



**THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS),
Sivakasi**

(Affiliated to Madurai Kamaraj University, Reaccredited with "A" Grade by NAAC,
College with Potential for Excellence by UGC & Mentor Institution under UGC PARAMARSH)

NAAC SSR Cycle IV (2015-2020)

7.1 Institutional Values and Social Responsibilities

7.1.6 Quality audits on Environment and Energy

Green Audit Report



**THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS),
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Green Audit Certificate

MAY-2020

Certificate

This is to certify that **The Standard Fireworks Rajaratnam College For Women** has conducted a detailed **Green Audit** of their campus and has submitted the necessary data and credentials for scrutiny. The activities and measures carried out by the College have been verified based on the field visit and reports submitted and were found to be **excellent**. The efforts taken by the faculty and students towards Green environment and sustainability are highly appreciated and commendable.


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Certified Energy Auditor,
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TJ Solutions

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Green Audit Report



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GREEN AUDIT REPORT

May 2020

For



**M/s THE STANDARD FIREWORKS RAJARATNAM
COLLEGE FOR WOMEN (Autonomous),
Thiruthangal Road , Sivakasi - 626123 , Tamil Nadu , India**

Audited by

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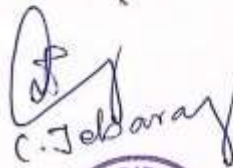
ACKNOWLEDGEMENT

TJ Solutions, Madurai are thankful to Principal for giving us the opportunity to carry out Green audit of M/s THE STANDARD FIREWORKS RAJARATNAM COLLEGE, Sivakasi, Tamil Nadu 626123. Without whose keen interest, this audit would not have been possible.

TJ Solutions team are also thankful to all Teaching & Non-Teaching Staffs and students of the M/s THE STANDARD FIREWORKS RAJARATNAM COLLEGE for their wholehearted support, hospitality and the courtesy extended to the Audit team during the course of the study.

The Following officers from TJ Solutions under the guidance of Mr. C. Jebaraj B. Tech., have carried out the Audit.

Name	Qualifications
Mr. C. Jebaraj	B.Tech., PGDEM, DIS, BEE Certified Energy Auditor, Energy, Environment, Safety & 5S Consultant
Mrs Tamil Selvaparvathy	M Sc.,


C. Jebaraj





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Executive Summary

A nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. A clean and healthy environment aids effective learning and provides a conducive learning environment. Educational institutions now a days are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly.

To preserve the environment within the campus, various viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc.. The activities pursued by colleges can also create a variety of adverse environmental impacts.

Environmental auditing is a process whereby an organisation's environmental performance is tested against its environmental policies and objectives. Green audit is defined as an official examination of the effects a college has on the environment. As a part of such practice, internal environmental audit (Green Audit) is conducted to evaluate the actual scenario at the campus.

Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan.

Green auditing and the implementation of mitigation measures is a win-win situation for all the college, the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus.

Green auditing promote financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. It is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

In The Standard Fireworks Rajaratnam College, Sivakasi the audit process involved initial interviews with management to clarify policies, activities, records and the cooperation of staff and students in the implementation of mitigation measures.





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This was followed by staff and student interviews, collection of data through the questionnaire, review of records, observation of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the green auditing process in the college.

The baseline data prepared for the SFR College, Sivakasi will be a useful tool for campus greening, resource management, planning of future projects and a document for implementation of sustainable development of the college. Existing data will allow the college to compare its programmes and operations with those of peer institutions, identify areas in need of improvement and prioritize the implementation of future projects. We expect that the management will be committed to implement the green audit recommendations.

We are happy to submit this green audit report to the SFR College authorities.

TJ Solutions
Madurai





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1. Introduction

“The Standard Fireworks Rajaratnam College For Women” was established in 1968, in memory of the late philanthropist Thiru N. R. K. Rajaratnam, whose pioneering spirit in business and industry has earned for himself an indelible niche in the annals of Sivakasi. Thiru Rajaratnam’s matchless genius and tireless energy gave rise to the “The Standard Group of Industries”.

The late Thiru K. A. A. Sankaralingam Nadar and Thiru K. A. Arunachalam Nadar and Thiru C. Chelladurai Nadar were the founder architects and stalwarts of this edifice of learning. They chalked out a programme for the dawn of higher education and intellectual upliftment of rural women in and around Sivakasi by generating the “The Standard Fireworks Educational Charities Trust”. It was their vision to liberate the rural women from their socio, economic and cultural constraints by intellectually equipping them to confront the challenges of everyday life.

Under the headship of the esteemed President Thiru Yennarkay R. Ravindran, the present Management Committee continues to liberally finance, monitor and endorse every step forward, initiated by this prestigious institution.

“The Standard Fireworks Rajaratnam College For Women” was inaugurated by the Vice-Chancellor, Sri Meenakshi Sundaram, on 27th January 1968. The College was initially housed in a modest building belonging to the “The Standard Group of Industries”. The Trust has been renamed “The Standard Fireworks Charities” since Dec.1984. The College is nestled & amidst a vast area of 25 acres, on the Sivakasi-Thiruthangal Road, since 1977. It is affiliated to the Madurai Kamaraj University.





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1.1 Vision and Mission

Vision:

To emerge as a premier institution offering need-based, value-conscious and career – oriented quality education to empower rural women.

Mission:

- To develop human resources of high caliber with moral ethics and employability potential.
- To empower rural women with
 - ❖ Academic excellence
 - ❖ Communicative competence
 - ❖ Entrepreneurial skills
 - ❖ Eco-consciousness
 - ❖ Evolving technologies
- To promote research culture
- To produce wholesome citizens to contribute towards nation building

1.2 Total Campus Area & College Building Spread Area

Campus area 25.29 Acres

Built up area 11,692 Sqmt.

SFR College is running 18 buses and one van for students and Staffs

List of Places from where Students Commute

- Sattur
- Rajapalayam
- Srivilliputhur
- Sankaran Kovil.





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1.3 NAAC Grading

ReAccredited with A Grade by NAAC (3rd Cycle)

NAAC grading-‘A’ with CGPA of 3.36

1.4 Campus Infrastructure

The College provides a range of facilities for teaching and learning. It is equipped with modern infrastructure facilities and provides an appropriate environment for arts and science education.

The infrastructure has gradually developed through the years in accordance with the growing student strength. Spacious classrooms, laboratories, libraries, and auditorium create a conducive climate for academic excellence. 91 Lecture Halls, Conference Hall, Seminar Hall and Techno Lab with multimedia technologies for ICT learning through Power Point Presentation using LCD projector. ICT facilities enable effective transmission of knowledge.

The college is provided with **Air Conditioned Conference Hall** with a seating capacity for 150 persons. It is fully equipped with a Multimedia Projector, White Board, Digital Board, Video Conferencing facility and LCD TV. Entire campus is facilitated with 560 computers

Well-equipped Physics, Chemistry, Botany, Microbiology, computer laboratories

Technology enabled virtual class rooms and Language Lab to enhance the learning of new educational concepts and facilitates the teaching of oral communication skills in English

Library

The College **Library** is a gateway to a new world of information. Fully automated Library with centralised A/c, free internet facility, OPAC, DELNET and INFLIBNET utility, Inter Library Loan (ILL) Service all create a conducive atmosphere for learning.

The staff and students have unlimited access to a wealth of Information found in books, magazines, Journals, statistics, encyclopaedias, annual reports and the Internet.

Library is kept open to the students, staff members, alumnae, Retired faculty members and the Management members from 8.15 AM. to 5.15 PM on all working days and from 9.05 AM to 5.15 PM during the semester holidays. It is closed only on Sundays and National holidays.





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Computer Labs

The Computer laboratories viz Web Centre, Info Centre, New lab, VTC lab, Internet lab, i-smart lab, Computer science lab are utilized by the students of the respective departments. The laboratories are so designed that the parallel growth in theoretical and practical skills are ensured.

Science Instrumentation Centre

Advanced scientific instruments are available

Canteen

The college canteen caters to the nutritional needs of the staff and students at nominal price. The canteen functions from 8.30 am to 5.30 pm.

Hostel

The girl students are provided neat and safe residential accommodation at well-equipped hostels

Separate hostel for PG and UG students with 153 rooms to accommodate 480 students. The Dining Hall measuring 617.85 sq.m is furnished with 40 Tables and 84 Benches.

Sports and Games facilities

The Playground, Multipurpose Indoor Stadium (11000 sq.ft) with a Staff Room, Well-equipped Health and Fitness Centre, Table-Tennis Room, Change Room, Chess Room, Gallery, Equipment Room and Sports equipment are available

Health Centre equipped with gadgets like Stepper, Rowing Machine, Abdominal Conditioner, Tummy Vibrator, Tread Mill, Ergo Cycle, Twister 2 station, 10 Finger Grips and 10 Chest Expanders

Other facilities

IMF centre to take care of maintenance of all instruments and Flair system.

Public Address System is available in the Campus.

Biometrics System is used in Office & Library.

Reverse Osmosis system is installed in the campus for the benefit of the students.

Campus is provided with the LAN connectivity, Leased line @ 4 mbps (1:1) and WIFI connectivity. In addition NMEICT 5 mbps is there





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2.Pre-Audit Stage

A pre-audit meeting provided an opportunity to reinforce the scope and objectives of the audit and discussions were held on the practicalities associated with the audit. This meeting is an important prerequisite for the green audit because it is the first opportunity to meet the auditee and deal with any concerns. The meeting was an opportunity to gather information that the audit team can study before arriving on the site. The audit protocol and audit plan was handed over at this meeting and discussed in advance of the audit itself. In SFR College pre-audit meeting was conducted successfully and necessary documents were collected directly from the college before the initiation of the audit processes. Actual planning of audit processes were discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the college management. The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself. The audit team worked together, under the leadership of the lead auditor, to ensure completion within the brief and scope of the audit.

2.1 Management's Commitment

The Management of the college has shown the commitment towards the green auditing during the pre-audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environment friendly and planting more trees on the campus etc., after the green auditing. The management of the college was willing to formulate policies based on green auditing report.

2.2 Scope and Goals of Green Auditing

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of economic, financial, social, environmental factor. It is necessary to conduct green audit in college campus because students become aware of the green audit, its advantages to save the planet and they become good citizen of our country. Thus Green audit becomes necessary at the college level. A very simple indigenized system has been devised to monitor the environmental performance of SFR College, Sivakasi. It comes with a series of questions to be answered. This innovative scheme is user friendly. The aim of this is to help the institution to set environmental examples for the community and to educate the young learners.



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2.3 Benefits of the Green Auditing

- More efficient resource management
- To provide basis for improved sustainability
- To create a green campus
- To enable waste management through reduction of waste generation, solid-waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing and managing
- Point out the prevailing and forthcoming complications
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmental management approach and Improving environmental standards
- Benchmarking for environmental protection initiatives
- Financial savings through a reduction in resource use
- Development of ownership, personal and social responsibility for the College and its environment
- Enhancement of college profile
- Developing an environmental ethic and value systems in youngsters.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the college.

2.4 Target Areas of Green Auditing

Green audit forms part of a resource management process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals and their results can illustrate the improvement. Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency. All these indicators are assessed in process of “Green Auditing of educational institute”. Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute’s energy and water consumption, reduce wastes to landfill and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.





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Auditing for Water Management

Water is a natural resource; all living matters depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. We need to use water wisely to ensure that drinkable water is available for all, now and in the future. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water. It is therefore essential that any environmentally responsible institution examine its water use practices.

Auditing for Energy Management

Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. 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. An old incandescent bulb uses approximately 60W while an energy efficient light emitting diode (LED) uses only less than 10 W. 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.

Auditing for Waste Management

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals. This indicator addresses waste production and disposal of plastic waste, paper waste, food waste, and recycling. Solid waste can be divided into two categories: general waste and hazardous waste. General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and used oils. Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair, and reuse. Thus the minimization of solid waste is essential to a sustainable college. It is therefore essential that any environmentally responsible institution examine its waste processing practices.





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Auditing for Green Campus Management

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature’s balance and our quality of life. Without this variability in the living world, ecological systems and functions would break down, with detrimental consequences for all forms of life, including human beings.

Newly planted and existing trees decrease the amount of carbon dioxide in the atmosphere. Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. The amount of oxygen that a single tree produces is enough to provide one day’s supply of oxygen for people. So while you are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner for us

Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which a huge deal is considering many students are under some amount of stress.

Auditing for Carbon Footprint

Commutation of stakeholders has an impact on the environment through the emission of greenhouse gases into the atmosphere consequent to burning of fossil fuels (such as petrol). The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising around 400 ppm of the Earth’s atmosphere. The release of carbon dioxide gas into the Earth’s atmosphere through human activities is commonly known as carbon emissions.

An important aspect of doing an audit is to be able to measure your impact so that we can determine better ways to manage the impact. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created. One aspect is to consider the distance and method travelled between home and college every day. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is necessary to know how much the organization is contributing towards sustainable development. It is therefore essential that any environmentally responsible institution examine its carbon footprint.





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2.5 Methodology of Green Auditing

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The criteria, methods and recommendations used in the audit were based on the identified risks. The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the document, interviewing responsible persons and data analysis, measurements and recommendations. The methodology adopted for this audit was a three step process comprising of:

1. Data Collection - In preliminary data collection phase, exhaustive data collection was performed using different tools such as observation, measurements and survey communicating with responsible persons.

Following steps were taken for data collection:

- The team went to each department, centres, Library, canteen etc.
- Data about the general information was collected by observation and interview.
- The power consumption of appliances was recorded by taking an average value in some cases.

2. Data Analysis - Detailed analysis of data collected include : calculation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by the State Electricity Board. Data related to water usages were also analysed using appropriate methodology.

3. Recommendation - On the basis of results of data analysis and observations, some steps for reducing power and water consumption were recommended. Proper treatments for waste were also suggested. Use of fossil fuels has to be reduced for the sake of community health. The above target areas particular to the college was evaluated through questionnaire circulated among the students for data collection. Five categories of questionnaires were distributed. The formats of these are given below.





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2.6 Survey Forms

I Auditing for Water Management

1. List uses of water in your college.
2. What are the sources of water in your college?
3. How many wells are there in your college?
4. No. of motors used for pumping water from each well?
5. What is the horse power of each motor?
6. What is the depth of each well?
7. What is the present depth of water in each well?
8. How does your college store water?
9. Quantity of water stored in your overhead water tank? (in liters)
10. Quantity of water pumped every day? (in liters)
11. If there is water wastage, specify
12. How can the wastage be prevented / stopped?
13. Locate the point of entry of water and point of exit of waste water in your College.
14. Where does waste water come from?
15. Where does the waste water go?
16. What are the uses of waste water in your college?
17. What happens to the water used in your labs? Whether it gets mixed with ground water?
18. Is there any treatment for the lab water?
19. Whether green chemistry methods are practiced in your labs?
20. Write down four ways that could reduce the amount of water used in your college.
21. Record water use from the college water meter



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22. Bimonthly water charges paid to water connections if any
23. No. of water coolers. Amount of water used per day? (in liters)
24. No. of water taps. Amount of water used per day?
25. No. of bath rooms in staff rooms, common, hostels, amount of water used per day?
26. No. of toilet, urinals. Amount of water used per day?
27. No. of water taps in the canteen. Amount of water used per day?
28. Amount of water used per day for garden use.
29. No. of water taps in laboratories. Amount of water used per day in each lab?
30. Total use of water in each hostel?
31. At the end of the period, compile a table to show how many litres of water have been used in the college for each purpose
32. Is there any water used for agricultural purposes?
33. Does your college harvest rain water?
34. If yes, how many rain water harvesting units are there? (Approx. amount)
35. How many of the taps are leaky? Amount of water lost per day?
36. Are there signs reminding people to turn off the water? Yes / No
37. Is there any waterless toilets?
38. How many water fountains are there? &
39. How many water fountains are leaky?
40. Is drip irrigation used to water plants outside? YES/NO
41. How often is the garden watered?
42. Quantity of water used to watering the ground?
43. Amount of water for other uses? (items not mentioned above)
44. Area of the college land without tree/building canopy





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45. Is there any water management plan in the college?

46. Are there any water saving techniques followed in your college? What are they?

47. Please share Some IDEA for how your college could save more water.



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II Auditing for Energy Management

1. List ways that you use energy in your college. (Electricity, electric stove, kettle, microwave, LPG, firewood, Petrol, diesel and others).
2. Electricity bill amount for the last year
3. Amount paid for LPG cylinders for last one year
4. Weight of firewood used per month and amount of money spent? Also mention the amount spent for petrol/diesel/ others for generators?
5. Are there any energy saving methods employed in your college? If yes, please specify. If no, suggest some.
6. How much money does your college spend on energy such as electricity, gas, firewood, etc. in a month.
7. How many CFL bulbs has your college installed? Mention use (Hours used/day for how many days in a month)
8. Energy used by each bulb per month? (for example- 60 watt bulb x 4hours x number of bulbs = kwh).
9. How many LED bulbs are used in your college? Mention the use (Hours used/day for how many days in a month)
10. Energy used by each bulb per month? (kwh).
11. How many incandescent (tungsten) bulbs have your college installed?
Mentions use (Hours used/day for how many days in a month)
12. Energy used by each bulb per month? (kwh).
13. How many fans are installed in your college? Mention use (Hours used/day for how many days in a month)
14. Energy used by each fan per month? (kwh)
15. How many air conditioners are installed in your college? Mention use (Hours used/day, for how many days in a month)
16. Energy used by each air conditioner per month? (kwh).





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17. How many electrical equipment including weighing balance are installed in your college? Mention the use (Hours used/day for how many days in a month)
18. Energy used by each electrical equipment per month? (kwh).
19. How many computers are there in your college? Mention the use (Hours used/day for how many days in a month)
20. Energy used by each computer per month? (kwh)
21. How many photocopiers are installed by your college? Mention use (Hours used/day for how many days in a month).
22. How many cooling apparatus are in installed in your college? Mention use (Hours used/day for how many days in a month)
23. Energy used by each cooling apparatus per month? (kwh) Mention use (Hours used/day for how many days in a month)
24. Energy used by each photocopier per month? (kwh) Mention the use (Hours used/day for how many days in a month) how many inverters your college installed? Mentions use (Hours used/day for how many days in a month)
25. Energy used by each inverter per month? (kwh)
26. How many electrical equipment are used in different labs of your college? Mention the use (Hours used/day for how many days in a month)
27. Energy used by each equipment per month? (kwh)
28. How many heaters are used in the canteen of your college ? Mention the use (Hours used/day for how many days in a month)
29. Energy used by each heater per month? (kwh)
30. No of street lights in your college?
31. Energy used by each street light per month? (kwh)
32. No of TV in your college and hostels?





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33. Energy used by each TV per month? (kwh)
34. Any other item that uses energy (Please write the energy used per month) Mention the use (Hours used/day for how many days in a month)
35. Are any alternative energy sources/nonconventional energy sources employed / installed in your college? (photovoltaic cells for solar energy, windmill, energy efficient fan etc.) Specify.
36. Do you run “switch off” drills at college?
37. Are your computers and other equipment put on power-saving mode?
38. Does your machinery (TV, AC, Computer, weighing balance, printers, etc.) run on standby mode most of the time? If yes, how many hours?
39. What are the energy conservation methods adapted by your college?
40. How many boards displayed for saving energy awareness?
41. How much ash is collected after burning fire wood per day in the canteen?
42. Write a note on the methods/practices/adaptations by which you can reduce the energy use in your college campus in future.



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III Auditing for Waste Management

What is the total strength of students, teachers and Nonteaching staff in your College?

No. of Students	No. of Teachers	No. of Nonteaching staff
Gents		
Ladies		
Total		

Which of the following are available in your College? Give area occupied and number

Garden area	Garbage dump (number)
Playground area	Laboratory
Kitchen	Canteen
Toilets (number)	Car/scooter shed area
Number of class rooms	Office rooms
	Others (specify)

Which of the following are found near your college?

Mark the level of disturbance it creates for the college in a scale of 1 to 9.

Municipal dump yard
Garbage heap
Public convenience
Sewer line, Stagnant water, Open drainage
Industry - (Mention the type)
Bus / Railway station
Market / Shopping complex / Public halls





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WASTE

Does your college generate any waste?

If so, what are they?

How much quantity? Number or weight

E-waste,

Hazardous waste (toxic)

Solid waste,

Dry leaves

Canteen waste ,

Liquid waste

Glass,

Unused equipment

Bio Medical waste if any

Napkins

Others (Specify)

Is there any waste treatment system in the college?

Is there any treatment for toilet/urinal/sanitary napkin waste?

What is the approximate quantity of waste generated per day? (in Kilograms)

Office

Approx	Bio degradable	Non-Bio degradable	Hazardous Others	Others
<1Kg				
1-10 KG				
> 10 KG				





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Laboratories

Approx	Bio degradable	Non-Bio degradable	Hazardous Others	Others
<1Kg				
1-10 KG				
>10 KG				

Canteen/kitchen

Approx	Bio degradable	Non-Bio degradable	Hazardous Others	Others
<1Kg				
1-10 KG				
>10 KG				

2 Why waste is a problem?

3 Whether waste is polluting ground/surface water? How?

4 Whether waste is polluting the air of the college? How?

5 How is the waste generated in the college managed? Methods

1 Composting

2 Recycling

3 Reusing

4 Others (specify)

6 How many separate boxes do you think you would need to put into a classroom to start a waste segregation and recycling campaign?

What should be the use for each box? (Develop a colour code with reasons)





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7 Do you use recycled paper in College?

8 Is there any waste wealth program practiced in the college?

9. How would you spread the message of recycling to others in the community? Have you taken any initiatives? If yes, please specify.

10 Can you achieve zero garbage in your college? (Reduce ,Recycle, Reuse, Refuse) If yes, how?



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IV Auditing For Green Campus Management

1. Is there a garden in your college? Area?
2. Do students spend time in the garden?
3. List the plants in the garden, with approx. numbers of each species.
4. Suggest plants for your campus. (Trees, vegetables, herbs, etc.)
5. List the species planted by the students, with numbers.
6. Whether you have displayed scientific names of the trees in the campus?
7. Is there any plantations in your campus? If yes specify area and type of plantation.
8. Is there any vegetable garden in your college? If yes how much area?
9. Is there any medicinal garden in your college? If yes how much area?
10. What are the vegetables cultivated in your vegetable garden?
(Mention the quantity of harvest in each season)
11. How much water is used in the vegetable garden and other gardens?
(Mention the source and quantity of water used).
12. Who is in charge of gardens in your college?
13. Are you using any type of recycled water in your garden?
14. List the name and quantity of pesticides and fertilizers used in your gardens?
15. Whether you are doing organic farming in your college? How?
16. Do you have any composting pit in your college? If yes What are you doing with the compost generated?
17. What do you doing with the vegetables harvested? Do you have any student market
18. Is there any botanical garden in your campus? If yes give the details of campus flora.
19. Give the number and names of the medicinal plants in your college campus.
20. Any threatened plant species planted/conserved?





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21. Is there a nature club in your college? If yes what are their activities?
22. Is there any arboretum in your college? If yes details of the trees planted.
23. Is there any fruit yielding plants in your college? If yes details of the trees planted.
24. Is there any groves in your college? If yes details of the trees planted.
25. Is there any irrigation system in your college?
26. What is the type of vegetation in the surrounding area of the college?
27. What are the nature awareness programmes conducted in the campus?(2019-20)
28. What is the involvement of students in the green cover maintenance?
29. What is the total area of the campus under tree cover? Or under tree canopy?
30. Share your IDEAS for further improvement of green cover.



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V Auditing for Carbon Footprint

1. What is the total strength of students and teachers in your College?

No. of Students	No. of Teachers	No. of Non-teaching staff
-----------------	-----------------	---------------------------

Gents

Ladies

Total

2. Total Number of vehicles used by the stakeholders of the college.(per day)

3. Number of cycles used

4. Number of two wheelers used (average distance travelled and quantity of fuel and amount used per day)

5. Number of cars used (average distance travelled and quantity of fuel and amount used per day)

6. Number of persons using common (public) transportation (average distance travelled and quantity of fuel and amount used per day)

7. Number of persons using college conveyance by the students, non-teaching staff and teachers (average distance travelled and quantity of fuel and amount used per day)

8. Number of parent-teacher meetings in an year? Parents turned up (approx.)

9. Number of visitors with vehicles per day?

10. Number of generators used per day (hours). Give the amount of fuel used per day.

11. Number of LPG cylinders used in the canteen (Give the amount of fuel used per day and amount spent).

12. Quantity of kerosene used in the canteen/labs (Give the amount of fuel used per day and amount spent).

13. Amount of taxi/auto charges paid and the amount of fuel used per month for the transportation of vegetables and other materials to canteen.

14. Amount of taxi/auto charges paid per month for the transportation of office goods to the college.





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15. Average amount of taxi/auto charges paid per month by the stakeholders of the college.

16. Use of any other fossil fuels in the college (Give the amount of fuel used per day and amount spent).

17. Suggest the methods to reduce the quantity of use of fuel used by the stakeholders / students / teachers / non-teaching staff of the college.



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3. Audit Stage

In SFR College green auditing was done with the help of TJ solutions involving different student groups, teaching and non-teaching staff. The green audit began with the teams walking through all the different facilities at the college, determining the different types of appliances and utilities as well as measuring the usage per item and identifying the relevant consumption patterns and their impacts.

The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified to clarify the data received through survey and discussions.

3.1 Student Clubs and Forums Involved

ECO Club, National Service Scheme (NSS) and National Cadet Corps (NCC)

3.2 Comments on Site Tour

Site inspection was done along with students and staff. Questionnaires were answered during the site tour. Students and staff took much interest in the data collection processes. It was quite interesting and fascinating. It was an environmental awareness program for the students who participated in the green auditing. The experience of green auditing was totally a new experience for most of the students. They have shared their expectations about a green campus and gave suggestions for the audit recommendations.

3.3 Review of Documents and Records

Documents such as electricity and water charge remittance, laboratory equipment registers, audited statements and office registers were examined and data were collected. College calendars, college magazines, annual report of the college and NAAC self-assessment reports, UGC report etc. were also verified as part of data collection.

3.4 Review of Policies

Discussions were made with the college management regarding their policies on environmental management. Future plans of the college were also discussed. The management would formulate a environment / green policy for the college in the light of green auditing. The purpose of the green audit was to ensure that the practices followed in the campus are to be in accordance with the Green Policy adopted by the institution.





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3.5 Interviews

In order to collect information for green auditing different audit groups interviewed office staff, teaching and non-teaching staff, students and other stakeholders of the college.

3.6 Site inspection

College and its premises were visited and analysed by the audit-teams several times to gather information. Campus trees were counted and identified. Vegetable garden, play grounds, canteen, library, office rooms and parking grounds were also visited to collect data. Number and type of vehicles used by the stakeholders were counted. Number of LPG cylinders used in labs, canteen and hostel kitchen were also counted. Leakage of a few water taps were noticed during the site inspection.

4. Post Audit Stage

The base of any green audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events, and procedures to ensure that they are carried out according to systems requirements and in the correct manner.

Green audits form a part of a process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Although green audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit.

The essence of any green audit is to find out how well the environmental organisation, environmental management and environmental equipment are performing. Each of the three components are crucial in ensuring that the organisation's environmental performance meets the goals set in its green policy. The individual functioning and the success of integration will all play a role in the degree of success or failure of the organisation's environmental performance.



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4.1 Key Findings and Observations

a) Water

- ❖ Water purchased from outside source - 60,000liters/Day
- ❖ Quantity of water pumped from well - 25,000liters/day
- ❖ The open well-water & 4 Nos bore well water acts as partial source in the supply of water to the whole campus

Water usage in the campus

Sl. No	Place	Quantity litres / Day
1.	College	32 000
2.	Drinking	5500
3	Garden	12000
4	Vehicle Cleaning	500
5	UG Hostel	15000
6	PG Hostel	8000
7	New Hostel	6000
8	Canteen	6000

- ❖ Main water uses in the campus
 - Laboratories,
 - Drinking
 - College Toilets, Bathrooms,
 - Hostel Toilets and Bathroom
 - Hostel Kitchen, Canteen
 - Washing of clothes at Hostel
 - Garden
 - Vehicle Cleaning
 - Construction works
- ❖ RO unit of 1000 LPH is installed and supplying water for drinking purpose
RO waste water is used effectively





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- ❖ Cold water dispenser with filters are installed (3 Nos each 25 lit /hr cap)
- ❖ Analysis of Drinking water, well water and outsourced water samples are done periodically
- ❖ Number of urinals and toilets in the College-110
Number of bath rooms for staff at College- 45
Number of bath rooms for students at College- 116
Number of bath rooms at Hostel -70
- ❖ Number of water taps in the College -220
Physics Lab - 12
Chemistry Lab - 63
Botany Lab - 7
Microbiology Lab- 11
Nutrition Lab - 6

Number of water taps in the College canteen -10
- ❖ Number of ponds -Nil
- ❖ Water pumps - 5HP-1 Nos, 3HP -3 Nos, 1.5 HP -8 Nos.

Rainwater Harvesting

The college is located in a drought prone area and is affected by the scarcity of water.

The following measures are taken in the campus:

- Rainwater harvesting is installed in all the blocks
- Rainwater collected from the Administrative block, IT block, Computer block, M.C.A. block and Indoor stadium are diverted into the well.
- Rainwater collected from the Main block is stored in three tanks and it is used for science laboratories.
- The waste water from the RO plant is stored in a tank and is used in the chemistry lab for washing purposes and also used for gardening throughout the year.





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b) Energy

Electrical Energy consumption in the college

Service No 07 239 001 3024 Load 101.4KW Tariff LM2B1				
Sl. No.	Assessment Date	Units Consumed	Bill Amount in Rs	Unit cost in Rs
1	23.12.2019	3283	26089	7.95
2	22.11.2019	1785	17000	9.52
3	23.10.2019	6148	43421	7.06
4	23.09.2019	6877	47824	6.95
5	23.08.2019	5806	41365	7.12
6	24.07.2019	7659	52560	6.86
7	24.06.2019	2857	23547	8.24
8	22.05.2019	1603	15943	9.95
9	23.04.2019	3821	29355	7.68
10	22.03.2019	7203	49792	6.91
11	21.02.2019	5958	42259	7.09
12	22.01.2019	3312	26262	7.93
	Total	56312	415417	7.38

Service No 07 239 001 4383 Load 86 KW Tariff LM2B1				
Sl. No.	Assessment Date	Units Consumed	Bill Amount in Rs	Unit cost in Rs
1	23.12.2019	2316	23495	10.14
2	26.11.2019	2756	26964	9.78
3	23.10.2019	4957	44321	8.94
4	23.09.2019	5138	45896	8.93
5	23.08.2019	3938	29090	7.39
6	24.07.2019	5729	39893	6.96
7	24.06.2019	3700	27631	7.47
8	22.05.2019	5304	37320	7.04
9	23.04.2019	4664	33467	7.18
10	22.03.2019	4822	34396	7.13
11	21.02.2019	3794	28182	7.43
12	22.01.2019	2026	17470	8.62
	Total	49144	388125	7.90





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Service No 07 239 001 1926 Load 79.12 KW Tariff LM2B1				
Sl. No.	Assessment Date	Units Consumed	Bill Amount in Rs	Unit cost in Rs
1	23.12.2019	3595	26620	7.40
2	26.11.2019	3558	26403	7.42
3	23.10.2019	6661	45177	6.78
4	23.09.2019	7035	47444	6.74
5	23.08.2019	5983	41104	6.87
6	24.07.2019	8092	53822	6.65
7	24.06.2019	5088	35594	7.00
8	22.05.2019	5169	36149	6.99
9	23.04.2019	6453	43926	6.81
10	22.03.2019	7630	51032	6.69
11	21.02.2019	6080	41656	6.85
12	22.01.2019	3818	27969	7.33
	Total	69162	476896	6.90

Service No 07 239 001 488 Load 72.78 KW Tariff LM2B1				
Sl. No.	Assessment Date	Units Consumed	Bill Amount in Rs	Unit cost in Rs
1	22.11.2019	11080	75962	6.86
2	25.09.2019	15070	100063	6.64
3	24.07.2019	12290	83321	6.78
4	27.05.2019	10620	73196	6.89
5	26.03.2019	16490	108636	6.59
6	28.01.2019	13470	90397	6.71
	Total	79020	531575	6.73





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Service No 07 239 001 645 Load 57.09 KW Tariff LM2B1				
Sl. No.	Assessment Date	Units Consumed	Bill Amount in Rs	Unit cost in Rs
1	22.11.2019	4860	36476	7.51
2	25.09.2019	6360	45521	7.16
3	24.07.2019	4190	32353	7.72
4	27.05.2019	2570	22578	8.79
5	26.03.2019	5610	40980	7.30
6	28.01.2019	5340	39320	7.36
	Total	28930	217228	7.51

Service No 07 239 001 486 load 8KW Single phase LM51				
Sl. No	Assessment Date	Units Consumed	Bill Amount in Rs	Unit cost in Rs
1	22.11.2019	900	8581	9.53
2	25.09.2019	930	8678	9.33
3	24.07.2019	710	6722	9.47
4	27.05.2019	510	5032	9.87
5	26.03.2019	600	5800	9.67
6	28.01.2019	560	5461	9.75
	Total	4210	40274	9.57

Service No 07 239 001 1928 load 9KW 3 Phase LA1A				
Sl. No.	Assessment Date	Units Consumed	Bill Amount in Rs	Unit cost in Rs
1	22.11.2019	410	860	2.10
2	25.09.2019	810	3826	4.72
3	24.07.2019	720	3232	4.49
4	27.05.2019	1110	5806	5.23
5	26.03.2019	630	2638	4.19
6	28.01.2019	670	2902	4.33
	Total	4350	19264	4.43





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Service No 07 239 001 6602 5KW 3 Phase LM51				
Sl. No.	Assessment Date	Units Consumed	Bill Amount in Rs	Unit cost in Rs
1	24.01.2020	680	6642	9.5
2	22.11.2019	170	2144	12.6
Total		850		

❖ Number of Generators – 4 (75 KVA-1, 125 KVA-1 200KVA-1 & 320 KVA-1)

Diesel consumption per month is 200 liters

- 200 KVA generator is used with fuel 20 lit / hour when the college is in full strength.
- 125 KVA generator is used with fuel 12 lit / hour when the college is in 50% strength (from 3.30pm to 5pm).
- 75 KVA generator is used for the Hostel with the fuel 7lit /hour during holidays

Solar street Light

- ❖ Fourteen solar lamps illuminate the college campus

Electrical Energy consumption in the hostel

Service No 07 239 001 1927 Load 40 KW Tariff LM2B1				
Sl. No.	Assessment Date	Units Consumed	Bill Amount	Unit cost
1	22.11.2019	19040	119958	6.30
2	25.09.2019	21780	136483	6.27
3	24.07.2019	15920	101097	6.35
4	27.05.2019	14820	94462	6.37
5	26.03.2019	20890	131121	6.28
6	28.01.2019	18380	115967	6.31
Total		110830	699088	6.31

LPG Consumption

Number of Gas cylinders used in the Hostel per month –30

Number of Gas cylinders used in the canteen per month –5



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BIO GAS

- ❖ Biogas plant installed to generate gas from the human waste at Hostel
- ❖ No of students in the hostel -350

Solar Water Heater

- ❖ Solar water heater capacity of 500 LPD is installed in the hostel
- ❖ Hot water is used for cooking purpose.

Energy conservation

The energy conservation measures followed in the institution are listed below.

- The fans, lights, air-conditioners and other electronic and electrical equipment are switched off when not in use.
- Computers are switched to sleep mode or hibernate mode automatically when not in use
- Electrical equipment like CROs, Oscillators, Sodium lamps are switched off in the laboratory when the students complete their observations.
- At the end of every practical session, Computer monitors and UPS are switched off.
- Periodical maintenance and overhauling of generators is being carried out
- Soft copies are maintained instead of hard copies, to reduce power consumption and paper
- Work supervisor and electrician regularly check the usage of lights, fans and all other energy sources during and out of the college hours.
- Students are educated about the importance of energy conservation in the ward meetings.
- Staff and Students are made aware of vehicle pooling.





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c)WASTE

Quantity of waste generated:-

Office

- ❖ Biodegradable - <0.5 kg/day
- ❖ Non-biodegradable -< 0.1kg/day

Labs

- ❖ Biodegradable - < 1kg/day
- ❖ Non-biodegradable -< 0.5 kg/day
- ❖ Hazardous waste -< 100 ml/day

Canteen

- ❖ Biodegradable college canteen -10 kg/day
- ❖ Non-biodegradable - < 0.5 kg/day

Hostel

- ❖ Biodegradable college canteen -20 kg/day
- ❖ Non-biodegradable - < 0.5kg/day

Open area

Biodegradable(Dry leaves)- 5 Kgs/Day

Waste Management

- ❖ Paper cups, paper plates, stainless steel cups and plates are used in the canteen.
- ❖ Separate dustbins are kept to collect the waste food and used plates.
- ❖ Bio-Degradable and non-biodegradable waste are collected in separate bins provided.
- ❖ Food waste and vegetable waste from Hostel & canteen are sent to compost yard
- ❖ Withered leaves are collected and used for composting
- ❖ Use of polythene bags is avoided.



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- ❖ Plastic waste comes in through lab equipment's package, empty chemical containers etc are disposed periodically
- ❖ Solid wastes generated from damaged furniture, paper waste, paper plates - to Municipal waste collection system
- ❖ Glass waste from Broken glass wares are disposed periodically through municipal waste collection system
- ❖ Napkins are burnt in the incinerators

Awareness on Plastic free campus.

- All the stake holders and the faculty are motivated to use silver bottles and tiffin boxes.
- Number of programs related to plastic ban was conducted by various departments and a rally was organized to create awareness among the college students.
- Plastic utensils in the stores, canteen and hostel kitchen are replaced with stainless steel plates, tumblers etc
- Use of Jute bags encouraged: Jute bag making machines are purchased and students are trained in jute bag making and sold on the entrepreneur Day.
- Use of Cotton sanitary pads: Advantages of using Cotton sanitary pads is imparted by organizing awareness program

Initiative for Paperless office

- Part of the library is changed as E-learning centre
- Public announcement system is used for making all announcement to the students and faculty
- Online exams are conducted for Environmental Studies, Computer literacy to reduce the paper usage.
- Use of ICT is promoted through e-content cell functioning in the college.



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e-waste management

- In the computer laboratories, the computers that turn to be less memory spaced are used for storing less memory-spaced programmes like MS-Office, Corel Draw and Paint and are used for summer vacation classes.
- They are also used in computer installation, trouble- shooting laboratories and for demos for the Computer Literacy students.
- The used CDs are creatively employed in Art from Waste Competition.
- Electronics contingency items like resistors, capacitors, diodes, transistors, etc., which are worn-out are used as demo models in the classrooms or for extension activities.
- Parts of worn-out equipment are used as spares for other equipment.
- Discarded Computer parts (Monitor, CPU, Keyboard, Mouse, Speakers), Printers, Projectors, Refrigerators, Air Conditioners, UPS, Batteries, Vacuum Cleaners, Switches are collected from all the departments and are stockpiled.
- The maintenance team in the college campus identifies the faulty components and does the replacement once they get the approval from the Principal.

e-wastes are disposed by

- Once in four years the collected e-wastes are sold to authorised e-waste management organisation

Hazardous Waste Management

- Green Chemistry is followed in the lab.
- To get rid of toxic fumes in the Chemistry Laboratory, a separate fume hood and many industrial exhaust fans are set up.

Used Battery Management

- ‘GO for Green Policy ‘is followed





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Liquid waste

- ❖ Laboratory waste water is being sent through public sewer drainage system after proper dilution
- ❖ Waste water generated from washing, urinals, bathrooms are sent through public sewer drainage system

Waste Reduction

- ❖ In order to reduce the use of paper, procedures such as admission, Student attendance, mark entry, campus round up and office accounts are done through office automation.
- ❖ Students are instructed not to waste paper while writing examinations. They are provided with ruled paper.
- ❖ Microscale laboratory is implemented in chemistry to reduce the usage of chemicals

d) Green Campus

The campus is enriched with different types of trees, shrubs and herbs.

- Special initiatives are taken by the department of Botany and new saplings are planted every year. Altogether, there are 1329 trees in the campus.
- The fountain, lily pond and 162 potted plants add to the aesthetic beauty.
- A lily pond and green lawns enrich the beauty of the campus
- Herbal garden is maintained by the Department of Botany and the students are made aware of the traditional medicinal practices.
- The Department of Botany has cultivated medicinal plants with a focus on good health.
- The list of trees and the arrival of new saplings are recorded every year.
- A full time horticulturalist takes care of the trees, herbs and shrubs in the campus.
- Greenery and shade area of the campus occupies 70% of the total campus area.
- The eco-friendly ambience of the campus is a noteworthy feature of SFRC.



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Routine Green Practices

- The Green campus drive is an initiative of the college to protect the environment.
- The college has been declared as a ‘No Plastic’ zone.
- The campus protects age old trees in addition to several new trees and plants planted.
- The campus is lush green with gardens, lawns, flowers and plants wherever there is open space.
- The N.S.S and N.C.C wings of the college take special care to keep the campus neat and green.
- Poster/ painting competitions are conducted for the students on the theme “Green S.F.R.C campus” in order to alert the students of their duty to maintain a green and clean campus
- **Clean Green day- No Vehicle day** is observed to instil conservation of fuel.
- Students, faculty members and non-teaching fraternity are motivated to come by walk, bicycles or public transport once in a semester to instil the concept of reduction in usage of fuel.
- Students will be honoured with a small **GO GREEN BADGE** to motivate them to come to college by bicycles or battery-operated vehicles to do their part in protecting the environment
- Tree plantation programmes are organised regularly in adopted villages
- Rallies were conducted in adopted villages to say ‘No to Plastics’.
- Paper bags prepared by the students were distributed to the people of adopted villages to reduce usage of plastics.





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Campus Trees

Sl. No.	Botanical name	Tamil name	Family	Number of plants
1	<i>Acacia auriculiformis</i> A.Cunn. ex Benth.	பென்சில்மரம்	Fabaceae	1
2	<i>Annona squamosa</i> L.	சீதா	Annonaceae	1
3	<i>Azadirachta indica</i> A. Juss.	வேம்பு	Meliaceae	20
4	<i>Bauhinia purpurea</i> L.	மந்தாரை	Fabaceae	2
5	<i>Bauhinia tomentosa</i> L.	திருவாதி	Fabaceae	1
6	<i>Caesalpinia pulcherrima</i> (L.) Sw.	மயில்கொண்டை	Fabaceae	2
7	<i>Cassia fistula</i> L.	சரக்கொன்றை	Fabaceae	1
8	<i>Casuarina equisetifolia</i> L.	சவுக்கு	Casuarinaceae	1
9	<i>Delonix regia</i> (Boj. ex Hook.) Raf.	செம்மயிற்கொன்றை	Fabaceae	10
10	<i>Eucalyptus globules</i> Labill.	கற்பூரமரம்	Myrtaceae	1
11	<i>Ficus religiosa</i> L.	அரசு	Moraceae	1
12	<i>Guazuma ulmifolia</i> Lam.	தேன்மரம்	Sterculiaceae	1
13	<i>Hibiscus rosa-sinensis</i> L.	செம்பருத்தி	Malvaceae	1
14	<i>Ixora coccinea</i> L.	இட்லிபூ	Rubiaceae	1
15	<i>Lawsonia inermis</i> L.	மருதாணி	Lythraceae	1
16	<i>Limonia acidissima</i> L.	விளாமரம்	Rutaceae	1
17	<i>Libidibia coriaria</i> (Jacq.) Schldt.	இங்கிமரம்	Fabaceae	1





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18	<i>Manilkra sapota (L.) P. Royen</i>	சப்போட்டா	Sapotaceae	1
19	<i>Melaleuca citrina</i> (Curtis) Dum.Cours.	பாட்டிலிப்பிரஷ்	Myrtaceae	1
20	<i>Melia azedarach L.</i>	மலை வேம்பு	Meliaceae	1
21	<i>Millettia pinnata (L.) Panigrahi</i>	புங்கை	Fabaceae	4
22	<i>Millingtonia hortensis L.f.</i>	பன்னீர்	Bignoniaceae	8
23	<i>Mimusops elengi L.</i>	மகிழ்மரம்	Sapotaceae	1
24	<i>Moringa oleifera Lam.</i>	முருங்கைமரம்	Moringaceae	1
25	<i>Muntingia calabura L.</i>	சீனிபழமரம்	Muntingiaceae	1
26	<i>Murraya koenigii (L.) Sprengel</i>	கருவேப்பினை	Rutaceae	1
27	<i>Nerium oleander L.</i>	அரளி	Apocynaceae	2
28	<i>Nyctanthes arbor-tristis L.</i>	பவழமல்லி	Oleaceae	1
29	<i>Odina wodier Roxb.</i>	ஒடி	Anacardiaceae	2
30	<i>Parkinsonia aculeata L.</i>	சீமை	Fabaceae	1
31	<i>Peltophorum pterocarpum (DC.) K.Heyne</i>	பெருங்கொன்றை	Fabaceae	4
32	<i>Pentalinon luteum (L.) B.F.Hansen & Wunderlin</i>	மளடிவிலர்	Apocynaceae	1
33	<i>Phyllanthus acidus (L.) Skeels</i>	அரிநெல்லி	Euphorbiaceae	1
34	<i>Pisonia alba Span.</i>	லட்சகட்டகீரை	Nyctaginaceae	1
35	<i>Pithecellobium dulce (Roxb.) Benth.</i>	கொடிக்காய்	Fabaceae	1
36	<i>Plumeria rubra L.</i>	இல்லத்தரளி	Apocynaceae	1
37	<i>Polyalthia longifolia Sonn.</i>	நெட்டிலிங்கம்	Annonaceae	1
38	<i>Psidium guajava L.</i>	கொய்யாமரம்	Myrtaceae	1



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39	<i>Punica granatum</i> L.	மாதுளை	Punicaceae	1
40	<i>Tamarindus indica</i> L.	புளியமரம்	Fabaceae	1
41	<i>Tecoma stans</i> (L.) Juss. ex Kunth	தங்கரளி	Bignoniaceae	1
42	<i>Terminalia catappa</i> L.	நாட்டுவாதுமை	Combretaceae	4
43	<i>Thespesia populnea</i> (L.) Sol. ex Correa.	பூவரசு	Malvaceae	1

TJ Solutions *
Madurai-10



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e) Carbon Footprint

The college promotes the usage of public transport by issuing government bus passes. Rather than using individual vehicles, the college arranges buses from various places to the college so as to minimize the emission of carbon.

No of students-3436,
No of Teaching staff -165,
No of non-teaching staff -130

A Radius of Sivakasi town -7 KM

Average distance travelled by staff and students per day from home to College and
back to home=10 KM

No of Four wheelers being used by students and staff =183
No of Two wheelers being used by students and staff =532
Average No of days vehicle used for college per year-220 days

Average Fuel efficiency of Four wheelers = 20KM/ Lit	
Average Fuel efficiency of Two Wheelers = 60KM/ Lit	
Average Petrol consumption by Four wheelers per year	20130 Lits.
Average Petrol consumption by Two wheelers per year	19506 Lits.
Total Petrol consumption per year	39636 Lits

Diesel consumption by college vehicle per year	36720 Lits
Diesel consumption by DG sets per year	2400 Lits
Total Diesel Consumption per year	39120 Lits

LPG consumption(Hostel & canteen) per year	7980 KGs
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Total electrical power consumed from Grid in the year 2019	4,01,958 units
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Green House Gas emission due to petrol	93542.5 kg CO ₂ e
Green House Gas emission due to diesel	104450.4 kg CO ₂ e
Green House Gas emission due to LPG	24179.4 kg CO ₂ e
Green House Gas emission due to Grid power	329605.6 kg CO ₂ e

Total GHG emission per year	551777.9 kg CO ₂ e
Total GHG emission per year	551.7 t CO ₂ e





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4.2 Evaluation of Audit Findings

Awards , Recognition and Appreciations received

- World Record was done on 17 8 2019. Noble World Record was received for world largest human Tree formation with 966 students.
- Attended and received Annual Swachhta Ranking Award at AICTE, New Delhi on Dec 3 2019
- Recognised as SES REC(Social Entrepreneurship, Swachhta & Rural Engagement Cell) action plan Institution by Ministry of Education, Government of India
- Recognised SAP (SWACHHTA ACTION PLAN) INSTITUTION by Ministry of Human Resource Development, Government of India
- Received Swatch Bharath Internship-2018, Athikulam village was adopted and various activities were performed
- UNNAT BHARAT ABHIYAN CELL is constituted under the guidance of Govt of India. Five villages were adopted and various activities like Dengue awareness programme, need for rain water harvesting, tree plantation and plastic ban were conducted.

Water

- 85 000 litres of water is used per day by the college for its different uses.
- Flow meter to be installed for measuring the actual quantity of water used in different purpose and to find way for reduction in consumption
- The quality of Drinking water is within the norms
- The chemical parameters like TDS, Hardness etc present in the borewell water and the outsourced water are within the norms
- Microbial test for Drinking water to be carried out on periodical manner
- Chlorine system is not in operation in RO plant. UV light shall be provided to disinfect the RO water outlet
- If waste water treatment system is installed at hostel ,& canteen the amount of water lost through outlets can be recycled and utilized for gardening and toilet uses. Awareness programs for the management of sustainable water use will be highly beneficial





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Energy

Electrical Energy consumption in the college

Sl.No	Service no	Building	Tariff	phase	2019 Full year consumption	July- December consumption		
						2019	2018	Difference
1	072390013024	IT	LM2B1	3	56312	31558	29304	2254
2	072390014383	Admin Extn	LM2B1	3	49144	24834	20210	4624
3	072390011926	Admin + Computer	LM2B1	3	69162	34924	32959	1965
34	07239001488	Main	LM2B1	3	79020	38440	38030	410
5	07239001645	Main Extn	LM2B1	3	28930	15410	13340	2070
6	072390011927	Hostel	LM2B1	3	110830	56740	59040	-2300
7	07239001486	Canteen	LM51	3	4210	2540	1840	700
8	072390011928	Principal House	LA1A	3	4350	1940	2440	
SUM					401958	206386	197163	9723

Summary

- In the year 2019(July to December months) around 9700 units of electrical energy was consumed more compare to previous year 2018
- Only in the service No 072390011927(Hostel) -In the year 2019 around 2300 units of electrical energy was consumed less compare to previous year 2018(July to December months)
- In the remaining services, electricity consumption is high compare to previous year
- Annual electricity consumption is around 4,02,000 units. Management shall fix some target to reduce consumption

Present energy saving methods adopted in the college

- Turning off electrical equipment when not in use
- Replacing CFL bulbs with energy efficient light-emitting diode (LED) bulbs
- Replace old high energy consuming appliances with five star rated energy efficient appliances
- Computers are switched to sleep mode or hibernate mode automatically when not in use





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Waste

The composting facility of the college for the treatment of biodegradable waste generated from the Hostel and canteen can be improved. Different methods such as pit composting, bacterial composting using bacterial consortium may be used to treat the biodegradable waste. Bottles, plastics, cans, tins etc., may be recycled. A model solid waste treatment system can be established in the college as a part of awareness program to the students.

Green Campus

Area demarcated for the establishment of a gardens of medicinal plants and vegetable garden, the extent of which may be increased.

Carbon Footprint

Release of carbon dioxide to the atmosphere is contributing to the global warming and increasing the pace of climate change. More trees may be planted in the campus to make a source of sink for the carbon dioxide and for other greenhouse gases.

Total GHG emission per year is 551.7 t CO₂ e

4.3 Consolidation of Audit Findings

We hope that students will have developed a greater appreciation and understanding of the impact of their actions on the environment. They have successfully been able to determine the impacts on the environment through the various auditing exercises. Participating in this green auditing procedure they have gained knowledge about the need of sustainability of the college campus. It will create awareness on the use of the Earth's resources in their home, college, local community and beyond.

Energy Saving activities implemented

- Solar Water Heater capacity of 500 Litres per Day
- Solar Street Lights -14 Nos

Waste to Wealth

- Biogas plant was installed at Hostel
- Every month, fuel usage equal to 2 nos. LPG cylinder quantity got reduced
- Selling of Bio Fertilizer made from Bio composting of dry leaves
- Waste papers are converted into useful products





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Rain water Harvest system

- Highly appreciable work carried out for harvesting the rainwater both from college buildings & hostel as well as open walking area.
- Water outsourcing cost equivalent to quantity of Rainwater collection in the well and pollution due to transport for this quantum of water from outside has been reduced extremely.

Reduction in Water consumption

- Green Chemistry is followed in the Chemical laboratory

Reduction in usage of Hazardous chemical

- Most of the Hazardous chemicals are replaced with green chemicals
- Microscale laboratory is implemented in chemistry to reduce the usage of chemicals

Waste Recycle

- The waste water from the RO plant is stored in a tank and is used in the chemistry lab for washing purposes and also used for gardening throughout the year.
- One-sided waste print-out papers are used again for writing purposes.
- Used papers are sent for recycling.

General

- Green Policy is stated and reflected in the functioning of the college and it shall be written in a more descriptive manner
- Gardens inside the college premises are found well maintained.
- More no. of notice boards and sign can be placed in the campus to reduce over exploitation of natural resources.
- Campus is declared plastic free and hence stringent actions should be taken to maintain this.
- Solar power generation, environmental education programs have to be strengthened.
- Dedicative fire hydrant system erection work is under progress
- Lightning arrestor for all high raise building erection & commissioning is under progress





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Water Audit

- Water consumption monitoring system and waste water treatment facility has to be implemented in the college campus
- The college shall plan for effective utilisation of waste water generated from canteen, hostel kitchen, toilets, bathrooms and office rooms.
- Awareness on saving water can be created by means of placing more number of display boards in the campus.

Energy Audit

- The communication process for awareness in relation to energy conservation is found inadequate.
- Monthly use of electricity (Energy) in the college and hostel to be monitored
- Meter for Biogas generation to be provided
- Objectives for reducing energy and water consumption are to be fixed
- Targets to be set for energy & water consumption reduction

Waste Audit

- The college has proper communication with the local body for regular collection of solid waste from the campus.
- Number of waste bins in the class rooms, veranda, canteen and campus can be increased
- Composting systems to be enhanced from the current level.
- E- waste are sent to authorised vendor and it is better to dispose them now and then
- Go For Green Policy is followed for disposal of used batteries

Green Campus Audit

- Tree cover of the college with respect to the stakeholder strength is good
- Regular planting of trees in the campus are to be continued
- Usage of water for gardens are to be measured
- Environment Day and Ozone day are celebrated to create awareness





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Carbon Foot Print Audit

- Yearly Green House Gas emission is around 551 t CO₂ eq
- Clean Green day- No Vehicle day is observed
- Initiatives for carbon accounting has to be taken.
- Students/staff coming to college in vehicles can be reduced and it should be monitored
- Encourage students to use cycles.

4.4 Preparation of Action Plan

Policies referring to college’s management and approach towards the use of resources need to be considered. The college green policy/ environmental policy for its sustainable development to be monitored consciously

4.5 Follow-up Action and Plans

Green Audits are exercises which generate considerable quantities of valuable management information. The time and effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and that action plans and implementation programs result from the findings. Audit follow up is part of the wider process of continuous improvement. Without follow-up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organisational priorities and the passing of time.

4.6 Environmental Education

The following environmental education program may be implemented in the college before the next green auditing:-

- Training programs in solid waste management, liquid waste management, setting up of water management, energy management, Impact of pollution, Carbon footprint concepts, Awareness on Global warming
- Increase the number of display boards on environmental awareness such as - save water, save electricity, no wastage of food/water, switch off light and fan after use, plastic free campus etc.





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Awareness on Carbon Consumption

- Students and Staff members may be made totally aware of pollution caused by use of vehicles.
- The carbon consumption awareness programs on carbon emission at individual as well as social level will help to avoid air and noise pollution in the campus due to vehicles.

4.7 Conclusion and Full List of Recommendations

The green audit assists in the process of testing performance in the environmental arena and is fast becoming an indispensable aid to decision making in a college. The green audit reports assist in the process of attaining an eco- friendly approach to the sustainable development of the college. Hope that the results presented in the green auditing report will serve as a guide for educating the college community on the existing environment related practices and resource usage at the college as well as spawn new activities and innovative practices.

A few recommendations are added to curb the menace of waste management using eco- friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development. It has been shown frequently that the practical suggestions, alternatives, and observations that have resulted from audits have added positive value to the audited organisation.

An outside view, perspective and opinion often helps staff who have been too close to problems or methods to see the value of alternative approaches. A green audit report is a very powerful and valuable communications tool to use when working with various stakeholders who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur.

Common Recommendations

- ❖ Objectives & Targets for environmental policy shall be fixed
- ❖ Establish a purchase policy for environmental friendly materials
- ❖ Students and staff can be permitted to solve local environmental problems
- ❖ Establish Water, Energy, Waste Water, Plastic waste, E-Waste, Hazardous Waste and Solid waste Management systems



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Criteria Wise Recommendations

Water

- Install water flow meter to measure the consumption of water
- Establish waste water treatment systems and reuse the water for gardening
- More Awareness programs on water conservation to be conducted.
- Install more display boards to control over exploitation of water.
- UV light to be fixed at the outlet of RO unit for disinfection

Energy

- Target for Reduction in Energy consumption to be fixed
- Installation of solar power plants shall be planned for IT Block
- Conduct more awareness programs on importance of energy saving for students and staff.
- Conventional fans to be replaced with Energy efficient fans in phased manner
- More number of old Tube lights to be replaced with LED tube lights
- Observe a power saving day every year.
- Automatic power switch off systems may be introduced.
- Green building concept shall be planned for one of the new building

Waste

- A model solid waste treatment system to be established.
- Practice of waste segregation to be improved.
- Biogas plant for Hostel and canteen vegetable and food waste shall be planned in future
- Conduct exhibition of recyclable waste products
- Target for reduction in waste generation shall be planned
- Every six months e-waste to be disposed as per E-waste Management rules 2016.
Not to be stored for more than 180 days.





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- Register to be maintained for collection, storage and disposal of E waste & used batteries

Green Campus

- Create more space for planting.
- Grow potted plants at both veranda and class rooms.
- Beautify the college building with indoor plants
- Continuously encourage students for making the campus green
- Conducting competitions among departments for making students more interested in making the campus green.
- Periodically remove the dead trees and plant a new saplings
- Roof garden for some building shall be planned in future

Carbon footprint

- Establish a system of car-pooling among the staff to reduce the number of four wheelers coming to the college.
- Discourage the students using two wheelers for their commutation.
- Encourage more number of students and staff to use public transport system
- Fix a target to reduce Green House Gas emission
- Plan for e- vehicle for college vehicle in future

