

7-113.E

Certificate of Registration

This is to Certify that
Energy Management System of

SRI MANAKULA VINAYAGAR MEDICAL COLLEGE AND HOSPITAL

KALITHEERTHALKUPPAM, MADAGADIPET,
PUDUCHERRY - 605107, INDIA

has been assessed and found to conform to the requirements of

ISO 50001:2018

for the following scope :

IMPARTING EDUCATION SERVICES (MBBS AND MD/MS
DEGREES), POWER AND ENERGY OPTIMIZATION SYSTEM
PROCESS AND RESOURCE MANAGEMENT

Certificate No	: 22IEnKJ96	Issuance Date	: 20/09/2022
Initial Registration Date	: 20/09/2022	Date of Expiry*	: 19/09/2025
1st Surv. Due	: 20/08/2023	2nd Surv. Due	: 20/08/2024

Director



ACCREDITED
Management Systems
Certification Body
MSCB-119



AQC MIDDLE EAST LLC

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Key Location: A-60, Sector - 2, Noida, Uttar Pradesh, 201301, India.

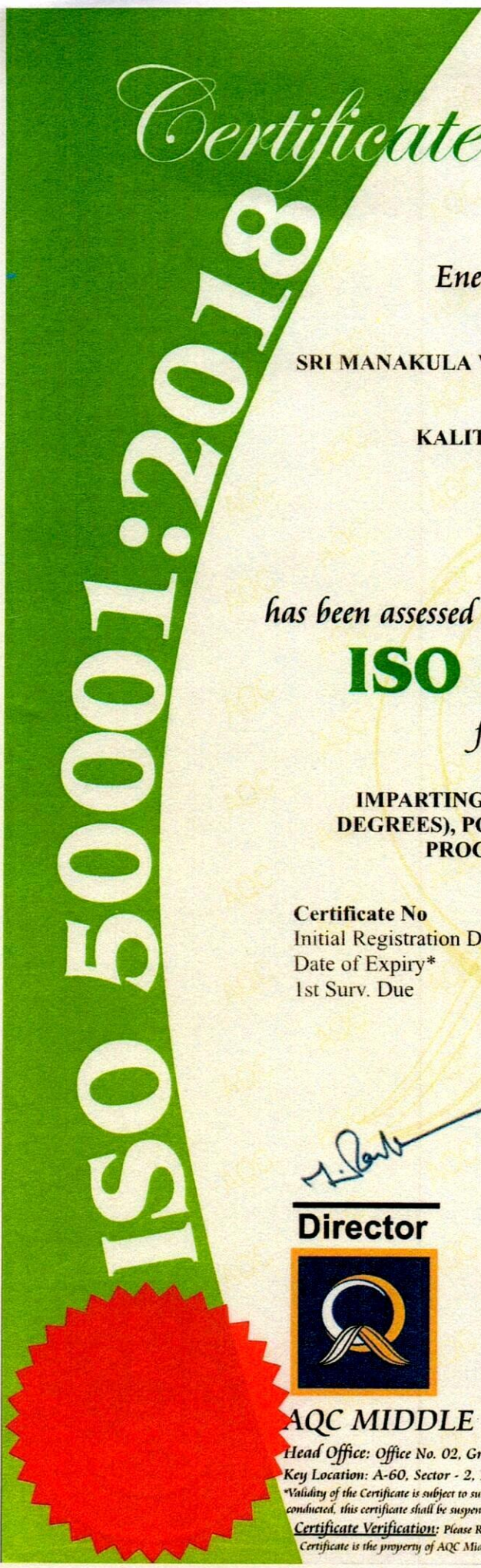
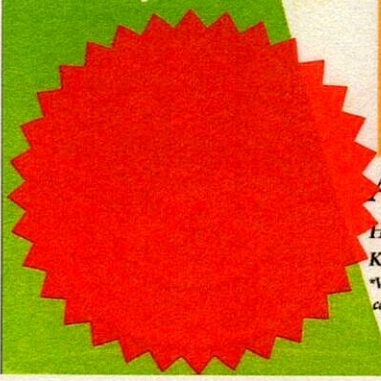
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Dr. KAGNE. R.N
DEAN

SRI MANAKULA VINAYAGAR
MEDICAL COLLEGE & HOSPITAL
KALITHEERTHALKUPPAM,
PUDUCHERRY-605107.



7.1.3.D

Certificate of Registration

This is to Certify that
Environmental Management System of

SRI MANAKULA VINAYAGAR MEDICAL COLLEGE AND HOSPITAL

KALITHEERTHALKUPPAM, MADAGADIPET,
PUDUCHERRY - 605107, INDIA

has been assessed and found to conform to the requirements of

ISO 14001:2015

for the following scope :

IMPARTING EDUCATION RESEARCH SERVICES IN (MBBS AND
MD/MS DEGREES), WASTE MANAGEMENT, WATER
CONSERVATION AND RECYCLING SYSTEM, GREEN
ENVIRONMENT, CAMPUS SUSTAINABILITY MAINTENANCE, AND
RELATED PROCESS AND RESOURCE MANAGEMENT

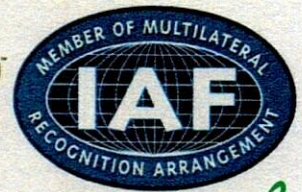
IAF CODE : 37

Certificate No	: 22IEKW99	
Initial Registration Date	: 20/09/2022	Issuance Date : 20/09/2022
Date of Expiry*	: 19/09/2025	
1st Surv. Due	: 20/08/2023	2nd Surv. Due : 20/08/2024

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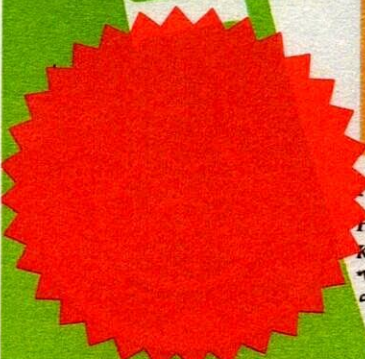
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MEDICAL COLLEGE & HOSPITAL
KALITHEERTHALKUPPAM,
PUDUCHERRY-605107.

ISO 14001:2015





GREEN and ENERGY AUDIT REPORT

Sri
MANAKULA VINAYAGAR



Medical college and Hospital



*Sri Manakula Vinayagar Medical College and Hospital
Kalitheerthal kuppam, Madagadipet,*

Puducherry – 605 107

Submitted by
ACM Certification Pvt Ltd

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SMVMCH- Green & Energy Audit Report, 2021~2022

Dr. KACNE. R.N
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DEAN

SRI MANAKULA VINAYAGAR
MEDICAL COLLEGE & HOSP
KALITHEERTHALKUPPAM,
PUDUCHERRY-605107.

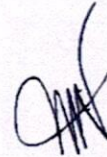
This is to certify that the following utilities were carried out Environmental audit in the month of May 2021.

Details of Facilities Audited: Main college building including: Medical College, Hospitals, Laboratories, Libraries, , All departments and Hostel and college Canteen.

On behalf of ACM Certification Pvt Ltd



Dr. Vanisri Arunachalam



Er. C. Madhan Mohan

ISO 14001:2015 Lead Auditor

Authorized signatory

Date: 22-Nov-2021

Place: Bengaluru

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1. INTRODUCTION

"The term 'Green' means eco-friendly or not damaging the environment. This can acronymically is called as 'Global Readiness in Ensuring Ecological Neutrality' (GREEN).

Green Audit is a process of Systematic identification, Quantification, Recording, Reporting and Analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. 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.

Educational institutions are becoming more sensitive nowadays to environmental factors and more concepts are being introduced to make them eco-friendly. To preserve the environment within the campus, various viewpoints are applied by the institutions to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc..

Green audit is defined as an official examination of the effects, a college has on the environment. As a part of such practice, internal environmental audit (Green Audit) is conducted to evaluate the actual scenario at the campus

An energy audit is an inspection, survey, and analysis of energy flows, for energy conservation in a building, process or system to reduce the amount of energy input into the system without negatively affecting the output(s). In commercial and industrial real estate, an energy audit is the first step in identifying opportunities to reduce energy expense and carbon footprints.

The scope of an energy audit can comprise a detailed review of the energy performance of an organization, Significant Energy User(s), systems, energy-using processes and/or equipment. It is typically based on appropriate measurement and observation of actual energy performance for the defined energy audit scope.

Energy audit outputs typically include information on current energy consumption and energy performance, and they can be accompanied by a series of specific recommendations ranked by energy performance improvement or financial return on investment, based on analysis of specific site data and operating conditions.

In this study Admin buildings, laboratories, Classrooms and Service areas viz. laundry, kitchen, , Backup power supply, AC plant, Fans, air conditioners, Computers facilities, IT infrastructures, Digital Libraries, Hostel facilities etc.. were considered. We have studied total budget of the Institution, total economic investment of Institution on the electricity and total electricity generation from the solar unit. Also, we have studied total saving of "electricity" and the exact contribution of bulb, fans, computer, instruments etc., in the total requirement of electricity. We studied all the above said parts of energy audit by collecting exact details of the inputs through a survey.

The DEAN , Sri Manakula Vinayagar Medical College and Hospital , Pondicherry in requested to carry out Energy Audit at their campus. Energy Audit team had undertaken the energy consumption and other electrical parameter measurements on 22nd November 2021 at their institute.

2. OBJECTIVES

The Green Audit of an institution is self- assessment of the institution which reveals its role in mitigating the present environmental problems. The college has been putting efforts to keep our environment clean since beginning. The non-scholastic effort has not been documented. Hence, the purpose of the present green audit is to Identify, Quantify, Describe and Prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Green Audit are:

To promote environmental aspects, the institute has initiated steps which includes

- a. Rainwater harvesting projects in campus
- b. To Complete ban on plastic
- c. Solar systems within the campus,
- d. Treatment of wastewater and its recycling,
- e. Percentage of power requirement of the University met by the renewable energy sources,
- f. The academy should encourage the faculty and students to use cycles to save environment, prevent air pollution and promote healthy lifestyle.
- g. To suggest for using alternative energy for the conservation of energy resources.
- h. Evaluation of wastewater quality and determination of wastewater characteristics & their effects on the living system.
- i. Introduction and implementation of time saving technologies in regular operations.
- j. To help in minimizing the wastes through modern cleaner technologies.

3. METHODOLOGY

All the campuses of the Institution designed eco-friendly and landscaped with extensive gardens, Plantation with recycled water. The entire campuses are maintained as non-smoking zone. The significant initiatives implemented are:

- Energy Conservation
- Use of renewable energy through solar systems.
- Rainwater Harvesting and Sewage Treatment and Recycling Plant
- Carbon neutrality effort by tree plantation, Prevention of pollution, Reduction of paper usage and Plastic free zone.

The purpose of the Green audit is to ensure the commitments mentioned in the Green policies are adhered. This includes:

- Inspection of the campus,
- Document Review
- Interview with Key personnel
- Measurements and recommendations.

4. EXECUTIVE SUMMARY

SI No	Area	Observation	Remarks
1	Tree Plantation	<ul style="list-style-type: none">• Institution has carried out tree plantation activity.• 90 no's of species planted by students• 3 acres of banana plantation• 50 cents of vegetable garden• 3500 sq.ft of medicinal plants and few are:<ul style="list-style-type: none">○ Ocimum Tenuiflorum○ Aloe vera○ Melia Azadirachta○ Punica granatum	<ul style="list-style-type: none">• Students should plant a tree when they are studying Environmental Science subject• Organic farming initiation will be appreciated

		<ul style="list-style-type: none"> ○ Pisidium guajuva ○ Syzegium cumini ○ Phyllanthus • Vegetables cultivated in the garden <ul style="list-style-type: none"> ○ Lady's finger – 300 Kg ○ Plaintain – 4000 Kg ○ Green Chilly – 50 Kg ○ Brinjal – 600 Kg • Arboretum <ul style="list-style-type: none"> ○ Pentanus – 24 Nos ○ Thyphanbakya – 50 Nos ○ Dracema – 50 Nos ○ Aglonoma – 50 Nos ○ Coloroma – 50 Nos • At least 50 different types of trees can be planted in the campus every year. Area demarcated for the establishment of a gardens of medicinal plants, paddy field and vegetable garden, may be extended. 	
2	Energy conservation	<ul style="list-style-type: none"> • The steps taken to reduce energy consumption is a great achievement Energy conservation by using energy efficient tube fittings and light sources like CFL and LED bulbs. • Every department non-teaching faculty is instructed to switch off lights, fans, electronic devices and AC's when they are not in use and stickers also pasted in all switch board and rooms. • All the faculty members and staffs are instructed to use minimal electricity 	<p>Good support from the institution and Good initiative taken by college towards reduction of energy consumption.</p> <p>Energy efficient electrical equipment's especially fans and pump sets can be replaced against old ones</p>
3	Use of renewable and nonrenewable energy	<ul style="list-style-type: none"> • 755.71 kw-hr capacity solar panels installed 	<p>Good support from the institution and towards reduction of energy consumption.</p> <p>More imitative can be taken to use the solar power panels for</p> <ul style="list-style-type: none"> • Street light • Water Heater

			<ul style="list-style-type: none"> Mess- kitchen/ Canteen/ pumping activities
4	Water harvesting	<p>Several types of water saving system adhered like</p> <ul style="list-style-type: none"> 12 no's of Rain water harvesting system Maintenance of water pipe lines. Signage's about importance of water Ways that could reduce the amount of water used <ul style="list-style-type: none"> Automatic (Sensor) for washbasin Reduce the No of tops/outlets Reduce the water pressure through using of pressure control valve Sensor for urinals Treated Waste treated reused for gardening 	<p>No water management plan</p> <p>Drip irrigation used to water plants outside</p>
5	Efforts for carbon neutrality	<ul style="list-style-type: none"> Tree Plantation, Required to implement Ban of Two and Four Wheeler's within campus which doesn't have PUC, Trap vehicular and fugitive dust emission. 50 cycles used 	<p>Good initiative taken by the institution but need more towards prevention of pollution and make the institution a greenery one .</p>
6	Waste management	<ul style="list-style-type: none"> E-waste are taken away by a third party Paper waste are recycled Food and Vegetable waste are managed through Bio-gas plant 	<p>Good initiative taken by the institution and make the institution a greenery one .</p>
7	Effluent treatment and recycling plant	<ul style="list-style-type: none"> The university has a Sewage Treatment Plant in the campus and the recycled water is used for green campus. Labs waste water treated through STP, does not mixed with ground water 	<p>The institution practices waste water management system effectively to minimize water and to keep the campus clean, hygienic and free from any sort of pollution.</p>

5. ABOUT THE COLLEGE

Sri Manakula Vinayagar Group of Institutions offer courses in Medicine, Engineering, Nursing, Polytechnic and Education offering 52 courses. Our campus spread across 225 acres of land with built up area of more than 25 Lakhs square feet to grown it. We have more than 12500 students, 2500 employees, 150 buses, hostel accommodation for 2000 students and more than 200 staff quarters.

- University Gold medals and 9 out of 10 University ranks continuously from the inception
- Conducted over 6000 surgeries in a year
- The Nephrology department performs more than 1100 cycles of dialysis per month for renal failure patients
- 12 Ultra-Modern operation theatres with laminar flow
- 900 bedded ultra-modern tertiary care and super specialty hospital
- In 2015, South India Medical students conference held in Sri Manakula Vinayagar Medical College and Hospital's central auditorium conducted by the students attracted over 500 Professionals, Faculties and Students
- 75 students were awarded prizes for winning various national and International competitions in the year 2014-2015
- 475 Seminars / Workshops were organized by the institute in the last five years
- 17 Books were published by the faculty of SMVMCH in last 5 years
- In first half of this decade, faculties have submitted 552 research papers
- National level events of 12 were organized in the year 2014-2015

The college offering the following services

- Speciality Services
- Super Speciality Services
- Inpatient Services
- Diagnostic Services
- Cashless Services
- Empanelled Government Health Schemes
- Third party Administrator tie up list

6. VISION & MISSION STATEMENT

NAME	VISION	MISSION
SMVMCH	<ul style="list-style-type: none">To impart holistic, evidence based medical education, quality patient care and ethical research to become globally recognized centre of excellence..	<ul style="list-style-type: none">To undertake continuous quality improvement in patient care and research through accreditation of hospital and laboratories.To inculcate clinical skills, professionalism, medico legal responsibilities managerial and leadership skills among students.To promote clinical research and innovative research in basic science for better outcome.To encourage MOUs with National and International Institutions for centers of excellence

7. CAMPUS INFRASTRUCTURE

Student hostel

The college has well equipped hostel accommodation to its students, separately for Boys and Girls on the campus. The Hostel provides accommodation for all the needy students. The rooms are furnished with Table, Chair, Cot and Fan. A Committee consisting of the following personnel manages the Hostel

- 7.1 Mess/ Canteen facilities** - A clean and hygienic mess for everyone, with all kind of food for all. Separate mess for girls and boys.

7.2 Dining Hall- Campus has been provided with well maintained, hygienic canteen, which serves variety of menus including, Chinese, north Indian at subsidized rate.

7.3 Visitors Room- Has spacious visitors' room and considering the need for privacy when hostellers meet their family. To spend their valuable time, have separate rooms for visitors both in Ladies and Gents Hostel for them

7.4 CONFERENCE HALL - The campus has spacious Conference Hall & Digital Classroom which include facilities like

- Internet connectivity
- Audio visual aids
- Public address systems.

7.5 LIBRARY – Central and Digital Library are available

Digital Library- Sri Manakula Vinayagar Medical College and Hospital digital lab equipped with 40 ultra modern computers of 100 Mbps Internet bandwidth speed is available round the clock within the college premises for the benefit of Staff and Students.

Proquest Full Text 900 and Abstract 300 Online Medical Journals MD Consult, Elsevier electronic product of 84 Full Text Online Medical Journals and 50 leading medical reference E books (Latest Editions). Drug database, Patient Handouts, Medical News, Practical Guidelines, CME, and Medical Images are also available.

N-List (National Library and Information Services infrastructure for Scholarly content) having 55,000 E-books and 2,100 E-journals.

Printout facilities, Uninterrupted power supply.

Central Library- Sri Manakula Vinayagar Medical College and Hospital Central Library is the best among the medical college libraries of Pondicherry.

- Also equipped with an E- Library
- 16 hours service with supporting staff.
- Spacious 2400Sq. mt.
- Medical books 16813 nos.
- Journals 130 nos.
- Back volume of Foreign and Indian Journals 1477 nos.
- Medical CD's 1031 nos.
- Audio visual equipment, internet, Xerox facilities, Uninterrupted power supply.
- Separate Departmental Libraries.

7.6 Events- Diverse events are periodically organised within the hostels to help the residents unwind, network , exhibit their talents and volunteer with the communities they live and study

To name a few:

- Yearly Hostel day celebrations
- Sports
- Cultural events
- Competitive events etc. are made available for residents to have a memorable hostel life.

8. GREEN AUDITING

8.1 Benefits of green auditing

- To safeguard the environment and natural resources used in the institution.
- Address current or potential future problems that may arise during the course of action.
- To provide basis for improved sustainability.
- To create a green campus.

- To enable waste management through reduction of waste Generation, solid- waste and water recycling.
- To create plastic free campus and evolve health consciousness among the stakeholders.
- Providing an opportunity for management to give credit for good environmental performance.
- Empower the organizations to frame a better environmental performance.
- Impart environmental education through systematic environmental Management approach and improving environmental standards.
- Benchmarking for environmental protection initiatives.
- Financial savings through a reduction in resource use.
- Development of ownership, personal and social responsibility for the College and its environment.
- Enhancement of college profile.
- Developing an environmental ethic and value systems in youngsters.
- Green auditing should become a valuable tool in the management & monitoring of environmental and sustainable development programs of the college.

8.2 Target areas of green auditing

Basically, Green Audit involves the inspection to assess the total environmental impact of its activities. It indicates what type of carbon footprints organizations are leaving on the planet & also suggest ways to reduce it.

Accordingly, Green Audit mainly emphasizes the following key areas:

1. Energy Conservation
2. Saving Water
3. Greening the workplace

- a. Efforts of carbon neutrality
 - b. Plantation – Botanical or Medical Significance
 - c. Non-conventional Energy sources-solar panels
- 4. Waste Management**
- a. Bio- Hazardous
 - b. E-Waste
 - c. Other wastes
- 5. Effluent/Sewage Treatment and Recycling plant**

8.3 Methodology of Green Auditing

8.3.1 Data Collection

8.3.2 Data Analysis

8.3.3 Observation

8.3.4 Recommendation

8.3.5 Review of Documents and Records

8.3.1.1 Data collection

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

Following steps were taken for data collection:

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

8.3.1.4 FLORA & FAUNA

ARBORETUM

S. No.	Name	Quantity
1	Pentanus	24
2	Thyphanbakya	50
3	Dracema	50
4	Aglonoma	50
5	Coloroma	50

MEDICINAL PLANTS

S. No.	Name
1	Ocimum Tenuiflorum
2	Aloe vera
3	Melia Azadirachta
4	Punica granatum
5	Pisidium guajuva
6	Syzegium cumini
7	Phyllanthus

PLANTATION

3 Acre of Banana Plantation

TREES

S. No.	Name	Quantity
1	Mango Tree	22
2	Jambul Tree (Naval Tree)	12
3	Bablimos Tree	6

4	Sweet Lemon tree	16
5	Pomegranate Tree	8
6	Papaya Tree	26
7	Jackfruit Tree	21
8	Sweet apple Tree	9
9	Mango groves	3

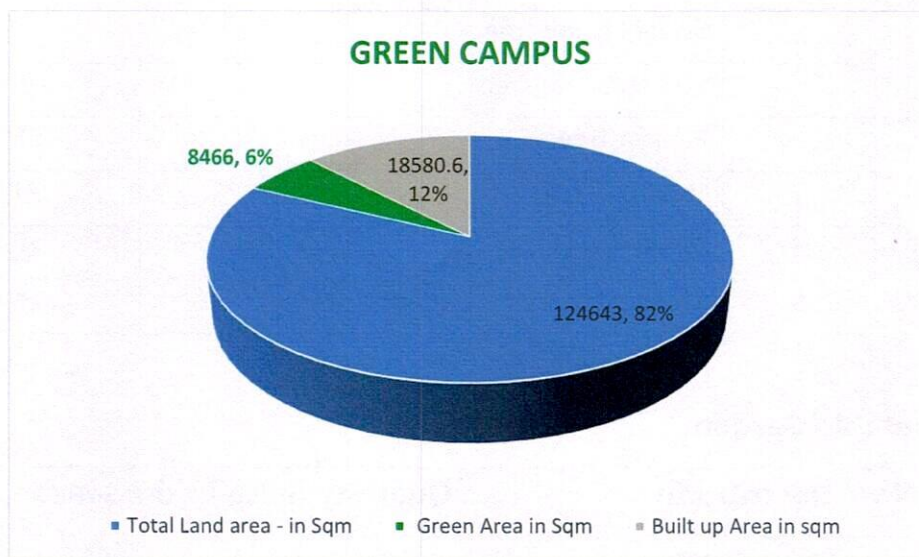
Vegetable Garden

Sr No	Description	Quantity in Kg in the season
1	Lady's finger	300
2	Plaintain	4000
3	Green Chilly	50
4	Brinjal	600

DESCRIPTION- FAUNA	Zoological name
SPIDERS	Araneae
Reptiles	Reptilia
Birds	Aves
Mammals	Mammalia

8.3.1.5 Green Campus

Total Land area - in Sqm	124643
Green Area in Sqm	8466
Built up Area in sqm	18580.6



8.3.2 DATA ANALYSIS

Detailed analysis of data collected including calculation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by the Tamilnadu State Electricity Board Data related to water usages were also analyzed using appropriate methodology.

8.3.2.1 Electricity

Statement of Electricity and DG Set Expenditure

S.No	Description	2020-21
1	Sanctioned Electricity capacity details	1600KVA
2	Month-wise units consumed and corresponding charges for each Input along with power factor details	232167 Kwh & Rs: 1311743/0.98
3	Diesel Generators Details (Number and its ratings)	725KVA and 500KVA
4	Energy Generated by D G month-wise details	16300Kwh
5	Cost of Diesel charges	Rs:97790
6	Total Cost TANGEDCO and DG sets	Rs:1409533
7	Average Occupancy during the year	950
8	Cost per capita	12.3642982

Statement of power generation by VRF/AC

S.No	Description	20-21 VRF	20-21 AC
1	Capacity of VRF in KW	20 HP -01 18HP -01	216 Ton
2	Average Use per day in hours	8	8
3	Electrical power consumed per day in KW-hr or Units	288.8Kw	1.728Kw
4	Energy utilization per year(310Days) in Units	89.528 Units	535,680.00 units
5	Rate /Unit	2.75	6.05
6	Total Amount in Rs	246.202	3240864

8.3.2.3 ANALYSIS OF WASTE GENERATION AND DISPOSAL

Biodegradable waste

- Kitchen waste, vegetables, fruits, flowers, leaves from the garden, and paper are collected in a bin separately.
- Kitchen food waste and vegetable / fruit waste are used in piggery composting.
- Paper waste is sold to a third party agency.

Non-biodegradable waste

- Plastics, glass, metal, etc. are collected in a separate Bin.
- There is no plastic waste in our campus.
- Other wastes like glass, metal and E-waste are taken away by a third party.

Waste treatment systems in place

- Plastic shredding unit
- Initiation of vermicomposting
- Initiation of Bio gas plant

Total Biodegradable waste in kg/ day	77.25
Non-biodegradable waste in kg/ day	7.5
Hazardous wastes in kg/day	95
Canteen waste in kg/day	76
Liquid waste in Its / day	28000
Glass waste in kg per annum	5

8.3.3 Major Audit Observations

- Observed that college has promoted environmental aspects and initiated steps which includes in campus rainwater harvesting projects within the campus
- Practiced complete ban on plastics within the campus.
- Renewable energy sources like solar panels used for power generation.
- The future goal is to make the institution, a paperless organization.
- Hence the SMVMCH promotes the eco-friendly initiatives include energy conservation, use of renewable energy, rainwater harvesting, sewage treatment plant, domestic waste and biomedical waste management and air pollution control.

8.3.4 Recommendation

Based on results of data analysis and observations, some steps for reducing power, water consumption, greening the workplace, waste management and effluent treatment and recycling plant were recommended. Proper treatments for waste were also suggested. Use of fossil fuels must be reduced for the sake of community health

Target Areas of green auditing in Detail

8.3.4.1 Energy Conservation – This includes energy audit where the auditors identifies way to save electric, natural gas, and other forms of power that are inefficient or being wasted in the organization. This is done by recommending more efficient electric heating & cooling etc.

The following are steps taken to ensure the energy conservation

- Tungsten bulbs have been replaced with LED and CFL (compact fluorescent lights) which conserve energy.

- The college has around 950 solar panels with a capacity of 100KV electricity which is being used for street lights, Admin Block and for all class rooms
- All the Fans, Lights and Air conditioners are maintained in the switched off mode when not in use. The slogans insisting the necessity to switch off the Fans, Lights & AC's displayed above to all the switch boards in the campus.

Recommendation

- Light fittings are needed to be cleaned regularly to ensure optimal lighting.
- Windowpanes are to be cleaned regularly to allow in more day light.
- All air conditioners are with local control and are used only when necessary. They are needed to set at comfortable 25 degrees.
- All computers, printers, photocopiers and other equipment are have to be switched off at the end of the day.
- Standby settings on LCD projectors, printers and computers are to be avoided.
- No of Energy efficient ceiling fans must be increased to conserve more power.
- Ensure Fridges are not placed next to heat sources.

8.3.4.2 Saving water- This involves educating the employees on ways to save, recycle & reuse precious water resources both inside & outside the premises. The basic emphasis should be to reduce water consumption.

Source of supply	Amount of Water used in liters	Point of entry of water and point of exit of waste water	Mode of treating waste-water
Tube well (Bore well)	45000	Water entry from OHT to toilets, Canteen, Labs and the waste water exit through chambers.	STP

Description	Qty in No's	Water used per day in Its
Water coolers	24	3500
Water Taps- Medical college, Hospital and Hostels	1249	245000
Toilet, urinals- Medical college, Ladies hostel, Boys hostel, Hospital	664	115000
Canteen- Hospital , Medical College	20	17500
Amount of water used for garden		220000
Taps in lab- Medical college and Hospital	165	12500
Water used in hostel- Boys and Ladies	-	35000 54500
Amount of water used for bus cleaning	-	2500

- ❖ 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.
- ❖ No water treatment system in place.
- ❖ Water cooler with drinking water filtration is installed **(24 numbers)**.
- ❖ Number of urinals and toilets – **Toilets – 664 Nos, Urinals–191 Nos**
- ❖ Number of waterless urinals - **Nil**
- ❖ Number of bathrooms – **344 Nos**
- ❖ Number of water taps – **1249 Nos** (taps are leaky - **Nil**)

SMVMCH- GREEN & ENERGY AUDIT REPORT
KALITHEERTHALKUPPAM
PUDUCHERRY-605107

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- ❖ Water taps in laboratories - **165 Nos**
- ❖ Number of wells – **1 No** tube well and open wells - **Nil**
- ❖ Number of ponds – **1 No**
- ❖ Water pumps – **1 No (12.5 hp)**
- ❖ Depth of each well – **Bore Well (110 feet)**
- ❖ Quantity of water pumped – **2,50,000 liters/day**
- ❖ Total water in the overhead tanks – **1,27,000 Lts**
- ❖ Water charges paid – **water charges approx. Rs.11,000/-**
- ❖ Number of water tanks for water storage – **9 Nos**

Steps taken to conserve water are as follows:

Rainwater Harvesting System is installed to collect rainwater from roof top of the buildings and allow it to flow to the nearest open well.

Four ways that could reduce the amount of water used in SMVMCH college.

- i. Automatic (Sensor) for washbasin
- ii. Reduce the No of tops/outlets
- iii. Reduce the water pressure through using of pressure control valve
- iv. Sensor for urinals

8.3.4.3 Greening the workplace

This is achieved by the following activities of designing a greener office space like:

1. Efforts for carbon neutrality- Tree Plantation, Reduction of paper usage , and ban on plastic to make the campus as plastic free zone,
2. Use of renewable energy sources
 - a. Solar Energy
3. Waste Management
 - a. E-Waste
 - b. Bio and non-biodegradable
 - c. Other wastes

4. Water recycling

In one year, a single mature tree will absorb up to 48 pounds of Carbon-Di-Oxide from the atmosphere and releases its oxygen. The amount of oxygen that a single tree produces is enough to provide one day's supply of oxygen for people.

a. Efforts of carbon Neutrality

Current Practice

- Tree Plantation.
- Saplings were planted inside the campus and sustain it more.
- 35 buses used by the stakeholders of the college.(per day)
- 50 cycles used per day
- No. of two wheelers used (average distance travelled and quantity of fuel and amount used per day) – 50kms /Rs.70X1300 = Rs.91,000/-
- No. of cars used (average distance travelled and quantity of fuel and amount used per day) – 50Kms/Rs.70X400 = Rs.28,000/-
- No. persons using common (public) transportation (average distance travelled and quantity of fuel and amount used per day) 300 persons X 50= Rs.15,000/-
- No. of persons using college conveyance by the students, non-teaching staff and teachers (average distance travelled and quantity of fuel and amount used per day) – Rs.10,000/-
- 440 visitors with vehicles per day

Transportation means of stakeholders

Stakeholders	Bus	Bike	Car	Autorik shaw	Cycle	pedest rians	Total (No of persons)
Staffs	8 (8X60=480)	500	30	Nil	25	350	1385
Students	7 (7X60=420)	400	20	Nil	Nil	Nil	840

Visitors	Nil	400	30	10	Nil	100	540
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Recommendation

- Restricted entry for vehicles to the campus to keep the campus pollution free.
- The staff is also encouraged to use carpool to reduce consumption of fuel, pollution and reduce carbon footprint.
- The university vehicles are to be checked by the RTO and provided with (CNG) pollution-free stickers.
- Recommend to the institution to launch a drive to reduce the use of paper and paper usage must be replaced by soft copies like scanned copies and images and circulars are to be sent via e-mails and text messages.
- The future goal is to make the institution, a paperless organization.
- Recommend using Environment friendly jute bags to the delegates during the undergraduate conferences or any other occasions.
- The use of polythene covers are not to encourage on campus instead everyone is encouraged to use paper bags / cloth bags.
- College observe " no own vehicle day" every month. The second Tuesday of every month is dedicated for it. Teachers and students are not allowed to take their private vehicles on that day and are supposed to reach college via public transportation methods. The no own vehicle day is widely accepted among students and teachers and is hugely appreciated by the community.
- 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 in the campus due to vehicles.

b. Use of renewable Energy source

• **Solar Energy-**

Current Practice- Solar panels installed capacity 755.71 kwh

Recommendation

- Solar water heater can installed in college/ hostel/canteen
- Street lights from solar or any renewable energy can be introduced

c. Waste Management-

- **Hazardous waste**
 - **Bio Medical Waste-**302 kg/day
- **Food Waste-**241 kg/day
- **Canteen Waste-** 76 kg / day
- **Liquid waste-** 28000 lts/ day

Current Practice

- i. Composting
- ii. Recycling
- iii. Reusing
- iv. Disposed to third party
- v. Food and vegetable waste-Bio gas plant
- vi. Waste segregation in different colored containers Green (Degradable) and Yellow (Non-degradable)
- vii. Papers are recycled
- viii. Waste wealth program practiced

Recommendation

- i. To inculcate environment awareness among the students and to urge them to recycle waste materials, they are encouraged to actively participate in competitions on 'Junk Art' - making art from waste etc.,
- ii. Green computing through implementation of energy-efficient central processing units (CPU's), servers and peripherals and all the equipment in the laboratories and departments are under Annual Maintenance Contract (AMC) to ensure their optimum functioning.
- iii. Minor repairs are set right by the staff and the Laboratory.
- iv. Assistants and the major repairs are to be undertaken by the professional technicians and the equipment is reused.
- v. Separate e - waste bins are to be maintained in the campus.

○ **Bio and Non-biodegradable waste**

The institution has generated the below wastes from various department including canteen, Garden, Auditorium, Bathrooms and premises

- Total biodegradable waste is accumulated as 77.25 kg/day and Non-biodegradable waste in kg/day as 75 kg/day.

○ **Other wastes - Types of wastes and its disposal method**

- i. Plastic wastes. –No plastic waste generated
- ii. Solid wastes – Damaged furniture, paper waste, paper plates, food wastes – to Municipal waste collection centers.
- iii. Chemical wastes – Laboratory waste – Treated with STP
- iv. Waste water – washing, urinals, bathrooms in soak pits
- v. Glass waste – Broken glass wares from the labs to municipal waste collection centers.

Recommendation- Nil

d. Water recycling

Current practice

Sewage Treatment plant is available and its treated 60000 lts per day which is used in Garden Area

Lab waste water sent for STP and doesn't mixed with ground water

Maintaining the record of water consumption

Recommendation

- Wherever possible, should minimize the water usage
- Drip irrigation for gardens and vegetable cultivation can be initiated

9. ENERGY USE AND CONSERVATION

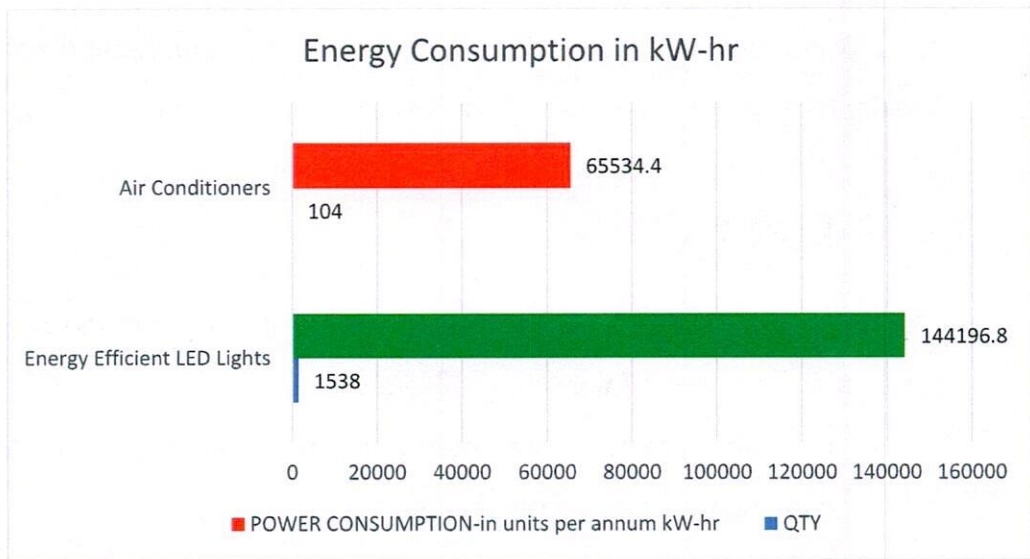
TOTAL POWER REQUIREMENT OF VARIOUS EQUIPMENT

Department/Infrastructure	CFL BULBS	LED BULBS	FANS	A/C	TUBE LIGHTS	COOMPUTERS	PHOTOCOPIER	TV	CCTV/DVR	WATER HEATER/STERLIZER
Full college/ Admin/ Hostel / other	1122	1538	3124	104	4956	328	12	42	7	172
POWER CONSUMPTION(KWh) in units per annum	123448.44	144196.8	721375.2	65534.4	631026.72	18096	1800	4401.6	3150	594720

“The college uses energy efficient lights of 1538 numbers, which consumed only 20 % of power compared to normal lights. So savings is attained almost 80 %.”

BUILDINGS AND ENERGY EFFICIENT EQUIPMENT

SL NO	CATEGORIES	QTY	POWER CONSUMPTION-in units per annum
1	Energy Efficient LED Lights	1538 No's	144196.8
2	Air Conditioners	104 No's	65534.4 kW-hr



8.3.4 Review of Documents and Records

Documents such as admission registers, registers of electricity and water charge remittance, furniture register, laboratory equipment registers, purchase register, audited statements, and office registers were examined, and data were collected. College calendars, college magazines, annual report of the college etc. were also verified as part of data collection.

10. AUDIT STAGE

Objective: Meeting of the team with the appropriate personnel of the unit

The 3 primary functions on site activities are

- Record & documentation review.
- Interview with staff.
- Physical inspection of the facilities.

Data collection was done in the sectors such as Energy, Waste, Greening, and Water use. College records and documents were verified several times to clarify the data received through survey and discussions.

11. CONCLUSION

Although the concept of Green Auditing is being implemented & appreciated, it should overcome the following challenges:

- Reducing power, Water consumption, Greening the workplace, Waste management were recommended.
- Encouraging responsible water use through posters/placards/ incentives/ contests/ awards.
- Meters needs to measure the water consumption from the resources.
- The Electrical Equipment's are well operated. Redundant operations are avoided.
- The students, staff members and guests have access to clean, safe and potable water.
- Sustain the awareness programs for students and faculty about the recycling through plastic free cell.
- Take more initiative to sustain the Zero garbage through Reduce, Recycle, Reuse and Refuse.

- Non inverter Air conditioners can be replaced by inverter based 5 Star rating for Eco friendly, Power consumption, Energy Savings, Sound, Longer life and fast cooling/heating.
- Recommended to use more number of energy efficient fans to conserve energy.
- Solar street lights can be introduced from the solar power source.
- Proximity/ Motion sensor can be introduced in the rest room and storage room.
- Small wind mills can be established for pumping water at the bore well places.
- Load can be shared equally to reduce the losses and conserve energy.


Positive points:

Some of the positive points mentioned here which is already in practice, and shall recommend following the same.

- Power factor is maintained above 0.9 for different load conditions.
- The Tungsten lights have been replaced with compact fluorescent lights/LED which conserves energy.
- During the day, lights are switched off to make use of daylight.
- All air conditioners are with local control and are used only when necessary. They are set to a comfortable 25 degrees.
- The use of renewable energy is highly recommended to sustain the same.

Considering the fact that the institution is Medical College the environmental awareness initiatives are to be sustained. The installation of solar panels and rainwater harvesting system are noteworthy. Besides, environmental awareness programs initiated by the administration shows how the campus is going green. Few recommendations are added

to using eco-friendly and scientific techniques and to conserve energy. This may lead to the prosperous future in context of Green Campus & thus sustainable environment and community development. As part of Energy audit in the campus, we carried out the environmental monitoring of campus including Illumination and Ventilation of the classroom. It was observed that Illumination and Ventilation is adequate considering natural light.



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