operational reliability, maintenance practices, and the integration of renewable energy with the campus electrical distribution network. The audit also evaluated the effectiveness of monitoring systems used to assess renewable energy performance and identify opportunities for improving energy generation efficiency.

The assessment involved detailed site inspections, verification of renewable energy installations, review of generation records, analysis of maintenance practices, and interaction with facility management personnel. Operational parameters such as energy production, system availability, equipment condition, inverter performance, and preventive maintenance schedules were reviewed to ensure reliable and efficient operation of renewable energy assets.

The findings indicate that the institution has taken significant steps toward integrating renewable energy into its overall energy management strategy. The adoption of renewable energy systems has contributed to reducing dependence on grid electricity, lowering operational costs, minimizing carbon emissions, and promoting the use of clean and sustainable energy resources. Regular maintenance, continuous performance monitoring, and systematic operational management have further enhanced the efficiency and reliability of the installed renewable energy infrastructure.

The Renewable Energy Assessment also demonstrates the institution's commitment to national and global sustainability goals by encouraging the use of environmentally friendly energy


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technologies and reducing the environmental impact associated with conventional energy consumption. The baseline information generated through this assessment provides a valuable framework for evaluating renewable energy performance, planning future capacity expansion, and identifying opportunities for increasing the share of clean energy within the campus energy mix.

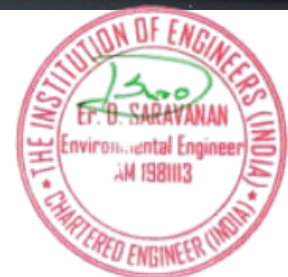
Overall, the assessment confirms that renewable energy initiatives have become an integral part of the institution's sustainable energy management programme. The findings support continuous improvement in renewable energy utilization, strengthen institutional resilience through diversified energy sources, and reinforce the institution's vision of developing a low-carbon, energy-efficient, and environmentally responsible campus.


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2.5 Energy Conservation Practices

Energy conservation is a key element of sustainable campus management, enabling institutions to optimize energy utilization, reduce operational costs, and minimize environmental impacts. Effective energy conservation practices involve

- the adoption of energy-efficient technologies
- regular maintenance of electrical systems
- responsible energy-use behaviour
- continuous monitoring of energy performance

These measures collectively contribute

- to reducing greenhouse gas emissions
- conserving natural resources
- enhancing the overall sustainability of institutional operations

Sathyabama Institute of Science and Technology has implemented a comprehensive range of energy conservation practices aimed at improving energy efficiency across academic, research, healthcare, residential, and administrative facilities. These initiatives reflect the institution's commitment to responsible energy management and its long-term vision of developing a sustainable and environmentally responsible campus.

The assessment indicates that energy-efficient lighting systems, particularly LED luminaires, have been widely adopted throughout the campus to reduce electricity consumption while maintaining adequate illumination levels.

The institution also promotes the use of energy-efficient electrical equipment including high-efficiency air-conditioning systems, laboratory instruments, office equipment, water pumps, and other electrical appliances that comply with modern energy performance standards.

Regular preventive maintenance of electrical installations, transformers, distribution panels, motors, HVAC systems, and other energy-consuming equipment is carried out to ensure reliable operation and minimize energy losses. Scheduled maintenance activities, timely replacement of inefficient components, and continuous monitoring of equipment performance have significantly contributed to improving operational efficiency and extending the service life of electrical assets.

The institution has also implemented operational strategies to optimize energy consumption through efficient scheduling of electrical equipment, effective load management, and routine monitoring of electricity usage patterns. Awareness programmes and capacity-building initiatives are periodically organized to encourage students, faculty members, technical staff, and administrative personnel to adopt energy-conscious practices such as switching off lights and electrical appliances when not in use, maximizing the use of natural daylight and ventilation, and promoting responsible energy-use behaviour across the campus.

Renewable energy initiatives, including the utilization of solar photovoltaic systems wherever applicable, further strengthen the institution's energy conservation efforts by reducing dependence on grid electricity and supporting the transition towards clean energy. The integration of renewable energy with conventional power systems enhances overall energy security while contributing to the reduction of carbon emissions.

The institution also emphasizes continuous monitoring of electricity consumption through systematic analysis of utility records, periodic energy audits, and evaluation of energy performance indicators. These activities facilitate the identification of energy-saving opportunities, support informed decision-making, and enable the implementation of targeted energy efficiency measures for continuous improvement.


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Overall, the Energy Conservation Practices adopted by Sathyabama Institute of Science and Technology demonstrate a proactive and integrated approach to sustainable energy management. Through the combined implementation of energy-efficient technologies, preventive maintenance, renewable energy utilization, operational optimization, and stakeholder awareness, the institution has established a strong foundation for reducing energy consumption, improving resource efficiency, and supporting long-term environmental sustainability. The initiatives presented in this section provide a valuable framework for achieving continuous improvements in energy performance while reinforcing the institution's commitment to responsible and sustainable campus operations.

2.6 Final Evaluation

The Energy Audit conducted at Sathyabama Institute of Science and Technology demonstrates that the institution has established a comprehensive and well-structured energy management system that effectively supports its academic, research, healthcare, residential, and administrative activities. The assessment evaluated energy consumption patterns, electrical infrastructure, renewable energy utilization, and energy conservation practices to determine the overall efficiency and sustainability of the campus energy management programme.

The audit findings indicate that the institution has adopted several energy-efficient measures that have significantly improved the reliability and performance of its electrical systems. The widespread use of LED lighting, energy-efficient electrical equipment, optimized operation of heating, ventilation and air-conditioning (HVAC) systems, and regular preventive maintenance have contributed to reducing energy consumption while maintaining a safe and comfortable learning environment. Continuous monitoring of electricity usage and systematic maintenance of electrical infrastructure have further enhanced operational efficiency and minimized energy losses.

The assessment also highlights the institution's commitment to integrating renewable energy into its overall energy strategy. The adoption of renewable energy technologies, including solar photovoltaic systems wherever implemented, has reduced dependence on conventional electricity sources, lowered operational costs, and contributed to the reduction of greenhouse gas emissions. These initiatives demonstrate the institution's proactive approach to promoting clean energy and supporting national and global sustainability objectives.


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The electrical infrastructure assessment confirms that the campus possesses a reliable and adequately maintained power distribution system capable of meeting current operational requirements. Regular inspection of transformers, substations, distribution panels, protection systems, and electrical safety installations has strengthened system reliability, improved power quality, and ensured compliance with applicable safety standards.

The audit further reveals that the institution has successfully established a culture of energy conservation through awareness programmes, operational optimization, responsible energy-use practices, and continuous performance monitoring. Active participation by students, faculty members, technical staff, and administrative personnel has strengthened the implementation of energy conservation initiatives and contributed to achieving measurable improvements in energy efficiency across the campus.

Overall, the Energy Audit confirms that Sathyabama Institute of Science and Technology has developed an effective and sustainable energy management framework that aligns with its environmental objectives and institutional sustainability goals. The baseline information generated through this assessment provides a valuable foundation for monitoring future energy performance, benchmarking institutional progress, identifying opportunities for continuous improvement, and guiding strategic investments in advanced energy-efficient technologies and renewable energy systems.

The findings of this audit reaffirm the institution's commitment to responsible energy management, resource conservation, and environmental stewardship. By continuously enhancing energy efficiency, expanding renewable energy utilization, and adopting innovative energy management practices, the institution is well positioned to strengthen its contribution toward sustainable campus development and a low-carbon future.

2.7 Recommendations

Based on the observations and findings of the Energy Audit, the following recommendations are proposed to further enhance energy efficiency, strengthen sustainable energy management practices, and improve the overall performance of the campus energy infrastructure:

1. **Strengthen Energy Monitoring:** Establish a comprehensive energy monitoring system with building-wise and department-wise energy metering to facilitate real-time


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tracking of electricity consumption, identify high-energy-use areas, and support data-driven decision-making.

2. **Enhance Energy-Efficient Infrastructure:** Continue replacing conventional electrical equipment with energy-efficient alternatives such as LED lighting, high-efficiency HVAC systems, energy-saving motors, and star-rated electrical appliances to further reduce electricity consumption.
3. **Expand Renewable Energy Utilization:** Increase the installed capacity of renewable energy systems, particularly rooftop solar photovoltaic installations, to reduce dependence on grid electricity, lower carbon emissions, and improve long-term energy sustainability.
4. **Optimize HVAC Operations:** Regularly maintain air-conditioning systems, optimize thermostat settings, improve insulation where required, and implement energy-efficient operational schedules to minimize unnecessary energy consumption.
5. **Promote Smart Energy Management:** Introduce intelligent energy management technologies such as occupancy sensors, daylight sensors, automatic lighting controls, programmable timers, and Building Management Systems (BMS) to optimize energy usage across campus facilities.
6. **Improve Preventive Maintenance:** Continue periodic inspection and preventive maintenance of transformers, electrical panels, distribution networks, power factor correction equipment, and backup power systems to reduce technical losses and improve system reliability.
7. **Strengthen Electrical Safety and Power Quality:** Regularly assess earthing systems, protective devices, power factor, voltage stability, and power quality parameters to ensure safe, efficient, and uninterrupted operation of the electrical infrastructure.
8. **Promote Energy Conservation Awareness:** Organize regular awareness programmes, workshops, and training sessions for students, faculty members, technical staff, and administrative personnel to encourage responsible energy-use practices and strengthen the institutional culture of energy conservation.
9. **Develop Energy Performance Indicators:** Establish measurable Key Performance Indicators (KPIs) and annual energy reduction targets to evaluate the effectiveness of conservation measures, monitor institutional progress, and support continuous improvement.
10. **Conduct Periodic Energy Audits:** Perform regular internal and third-party energy audits to assess system performance, identify new opportunities for energy savings,

evaluate compliance with applicable standards, and update the institutional energy management strategy.

11. **Encourage Research and Innovation:** Promote interdisciplinary research, student projects, and industry collaborations focused on renewable energy technologies, smart energy systems, energy storage solutions, and sustainable energy management practices.
12. **Strengthen Institutional Energy Policy:** Periodically review and update the institutional energy management policy to align with emerging technologies, national energy efficiency programmes, regulatory requirements, and global sustainability goals.

Conclusion

The Energy Audit demonstrates that Sathyabama Institute of Science and Technology has established a strong foundation for sustainable energy management through efficient electrical infrastructure, systematic energy monitoring, renewable energy initiatives, and effective conservation practices. The institution has successfully integrated energy efficiency into its operational framework, contributing to reduced energy consumption, improved resource utilization, and enhanced environmental performance.

The implementation of the above recommendations will further strengthen the institution's energy management system by improving operational efficiency, expanding the use of renewable energy, reducing greenhouse gas emissions, and enhancing energy resilience. Continuous monitoring, technological advancement, stakeholder participation, and periodic evaluation will support long-term improvements in energy performance and reinforce the institution's commitment to sustainable campus development.

By adopting these recommendations, Sathyabama Institute of Science and Technology can continue to serve as a model institution in energy conservation and environmental stewardship while contributing meaningfully to national and global sustainability objectives.


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