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Solar plants and Power Back Up Images

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VIMAL JYOTHI ENGINEERING COLLEGE, CHEMPERI.

GREEN AUDIT REPORT 2022

EXECUTIVE SUMMARY

Green audit is **defined** as an official examination of the effects a college has on the environment. It helps to improve the existing practices with the aim of reducing the adverse effects of these on the environment concerned. Several institutions have applied various viewpoints to preserve the environment within the campus such as promotion of energy savings, recycling of waste, water use reduction, water harvesting etc. Green audit visualizes the documentation of all such activities taking stock of the infrastructure of the college, their academic and managerial policies and future plans. A green auditor will study an organisation's environmental effects in a systematic and documented manner and will produce an environmental audit report. A clean and healthy environment aids effective learning and provides a conducive learning environment.

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. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of green impact on campus. Green auditing promotes 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. Thus 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 relevant.

In our College, the audit process involved staff and students in the implementation of mitigation measures. Staff and students were given instructions to collect the data for the green audit process. This was followed by staff and student interviews, collection of data through the questionnaire based survey, 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 our college.

Existing data will allow our college to compare its programs and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects. The green audit reports assist in the process of attaining an eco-friendly approach to the sustainable development of our 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. We expect that the Principal and the Management of our College will implement the green audit recommendations.

We are happy to submit this green audit report to the Principal and the Management of our College.

- Green Audit 2022 Team

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Chapter – 1

Introduction

Vimal Jyothi Engineering College (VJEC) is an educational project of the Archdiocese of Thallassery established in the year 2002 and is managed by Meshar Diocesan Educational Trust. The college is approved by AICTE and affiliated to APJ Abdul Kalam Technological University (KTU). VJEC is a self-financing catholic minority institution aiming at generating fervour for Engineering and Technology in students. Here we inspire, nurture and foster them to realize their career potential in the field of Engineering and Technology.

With profound insight into the resource requirements of the higher education system, VJEC has proudly set up world-class infrastructure complemented with intellectual capital in the form of competent faculty. Many of the facilities are way beyond the regulatory requirements aiming for learning beyond the syllabus to address the requirements of the industry. These material facilities along with value addition programs and student support systems are the integral facets of empowerment at VJEC.

Digital library, industry supported project labs, language lab, and student chapters of professional bodies such as **IEEE, ISOI, IETE, SAE, CSI, WIE, IME,** offer an extensive range of resources, opportunities and services to the outcome based teaching learning process. Effective implementation of quality control processes ensure Engineering graduates with the expected level of knowledge, skill and attitude.

With this short introduction from the college website, we shall see to the functional aspects of our college. The college is now 20 years old. It is the centre of higher learning in the Malabar region of Kerala with 10 undergraduate programs, 2 post-graduate programs and 6 research programs. The college has 140 regular faculty

members in various disciplines of whom 21 are Ph.D. holders. About 49% of the faculties are women. The total number of non-teaching staff comes to 45. The college has a total student strength of 1923 of which 35% are girls.

The college is credited with the running of a Civil Service Academy on its campus. It provides effective coaching to the civil service aspirants on a regular basis. The integral development of student personality is taken care of by various clubs and units like National Service Scheme, Robotics Club, Go Green Club etc.

The students have been consistently contributing to the ethos of the college through their outstanding performance in the University Festivals, sports, Games and intellectual pursuits. They maintain high standards in University examinations with occasional ranks and distinctions.

The college gives due importance to the wholesome development of the human personality. In this perspective, we have facilities for computer training, yoga practicing, body building and spiritual renewal. The practice of reaching out to the entire college community is through the installed public address system and educating on topics of common interest. The recreational facilities like department celebrations, inter-departmental competitions, Tech Fest, Onam and Christmas celebrations are the means of unearthing the best talents hidden in each student.

The career guidance and placement cell is very active and has been successful in securing maximum campus placements for our students. The Parent Teacher Association and Alumni Association are also very active with many innovative programmes.

On infra-structural front, the college has state of the art facilities. Technical laboratories, which satisfy the course requirements as per KTU. It has air conditioned conference halls, auditorium, seminar halls, computer labs, smart class rooms, language lab, nearly 250 computers with peripherals, photocopying machines, overhead projectors and so on. Two Ladies' Hostels, Two Boys Hostel, one PG hostel, Canteen, Gymnasium, Yoga Centre, Chapel, Counselling Centre, Book Stall and Stationery Shop are other facilities on the campus.

The college administration is assisted and advised by the Governing Body, IQAC, College Council, PTA, Alumni Association, and the College Union in its march ahead.

The emerging system of higher education demands increased importance to skill development in order to make our students more employable by acquiring necessary analytical and soft skills. Aptitude tests, group discussions, interviews, personality tests etc. have become essential components of any education system. Hence, students are encouraged to join clubs / associations for co-curricular activities and take maximum advantage of the facilities available. Let us develop a new culture of innovation and hard work with a firm desire and determination for achieving our goals. We have to be punctual and systematic, humble, sincere and honest. Let us nurture deep rooted values and faith in God along with an uncompromising search for truth, knowledge and excellence in all our endeavours.

The college is preparing itself for the second cycle of accreditation by the NAAC. The IQAC of the college is in the field, grooming the ground for the next cycle of accreditation ever since the first cycle accreditation of the college in 2019. Its focus is on ushering in a positive and qualitative change in the delivery of academic services in the college. The qualitative changes seen on the campus now are the result of concerted and dedicated efforts of the management, staff and students of this institution.

1.1 Vision and Mission

Vision of the Institute

To bloom into a Center of Excellence for Technical Education and a pace-setter in rural India with its quality processes and procedures, interwoven with freedom of flexibility, moulding professionals of superior quality, dedicated to the progress and development of Humanity.

Mission of the Institute

To prepare the students to see beyond geographical limit and belong to a new age of acquisition and application of technology, to meet the challenges of the changing world. Inspired and guided by gospel values, we contribute to the socioeconomic welfare of the country with due concern to the marginalized.

Quality Policy of the Institute

VJEC is committed to provide quality education in engineering and technology, to transform the youth into committed technical personal for the social and economical well-being of the nation with integral development of the personality and character building.

Motto of the Institute

"Where Perfection is the Tradition"

1.2 Objectives of the College

- Enable students to pursue knowledge with an insatiable thirst, discipline them to harness their energy for creative purposes, make them physically and mentally fit and competent for a career and equip them to be self-supportive in life.
- Foster feelings of love, compassion and tolerance towards all and enable them to fight against all social evils. Encourage healthy interaction so that they place the common good of a larger community above their personal interests.
- Induce patriotic fervor and an unflinching pride in the national heritage and inculcate qualities of enlightened leadership, so that they become responsible citizens and good leaders of tomorrow.
- Encourage art, music, dramatics and other forms of creativity inherent in students, make them honour the dignity of labour and encourage service activities and extension programmes.
- Promote healthy staff student relationship and instil in them love and respect towards their parents, elders, people of authority and everyone worthy of respect. To sum up, the College looks forward to educate citizens who love God and serve humanity. The institution endeavours to help the youth to grow up competent, responsible and mature individuals with strength of character, moral uprightness and courage of conviction, imbued with qualities of the head and the heart.

1.3Total Campus Area and College Building Spread Area

Total Campus Area	1,21,835 Sq. m
Green Area	Approx. 73,101 Sq. m

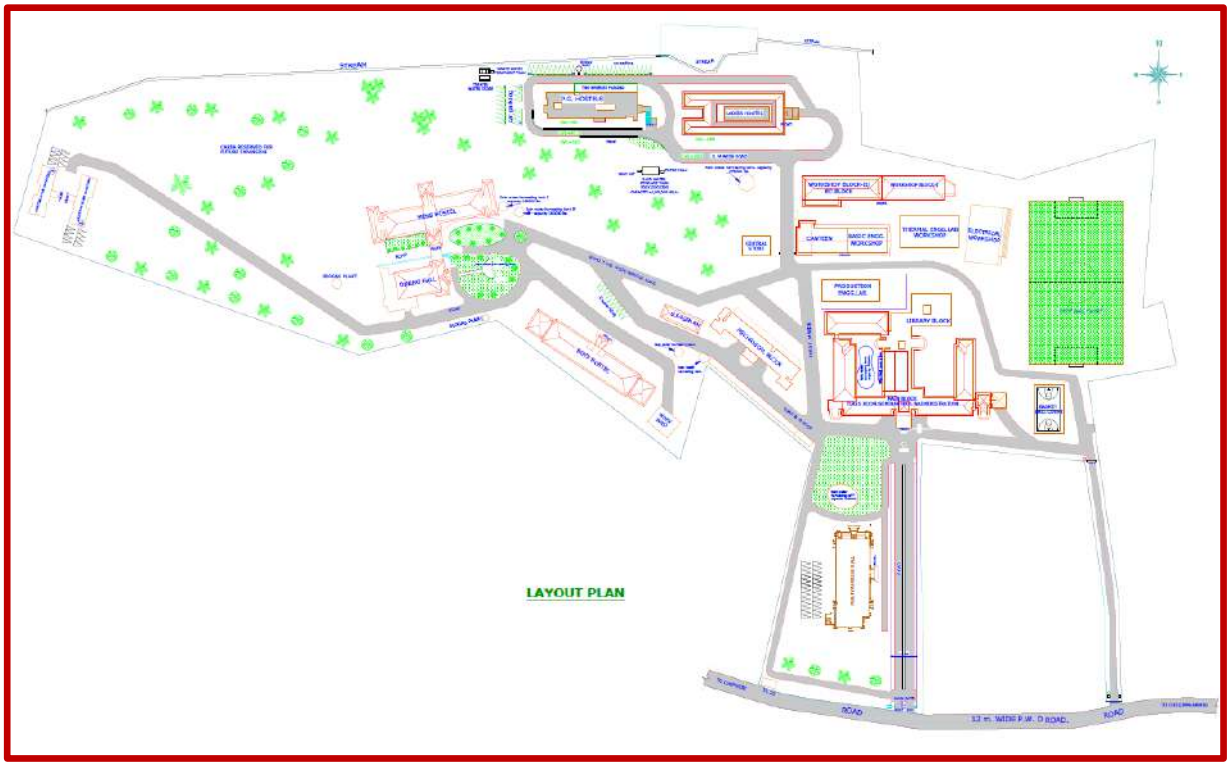
List of Places from where Students Commute

Malapattam, Mayyil, Kambil, Kattampally, Puthiyatheru, Podikundu, Kannur, Payyavoor, Chulliyode, Irity, Sreekandapuram, Taliparamba, Naduvil, Pariyaram, Pilathara, Thotty, Dhamasala, Chembanthotty, etc.

NAAC Grading in Assessments

SN	Cycle	Grade	CGPA	Year of Accreditation	Validity Period
1	1st Cycle	B+	2.67	2019	27 March 2024

VJEC CAMPUS LAYOUT



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Chapter – 2

Pre-Audit Stage

The green audit practically involves energy conservation, use of renewable resources, rain water harvesting, efforts of carbon sequestration methods, planting trees, waste management including hazardous and e-waste. This requires data collection and efforts for clarification of environmental policies. Green auditing includes systematic identification, recording and analysis of components related to sustainable development of an educational institution to preserve for future generations. The process has three important stages such as pre audit stage, audit stage and post audit stage.

A Pre- audit meeting was held in the college, 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 was an important prerequisite for the green audit as it is the first opportunity to meet to discuss the pro's and con's of the audit with more concern. It was held at the College, on 10th October 2022. The meeting was an opportunity to gather information that the audit team can study before arriving at the site. The audit protocol and audit plan was handed over at this meeting and discussed in advance of the audit itself.

Actual planning of audit processes was discussed in the pre-audit meeting. The Principal along with HOD's and the college management selected the Audit team before convening this meeting. The audit team worked together under the leadership of the lead auditor, the senior staff member, to ensure completion within the brief period and scope of the audit.

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 such as awareness programs on environment, campus farming, planting more trees in the campus etc. after the green auditing. The management of the college was willing to formulate policies based on green auditing report.

2.1 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 economical, financial, social and environmental processes. 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 our College. It comes with a series of questions to be answered on a regular basis. This innovative scheme is user friendly and totally voluntary. The aim of this is to help the institution to set environmental examples for the community, and to educate the young learners.

2.2 Benefits of the Green Auditing

- Empower the organizations to frame a better environmental performance
- More efficient resource management
- Benchmarking for environmental protection initiatives
- To provide basis for improved sustainability
- To create and maintain 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
- ❖ Enhance the alertness for environmental guidelines and duties
- ❖ Impart environmental education through systematic environmental management approach and improving environmental standards
- ❖ 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.

2.3 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 improvement or change over time. 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, procures 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.

Auditing for Water Management

Water auditing is a method of quantifying water flows and quality in simple or complex systems, with a view to reducing water usage and often saving money on otherwise unnecessary water use. Water is life; virtually everything we do or use each day involves water. Yet, we do not give it the importance that is due to it. There is an

increasing awareness around the globe of the centrality of water to our lives. In many places people have difficult access to drinking water. Often it is polluted. We need to use water wisely to ensure that drinkable water is available for all, now and in the future. Water auditing is a mechanism for conserving water, which will grow in significance in the future as demand for water increases. It 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

An energy audit is an inspection, survey and analysis of energy flows for energy conservation in a building, institution, process or system to reduce the amount of energy input into the system without negatively affecting the output. It shows where the power consumption is more in the given system. It can also be called as controlling of the power usage to avoid losses and maximize efficiency. Energy management (audit) approach is understanding energy costs, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, and fuel and energy substitution. Energy cannot be seen, but we know it is there because we can sense 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 to 100W 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.

Auditing for Waste Management

A waste audit is a methodically thought out process which can be used to determine the amount and types of waste that are generated by an organization. Information from these audits can help the organization to determine how we can reduce the amount of waste that an institution generates. In most work places, cardboard, paper, plastics,

metals and food constitute the majority of what goes in the garbage. Pollution from waste is aesthetically unpleasant and results in large amount 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. 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 petrol. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

Auditing for Green Campus Management

Green Campus is an environment which improves energy efficiency, conserving resources and enhancing environmental quality by educating for sustainability and creating healthy, living and learning environments. Green Campus rewards long term commitment to continuous environmental improvement from the campus community. Green colleges make a point to account for sustainable living when designing and operating their buildings. Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. It is essential to plan where the trees are planted and to plan their ongoing maintenance in order to maximize future benefits and to ensure long-term tree survival and growth. Trees in a college yard improve air quality and can reduce temperatures with their cool shade. They are a small environmental investment that will pay dividends for decades to come. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. 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 that many students are under some amount of stress.

Auditing for Carbon Footprint

Microcosms of the world at large, college campuses are great test beds for environmental change, and many students are working hard to get their administrations to take positive action. The initiatives that are emerging are models for the larger society, and the students pushing for them will be taking these lessons with, too,

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as they enter the work force after graduation. Foremost on the minds of green-leaning students today is global warming, and many are joining hands to persuade their colleges to update policies and streamline operations so that their campuses can become part of the solution. 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 402 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. The question is what should be done to reduce carbon emissions. Often the challenge lies in choosing just the right approach that will contribute most to the objective. Naturally, the results of these interventions also have to be monitored and assessed.

Many colleges want to reduce their carbon dioxide (CO_2) emissions. But that's not so easy, given that a range of factors determine carbon emissions, including mobility, waste, and energy consumption. So, gaining insight into CO_2 emissions is extremely important.

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.

2.4 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 documents, 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 data collection phase, exhaustive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurements. Data collection was done from the primary sources.

Following steps were taken for data collection:

- The team visited each department, centres, Library, canteen, gardens, campus etc.
- Data on the general information was collected by observation and interview.
- The power consumption of appliances was recorded by taking an average value in some cases.
- Plants were identified using standard taxonomic books.
- Waste generated was measured directly at the source of production.

2. **Data Analysis** - Detailed analysis of data collected include: computation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by the Kerala State Electricity Board (KSEB). Data related to water usage were also analyzed 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 treatment methods for waste were also suggested. The above target areas particular to the college was evaluated through questionnaire circulated among the students for data collection.

2.5 Survey Forms

Survey questions for Water Management at VJEC

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 total 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 why.
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. Rate the Quality (tase, colour, smell) of water delivered for general use
21. Rate the Reliability of water services in the campus
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?
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. Quantity of water used for bus cleaning? (liters per day)
44. Amount of water for other uses? (items not mentioned above)
45. Area of the college land without tree/building canopy.
46. Is there any water management plan in the college?
47. Are there any water saving techniques followed in your college?What are they?
48. Please share Some IDEA for how your college could save more water.
49. Rate the recycling of water in the campus
50. In the past few months, have you had any complaints with water quality or availability?

Survey questions for Energy Management at VJEC

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.(Record monthly for the year 2016).
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? Mentionuse (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).
17. How many electrical equipment's including weighing balance are installed 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? Mention 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?

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 stoves, 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.

Calculation of energy for electrical appliances

Appliance	Power	Usage per	Number of	Average	Average
incandescent	60 watt				
CFL	18W				
Microwave	1000W				
Stove	3000W				
Kettle	2500W				

Survey questions for Waste Management for VJEC

What is the total strength of students, teachers and Non-teaching staff in your College?

No. of	Students	Teachers	Non-teaching staff
Gents			
Ladies			
Total			

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

Garden area		Garbage dump (number)	
Play ground 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	

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	
		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?

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

Office

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.				
2 - 10 kg.				
> 10 kg.				

Laboratories

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.				
2 - 10 kg.				
> 10 kg.				

Canteen/kitchen

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.				
2 - 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)

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?

Survey questions for Green Campus Management for VJEC

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?
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? (2020-21)
28. What is the involvement of students in the green cover maintenance?
29. What is the total area of the campus under tree cover?under tree canopy?
30. Share your IDEAS for further improvement of green cover.

Survey questions for Carbon Footprint for VJEC

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

No. of	Students	Teachers	Non-teaching staff
Gents			
Ladies			
Total			

2. Total Number of vehicles used by the stakeholders of the college.(per day)
3. No. of cycles used
4. No. of two wheelers used (average distance travelled and quantity of fuel and amount used per day)
5. No. of cars used (average distance travelled and quantity of fuel and amount used per day)
6. No. persons using common (public) transportation (average distance travelled and quantity of fuel and amount used per day)
7. No. of persons using college conveyance by the students, non teaching staff and teachers (average distance travelled and quantity of fueland amount used per day)
8. Number of parent-teacher meetings in a 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 perday.
11. Number of LPG cylinders used in the canteen (Give the amount of fuel usedper 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 monthfor the transportation of vegetables and other materials to canteen.
14. Amount of taxi/auto charges paid per month for the transportation of officegoods to the college.
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.

Chapter – 3

Audit Stage

The green audit began with the teams walking around examining all the different facilities of the college, identifying the different types of appliances and utilities (lights, taps, toilets, fridges, etc.), as well as measuring the usage per item (Watts indicated on the appliance or measuring water from a tap) and identifying the relevant consumption patterns (such as how often an appliance is used) 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 several times to clarify the data received through survey and discussions. The whole process was completed within 3 months from 2022October to December, 2022.

3.1 Students and Staff Involved in Green Auditing

Chairman : Dr. Benny Joseph, Principal.

Co-Chairman :Mr. Sebastian, P.R.O.

Coordinator : Prof. Dr. Vra Saathappan, Prof. of Civil Engineering.

1. Water Management

Faculty In-charge : Ms. Vidhya SS, Assistant Professor in CSE.

Assisting Non-Teaching Staff : Mr. Jimmy Philip, Lab Technician, CSE.

Students

SN	NAME	CLASS
1	AdilaFarha P K	S7 CSE
2	Aneesha S	S7 CSE
3	Harold Prakash	S7 CSE
4	Henathraj K V	S7 CSE
5	Nathasha K V	S7 CSE
6	ShradhaSujith	S7 CSE
7	Adwaith Rajesh	S3ADS
8	Akash V V	S3ADS

2. Energy Management

Faculty In-charge : Dr. Sethilkumar, Professor of EEE.

Assisting Faculty : Mr. Jijo Joseph, Assistant Professor in EEE

Assisting Faculty : Mr. Dhanooj Mohan, Assistant Professor in AEI.

Students

SN	NAME	CLASS
1	Joyal Saji	S5 AEI
2	Mrinal C Pradeep	S5 AEI
3	Revathi PVK	S5 AEI
4	Alen Johns	S3 AEI
5	Mohammed Amal	S3 AEI

3. Waste Management

Faculty In-charge : Ms. Jerrin Yomas, Associate Professor in ECE.

4. Green Campus Management

Faculty In-charge : Ms. Lekshmi M Ramdas, Assistant Professor in Civil.

Assisting Faculty : Mr. Vasudevan Nair, Assistant Professor in ASH

5. Carbon Footprint

Faculty In-charge : Mr. Ryne P.M., Assistant Professor in Mech.

Assisting Faculty : Mr. Gokulnath R, Assistant Professor in Mech.

3.2 Student Clubs and Staff Forums Involved

Go Green Club, Robotic Club, NSS, Department Level Associations, Staff Club, Career Guidance, Training and Placement Cell,

3.3 Comments on Site Tour

Site inspection was done along with students and staff. Audit team visited laboratories, libraries, class rooms, college campus, agricultural fields, solar power generation fields, play grounds etc. Questionnaires were answered during the site tour. Students and staff took much interest in the data collection process. It was an environmental awareness program for the students who participated in the green auditing. It was quite interesting and fascinating. The experience of green auditing was total a new

experience for most of the students. They have shared their expectations about a green campus and gave suggestions for the audit recommendations. Data collected in different intervals were consolidated later.

3.4 Review of Documents and Records

Data verification was done with office records. Documents such as admission registers, registers of electricity and water charge remittance, furniture register, laboratory equipment registers, purchase register, and audited statements of the college were examined for data collection and verifications. Collegecalendars, college magazines, annual report of the college and NAAC self- assessment reports, UGC report etc. were also verified as part of data collection.

Review of Policies

Discussions were made with the college management regarding their policies on environmental management. Reviews of existing policies were also done. Future plans of the college and basis for new policies to be adopted were also discussed. The management would formulate a revised 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.

3.5 Site Inspection

College and its premises were visited and analyzed 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 and fuel consumption for each vehicle was verified with the user. 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. Energy wastage and misuses were also noted.

3.6 Common Questionnaire

Apart from all the above steps taken to collect the data and information related to the type of audit management, a common questionnaire for all staff and students in the form of a Google Form was floated through Google drive. The data was collected and was incorporated as a part of the audit findings.https://forms.gle/7MgV1N7sfn92qh2y6

VIMAL JYOTHI ENGINEERING COLLEGE
Chemperi, Kerala-607632.
GREEN AUDIT 2022
QUESTIONNAIRE
Answer all questions

Employee's code for staff or University Register Number (URN) for students:

Q.1. Rate the QUALITY (taste, colour, smell) of water delivered for general use [*Ans: (1)Excellent, (2)Very Good, (3)Good, (4)Fair, (5)Poor*]
Q.2. Rate the RELIABILITY of water services in the campus [*Ans: (1)Excellent, (2)Very Good, (3)Good, (4)Fair, (5)Poor*]
Q.3. Rate the recycling of water in the campus [*Ans: (1)Excellent, (2)Very Good, (3)Good, (4)Fair, (5)Poor*]
Q.4. In the past few months, have you had any complaints with water quality or availability? (*Ans: Yes / No*)
Q.5. Is it essential to have a waste management system in our campus? (Ans: Yes / No)
Q.6. Are you aware that our college is installed a waste disposal system? (Ans: Yes / No)
Q.7. Are you using the waste management of our college facility properly? (Ans: Yes / No)
Q.8. Are you satisfied with the current waste management system in our college? (Ans: Yes / No)
Q.9. Any suggestions for improving the present waste management system in the campus.
Q.10. Are you satisfied with the solid waste segregation in the campus? (Ans: Yes / No)
Q.11a. Are you satisfied with the activities conducted by the Go Green Club? (Ans: Yes / No)
Q.11b. Give suggestions for any extra activities for Go Green Club.
Q.12. Share your ideas for further improvement of green cover of our campus.
Q.13. Are you happy with the nature awareness programs conducted. (Ans: Yes / No)
Q.14. Do you travel by foot to college? (Ans: Yes / No)
Q.15. Do you travel by college bus? (Ans: Yes / No)
Q.16a. Do you travel by public transportation to college? (Ans: Yes / No)
Q.16b. If yes, distance travelled per day and fuel consumption in liters [=distance/(3 x 60)]. (Ans: Distance travelled: kms, Fuel consumption in Liters:)
Q.17a. Do you travel by a two wheeler? (Ans: Yes / No)
Q.17b. If yes, distance travelled per day and fuel consumption in liters [=distance/(average mileage)] (Ans: Distance travelled: kms, Fuel consumption in Liters:)
Q.18a. Do you travel by a four wheeler? (Ans: Yes / No)
Q.18b. If yes distance travelled per day and fuel consumption in liters [distance/(average mileage)] (Ans: Distance travelled: kms, Fuel consumption in Liters:)
Q.19. Your suggestions to reduce Carbon Footprint in our college campus.
Q.20. Are lightings used in our college is sufficient levels (Lux)? (Ans: Yes / No)
Q.21. Are lighting management equipment such as dimmers, timers and sensors are needed in the class rooms? (Ans: Yes / No)
Q.22. Are all projectors, lights and fans which is used in classes switched off when not in use? (Ans: Yes / No)
Q.23a. Is energy efficient equipment like LED bulbs, energy efficient fans are used in our college? (Ans: Yes / No)
Q.23b. If yes, mention them.
Q.24a. Are any alternative energy sources / non-conventional energy sources like solar energy, wind mill are employed / installed in our college? (Ans: Yes / No)
Q.24b. If yes, specify.
Q.25. What are the energy conservation methods adopted by our college?
Q.26. Will you like the trees in our campus be identified, their botanical name and the local name in Malayalam to be written on a board and tied to the trees. (Ans: Yes / No)

Chapter – 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. 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 is crucial in ensuring that the organisation's environmental performance meets the goals set in its green policy.

4.1 Key findings and Observations

Water Management

Main water uses in the campus

- Drinking purpose.
- Toilets and Wash areas (including hostel and canteen).
- Labs.
- Gardening and agriculture.
- Construction purpose.
- Cooking purpose in hostels and canteen.

- ❖ College has a water treatment plant for treating of 2 lakhs liters per day
- ❖ Water cooler with drinking water filtration is installed (22 numbers).
- ❖ Number of urinals and toilets – 303
- ❖ Number of waterless urinals - Nil

- Number of bathrooms – 204
- Number of Water outlets in Bath rooms - 466
- Number of water outlets in washing area - 63
- Total water outlets in the campus –1421
- Water taps in laboratories - 37
- Number of wells – 3 Open well 2 bore wells
- Number of ponds - 2 (chemperi 30ft[20 hp], chalimparamba 25 ft[3 hp])
- Water pumps – 10 (7.5 hp x 2, 10 hp, 5 hp x 2)
- Number of wells : 3
  - chalimparamba- 30ft , 15 hp
  - Near to Sanjose hostel-45 ft, 1 hp
  - Near to valliyamattam block - 45 ft, 1.5 hp
- Quantity of water pumped – 95000 liters/day
- Total water in the overhead tanks – 513000 L

Water charges paid – No water charges
(No municipal water supply, Using water from own well)

Number of water tanks for water storage -22

Main block Water tank(4) - (1000+20000x3) Liters	61,000
ME block water tank (3) - (30000+20000+10000)Liters	60,000
EC Block (2) - 25000 Liters	25,000
PG Hostel (3) - (30000+10000x2)Liters	50,000
Girls Hostel(3) -(1.5 lakh+1000+20000) Liters	1,71,000
Sanjose Hostel(3) - (100000x2+20000) Liters	1,20,000
Santhom Hostel(3) - (10000x2+1000)Liters	21,000
Guest House(1) - 5000 Liters	5,000
Total water tank capacity in Liters	5,13,000

Reasons for Water wastage

- Leakages from taps
- Over use of water
- Overflow of water from overhead tanks

Overall utilization of water in the College

Location	Water Use / day
Toilets and urinals	15,484 Liters
Hostel	1,50,000 Liters
Canteen	25,000 Liters
Garden	1,000 Liters
Laboratories	5,000 Liters
Drinking	22,000 Liters
Leakage	4,000 Liters
Construction work	30,000 Liters
Total	**2,52,484 Liters**

Suggestions to save water

- Posters could be placed at the wash areas as well as toilets to make the students aware about the value of water resources.
- Automated sensors can be installed in order to prevent the over flow of water from tanks.
- Awareness campaigns can be held in the campus for the students to save water.
- Automated taps could be used so that usage of water can be reduced.
- Awareness campaigns can be conducted among students.
- Periodical maintenance of water tap should be done in order to prevent the leakage of water through taps.

Energy Management

Electricity charges	-Rs.370000/- per month.
Number of gas cylinders used per month	- 80
Number of Generators	-3
Air Conditioner	-48
Number of Celling Light LED	- 24
Number of CFL	-128
Number of Computer	-709

Number of Exhaust Fan	-5
Number of Celling Fan	-2479
Number of Fridge	-8
Number of Heater	-6
Number of LED CELLING	-7
Number of LED TUBE	-451
Number of Printer	-42
Number of Projector	-28
Number of Purifier	-9
Number of Speaker	- 80
Number of Television	-36
Number of Tube light	- 2268
Number of 9W LED	-31
solar power rating	-50KW

ELECTRICITY USAGE IN THE COLLEGE:

ENERGY SOURCES:

1. KSEB (Kerala State Electricity Board):

Transformer of capacity 315KVA (step down) has been installed in campus for distribution of power to different units.

Transformer details:

Manufacturer's Name -Kerala electrical & Allied Engg. Co Ltd, Mamala, Kerala

Year -2005

Rating -315 KVA

At No load

HV-110V 18.53 Amps

LV-436V 420 Amps

In case of power cut we supply power to fulfill demands with the help of generator which runs on diesel as fuel.

2. Generator 1 – 250 KVA

250 KVA Koel Green DG Set, 415 V (3 Phase)

Koel Green Genset	-	KG1-250WS
Voltage	-	415V (3 Phase)
Current	-	347.8A
Power Factor	-	0.8 Lagging
Connection	-	Star
Excitation	-	Self
Year	-	2016

Full load power at NTP condition is 310 BHP at 1500rpm

Generator 2 – 125 KVA

Model	-	KG125WS-13
MFD Date / S. No	-	06.06.2008 / COO955

Generator 3 – 62.5 KVA

Manufacturer's Name	-	BANCO Products (India) Ltd.
Model	-	4RT/62.5 KVA
Serial Number	-	2004 09 105

3. Solar Power Generation – 50KW

Data collected on Energy usage in the college has been provided in the Annexure

Electricity Saving Methods Adopted in the College:

- ❖ Turn off electrical equipment's when not in use.
- ❖ Use energy efficient LED bulbs instead of incandescent CFL bulbs.
- ❖ Maintain appliances and replace old appliances.
- ❖ Use computers and electronic equipment in power saving mode.
- ❖ In some classes, the motion sensors are used to switch off automatically the electrical equipment when students are not in class room.

Waste Management

Total Stakeholders - 2108

Class rooms - 46

Office rooms - 22

Laboratories - 60

Kitchen - 2

E-wastes - computers, electrical and electronic parts - Disposal by selling

Plastic waste - disposal by selling for recycling

Solid wastes - Damaged furniture, paper waste, paper plates - disposal by selling

Chemical wastes - Laboratory waste - No treatment

Treated Waste water - Watering the garden

Napkin incinerators -1

Quantity of waste generated:-

Biodegradable – 8.5 kg/day (office and class rooms)

Non biodegradable – 2 kg/day " "

Biodegradable – 2 kg/day (labs)

Non-biodegradable – ½ kg/day (labs)

Hazardous waste – 100 gm/day (labs)

E-waste collected – 110kg /year

Unused equipments(Collected during the audit period) – 210 Kg

Dry leaves – 40 Kg/day

Napkins (number) – 100/day (burning by incinerators)

Canteen waste

Bio-degradable waste – 21 kg/day

Non bio-degradable waste – 2 kg/day

Waste treatment systems in place

1.Water treatment Plants

2.Solid Waste Incinerator

The approximate quantity of waste generated per day

Office

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.	✓	✓	✓	
2 - 10 kg.				
> 10 kg.				

Laboratories

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.	✓	✓	✓	
2 - 10 kg.				
> 10 kg.				

Canteen/kitchen

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.		✓	x	
2 - 10 kg.				
> 10 kg.	✓			

Suggestions to reduce waste

1. Reduce the use of paper cups and plastic coated plates in canteen by introducing steel cups and plates
2. Implementing bio gas plant in canteen

Green Campus Management

Total number of plant species identified - 112
Tree cover of the campus - 73,101m2 (18.664 Acres)
Frees pace in the campus - 24281.14 m2 (6 Acres)
Plantation - 12140.57 m2 (3 Acres)
Garden inside the campus - 10117.14 m2 (2.5 Acres)
Vegetable garden area - 2023.428 m2 (0.500 Acres)
Total campus area - 1,21,835 m2 (31.106 Acres)

Nature awareness programmes in the campus

Go Green Club
Plastic free campaign
Invited talks on environment sustainability
Switching from flex to cloth banners

Activities of Go Green Club

Go Green club conducts a number of programmes to promote love of natureamong students and make them conscious of the various ways in which theycan work effectively to preserve the ecosystem. The programmes includenature camps, environment educationetc. It celebrates National and International days connected with Environment and its sustainability. Every day we have a unique Go Green message displayed in all the department notice boards to create awareness about the role of environment in our life. Students are motivated to keep upthe green cover maintenance by planting saplings.

Suggestions to Improve Green Cover in the Campus

Bush gardens

Green Corridors

Canopy Climbers through walkways

Plantation of trees

Carbon Footprint

Number of persons using cycles – 2

Number of persons using cars – 70, 1921 km, 120 liters.

Number of persons using two wheelers – 99, 2053 km, 45 liters.

Number of persons using auto rickshaw – 25 /day

Number of persons using other transportations – 195, 2420 km, 16 liters

Number of visitors per day – 20

Number of Students staying in the hostel – 644

Number of Faculty and staff staying in the quarters – 14

Auto charges for office transportation – 1000/month

Average distance travelled by stake holders – 35 kms /day

Total Number of vehicles used by the stakeholders - 109

Number of parent-teachers meetings in a year – 60 Parents turned up 2500

Total LPG cylinders used in canteen and hostels – 989 kg / month

Suggestions to reduce carbon footprint

1. Encourage the students and staff to use public transportation

2. Usage of cycles inside the campus instead of motor vehicles

3. Usage of Electric vehicles and buses

4. Do not allow fossil fuel using vehicle inside campus road

5. Encourage the students and staff to use the transportation facility provided by the college.

6. Teachers/ students coming from the same area are asked to share their vehicles to reach the college. This also reduces the number of private vehicles used in the college campus.

4.2 Evaluation of Audit Findings

Water Management

Activity	Average use per activity (litres)	Number ofactivity /day	water use/ person / day (litres)	Number of persons using water	Total water consumption /day (litres)
Washing hands andface	1/2 li	3	1li	22212	22212
Bath	10-30	1	20L	12000	26000
Toilet flush [in college]	6-20	1	7li	22212	15484
Leaking/dripping tap (1 drop/sec/day)	30-60	continuous	NA	1000	4000
garden use	500	2			1000
Cooking (average)	3	15 hrs			25000
Hostel uses	Total Activity				1.5 lakh
Lab uses					5000
Construction work					30000
Total water use					**27696 l/ day**

27696 liters of water is used per day by the college for its different uses. The main source of water is ground water. Water from the public water supply is not utilized. **696 L** of water is lost per day through the leaking of pipes and other misuse. This can be prevented. Awareness programs for the management of sustainable water use will be highly beneficial in the college.

Energy Management

APPLIANCES	No. of Units	Power (Watts)	Total Power (Watts)	Avg. Usage/ day(Hrs.)	Avg. Energy Usage/ day(Kwh)	Avg. Energy Usage/ month(Kwh)
AirConditioner	48	1000	48000	2	96.00	2880.00
Celling Light LED	24	9	216	4	0.86	25.92
CFL	128	60	7680	4	30.72	921.60
Computer	709	200	141800	6	850.80	25524.00
Exhaust Fan	5	200	1000	6	6.00	180.00
Celling Fan	2479	60	148740	6	892.44	26773.20
Fridge	8	200	1600	12	19.20	576.00
Heater	6	1000	6000	4	24.00	720.00
LED Celling	7	18	126	6	0.76	22.68
LED Tube	451	20	9020	6	54.12	1623.60
Printer	42	150	6300	1	6.30	189.00
Projector	28	230	6440	3	19.32	579.60
Purifier	9	300	2700	24	64.80	1944.00
Speaker	80	6	480	1	0.48	14.40
Television	36	150	5400	3	16.20	486.00
Tubelight	2268	40	90720	6	544.32	16329.60
9W LED	31	9	279	6	1.67	50.22
Total Connected Load			**476501**	**Total Avg. Energy Usage/month**		**78839.82**

Total Connected Load - 476501 Watts

Average energy usage per month - 78839.82 KWH

The total energy utilization of the college for different purpose is approximately 78839 units per month. Increased production of solar energy, a type of non-conventional category of energy will be good energy management system for the college. Energy saving through the replacement of incandescent bulbs, CFL lamps and tube lights to LED could be a good option. Energy efficient electrical equipment especially fans and bulbs and pump sets can be replaced against old ones. Awareness programs for the

stakeholders to save energy may also increase sustainability in the utilization of various energy sources.

Waste Management

- ❖Total Biodegradable waste - 31.5 kg/day
- ❖Non-biodegradable waste - 4.5 kg/day
- ❖Hazardous wastes - 0.1kg/day
- ❖E-waste collected - 110 kg /year

The composting facility of the college for the treatment of biodegradable waste generated from the canteen, office, vegetable garden, and from the college campus cleaning operations is not adequate. Different methods such as pit composting, vermicomposting, bacterial composting using bacterial consortium may be used to treat the biodegradable waste. Bottles, plastics, cans, broken glass wares, tins etc., are recycled or sold out. A model solid waste treatment system can be established in the college as a part of awareness program to the students.

Green Campus Management

Total number of plant species identified	- 42
Green cover of the campus	- 73,100.961 m^2 (18.664 Acres)
Frees pace in the campus	- 24,281.141 m^2 (6.000 Acres)
Total campus area	- 1,21,835 m^2 (31.106 Acres)

Total area of cultivation:-

Garden inside the campus	- 10117.141 m^2 (2.500 Acres)
Vegetable garden area	- 2023.428 m^2 (0.500 Acres)
Plantation area	- 12,140.569 m^2 (3.000 Acres)

The college has ample land surface for greening initiatives. The campus has 42 species of trees. A model arboretum will be ideal for the college. At least 50 different types of trees can be planted in the campus every year. Area demarcated for the establishment of a vegetable garden, may be extended. Establishment of a new herbal garden for the college is suggested

Carbon Footprint

Petrol used by two wheelers / day - **45 L**

Fuel used by four wheelers (65 Persons) - **70 L**

Fuel for persons (total 195 persons) travelling by common transportation -**16 L**

Persons travelling auto-rickshaw – **25 /** day (Fuel used - 12 ½ L (½ /person))

Total fossil fuel use is 143 ½ L / day

Total fuel cost per day for transportation = Rs15,067.50 /day (143.5 L x Rs.105)

- Cost of Gas cylinders used – Rs. 62,750 /month (51 cylinders)
- Cost of generator fuel – Rs. 250/day
- Amount spent for transportation (office) – Rs. 1000/month (Approx.)
- Amount spent for transportation (canteen) – Rs. 4000/month “
- Amount spent for transportation (visitors) – Rs. 15000/year
- Other expenditures for the fuel – Rs. 840/day

Burning of fossil fuels is the main source and cause of carbon dioxide release tothe atmosphere. Carbon dioxide release for the stakeholders to reach thecollege is very high. It is contributing to the global warming and increasing thepace of climate change.

4.3 Consolidation of Audit Findings

Major Audit Observations

Approximately 253000L water is pumped to the overhead tanks from 3open wells and 2 bore wells with the help of pumps (total 35hp) every day. Frequency of water pumping will be more during the summer season. This may lead to ground water depletion and induce drought locality. Usage of water should be cut short and water management should be done for the replenishment of ground water resources. Power consumption in the college is high even though there is solar power generation at the rate of 15000 kWh/month. Cost of energy including electricity, fuel for generator, firewood, LPG cylinders etc is up to 4,40,250/month. It is high time to go for more non-conventional type of energy sources. College generates 120kgs of biodegradable waste which is good for bio gas production. Composting using consortium of bacteria may also be used

to manage waste in the campus. If different model plants of solid waste treatment are established in the college, which will be a source of informal education for students to practice the waste treatment at home there by a menace of the society can be partially controlled. College has 112 species of plants in the campus, but an inventory of all plants present with photographs are lacking. There is enough free space to plant fruit trees in the campus. It is high time to make an arboretum in the campus. Consortium of bacteria may also be used to manage waste in the campus. Carbon emission rate in the college is due to burning of 143.5 liters of fossil fuels every day by the stakeholders for their transportation alone. 51 LPG cylinders per month are used in the college for different purposes. This is also contributing to the carbon footprint. College management should take steps to further reduce the carbon emission rate.

- The environmental awareness initiatives are to be increased.
- Training of students in vegetable cultivation and composting practices can be initiated.
- There is no Green policy/ environmental policy statement indicating the commitment of the college towards its environmental performance.
- Gardens inside the college premises are found well maintained, the area can be increased.
- Use of notice boards and signs are inadequate to reduce over exploitation of natural resources.
- Programs on green initiatives have to be increased.
- Campus is declared as plastic free; stringent actions should be taken to maintain this.
- Rain water harvesting systems, solar power generation, and environmental education programs must be widened.

Water Management

- There is no water consumption monitoring system in the college campus.
- The waste water from laboratories, canteen and kitchens are not suitably controlled and are not used for gardening.
- The college has to take actions to strengthen rain water harvesting. Measurement of quantity of water obtained from the rain water harvesting is to be done.

- Automatic switching system is not installed for pump sets used for overhead tank filling.
- Per day use of water is very high and there is no control over wastage ofwater.
- Display boards against the misuse of water use are lacking.

Energy Management

- The communication process for awareness in relation to energy conservation is found to be inadequate.
- Monthly use of electricity in the college is very high.
- Objectives for reducing energy, water and fuel consumption are to be improved.
- There are fans of older generation and non-energy efficient, which can be phased out by replacing with new energy efficient fans.
- Regular monitoring of equipment's and immediate rectification of anyproblems.care.

Waste Management

- Solid waste management systems established are insufficient.
- The college has proper communication with the local body for regular collection of solid waste from the campus.
- Implementation of sustainable projects to attain set environmental goals is not there.
- Waste bins in the class rooms, veranda, canteen and campus are inadequate.
- Proper composting systems are lacking.

Green Campus Management

- Regular planting of trees in the campus are inadequate.
- Display boards to all plants identified are lacking.
- No arboretum is set up in the college campus.
- There is only very few fruit trees in the college to attract birds.
- Registry for flora and fauna on the campus is lacking.

Carbon Footprint

- College has not yet taken any initiative for carbon accounting.
- Adequate common transportation facilities should be provided by thecollege.
- Encourage students to use cycles.
- **143.5** liters of fossil fuel is burned every day for the functioning of thecollege. This releases very high carbon emission.
- A huge amount such as **Rs. 15120** per day is spent as the cost of fossil fuel by the stakeholders.
- Usage of **51** gas cylinders per month is very high. Rs.62,750 is spent for LPG every month. Stakeholders spent Rs840/day for other expenses for the energy.

4.4 Preparation of Action Plan

Policies referring to college's management and approach's towards the use of resources need to be considered. The college should have a green policy / environmental policy for its sustainable development. The environmental policy formulated by the management should be implemented meticulously. The college should have a policy on awareness rising or training programs (for ground staff or kitchen staff for example) and college also should have a environment oriented procurement policy (the College's policy for purchasing materials).

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.

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 medicinal plant nursery, water management, vegetable cultivation, tree planting, energy management, landscape management, pollution monitoring methods, and rain water harvesting methods.
- Increase the number of display boards on environmental awareness such as save water, save electricity, no wastage of food / water, no smoking, switch off light and fan after use, plastic free campus etc.
- Activate the environmental clubs
- Set up model rainwater harvesting system, rainwater pits, vegetable garden etc. for providing proper training to the students.
- Conduct exhibition of recyclable waste products
- Implement chemical treatment system for waste water from the laboratories.

Awareness on Carbon Consumption

- Students and Staff members may be made 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 due to vehicles.

4.5 Conclusion and 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 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 help staffs 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

- ❖ Adopt an environmental policy for the college
- ❖ Establish a purchase policy towards environmental friendly materials
- ❖ Conduct more seminars and group discussions on environmental education
- ❖ Students and staff can be permitted to solve local environmental problems
- ❖ Renovation of cooking system in the canteen and hostel mess, to save gas.
- ❖ Establish water, waste and energy management systems

Criteria Wise Recommendations

Water Management

- Remove damaged taps and install sensitive taps if possible.
- Drip irrigation for gardens and vegetable cultivation can be initiated.
- Establish regular maintenance of rain water harvesting systems and water treatment systems.
- Awareness programs on water conservation to be conducted.
- Install display boards to control over use of water.

Energy Management

- Employment of more solar panels and other renewable energy sources.
- Conduct more save energy awareness programs for students and staff.

- More energy efficient fans should be installed.
- Observe a power saving day every year.
- Automatic power switch off systems may be introduced.

Waste Management

- A model solid waste treatment system to be established.
- Regular practice of waste segregation to be initiated.
- A model vermi composting plant to be set up in the college campus.
- Establish a plastic free campus.
- Avoid paper plates and cups for all functions in the college.

Green Campus Management

- All trees in the campus should be named scientifically.
- Create more space for planting.
- Grow more potted plants in both verandah and class rooms.
- Create automatic drip irrigation system during summer holidays.
- Not just celebrating environment day but making it a daily habit.
- Beautify the college building with indoor plants
- Provide funds to nature club for making campus greener
- Encourage students not just through words, but through action for making the campus green
- Conduct competitions among departments for making students more interested in making the campus green.

Carbon footprint

- Establish a system of carpooling among the staff to reduce the number of four wheelers coming to the college.
- Encourage students and staff to use bicycles.
- Establish a more efficient cooking system to save gas.
- Discourage the students using two wheelers for their transport / commutation.
- More use of generators should be discouraged.

Chapter – 5

Exit Meeting

The exit meeting is a mechanism to provide the management and staff a broad feedback on the preliminary findings of the audit team before completing the audited report. The exit meeting was held in the college on 16th December, 2022. Clarification on certain information gathered was sought by the audit team from the management and staff of the college.

Draft Audit Report

The information gathered by the audit team was consolidated as a draft audit report. This draft report was then circulated to the audit team and those directly concerned with the audit to check the report for accuracy. The draft green audit report was also discussed in the exit meeting.

Final Audit Report

The final audit report is the corrected final document which contains the findings and recommendations of the audit. It will also form one of the bases of future audits because the information it contains informs some of the tests and analyses that need to be performed in the future. Final Audit Report was submitted on 22nd December, 2022 to the Principal of the college.

Follow Up and Action Plans

Green audits form a part of an on-going process. Innovative green initiatives have to be designed and implemented every year to make the college environmentally sustainable. Follow up programs of green auditing recommendations should be done meticulously before the next audit.

Next Audit

In order to promote continuous improvement it is recommended to conduct the next green auditing during the year 2024.

Transparency of Green Audit Report

Green audit report is one of the useful means of demonstrating an organisation's commitment to openness and transparency. If an organization believes it has nothing to hide from its stakeholders, then it should feel confident enough to make its green audit reports freely available to those who request them. As a basic rule, green audit reports should be made available to all stakeholders.

Acknowledgements:-

The Green Audit 2022 team is thankful to the Management and the Principal for entrusting the processes of Green auditing to the team. We thank all the participants of the auditing team especially students, faculty and non-teaching staff who took pain along with us to gather data through survey. We also thank the office staff who helped us during the document verification.

Supporting Photographs

PHOTO'S RELATED TO WATER MANAGEMENT

BASEMENT STORAGE BELOW MECHANICAL BLOCK

INLET POINTS AT EITHER SIDE OF THE BLOCK

RAINWATER HARVESTING TANK- ALPHONSA HOSTEL

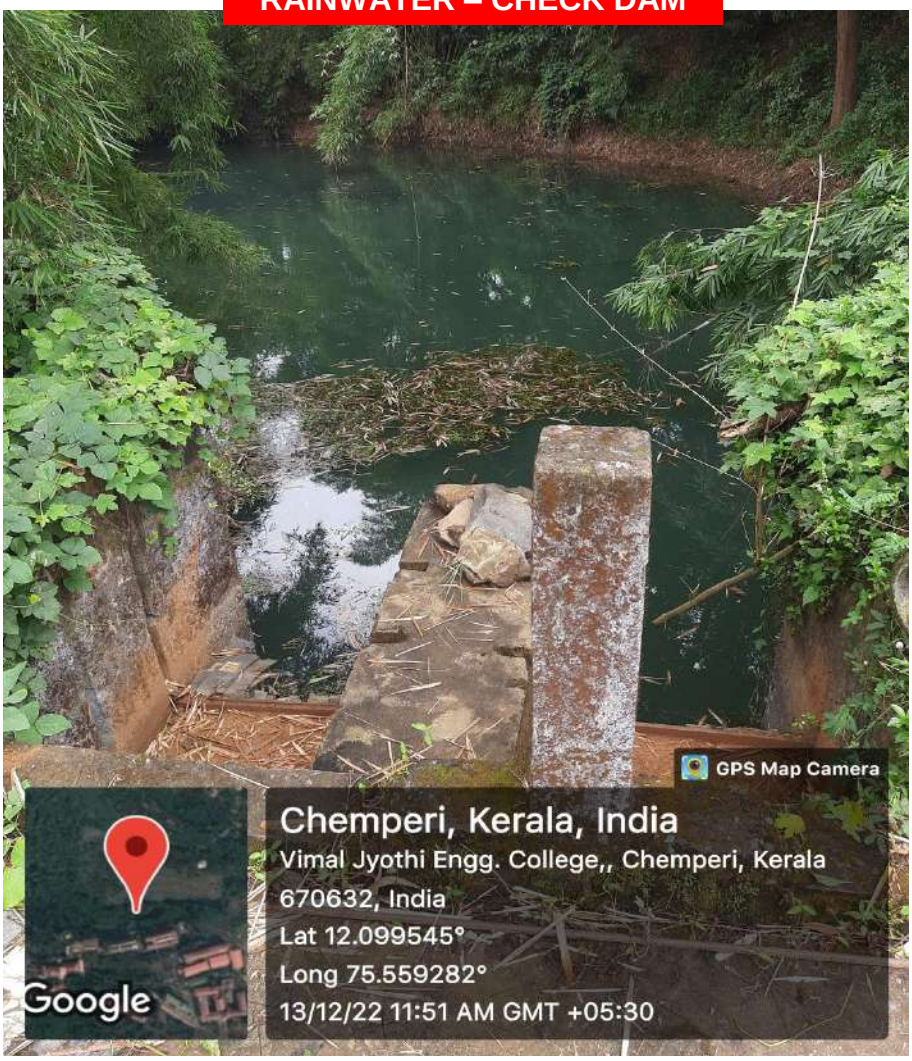
RAINWATER HARVESTING TANK- NEAR SANJOSE AND PG HOSTELS

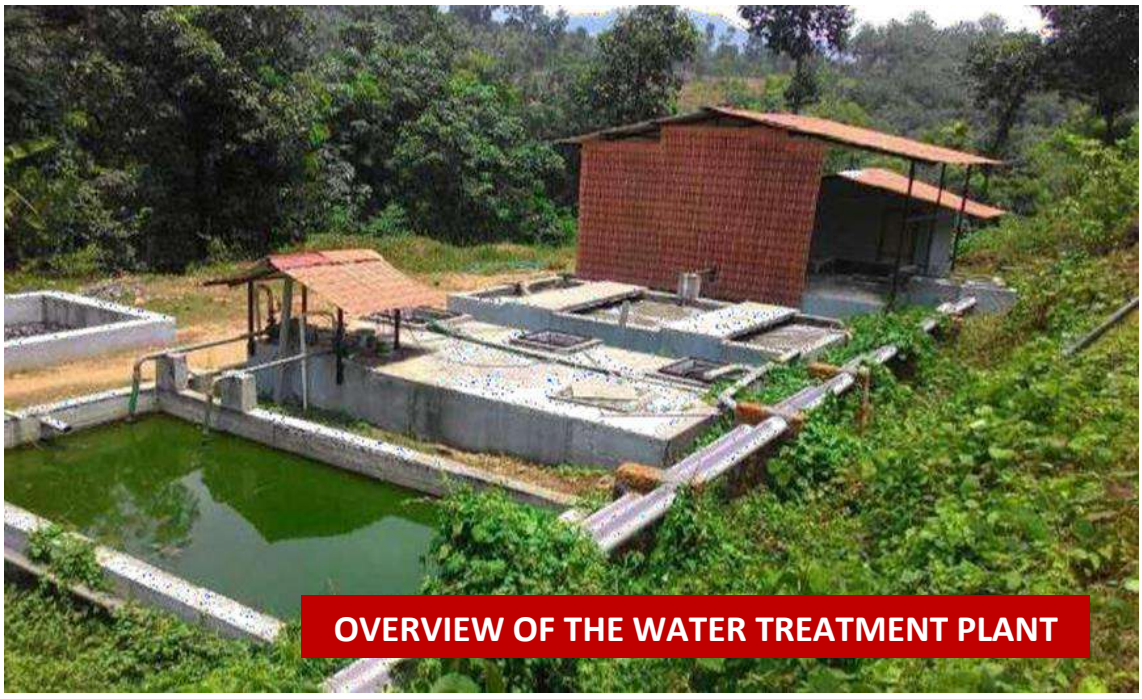
RAINWATER HARVESTING POND INSIDE MAIN BUILDING

RAIWATER - RECHARGE WELL

RAINWATER – WELL RECHARGE – FILTERING SYSTEM

RAINWATER – CHECK DAM





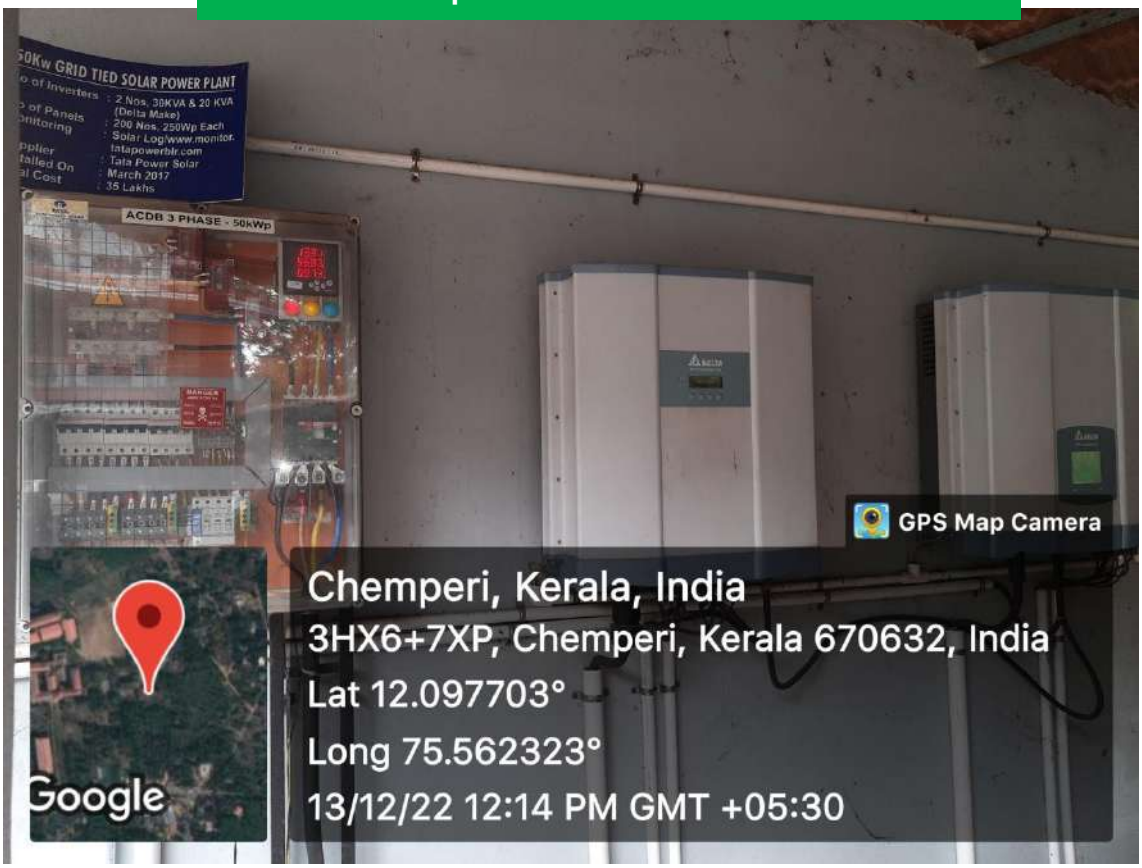
OVERVIEW OF THE WATER TREATMENT PLANT

WATER PURIFYING PLANT

PHOTO'S RELATED TO ENERGY MANAGEMENT

50 kW Solar Field – Various Views

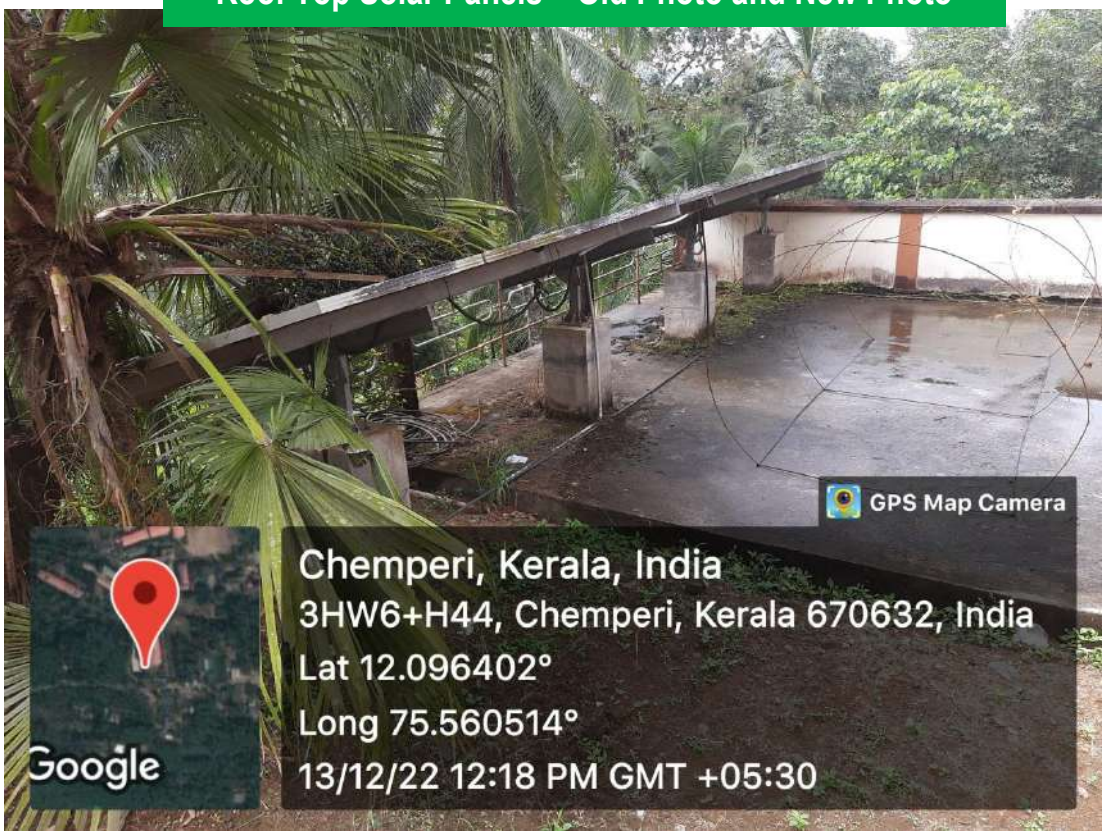
50 kW Solar panel connected to the KSEB Grid



Signature Not Verified

Principal.VJEC

Roof Top Solar Panels – Old Photo and New Photo



Solar Water Heaters in Hostels

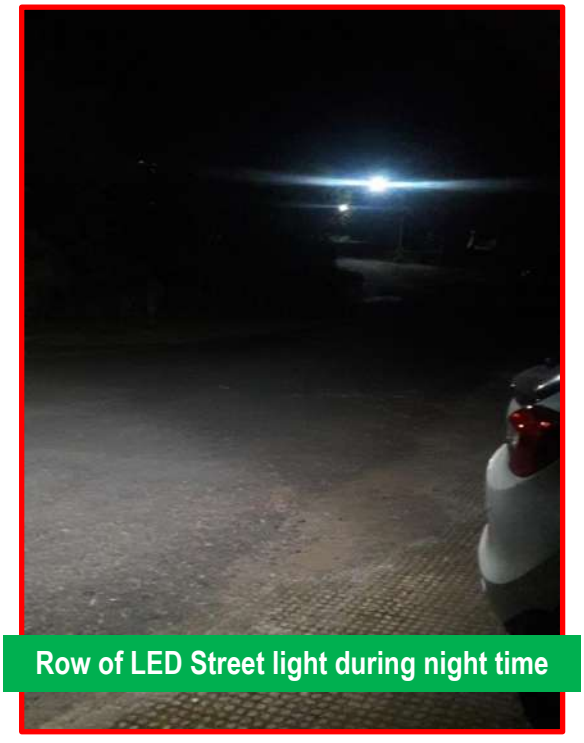
AUTO LIGHT-OFF SENSOR FITTED IN THE CLASS ROOM

LED STREET LIGHT DURING DAY TIME

LED Street light during day time

LED Street light during night time

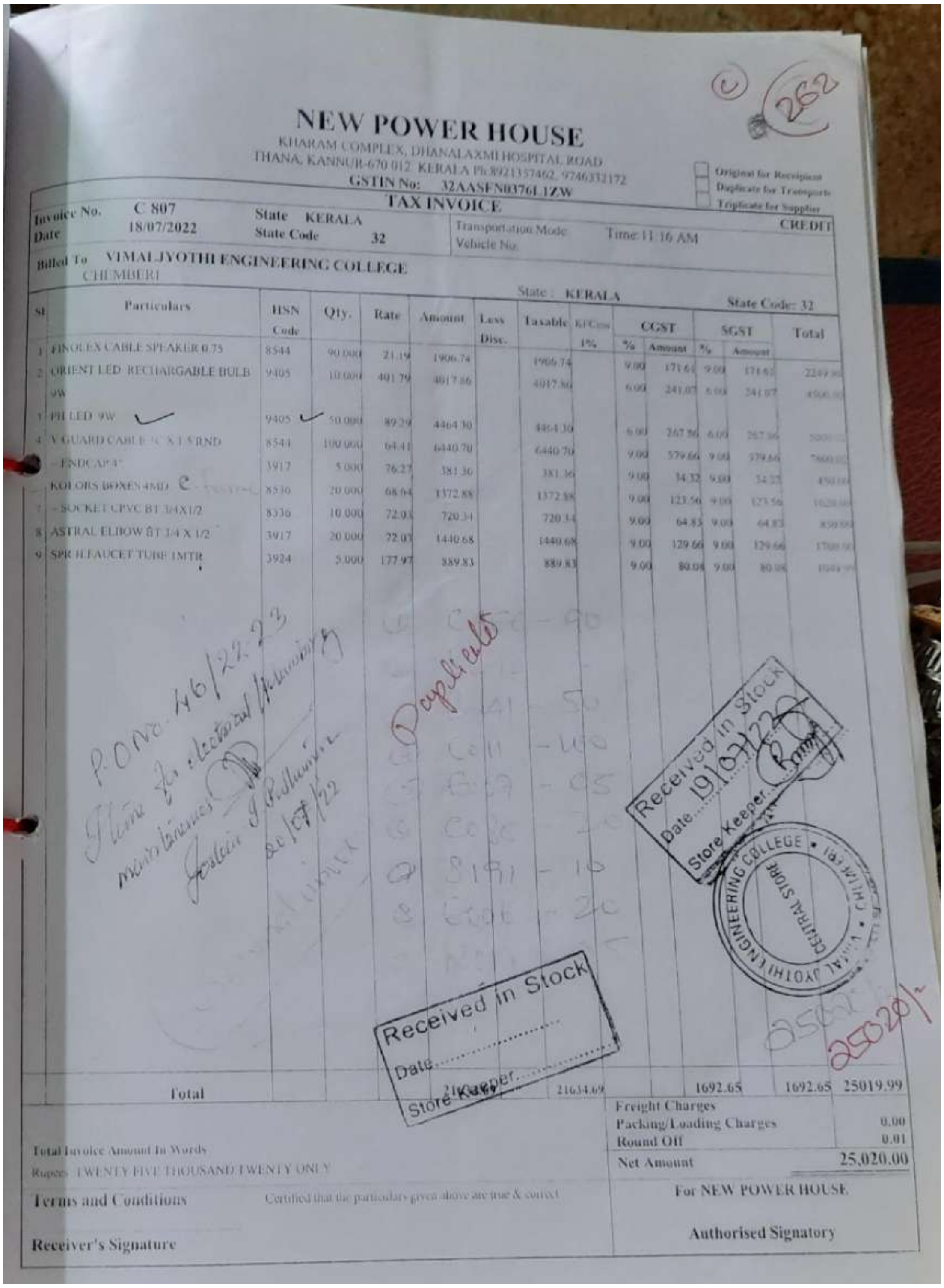
LED Street light during dusk



Row of LED Street light during night time

LED Tube Light and LED Bulb in Staff Quarters

BILL FOR PURCHASE OF 50 LED BULBS



NEW POWER HOUSE
KHARAM COMPLEX, DHANALAXMI HOSPITAL ROAD
THANA, KANNUR-670 012 KERALA Ph:8921357462, 9746332172
GSTIN No: 32AASFN0376L1ZW

Original for Recipient / Duplicate for Transports / Triplicate for Supplier

TAX INVOICE

Invoice No. C 807 | State KERALA | Transportation Mode | Time 11:16 AM | CREDIT
Date 18/07/2022 | State Code 32 | Vehicle No

Billed To VIMALJYOTHI ENGINEERING COLLEGE
CHEMBERI
State : KERALA State Code: 32

Sl	Particulars	HSN Code	Qty.	Rate	Amount	Less Disc.	Taxable	KFCess 1%	CGST %	CGST Amount	SGST %	SGST Amount	Total
1	FINOLEX CABLE SPEAKER 0.75	8544	90.000	21.19	1906.74		1906.74		9.00	171.61	9.00	171.61	[illegible]
2	ORIENT LED RECHARGABLE BULB 9W	9405	10.000	401.79	4017.86		4017.86		6.00	241.07	6.00	241.07	[illegible]
3	PH LED 9W	9405	50.000	89.29	4464.30		4464.30		6.00	267.86	6.00	267.86	[illegible]
4	V GUARD CABLE 1C X 1.5 RND	8544	100.000	64.41	6440.70		6440.70		9.00	579.66	9.00	579.66	[illegible]
5	ENDCAP 3"	3917	5.000	76.27	381.36		381.36		9.00	34.32	9.00	34.32	[illegible]
6	KOLORS BOXES 4MD	8536	20.000	68.64	1372.88		1372.88		9.00	123.56	9.00	123.56	[illegible]
7	SOCKET CPVC BT 3/4X1/2	8536	10.000	72.03	720.34		720.34		9.00	64.83	9.00	64.83	[illegible]
8	ASTRAL ELBOW BT 3/4 X 1/2	3917	20.000	72.03	1440.68		1440.68		9.00	129.66	9.00	129.66	[illegible]
9	SPR H.FAUCET TUBE 1MTR	3924	5.000	177.97	889.83		889.83		9.00	80.08	9.00	80.08	[illegible]
	Total						21634.69			1692.65		1692.65	25019.99

Received in Stock
Date
Store Keeper

Total Invoice Amount In Words
Rupees TWENTY FIVE THOUSAND TWENTY ONLY

Freight Charges	0.00
Packing/Loading Charges	0.00
Round Off	0.01
Net Amount	25,020.00

Terms and Conditions
Certified that the particulars given above are true & correct

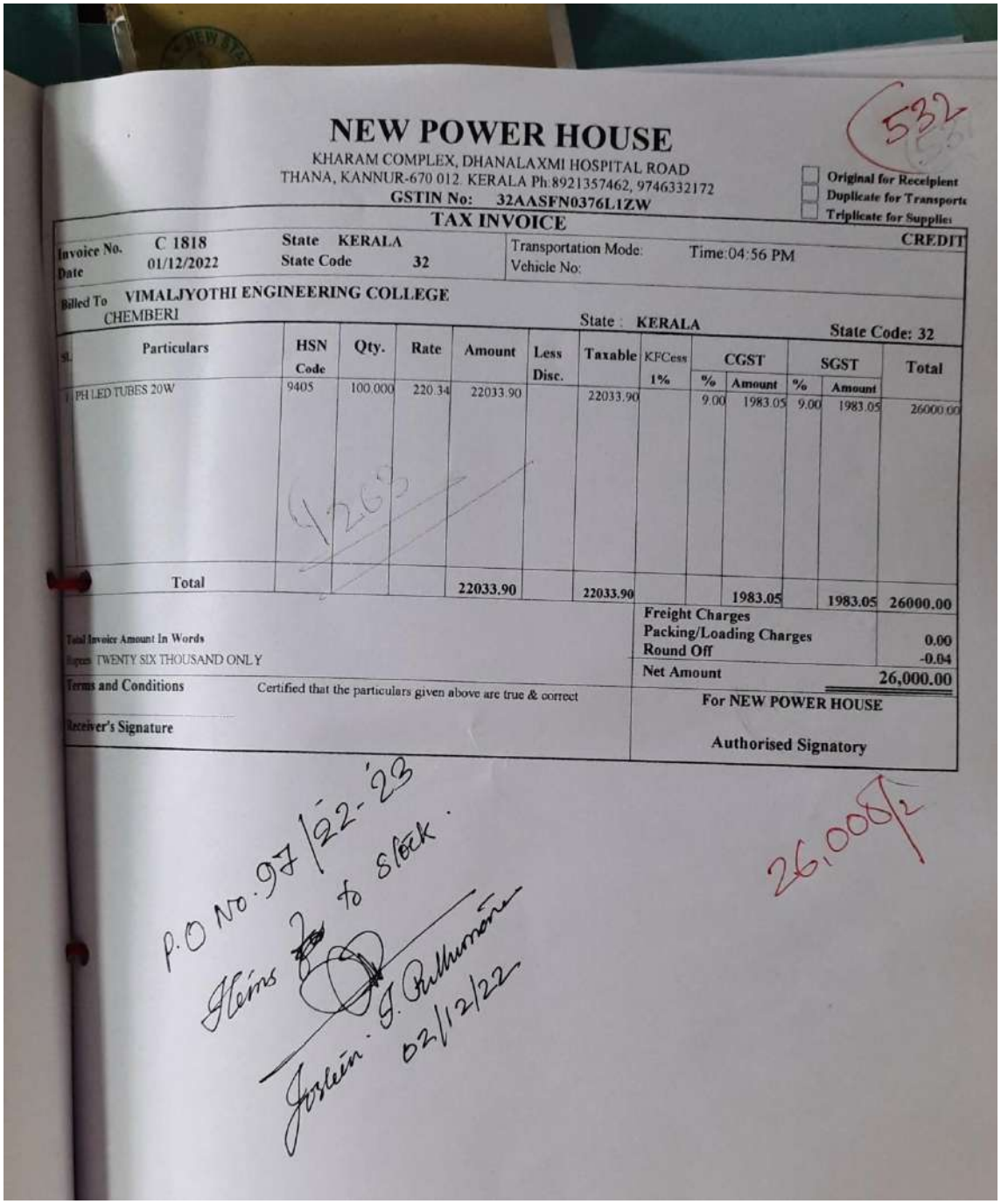
For NEW POWER HOUSE

Receiver's Signature

Authorised Signatory

Signature Not Verified
Principal.VJEC

BILL FOR PURCHASE OF 100 LED TUBE LIGHTS



NEW POWER HOUSE

KHARAM COMPLEX, DHANALAXMI HOSPITAL ROAD
THANA, KANNUR-670 012. KERALA Ph:8921357462, 9746332172
GSTIN No: 32AASFN0376L1ZW

532

☐ Original for Receipient
☐ Duplicate for Transporte
☐ Triplicate for Supplie

TAX INVOICE CREDIT

Invoice No. C 1818 | State KERALA | Transportation Mode: | Time:04:56 PM
Date 01/12/2022 | State Code 32 | Vehicle No:

Billed To VIMALJYOTHI ENGINEERING COLLEGE
CHEMBERI
State : KERALA State Code: 32

Sl.	Particulars	HSN Code	Qty.	Rate	Amount	Less Disc.	Taxable	KFCess 1%	CGST %	CGST Amount	SGST %	SGST Amount	Total
1	PH LED TUBES 20W	9405	100.000	220.34	22033.90		22033.90		9.00	1983.05	9.00	1983.05	26000.00
	Total				22033.90		22033.90			1983.05		1983.05	26000.00

Total Invoice Amount In Words
Rupees TWENTY SIX THOUSAND ONLY

Freight Charges
Packing/Loading Charges 0.00
Round Off -0.04
Net Amount 26,000.00

Terms and Conditions
Certified that the particulars given above are true & correct

Receiver's Signature

For NEW POWER HOUSE

Authorised Signatory

P.O No. 97/22-'23
Items to Stock.
Joslin. J. Pullumana
02/12/22

26,008/2

Signature Not Verified
Principal.VJEC

KERALA STATE RENEWABLE ENERGY AWARD 2017 FOR VIMAL JYOTHI ENGINEERING COLLEGE RECEIVED BY PROF. LALY JAMES, HOD, EEE.

Signature Not Verified

Principal.VJEC

THE AWARD

KERALA STATE
RENEWABLE ENERGY
COMMENDATION
CERTIFICATE 2017

In appreciation of the commendable achievements towards
the utilisation of Renewable Energy
in the category of

EDUCATIONAL INSTITUTIONS

in the State of Kerala during the year 2016 - 2017
The Department of Power, Government of Kerala
through **ANERT** are pleased to present

VIMAL JYOTHI ENGINEERING COLLEGE
KANNUR

The Commendation Certificate
on the 28th day of February 2018

Director
ANERT

Principal Secretary to Govt. (Power) &
Chairman, State Level Monitoring Committee
for Renewable Energy Awards 2017

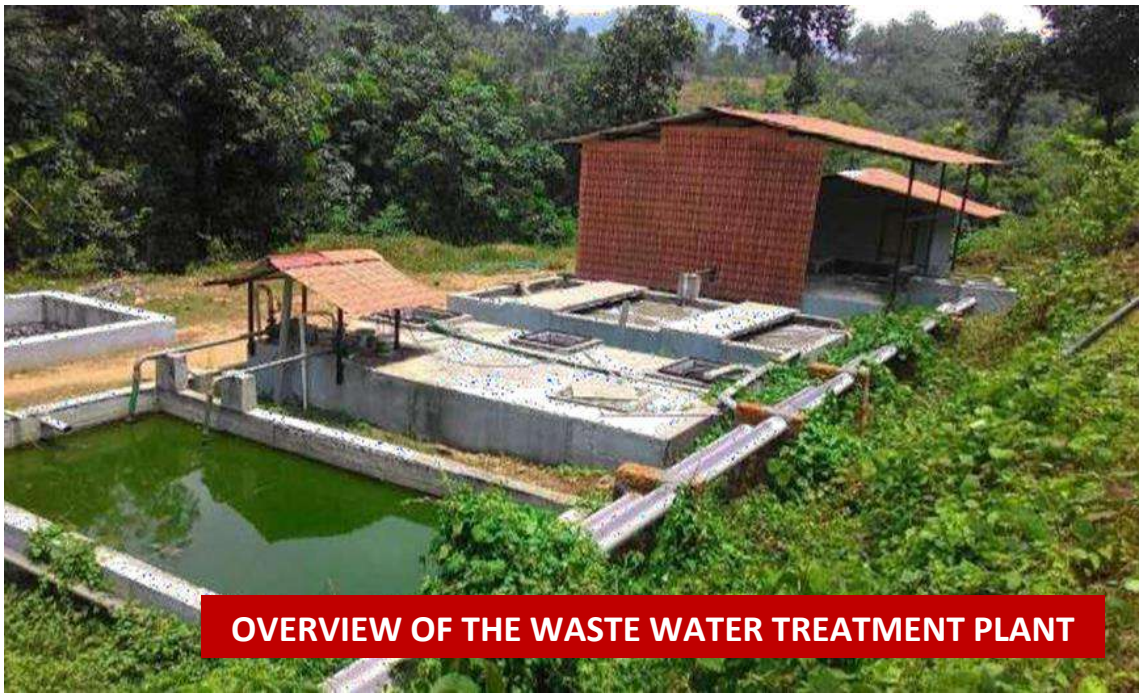
ANERT

PHOTO'S RELATED TO WASTE MANAGEMENT

ONE METHOD OF COLLECTION OF SOLID WASTE

INSIDE THE WAREHOUSE

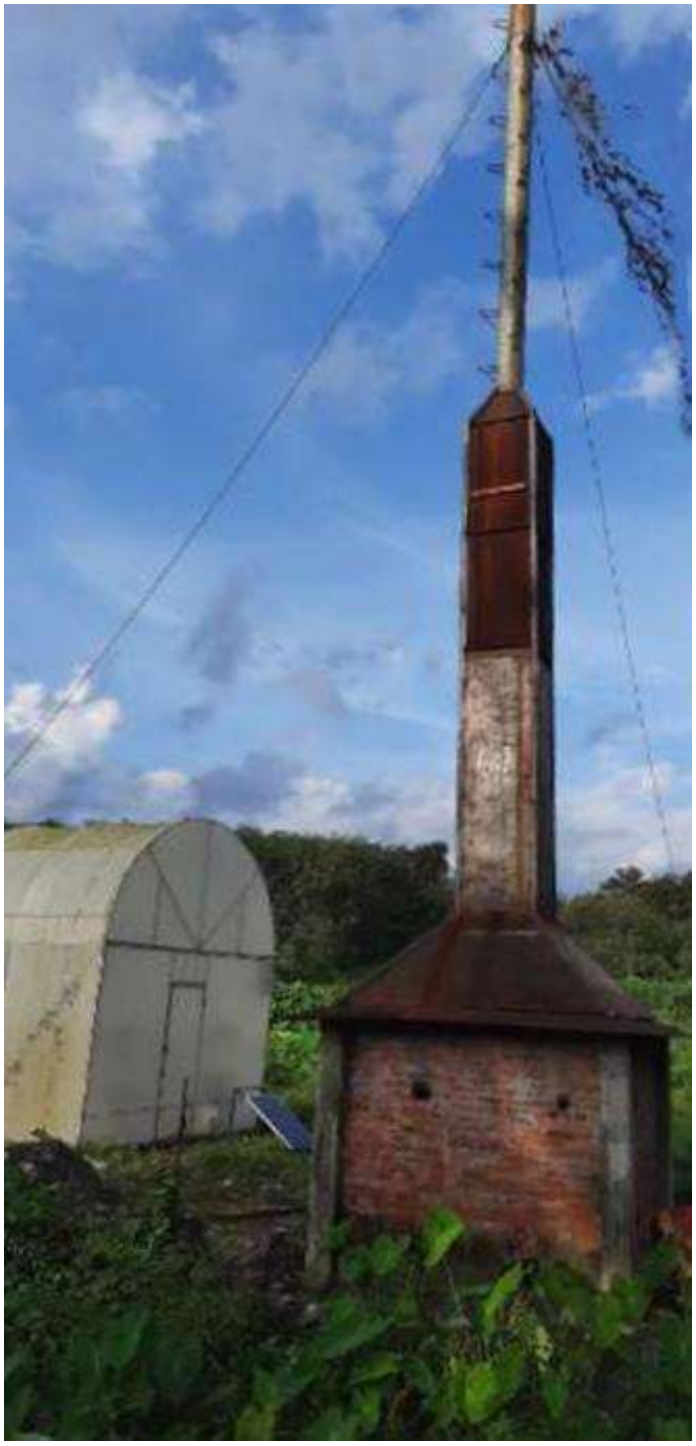
FRONT OF WAREHOUE FOR SOLID WASTE



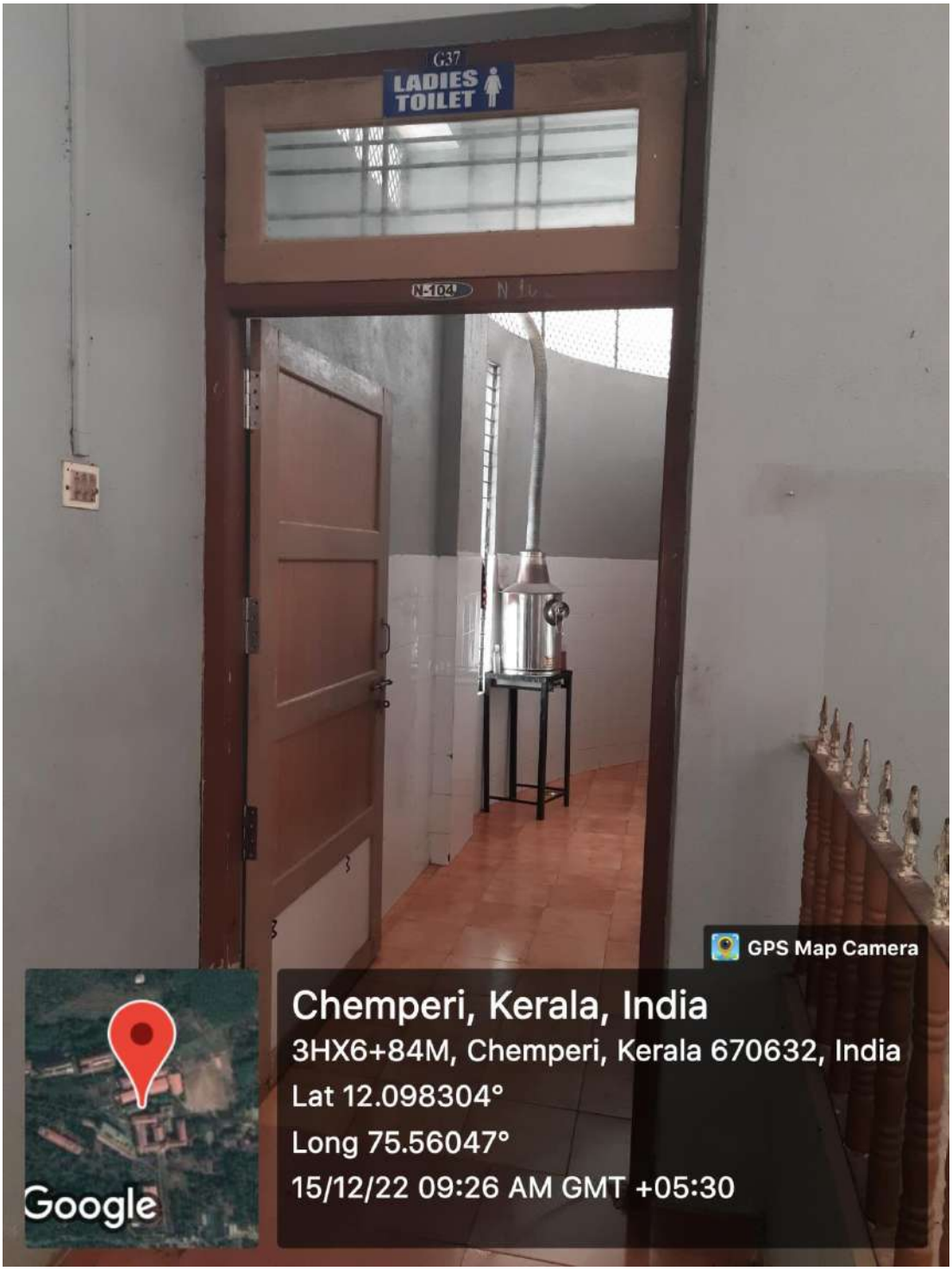
OVERVIEW OF THE WASTE WATER TREATMENT PLANT

FILTERS AND MOTORS IN THE WATER TREATMENT PLANT

INCINERATOR WITHIN THE CAMPUS



'SANITARY NAPKINS DISPENSER' IN THE LADIES TOILET



Waste Management Information Board in the Campus

PHOTO'S RELATED TO GREEN CAMPUS

THE GREEN INSTITUTIONAL RANKINGS 2022

DISTRICT GREEN CHAMPION CERTIFICATE

ज्ञापन संख्या / Memo no: 04/KER/KNR

तारीख / Date: 05/08/2021

सत्यमेव जयते

भारत सरकार / Government of India
महात्मा गांधी राष्ट्रीय ग्रामीण शिक्षा परिषद / Mahatma Gandhi National Council of Rural Educatio
उच्च शिक्षा विभाग/Department of Higher Education
शिक्षा मंत्रालय / Ministry of Education

District Green Champion Certificate

This is to certify that **Vimal Jyothi Engineering College** is hereby recognized as **District Green Champion** for **Kannur** District for the Academic Year 2020-21. The Institution has successfully set up the Swachhta Action Plan Committee, adopted and implemented best practices in the areas of Sanitation, Hygiene, Waste Management, Water Management, Energy Management and Greenery Management.

This certificate is given in the presence of **Shri. Snehil Kumar Singh IAS., District Development Commissioner, Kannur, Kerala.**

JULY 2021

Dr W G Prasanna Kumar
Chairman
MGNCRE, Ministry of Education
Government of India

Green Campus – Contour Terracing

Green Campus – Contour Farming

Green Campus – Vegetable Garden

Green Campus – Tree Shaded Internal Roads

Green Campus – PLANTATION

LANDSCAPING AND GARDEN IN FRONT OF THE COLLEGE

TREE PLANTATION BY THE V.I.P. VISITORS OF OUR COLLEGE

PHOTO'S RELATED TO CARBON FOOTPRINT

PEDESTRIAN-FRIENDLY PATHWAYS

GARDENING AND GREENERY IN AND AROUND THE BOYS HOSTEL

Campus-Full of Greenery-Ariel View From a Drone Camera

Annexures

Annexure-1 (Data Collected)

1.1 - Data collected for Water Management

Name of the Building	Floor Number	Number of Bathrooms Available	Number of Water outlets in Bath rooms(tap/shower/ flush tank inlet/wash basin)	Number of water outlets in washing area (if Any)	Number of water outlet at Laboratories(if any)	Number of Drinking water outlets	Number of Toilets and urinals Available	Number of water outlets (water tap/shower/flush tank inlet, wash basin)
Auditorium	-----	5.0	25.0	-----	-----	1.0	15.0	25.0
Boys Hostel 1	-----	12.0	12.0	3.0	-----	-----	12.0	12.0
Boys Hostel 1	1.0	12.0	12.0	3.0	-----	2.0	12.0	12.0
Boys Hostel 1	2.0	12.0	12.0	3.0	-----	-----	12.0	12.0
Boys Hostel 1	3.0	12.0	12.0	3.0	-----	-----	12.0	12.0
Boys Hostel 2	-----	12.0	12.0	4.0	-----	2.0	12.0	18.0
Boys Hostel 2	1.0	12.0	12.0	4.0	-----	-----	12.0	18.0
Boys Hostel 2	2.0	12.0	12.0	4.0	-----	1.0	12.0	18.0
Boys Hostel 2	3.0	12.0	12.0	4.0	-----	-----	12.0	18.0
Canteen	-----	-----	-----	-----	-----	2.0	1.0	22.0
ECE Block	-----	7.0	14.0	-----	8.0	-----	8.0	15.0
ECE Block	1.0	7.0	15.0	-----	20.0	1.0	7.0	15.0
ECE Block	2.0	-----	16.0	-----	-----	-----	8.0	16.0
ECE Block	3.0	-----	11.0	-----	8.0	-----	4.0	11.0
Gardening Purpose	-----	-----	-----	-----	-----	-----	-----	11.0
Girls Hostel	-----	15.0	64.0	3.0	-----	-----	18.0	64.0
Girls Hostel	1.0	12.0	44.0	6.0	-----	3.0	14.0	44.0
Girls Hostel	2.0	11.0	42.0	6.0	-----	-----	13.0	42.0
Girls Hostel	3.0	11.0	36.0	6.0	-----	-----	12.0	36.0
Main Block	-----	1.0	1.0	-----	-----	2.0	9.0	55.0
Main Block	1.0	4.0	8.0	-----	-----	2.0	2.0	58.0
Main Block	2.0	2.0	2.0	-----	1.0	1.0	21.0	41.0
ME block	-----	-----	-----	-----	-----	-----	5.0	16.0
ME block	1.0	-----	-----	-----	-----	1.0	8.0	19.0
ME block	2.0	-----	-----	-----	-----	-----	7.0	25.0
ME block	3.0	-----	-----	-----	-----	1.0	7.0	17.0
ME block	4.0	-----	-----	-----	-----	1.0	7.0	20.0
PG Hostel	-----	5.0	5.0	2.0	-----	1.0	7.0	28.0
PG Hostel	1.0	7.0	7.0	1.0	-----	-----	-----	27.0
PG Hostel	2.0	7.0	7.0	1.0	-----	-----	7.0	29.0
PG Hostel	3.0	5.0	20.0	1.0	-----	-----	7.0	20.0
PG Hostel	4.0	-----	5.0	7.0	-----	-----	7.0	7.0
PG Hostel	5.0	5.0	26.0	1.0	-----	-----	7.0	26.0
PG Hostel	6.0	4.0	22.0	1.0	-----	1.0	6.0	22.0
Sweet House	-----	-----	-----	-----	-----	-----	-----	2.0
	-----						-----	**833.0**
	-----	**204.0**	**466.0**	**63.0**	**37.0**	**22.0**	**303.0**	

Principal.VJEC

1.2 - Data collected for Energy Management

1. MAIN BUILDING 1st FLOOR:

Location	Tube Light	Fan	Socket	LED Tube	Projector	Printer	AC	Computer	T V	Speakers	Purifier
Tagore block											
Toilet	3										
EEE software lab	4	3	5		1	1		34		2	
CSE software lab	18	11	2					35			
S5/S6 EEE	5	7	2		1					1	
Staff room	17	20	22	1	1	3		2		2	
Mahatma block											
Toilet AND ROOM	3	1	2								
M1/M2	2	3	2							1	
Ktu Valuation camp	5	5	4			1		3		1	
S3/S4 ADS	2	5	3		1					1	
Verandah	2									1	1
Jawahar block											
EEE dpt library	2	2	2			1		1			
Verandah	6										1
S3S4 CE	4	6	4		1						
S3 S4 EEE	4	6	4		1						
S7/S8 EEE	4	6	3		1					1	
Verandah	3									3	
Administration block											
Staff room Office	2	2	2								
Principle	6	4	4			1	1	1	1	1	
Varikkattu hall	8		8		1		5				1
Office	2	10	7	3		4	1	10			
Toilet electric switch room	2		2								
Manager	2	2	8	2		1	2	2			
Security	1	1	1								
Board room			2		1		2			4	
Chair man	2	4	4	1			1				
Placement	4	4	4			1		2			
Diet pt	1	1	2					1			
Total	**114**	**103**	**99**	**7**	**9**	**13**	**12**	**91**	**1**	**18**	**3**

2. MAIN BUILDING 2nd FLOOR:

Location	Tube Light	Fan	Socket	LED Tube	Projector	Printer	AC	Computer	T V	Speakers	Purifier	Celling LED
Tagore block												
Across lab staff	4	2	8			1		3				
Battery room	1											
AcRC lab	9		11			1	2	32		1		
Interactive class room	9		12				3	32	1			
Hardware lab	4	4	8	1								
Computer lab	29		14			1	8	70				
Pg lab	24	6	1		1	1	4	35		1		
Server room	4	1	22	2		1	2	2				
Varandtha	2		3							3		
Mahatma block												
Toilet	1											
Process Control Lab	8	8	12					2				0
Power system lab	7	8	7	1				12				
Verandah	3											
Jawahar block												
1S21	1	1	1									
S3/S4 CSE A	3	6	3						1			
S3/S4 CSE B	4	6	4						1			
S3/S4 CSE C	4	6	4						1	3		
Toilet VARADHA	4											
Administration block												
Instrumentation lab	10	10	32									
Control System lab	5	9	11									
S10	2	1	3									
S5/S6 CSE A	7	9	6						1	1		16
S5/S6 CSE C	2	3	6						1			8
S5/S6 CSE B	4	6	4		1							
S13 File room	2	1	3									
S14 M1/M2	1	1	3									
S15	2	4	2									
IOT Lab	2	1	3	1								
Staff room CSE	7	8	13			1				3		
HOD CSE	2	2	5							1		
Dpt Library CSE	2	2	3									
S20	1	1	2									
Verandah	6										1	0
Total	**176**	**106**	**206**	**5**	**2**	**6**	**19**	**188**	**6**	**13**	**1**	**24**

3. MAIN BUILDING 3rd FLOOR:

Location	Tube Light	Fan	Socket	LED Tube	Projector	Printer	AC	Computer	T V	PURIFIER	Speaker
Tagore block											
Aei staff room	4	12	16	0	0	1	0	1	0	0	1
Varenda	1										
S7 cse a	4	7	4						1		
S7 cse b	2	7	3	2					1		
Mahatma block											
Toilet(gents) t2	2										
Applied electronics laboratory	5	6	22	1	0	1	0	1			1
Research lab	5	4	15	1	1	1	2	32			
Digital electronics lab	5	6	14	1	0	0	0	10			
Jawahar block											
T19 s1 s2 CSD	2	2	4								
T20	2	2	1	0	0	0	0	0	0	0	0
1T20A	6	10	1	0	0	0	0	0	1	1	1
Toilet (ladies)	0	0	0	0	0	0	0	0	0	0	0
Vareda	2										
Varenda	2										
Administrative block											
Seminar hall	5	10									
M tech S3 S4 c&i	2	4		1							1
S3/S4 aei	2	4	3	1	1						
T10	2	1		1				1			
Department library	4	5	2			1		1			
Professional society	1							1			
T14	2	1	3	1	0	1	0	1			
S5/S6 aei	3	6	5	0	1	0	0	0	0		1
S7/s8	2	4	9	0	1	0	0	0	0		1
Hodaei	3	2	3	4	1	1		1			
Varenda	3	0		2	0	0	0	0	0	0	1
Total	**71**	**93**	**105**	**15**	**5**	**6**	**2**	**49**	**3**	**2**	**7**

4. MECHANICAL BUILDING:

Location	Tube Light	Fan	Socket	LED Tube	Projector	Printer	AC	Computer	T V	Speakers	LED Celling	LED 9W	Purifier
4th Floor													
CAD Lab	15	9	3	7	1	1	3	68		4	7		
Staff room	5	4	11			1		1					
CSD S1S2	4	5	2						1	1			
ADS S1S2	5	5	2						1	1			
Verandah Toilet	4			5						2		5	
3rd Floor													
Toilet Verandah	6												1
S1S2 CSE A	6	8	12		1				1	1			
S1S2 CSE B	4	6	10						1	1			
Vt5	3	2	5										
Vt3	2	1	3										
S1S2 ECE	6	4	6						1	1			
S1S2 CSE C	4	6	13						1				
2nd Floor													
VS1 S1 S2 AEI	4	4	3						1	1			
Staff room ME	6	7	14			1		1		1		3	
Vs3 Vs4	2	1	1										
Staff ash	3	4	6			1		1		1			
CSBS S1S2	2	6	2	2					1				
CSCY S1 S2	4	6	5	1					1	1			
Verandah Toilet	8		1										
1st Floor													
Toilet Verandah	6												1
AEI EEE S1S2	4	5	2		1				1	1			
ME CE S1S2	4	5	2		1				1	1			
Staff room ME	3	4	5			1		1		1			
Vf5 vf4	2		1										
HOD Mech	3	2	2			1		1		1		2	
S3S4 ME A	3	4	2		1								
Mech Library	2	1	10			1		1		1			
Ground floor													
S5S6 ME B	5	6	2							1			
S7S8 ME A	5	5	2		1					1			
Vg6 Staff	1	2	4	2				1		1			
Staff ME Vg2	3	4	13	1		1		1					
S7S8 ME B	4	5	2							1			
Verandah Toilet	4		2							1			
Total	**142**	**121**	**148**	**18**	**6**	**8**	**3**	**76**	**11**	**25**	**7**	**10**	**2**

5. MACHINES LAB:

Location	Tube Light	Fan	Socket	LED Tube	Computer	Speakers
Fitness centers	3	1	2	2		
Research lab	12		10			
Machine lab MEASUREMENTS LAB	10	10	9 ×500 3×1500			
Machine lab electrical workshop	3	6	4×500	4	1	
Machine lab	12	13	5	2		
METROLOGY LAB	6	4	12	1	1	
Heat lab	4	6	13	7	1	
Thermal engineering	8	13	14	7		
Canteen	7	7	13	2	1	
Canteen kitchen	1		8	3		
Mechanical workshop	8	14	5	2		2
Manufacturer tech lab	43	13		2		
Total	**117**	**87**		**32**	**4**	**2**

6. ECE BUILDING:

Location	Tube Light	Fan	Socket	LED Tube	Projector	Printer	AC	Computer	T V	Speakers	Exhaust Fan	UPS
3rd Floor												
Chemistry lab	8	12	2	1						1		
M.Tech s3s4	8	12	2									
Project lab	6	12	6									
T10	4	6	5							1		
Research lab	4	6	11					18				
Advanced communication lab	6	11	8				2	36				
Communication Eng. Lab	6	12	12									
2nd floor												
Analog lab	8	12	13					18				12V 60AH x16
Staff Lab	4	5	6									
Digital Electronics Lab	6	12	12									
HOD ECE	4	5	4			1		1				
S7S8	2	7	3	1					1	1		
S5 S6	3	7	3						1	1		
S3 S4	1	7	3	2	1				1	1		
Verandah Toilet	6									2		12V 60AH x10
Dep library	4	6	6	1								
1st Floor												
Staff ece	8	10	9			1		3		1		
F5	3	7	3							1		
F6	4	6	3									
Survey Lab	2	4	2									
Design studio	4	8	6		1	1		34				13V 40AH x16
Environmental Lab	4	12	6								5	
Ground. floor												
Mechanics and Machinery lab	16	21	6	2								
Material testing	16	21	8									
Staff	2	2	3			1		1				
Transportation Engineering	3	14	6	2								
Geothermal Lab	4	8	5									
Verandah Toilet	6		2									
Total	**152**	**245**	**155**	**9**	**2**	**4**	**2**	**111**	**3**	**9**	**5**	

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7. MBA BLOCK:

Location	Tube Light	Fan	Socket	LED Tube	Projector	Printer	AC	Computer	T V	9W LED	Speakers	Purifier
2nd Floor												
Seminar hall	8	14	7	16	1						2	
Language lab	3	2	2									
Toilet verandah	1									12		
Sanjose academy office	3	3	2	1		1		1				
Maintained office	1	1	1									
Dep office		3	1	4								
Class room1		4	5	5			1					
Class room 2		4	3	6			2	1				
1st Floor												
Computer center		10	3	5				40		7		
Toilet verandah	4			1							2	
Sick room	5	4	4									
Library reading room		12	3	11		1		10				
Boys common room	4	4	3									
Pantry for staff	4	4	5									
Ground Floor												
Toilet verandah				7								1
Tutorial room	1	3	2	1	1							
Tutorial room 2		4	4	2			1		1			
Class room		6	2	5	1		2				2	
Class room		6	6	5	1		2					
Principle	1	3	4	4		1	1	1				
BORD ROOM		2	3	2						2		
Reception		6	3	3		2		2				
Faculty		4	7	4				6				
Total	**35**	**99**	**70**	**82**	**4**	**5**	**9**	**61**	**1**	**21**	**6**	**1**

8. ALPHONSHA HOSTEL:

Location	Tube Light	Fan	CFL	LED Tube	Computer	AC	Fridge	T V	Heater
Ground Floor	1	5	1	2			1	1	1
GF Wing	36	40		5					
1F Corridor	2	6	2	2					
1F wing	38	40		6					
2F Corridor	2	6	2	2					
2F wing	35	40		4					
3F Corridor	1	6	2	2			1	1	
3F wing	36	40		5					
4F Corridor	1	6	2	2					
4F wing	37	40		5					
TOTAL	**189**	**229**	**9**	**35**	**0**	**0**	**2**	**2**	**1**

9. HOLYCROSS HOSTEL:

Location	Tube Light	Fan	CFL	LED Tube	Computer	AC	Fridge	T V	Heater
Ground Floor	8	8	2	2		1	1	1	1
GF Wing	100	110		10					
1F Corridor	8	10	1	3					
1F wing	104	110		6					
2F Corridor	9	10	2	3					
2F wing	108	110		2					
3F Corridor	10	8	1	2			1	1	1
3F wing	105	110		5					
4F Corridor	8	9	2	3					
4F wing	101	110		9					
TOTAL	**561**	**595**	**8**	**45**	**0**	**1**	**2**	**2**	**2**

10. MOTHER THERESA HOSTEL:

Location	Tube Light	Fan	CFL	LED Tube	Computer	AC	Fridge	T V	Heater
Ground Floor	8	3	5	5	2				
GF Wing	20	35	2	10					
1F Corridor	8	3	5	5				1	
1F wing	20	35	3	10	15				
2F Corridor	8	3	5	5					
2F wing	20	35	3	10	5				
3F Corridor	8	3	5	5					
3F wing	20	35	3	10					
4F Corridor	8	3	5	5			1	1	1
4F wing	20	35	2	10					
5F Corridor	8	3	5	5				1	
5F wing	20	35	2	10					
6F Corridor	8	3	5	5					
6F wing	20	35	2	10					
7F Corridor	8	3	5	5					
7F wing	20	35	2	10					
TOTAL	**224**	**304**	**59**	**120**	**22**	**0**	**1**	**3**	**1**

11. SANTHOME HOSTEL:

Location	Tube Light	Fan	CFL	LED Tube	Computer	AC	Fridge	T V	Heater
Basement Corridor	6	4	4	3				1	
Basement wing 1	24	24							
Basement wing 2	26	26							
GF Reception	2	6	6	5			1	1	
GF Wing 1	24	24							
GF Wing 2	26	26							
1F Corridor	3	4	4	5				1	
1F Wing 1	24	24							
1F Wing 2	26	26							
2F Corridor	2	4	4	4					
2F Wing 1	24	24							
2F Wing 2	24	26							
3F Corridor	3	4	4	5					
3F Wing 1	24	24							
3F Wing 2	26	26							
3F chapel	4	4							
TOTAL	**268**	**276**	**22**	**22**	**0**	**0**	**1**	**3**	**0**

12. SANJOSE HOSTEL:

Location	Tube Light	Fan	CFL	LED Tube	Computer	AC	Fridge	T V	Heater
GF Reception	3	2	3	1	5		1		1
GF Wing 1	24	29	3	7	6				
GF Wing 2	18	22	3	6	8				
1F Corridor	4	2	1	6	2			1	
1F Wing 1	30	29	3	1	12				
1F Wing 2	25	25	2	2	18				
2F Corridor	2	2	1	5			1		
2F Wing 1	35	29	2	6	13				
2F Wing 2	14	25	3	7	15				
3F Corridor	3	2	1	5					
3F Wing 1	32	29	4	2	14				
3F Wing 2	29	25	4	13	14				
TOTAL	**219**	**221**	**30**	**61**	**107**	**0**	**2**	**1**	**1**

OVERALL ENERGY UTILIZATION

APPLIANCES	No. of Units	Power (Watts)	Total Power (Watts)	Avg. Usage/ day(Hrs.)	Avg. Energy Usage/ day(Kwh)	Avg. Energy Usage/ month(Kwh)
Air Conditioner	48	1000	48000	2	96	2880
Celling Light LED	24	9	216	4	0.864	25.92
CFL	128	60	7680	4	30.72	921.6
Computer	709	200	141800	6	850.8	25524
Exhaust Fan	5	200	1000	6	6	180
Celling Fan	2479	60	148740	6	892.44	26773.2
Fridge	8	200	1600	12	19.2	576
Heater	6	1000	6000	4	24	720
LED Celling	7	18	126	6	0.756	22.68
LED Tube	451	20	9020	6	54.12	1623.6
Printer	42	150	6300	1	6.3	189
Projector	28	230	6440	3	19.32	579.6
Purifier	9	300	2700	24	64.8	1944
Speaker	80	6	480	1	0.48	14.4
Television	36	150	5400	3	16.2	486
Tubelight	2268	40	90720	6	544.32	16329.6
9W LED	31	9	279	6	1.674	50.22
Total Connected Load			**476501**	**Total Avg. Energy Usage/month**		**78839.82**

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1.3 - Data collected for Green Campus Management

SN	Tree - English Name	Tree - Botanical Name	Family
01	Coniferous Tree	Araucaria Heterophyll	Araucariaceae
02	Shoe Button Ardisia	Ardisia Elliptica	Primulacese
03	-- -- -- -- --	Areca Catechu	Arecaceae
04	-- -- -- -- --	Artocarpus Heterophyllus	Moraceae
05	-- -- -- -- --	Artocarpus Hirsutus	Moraceae
06	-- -- -- -- --	Azadiracta Indica	Meliaceae
07	Divi Divi Plant	Caesalpinia Coriaria	Fabaceae
08	-- -- -- -- --	Caesalpinia Pulcherrima	Fabaceae
09	Bottlebrush	Callistemon Lanceolatus	Myrtaceae
10	-- -- -- -- --	Cassia Fistula	Fabaceae
11	-- -- -- -- --	Casuarina Equisetifolia	Cassurinaceae
12	-- -- -- -- --	Cinnamomum Zeylanicum	Lauraceae
13	Gulmohor	Delonix Regia	Fabaceae
14	-- -- -- -- --	Diospyros Buxifolia	Ebenaceae
15	-- -- -- -- --	Ficus Benjamina	Moraceae
16	Bodhi Tree / Peepal Tree	Ficus Religiosa	Moraceae
17	-- -- -- -- --	Grevillea Robusta	Proteaceae
18	Fire Bush	Hamelia Patens	Rubiaceae
19	-- -- -- -- --	Hopea Parviflora	Dipterocarpaceae
20	Sausage Tree	Kigelia Pinnata	Bignoniaceae
21	-- -- -- -- --	Lagerstroemia Speciosa	Lythraceae
22	-- -- -- -- --	Mangifera Indica	Anacardiaceae
23	-- -- -- -- --	Manilkara Zapota	Supotaceae
24	Orange Jasmine	Murraya Paniculata	Rutaceae
25	-- -- -- -- --	Murraya Koenigii	Rutaceae
26	Yellow Flame Tree	Peltophorum Pterocarpum	Fabaceae
27	-- -- -- -- --	Phyllathus Embilica	Euphorbiacese
28	-- -- -- -- --	Piper Nigrum	Piperaceae

SN	Tree - English Name	Tree - Botanical Name	Family
29	-- -- -- -- --	Plumeria Apiculata	Plumeriaceae
30	-- -- -- -- --	Pongamia Pinnata	Fabaceae
31	-- -- -- -- --	Psidium Guajava	Myrtaceae
32	-- -- -- -- --	Saraca Asoca	Fabaceae
33	-- -- -- -- --	Simarouba Glauca	Simaroubaceae
34	-- -- -- -- --	Sizygium Cumini	Myrtaceae
35	African Tulip Tree	Spathodea Campanulata	Bignoniaceae
36	-- -- -- -- --	Swietenia Mahogany	Meliaceae
37	Yellow Trumpet Bush	Tecoma Stans	Bignoniaceae
38	-- -- -- -- --	Tectona Grandis	Lamiaceae
39	-- -- -- -- --	Terminalia Catappa	Combretaceae
40	-- -- -- -- --	Terminalia Arjuna	Combretaceae
41	-- -- -- -- --	Terminalia Bellirica	Combretaceae
42	-- -- -- -- --	Wodyetia Bifurcata	Arecaceae

Annexure 2

Answers for Survey Questions

2.1 - Water Management

Answers for Survey questions for Water Management

1. List uses of water in your college.

Toilets and bathrooms hand and face wash, laboratories, cooking and washing, cleaning and washing of floors, Drinking - 1.5 lakh Liters

2. What are the sources of water in your college?

Pond, Open wells and bore wells

3. How many wells are there in your college?

3 Open wells and 2 bore wells

4. No. of motors used for pumping water from each well?

10 Nos. in wells and 1 for pond

5. What is the total horse power of each motor?

15 H P / 20 HP in pond

6. What is the depth of each well?

12 mts ./ 5 mts

7. What is the present depth of water in each well?

2 mts

8. How does your college store water?

Rain water Storage Tanks (31 lakh liters)

9. Quantity of water stored in your overhead water tank? (in liters)

10 lakhs

10. Quantity of water pumped every day? (in liters)

1.5 lakh liters

11. If there is water wastage, specify why.

Leaking taps

12. How can the wastage be prevented / stopped?

As a first step, wastage can be minimised and later it can be prevented and stopped.

13. Locate the point of entry of water and point of exit of waste water in your College.

Not able to identify.

14. Where does waste water come from?

Treatment plant

15. Where does the waste water go?

Gardening

16. What are the uses of waste water in your college?

Gardening

17. What happens to the water used in your labs? Whether it gets mixed with ground water?

Treating

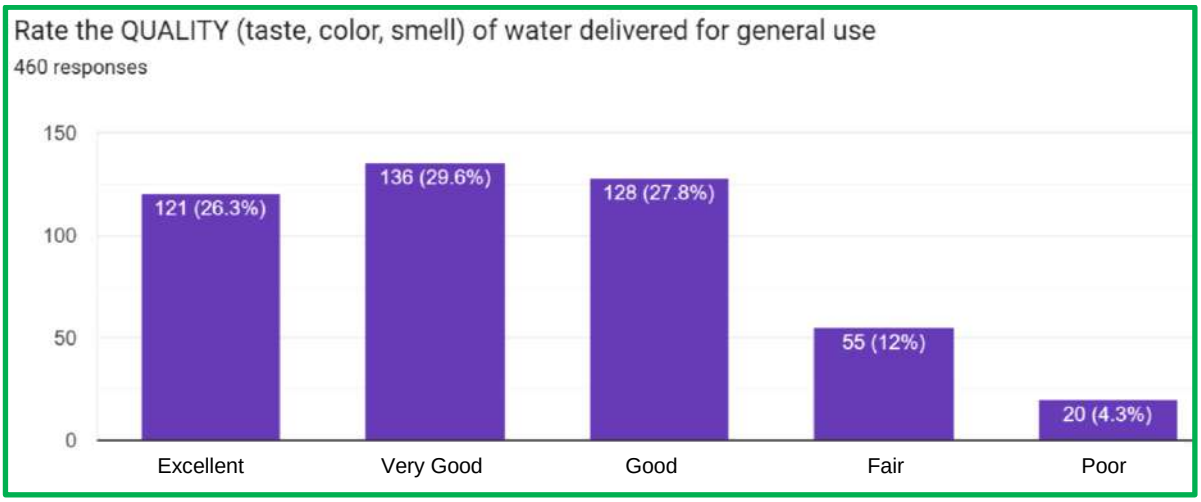
18. Is there any treatment for the lab water?

Yes

19. Whether green chemistry methods are practiced in your labs?

Yes

20. Rate the Quality (tase, colour, smell) of water delivered for general use



21. Record water use from the college water meter for six months.

Corporation water is not used. So no water meter reading.

22. Bimonthly water charges paid to water connections if any

No

23. No. of water coolers. Amount of water used per day? (inliters)

16 Nos. - 2000 liters.

24. No. of water taps. Amount of water used per day?

1000 Nos.

25. No. of bath rooms in staff rooms, common, hostels. amount of water used per day?

204 Nos. - 20485 litres

26. No. of toilet, urinals. Amount of water used per day?

303 Nos. - 15484 litres

27. No. of water taps in the canteen. Amount of water used per day?

20 Nos. - 20,000 liters

28. Amount of water used per day for garden use.

50,000 liters.

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29. No. of water taps in laboratories. Amount of water used per day in each lab?

60 Nos. – 5,000 liters

30. Total use of water in each hostel?

40,000 liters.

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

Location	Water Use / day
Toilets and urinals	15,484 Liters
Hostel	1,50,000 Liters
Canteen	25,000 Liters
Garden	1,000 Liters
Laboratories	5,000 Liters
Drinking	22,000 Liters
Leakage	4,000 Liters
Construction work	30,000 Liters
Total	2,52,484 Liters

32. Is there any water used for agricultural purposes?

Waste water - 50000 liters.

33. Does your college harvest rain water?

Yes

34. If yes, how many rain water harvesting units are there?

4 No.s

35. How many of the taps are leaky? Amount of water lost per day?

Not Available

36. Are there signs reminding people to turn off the water? Yes / No

Yes

37. Is there any waterless toilets? _____

No

38. How many water fountains are there? _____

5

39. How many water fountains are leaky? _____

None

40. Is drip irrigation used to water plants outside? YES/NO

No

41. How often is the garden watered?

One time per day

42. Quantity of water used to watering the ground?

Not Available

43. Quantity of water used for bus cleaning? (liters per day)

15000

44. Amount of water for other uses? (items not mentioned above)

1000 Liters

45. Area of the college land without tree/building canopy.

5 Acres.

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

Not Available

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

Not Available

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

Proper maintenance, so that leakage can be avoided.

Automated sprinklers can be installed in the garden.

Conduct awareness programs among the students.

2.2 - Energy Management

Answers for Survey questions for Energy Management

1. List ways that you use energy in your college (electricity, electric stove, LPG etc.,)

Electricity , Electric Stove, LPG

2. Electricity Bill amount for the last one year.

Rs. 44,35,481/-

3. Amount paid for LPG cylinders for the last one year.

Rs. 23,25,600/-

4. Amount spend for fuel for generators.

Approximately 100 liters / month

5. Is there any energy saving methods employed in your college?

Sensors are used for automatic switch off; awareness board is fixed in all class rooms.

6. How much money does your college spend on energy such as electricity, LPG etc., in a month?

Rs.5,63,423/-

7. How many CFL bulbs has your college installed? Mention used hours in a month.

128 Numbers; 120 Hrs.

8. Energy used by each bulb per month? (Kwh)

(1). LED TUBE – 1623 Kwh (2). Tube Light – 16329 Kwh

9. How many LED bulbs has your college installed? Mention used hours in a month.

451 Numbers, 180 Hrs.

10. Energy used by each bulb per month? (Kwh)

(1). LED TUBE – 1623 Kwh (2). Tube Light – 16329 Kwh

11. How many Incandescent bulbs has your college installed? Mention used hours in a month.

2268 numbers; 180 Hrs.

12. Energy used by each bulb per month? (Kwh)

Not available

13. How many fans has your college installed? Mention used hours in a month.

2479 numbers; 180 Hrs.

14. Energy used by each fan per month? (Kwh)

11 Kwh

15. How many air conditioners has your college installed? Mention used hours in a month.

48 Numbers

16. Energy used by each air conditioner per month? (Kwh)

60 Kwh

17. How many computers are there in your college? Mention used hours in a month.

709 numbers; 180 Hrs.

18. Energy used by each computer per month? (Kwh)

36 Kwh

19. How many photo copiers are there installed in your college? Mention used hours in a month.

Not available

20. Energy used by each photo copier per month? (Kwh)

Not available

21. How many electrical equipment are used in different labs of your college? Mention used hours in a month.

Not available

22. Energy used by each equipment per month? (Kwh)

Not available

23. How many heaters are used in canteen of your college? Mention used hours in a month.

6 Numbers; 720 Hrs.

24. Energy used by each heater per month? (Kwh)

720 Kwh.

25. How many street lights are installed in your college? Mention used hours in a month.

Not available

26. Energy used by each street light per month? (Kwh)

Not available

27. How many TV's are there installed in your college and hostel? Mention used hours in a month.

36 numbers; 90 Hrs.

28. Energy used by each TV per month? (Kwh)

13 Kwh

29. How many photo copiers are there installed in your college? Mention used hours in a month.

Not available

30. Energy used by each computer per month? (Kwh)

20 Kwh

31. Are your Computers and other equipment put-on power saving mode?

Yes

32. Does your machinery (TV, AC Computer etc.,) run on standby mode most of the time? If yes, how many hours?

Yes

33. Are any alternative energy sources / Non-conventional energy sources installed in your college?

Yes. Solar energy of capacity 50KW installed

34. What are the energy conservation methods adapted by your college?

Boards displayed for saving energy awareness in all classes

35. How many boards displayed for saving energy awareness?

Not available

36. Write a note on the methods/practices/adaptions by which you can reduce the energy use in your college campus in future.

Take advantage of natural sunlight.

Switch to LED Lightbulbs.

Invest in energy-saving power strips.

Use LCD screens or Smart Projectors.

Invest in Better Cooling Options.

Encourage Students to Recycle.

Use Sensors for Lights.

Consider Upgrading the Kitchen.

Close unused rooms and spaces.

2.3 - Waste Management

Answers for Survey questions for Waste Management

What is the total strength of students, teachers and Non-teaching staff in your College?

No. of	Students	Teachers	Non-teaching staff
Gents	1272	63	31
Ladies	651	77	14
Total	1923	140	45

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

Garden area	2.5 Acres	Garbage dump (number)	
Play ground area	6.0 Acres	Laboratory	5930 m^2 (60 Nos.)
Kitchen	385.50 m^2	Canteen	496 m^2
Toilets (number)	900 m^2 (500 Nos.)	Car/scooter shed area	1000 m^2 (4 Nos.)
Number of class rooms	2998.70 m^2 (46 Nos.)	Office rooms	22
Others (specify) Indoor court	2087 m^2		

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	NA	Garbage heap	NA
Public convenience	NA	Sewer line	NA
Stagnant water	Check Dam	Open drainage	NA
Industry – (Mention the type)	NA	Bus / Railway station	NA
Market / Shopping complex	1	Public halls	NA

WASTE

Does your college generate any waste? **YES**
If so, what are they? How much quantity? Number or weight

E-waste	110 kg/year	Hazardous waste (toxic)	0.1 kg/day
Solid waste	36 kg/day	Dry leaves – during summer	40 kg/day
Canteen waste	23 kg/day	Liquid waste	
Glass		Unused equipment (Collected during the audit period)	210 kg
		Medical waste if any, Napkins, Others (Specify	100 /day

- Is there any waste treatment system in the college? **YES**
  1. Waste Water Treatment Plant
  2. Solid Waste Incinerator

- Is there any treatment for toilet/urinal/sanitary napkin waste? **YES**
  Solid waste Incinerator

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

Office

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.	✓	✓	✓	
2 - 10 kg.				
> 10 kg.				

Laboratories

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.	✓	✓	✓	
2 - 10 kg.				
> 10 kg.				

Canteen/kitchen

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.		✓	x	
2 - 10 kg.				
> 10 kg.	✓			

2 Why waste is a problem?

Poor waste management contributes to climate change and air pollution, and directly affects many ecosystems and species. Left unmanaged, dumped or burned, waste harms human health, hurts the environment and climate, and hinders economic growth. Uncontrolled waste management can lead to medical and healthcare waste being mixed with household waste. This increases the risk of poisoning or injury to children and adults who are working sorting waste. Indiscriminate burning of waste can cause major air pollution and increases greenhouse emissions.

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

Road salt, toxic substances from mining sites, and used motor oil may seep into groundwater. Pesticides and Fertilizer used for agriculture is a huge source of groundwater pollution.

One of the most common sources of surface water pollution is human waste. Water from lakes and rivers that are used by municipalities, agriculture, and industry, is increasingly exposed to pollutants from manufacturing or the environment. Fertilizers can leak into rivers, and flooding leads to pollution of surface water as the volume spreads across areas that are normally not exposed to water.

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

Yes. Air pollution is the greatest environmental threat to public health . Air pollution is caused by solid and liquid particles and certain gases that are suspended in the air. These particles and gases can come from car exhaust, dust etc.

5 How is the waste generated in the college managed?

Methods 1 Composting, 2.Recycling, 3.Reusing, 4. Others (specify)

(a). Waste Water Treatment Plant (b). Solid Waste Incinerator

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)

3 boxes (1) Paper – Blue Colour – recycled and reused
(2) Plastics – Red Colour – Non-biodegradable
(3) Food – Green Colour – reused for Biogas

7 Do you use recycled paper in College?

Yes.

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

No.

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

No.

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

Zero garbages can never be achieved. But still a much reduced garbage can be achieved through action plans and measures that significantly reduce waste like composting of food waste.

2.4 - Green Campus Management

Answers for Survey questions for Green Campus

1. Is there a garden in your college? Area?

Yes. 2.50 Acres.

2. Do students spend time in the garden?

Yes

3. List the plants in the garden, with approx. numbers of each species.

Not available.

4. Suggest plants for your campus. (Trees, vegetables, herbs, etc.)

Rubber Trees, coconut Trees, Papaya, Plantain, Nellikkai, Manjal, Ingi, Chemparathi, Thulasi, Kallurukki, Kattarvazha, Aavaram, Lekshmi tharu, Eswaramulla, Nelapana, Narangai, Panikkurkka, Mango, Cashew, etc.

5. List the species planted by the students, with numbers.

Not available.

6. Whether you have displayed scientific names of the trees in the campus?

Yes.

7. Is there any plantations in your campus? If yes specify area and type of plantation.

Yes. 3.00 Acres – Tapioca, Banana, Coconut.

8. Is there any vegetable garden in your college? If yes how much area?

Yes 0.50 Acres

9. Is there any medicinal garden in your college? If yes how much area?

No.

10. What are the vegetables cultivated in your vegetable garden?(Mention the quantity of harvest in each season)

Tapioca, Greens,

11. How much water is used in the vegetable garden and other gardens? (Mention the source and quantity of water used).

50,000 liters of recycled water from waste water treatment plant

12. Who is in charge of gardens in your college?

Housekeeping staff

13. Are you using any type of recycled water in your garden?

Yes. Recycled water from waste water treatment plant

14. List the name and quantity of pesticides and fertilizers used in your gardens?

Panchakavya as pesticide and Cow dung as fertilizer.

15. Whether you are doing organic farming in your college? How?

Yes. Using Panchakavya as pesticide and Cow dung as fertilizer.

16. Do you have any composting pit in your college? If yes, What are you doing with the compost generated?

No.

17. What do you doing with the vegetables harvested? Do you have any student market?

No Student Market. Vegetables are used in the college hostel mess.

18. Is there any botanical garden in your campus? If yes give the details of campus flora.

No.

19. Give the number and names of the medicinal plants in your college campus.

The following are the commonly available medicinal plants, shrubs and trees in our campus

Local Name in English	Scientific / Binomial Name
Nellikkai	Phyllanthus emblica
Manjal	Curcuma longa
Ingi	Zingiber officinale
Chemparathi	Hibiscus
Thulasi	Ocimum sanctum
Kallurukki	Scoparia dulcis
Kattarvazha	Aloe vera
Aavaram	Senna auriculata L
Lekshmi tharu	Simarouba glauca
Eswaramulla	Aristolochia indica
Nelapana	Curculigo orchioides
Kappalam	Carica papaya
Vazha	Musa × paradisiaca
Narangai	Citrus limon
Panikkurkka	Plectranthus amboinicus

20. Any threatened plant species planted/conserved?

No.

21. Is there a nature club in your college? If yes what are their activities?

Go Green Club. It conducts a number of programmes to promote love of nature among students and make them conscious of the various ways in which they can work effectively to preserve the ecosystem. The programmes include nature camps, environment education etc. It celebrates National and International days connected with Environment and its sustainability. Every day we have a unique Go Green message displayed in all the department notice boards to create awareness about the role of environment in our life. Students are motivated to keep up the green cover maintenance by planting saplings.

22. Is there any arboretum in your college? If yes, details of the trees planted.

No.

23. Is there any fruit yielding plants in your college? If yes, details of the trees planted.

Papaya, Plantain, Citrus, Mango, Cashew, Coconut, Jack fruit.

24. Is there any groves in your college? If yes, details of the trees planted.

No.

25. Is there any irrigation system in your college?

Well Irrigation

26. What is the type of vegetation in the surrounding area of the college?

Rubber trees

27. What are the nature awareness programmes conducted in the campus? (2020-21)

Environment Day celebrations, regular display of Go Green Messages in department Notice Boards, Demonstrations on how to care for environmental issues etc.

28. What is the involvement of students in the green cover maintenance?

Planting Trees and care to grow them

29. What is the total area of the campus under tree cover? under tree canopy?

Approximately 73,101 sq. m.

30. Share your IDEAS for further improvement of green cover.

Plant more trees.

2.5 - Carbon Footprint

Answers for Survey questions for Carbon Footprint

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

No. of	Students	Teachers	Non-teaching staff
Gents	1093	55	39
Ladies	524	70	15
Total	1617	125	54

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

109

3. No. of cycles used

2 – Two

4. No. of two wheelers used (average distance travelled and quantity of fuel and amount used per day)

99 – 2053 km – 45 liters

5. No. of cars used (average distance travelled and quantity of fuel and amount used per day)

70 – 1921 km – 120 liters

6. No. persons using common (public) transportation (average distance travelled and quantity of fuel and amount used per day)

195 – 2420 km – 61 liters

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

60 – 2500

9. Number of visitors with vehicles per day?

Average visitors per day is 20 to 40 in 10 cars

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

Two generators are present in the campus which uses approximate diesel of 100 liters

7. No. of persons using college conveyance by the students, non teaching staff and teachers (average distance travelled and quantity of fueland amount used per day)

Bus Number	Student Passengers	Staff Passengers	Total Passengers	Average Distance /day	Average Fuel Consumption / day in liters
1	45	5	50	80	26.66
2	45	5	50	75	34.67
3	29	12	41	76	25.00
4	42	7	49	86	28.66
5	40	9	49	102	34.00
6	42	7	49	74	24.67
7	44	5	49	72	24.00
8	50	4	54	60	20.00
9	49	5	54	86	28.67
10	47	7	54	74	24.67
11	43	9	52	56	18.67
12	47	7	54	84	28.00
13	28	6	34	102	34.00
14	45	4	49	86	28.67
15	44	5	49	86	28.67
Total	640	97	737	1199	400.00

No of the students using college conveyance = 640

No of the staff using college conveyance = 97

Average distance travelled per day= 1199 kms

Average quantity of fuel per day = 400 liters/day

Amount spend per day = Rs 42400

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

LPG cylinders used in college canteen = 10 cylinders/month (19.7 kg/cyl)

LPG cylinders used in hostel canteen 40 cylinders/month (19.7 kg/cyl)

LPG cylinders used in Cafeteria 1/4 cylinder/month (15.9 kg/cyl)

Total LPG used = 989 kg/month

Total amount spend = Rs62750 / month

Total amount spend = Rs 2600 / day

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

Diesel = 60 liters / semester, Petrol = 50 liters / semester

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Principal.VJEC

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

Rs. 2,000/- per month

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

Rs. 1,000/- per month

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

Rs. 5,000/- per month

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

NIL

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

1. Encourage the students and staff to use public transportation

2. Usage of cycles inside the campus instead of motor vehicles

3. Usage of Electric vehicles and buses

4. Do not allow fossil fuel using vehicle inside campus road

5. Encourage the students and staff to use the transportation facility provided by the college.

Annexure-3 (Data from Questionnaire)

VIMAL JYOTHI ENGINEERING COLLEGE
Chemperi, Kerala-607632.
GREEN AUDIT 2022
QUESTIONNAIRE

Answer all questions

Employee's code for staff or University Register Number (URN) for students:

Q.1. Rate the QUALITY (taste, colour, smell) of water delivered for general use [*Ans: (1)Excellent, (2)Very Good, (3)Good, (4)Fair, (5)Poor*]
Q.2. Rate the RELIABILITY of water services in the campus [*Ans: (1)Excellent, (2)Very Good, (3)Good, (4)Fair, (5)Poor*]
Q.3. Rate the recycling of water in the campus [*Ans: (1)Excellent, (2)Very Good, (3)Good, (4)Fair, (5)Poor*]
Q.4. In the past few months, have you had any complaints with water quality or availability? (*Ans: Yes / No*)
Q.5. Is it essential to have a waste management system in our campus? (Ans: Yes / No)
Q.6. Are you aware that our college is installed a waste disposal system? (Ans: Yes / No)
Q.7. Are you using the waste management of our college facility properly? (Ans: Yes / No)
Q.8. Are you satisfied with the current waste management system in our college? (Ans: Yes / No)
Q.9. Any suggestions for improving the present waste management system in the campus.
Q.10. Are you satisfied with the solid waste segregation in the campus? (Ans: Yes / No)
Q.11a. Are you satisfied with the activities conducted by the Go Green Club? (Ans: Yes / No)
Q.11b. Give suggestions for any extra activities for Go Green Club.
Q.12. Share your ideas for further improvement of green cover of our campus.
Q.13. Are you happy with the nature awareness programs conducted. (Ans: Yes / No)
Q.14. Do you travel by foot to college? (Ans: Yes / No)
Q.15. Do you travel by college bus? (Ans: Yes / No)
Q.16a. Do you travel by public transportation to college? (Ans: Yes / No)
Q.16b. If yes, distance travelled per day and fuel consumption in liters [=distance/(3 x 60)]. (Ans: Distance travelled: kms, Fuel consumption in Liters:)
Q.17a. Do you travel by a two wheeler? (Ans: Yes / No)
Q.17b. If yes, distance travelled per day and fuel consumption in liters [=distance/(average mileage)] (Ans: Distance travelled: kms, Fuel consumption in Liters:)
Q.18a. Do you travel by a four wheeler? (Ans: Yes / No)
Q.18b. If yes distance travelled per day and fuel consumption in liters [distance/(average mileage)] (Ans: Distance travelled: kms, Fuel consumption in Liters:)
Q.19. Your suggestions to reduce Carbon Footprint in our college campus.
Q.20. Are lightings used in our college is sufficient levels (Lux)? (Ans: Yes / No)
Q.21. Are lighting management equipment such as dimmers, timers and sensors are needed in the class rooms? (Ans: Yes / No)
Q.22. Are all projectors, lights and fans which is used in classes switched off when not in use? (Ans: Yes / No)
Q.23a. Is energy efficient equipment like LED bulbs, energy efficient fans are used in our college? (Ans: Yes / No)
Q.23b. If yes, mention them.
Q.24a. Are any alternative energy sources / non-conventional energy sources like solar energy, wind mill are employed / installed in our college? (Ans: Yes / No)
Q.24b. If yes, specify.
Q.25. What are the energy conservation methods adopted by our college?
Q.26. Will you like the trees in our campus be identified, their botanical name and the local name in Malayalam to be written on a board and tied to the trees. (Ans: Yes / No)

The response for this Questionnaire is available in the following URL
https://docs.google.com/spreadsheets/d/1a4FKrXls0_FCqFGql40irwtDIneKSY33VH02FZbUqsw/edit?usp=sharing

Signature Not Verified

Principal.VJEC

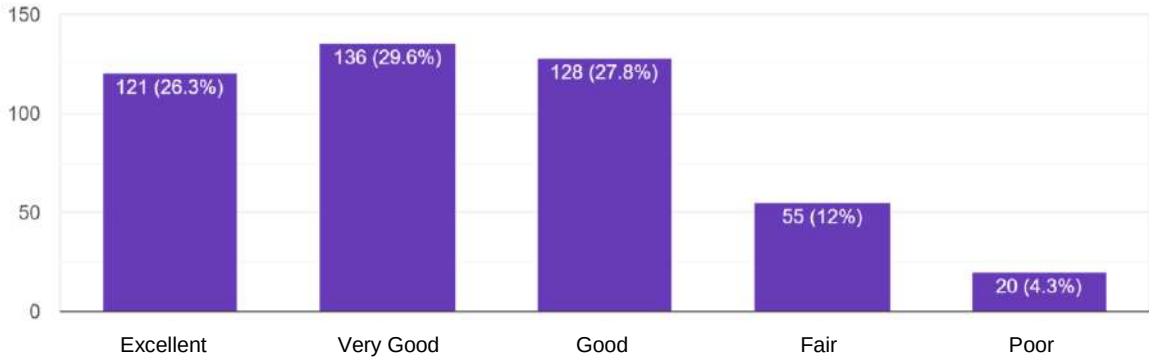
3.1 – Water Management

Summary of survey conducted among staff and students (1-5, Excellent - Poor)

(Question No. 1 to 4)

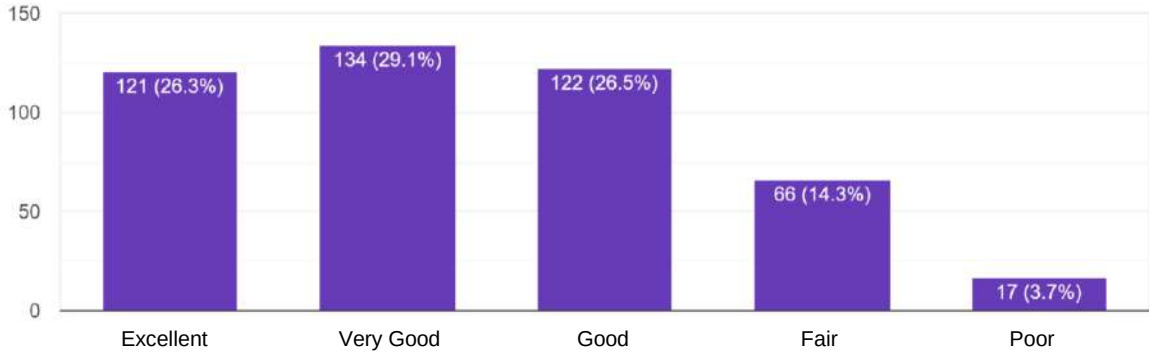
Rate the QUALITY (taste, color, smell) of water delivered for general use

460 responses



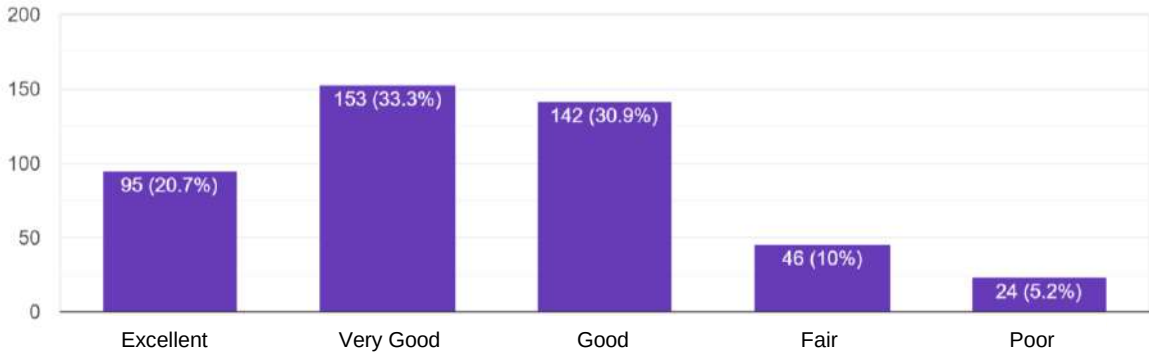
Rate the RELIABILITY of water services in the campus

460 responses



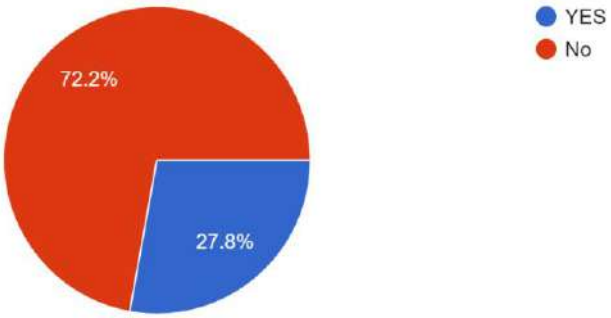
Rate the recycling of water in the campus

460 responses



In the past few months, have you had any complaints with water quality or availability?

460 responses



3.2 – Energy Management

Analysis of Responses for Common Questionnaire for Staff and Students

(Question No. 20 to 25)

QN. 20. Are lightings used in our college is sufficient levels (Lux)?

327 YES out of 460 responses

Response: Yes-Among the response from students and faculty members the 327 members are said that in all the class rooms, corridors, labs and rest rooms are having a sufficient level of lighting systems.

QN. 21. Are lighting management equipment such as dimmers, timers and sensors is needed in the class rooms?

303 YES out of 460 responses

Response: Yes-For energy saving purpose in the college premises, we are going to be used lighting management equipment such as dimmers, timers and sensors. When the student is not in class room the electrical equipment's are switched off automatically if we are used sensors.

QN. 22. Are all projectors, lights and fans which is used in classes switched off when not in use?

400 YES out of 460 responses

All projectors, lights and fans which is used in classes switched off when not in use. For that the awareness boards are installed in each class rooms.

QN. 23 a. Is energy efficient equipment like LED bulbs, energy efficient fans are used in our college?

211 Yes out of 460 responses

Energy efficient equipment are used in our college. We are shortly going to replace the fluorescent lamps and fans into LED bulbs and energy efficient fans.

QN. 23b. If yes, mention them.

LED bulbs, LED tube lights.

QN. 24a. Are any alternative energy sources/ non-conventional energy sources like solar energy, wind mill is employed/installed in our college?

228 YES out of 460 responses

QN. 24b. If yes, specify.

College has installed a solar power system of 50KW capacity

QN. 25. What are the energy conservation methods adapted by our college?

Awareness boards of "Turn off electrical equipment's when not in use" is present in all the class rooms. Some classes have energy efficient Light emitting diode (LED) bulbs instead of Fluorescent Tube lights. Maintained the appliances and lab equipment's in regular period and old appliances are replaced. Using the computers and electronic equipments in power saving mode. In classes, the motion sensors are used to switch off automatically the electrical equipment when students are not in the class room.

3.3 – Green Campus Management

Analysis of Responses for Common Questionnaire for Staff and Students

(Question No. 11, 12, 13 & 26)

QN 11a- Are you satisfied with the activities conducted by the Go Green Club? (Ans: Yes / No)

127 No 27.61%	333 YES 72.39%

QN 11b- Give suggestions for any extra activities for Go Green Club.

Out of 460 responses, 128 responses had suggestions for extra activities. 20 % have suggested increasing the green cover in the campus, 18 % have preferred for more awareness through camps, classes, programmes, workshop etc. 16.41 % wanted to be initiated on the awareness on energy savings and about the waste management in campus. 12.5 % wanted to observe one day in a month as campus cleanliness day. Other suggestions are to conduct competitions on using the waste, campaign against plastic usage, involve all students in the club activities, make demonstrations through posters etc.

QN 12- Share your ideas for further improvement of green cover of our campus.

Out of 460 responses, 144 responses had ideas for further improvement of green cover of our campus. 47.22 % have suggested increasing the green cover in the campus in the form of gardens, plantations and by planting trees. 9.03 % wanted more awareness programme about improving the green cover. Other ideas are to increase the number of dust bins for solid waste, need plastic free campus, increase the % area of gardens, landscaping, fruit trees, flowering plants & shrubs etc.

QN 13 - Are you happy with the nature awareness programs conducted. (Ans: Yes / No)

132 No 28.70%	328 YES 71.30%

QN 26 - Will you like the trees in our campus be identified, their botanical name and the local name in Malayalam to be written on a board and tied to the trees. (Ans: Yes / No)

96 No 20.87%	364 YES 79.13%

VIMAL JYOTHI ENGINEERING COLLEGE,

JYOTHI NAGAR, CHEMPERI, KERALA-670632.

Temple of Knowledge in a Clean Green Environment, where Perfection is the Tradition

Signature Not Verified

Principal.VJEC