A DETAILED REPORT ON

ENERGY, ENVIRONMENT AND GREEN AUDIT



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited A++ Grade by NAAC | 12B Status by UGC | Approved by AICTE

JEPPIAAR NAGAR, SEMMENCHERRY,

SHOLINGANALLUR, CHENNAI - 600119

YEAR OF AUDIT: 2024-25

AUDIT CONDUCTED AND REPORT PREPARED BY

NIN ENERGY INDIA PRIVATE LIMITED

JUSA COMPLEX, NEW NO 47, OLD NO 21/2

PONNIAMMAN KOIL STREET, KOTTUR,

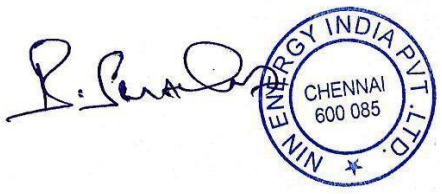
CHENNAI-600085, TAMILNADU, INDIA.

ACKNOWLEDGEMENT

We are deeply grateful to the management of **SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY (DEEMED TO BE UNIVERSITY)**, for providing **NIN Energy India Private Limited** the opportunity to conduct the Energy, Environment, and Green Audit at their esteemed campus located at **Jeppiaar Nagar, Semmencherry, Sholinganallur, Chennai - 600119.**We sincerely appreciate the proactive support and valuable cooperation extended by the management, faculty, and staff during the audit process. Their commitment to sustainability and environmental stewardship greatly contributed to the successful completion of this study.

It is our privilege to contribute to the institute's ongoing efforts toward achieving a greener, more sustainable campus.

For NIN ENERGY INDIA PRIVATE LIMITED



(B. SENTHILKUMAR)

ACCREDITED ENERGY AUDITOR (AEA 023)

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ABBREVIATIONS

Dept	Department
EER	Energy Efficiency Ratio
INR	Indian Rupees
KL	Kilo Litre
kWh	Kilo Watt Hour
LED	Light Emitting Diode
LPG	Liquified Petroleum Gas
t CO2	Tonne Of Co2
TR	Ton of refrigeration
BLDC	Brushless direct current motor

1. INTRODUCTION ABOUT GREEN AUDIT

A Green Audit at Sathyabama is carried out as a regular practice to understand and improve the institution's environmental impact. It involves a systematic review of sustainability measures, resource usage, energy efficiency, waste management, and overall ecological responsibility. Through this process, the university continuously monitors its environmental footprint, identifies areas for improvement, and strengthens eco-friendly initiatives. These practices reflect Sathyabama's commitment to creating a sustainable campus, fostering environmental awareness among students and staff, and contributing positively to society and the environment.

2. OBJECTIVES

In recent times, adopting green practices has become an essential way for institutions to reflect their commitment to environmental responsibility. Since its inception, our institute of science and technology has prioritized maintaining a clean, eco-friendly, and sustainable campus. These practices focus on identifying and strengthening actions that support sustainability, including efficient resource use, waste reduction, and conservation initiatives. This proactive approach demonstrates our dedication to nurturing a greener environment and building a sustainable future for generations to come. The main objectives of carrying out green audit are:

- ✓ To map the geographical location of the institute of science and technology
- ✓ To document the floral and faunal diversity of the institute of science and technology
- ✓ To record the meteorological parameter of institute of science and technology
- ✓ To document the ambient environmental condition of weather, air, water and noise of the institute of science and technology
- ✓ To document the waste disposal system
- ✓ To estimate the energy requirements of the institute of science and technology
- ✓ To report the expenditure on green initiatives during the last five years

3. INTRODUCTION ABOUT THE INSTITUTE OF SCIENCE AND TECHNOLOGY

Sathyabama Institute of Science and Technology has been a distinguished center of excellence in Engineering, Science, and Technology for over three decades. The institution offers a wide range of multidisciplinary academic programs across Engineering, Science, Technology, Law, Dental Science, Pharmacy, Nursing, Management, Arts and Science, and Allied Health Sciences. Established under Section 3 of the UGC Act, 1956, Sathyabama has consistently demonstrated its commitment to quality education and innovation.

The university embraces modern pedagogical practices, supported by a team of dynamic faculty, state-of-the-art infrastructure, and world-class research facilities. Guided by the visionary leadership of Dr. Mariazeena Johnson (Chancellor), Dr. Marie Johnson (President), Mr. J. Arul Selvan (Vice President), Ms. Maria Bernadette Tamilarasi (Vice President), and Ms. Maria Catherin Jayapriya (Vice President), Sathyabama continues to set benchmarks in higher education.

National and International Recognition

- Ranked **51st among Indian Universities** by the National Institutional Ranking Framework (NIRF), Government of India, in 2023.
- Consistently placed among the **Top 100 Universities in India** for eight consecutive years.
- Ranked among the **Top 5 Institutions in the country for Innovation** by the ATAL Ranking of Institutions for Innovation Achievements (ARIIA), Government of India.
- Featured in global rankings by **Times Higher Education** and **QS**, affirming its international standing.

Research and Innovation Sathyabama is a research-intensive university with advanced laboratories and facilities dedicated to emerging areas of science and technology. It has established collaborations with leading universities and research organizations at both national and international levels. The institution has successfully undertaken numerous sponsored and collaborative R&D projects funded by prestigious organizations worldwide.

Milestone Achievement On 22nd June 2016, Sathyabama made history in space research with the successful launch of **"SATHYABAMASAT"** in association with ISRO, marking a significant contribution to India's space exploration journey.

Global Outlook Through its academic excellence, impactful research, and international collaborations, Sathyabama has emerged as a leading institution that delivers education of global standards, shaping future leaders and innovators.

3.1 VISION

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

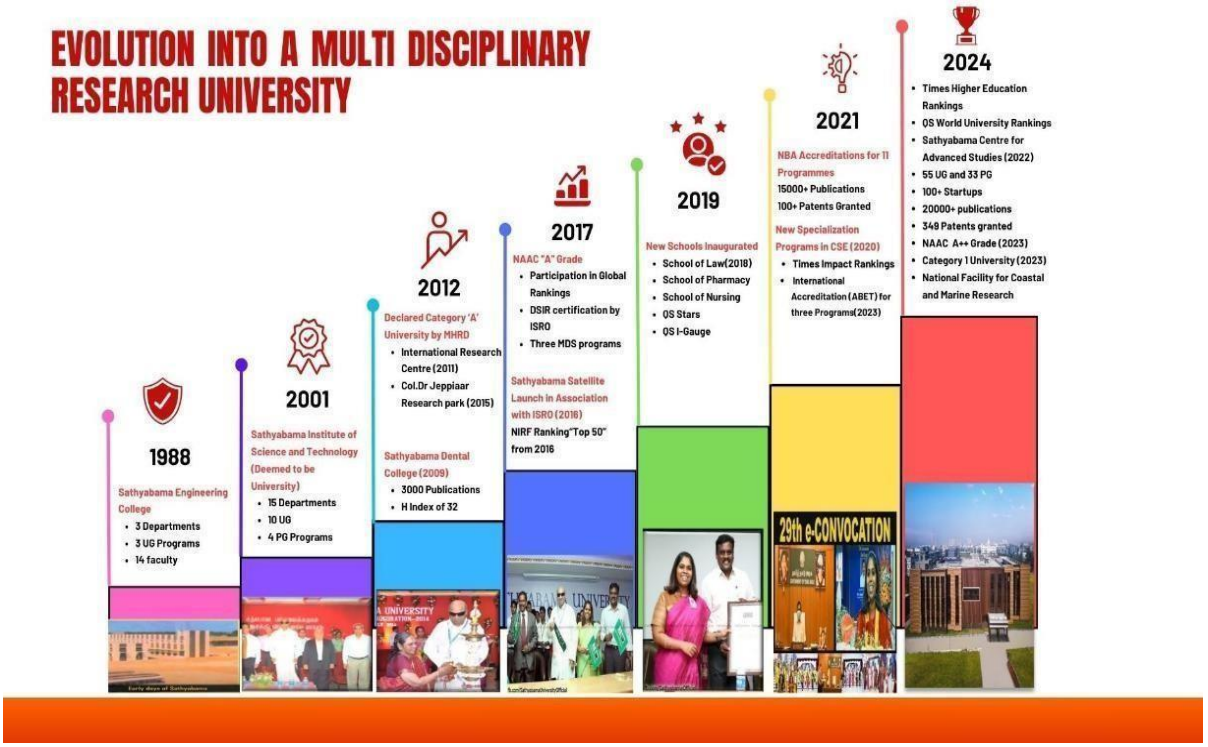
3.2 MISSION

challenges

- 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

3.3 OBJECTIVE

- To improve the livelihood of the people of the beneficiary villages To help them generate income through alternate source
- To develop the selected villages through various measures
- To solve the day-to-day problems of the villages by providing technological solutions



3.4 SUSTAINABLE DEVELOPMENT GOALS

In 2015, 193 Nations agreed with the United Nation that they can change the world for the better by eradicating poverty and hunger, promoting good health and quality education, promoting gender equality, promoting access to clean water and clean energy, taking actions to combat climate change, protecting life below water and life on land, Promoting peaceful and inclusive societies for sustainable development and strengthening the means of implementation and development through global partnerships for sustainable development.

3.5 SATHYABAMA'S CONTRIBUTION TOWARDS SUSTAINABLE DEVELOPMENT GOALS

- Sathyabama Institute of Science and Technology support the implementation of every SDG, through learning and teaching, research and organizational governance.
- Sustainability forms the core of teaching, and the notion of sustainable development is instilled in the students. Students are educated about the sustainability issues, and a sense of responsibility is created.
- To have sustainability principle inbuilt in the curriculum of the University.
- Research at Sathyabama addresses the Sustainable Development Goals of Agenda 2030, which requires the participation of individuals, institutions, countries and Governments in creating a better world free from poverty, hunger, health issues, inequalities, and providing access to quality education, access to clean water and sanitation, access to affordable and clean energy.
- Sathyabama Institute of Science and Technology is involved in community development initiatives that contribute positively to the development of sustainable community. It is playing a vital role in developing a sustainable community
- where the needs of everyone in the community are met and people feel safe, healthy and happy and the prosperity jointly enjoyed
- Where the needs are met while ensuring that adequate resources are available for future generations.
- where the environment is appreciated, protected and damage to the environment is minimised
- Where the employment opportunities are growing and working lives are more rewarding
- Sathyabama is working to achieve the following goals
- Clean air and water and nutritious food for everyone
- Protection of ecosystems and biological diversity
- Conservation of water, land, energy, reduction, reuse and recycling of waste.
- To pursue these goals, the Institution:
- Use appropriate technology to minimize emissions and pollution
- Use of renewable energy and Minimize waste
- Advocates green concepts like organic farming
- Avoid usage of plastics
- Advocate Plantation drive
- Advocates mass transportation
- Advocates the usage of biofuel and bio-fertilizers
- Promotes eco-conscious and eco-friendly initiatives

VARIOUS PROGRAMME SCHOOLS UNDER SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

- School of Computing
- School of Electrical and Electronics
- School of Mechanical Engineering
- School of Bio and Chemical Engineering
- School of Building and Environment
- School of Management Studies
- School of Science and Humanities
- School of Pharmacy
- School of Nursing
- School of Dental Science
- School of Law
- School of Allied Health Sciences

3.7 TEACHING AND LEARNING

Sustainability forms the core of teaching, and the notion of sustainable development is instilled in the students. Students are educated about the sustainability issues, and a sense of responsibility is created. Sathyabama is committed to providing a quality education to students to develop them as responsible citizens who are concerned about their environment. We design our curriculum with adequate emphasis on environmental education. Subjects relating to sustainable development are included in the curriculum of all branches of studies, ensuring that all our students are groomed as professionals who follow sustainability principles in their professional life.

3.8 SUSTAINABILITY IN THE CURRICULUM

To have sustainability principle inbuilt in the curriculum the following Courses are included in the curriculum of the University.

- Green computing for Computer
- science students
- Energy Engineering
- Environmental impact assessment
- Environment pollution control
- Disaster management
- Wind and solar energy

- Health informatics
- Environmental science and engineering
- Environmental biotechnology
- Biosafety, bioethics and IPR
- Water resources engineering
- Irrigation engineering
- Air and noise pollution
- Ground water engineering
- Solid waste management
- Energy and environmental management
- Environmental planning and design

3.9 MASTER'S PROGRAMMED OFFERED ON SUSTAINABLE

A master's Programs on Sustainable Architecture is offered in the School of Built Environment.

3.10 RESEARCH AT SATHYABAMA

Sathyabama is one of India's premier Higher Education Institutions known for its research excellence. World-class research facilities are available at the Institution. Our university's research initiatives serve as a foundation for transformative solutions that address the Sustainable Development Goals, equipping students and faculty to be catalysts of change in building a sustainable, equitable, and prosperous future for all.

3.11 RESEARCH STRATEGIES

- Establishment of Research Centres in the frontier areas of Science and Technology
- Setting up Centres of Excellence in association with Government agencies
- Promoting research culture through seed funding
- Collaboration with Industries and Universities across the world to improve the research
- strength
- Strengthening research infrastructure
- Establishment of Centre for innovation and Technology Transfer to promote innovation
- and knowledge transfer
- Strengthen the Institution-Industry interaction through involvement in consultancy-based
- research projects
- To promote research activities, Sathyabama installs a research culture and provides research
- enabling environment through the following measures
- Drafting a research policy to guide the research activities
- Making substantial investments to develop research infrastructure
- Providing Institutional seed fund to encourage innovation and research and facilitate
- conversion of ideas into products

- Setting up IPR facilitation Cell to support and promote innovation and protect intellectual
- property
- Rewarding the researchers appropriately rewarded for their research accomplishments.
- Allocating a significant percentage (7%) in its annual budget for research to upgrade the
- research infrastructure and research facilities
- Constituting Research Committees to review the research and development activities of
- the Institution

3.12 SATHYABAMA RESEARCH CENTRES WORKING TOWARDS SUSTAINABLE GOALS

- The following are the Research Centre of Sathyabama that are carrying out research on almost
- All the major areas of science and Technology:
- Centre for Nanoscience and Nanotechnology
- Centre for Energy Research
- Centre for Ocean Research
- Centre for Space Technology
- The Centre for Bioresource Research and Development
- Centre for Earth and Atmospheric Science
- Centre for Remote Sensing and Geoinformatics
- Centre for Robotics and Automation
- Centre for Quality Assurance and Non-Destructive Evaluation
- Centre for Waste Management
- Centre for Laboratory Animal Research
- Centre for Climate Change Studies
- Centre for Drug Discovery and Development

3.13 SOCIAL SUSTAINABILITY DIMENSION AND EFFICIENT RESOURCE UTILIZATION

Free education plays a crucial role in addressing Sustainable Development Goal 1, which aims to end poverty in all its forms. By providing access to quality education without financial barriers, Sathyabama Provides admission of students belonging to lower income group with full scholarships and helps the society to empower individuals and communities to break the cycle of poverty. When education is free, children from low-income families are more likely to participate in higher education, opening future economic opportunities for them and their families. Education equips individuals with skills and knowledge, enabling them to secure better-paying jobs and break out of poverty. Free education increases the employability of marginalized groups, helping them to participate in the formal economy. Sathyabama is dedicated to supporting students from lower- income backgrounds by providing full scholarships, an initiative that directly aligns with several Sustainable Development Goals including SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 5 (Gender

Equality) and SDG10 (Reduced Inequalities). By ensuring that financial barriers do not stand in the way of higher education, we empower students to pursue their academic and career goals, creating opportunities that contribute to long-term economic stability and social equity. Improving the livelihood of Marginalized community through village Adoption Initiative Sathyabama's initiatives will always focus on finding solutions to the social, economic and environmental problems faced by the society. The Institution believes that villages are to be developed to develop the nation. Several activities are undertaken by the institution for livelihood enhancement from health, education and economic perspective.

3.14 ADDITIONAL TRAINING SKILLS

The academicians and researchers of the institution have trained individuals from the Scheduled Caste (SC) communities in the villages of Aadhanur, Eachampoondi, and Periakottagam on a range of sustainable technologies, including biodiesel production, biochar production from agricultural waste, accelerated bio compost production from vegetable market waste, fly ash brick manufacturing, and hydroponics, an innovative alternative farming technique. These training sessions are conducted through the recently established Science, Technology, and Innovation (STI) Hub in Cuddalore, Kattumannarkoil Taluk.

3.15 IMPACT OF THE INSTITUTION INITIATIVES

Community Empowerment and Skill Development:

- The training programs conducted by the institution aim to empower marginalized communities by equipping them with modern skills and technologies that are both economically viable and environmentally sustainable.
- Special focus has been given to creating awareness about the long-term benefits of adopting green technologies for income generation and environmental preservation.

Promotion of Sustainable Practices:

- The use of Agro waste for biochar production and vegetable market waste for bio composting not only helps reduce landfill burden but also promotes circular economy practices within the local community.
- Hydroponics training has introduced farmers to innovative farming techniques that maximize yield with minimal water usage, addressing challenges posed by water scarcity.

Environmental Benefits:

- The initiatives are aligned with global goals for climate action, promoting the use of renewable energy, waste management, and sustainable agriculture practices.
- Biochar and compost production initiatives have significantly contributed to soil health improvement, enhancing agricultural productivity in the region.

Economic Impact:

- The production of fly ash bricks has provided villagers with an additional source of income while promoting eco-friendly construction practices in the area.
- Biodiesel production training has paved the way for small-scale businesses, offering the potential for income generation through the sale of renewable energy products.

Collaborative Efforts:

- The success of these programs is the result of collaborative efforts between the institution, local government bodies, and community stakeholders, ensuring a holistic approach to development.
- Periodic follow-ups and support from the institution ensure the sustainability of these practices and technologies in the long run.

STI Hub's Role:

- The STI Hub serves as a centre of excellence, fostering innovation and enabling the dissemination of advanced knowledge and practices to the rural population.
- Through the hub, the institution provides access to modern equipment, technical expertise, and continuous mentorship for the beneficiaries.

Capacity Building for Women:

- Special emphasis has been placed on training women in these villages, empowering them to take active roles in sustainable livelihood activities, thereby fostering gender equity.

Future Plans and Scalability:

- The institution plans to expand the reach of these training programs to neighbouring villages and taluks, thereby scaling the impact and promoting sustainability at a larger level.
- Further research and development initiatives will focus on integrating advanced technologies like solar energy, bio-digesters, and rainwater harvesting systems into the community training modules.

Alignment with National Goals:

These initiatives align with the Government of India's Swachh Bharat Mission, National Biodiversity Action Plan, and Sustainable Development Goals (SDGs), particularly Goals 6 (Clean Water and Sanitation), 7 (Affordable and Clean Energy), and 13 (Climate Action).

4. EXECUTIVE SUMMARY

The Energy, Environment and Green Audit for the year 2024-2025 has been updated with the infrastructure, energy and resource data verified by the institution. The proposed energy conservation measures for the remaining conventional equipment are summarised below.

S. No	Energy Efficiency Measures	Estimated annual Energy Savings, kWh/Annum	Estimated Investment, INR	Monetary Savings, INR/Annum	Payback Period, Years	Emission Reduction, t CO2/Annum
1	Replace remaining 6,456 conventional ceiling fans with 30 W BLDC ceiling fans	5,81,040	2,58,24,000	45,14,681	5.72	412.5
2	Replace remaining 4,127 nos. 36 W tube lights with 20 W LED tube lights	1,32,064	12,38,100	10,26,137	1.21	93.8
	Total	**7,13,104**	**2,70,62,100**	**55,40,818**	**4.88**	**506.3**

Description	Value
Annual Electrical Energy consumption, kWh/Annum	**52,12,026**
Annual Electrical Energy Savings, kWh/Annum	7,13,104
Electrical Energy Savings, %	**13.7**

Green measures already implemented by the institution

S. No	Green measure already implemented	Energy / fuel benefit	CO2 avoided, t/Annum
1	Wind and solar power from external sources (22% of EB supply)	11,46,646 kWh/Annum	814.1
2	Solar PV system on campus – 100 kW	1,00,000 kWh/Annum	71
3	Biogas plant – 1 tonne/day canteen food waste	≈ 815 LPG cylinders/Annum	46.2
4	520 BLDC ceiling fans (30 W) in Ladies and Boys Hostels	46,800 kWh/Annum	33.2
	Total		**964.5**

5. ENERGY AUDIT FOR YEAR 2024-2025

The energy-saving projects focus on reducing energy consumption, cutting operational costs, and lowering carbon emissions. Two key measures have been identified for the equipment that is yet to be upgraded:

- Replacing Conventional Ceiling Fans with BLDC Fans: Of the 6,976 ceiling fans on the campus, 520 have already been replaced with 30 W BLDC fans. Replacing the remaining 6,456 conventional fans with 30 W BLDC fans leads to annual energy savings of 5,81,040 kWh, with an investment of INR 2,58,24,000. The monetary savings amount to INR 45,14,681 per annum, achieving a payback period of 5.7 years while reducing emissions by 412.5 tons of CO2 annually.

- ❖ Replacing Tube Lights with LED Tube Lights: Based on the verified block-wise LED count, 18,974 LED fittings are already in use and 4,127 tube lights of 36 W remain. Replacing them with 20 W LED tube lights results in annual energy savings of 1,32,064 kWh, requiring an investment of INR 12,38,100. This measure generates annual monetary savings of INR 10,26,137, with a payback period of about 14.5 months and an emissions reduction of 93.8 tons of CO2 annually.

Summary: Together, these projects yield total energy savings of 7,13,104 kWh per annum, requiring an investment of INR 2,70,62,100 and producing annual savings of INR 55,40,818. They also contribute to a total emissions reduction of 506.3 tons of CO2 per year.

With an **annual electrical energy consumption of 52,12,026 kWh**, the proposed initiatives achieve **annual savings of 7,13,104 kWh**, a **13.7% reduction in energy consumption**. In addition, 22% of the electricity supplied to the campus (11,46,646 kWh) is sourced from external wind mills and solar plants, and together with the on-campus solar PV, the biogas plant and the BLDC fans, the low-carbon measures already in place avoid about 965 tons of CO2 every year.

6. ABOUT NIN ENERGY INDIA PRIVATE LIMITED

NIN Energy India Private Limited is providing Energy Related services like Energy Audit, Power Quality Audit, Infrared Thermography, Thermal Audit, PAT Monitoring and Verification Audit, PAT Consultancy, Green Building Commissioning, Electrical Safety Audit, Internet of Things, Carbon Foot Printing, etc. We have experienced team and helping the customers to manage and reduce their energy consumption. We are providing complete Energy Services under one roof at a competitive price. Our team members are having more than 10 years of experience in Energy, Renewable Energy and Environmental Engineering with good Academic background.

we pride ourselves on our highly skilled and experienced team that provides comprehensive energy services aimed at optimizing energy consumption and ensuring sustainable practices across industries.

Our team is made up of professionals who are highly qualified, committed to excellence, and specialize in providing energy audits, renewable energy solutions, and environmental sustainability services. Here is a breakdown of our key team qualifications and expertise:

6.1 OUR TEAM STRENGTH

- Accredited Energy Auditor by Bureau of Energy Efficiency, Government of India
- Certified Energy Auditors by Bureau of Energy Efficiency, Ministry of power
- Certified Measurement and Verification Professionals (CMVP) by EVO
- Certified Level II Thermographer
- Enlisted with Tamil Nādu Energy Development Agency (TEDA) as a system Integrator for Solar PV systems.
- Lead Auditors for ISO 50001 (Energy Management System)
- Lead Auditors for ISO 14064 (Green House Gas inventory and verification)
- Lead Auditors for ISO14000 (Environmental Management System)

6.2 AUDIT TEAM

The Green Audit of INSTITUTE OF SCIENCE AND TECHNOLOGY was conducted by the expert team from NIN Energy India Private Limited, renowned for their specialization in energy and environmental audits. The team's composition reflects a blend of high qualifications and extensive experience:

Name	Designation
Mr. B SENTHIL KUMAR	• ACCREDITED ENERGY AUDITOR BY BUREAU OF ENERGY EFFICIENCY • ISO 50001:2018 LEAD AUDITOR • ISO 14064 LEAD AUDITOR • ISO 14001 LEAD AUDITOR
Mr. T. KARTHIKEYAN	CERTIFIED ENERGY AUDITOR BY BUREAU OF ENERGY EFFICIENCY
Mr. M. ABILASH	SENIOR ENGINEER

6.3 INSTRUMENTS USED FOR THE AUDIT

Instruments used in the Green Audit are as follows.

S. No	Name of the instrument
1	Air quality meter
2	Noise meter
3	Lux meter
4	Thermal Imager
5	Clamp meter

6.4 AIR QUALITY METER

Purpose: Measures various air quality parameters, including concentrations of particulate matter (PM), carbon dioxide (CO2), carbon monoxide (CO), ozone (O3), nitrogen dioxide (NO2), sulphur dioxide (SO2), and volatile organic compounds (VOCs).

Usage of Audit:

- **Ensures the quality of indoor air in educational institutions and other facilities.**
- Measures pollutant levels to comply with environmental health standards.
- Helps in assessing the effectiveness of ventilation systems and identifying potential air quality issues that may affect the health and well-being of students, staff, and other stakeholders.

6.5 NOISE METER (SOUND LEVEL METER)

Purpose: Measures the sound pressure level in decibels (dB) across different frequencies.

Usage of Audit:

- Helps assess the noise levels in classrooms, lecture halls, and surrounding areas to ensure they are within acceptable limits for comfort and safety.

- Essential in noise pollution control, especially in urban settings where institutions are located near busy roads, industries, or airports.
- Noise meters are used to determine whether noise levels comply with environmental standards set by local authorities or the educational institution's own guidelines.

6.6 LUX METER (LIGHT METER)

Purpose: Measures illuminance in lux (lx), which quantifies the amount of light reaching a surface.
Usage in Audit:

- Ensures that lighting levels in classrooms, libraries, laboratories, and other spaces meet minimum standards for effective learning and safety.
- Helps assess whether energy-efficient lighting systems (like LED) are being used appropriately to minimize energy consumption while providing adequate illumination.
- Ensures compliance with energy management standards and ISO 50001, helping educational institutions reduce their energy footprint while enhancing comfort for students and faculty.

6.7 THERMAL IMAGER (INFRARED CAMERA)

Purpose: Detects heat signatures and visualizes temperature differences on surfaces using infrared radiation.
Usage of Audit:

- Used to identify energy inefficiencies such as heat leaks in buildings, poor insulation, faulty electrical equipment, or areas of equipment overheating.
- Plays a crucial role in energy audits, helping locate hotspots in HVAC systems, electrical panels, or machinery that may require maintenance or upgrades.
- Thermal imagers contribute to identifying energy-saving opportunities, improving overall building energy performance, and ensuring compliance with energy efficiency standards.

6.8 CLAMP METER

Purpose: Measures electrical current (AC or DC) without the need to disconnect the circuit. The clamp surrounds a conductor and measures the magnetic field to determine the current. **Usage of Audit**:

- Used to monitor energy consumption of electrical systems and machinery to ensure efficiency and identify areas where energy usage can be reduced.
- Helps identify faulty electrical systems or equipment that might be consuming excess energy, such as motors, lights, and HVAC systems.
- Important in ensuring that an institution’s electrical systems are operating within safe limits and to monitor energy usage for energy efficiency audits.

6.9 SUMMARY OF INSTRUMENT & USAGE OF AUDIT

- ❖ Air Quality Meter: Monitors air quality and health safety for a healthy learning environment.
- ❖ Noise Meter: Ensures noise levels in educational spaces comply with safety and comfort standards.
- ❖ Lux Meter: Assesses lighting levels for optimal energy use and comfort.
- ❖ Thermal Imager: Identifies energy inefficiencies and heat-related issues in building systems.
- ❖ Clamp Meter: Measures electrical consumption and energy efficiency of electrical systems.

7. LOCATION OF THE INSTITUTION

The **Sathyabama Institute of Science and Technology (Deemed to be University), a prestigious Category-1 University recognized by UGC** is located in **Jeppiaar Nagar, Semmencherry, Sholinganallur, Chennai - 600119.**

- Latitude: **12.8729° N**
- Longitude: **80.2261° E**

8. GENERAL DETAILS

Overview of Sathyabama Institute of Science and Technology

S. No	Description	Details
1	Name of the INSTITUTE OF SCIENCE AND TECHNOLOGY	Sathyabama Institute of Science and Technology
2	Address	Jeppiaar Nagar, Semmencherry, Sholinganallur, Chennai - 600 119
3	No of building blocks & Building blocks details	26
4	No of departments and its details	32
5	No of student's details	16609
6	No of Teaching staff	1533
7	No of non-teaching staff	2477
8	No of Guest lectures	42
9	No of Classrooms	512
10	No of Labs	185
11	No of Smart classrooms	48
12	Courses available in the INSTITUTE OF SCIENCE AND TECHNOLOGY	84
13	No of hostel building	10
14	Waste water treatment details	STP Plant
15	No of solar streetlights available in the campus	80KW

9. UNDERGRADUATE PROGRAMME OFFERED

9.1 ENGINEERING PROGRAMMES

Approved by AICTE, the institution offers a range of undergraduate engineering programs, including B.E., B. Tech, and B. Des, for the Academic Year 2025-2026 (Regular), designed to equip students with technical expertise and innovative skills.

S.NO	NAME OF THE PROGRAMME	DURATION
1	B.E - Computer Science and Engineering	4 years
2	B.E - Computer Science and Engineering with specialization in Artificial Intelligence	4 years
3	B.E - Computer Science and Engineering with specialization in Data Science	4 years
4	B.E - Computer Science and Engineering with specialization in Internet of Things	4 years
5	B.E - Computer Science and Engineering with specialization in Artificial Intelligence and Robotics	4 years
6	B.E - Computer Science and Engineering with specialization in Artificial Intelligence and Machine Learning	4 years
7	B.E - Computer Science and Engineering with specialization in Block Chain Technology	4 years
8	B.E - Computer Science and Engineering with specialization in Cyber Security	4 years
9	B. Tech Artificial Intelligence and Data Science	4 years
10	B.E. Computer Science and Business Systems	4 years
11	B.E - Electrical and Electronics Engineering	4 years
12	B.E - Electronics and Communication Engineering	4 years
13	B.E. Electronics and Communication Engineering with Specialization in Data Science	4 years
14	B.E - Mechanical Engineering	4 years
15	B.E - Mechatronics	4 years
16	B.E - Aeronautical Engineering	4 years
17	B.E - Civil Engineering	4 years
18	B. Tech - Information Technology	4 years
19	B. Tech - Chemical Engineering	4 years
20	B. Tech - Biotechnology	4 years
21	B. Tech - Biomedical Engineering	4 years
22	B. Des. - Design	4 years

9.2 ARCHITECTURE PROGRAMMES

Approved by the Council of Architecture, the institution offers undergraduate architecture programs for the Academic Year 2024-2025 (Regular), aimed at fostering creativity, technical proficiency, and a deep understanding of sustainable design practices.

S.NO	NAME OF THE PROGRAMME	DURATION
1	B.Arch.	5 years

9.3 PHARMACY PROGRAMMES

Approved by the Pharmacy Council of India, the institution offers undergraduate pharmacy programs for the Academic Year 2024-2025 (Regular), designed to provide students with a strong foundation in pharmaceutical sciences and prepare them for careers in healthcare and drug development.

S.NO	NAME OF THE PROGRAMME	DURATION
1	B.Pharm. - Pharmacy	4 years
2	D.Pharm. - Pharmacy	2 years
3	Pharm.D - Doctor of Pharmacy	6 years

9.4 NURSING PROGRAMMES

Approved by the Indian Nursing Council and Tamil Nadu Nurses and Midwives Council (TNNMC), the institution offers undergraduate nursing programs for the Academic Year 2024-2025 (Regular), aimed at equipping students with the clinical skills, knowledge, and ethical foundation needed to excel in the healthcare profession.

S.NO	NAME OF THE PROGRAMME	DURATION
1	B.Sc., Nursing	4 Years

9.5 PHYSIOTHERAPY PROGRAMMES

Approved by the Board of Management, the institution offers undergraduate physiotherapy programs for the Academic Year 2024-2025 (Regular), designed to provide students with the clinical expertise, hands-on experience, and knowledge required to excel in the field of physiotherapy and rehabilitation.

S.NO	NAME OF THE PROGRAMME	DURATION
1	B.P.T. Physiotherapy	4 Years

9.6 DENTAL PROGRAMMES

Approved by the Dental Council of India, the institution offers undergraduate dental programs for the Academic Year 2024-2025 (Regular), aimed at providing students with comprehensive knowledge, clinical skills, and hands-on experience to excel in the field of dentistry.

S.NO	NAME OF THE PROGRAMME	DURATION
1	B.D.S - Bachelor of Dental Surgery	5 Years with Integrated Internship

9.7 LAW PROGRAMMES

Approved by the Bar Council of India, the institution offers undergraduate law programs for the Academic Year 2024-2025 (Regular), designed to equip students with a strong foundation in legal theory, practical skills, and ethical practices required for a successful career in law.

S.NO	NAME OF THE PROGRAMME	DURATION
1	B.A. LL.B. (Hons.)	5 years
2	B.B.A. LL.B. (Hons.)	5 years
3	B.Com. LL.B. (Hons.)	5 years
4	LL.B.	3 years

9.8 ARTS, SCIENCE AND HUMANITIES PROGRAMMES

Approved by the Board of Management, the institution offers undergraduate programs in Arts, Science, and Humanities for the Academic Year 2024-2025 (Regular), designed to provide students with a well-rounded education that fosters critical thinking, creativity, and a deep understanding of diverse disciplines.

S.NO	NAME OF THE PROGRAMME	DURATION
1	B.B.A. - Bachelor of Business Administration	3 years
2	B.Com. - Bachelor of Commerce	3 years
3	B.Com. - Financial Accounting	3 years
4	B.Sc. - Visual Communication	3 years
5	B.Sc. - Physics	3 years
6	B.Sc. - Chemistry	3 years
7	B.Sc. - Computer Science	3 years
8	B.Sc. - Mathematics	3 years
9	B.Sc. - Biochemistry	3 years
10	B.Sc. - Fashion Design	3 years
11	B.Sc. - Biotechnology	3 years

S.NO	NAME OF THE PROGRAMME	DURATION
12	B.Sc. - Microbiology	3 years
13	B.Sc. - Psychology	3 years
14	B.A. - English	3 years
15	B.Sc. - Bio Informatics and Data Science	3 years
16	B.Sc. - Clinical Nutrition and Dietetics	3 years
17	B.Sc. - Medical Lab Technology	3 years
18	B.Sc. - Computer Science specialization in Artificial Intelligence	3 years
19	B.Sc. - Hotel Management and Catering	3 Years
20	B.Sc. - Data Science	3 Years
21	B.Sc. - Information Technology	3 Years
22	B.C.A - Bachelor of Computer Applications	3 Years

9.9 ENGINEERING PROGRAMMES (PART TIME)

Approved by AICTE, the institution offers part-time undergraduate engineering programs (B.E. / B. Tech) for the Academic Year 2024-2025, designed to provide working professionals with the opportunity to enhance their technical skills and advance their careers while balancing their professional commitments.

S.NO	NAME OF THE PROGRAMME	DURATION
1	B.E - Computer Science and Engineering	3 ½ years
2	B.E - Electrical and Electronics Engineering	3 ½ years
3	B.E - Electronics and Communication Engineering	3 ½ years
4	B.E - Mechanical Engineering	3 ½ years
5	B.E - Civil Engineering	3 ½ years
6	B. Tech - Chemical Engineering	3 ½ years

10. POST GRADUATE PROGRAMMES OFFERED

10.1 ENGINEERING PROGRAMMES

Approved by AICTE, the institution offers regular postgraduate engineering programs (M.E. / M. Tech.) for the Academic Year 2024-2025, designed to provide advanced knowledge, research opportunities, and specialized skills to prepare students for leadership roles in the engineering and technology sectors.

S.NO	NAME OF THE PROGRAMME	DURATION
1	M.E. Computer Science and Engineering	2 Years
2	M.E. Applied Electronics	2 Years
3	M.E. Computer Aided Design	2 Years
4	M.E. Structural Engineering	2 Years
5	M.E. Power Electronics and Industrial Drives	2 Years
6	MTech. Biotechnology	2 Years

S.NO	NAME OF THE PROGRAMME	DURATION
7	MTech. Medical Instrumentation	2 Years
8	M.E. Embedded Systems and IoT	2 Years

10.2 ARCHITECTURE PROGRAMMES

Approved by the Council of Architecture, the institution offers regular postgraduate architecture programs for the Academic Year 2024-2025, designed to equip students with the creative, technical, and professional skills required to excel in the dynamic field of architecture and urban design.

S.NO	NAME OF THE PROGRAMME	DURATION
1	M. Arch. Sustainable Architecture	2 Years
2	M. Arch. Building Management	2 Years

10.3 MANAGEMENT PROGRAMMES

Approved by AICTE, the institution offers regular management programs for the Academic Year 2024-2025, designed to provide students with a strong foundation in business principles, leadership skills, and strategic thinking to excel in the competitive global marketplace.

S.NO	NAME OF THE PROGRAMME	DURATION
1	M.B.A - Master of Business Administration	2 years

10.4 PHARMACY PROGRAMMES

Approved by the Pharmacy Council of India, the institution offers regular postgraduate pharmacy programs for the Academic Year 2024-2025, designed to equip students with comprehensive knowledge and practical skills in pharmaceutical sciences, preparing them for successful careers in healthcare, drug development, and pharmacy practice.

S.NO	NAME OF THE PROGRAMME	DURATION
1	M. Pharm with Specialization in Pharmaceutics	2 Years

10.5 DENTAL PROGRAMMES

Approved by the Dental Council of India, the institution offers regular postgraduate dental programs for the Academic Year 2024-2025, designed to provide students with a thorough understanding of dental sciences, clinical expertise, and hands-on experience to prepare them for successful careers in dentistry.

S.NO	NAME OF THE PROGRAMME	DURATION
1	M.D.S - Pedodontics and Preventive Dentistry	3 Years
2	M.D.S - Conservative Dentistry and Endodontics	3 Years
3	M.D.S - Orthodontics and Dentofacial Orthopaedics	3 Years

10.6 ART, SCIENCE AND HUMANITIES PROGRAMMES

Approved by the Board of Management, the institution offers regular postgraduate programs in Arts, Science, and Humanities for the Academic Year 2024-2025, aimed at nurturing creativity, analytical skills, and intellectual curiosity, preparing students for a wide range of professional and academic opportunities.

S.NO	NAME OF THE PROGRAMME	DURATION
1	M.A - English	2 years
2	M.Sc. - Visual Communication	2 Years
3	M.Sc. - Physics	2 Years
4	M.Sc. - Mathematics	2 Years
5	M.Sc. - Chemistry	2 Years
6	M.Sc. - Bioinformatics & Data Science	2 Years
7	M.Sc. - Computer Science	2 Years
8	M.Sc. - Medical Biotechnology and Clinical Research	2 Years
9	M.Com	2 Years
10	MCA - Master of Computer Applications	2 Years

10.7 LAW (LL.M) PROGRAMMES

Approved by the Bar Council of India, the institution offers regular postgraduate Law (LL.M) programs for the Academic Year 2024-2025, designed to provide advanced legal knowledge, research skills, and specialized expertise to prepare students for leadership roles in the legal profession.

S.NO	NAME OF THE PROGRAMME	DURATION
1	LL.M - Constitutional Law and Legal Order	2 Years
2	LL.M - Intellectual Property Laws	2 Years
3	LL.M - Criminal Law	2 Years

11. GEOGRAPHICAL LOCATION WITH CAMPUS MAP IN SCALE



12. BLOCK DETAILS

Details of Buildings, Rooms, and Labs in Sathyabama Institute of Science and Technology

S. No	Name of the Building	No of Rooms	No. Of Labs
1	Block 1	15	-
2	Block 2	4	-
3	Block 4	4	-
4	Block 5	4	-
5	Block 6	4	-
6	Block 7	4	-
7	Block 8	4	-
8	Block 9	12	-
9	Block 10	15	-
10	Block 11	4	9
11	Block 12	15	1
12	Block 14	26	-
13	Block 15	12	-
14	Block 16	27	-
15	Block 18	42	-
16	Block 20	5	-
17	Block 20A	18	-
18	Block 20B	18	-

S. No	Name of the Building	No of Rooms	No. Of Labs
19	B Arch	12	7
20	Old Computer Science	-	3
21	ECE	-	5
22	Mechanical	-	8
23	ETCE	-	6
24	Aeronautical	5	6
25	EEE	-	6
26	New CSE	15	2
27	New MBA	15	2
28	Old MBA	-	6
29	Mess	1	-
30	Ladies Mess	1	-
31	Physics and Chemistry	-	2
32	COE	1	-
33	Boys Hostel - MGR	195	-
34	Boys Hostel - Jeppiaar	145	-
35	Boys Hostel - Gopalakrishnan	96	-
36	Ladies Hostel - Mother Theresa	150	-
37	Ladies Hostel-Panimalar	90	-
38	Ladies Hostel - Rossery	90	-
39	Ladies hostel - Immaculate	92	-
40	Admin	20	-
41	Nano	40	-

13. ENVIRONMENTAL AUDIT

Carbon footprint is the total sum of greenhouse gases (GHG) emission caused by an organization, event, product, or person. As we are aware, the increasing concentration of GHGs in the atmosphere can accelerate climate change and global warming, it is very necessary to measure these emissions from our day-to-day activities. The first step towards managing GHG emissions is to measure them. There are some standards and guidelines to measure GHG emissions like GHG protocol, ISO 14064, the more comprehensive one Life Cycle Assessment (LCA), and market-based mechanisms. Out of them, ISO 14064 is an offset protocol and independent, voluntary GHG project accounting standard helps to quantify GHG emission of the organization, event, product, or person.

Our day-to-day activities are dependent on electricity which is mostly coming from coal-based power plants, Diesel and Petrol for our vehicles and LPG for cooking in our kitchen. All of the energy we use is derived from these fossil fuels which are GHG intensive. The following methodology helps you to calculate your carbon footprint resulting from the use of Electricity, Petrol, Diesel, and LPG.

Floristic status of the institution:

The current situation of planted trees is as follows:

S.No	Type of Trees	Total No of Trees	CO2 Absorption	Unit
1	No of matured trees (Age more than 10 years)	138	938.4	kg
2	No of Semi matured trees (Age below 10 years)	316	1,074.4	kg
3	No of plants/herbs/Shrubs	1,140	228.0	kg
4	No of medicinal plants	89	17.8	kg
5	Any other plants details, if any	216	43.2	kg
	Total	**1,899**	**2,301.8**	**kg**

Carbon absorption by flora in the Institution

Carbon absorption capacity of one matured tree = 6.8 kg of CO2. Carbon absorption capacity of one semi-matured tree = 3.4 kg of CO2. In bushes it absorbs an average of 200 g of CO2.

- The carbon absorption capacity of 138 matured trees in campus (138 × 6.8 kg CO2/Annum) = 938.4 kg of CO2/Annum.
- The carbon absorption capacity of 316 semi-matured trees in campus (316 × 3.4 kg CO2/Annum) = 1,074.4 kg of CO2/Annum.
- There are 1,445 plants, herbs, shrubs, medicinal and other plants (1,140 + 89 + 216) being raised in the gardens of the Institution; total carbon absorption was calculated to be (1,445 × 0.2 kg CO2/Annum) = 289.0 kg of CO2/Annum.

The grand total of carbon absorption by the flora in the campus is **2,301.8 kg (2.30 tCO2) per year.**

Description	Unit	Values
Annual Emissions from Electricity – conventional grid share (40,65,380 kWh), tCO2	tCO2 /year	2,886.4
TOTAL EMISSIONS FROM FACILITY	tCO2 /year	2,886.4

Description	Unit	Values
Carbon absorption by mature trees, semi mature trees, bushes, and lawns	tCO2 /year	2.30
Net carbon emission of the campus	tCO2 /year	2,884.1
Carbon reduction opportunities by energy saving projects	tCO2 /year	506.3
Estimated Carbon Emissions after implementing the Energy Saving Projects	tCO2 /year	2,377.8

LPG consumption Details

Description	Details
No of student's details	16609
No of Teaching staff	1533
No of non-teaching staff	2477
No of Guest lectures	42
Total	20661
Average LPG cylinder usage per day	22
Average LPG cylinder usage per month	660
Average LPG cylinder usage per Year	7920
Cost of one LPG cylinder	3000
Food wasted by students/staff per day kg	1000 (to biogas plant)

Observations:

REST ROOM(TOILETS)

S. No	Description	Details
1	No of rest rooms available in the campus	45 nos'
2	Availability of lighting and ventilation facilities	Yes
3	Frequency of cleaning the rest rooms per day	Three time in Week
4	Way of disposing sanitary napkins in INSTITUTE OF SCIENCE AND TECHNOLOGY and hostel	Dustbin
5	Any steps taken by INSTITUTE OF SCIENCE AND TECHNOLOGY in distributing sanitary napkins	Now Introduce the napkin Machine

Conclusion: Sathyabama Institute of Science and Technology maintains clean and well-equipped restrooms with proper lighting and ventilation. The introduction of napkin machines and efficient disposal systems demonstrates the INSTITUTE OF SCIENCE AND TECHNOLOGY's commitment to hygiene and the well-being of its students and staff.

14. TRANSPORTATION AT INSTITUTE OF SCIENCE AND TECHNOLOGY

Sathyabama Institute of Science and Technology has 180 INSTITUTE OF SCIENCE AND TECHNOLOGY buses that serve as the primary mode of transportation for most students. While some students use personal vehicles, a significant number rely on the INSTITUTE OF SCIENCE AND TECHNOLOGY buses or public transport to commute. Additionally, students staying in hostels also benefit from these transport facilities, ensuring convenient access to the campus for both day scholars and hostel residents. The combination of INSTITUTE OF SCIENCE AND TECHNOLOGY buses, personal vehicles, and public transport makes commuting to the INSTITUTE OF SCIENCE AND TECHNOLOGY accessible and efficient for the student body.

Most of the INSTITUTE OF SCIENCE AND TECHNOLOGY staff at Sathyabama Institute of Science and Technology commute using personal vehicles. While the INSTITUTE OF SCIENCE AND TECHNOLOGY provides transportation for students, staff members typically rely on their own vehicles for daily commuting. This helps them maintain flexibility in their schedules and ensures they can efficiently reach the campus.

Description	Details
No of INSTITUTE OF SCIENCE AND TECHNOLOGY buses	180

To reduce carbon emissions and save fuel, an awareness program can be implemented encouraging staff and students to use INSTITUTE OF SCIENCE AND TECHNOLOGY buses, electric vehicles, and private buses at least once a month. By opting for these eco-friendly transportation options, the campus can contribute to a significant reduction in the environmental impact, promoting sustainability and energy conservation. This initiative not only helps in reducing traffic congestion but also supports the INSTITUTE OF SCIENCE AND TECHNOLOGY's commitment to a greener, more sustainable future.

15. GREEN AUDIT

15.1 LAND USE ANALYSIS

GENERAL OVERVIEW OF THE CONCEPT OF LANDUSE Land use refers to man's activities and the various uses which are carried on and derived from land. Viewing the earth from space, it is now very crucial in man's activities on natural resource. In situations of rapid changes in land use, observations of the Earth from space give the information of human activities and utilization of the landscape. Remote sensing and GIS techniques are now providing new tools for advanced land use mapping and planning. The collection of remotely sensed data facilitates the synoptic analyses of earth system, functions, patterning, and change in the local, regional as well as at global scales over time. Satellite imagery particularly is a valuable tool for generating land use map.



16. THE INSTITUTIONAL INITIATIVES FOR GREENING THE CAMPUS ARE AS FOLLOWS

Sathyabama Institute of Science and Technology (Deemed to be University) has demonstrated a strong commitment to sustainability through various initiatives aimed at greening the campus and minimizing its environmental footprint. The INSTITUTE OF SCIENCE AND TECHNOLOGY recognizes the critical role that educational institutions play in fostering environmental awareness and promoting sustainable practices.









17. FAUNAL DIVERSITY IN INSTITUTE OF SCIENCE AND TECHNOLOGY

Sathyabama Institute of Science and Technology (Deemed to be University), with its lush green spaces, well-maintained gardens, and open areas, serves as an important habitat for a variety of fauna. While the primary focus of the campus may be on academic and extracurricular development, the natural environment of the INSTITUTE OF SCIENCE AND TECHNOLOGY also supports a rich and dynamic diversity of birds, small mammals, insects, and other wildlife. This faunal diversity plays a crucial role in maintaining ecological balance, enhancing campus aesthetics, and fostering environmental awareness among the INSTITUTE OF SCIENCE AND TECHNOLOGY community.

Though some species are resident, others visit periodically, creating a dynamic and ever-changing ecosystem. The presence of these creatures also indicates the health of the campus's green spaces and the effectiveness of the institution's sustainability efforts, such as the planting of native vegetation, reduction of pollution, and minimization of human impact on local wildlife habitats.

17.1 BIRDS

The INSTITUTE OF SCIENCE AND TECHNOLOGY campus hosts a variety of bird species, both resident and migratory, contributing to its biodiversity. Commonly observed species include:

- **House sparrows (Passer domesticus):** Once common across urban areas, these small birds are often seen in the INSTITUTE OF SCIENCE AND TECHNOLOGY gardens, nests, and trees.
- **Indian mynas (Acridotheres tristis):** Known for their adaptability to urban environments, these birds are frequently spotted across campus.
- **Crows (Corvus splendens):** A common presence in both urban and rural settings, crows contribute to the biodiversity of the campus.
- **Parrots (Psittacula krameri):** Occasionally, flocks of rose-ringed parakeets can be seen flying around or perched in trees.
- **Pigeons (Columba livia):** These birds are commonly found around the campus, especially near open spaces and buildings.
- **Koels (Eudynamys scolopaceus)**: Often heard before being seen, these birds are known for their melodious calls, particularly during the breeding season.

Additionally, seasonal migratory birds, such as **sunbirds**, **wagtails**, and **drongos**, make temporary visits to the campus, depending on the time of year.

17.2 VISUAL IMAGES

Discover the vibrant avian diversity of our campus through these captivating photos, showcasing both resident and migratory bird species that contribute to its rich biodiversity.

S. NO	COMMON NAME	SCIENTIFIC NAME	IMAGES
1.	Pigeon	Columbidae Livia	
2.	Grey Crow	Corvous Tristis	
3.	Green Parrot	Psittacula Eupatria	

S. NO	COMMON NAME	SCIENTIFIC NAME	IMAGES
4.	Myna	Acridotheres tristis	
5.	squirrel	Sciuridae	

17.3 SMALL MAMMALS AND OTHER FAUNA

While the faunal diversity at **Sathyabama Institute of Science and Technology (Deemed to be University)** may primarily consist of birds, the campus also provides a suitable environment for small mammals and reptiles, including:

- **Squirrels:** Commonly found in INSTITUTE OF SCIENCE AND TECHNOLOGY gardens and trees, these small mammals are often seen scurrying around, foraging for food.
- **Rats and mice:** While not as visible, these small rodents are part of the natural fauna of the area, thriving in urban and semi-urban environments.
- **Lizards:** Various species of lizards, such as garden lizards and geckos, are frequently spotted basking in the sun or hiding among the vegetation.
- **Beetles and Ants**: These insects, often unnoticed, contribute significantly to soil aeration, decomposition, and nutrient recycling, enhancing soil fertility in the campus gardens.

The presence of such diverse fauna, alongside the avian population, showcases the campus's role as a haven for urban biodiversity. Together, these species play vital roles in pollination, pest control, seed dispersal, and nutrient cycling, contributing to a balanced and sustainable ecosystem.

17.4 INSECT DIVERSITY

The campus also supports a variety of insects, which are essential for pollination, decomposing organic matter, and maintaining the food chain. Among the insects that can be seen on the INSTITUTE OF SCIENCE AND TECHNOLOGY campus are:

- **Butterflies:** Numerous butterfly species, including the monarch butterfly (Danaus plexippus) and tiger butterfly (Danaus genutia), enhance the aesthetic appeal of the gardens while playing a critical role in pollination.
- **Bees:** Both honeybees (Apis spp.) and solitary bees are seen buzzing around flowers, performing the crucial task of pollination that supports the reproductive cycles of numerous plant species on campus.
- **Dragonflies:** These insects, often spotted near water bodies or lush garden areas, are effective predators of mosquitoes and other small flying insects, contributing to natural pest control.
- **Beetles:** From vibrant ladybird beetles, which feed on aphids, to dung beetles that help in nutrient recycling, beetles on campus play diverse ecological roles that benefit the ecosystem.
- **Grasshoppers and Crickets**: These orthopterans are commonly seen in grassy areas and serve as a food source for birds and small reptiles, maintaining the campus food web.

The vibrant insect diversity on campus ensures the functioning of essential ecological processes like pollination, pest control, and nutrient cycling, making the campus a model of urban biodiversity conservation.

18. WATER AUDIT

During the audit, it was observed that Sathyabama Institute of Science and Technology receives water from the Chennai Municipality via tanker lorries. Two types of tanker lorries are deployed daily: eight lorries of 36 KL capacity and five lorries of 24 KL capacity, each making six trips per day. The total supply is about 2,448 KL (24.48 lakh litres) of water per day.

Daily water supply through tanker lorries

S. No	Tanker lorry type	Capacity (KL)	No. of lorries	Trips / lorry / day	Supply (KL/day)	Supply (KL/year)
1	Tanker lorry – 36 KL	36	8	6	1,728	6,30,720
2	Tanker lorry – 24 KL	24	5	6	720	2,62,800
	Total		**13**		**2,448**	**8,93,520**

Description	Unit	Value
Daily water supply	KL/day	2,448
Annual water supply (365 days)	KL/year	8,93,520
Campus population	Persons	20,661
Per-capita water supply	Litres/person/day	118.5
Storage tank capacity	Litres	2,00,000

Primary Usage: Restrooms, mess operations, food cleaning and hostels.

Recycled Water: Treated in the Sewage Treatment Plant (STP) and reused for toilet flushing and gardening.

RO Water Treatment: The institution operates 4 RO plants that provide clean drinking water and water for kitchen food preparation; purified water is also packaged in cans for hostel use.

This integrated water management ensures efficient utilization and recycling, supporting both operational and environmental needs.

18.1 WATER TREATMENT PLANT

Introduction

The institution is equipped with four large Reverse Osmosis (RO) plants, each with a capacity of 10,000 Liters. These plants play a crucial role in ensuring a continuous supply of safe, purified drinking water for students, staff, and faculty. The purified water is used in various areas such as drinking stations, kitchens, messes, and smaller RO plants for specific purposes like transport driver consumption.

Overview of the RO Process

The Reverse Osmosis process is a water purification method that removes contaminants and impurities by forcing water through a semi-permeable membrane. This membrane allows only clean water molecules to pass through while blocking particles, bacteria, and other harmful substances.

- Pre-filtration: Raw water is first passed through pre-filters (e.g., sediment filters) to remove large particles, dirt, and debris.
- Activated Carbon Filtration: This step removes chlorine, pesticides, and other organic compounds from the water.
- Reverse Osmosis Filtration: The water is then pushed through a semi-permeable membrane at high pressure. This membrane blocks harmful ions (like salts, minerals, and heavy metals), bacteria, viruses, and other contaminants.
- Post-filtration: After the RO membrane, additional post-filters (such as carbon filters) are used to further purify the water and improve taste.
- UV Sterilization: In some systems, ultraviolet (UV) light is used to further disinfect the water, killing any remaining bacteria and pathogens.
- Storage: The purified water is stored in tanks or reservoirs and distributed as needed.

3. RO Plant Distribution and Usage

Main RO Plants: Four large RO plants, each with a capacity of 10,000 Liters, serve the INSTITUTE OF SCIENCE AND TECHNOLOGY's drinking water needs. The water from these plants is supplied to:

- Drinking stations
- Kitchens and messes

Smaller RO Plants for Specific Needs

In addition to the four large RO plants, the INSTITUTE OF SCIENCE AND TECHNOLOGY has installed smaller RO plants strategically located to meet specific drinking water requirements. These smaller plants ensure a continuous and accessible supply of purified water for various groups within the campus:

Drinking Water for Staff and Students near Canteens:

- Purpose: These smaller RO plants are positioned near canteen areas to provide staff and students with convenient access to clean, purified drinking water throughout the day.
- Benefits: They offer a steady supply of fresh water during mealtimes, promoting hydration and improving health standards. They also reduce the need for bottled water, contributing to the INSTITUTE OF SCIENCE AND TECHNOLOGY’s sustainability efforts.

Drinking Water for Transport Drivers in Parking Areas:

- Purpose: Smaller RO plants are placed in parking areas where transport drivers (e.g., bus and delivery drivers) can access purified water while on duty.
- Benefits: This ensures that drivers have access to safe drinking water during their breaks, helping maintain their health and hydration levels. It also supports a clean and sustainable campus environment by eliminating the reliance on single use bottled water.

Benefits of the RO System

- Improved Water Quality: The RO process ensures that the water is free from harmful chemicals, salts, and microorganisms, making it safe for drinking and cooking.
- Cost-Effective: The system provides a cost-effective solution for water purification, reducing the dependency on bottled water.
- Environmentally Friendly: By using the RO system, the INSTITUTE OF SCIENCE AND TECHNOLOGY helps reduce plastic waste from bottled water.
- Continuous Supply: The capacity of the four large RO plants ensures a steady supply of purified water, meeting the needs of all users within the INSTITUTE OF SCIENCE AND TECHNOLOGY.

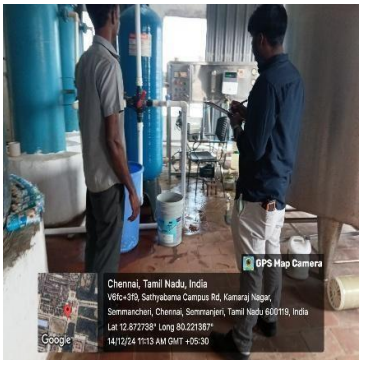
Maintenance and Monitoring

- Regular maintenance of the RO plants is crucial to ensure their proper functioning and efficiency. This includes:
- Regular cleaning of filters and membranes
- Replacement of filters when needed to ensure continued purification
- Monitoring water quality through regular testing (e.g., checking TDS, pH levels, and bacterial contamination)

Conclusion

The RO water treatment plants at the INSTITUTE OF SCIENCE AND TECHNOLOGY provide high-quality, purified water for a wide range of purposes. This system not only ensures the health and safety of students, staff, and faculty but also contributes to environmental sustainability by reducing the need for bottled water. The proper maintenance and management of the RO system are essential to keep the water clean and safe for consumption.





18.2 Seepage Treatment plant:

The INSTITUTE OF SCIENCE AND TECHNOLOGY has a dedicated Sewage Treatment Plant (STP) designed to handle and purify wastewater for reuse. The process ensures efficient filtration and separation of particles, ultimately providing treated water for non-potable purposes such as garden irrigation and toilet flushing.

Collection Tank (15KL Capacity):

Wastewater from the campus is initially collected in a large 15KL collection tank. This tank serves as the starting point for the wastewater treatment process.

Circulation and Separation:

The water is circulated using two 30HP motors, which help to maintain proper flow and facilitate the separation of particles in the next stages.

Particle Separation:

The wastewater is then directed to two separate tanks for particle separation:

Tank-1 (for larger particles): This tank is designed to capture and settle larger particles and debris from the wastewater.

Tank-2 (for medium-sized particles): This tank is responsible for further filtering medium-sized particles.

Both Tank-1 and Tank-2 have a capacity of 15KL each.

Filtration and Clarification:

After the particle separation, the treated water is sent to a filtration unit for further purification, removing any remaining impurities.

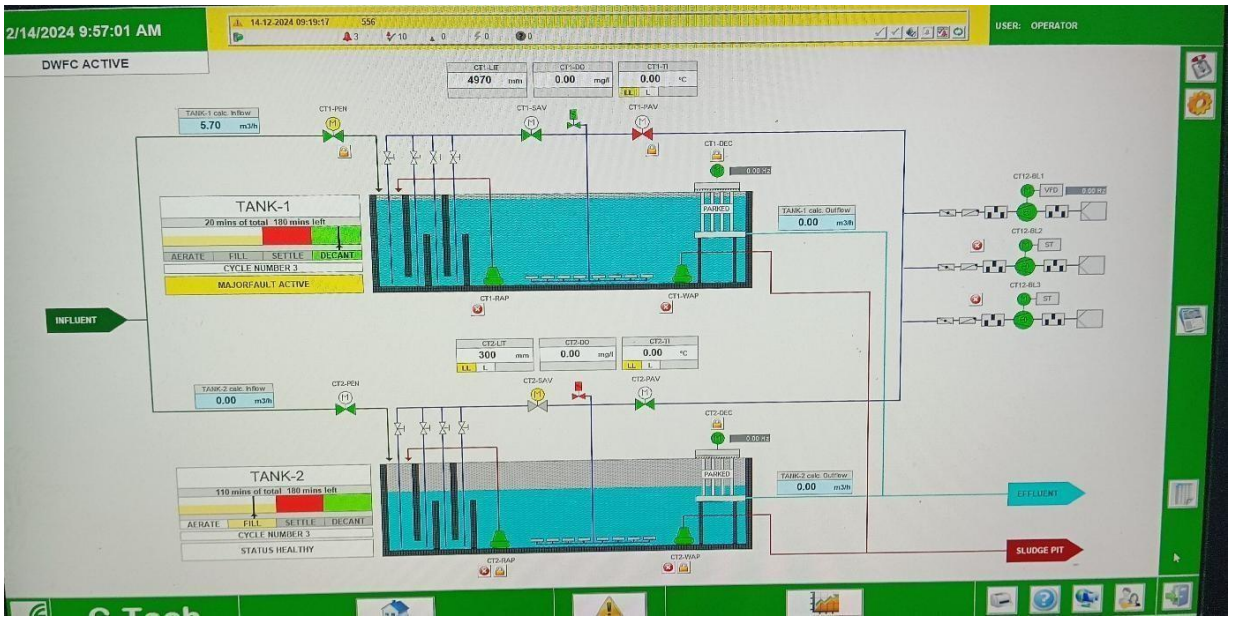
The water then flows into two Clarified Water Tanks, where additional clarification takes place to ensure the water is clean and safe for reuse.

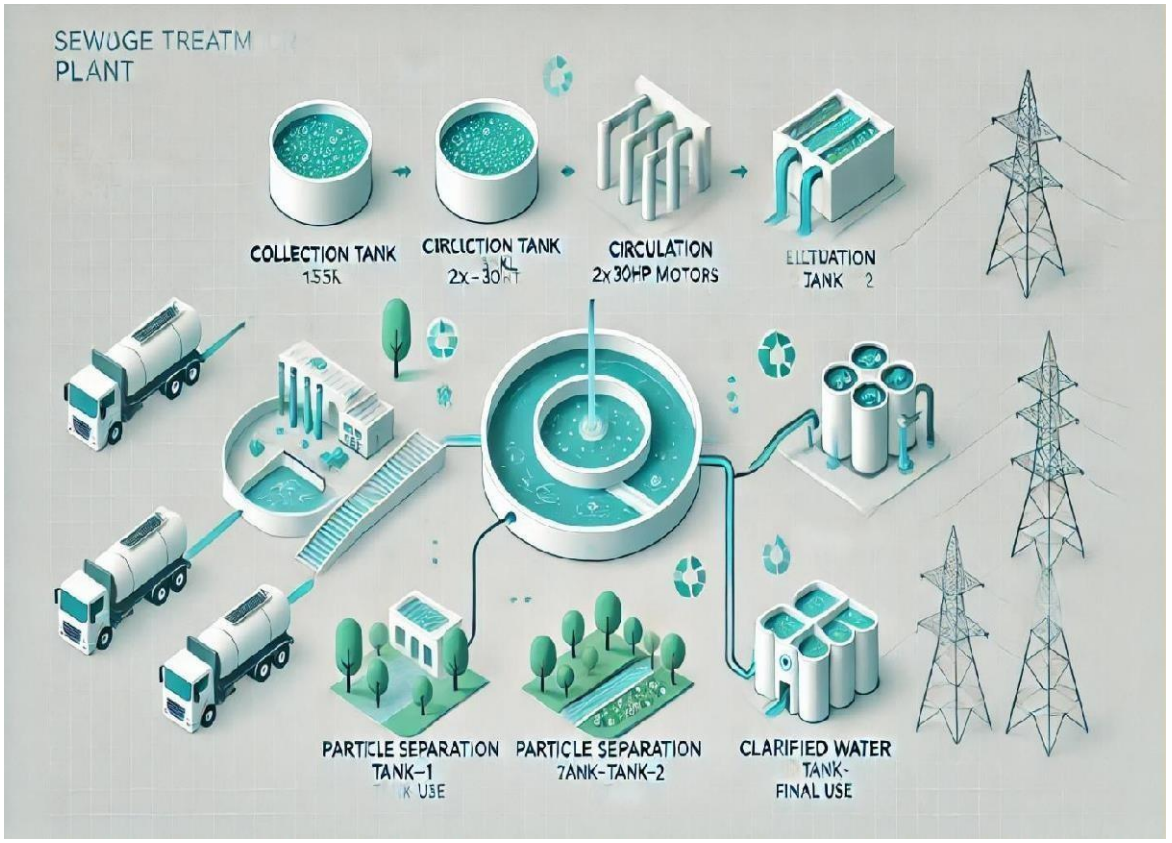
Final Use:

The clarified water is then directed to specific areas of the campus for non-potable uses:

Gardens: The treated water is used for irrigation, ensuring that the campus gardens receive consistent and efficient watering.

Toilet Flush: The purified water is also supplied to toilets across the campus for flushing, helping to conserve potable water.


2/14/2024 9:57:01 AM
DWFC ACTIVE
USER: OPERATOR
TANK-1
20 mins of total 180 mins left
AERATE FILL SETTLE DECANT
CYCLE NUMBER 3
MAJORFAULT ACTIVE
TANK-2
110 mins of total 180 mins left
AERATE FILL SETTLE DECANT
CYCLE NUMBER 3
STATUS HEALTHY
INFLUENT
EFFLUENT
SLUDGE PIT


SEWAGE TREATMENT PLANT
COLLECTION TANK
155K
CIRCULATION TANK
2x-30HP
CIRCULATION
2x30HP MOTORS
ELUTUATION
TANK 2
PARTICLE SEPARATION
TANK-1
PARTICLE SEPARATION
TANK-TANK-2
CLARIFIED WATER
TANK-
FINAL USE

18.3 WATER CONSERVATION FACILITIES AVAILABLE IN THE INSTITUTION

RAINWATER HARVESTING





Benefits:

Reduced Reliance on Municipal Water:

By capturing and storing rainwater, the campus can reduce its dependence on external water sources, such as the local municipal water supply or borewells. This is especially important during dry periods or water shortages.

Sustainability:

Rainwater harvesting contributes to sustainability by making use of a renewable resource—rainfall. It helps reduce the campus's environmental footprint by decreasing the need for groundwater or treated water from external suppliers.

Groundwater Recharge:

The harvested water, if directed towards recharging groundwater, can improve the local water table. By replenishing the underground water resources, it helps in sustaining the ecosystem and supports the availability of water for future use.

Flood Prevention:

During heavy rainfall, rainwater harvesting pits can prevent local flooding by diverting excess water from storm drains. This can reduce the strain on urban drainage systems and prevent flooding on campus.

Cost Savings:

Over time, utilizing harvested rainwater for non-potable needs such as landscape irrigation, cooling, and flushing toilets can reduce water bills, particularly in regions with high water costs.

Conclusion:

WATER CONSERVATION

The INSTITUTE OF SCIENCE AND TECHNOLOGY campus is equipped with sensor-type taps, which enhance water efficiency and contribute significantly to energy conservation during water audits.



Overview of Sensor-Type Taps:

The campus has equipped its facilities with **sensor-type taps**, which are automatic faucets that activate when hands or objects are detected within the sensor range. These taps are designed to conserve water by automatically shutting off when no motion is detected.

Key Benefits of Sensor-Type Taps:

1. **Water Efficiency**:

- **Automatic Shut-off**: Sensor taps automatically turn off after a set period or when hands are no longer detected, which reduces the risk of water being left running unintentionally. This feature is especially useful in high-traffic areas like restrooms or communal washbasins.

- **Flow Control**: Many sensor taps are equipped with low-flow mechanisms, which regulate the volume of water dispensed. By reducing the flow rate, these taps ensure that less water is used for everyday tasks, such as handwashing, while still maintaining adequate pressure.

2. **Energy Conservation**:

- **Reduced Water Heating Demand**: By cutting down on water wastage, sensor taps also contribute to energy conservation. Less water being used means less hot water is needed, which in turn reduces energy consumption for water heating, especially in areas where hot water is required (e.g., washbasins in bathrooms).

- **Lower Carbon Footprint**: The combined savings in water and energy can help reduce the overall carbon footprint of the campus, contributing to the institution's sustainability goals.

3. **Hygiene:**

- Touchless Operation: Since sensor taps operate without the need to physically touch any surfaces, they help improve hygiene by reducing the spread of germs and bacteria. This is especially important in high-traffic areas like restrooms and washrooms, where many people come into contact with faucet handles.

4. **Cost Savings:**

- Reduced Water Consumption: Over time, the installation of sensor taps can result in significant cost savings for the campus. With the ability to track and optimize water usage, the campus will see reduced water bills because of lower consumption.
- Maintenance Efficiency: Since the taps are automated and only run when needed, the risk of leakage due to forgotten faucets or faulty handles is minimized. This reduces the need for costly repairs and maintenance associated with manual taps.

19. WASTE DISPOSAL OF INSTITUTE OF SCIENCE AND TECHNOLOGY

The institution generates food waste daily from its canteens, hostels and messes, along with other general waste. About 1 tonne (1,000 kg) of canteen food waste is collected every day and processed in the on-campus biogas plant, where it is converted into renewable cooking fuel and organic fertilizer. Other waste, such as plastics and recyclables, is collected separately and handed over to the Chennai Corporation for proper disposal. This system helps maintain a clean campus, reduces landfill waste, and supports environmental sustainability.

Process:

- ❖ Collection of Food Waste: Food waste is segregated at the source to collect only biodegradable materials.
- ❖ Transportation to Biogas Plant: The collected waste is transported to the on-campus biogas plant.
- ❖ Anaerobic Digestion: Microorganisms break down the organic matter in an oxygen-free environment, producing biogas (mainly methane), used as cooking fuel, and digestate, a nutrient-rich organic fertilizer for campus gardens.

Food waste to biogas – 1 tonne per day

S. No	Description	Units	Values
1	Canteen food waste processed	kg/Day	1,000
2	Biogas yield from mixed food waste (conservative)	m3/tonne	100
3	Biogas generated	m3/Day	100
4	Biogas generated (360 days)	m3/Annum	36,000
5	LPG equivalent (0.43 kg LPG per m3 biogas – MNRE)	kg/Day	43
6	Commercial LPG cylinders (19 kg) replaced	Nos/Annum	815
7	Share of present LPG use (7,920 cylinders/Annum) replaced	%	10.3
8	Annual LPG cost saving (INR 3,000 per cylinder)	INR/Annum	24,44,211
9	Estimated annual emission reduction (2.985 kg CO2/kg LPG)	t CO2/Annum	46.2

Benefits:

- Environmental Sustainability: Reduces methane emissions from decomposing food waste in landfills.
- Energy Savings: Lowers dependency on traditional energy sources by providing renewable biogas.
- Cost-Efficiency: Cuts waste disposal costs and generates fertilizer for landscaping.
- Educational Value: Acts as a live demonstration for students studying environmental science, renewable energy, or sustainable practices.

20. AIR QUALITY OF THE INSTITUTE OF SCIENCE AND TECHNOLOGY

The Air (Prevention and Control of Pollution) Act 1981 was enacted by the Central Government with the objective of arresting the deterioration of air quality. The Air (Prevention and Control of Pollution) Act 1981 describes the main functions of the Central Pollution Control Board (CPCB) as follows:

- To Advise the Central Government on any matter concerning the improvement of the quality the air and the prevention, control, and abatement of air pollution.
- To plan and cause to be executed a nation-wide programme for the prevention, control and abatement of air pollution.
- To provide technical assistance and guidance to the State Pollution Control Board.
- To carry out and sponsor investigations and research related to prevention, control and abatement of air pollution.
- To collect, compile and publish technical and statistical data related to air pollution; and
- To lay down and annul standards for the quality of air.

Particulate Matter (PM10 & PM2.5)

A mixture of particles with liquid droplets in the air forms particulate matter. PM 10 are particles that have a size of less than or equal to 10 microns whereas PM2.5 are ultra-fine particles having a size of less than or equal to 2.5 microns.

Sources:

Particulate Matter is released from constructions, smoking, cleanings, renovations, demolitions, constructions, natural hazards such as earthquakes, volcanic eruptions, and emissions from industries such as brick kilns, paper & pulp, etc.

Related effects:

These particles, when inhaled, can penetrate deeper into the respiratory system, and cause respiratory ailments such as asthma, coughing, sneezing, irritation in the airways, eyes, nose, throat irritation, etc.

Remarks:

PM2.5 Levels (Fine Particulate Matter):

- Excellent Air Quality: Locations with PM2.5 below 15 µg/m³, such as the Main Building 4th Floor Creativity & Visualization (9 µg/m³) and the Radio Room (10 µg/m³).
- Moderate Air Quality: Locations with PM2.5 between 25-50 µg/m³, such as Main Building Ground Floor Corridor (29 µg/m³).
- Poor Air Quality: Annex Building Ground Floor Canteen (99 µg/m³) and Annex Building 2nd Floor Classroom (101 µg/m³).

PM10 Levels (Coarse Particulate Matter):

- Good Air Quality: PM10 below 20 µg/m³, such as Main Building 4th Floor Creativity & Visualization (13 µg/m³).
- High Levels: Locations such as Annex Building 2nd Floor Classroom (43 µg/m³) exceed recommended thresholds, indicating potential issues with dust or particulate accumulation.

CO2 Levels (Ventilation Efficiency):

- Normal Range: CO2 levels between 400-800 ppm, such as Main Building Ground Floor Library (401 ppm).
- Elevated Levels: CO2 above 1000 ppm, as seen in the Main Building 4th Floor Flora Hall (2238 ppm) and Main Building 2nd Floor Classroom 206 (4199 ppm), indicates poor ventilation and potential discomfort for occupants.

S. No	Location	PM 2.5 in ug/m3	PM 10 in ug/m3	CO2 in ppm
1	EEE LAB	77	123	401
2	Machine lab	74	119	405
3	EC Lab-1	78	124	898
4	Block -16_ ClassNo.88	74	118	401
5	New CSC Block_ No.282	94	149	402
6	Block 1	13	21	401
7	Block 2	18	29	653
8	Block 4	24	38	487
9	Block 5	22	34	595
10	Block 6	9	14	520
11	Block 7	13	20	608
12	Block 8	16	25	422
13	Block 9	18	29	401
14	Block 10	18	29	401
15	Block 11	22	34	653
16	Block 12	14	22	487
17	Block 14	17	25	595
18	Block 15	18	24	520
19	Block 16	14	22	786

S. No	Location	PM 2.5 in ug/m3	PM 10 in ug/m3	CO2 in ppm
20	Block 18	38	47	874
21	Block 20	8	14	684
22	Block 20A	9	13	402
23	Block 20B	21	33	787
24	B Arch	21	32	632
25	Old Computer Science	18	29	457
26	ECE	18	29	854
27	Mechanical	23	36	657
28	ETCE	66	36	624
29	Aeronautical	22	35	786
30	EEE	23	35	874
31	New CSE	12	19	684
32	New MBA	29	47	402
33	Old MBA	14	21	568
34	Mess	10	15	854
35	Ladies Mess	72	18	564
36	Physics and Chemistry	33	24	756
37	COE	99	38	402
38	Boys Hostel - MGR	101	43	411
39	Boys Hostel - Jeppiaar	85	28	418
40	Boys Hostel - Gopalakrishnan	21	32	412
41	Ladies Hostel - Mother Theresa	18	29	413
42	Ladies Hostel-Panimalar	18	29	564
43	Ladioes Hopstel - Rossery	23	36	524
44	Ladies hostel - Immaculate	66	36	658
45	Admin	22	35	543
46	Nano	33	24	456

Critical Areas for Attention:

Improve Ventilation:

- Install or upgrade HVAC systems, particularly in areas with high CO2 levels.

Enhance Air Filtration:

- Deploy air purifiers or improve filtration in high PM2.5/PM10 areas.

Monitor and Adjust Usage:

- Limit occupancy in poorly ventilated spaces until improvements are made.

Regular Maintenance:

- Clean ducts and filters periodically to prevent particulate accumulation.
- These remarks aim to prioritize safety, health, and comfort for building occupants. Let me know if you'd like to delve further into any specific data point!

21. LUX LEVEL

The lux level survey is carried out in various location of campus by using lux meter and details are as follows.

S. No	Location	Lux values	RECOMMENDED LUX LEVEL STANDARD IS 3646: 1992
1	EEE LAB	154	300
2	Machine lab	256	300
3	EC Lab-1	482	300
4	Block -16_ ClassNo.88	432	300
5	New CSC Block_ No.282	426	300
6	Block 1	435	300
7	Block 2	405	300
8	Block 4	461	300
9	Block 5	363	300
10	Block 6	328	300
11	Block 7	250	300
12	Block 8	216	300
13	Block 9	112	300
14	Block 10	114	300
15	Block 11	126	300
16	Block 12	149	300
17	Block 14	536	300
18	Block 15	470	300
19	Block 16	508	300
20	Block 18	414	300
21	Block 20	389	300
22	Block 20A	297	300
23	Block 20B	326	300
24	B Arch	379	300
25	Old Computer Science	154	300
26	ECE	126	300
27	Mechanical	135	300
28	ETCE	107	300
29	Aeronautical	336	300
30	EEE	445	300
31	New CSE	614	300
32	New MBA	110	300
33	Old MBA	515	300

S. No	Location	Lux values	RECOMMENDED LUX LEVEL STANDARD IS 3646: 1992
34	Mess	329	300
35	Ladies Mess	148	300
36	Physics and Chemistry	356	300
37	COE	459	300
38	Boys Hostel - MGR	270	300
39	Boys Hostel - Jeppiaar	119	300
40	Boys Hostel - Gopalakrishnan	134	300
41	Ladies Hostel - Mother Theresa	132	300
42	Ladies Hostel-Panimalar	566	300
43	Ladies Hostel - Rossery	445	300
44	Ladies hostel - Immaculate	614	300
45	Admin	110	300
46	Nano	515	300

Recommended Actions:

Upgrade Lighting Fixtures:

- Install higher-lumen lights or increase the number of light sources in poorly lit areas, especially classrooms and labs.

Use Task Lighting:

- Introduce focused lighting in workstations and classrooms to enhance visibility.

Energy-efficient Solutions:

- Consider LED lighting for consistent brightness and lower energy consumption.

Conduct Regular Maintenance:

- Clean and replace old or malfunctioning bulbs to maintain optimal lighting levels.

22. NOISE LEVEL IN THE SURROUNDING OF INSTITUTE OF SCIENCE AND TECHNOLOGY

THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000

The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.

Ambient Air Quality Standards in respect of Noise

Area Code	Category Of Area/Zone	Limits In dB(A) Leq*	
		Day Time	Night-time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Note: -

- Day time shall mean from 6.00 a.m. to 10.00 p.m.
- Night-time shall mean from 10.00 p.m. to 6.00 a.m.
- Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places, or any other area which is declared as such by the competent authority.
- Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
- * dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.
- A “decibel” is a unit in which noise is measured.
- “A”, in dB(A) Leq, denotes the frequency weighting in the measurement of
- noise and corresponds to frequency response characteristics of the human ear.
- Leq: It is an energy mean of the noise level over a specified period.

S. No	Location	dB
1	EEE LAB	91.8
2	Machine lab	34.7
3	EC Lab-1	34.2
4	Block -16_ ClassNo.88	32.1
5	New CSC Block_ No.282	32.9
6	Block 1	69
7	Block 2	72
8	Block 4	79
9	Block 5	82
10	Block 6	71
11	Block 7	75

S. No	Location	dB
12	Block 8	94
13	Block 9	70
14	Block 10	71
15	Block 11	79
16	Block 12	82
17	Block 14	70
18	Block 15	65
19	Block 16	72
20	Block 18	75
21	Block 20	74
22	Block 20A	88
23	Block 20B	66
24	B Arch	60
25	Old Computer Science	60
26	ECE	65
27	Mechanical	69
28	ETCE	72
29	Aeronautical	79
30	EEE	82
31	New CSE	71
32	New MBA	75
33	Old MBA	94
34	Mess	92
35	Ladies Mess	80
36	Physics and Chemistry	80
37	COE	74
38	Boys Hostel - MGR	742
39	Boys Hostel - Jeppiaar	63
40	Boys Hostel - Gopalakrishnan	73
41	Ladies Hostel - Mother Theresa	80
42	Ladies Hostel-Panimalar	70
43	Ladies Hostel - Rossery	71
44	Ladies hostel - Immaculate	79
45	Admin	82
46	Nano	58

Remarks: The noise levels across the locations vary significantly, with some areas like the EEE LAB (91.8 dB), Mess (92 dB), Old MBA (94 dB), and Block 20A (88 dB) exceeding safe noise limits (above 85 dB can harm hearing over time). Such high levels are concerning and indicate the need for soundproofing or noise reduction measures. Areas with moderate noise (60–80 dB) like Boys Hostel - Gopalakrishnan, Ladies Mess, and Mechanical should monitor noise sources and minimize unnecessary disturbances. Lower noise areas such as Nano (58 dB) and B Arch (60 dB) are within acceptable limits and should maintain their quiet environment.

Remarks:

Recommended Actions:

Soundproofing and Acoustic Treatments:

- Install acoustic panels in high-noise areas like classrooms and canteens to reduce reverberations.

Noise Monitoring:

- Continuously monitor noise levels in critical areas to identify and address anomalies.

Behavioural Adjustments:

- Enforce noise policies where applicable (e.g., maintaining low volumes in classrooms or corridors).

Maintenance of Equipment:

- Inspect equipment in labs, canteens, or offices that may contribute to excessive noise.

23. ENERGY AUDIT

23.1 PRESENT ELECTRICAL ENERGY SYSTEM AND ELECTRICAL BILL ANALYSIS

Description	Details
Source of power supply	TNEB
Electric power supply is received from TANGEDCO	HT Supply
Service number	99094011060
Sectional load	2500
Annual electricity consumption, kWh	52,12,026
Avg. Annual power factor	0.97
Unit charges, INR/kWh (weighted average)	7.83
Power from external wind mills and solar	22% of EB supply

The month-wise electricity consumption of the institution for June 2024 to May 2025, as per the EB records furnished by the institution, is given below.

S. No	Month	Total units consumed, kWh	Unit cost, INR/kWh	Electricity (energy) charges, INR
1	Jun-24	2,50,727	7.7	19,30,598
2	Jul-24	2,33,754	7.7	17,99,906
3	Aug-24	4,14,406	7.7	31,90,926
4	Sep-24	4,72,613	7.7	36,39,120
5	Oct-24	4,32,150	7.7	33,27,555
6	Nov-24	4,62,854	7.7	35,63,976
7	Dec-24	3,26,955	7.7	25,17,554
8	Jan-25	3,55,519	7.7	27,37,496
9	Feb-25	5,87,130	8.0	46,97,040
10	Mar-25	5,83,672	8.0	46,69,376
11	Apr-25	6,35,983	8.0	50,87,864
12	May-25	4,56,263	8.0	36,50,104
	Total	**52,12,026**	**7.83***	**4,08,11,515**

* Weighted average tariff. Energy charge = units × unit cost.

Summary of energy and carbon figures

Description	Unit	Value
Annual electricity consumption	kWh/Annum	52,12,026
Average monthly consumption	kWh/Month	4,34,336
Annual energy charge (units × tariff)	INR/Annum	4,08,11,515
Electricity use per person (20,661 persons)	kWh/person/yr	252.3
Low-carbon power from external wind mills and solar (22% of EB supply)	kWh/Annum	11,46,646
Conventional grid power (78% of EB supply)	kWh/Annum	40,65,380

Description	Unit	Value
Annual emissions from electricity (conventional share × 0.71 kg CO2/kWh)	tCO2/year	2,886.4
Net carbon emission (less 2.30 t absorbed by campus flora)	tCO2/year	2,884.1
Savings from proposed BLDC fan and LED measures	kWh/Annum (%)	7,13,104 (13.7%)
Estimated emissions after implementing energy-saving projects	tCO2/year	2,377.8

Total power consumed and low-carbon energy

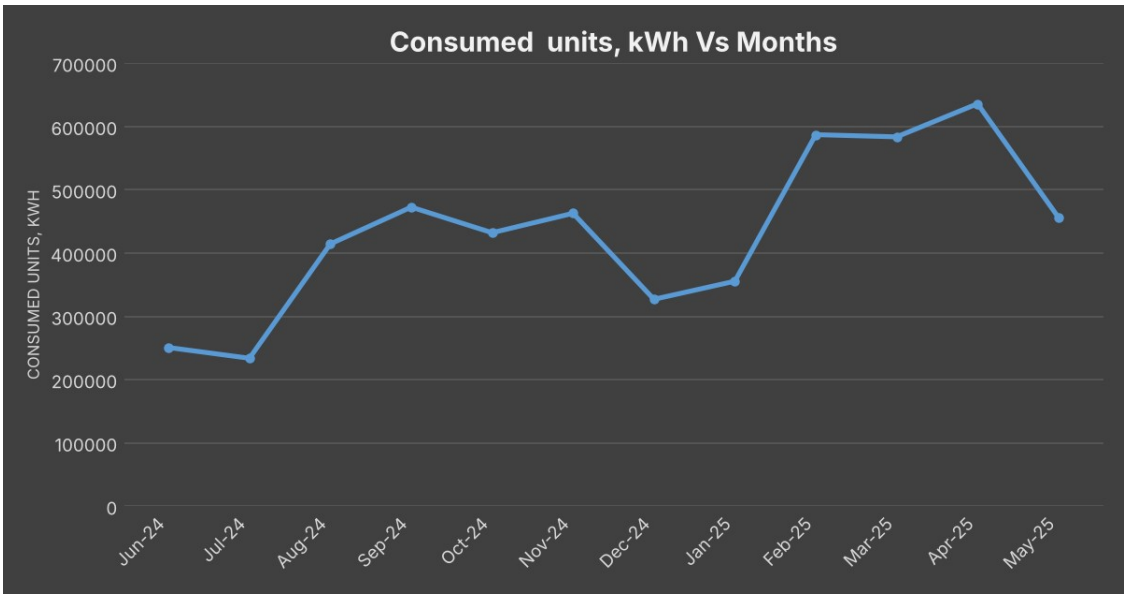
Source of power / energy	kWh/Annum	GJ/Annum	Share, %
Power from external wind mills and solar (22% of EB supply)	11,46,646	4,127.9	21.6
Conventional grid power (78% of EB supply)	40,65,380	14,635.4	76.5
Solar PV generated on campus (100 kW)	1,00,000	360.0	1.9
Total power consumed	**53,12,026**	**19,123.3**	**100.0**
Low-carbon electricity (external wind/solar + on-campus solar)	**12,46,646**	**4,487.9**	**23.5**

Total energy consumption and energy from low-carbon sources

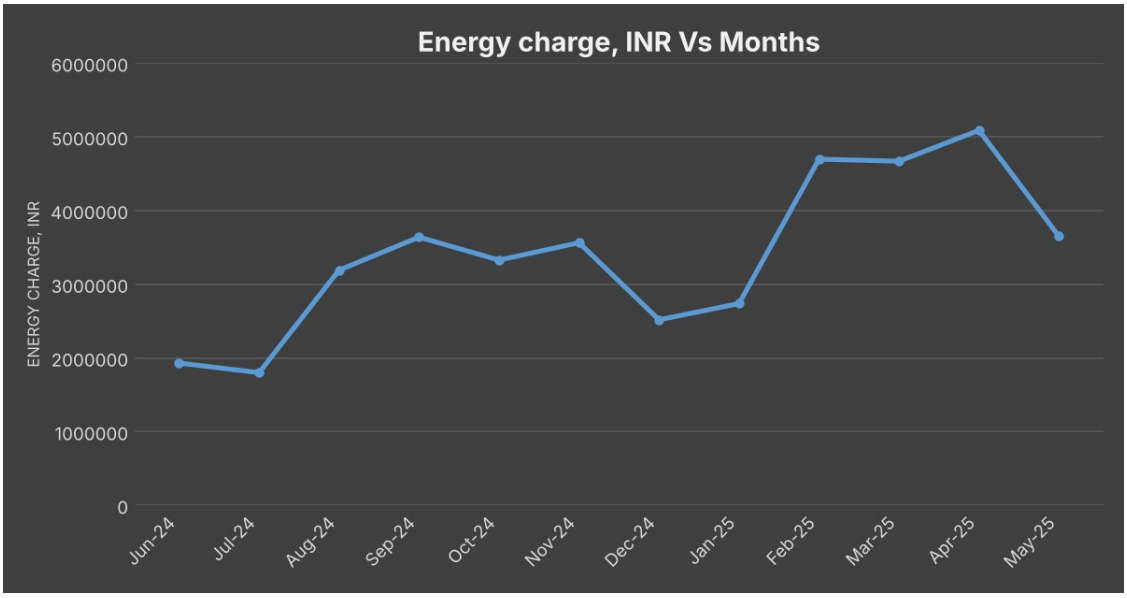
Energy source	Quantity	GJ/Annum	Share, %
Electricity (EB supply + on-campus solar)	53,12,026 kWh	19,123.3	70.9
LPG (7,920 cylinders × 19 kg)	1,50,480 kg	7,117.7	26.4
Biogas (36,000 m3; LPG equivalent)	15,480 kg LPG eq.	732.2	2.7
Total energy consumption		**26,973.2**	**100.0**
Energy from low-carbon sources (wind, solar, biogas)		**5,220.1**	**19.4**

Indicator (campus floor area 80,000 m2; 20,661 persons)	Unit	Value
Total energy intensity	GJ/m2	0.337
Electricity intensity	kWh/m2	66.4
Low-carbon energy	GJ/m2	0.065
Total energy per person	GJ/person/yr	1.31
Carbon intensity (electricity)	kg CO2/m2	36.1

Conversion factors: 1 kWh = 0.0036 GJ; LPG net calorific value 47.3 MJ/kg (IPCC).



The maximum units were consumed in April 2025 (6,35,983 kWh) and the minimum in July 2024 (2,33,754 kWh).



The highest energy charge was in April 2025 (INR 50,87,864) and the lowest in July 2024 (INR 17,99,906).

Observations:

- Consumption is highest from February to May 2025 (5.84–6.36 lakh kWh a month), reflecting summer cooling loads and peak academic activity.
- Consumption is lowest in June–July 2024 and December 2024, matching vacation periods.
- The unit cost rose from INR 7.7/kWh to INR 8.0/kWh from February 2025, which coincides with the highest-consumption months.
- 22% of the EB power supply (11,46,646 kWh) is sourced from external wind mills and solar plants; with the on-campus solar PV, 23.5% of the total power consumed (53,12,026 kWh) is from low-carbon sources.
- Annual electricity-based emissions are 2,886.4 tCO2, calculated on the conventional grid share of 40,65,380 kWh at 0.71 kg CO2/kWh.

Recommendations:

- Install block-wise sub-meters and a solar generation meter so that future audits use measured data.
- Prioritise BLDC fan and LED replacement in blocks used in February–May, when both load and tariff are highest.
- Keep the power factor close to 1.0 and review contract demand against the recorded maximum demand to avoid penalties.
- Explore further renewable energy options, such as rooftop solar, to offset the cost during high-consumption periods.

23.2 TRANSFORMER DETAILS

Sathyabama Institute of Science and Technology employs a well-structured transformer setup to efficiently convert High Tension (HT) supply to Low Tension (LT) supply, ensuring a steady and reliable power distribution system across the campus while avoiding voltage fluctuations.

S.No	Range	Make	Qty
1	1000 KVA	Kirloskar	2
2	625 KVA	Kirloskar	2
3	1250 KVA	Kirloskar	1
4	1600 KVA	Indoor Tech	1
5	1250 KVA	Indoor Tech	1

Conclusion

This combination of transformers ensures seamless power supply, supporting the institution's academic, research, and operational needs while maintaining electrical stability and minimizing disruptions.



23.3 USE OF LED BULBS

The lighting inventory of the campus has been updated with the block-wise LED count verified by the institution for 2024-25. Where the verified LED count is higher than the count recorded in the 2024 audit, the LED count has been increased and the number of 36 W tube lights reduced accordingly. Blocks not covered in the earlier audit have been added. All lights are operated for 8 hours per day.

Building-wise lighting details

S. No	Name of the Block / Building	Report 2024: Tube light (36 W)	Report 2024: LED	2024-25: Tube light (36 W)	2024-25: LED	2024-25: Total
1	Blocks 1–20B (classroom blocks)	2,840	1,895	2,840	1,895	4,735
2	B Arch	480	300	480	300	780
3	Old Computer Science	60	1,690	60	1,690	1,750
4	ECE	70	0	0	498	498
5	Mechanical	340	0	164	176	340
6	ETCE	0	140	0	140	140
7	Aeronautical	50	0	50	0	50
8	EEE	100	100	33	167	200
9	New CSE	0	324	0	324	324
10	New MBA + Old MBA	500	519	500	519	1,019
11	Mess + Ladies Mess	180	500	0	700	700
12	Physics & Chemistry	180	0	0	506	506
13	COE	0	170	0	262	262
14	Boys Hostels (MGR, Jeppiaar, Gopalakrishnan)	980	220	0	1,791	1,791
15	Ladies Hostels (Mother Teresa, Panimalar, Rossery, Immaculate)	1,780	100	0	3,080	3,080
16	Admin	0	200	0	200	200
17	Nano	0	720	0	720	720
	Sub-total	**7,560**	**6,878**	**4,127**	**12,968**	**17,095**

Note: Blocks 1–20B (classroom blocks), B Arch and MBA retain the 2024 LED count, as the verified count for these blocks did not exceed the earlier figure. Block-wise floor details are as recorded in the 2024 audit.

LED lighting in additional blocks (2024-25)

S. No	Name of the Block	LED 22 W	LED 40 W	LED 25 W	Total LED
1	ST.Pauls Block (CSE)	0	198	0	198
2	ST.Pauls Annexure-1 (CSE)	4	140	72	216
3	CSE LABORATORY BLOCK	0	60	0	60
4	OLD COE BLOCK	76	30	0	106
5	SCAS BLOCK	0	546	0	546
6	IT BLOCK	132	175	0	307
7	MECHATRONICS BLOCK	32	4	38	74

S. No	Name of the Block	LED 22 W	LED 40 W	LED 25 W	Total LED
8	BIO TECHNOLOGY	214	42	0	256
9	BIO INFORMATICS	54	8	0	62
10	BIO MED	85	12	11	108
11	CHEMICAL	0	0	0	0
12	PHARMACY	121	19	45	185
13	ALLIED HEALTH SCIENCE	19	0	0	19
14	MCA	24	13	13	50
15	LAW	52	29	25	106
16	DENTAL	0	0	0	0
17	NURSING	0	0	0	0
18	VISCOM	15	22	40	77
19	PSYCHOLOGY	46	32	15	93
20	SATHYABAMA RESEARCH /NFCMR/FIELD FACILITY	624	629	525	1,778
21	DIRECTOR INNOVATION OFFICE	1,203	35	100	1,338
22	PLACEMENT OFFICE	181	233	13	427
23	GROUND	0	0	0	0
	Sub-total	**2,882**	**2,227**	**897**	**6,006**

Summary of lighting

Type of light	Report 2024	2024-25
36 W tube lights	7,560	4,127
LED fittings	6,878	18,974
Total light fittings	**14,438**	**23,101**

Remarks: The share of LED lighting on the campus has increased from 48% to 82% of all light fittings. Replacing the remaining 4,127 normal tube lights (36 W) with energy-efficient LED tube lights (18–20 W) can result in up to 50% energy savings while providing the same or better illumination. Implementing this change in phases, starting with the classroom blocks, hostels and mess halls where tube lights remain, will maximize both environmental and financial benefits.

23.4 USE OF CONVENTIONAL FANS

The ceiling fan details of the campus are as follows. Of the 6,976 ceiling fans, 520 have been replaced with energy-efficient 30 W BLDC fans – 120 in the Ladies Hostel and 400 in the Boys (Gents) Hostels. The remaining 6,456 fans are conventional 75 W fans.

S. NO	NAME OF THE BLOCK	FLOOR	TOTAL FANS	BLDC FANS (30 W)	CONVENTIONAL FANS (75 W)
1	Block 1	Ground	60	–	60
2		First	60	–	60
3		Second	60	–	60
4	Block 2	Ground	24	–	24
5		First	24	–	24
6	Block 3	Ground	24	–	24
7		First	24	–	24
8	Block 4	Ground	24	–	24
9		First	24	–	24
10	Block 5	Ground	24	–	24
11		First	24	–	24
12	Block 6	Ground	24	–	24
13		First	24	–	24
14	Block 7	Ground	24	–	24
15		First	24	–	24
16	Block 8	Ground	24	–	24
17		First	24	–	24
18	Block 9	Ground	24	–	24
19		First	24	–	24
20	Block 10	Ground	84	–	84
21		First	84	–	84
22		Second	84	–	84
23	Block 11	Ground	48	–	48
24		First	48	–	48
25		Second	48	–	48
26		Third	48	–	48
27	Block 12	First	84	–	84
28		Second	84	–	84
29		Third	84	–	84
30	Block 14	Ground	96	–	96
31		First	96	–	96
32		Second	96	–	96
33		Third	96	–	96
34	Block 15	Ground	60	–	60
35		First	60	–	60
36		Second	60	–	60

S. NO	NAME OF THE BLOCK	FLOOR	TOTAL FANS	BLDC FANS (30 W)	CONVENTIONAL FANS (75 W)
37	Block 16	Ground	108	–	108
38		First	108	–	108
39		Second	108	–	108
40	Block 18	Ground	144	–	144
41		First	144	–	144
42		Second	144	–	144
43		Third	144	–	144
44	Block 20	Ground	60	–	60
45	Block 20A	Ground	72	–	72
46		First	72	–	72
47		Second	72	–	72
48	Block 20B	Ground	72	–	72
49		First	72	–	72
50		Second	72	–	72
51	B Arch	Ground	95	–	95
52		First	95	–	95
53		Second	95	–	95
54	ECE	Ground	32	–	32
55	Mechanical		60	–	60
56	Aeronautical		30	–	30
57	EEE		85	–	85
58	NEW CSE	Ground	72	–	72
59		First	52	–	52
60		Second	52	–	52
61	NEW MBA	Ground	72	–	72
62		First	52	–	52
63		Second	52	–	52
64	OLD MBA	Ground	180	–	180
65		First	180	–	180
66		Second	60	–	60
67	MESS	Ground	180	–	180
68		First	180	–	180
69	Ladies Mess	Ground	180	–	180
70	Physics & Chemistry	First	180	–	180
71	Boys Hostel - MGR		450	400	506
72	Boys Hostel - Jeppiaar		360		
73	Boys Hostel - Gopalakrishnan		96		
74	Ladies Hostel - Mother Teresa		850	120	730
75	Admin	Second	20	–	20
	Total		**6,976**	**520**	**6,456**

Remarks: The institution has initiated the transition to BLDC fans in the hostels, saving about 46,800 kWh and 33.2 tons of CO2 every year. Replacing the remaining conventional 75 W fans with 30 W BLDC fans can result in energy savings of up to 60%, lower electricity bills and reduced maintenance costs. Prioritizing high-usage areas like the remaining hostel rooms, mess halls and classrooms will maximize the impact.

23.5 USE OF AIR CONDITIONERS DETAILS

The Air conditioner details of the campus are as follows.

MAKE	MODEL (Split / Window)	TR	STAR RATING	NO OF AC'S
O General	Split	2 TR	5	650

High Cooling Capacity:

The O General split ACs have a cooling capacity of 2 TR (ton of refrigeration), suitable for medium to large rooms or halls. This suggests they are being used in areas with higher cooling requirements.

Star Rating:

The 5-star rating indicates that the air conditioners are energy-efficient and consume less power compared to lower-rated models.

Energy Efficiency Ratio (EER):

The EER value is missing in the data. EER is critical for assessing how efficiently the AC converts power into cooling. Higher EER values are preferable for better energy savings.

Quantity:

With 650 AC units, the total energy consumption can be significant, even with energy-efficient models. This requires regular maintenance and monitoring to ensure optimal performance.

24. ENERGY CONSERVATIVE MEASURES

24.1 REPLACE EXISTING CONVENTIONAL FAN TO BLDC FAN

Observation:

During the audit it was observed that 6,456 conventional ceiling fans are used for ventilation purposes, while 520 fans in the hostels have already been replaced with 30 W BLDC fans.

Recommendation:

It is recommended to replace the remaining conventional ceiling fans with energy-efficient 30 W BLDC fans, matching the fans already installed, to obtain the following energy savings.

Estimated Savings:

Description	Units	Values
Quantity of existing conventional ceiling fan	Nos	6,456
Wattage of conventional ceiling fan	W	75
Number of working days	Days/Annum	250
Present operating hours	Hours/Day	8
Present operating hours	Hours/Annum	2,000
Average unit cost	INR/kWh	7.77
Energy consumption by existing conventional ceiling fan	kWh/Annum	9,68,400
Wattage of BLDC ceiling fan	W	30
Energy consumption by BLDC ceiling fan	kWh/Annum	3,87,360
Cost of one BLDC ceiling fan	INR	4,000
Energy savings	kWh/Annum	5,81,040
Cost savings	INR/Annum	45,14,681
Investment	INR	2,58,24,000
Payback period	Years	5.72
Estimated Annual Emission Reduction	t CO2/ Annum	412.54

Savings already achieved by the 520 BLDC fans:

Description	Units	Values
BLDC fans installed (Ladies Hostel 120 + Boys Hostels 400)	Nos	520
Energy consumption before replacement (75 W)	kWh/Annum	78,000
Energy consumption after replacement (30 W)	kWh/Annum	31,200
Energy savings	kWh/Annum	46,800
Cost savings	INR/Annum	3,63,636
Annual Emission Reduction	t CO2/ Annum	33.23

24.2 REPLACE EXISTING 36W TUBE LIGHT WITH LED TUBE LIGHT

Observation:

During the audit, it was observed that tube lights are used for illumination purposes. These tube lights consume an average power of 36W, which is higher compared to LED lights.

Recommendations:

It is recommended to replace the tube lights with LED tube lights to achieve the following energy savings. The power consumption of traditional tube lights is 40-50% higher compared to LED tube lights.

Benefits of Switching to LED Tube Lights:

1. **Energy Savings:**
   - ✓ **Reduced Power Consumption:** LED tube lights consume significantly less power, typically around 18-20W, compared to the 36W consumed by traditional tube lights.
   - ✓ Percentage Savings: By switching to LED tube lights, you can achieve a reduction in power consumption by approximately 50%.
2. **Cost Savings:**
   - ✓ **Lower Electricity Bills:** Reduced power consumption directly translates into lower electricity bills, leading to substantial cost savings over time.
   - ✓ **Long-term Savings:** Although LED lights might have a higher initial cost, their longer lifespan and lower energy usage result in overall cost savings.
3. **Extended Lifespan:**
   - ✓ **Durability:** LED tube lights have a longer lifespan compared to traditional tube lights, reducing the frequency and cost of replacements.
   - ✓ **Reduced Maintenance:** With a longer operational life, LED lights reduce the maintenance effort and cost associated with frequent replacements.
4. **Improved Lighting Quality:**
   - ✓ **Better Illumination:** LED lights provide better quality illumination with higher brightness and improved colour rendering, enhancing the visual comfort in the canteen area.
   - ✓ **Instant On:** Unlike traditional tube lights, LEDs turn on instantly without flickering, providing immediate full illumination.
5. **Environmental Benefits:**
   - ✓ **Lower Carbon Footprint:** Reduced energy consumption leads to lower greenhouse gas emissions, contributing to environmental conservation.
   - ✓ **Reduced Hazardous Waste:** LED lights do not contain mercury or other hazardous materials, making them more environmentally friendly and easier to dispose of safely.

Description	Units	Values
Quantity of existing tube light	Nos	4,127
Wattage of tube light	W	36
Number of working days	Days/Annum	250
Present operating hours	Hours/Day	8
Present operating hours	Hours/Annum	2,000
Average unit cost	INR/kWh	7.77
Energy consumption by existing tube light	kWh/Annum	2,97,144
Wattage of LED tube light	W	20
Energy consumption by LED tube light	kWh/Annum	1,65,080
Cost of one LED tube light	INR	300
Energy savings	kWh/Annum	1,32,064
Cost savings	INR/Annum	10,26,137
Investment	INR	12,38,100
Payback period	Months	14.5
Estimated Annual Emission Reduction	t CO2/ Annum	93.77

Note: The quantity of tube lights has been revised from 7,560 to 4,127 based on the verified block-wise LED count for 2024-25 (Section 23.3).

25. ALTERNATE SOURCES OF ENERGY AND ENERGY CONSERVATION MEASURES

25.1 SOLAR ENERGY

A 100-kW solar system installed on the campus of the institution generates approximately 1,00,000 kWh of clean energy annually, operating 5 hours daily for 200 days, saving about INR 7,77,000 per year and significantly contributing to sustainability by reducing carbon emissions by 71 tons per year.

Description	Units	Values
Rated kW solar	kW	100
Present operating hours	Hours/Day	5
Operating days	Days/Annum	200
Present operating hours	Hours/Annum	1,000
Approx. Energy produced	kWh/Annum	1,00,000
Monetary savings (INR 7.77/kWh)	INR/Annum	7,77,000
Share of annual electricity consumption	%	1.92
Estimated Annual Emission Reduction	t CO2/ Annum	71.0

Remarks: The solar capacity of the campus has increased from 40 kW to 100 kW, raising annual generation from 40,000 kWh to 1,00,000 kWh. With minor optimizations and further expansion, its benefits can be amplified, contributing to long-term environmental and economic gains.

26. Annexure-1- CARBON FOOTPRINT

AUDIT ON CARBON FOOTPRINT

As per the Audit on Carbon Footprint the data was extracted from above sources and measured the low carbon energy use in the campus. It has focused on evaluating sustainability practices, resource usage, waste management, and overall environmental factor to highlight the institution's commitment to a greener, more sustainable future.

Low-carbon energy tracking

Measure of the amount of low carbon energy used across the university:

S. No	Low-carbon energy / fuel source	Energy / fuel benefit	CO2 avoided, t/Annum
1	Wind and solar power from external sources (22% of EB supply)	11,46,646 kWh/Annum	814.1
2	Solar PV system on campus – 100 kW	1,00,000 kWh/Annum	71
3	Biogas plant – 1 tonne/day canteen food waste	≈ 815 LPG cylinders/Annum	46.2
4	520 BLDC ceiling fans (30 W) in Ladies and Boys Hostels	46,800 kWh/Annum	33.2
	Total		**964.5**

The energy-saving projects focus on reducing energy consumption, cutting operational costs, and lowering carbon emissions. Two key measures have been identified:

- Replacing Conventional Ceiling Fans with BLDC Fans: Replacing the remaining 6,456 conventional fans with 30 W BLDC fans leads to annual energy savings of 5,81,040 kWh, with an investment of INR 2,58,24,000. The monetary savings amount to INR 45,14,681 per annum, achieving a payback period of 5.7 years while reducing emissions by 412.5 tons of CO2 annually.
- Replacing Tube Lights with LED Tube Lights: Replacing the remaining 4,127 tube lights results in annual energy savings of 1,32,064 kWh, requiring an investment of INR 12,38,100. This measure generates annual monetary savings of INR 10,26,137, with a payback period of about 14.5 months and an emissions reduction of 93.8 tons of CO2 annually.

Together, these projects yield total energy savings of 7,13,104 kWh per annum, requiring an investment of INR 2,70,62,100 and producing annual savings of INR 55,40,818. They also contribute to a total emissions reduction of 506.3 tons of CO2 per year. With an annual electrical energy consumption of 52,12,026 kWh, this translates to a 13.7% reduction in energy consumption.

NIN Energy India Private Limited is providing Energy Related services like Energy Audit, Power Quality Audit, Infrared Thermography, Thermal Audit, PAT Monitoring and Verification Audit, PAT Consultancy, Green Building Commissioning, Electrical Safety Audit, Internet of Things, Carbon Foot Printing, etc.

S. No	Energy Efficiency Measures	Estimated annual Energy Savings, kWh/Annum	Estimated Investment, INR	Monetary Savings, INR/Annum	Payback Period, Years	Emission Reduction, t CO2/Annum
1	Replace remaining 6,456 conventional ceiling fans with 30 W BLDC ceiling fans	5,81,040	2,58,24,000	45,14,681	5.72	412.5
2	Replace remaining 4,127 nos. 36 W tube lights with 20 W LED tube lights	1,32,064	12,38,100	10,26,137	1.21	93.8
	Total	**7,13,104**	**2,70,62,100**	**55,40,818**	**4.88**	**506.3**

Description	Value
Annual Electrical Energy consumption, kWh/Annum	**52,12,026**
Annual Electrical Energy Savings, kWh/Annum	7,13,104
Electrical Energy Savings, %	**13.7**

Low-carbon energy use

Carbon footprint can be measured by the total sum of greenhouse gases (GHG) emission caused by an organization, event, product, or person. As we are aware, the increasing concentration of GHGs in the atmosphere can accelerate climate change and global warming, it is very necessary to measure these emissions from our day-to-day activities. The first step towards managing GHG emissions is to measure them. There are some standards and guidelines to measure GHG emissions like GHG protocol, ISO 14064, the more comprehensive one Life Cycle Assessment (LCA), and market-based mechanisms. Out of them, ISO 14064 is an offset protocol and independent,

voluntary GHG project accounting standard helps to quantify GHG emission of the organization, event, product, or person.

Our day-to-day activities are dependent on electricity which is mostly coming from coal-based power plants, Diesel and Petrol for our vehicles and LPG for cooking in our kitchen. All of the energy we use is derived from these fossil fuels which are GHG intensive. The following methodology helps you to calculate your carbon footprint resulting from the use of Electricity, Petrol, Diesel, and LPG.

Floristic status of the institution:

The current situation of planted trees is as follows:

S.No	Type of Trees	Total No of Trees	CO2 Absorption	Unit
1	No of matured trees (Age more than 10 years)	138	938.4	kg
2	No of Semi matured trees (Age below 10 years)	316	1,074.4	kg
3	No of plants/herbs/Shrubs	1,140	228.0	kg
4	No of medicinal plants	89	17.8	kg
5	Any other plants details, if any	216	43.2	kg
	Total	**1,899**	**2,301.8**	**kg**

Carbon absorption by flora in the Institution

Carbon absorption capacity of one matured tree = 6.8 kg of CO2. Carbon absorption capacity of one semi-matured tree = 3.4 kg of CO2. In bushes it absorbs an average of 200 g of CO2.

- The carbon absorption capacity of 138 matured trees in campus (138 × 6.8 kg CO2/Annum) = 938.4 kg of CO2/Annum.
- The carbon absorption capacity of 316 semi-matured trees in campus (316 × 3.4 kg CO2/Annum) = 1,074.4 kg of CO2/Annum.
- There are 1,445 plants, herbs, shrubs, medicinal and other plants (1,140 + 89 + 216) being raised in the gardens of the Institution; total carbon absorption was calculated to be (1,445 × 0.2 kg CO2/Annum) = 289.0 kg of CO2/Annum.

The grand total of carbon absorption by the flora in the campus is **2,301.8 kg (2.30 tCO2) per year.**

Description	Unit	Values
Annual Emissions from Electricity – conventional grid share (40,65,380 kWh), tCO2	tCO2 /year	2,886.4
TOTAL EMISSIONS FROM FACILITY	tCO2 /year	2,886.4
Carbon absorption by mature trees, semi mature trees, bushes, and lawns	tCO2 /year	2.30
Net carbon emission of the campus	tCO2 /year	2,884.1
Carbon reduction opportunities by energy saving projects	tCO2 /year	506.3
Estimated Carbon Emissions after implementing the Energy Saving Projects	tCO2 /year	2,377.8

Note: Electricity emissions are calculated only on the conventional share (78%) of the EB supply, as 22% (11,46,646 kWh, avoiding 814.1 tCO2) is sourced from external wind mills and solar plants. Emissions avoided by on-campus solar PV (71.0 t), the biogas plant (46.2 t) and BLDC fans (33.2 t) are not deducted again, as they are already reflected in the electricity purchased or lie outside the electricity-based footprint.

27. GAP IDENTIFICATION

Based on the data verified for 2024-25 and a review of the 2024 audit, the following gaps have been identified in energy efficiency, resource management and data availability. Addressing these gaps will strengthen the institution's sustainability performance and the completeness of future audits.

S. No	Area	Gap identified	Action / data required
1	Energy data	Month-wise maximum demand, power factor and total bill (including fixed charges) for 2024-25 are not furnished; block-wise sub-metering is not available.	Furnish 2024-25 demand, PF and total bill details; install block-wise energy meters.
2	Lighting	4,127 conventional 36 W tube lights remain (Blocks 1–20B, B Arch, Old MBA, hostels).	Replace with 20 W LED tubes (payback ≈ 14.5 months).
3	Lighting data	Verified LED count for Blocks 1–20B, B Arch and MBA is lower than the 2024 count; some blocks may overlap (St. Paul's/CSE, Old COE/COE).	Reconcile block names and conduct a fresh floor-wise lighting count.
4	Ceiling fans	6,456 conventional 75 W fans remain; hostel-wise split of the 400 BLDC fans in Boys Hostels is not available.	Replace with 30 W BLDC fans in phases; record hostel-wise BLDC count.
5	Air conditioners	EER and operating hours of the 650 AC units are not recorded.	Record nameplate EER; set 24 °C default and timer/occupancy controls.
6	Solar energy	Installation cost and metered generation of the 100 kW system are not available; Section 8 lists 80 kW of solar street lights against 100 kW total.	Install generation meter; furnish cost, monthly generation and the street-light / rooftop break-up.
7	Water	Storage (2 lakh litres) is low against a supply of 2,448 KL/day; no flow meters; water quality test results not available.	Record all sump/OHT capacities, install flow meters, test water quarterly (IS 10500).
8	STP & rainwater	Treated water quantity, number and capacity of rainwater harvesting pits and number of sensor taps not quantified.	Measure STP output (KL/day); record RWH pits and sensor taps.
9	Waste & biogas	Actual biogas output, plant capacity and cost not recorded; e-waste, hazardous/lab waste and composting not documented.	Maintain daily biogas and LPG log; document e-waste and hazardous waste disposal.
10	Indoor environment	Several locations show high PM2.5, CO2 above 1,000 ppm, lux below 300 and noise above 85 dB (Sections 20–22).	Improve ventilation, raise lighting levels and add acoustic treatment.
11	Green expenditure	Expenditure on green initiatives over the last five years (Objective 7) is not reported.	Furnish year-wise green expenditure.
12	Corrections to 2024 report	LED payback shown as 14 years (correct: 14 months); solar '200 hours/annum' (correct: 200 days); flora calculation errors; food waste 'Nil'; noise value 742 dB.	Corrected in this 2024-25 report.
13	Certification	The green audit certificate on record is for the year 2024.	Auditor to verify the 2024-25 data and issue the certificate for 2024-25.

Priority actions: (i) replace the remaining tube lights with LED (fastest payback); (ii) phase-wise BLDC fan replacement starting with hostels and mess halls; (iii) install sub-metering for electricity, water, solar and biogas so that future audits are based on measured data.

28. SITE VISIT IMAGES

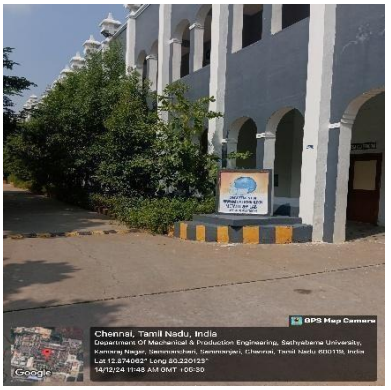






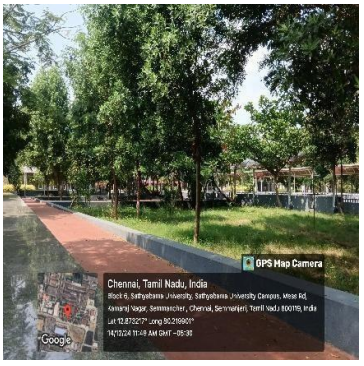












29. ACCREDITED ENERGY AUDITOR CERTIFICATES

ENERGY IS LIFE
BEE
CONSERVE IT

BUREAU OF ENERGY EFFICIENCY



Examination Registration No. : EA-3201

Accreditation Registration No. : AEA-0023

Certificate of Accreditation

This is to certify that Mr./Ms. B. Senthilkumar having its trade/registered office at Chennai has been given accreditation as accredited energy auditor. The certificate shall be effective from 26th day of February 2013

The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No. 0023 in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this 26th day of May 2014

Secretary,
Bureau of Energy Efficiency
New Delhi

iqms

In association with

SWISO

THIS IS TO CERTIFY THAT

B. Senthil Kumar

has successfully completed a course approved by the
Institute of Environmental Management & Assessment in

ADVANCED EMS AUDITOR
(ISO 14001:2004)

(achieving an overall mark of 75%)

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SGS

CERTIFICATE

SGS Taiwan GHG Group

This to certify that

B SENTHIL KUMAR

has successfully passed the course assessment and examination for

ISO14064:2006 GHG Inventory and Verification

Held on: 2nd-4th March 2009
Location: Gurgaon, India

Richard Huang
Technical Manager
SGS Taiwan GHG Group

TW-I-0082
Certificate Number

SGS United Kingdom Limited
Climate Change Programme

TM

Factual Assessments - Global Certifications

Certificate of Compliance

This is to certify that

NIN Energy India Private Limited

JUSA Complex, New No 47, Old No 21/2, Ponniamman Koil Street, Kottur,
Chennai - 600085 (Tamil Nadu), India.

has been assessed by RSI and found to comply with the requirements of

ISO/IEC 17020:2012

Operation of various types of bodies performing inspection - Requirements

for the following activities:

Mandatory Energy Audit, Environment Audit, Green Audit, PAT Measurement and Verification (M&V), Power Quality Audit, Infrared Thermography, Electrical Safety Audit, Energy Management Training, Energy Management System, Measurement & Verification, Green Building Services, Renewable Energy Services, Carbon Foot Printing and Water Audit

Certificaat Nummer / Certificate No. : IE-BV-2207-5410

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Ist Annual surveillance audit due on : 26/06/2023
IInd Annual surveillance audit due on : 26/06/2024

Director (Certification)

Royal Stancert B.V.
Feitelijke Beoordelingen - Wereldwijde Beoordelingen
Certificaat Nummer / Certificate No. : Q-xx-xxxx-xxxxx

Regd. Office - Joop Geesinkweg 701, 1114 AB Amsterdam. The Netherlands.
(KvK-Nummer 71431802 / RSIN 858713159 - Rechtsvorm - Besloten Vennootschap).

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