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

AUDIT CONDUCTED AND REPORT PREPARED BY

NIN ENERGY INDIA PRIVATE LIMITED

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

PONNIAMMAN KOIL STREET, KOTTUR,

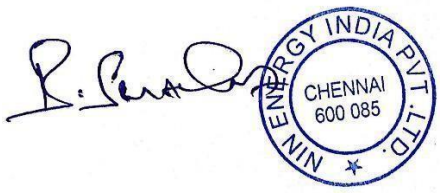
CHENNAI-600085, TAMILNADU, INDIA.

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

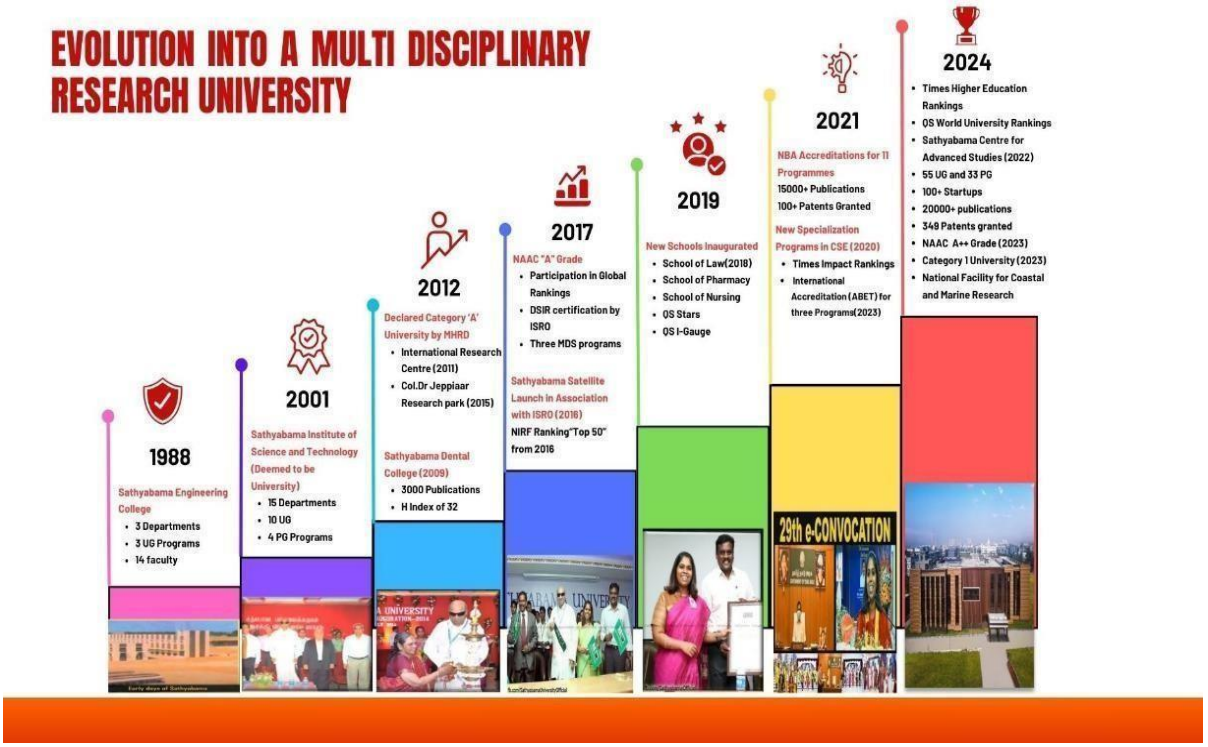
3.2 MISSION

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

S. No	Energy Efficiency Measures	Estimate annual Energy Savings, kWh/Annum	Estimated Investment, INR	Monetary Savings, INR	Payback Period, Years	Emission Reduction, t CO2/Annum
1	Replace existing conventional ceiling fan to BLDC ceiling fan	558080	27904000	4334421	**6**	396
2	Replace existing tube light to LED tube light	241920	2268000	1878912	**14**	172
Total		**800000**	**30172000**	**6213333**	**5**	**568**

Annual Electrical Energy consumption, kWh/Annum	**54,77,235**
Annual Electrical Energy Savings, kWh/Annum	800000
Electrical Energy Savings, %	**14.6**

5. ENERGY AUDIT FOR YEAR 2023-2024

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: This measure leads to significant annual energy savings of 558,080 kWh, with an investment of INR 27,904,000. The monetary savings amount to INR 4,334,421 per annum, achieving a payback period of 6 years while reducing emissions by 396 tons of CO2 annually.
- Replacing Tube Lights with LED Tube Lights: Transitioning to LED lighting results in annual energy savings of 241,920 kWh, requiring an investment of INR 2,268,000. This measure generates annual monetary savings of INR 1,878,912, with a payback period of 14 years and an emissions reduction of 172 tons of CO2 annually.

Summary: Together, these projects yield total energy savings of 800,000 kWh per annum, requiring an investment of INR 30,172,000 and producing annual savings of INR 6,213,333. They also contribute to a total emissions reduction of 568 tons of CO2 per year. These initiatives demonstrate a strong commitment to sustainability and energy efficiency while offering substantial long-term cost and environmental benefits.

The proposed energy-saving measures result in significant improvements to energy efficiency. With an **annual electrical energy consumption of 5,477,235 kWh**, the energy-saving initiatives, including replacing conventional ceiling fans with BLDC fans and switching to LED tube lights, achieve an **annual savings of 800,000 kWh**. This translates to an impressive **14.6% reduction in energy consumption**.

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	24
4	No of departments and its details	30
5	No of student's details	16609
6	No of Teaching staff	990
7	No of non-teaching staff	1537
8	No of Guest lectures	16
9	No of Classrooms	406
10	No of Labs	164
11	No of Smart classrooms	16
12	Courses available in the INSTITUTE OF SCIENCE AND TECHNOLOGY	82
13	No of hostel building	9
14	Waste water treatment details	STP Plant
15	No of solar streetlights available in the campus	40KW

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 are as follows:

S.No	Type of Trees	Total No of Trees	CO2 Absorption	
1	No of matured trees (Age more than 10 years)	88	598.4	kg
2	No of Semi matured trees (Age below 10 years)	156	530.4	kg
3	No of plants/herbs/Shrubs	815	163	kg
4	No of medicinal plants	89	17.8	kg
5	Any other plants details, if any	216	43.2	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 full grown tree = 3.4 kg of CO2. In bushes it absorbs an average of 200 g of CO2.

1. The carbon absorption capacity of 88matured trees in campus of (88× 6.8 kg CO2/Annum) = 47.6 kg of CO2/Annum.
2. The carbon absorption capacity of 156 semi-grown trees in campus of (156 × 3.4 kg CO2/Annum) = 20.4 kg of CO2/Annum.
3. There are 1120 bushes of various species being raised in the gardens of the Institution total carbon absorption was calculated to be (1120× 0.2 kg CO2/Annum) = 135.2 kg of CO2/Annum.

The grand total of carbon absorption by the flora in the campus is 1352.8 kg per year.

Description	Unit	Values
Annual Emissions from Electricity, tCO2	tCO2 /year	3889
TOTAL EMISSIONS FROM FACILITY	tCO2 /year	3889
Carbon absorption by mature trees, semi mature trees, bushes, and lawns	tCO2 /year	1.29
Net carbon emission of the campus	tCO2 /year	3888
Carbon reduction opportunities by energy saving projects	tCO2 /year	568
Estimated Carbon Emissions after implementing the Energy Saving Projects	tCO2 /year	3320

LPG consumption Details

Description	Details
No of student's details	16609
No of Teaching staff	990
No of non-teaching staff	1537
No of Guest lectures	16
Total	19152
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	Nil

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. On average, 80 tankers, each with a capacity of 24,000 Liters, supply a total of 1.92 million Liters of water daily, stored in a 200,000-liter capacity tank.

Primary Usage:

- Restrooms
- Mess operations
- Food cleaning
- Hostels

Recycled Water:

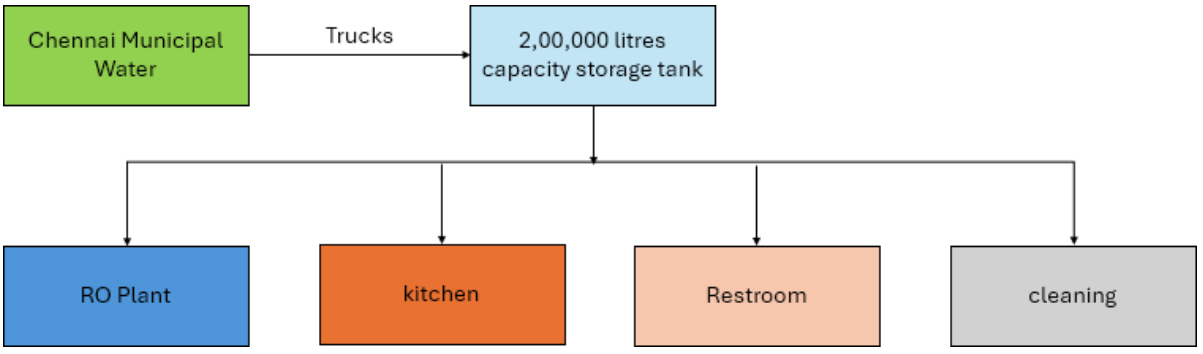
- Treated in the Sewage Treatment Plant (STP).
- Reused for toilet flushing and gardening.

RO Water Treatment:

- The INSTITUTE OF SCIENCE AND TECHNOLOGY operates 4 RO plants.
- Provides clean drinking water and water for kitchen food preparation.
- Packaged in cans for hostel use.

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

RAW WATER



18.1 WATER TREATMENT PLANT

Introduction

The INSTITUTE OF SCIENCE AND TECHNOLOGY 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

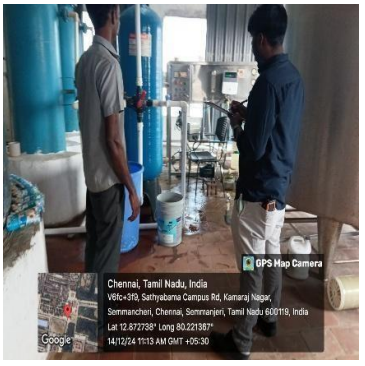
- Improved Water Quality: The RO process ensures that the water is free from harmful chemicals, salts, and microorganisms, making it safe for drinking and cooking.
- Cost-Effective: The system provides a cost-effective solution for water purification, reducing the dependency on bottled water.
- Environmentally 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.

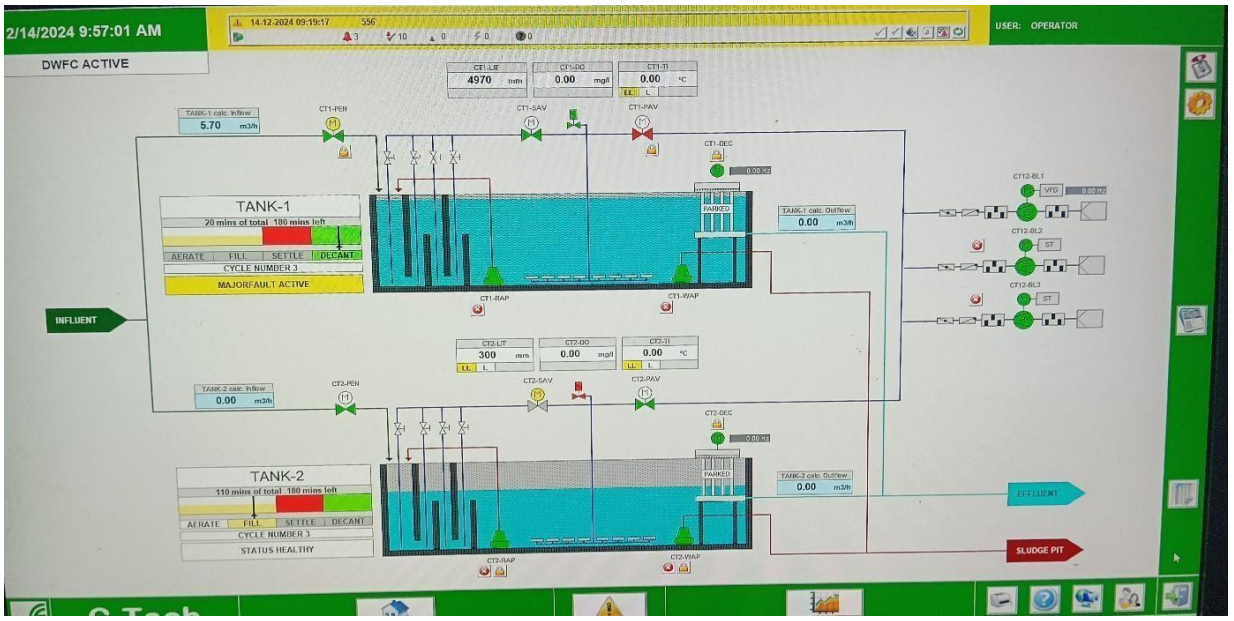
The water then flows into two Clarified Water Tanks, where additional clarification takes place to ensure the water is clean and safe for reuse.

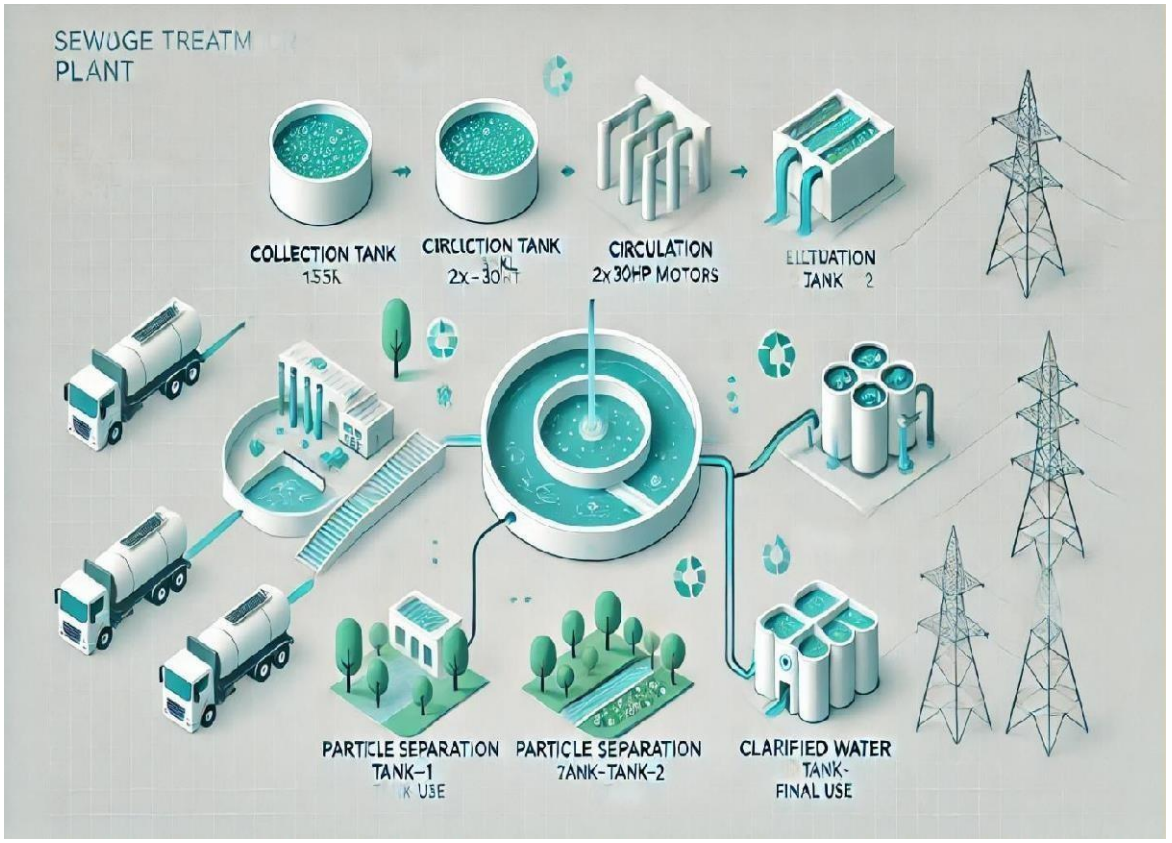
Final Use:

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 TREATM
PLANT
COLLECTION TANK
155K
CIRCLCTION TANK
2x-30HP
CIRCULATION
2x30HP MOTORS
ELLTUATION
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

INSTITUTE OF SCIENCE AND TECHNOLOGYs produce large amounts of waste daily, including food waste from canteens and other general waste. To manage this effectively, food waste can be collected and sent to a biogas plant, where it is converted into renewable energy 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. Recycling Food Waste in INSTITUTE OF SCIENCE AND TECHNOLOGYs with Biogas Plants

INSTITUTE OF SCIENCE AND TECHNOLOGYs generate significant amounts of food waste daily, especially from canteens, hostels, and cafeterias. A biogas plant can efficiently recycle this waste to produce energy and organic fertilizer, offering a sustainable solution.

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 an on-campus or nearby biogas plant.
- Anaerobic Digestion: Microorganisms break down the organic matter in an oxygen-free environment, producing:
- Biogas: A renewable energy source composed mainly of methane, which can be used for cooking, heating, or generating electricity.
- Digestate: A nutrient-rich byproduct that can be used as organic fertilizer for INSTITUTE OF SCIENCE AND TECHNOLOGY gardens or sold.

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

Source of power supply	TNEB
Electric power supply is received from TANGEDCO	HT Supply
Service number	99094011060
Sectional load	2500
Annual electricity consumption, kWh	5477235
Avg. Annual power factor	0.97
Unit charges, INR/kWh	7.8

Month	Recorded maximum demand, kVA	% of Demand utilisation	Total units consumed, kWh	Unit cost, INR/kWh	Electricity consumption charges, INR	Power factor	Total bill, INR
Dec-23	1455	58	313409	7.7	2397579	0.97	4040188
Jan-24	1298	52	216439	7.7	1655758	0.95	3194269
Feb-24	1518	61	370005	7.7	2830538	0.97	4533001
Mar-24	1678	67	482258	7.7	3689274	0.98	5500271
Apr-24	1755	70	508412	7.7	3889352	0.98	5731355
May-24	2118	85	578568	7.7	4426045	0.98	6344178
Jun-24	1905	76	467079	7.7	3573154	0.97	5331105
Jul-24	1568	63	323199	7.7	2472472	0.96	4127757
Aug-24	2110	84	515026	8.0	4120208	0.97	4120208
Sep-24	2248	90	566672	8.0	4533376	0.98	6548457
Oct-24	2395	96	623513	8.0	4988104	0.98	7140197
Nov-24	2370	95	512655	8.0	4101240	0.98	6124136

Remarks:

Demand Utilization Efficiency:

- Demand utilization gradually increases from 52% (Jan-24) to 96% (Oct-24), indicating better resource usage over time.
- However, lower utilization in early months (Dec-23 to Jul-24) suggests potential inefficiencies or unused capacity.

Power Factor:

- The power factor is consistently high (0.95–0.98), reflecting efficient energy usage. Maintaining this is critical to minimize energy losses and avoid penalties.

Electricity Cost Increase:

- The unit cost increased from INR 7.7/kWh to INR 8.0/kWh in August 2024, which impacts overall expenditure. Despite this, efficient utilization in later months kept the total bill within reasonable limits.

Seasonal Trends:

- Higher consumption is observed during summer months (Apr-24 to Oct-24), likely due to cooling requirements or increased activity.
- Lower demand in early months (Dec-23 to Feb-24) indicates potential underutilization of capacity during winter.

Total Bill:

- The total bill increases significantly in months with higher demand utilization and consumption (e.g., Oct-24 at INR 7.14 million).
- Recommendations:

Optimize Demand Utilization:

- Investigate the reasons behind low demand utilization in early months and aim to consistently operate above 70%.
- Schedule energy-intensive operations during off-peak times to maximize usage efficiency.

Monitor and Maintain Power Factor:

- Regularly maintain and test power factor correction equipment to keep it close to 1.0, minimizing losses and avoiding penalties.

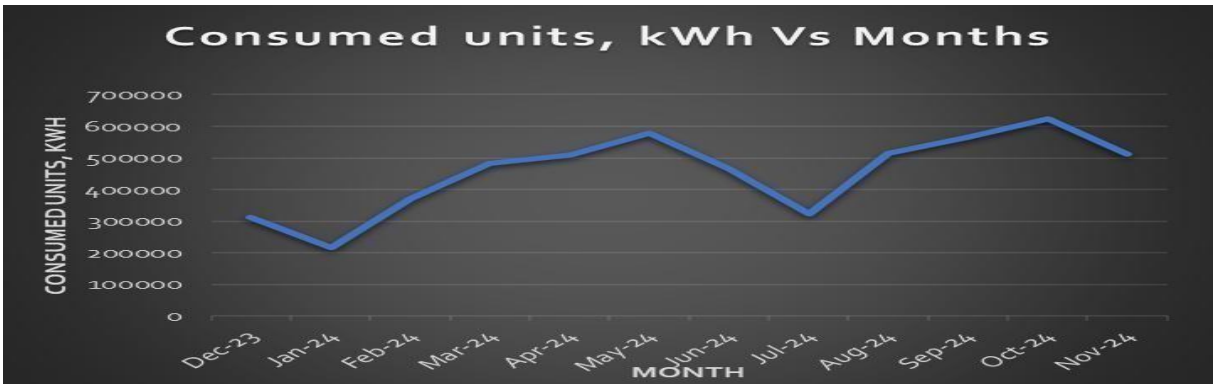
Energy Efficiency Measures:

- Implement energy-saving practices, such as upgrading to energy-efficient equipment, optimizing HVAC systems, and using LED lighting.
- Conduct energy audits to identify and eliminate wastage.

Manage Seasonal Fluctuations:

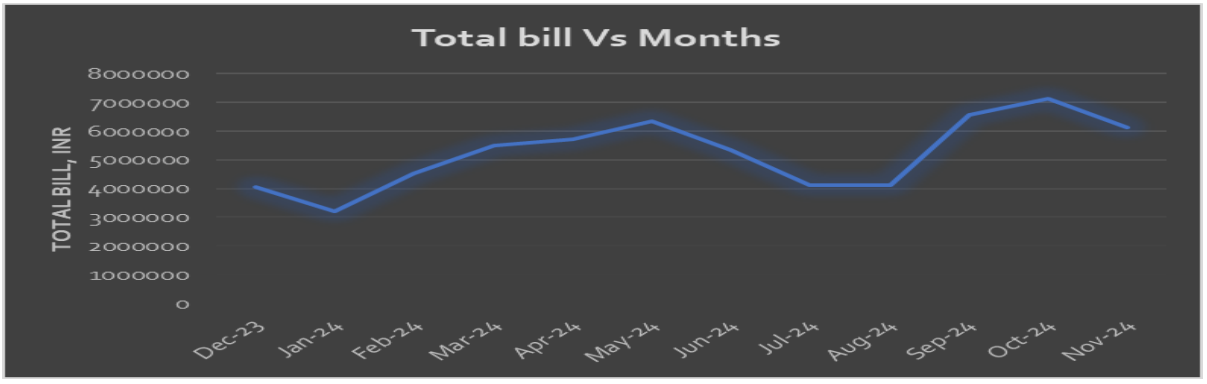
- Prepare for increased summer demand by ensuring systems is optimized to handle peak loads efficiently.
- Explore renewable energy options, such as solar panels, to offset the cost during high-consumption periods.

The units, kW consumed over the period of one year is shown below.



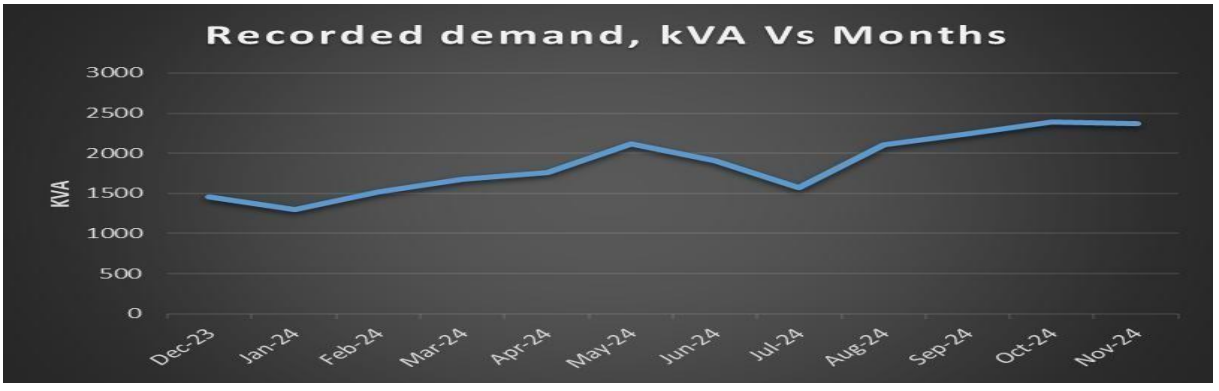
The maximum unit is consumed in the month of October 2024 and minimum unit is consumed in the month of January 2024.

The bill details over the period of one year is shown below.



The maximum bill is paid in the month of October 2024 and minimum unit is consumed in the month of January 2024.

The recorded Demand cover the period of one year is shown below.



The maximum recorded demand in the month of October 2024 and minimum recorded demand in the month of January 2024.

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 LED light details of the campus are as follows.

S. NO	NAME OF THE BLOCK	FLOOR	TYPE OF LIGHT	NO OF LIGHTS	WATTAGE	OPERATING HOURS
1	Block 1	Ground	LED	75	22W	8
2	Block 1	First	Tube Light	75	36W	8
3	Block 1	Second	Tube Light	75	36W	8
4	Block 2	Ground	LED	20	22W	8
5	Block 2	First	Tube Light	20	36W	8
6	Block 3	Ground	LED	20	22W	8
7	Block 3	First	Tube Light	20	36W	8
8	Block 4	Ground	LED	20	22W	8
9	Block 4	First	Tube Light	20	36W	8
10	Block 5	Ground	LED	20	22W	8
11	Block 5	First	Tube Light	20	36W	8
12	Block 6	Ground	LED	20	22W	8
13	Block 6	First	Tube Light	20	36W	8
14	Block 7	Ground	LED	20	22W	8
15	Block 7	First	Tube Light	20	36W	8
16	Block 8	Ground	LED	20	22W	8
17	Block 8	First	Tube Light	20	36W	8
18	Block 9	Ground	Tube Light	50	36W	8
19	Block 9	First	LED	120	22W	8
20	Block 10	Ground	LED	120	22W	8
21	Block 10	First	Tube Light	120	36W	8
22	Block 10	Second	Tube Light	120	36W	8
23	Block 11	Ground	LED	120	22W	8
24	Block 11	First	Tube Light	120	36W	8

S. NO	NAME OF THE BLOCK	FLOOR	TYPE OF LIGHT	NO OF LIGHTS	WATTAGE	OPERATING HOURS
25	Block 11	Second	Tube Light	120	36W	8
26	Block 11	Third	Tube Light	120	36W	8
27	Block 12	Ground	LED	120	22W	8
28	Block 12	First	LED	200	22W	8
29	Block 12	Second	LED	210	22W	8
30	Block 12	Third	LED	210	22W	8
31	Block 14	Ground	Tube Light	120	36W	8
32	Block 14	First	Tube Light	120	36W	8
33	Block 14	Second	Tube Light	120	36W	8
34	Block 14	Third	Tube Light	120	36W	8
35	Block 15	Ground	Tube Light	60	36W	8
36	Block 15	First	Tube Light	60	36W	8
37	Block 15	Second	Tube Light	60	36W	8
38	Block 16	Ground	LED	140	22W	8
39	Block 16	First	Tube Light	140	36W	8
40	Block 16	Second	Tube Light	140	36W	8
41	Block 18	Ground	Tube Light	240	36W	8
42	Block 18	First	Tube Light	240	36W	8
43	Block 18	Second	Tube Light	240	36W	8
44	Block 18	Third	Tube Light	240	36W	8
45	Block 20	Ground	LED	80	36W	8
46	Block 20A	Ground	LED	60	22W	8
47	Block 20A	First	LED	60	36W	8
48	Block 20A	Second	LED	60	36W	8
49	Block 20B	Ground	LED	60	22W	8
50	Block 20B	First	LED	60	36W	8
51	Block 20B	Second	LED	60	36W	8

S. NO	NAME OF THE BLOCK	FLOOR	TYPE OF LIGHT	NO OF LIGHTS	WATTAGE	OPERATING HOURS
52	B Arch	Ground	Tube Light	120	36W	8
53	B Arch	Ground	LED	150	22W	8
54	B Arch	First	Tube Light	120	36W	8
55	B Arch	First	LED	150	22W	8
56	B Arch	Second	Tube Light	240	36W	8
57	Old Computer Science	Ground	LED	120	36W	8
58	Old Computer Science	First	LED	120	36W	8
59	Old Computer Science	Second	LED	120	36W	8
60	ECE	Ground	Tube Light	70	36W	8
61	Old Computer Science	Ground	LED	50	36W	8
62	Old Computer Science	First	LED	60	36W	8
63	Old Computer Science	First	LED	120	22W	8
64	Old Computer Science	Second	LED	60	36W	8
65	Old Computer Science	Second	LED	120	22W	8
66	Mechanical		Tube Light	340	36W	8
67	Old Computer Science		LED	250	22W	8
68	ETCE	Ground	LED	140	22W	8
69	Old Computer Science	First	LED	140	22W	8
70	Old Computer Science	Second	LED	140	22W	8
71	Aeronatical	Ground	Tube Light	50	36W	8
72	Old Computer Science	First	Tube Light	60	36W	8
73	Old Computer Science	First	LED	50	36W	8
74	Old Computer Science	First	LED	70	22W	8
75	Old Computer Science	Second	LED	140	36W	8
76	Old Computer Science	Second	LED	130	15W	8
77	EEE	Ground	Tube Light	60	36W	8
78	EEE	First	Tube Light	40	36W	8
79	EEE	First	LED	30	22W	8
80	EEE	Second	LED	70	36W	8
81	NEW CSE	Ground	LED	72	36W	8
82	NEW CSE	Ground	LED	36	22W	8

S. NO	NAME OF THE BLOCK	FLOOR	TYPE OF LIGHT	NO OF LIGHTS	WATTAGE	OPERATING HOURS
83	NEW CSE	First	LED	72	36W	8
84	NEW CSE	First	LED	36	22W	8
85	NEW CSE	Second	LED	72	36W	8
86	NEW CSE	Second	LED	36	22W	8
87	NEW MBA	Ground	LED	72	36W	8
88	NEW MBA	Ground	LED	36	22W	8
89	NEW MBA	First	LED	72	36W	8
90	NEW MBA	First	LED	36	22W	8
91	NEW MBA	Second	LED	72	36W	8
92	NEW MBA	Second	LED	36	22W	8
93	OLD MBA	Ground	Tube Light	250	36W	8
94	OLD MBA	First	Tube Light	250	36W	8
95	OLD MBA	Second	LED	75	36W	8
96	OLD MBA	Second	LED	120	22W	8
97	MESS	Ground	LED	250	36W	8
98	MESS	First	LED	250	36W	8
99	Ladies Mess	Ground	Tube Light	180	36W	8
100	Physics & Chemistry	First	Tube Light	180	36W	8
101	COE	Second	LED	170	36W	8
102	Boys Hostel -MGR	Ground	Tube Light	180	36W	8
103	Boys Hostel -MGR	First	Tube Light	180	36W	8
104	Boys Hostel -MGR	Second	Tube Light	180	36W	8
105	Boys Hostel - Jeppiaar	Ground	Tube Light	160	36W	8
106	Boys Hostel - Jeppiaar	First	Tube Light	160	36W	8
107	Boys Hostel - Jeppiaar	Second	LED	160	22W	8
108	Boys Hostel - Gopalakrishnan	Ground	LED	60	22W	8
109	Boys Hostel - Gopalakrishnan	First	Tube Light	60	36W	8
110	Boys Hostel - Gopalakrishnan	Second	Tube Light	60	36W	8

S. NO	NAME OF THE BLOCK	FLOOR	TYPE OF LIGHT	NO OF LIGHTS	WATTAGE	OPERATING HOURS
111	Ladies Hostel - Mother Thresa	Ground	Tube Light	160	36W	8
112	Ladies Hostel - Mother Thresa	Ground	LED	40	36W	8
113	Ladies Hostel - Mother Thresa	First	Tube Light	180	36W	8
114	Ladies Hostel - Mother Thresa	Second	Tube Light	180	36W	8
115	Ladies Hostel - Mother Thresa	Third	Tube Light	180	36W	8
116	Ladies Hostel - Panimalar	Ground	LED	60	22W	8
117	Ladies Hostel - Panimalar	First	Tube Light	60	36W	8
118	Ladies Hostel - Rossery	Ground	Tube Light	160	36W	8
119	Ladies Hostel - Rossery	First	Tube Light	160	36W	8
120	Ladies Hostel - Rossery	Second	Tube Light	160	36W	8
121	Ladies Hostel - Immaculate	Ground	Tube Light	180	36W	8
122	Ladies Hostel - Immaculate	First	Tube Light	180	36W	8
123	Ladies Hostel - Immaculate	Second	Tube Light	180	36W	8
124	Admin	Ground	LED	60	36W	8
125	Admin	First	LED	70	36W	8
126	Admin	Second	LED	70	36W	8
127	Nano	Ground	LED	180	22W	8
128	Nano	First	LED	180	22W	8
129	Nano	Second	LED	180	22W	8
130	Nano	Third	LED	180	22W	8

Remarks: Replacing normal tube lights (36W) with energy-efficient LED tube lights (typically 18W or 20W) can result in up to 50% energy savings while providing the same or better illumination. This transition significantly reduces electricity consumption and costs, especially in high-usage areas like classrooms, hostels, and mess halls. Additionally, LED tube lights have a longer lifespan, require less maintenance, and align with sustainability goals by lowering the institution's overall carbon footprint. Implementing this change in phases, starting with high-density blocks, will maximize both environmental and financial benefits.

23.4 USE OF CONVENTIONAL FANS

The conventional fan details of the campus are as follows.

S. NO	NAME OF THE BLOCK	FLOOR	NO OF FANS	WATTAGE
1	Block 1	Ground	60	75W
2		First	60	75W
3		Second	60	75W
4	Block 2	Ground	24	75W
5		First	24	75W
6	Block 3	Ground	24	75W
7		First	24	75W
8	Block 4	Ground	24	75W
9		First	24	75W
10	Block 5	Ground	24	75W
11		First	24	75W
12	Block 6	Ground	24	75W
13		First	24	75W
14	Block 7	Ground	24	75W
15		First	24	75W
16	Block 8	Ground	24	75W
17		First	24	75W
18	Block 9	Ground	24	75W
19		First	24	75W
20	Block 10	Ground	84	75W
21		First	84	75W
22		Second	84	75W
23	Block 11	Ground	48	75W
24		First	48	75W
25		Second	48	75W
26		Third	48	75W
27	Block 12	First	84	75W
28		Second	84	75W
29		Third	84	75W
30	Block 14	Ground	96	75W
31		First	96	75W
32		Second	96	75W
33		Third	96	75W
34	Block 15	Ground	60	75W
35		First	60	75W
36		Second	60	75W
37	Block 16	Ground	108	75W
38		First	108	75W
39		Second	108	75W
40	Block 18	Ground	144	75W
41		First	144	75W

S. NO	NAME OF THE BLOCK	FLOOR	NO OF FANS	WATTAGE
42		Second	144	75W
43		Third	144	75W
44	Block 20	Ground	60	75W
45	Block 20A	Ground	72	75W
46		First	72	75W
47		Second	72	75W
48	Block 20B	Ground	72	75W
49		First	72	75W
50		Second	72	75W
51	B Arch	Ground	95	75W
52		First	95	75W
53		Second	95	75W
54	ECE	Ground	32	75W
55	Mechanical		60	75W
56	Aeronautical		30	75W
57	EEE		85	75W
58	NEW CSE	Ground	72	75W
59		First	52	75W
60		Second	52	75W
61	NEW MBA	Ground	72	75W
62		First	52	75W
63		Second	52	75W
64	OLD MBA	Ground	180	75W
65		First	180	75W
66		Second	60	75W
67	MESS	Ground	180	75W
68		First	180	75W
69	Ladies Mess	Ground	180	75W
70	Physics & Chemistry	First	180	75W
71	Boys Hostel -MGR		450	75W
72	Boys Hostel - Jeppiaar		360	75W
73	Boys Hostel - Gopalakrishnan		96	75W
74	Ladies Hostel - Mother Thresa		850	75W
75	Admin	Second	20	75W

Remarks: Replacing conventional 75W fans with energy-efficient BLDC fans, which consume only 28-35W, can result in significant energy savings of up to 60%, lower electricity bills, and reduced maintenance costs. This transition aligns with sustainability goals by minimizing the institution's carbon footprint and offers long-term financial benefits despite the higher initial investment. Prioritizing high-usage areas like hostels, mess halls, and classrooms will maximize impact, making it a smart and eco-friendly choice for the campus.

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 audit it was observed that conventional ceiling fans were used for ventilation purposes.

Recommendation:

It is recommended to replace those conventional ceiling fans with Energy efficient BLDC fans to observe the following energy savings.

Estimated Savings:

Description	Units	Values
Quantity of existing conventional ceiling fan	Nos	6,976
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	8
Energy consumption by existing conventional ceiling fan	kWh/Annum	10,46,400
Wattage of BLDC ceiling fan	W	35
Energy consumption by BLDC ceiling fan	kWh/Annum	4,88,320
Cost of one BLDC ceiling fan	INR	4,000
Energy savings	kWh/Annum	5,58,080
Cost savings	INR/Annum	43,34,421
Investment	INR	2,79,04,000
Payback period	Years	6
Estimated Annual Emission Reduction,	t CO2/ Annum	396.2368

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	7,560
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	5,44,320
Wattage of LED tube light	W	20
Energy consumption by LED tube light	kWh/Annum	3,02,400
Cost of one LED tube light	INR	300
Energy savings	kWh/Annum	2,41,920
Cost savings	INR/Annum	18,78,912
Investment	INR	22,68,000
Payback period	Months	14
Estimated Annual Emission Reduction,	t CO2/ Annum	171.7632

25. ALTERNATE SOURCES OF ENERGY AND ENERGY CONSERVATION MEASURES

25.1 SOLAR ENERGY

A 40-kW solar system installed on a INSTITUTE OF SCIENCE AND TECHNOLOGY campus generates approximately 40,000 kWh of clean energy annually, operating 5 hours daily, significantly contributing to sustainability by reducing carbon emissions by 28.4tons per year.

Description	Units	Values
Rated kW solar	kW	40
Present operating hours	Hours/Day	5
Present operating hours	Hours/Annum	200
Approx. Energy produced	kWh/Annum	40000
Estimated Annual Emission Reduction	t CO2/ Annum	28.4

Remarks: This solar energy system is an asset for energy savings and emission reductions. With minor optimizations and potential expansion, its benefits can be further amplified, contributing to long-term environmental and economic gains.

26. Annexture-1- CARBON FOOTPRINT

Annexture -1

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

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: This measure leads to significant annual energy savings of 558,080 kWh, with an investment of INR 27,904,000. The monetary savings amount to INR 4,334,421 per annum, achieving a payback period of 6 years while reducing emissions by 396 tons of CO2 annually.
- Replacing Tube Lights with LED Tube Lights: Transitioning to LED lighting results in annual energy savings of 241,920 kWh, requiring an investment of INR 2,268,000. This measure generates annual monetary savings of INR 1,878,912, with a payback period of 14 years and an emissions reduction of 172 tons of CO2 annually.

Together, these projects yield total energy savings of 800,000 kWh per annum, requiring an

investment of INR 30,172,000 and producing annual savings of INR 6,213,333. They also contribute to a total emissions reduction of 568 tons of CO2 per year. These initiatives demonstrate a strong commitment to sustainability and energy efficiency while offering substantial long-term cost and environmental benefits.

The proposed energy-saving measures result in significant improvements to energy efficiency. With an **annual electrical energy consumption of 5,477,235 kWh**, the energy-saving initiatives, including replacing conventional ceiling fans with BLDC fans and switching to LED tube lights, achieve an **annual savings of 800,000 kWh**. This translates to an impressive **14.6% 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	Estimate annual Energy Savings, kWh/Annum	Estimated Investment, INR	Monetary Savings, INR	Payback Period, Years	Emission Reduction, t CO2/Annum
1	Replace existing conventional ceiling fan to BLDC ceiling fan	558080	27904000	4334421	**6**	396
2	Replace existing tube light to LED tube light	241920	2268000	1878912	**14**	172
Total		**800000**	**30172000**	**6213333**	**5**	**568**

Annual Electrical Energy consumption, kWh/Annum	**54,77,235**
Annual Electrical Energy Savings, kWh/Annum	800000
Electrical Energy Savings, %	**14.6**

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 are as follows:

	Type of Trees	Total No of Trees	CO2 Absorption	Unit
1	No of matured trees (Age more than 10 years)	88	598.4	kg
2	No of Semi matured trees (Age below10 years)	156	530.4	kg
3	No of plants/herbs/Shrubs	815	163	kg
4	No of medicinal plants	89	17.8	kg
5	Any other plants details, if any	216	43.2	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 full grown tree = 3.4 kg of CO2. In bushes it absorbs an average of 200 g of CO2.

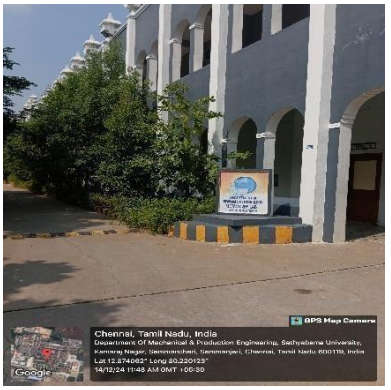
- The carbon absorption capacity of 88matured trees in campus of (88× 6.8 kg CO2/Annum) = 47.6 kg of CO2/Annum.
- The carbon absorption capacity of 156 semi-grown trees in campus of (156 × 3.4 kg CO2/Annum) =20.4 kg of CO2/Annum.

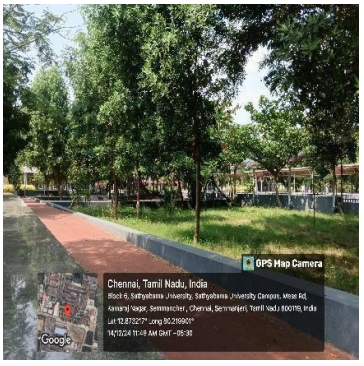
There are 1120 bushes of various species being raised in the gardens of the Institution total carbon absorption was calculated to be (1120× 0.2 kg CO2/Annum) = 135.2 kg of CO2/Annum.

The grand total of carbon absorption by the flora in the campus is 1352.8 kg per year.

Description	Unit	Values
Annual Emissions from Electricity, tCO2	tCO2 /year	3889
TOTAL EMISSIONS FROM FACILITY	tCO2 /year	3889
Carbon absorption by mature trees, semi mature trees, bushes and lawns	tCO2 /year	1.29
Net carbon emission of the campus	tCO2 /year	3888
Carbon reduction opportunities by energy saving projects	tCO2 /year	568
Estimated Carbon Emissions after implementing the Energy Saving Projects	tCO2 /year	3320

27. SITE VISIT IMAGES





28 CERTIFICATE OF GREEN AUDIT

NIN ENERGY INDIA PRIVATE LIMITED
47, JUSA COMPLEX,
PONNIAMMANKOIL STREET
KOTTUR, CHENNAI-600085

CERTIFICATE OF GREEN AUDIT

This is to certify that

SATHYABAMAINSTITUTE OFSCIENCE ANDTECHNOLOGY
(DEEMEDTO BE UNIVERSITY)
JEPPIAAR NAGAR, SEMMENCHERRY, SHOLINGANALLUR,
CHENNAI - 600119

has successfully undergone an ENERGY, ENVIRONMENT AND GREEN AUDIT for the year **2024** on and assessed the Electrical Energy conservation, Energy saving, measures and sustainability in compliance with the applicable regulations, policies and standards in the campus were found to be 'Satisfactory'

B. SENTHIL KUMAR, DIRECTOR,
NIN ENERGY INDIA PRIVATE LIMITED
ACCREDITED ENERGY AUDITOR BY BUREAU OF ENERGY EFFICIENCY

V. DIVYA, DIRECTOR
NIN ENERGY INDIA PRIVATE LIMITED
Date : 23/05/2024

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

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%)

13th to 17th October 2008

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Signed for Swiso India Private Limited

IQ – EMS42357
CERTIFICATE NUMBER

iqms Course No: IQM/EMS4/07308/UK approved by IEMA

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

Datum Van Publicatie / Date of Issue : 27/07/2022
Vervaldatum / Date of Expiry : 26/07/2025
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).

This certificate remains the property of **Royal Stancert B.V.** and must be returned whenever demanded. The validity of this certificate can be verified at http://www.royalstancert.org. **Royal Stancert B.V.** is an independent system, product and personal assessment body accredited by Global Euro Accreditation Centre, Georgia. (GCIN - 654). Email: info@royalstancert.org

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PAC-GEAC-1506-299