

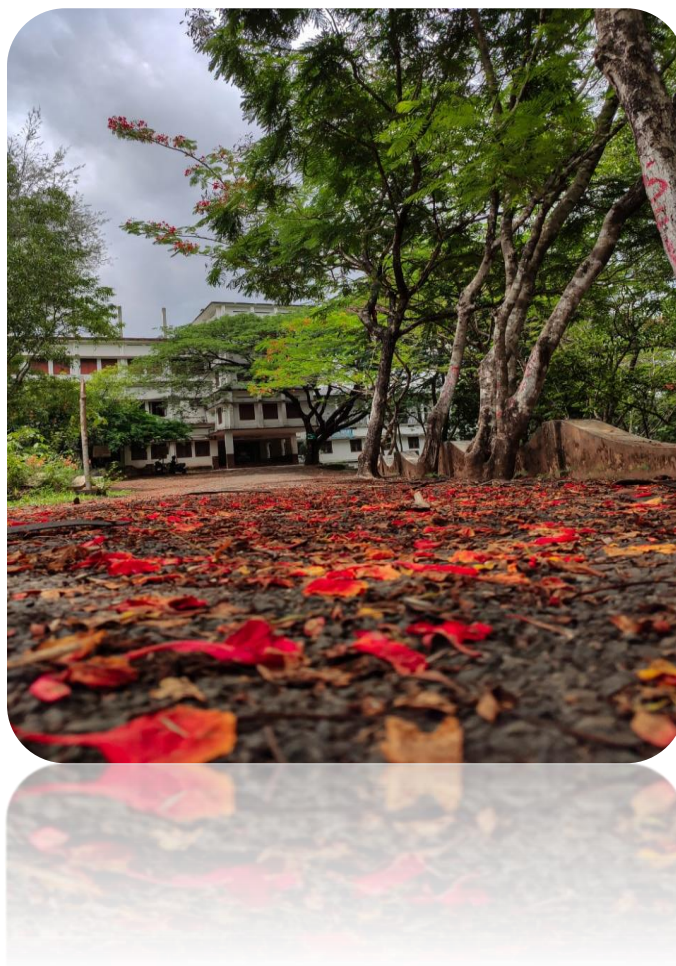
Energy Audit 21-22



S E S COLLEGE SREEKANDAPURAM



INTERNAL QUALITY ASSURANCE CELL



ENERGY AUDIT TEAM

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PREFACE

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.

Energy has been identified as a crucial and balancing factor in the indices for sustainable development since the Earth Summit in 1992. Especially in the contemporary scenario, it is acknowledged that the heavy and unbalanced energy consumption adversely affects energy price and economic growth, and most countries now give priority to energy conservation methods. The Energy Conservation Act, 2001, defines Energy auditing as the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption. It facilitates a systematic approach to the energy management in a system, trying to balance the total energy input with its use. It identifies all the energy streams in a system and quantifies the use of energy according to its discrete functions. It is a study to determine how and where energy is used, and to identify methods for energy savings. The Energy Auditing for a day is the index of the consumption which normalizes the situation of Energy crisis by providing the schemes for conservation of energy. The opportunities lie in the use of existing renewable energy technologies, greater efforts at energy efficiency and the dissemination of latest technologies.

The energy audit of our college was carried out by the teachers of the Department of Physics on behalf of IQAC, under the supervision of the Energy Audit team. This report is our effort in contributing to the larger picture of effective energy management and conservation. As is known,

energy auditing is an on-going process, a part of a larger procedure to ensure long- term sustainable development. We have enlisted plausible solutions based on the outcome of our analysis of data, and our recommendations, which can be implemented wholeheartedly in the campus in order to ensure minimizing energy waste and maximizing energy potential. We hope in all earnest that these will be given its due and that the audit will be fruitful in terms of energy conservation

Major electrical installations in the college are

- CFL bulbs
- LED lights
- Tube lights
- Fans
- Air conditioners
- Electrical Equipment
- Desktop and laptop computers
- Photocopier machine
- Televisions
- Water pumps

Electricity saving methods adopted in the college

- Turn off electrical equipment when not in use
- Use energy efficient light-emitting diode (LED) bulbs instead of incandescent and CFL bulbs
- Maintain fault free appliances and replace old appliances
- Use computers and electronic equipment in power saving mode
- Installed solar panel of 8kwh capacity, cleaned every week and other kind of maintenance is provided by service providers
- Planned to make campaign in college campus on careful usage of electric power, so as to avoid the unnecessary working of electrical items and equipment

Energy Audit Observations

The college has assessed the electrical load calculation. Looking at the range of college activities and working hours, monthly use of electricity in the college is very high. There are fans of older generation and non energy efficient which can be phase out by replacing with new energy efficient fans. Regular monitoring of equipment and immediate rectification of any problems. Awareness on conservation of energy, water and fuel consumption needs to be communicated among the stakeholders

The total energy consumption of the campus, renewable energy use (solar panel of 8kwh capacity), energy saving methods were documented. Office block, library, Principal's room, Management room and computer labs were newly connected to Solar. Due to this a drastic shift obtained in the current bill by saving almost ten thousand rupees per month. A proposal was also made as to how much energy we can save if the replace fluorescent tubes by LED tubes, older fans by star rating new fans. Almost 20 LEDs were installed during the year and older Fluorescent tubes were replaced by LEDs and thus saved 432kwh energy per year.

Total power required in one month : $80 \times 3 \times 30 \text{kwh} = 7200 \text{kwh}$

Total annual power required : $7200 \times 12 = 86400 \text{kwh}$

Total Energy obtained from renewable

energy source (Solar) per month : 480kwh

Total solar Energy for one year : $480 \times 12 = 5760 \text{kwh}$

Percentage of annual power obtained from Solar energy: $5760/86400 = 6.67\%$

Total number of LED tubes in the last year : 30

Newly purchased LEDs : 16(Newly added A Block)+104(seminar hall)

Energy consumed per year by LED : $150 \times 3 \times 30 \times 12 \times 12 = 1944 \text{kwh}$

Number of fluorescent tubes in the last year :150

Flourescent tubes replaced with LEDs during last year :110

Annual power met through fluorescent tubes : $40 \times 40 \times 3 \times 30 \times 12 = 1728 \text{ kwh}$

Annual lighting power requirement during last year : 6264kwh

Annual lighting power requirement during one hour: $40 + 110 + 120 = 270 \text{ kw}$

Annual lighting power requirement during current year: $270 \times 3 \times 30 \times 12 = 291 \text{ kwh}$

Total energy saved for lighting by LEDs : $6264 - 291 = 5973 \text{ kwh}$



CONCLUSIONS AND SUGGESTIONS

1. A well-prepared electrical wiring plan for the campus, which would help identify unused points of power and also in re-wiring the buildings.
2. Electric fans should be serviced and bearings replaced wherever necessary.

3. Installing solar panels which would cut down power consumption.
4. Installation of a suitable Bio-gas plant to save energy used for heating water in Science laboratories.
5. Rigorous training for both students and staff to inculcate awareness for the need of energy conservation. If everyone ensures switching off lights, fans and electrical gadgets that are not in use, roughly 10% to 15% of energy saving is possible.
6. A master switch located at a prominent place which can be directly supervised by the HoD/supervising staff would help avoid power wastage in closed rooms.
7. A healthy competition may be encouraged between departments by honoring those departments that produce higher savings by good practices. An element of weight-based on the above lines may be considered for allocation of funds.
8. It is suggested that a permanent body under the chairmanship of a senior teacher may be established in the College for periodical review of energy usage and concurrent energy audit. Representatives of students, staff and PTA may be included in the body.
9. Conversion of ordinary tubes into LED tubes can save a major share of power consumption
10. Effective use of classrooms and laboratories by switching off electrical gadgets after use
Replacement of low power consuming equipment in laboratories instead of old ones Encouraging the application of solar energy