

2021

Environment Audit Report

of

**Adhiparasakthi Dental College
and Hospital., Melmaruvathur**

Environment Audit

Done by

Sri Energy Solutions

21/01/2022

Project Report Title : Environment Audit

Client Name : Adhiparasakthi Dental College and Hospital

**College Location : GST Road,
Cheyyur,
Chengalpattu – 603 319**


Date of Audit : 21.01.2022

Environment Audit by : M/s. Sri Energy Solutions, Udumalpet

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Acknowledgement

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Our special thanks to **Dr.S.Karthiga Kannan – Principal and Dr.V.Sudhagar., NAAČ coordinator** for their co-operation and support us to carry out the Environment audit on time.

In addition with this, we are grateful to your staff **Dr.Ramya.,** for their co-operation and support us to carry out the Environment audit very effectively.



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1. Introduction

Adhiparasakthi Dental College and Hospital is one of the leading autonomous educational institution affiliated to the tamilnadu Dr.MGR medical university. This college was established by **Arul.Thiru.Padmashri Bangaru Adigalar through Adhiparasakthi Charitable, Medical, educational and cultural trust (ACMEC)** in the year of 2005.

This college is located in the prime location of Melmaruvathur city. This college is having lot of courses in Dental science with completely equipped. It has been providing quality education to the rural and urban students of Tamilnadu, Andhra and Kerala. This institution has one three LT TNEB services and three backup generators. High quality panels and switch gears are connected with this service for giving quality supply to the equipments. The capacity of generator is also well enough to meet the demand.

This college is located is well away from main road which leads to dust free environment. More over college is concentrating much on Green garden with enough trees and plants. The water supplied inside the campus is good. On the next step, the management decided to conduct the Green audit in their institution to provide effective environment.




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2. Objectives

The main objectives of the environment audit are to promote the environment management and conservation in the college campus. The purpose of the audit is to identify, quantify, describe and priorities framework environment sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Environment Audit are,

- To check that the natural resources are properly utilized and to control the adverse effect on the environment
- To check that proper steps have been undertaken for maintaining health, welfare of the community and also for dispersal of harmful wastes and social risks
- To introduce and make aware students to real concerns of environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and the extent of resource use on the campus
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requires high cost
- To bring out a present status report on environmental compliance



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3. Methodology

In order to perform environment audit, the methodology included different techniques such as physical inspection of the campuses, observation and review of the documentation, interviewing key persons, and data analysis, measurements and recommendations. The study covered the following area to summarize the present status of environment management in the campuses:

- Water quality assessment, consumption and management
- Air quality assessment and management
- Electricity consumption and management
- Sound pollution monitoring
- Waste management
- Biodiversity status of the campus
- Environment awareness development
- Developing green belt
- Encouraging alternate energy use



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4. About the College

Institutional Vision

The vision of the institution is to truly emerge as an internationally acclaimed institution by imparting the relevant practical knowledge and value educations through state-of-the-art technologies which will enrich the student's learning with a unique experience and suitably empower them to render their noble services for the well-being of the mankind.

Mission of the College

M/s.Adhiparasakthi Dental College and Hospital has the Missions of

- ❖ To render the services to the poor and needy
- ❖ To provide meaningful and comprehensive higher education through its undergraduate and post graduate doctoral programs, research and training programmes
- ❖ To impart higher technical skills, experiences and specialized academic excellence to the students thereby fostering innovation
- ❖ To create a rich and pleasant environment for studying, living and working where education and research go hand in hand
- ❖ To serve the under-served, nurture learner centric quality dental education, quality patient oriented services, community Centered research, excellence in knowledge, skills and strategic future oriented planning that meets the national, global dental educational standards.

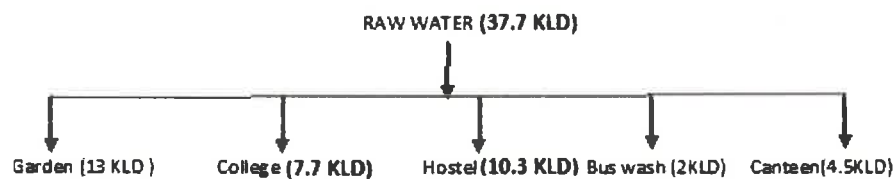


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5. Water Quality Assessment, Consumption and Management

In Adhiparasakthi Dental College and Hospital have three open wells. The college extracts around 37.7 KLD of water from bore well and utilizing to the college uses.

The water balance chart of college is given below,



The MPN index of water samples at different locations are given below,

Sample No	Location	MPN Index (per 100ml)	Water Quality
1	Class Room - GF	00	Outstanding (Potable)
2	Class Room - FF	00	Outstanding (Potable)
3	Class Room - SF	00	Outstanding (Potable)
4	Staffs Room	00	Outstanding (Potable)
5	Canteen	00	Outstanding (Potable)
6	Tap Water	17	Good (Non-potable)
7	Bore water	72	Average (Non-potable)

The following actions can be taken up to reduce the water usage and save environment for future generations



- Fixing of Aerators in all taps
- Scheduled watering to garden especially in early morning or late evening
- Usage waterless urinals
- Fixing of metering system to monitor water usage
- Providing drip irrigation to garden to reduce water usage
- Conduct water conservation program to students and nearby villages in order to conserve water
- Construct water treatment plant to treat the waste water and reuse it for bus cleaning and other cleaning purpose
- Conduct water leak test once in a month to reduce water wastage through leak

Most of the above points were discussed with top management and agreed to take immediate actions to conserve water.

College has good practice of using water to garden. Thereby nowhere waste water discharged as it is. Still we can try to treat this waste water and can be used to all other purpose.



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6. Air Quality Assessment, Consumption and Management

The following air quality parameters were measured using Airveda and government's official sites.

Parameter	Minimum Value ($\mu\text{g}/\text{m}^3$)	Maximum Value ($\mu\text{g}/\text{m}^3$)
PM 2.5	49	328
PM 10	68	224
O ₃	1	71
NO ₂	2	28
CO	18	47
NH ₃	2	9
NO	0.02	1.95
NO _x	9.19 (ppb)	96.2 (ppb)
SO ₂	1	13
Temp	26	31
Pressure	823	1010
Humidity	48	75
Wind Speed	8	17

Present air pollution level is in the range of good due to less population and lighter transport. Lot of efforts is taking up to reduce the air pollutions. Adhiparasakthi dental college and hospital developed good green belt. Management takes lot of efforts to improve further.

The location of this college is close to busy roads. Still the management had taken effective steps to provide comfort environment. Thereby the college students and staffs are enjoying high quality air and less noise. Moreover the college is maintaining lot of garden and trees to give more than enough clean air than what is required. As per the air sector the college is performing so better.



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7. Energy Consumption Analysis

Load Pattern

Load Type	Load In KW
Lighting	45.24
Fan	109.575
AC	118.08
Pump	8
Electric Heater	4
Computer	11.2
Dental Chair	219.2
Others	17.25
Total	532.545

Energy saving Potential in Lighting

Item	Population	Existing Light in Watts	Proposed LED Light in Watts	ES Potential in watts	Energy saving in KWH
Tube Light	383	40	20	20	7.66
Night Lamp	312	15	3	12	3.74
Compound Light	30	50	30	20	0.6
Total					12



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Energy saving Potential in Fan

Particulars	Load in KW
Existing Fan load in KW	109.575
Energy Saving Potential with Fan in KW	58.44

Energy saving Potential in Air Conditioning

Particulars	Load in KW
Existing Air Conditioner load in KW	118.08
Energy Saving Potential with AC in KW	17.712

Key Points

- Average energy consumption is 32 KWH per hour in day time
- Both voltage harmonics and current harmonics are on higher side requires harmonics mitigation equipments at all UPS and Lighting Circuits
- Isolated earthing is needed for all UPS and Lighting Circuits
- Some portion of the tube lights are conventional 40W bulbs and the same should be replaced with 20W LED tube light which gives same illumination. This saves 50% of energy bill.
- Most of the ceiling Fans used here are conventional type 75W fans and the same should be replaced with 35W BLDC Fan which saves 53% energy bill.
- Air conditioner can be operated with AC energy saver which saves 15% energy bill.
- We are utilising 50 KW solar power plant which is reducing the day time TNEB consumption
- We can go for solar water heater and thereby we can reduce water heater consumption
- Introduce the practice of conducting the leak test with compressor atleast once in a month.



8. Sound Pollution Monitoring

Sound pollution is another important parameter that is taken into account for green auditing of the college campus. Sound is quantified by the Sound level meter (Lutron– SL4030)

Location	Average Sound Level (db)
Ground Floor	69
First Floor	65
Second Floor	61
Canteen	65
Main Gate	59
Hostel	57
Laboratory	61
Power House	47
Library	41
Office	50
Principal Room	49
Conference Room	47
Reception	54
Play ground	56

The sound levels measured in different location of this campus are found satisfactory.



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9. Waste Management

This indicator addresses waste production and disposal of different wastes like food, Paper, Plastic, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair and reuse. For proper segregation and management, proper use of waste bins is the only solutions for waste management purpose in the college campus.



In Adhiparasakthi Dental college and Hospital, there is a practice of collecting the waste with colour coded bins. Each floor contains two or more sets of colour bins for proper waste management.



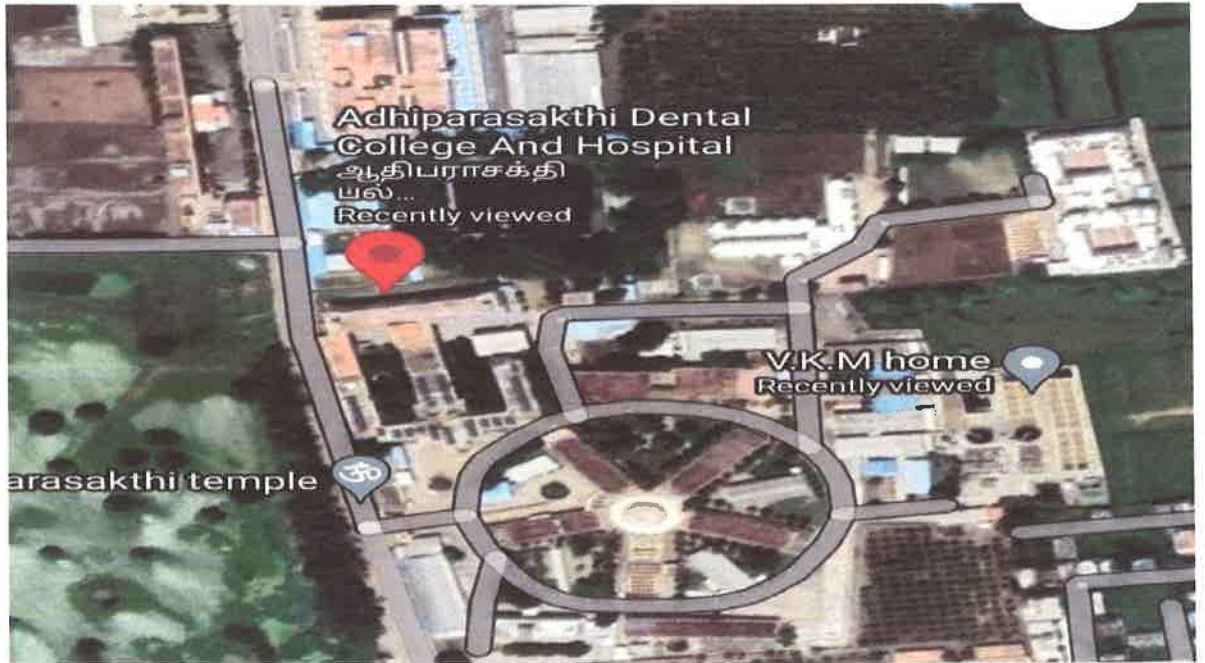
Location	Number of Waste bins
College – Ground Floor	6 Nos
College – First Floor	6 Nos
College – Second Floor	6 Nos
Canteen	3 Nos
Hostel	6 Nos

Moreover the college has placed lot of display boards to reduce the waste generation which aids to maintain good environment system inside the college campus.



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10. Green Campus



- ❖ Total number of Ornamental plants identified – 3,432 Nos
- ❖ Tree cover of the campus –682 m²
- ❖ Free space in the campus – 42800 m²
- ❖ Garden area inside the college – 1.52 acres

The college has maintaining lot of Plants and trees which helps the college surrounding looks more pleasant. This gives pleasant air with good thermal comfort to the students. In addition with all the class rooms were equipped with sufficient Window to floor ratio and enough number of ceiling fans



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11. Carbon Footprint

- ❖ Petrol used by two wheelers/day – **300 L**
(Per person to and fro 40 kms = 1L)
- ❖ Fuel used by four wheelers (12 Persons) - **24L**
(Per person to and fro 40 kms = 2L)
- ❖ Fuel for persons travelling by common transportation = **46.5 L**
- ❖ Fuel used by DG set – **0.5L**
(Based on average consumption per day)

- ❖ Total fossil fuel use is **371 L / day**

- ❖ Total fuel cost per day for transportation = Rs 34,132/-
(371 L x Rs 92)
- ❖ Cost of Gas cylinders used Rs. 12600/month (6 cylinders)
- ❖ Amount spent for transportation (office) – Rs. 5600/month(Approx.)
- ❖ Amount spent for transportation (canteen) – Rs. 7200/month
- ❖ Amount spent for transportation (visitors) – Rs.7500/year
- ❖ Other expenditures for the energy – Rs.45/day



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Burning of fossil fuels is the main source and cause of carbon dioxide release to the atmosphere. Carbon dioxide release for the stakeholders to reach the college is very high. It is contributing to the global warming and increasing the pace of climate change. If a College bus is fully utilised for the staff and students means carbon dioxide released for the stakeholders' commutation can be reduced. More trees are planted in the campus in order to make a source of sink for the carbon dioxide and for other green house gases.

$$\begin{aligned}
 \text{Annual CO}_2 \text{ emission by the college} &= (371 \times 250 \times 2.65) + \\
 & (300 \times 1.8 \times 3.01) \\
 &= 247.4 \text{ MT of CO}_2 \\
 \text{Annual Absorption of CO}_2 &= (3286 \times 9.4) + (1330521 \times 0.32) \\
 &= 456.5 \text{ MT of CO}_2
 \end{aligned}$$

List of eco friendly activities going on in the campus

- ❖ Planting and caring of trees in and around the campus.
- ❖ Timely disposal of wastes from the campus.
- ❖ Celebration of important days like World Environment Day, Ozone day with great importance.
- ❖ Campus is declared plastic free.
- ❖ Management has decided to adopt green protocol
- ❖ Distribution of medicinal plant saplings among students



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12. Alternative Energy Use

Solar Power Plant

The maximum power consumption is between 9AM to 3 PM. College has 50 KW of Solar Power Plant. This solar power plant is reduces our TNEB power consumption and supports our green initiative. M/s.Adhiparasakthi Dental science and hospital maintains the solar power plant very effectively.



Solar power plant daily power generation	=	225 KWH
Annual Solar power plant generation	=	67500 KWH
Annual Co ₂ Reduction by solar power plant	=	64125 Kgs



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Solar Water Heater

M/s.Adhiparasakthi Dental science and hospital maintains the solar water heater plants very effectively. Thereby this institution reduces the TNEB power consumption for hot water generation. Thereby it reduces Co₂ by solar water heaters.



Solar hot water generation quantity per day	=	6000 Liters
Heat generation by solar hot water plant per day	=	2,10,000 Kcal
Equivalent electricity requirement of 2,10,000 Kcal	=	244 KWH
Annual electricity reduction by solar water heater	=	73200 KWH
Annual Co ₂ Reduction by Solar water heater system	=	69,540 Kgs



13. World Environment Day Program

World environment day was celebrated on 05/06/2021 based on the theme " Environment Restoration " . Considering the prevailing Covid situation, The NSS committee encouraged online poster awareness competition for students on the theme. Student volunteers enthusiastically took part in the event to create awareness about environment restoration.



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14. Rain Water Harvesting

M/s.Adhiparasakthi Dental College and Hospital constructed with lot of rain water harvesting pits. This will supports to recharge the ground water level. College had the provision to store the rain water for their internal use in future. This is the very good step towards the environment protection.



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15. Sewage Treatment Plant

M/s.Adhiparasakthi Dental College and Hospital has Sewage treatment plant for treating waste water and then treated water is used for garden purpose. This appreciable work by this college to reduce the fresh water requirement and to protect the earth from contaminated water



The college has enough green belt to utilise the treated water well. Moreover college has consent to operate from Pondicherry pollution control board. This indicates that the college will maintain effluent treatment plant in operation continuously.

Moreover can think about earth worm based sewage treatment plant which will reduce the aeration energy consumption in effluent treatment plant. At the same this technology will give fertiliser to their own land too. Treater water from the above technology has more nutrition value to support the green belt.



16. Bio-Gas Plant

M/s.Adhiparasakthi Dental College and Hospital has bio-gas plants. The wastes from Hostel and canteen utilized at bio-gas plant. Thereby it reduces LPG requirement and also reduces waste accumulation. This is the great step to protect our environment from pollution



17. Floral Diversity

M/s.Adhiparasakthi dental college and Hospital maintains floral diversity in great manner. They are maintaining different kinds of plants and also have plan of improving their herbal garden in near future.



18. Faunal Diversity

M/s.Adhiparasakthi Dental College and Hospital maintains faunal diversity in great manner. They are maintaining different kinds of plants to attract different faunal in their campus.



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19. Major Audit Observations

- ❖ The environmental awareness initiatives are substantial.
- ❖ Solar plant generates enough power to reduce their internal energy consumption from TNEB Grid. Thereby we can reduce our TNEB bill
- ❖ Solar water heater is utilized for hot water generation and thereby it reduces TNEB power consumption is a good sign about environment
- ❖ Bio-gas plant is working well to reduce the LPG requirement. It is a good sign about environment protection
- ❖ Rain water harvesting is maintained with greater area and recharging of water is good enough
- ❖ Training in vegetable cultivation and composting practices are inadequate.
- ❖ Gardens inside the college premises are found well maintained.
- ❖ Programs on green initiatives have to be increased. Campus is declared plastic free, stringent actions should be taken to maintain this.
- ❖ Lot of NSS program conducted related cleaning activities in villages around the college are appreciable.
- ❖ Energy Conservation group also needed
- ❖ Separate group is needed to plan and cultivate location based plants to reduce the water consumption of the Garden
- ❖ College should take initiative to educate the nearby village peoples about global warming and waste management through their programs



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20. Water Audit Findings

- ❖ Water consumption monitoring system in the college campus needs to be started.
- ❖ The college has sewage water treatment for waste water generated from laboratories, canteen, hostel kitchen, toilets, bathrooms and office rooms.
- ❖ Fixing aerators to water taps to reduce the water consumption is on the way
- ❖ Display boards against the misuse of water use are needs to be improved.

21. Energy Audit

- ❖ The communication process for awareness in relation to energy conservation is found adequate.
- ❖ Monthly use of electricity in the college is very optimum
- ❖ Solar power plant, Solar Hot water plant and Bio-gas plants are great steps to reduce the energy consumption
- ❖ Objectives for reducing energy, water and fuel consumption are merged.
- ❖ There are fans of older generation and non energy efficient which can be phase out by replacing with new energy efficient fans.
- ❖ New projects are going out with Energy efficient product (LED) is a good sign
- ❖ Regular monitoring of equipments and immediate rectification of any problems needed and monitored.



22. Waste Audit

- ❖ Solid waste management systems established are needs to be improved.
- ❖ The college has proper communication with the local body for regular collection of solid waste from the campus.
- ❖ Waste bins in the class rooms, veranda, canteen and campus are adequate.
- ❖ Green chemistry labs are needs to be introduced.
- ❖ Bio-gas plants supports in a greater way to reduce the food wastes

23. Green Campus Audit

- ❖ Tree cover of the college with respect to the stakeholder strength is needs to be strengthened.
- ❖ Regular planting of trees in the campus are adequate.
- ❖ Display boards to all plants identified are needs to be improved.
- ❖ Water uses for gardens are adequate. Still we can reduce.
- ❖ There is only very few fruit trees in the college to attract birds.
- ❖ Registry for flora and fauna on the campus is needs to be improved
- ❖ College needs to plant more herbal plants

24. Carbon Foot Print Audit

- ❖ College has not yet taken any initiative for carbon accounting.
- ❖ Encourage students to use cycles.
- ❖ 371 liters of fossil fuel is burned every day for the functioning of the college. This is too high carbonemission, but It is compensated by high amount of Plants and trees
- ❖ Usage of 6 gas cylinders per month is high.



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25. Preparation of Action Plan

Policies referring to college's management and approaches towards the use of resources need to be considered. The environmental policy formulated by the management of the college should be implemented meticulously. The college should have a policy on awareness raising or training programs (for ground staff or kitchen staff for example).

26. Follow Up Action and Plans

Environment Audits are exercises which generate considerable quantities of valuable management information. The time and effort of 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.



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27. Environmental Education

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

- ❖ Training programs in solid waste management, liquid waste management, setting up of medicinal plant nursery, water management, vegetable cultivation, paddy 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.
- ❖ Set up model rainwater harvesting system, rainwater pits, vegetable garden, medicinal plant garden, paddy fields etc. for providing proper training to the students.
- ❖ Conduct exhibition of recyclable waste products
- ❖ Implement chemical treatment system for waste water from the laboratories.

28. Awareness on Carbon Generation

- ❖ Students and Staff members may be made totally aware of pollution caused by use of vehicles.
- ❖ The 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.



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29. Conclusion and Full List of Recommendations

The Environment 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 Environment 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 Environment auditing report will serve as a guide for educating the college community on the existing environment related practices and resource usage at the college as well as spawn new activities and innovative practices. A few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development.

It has been shown frequently that the practical suggestions, alternatives, and observations that have resulted from audits have added positive value to the audited organisation. An outside view, perspective and opinion often helps staff who have been too close to problems or methods to see the value of alternative approaches. A Environment 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.




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30. Common Recommendations

- ❖ 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 to save gas
- ❖ Establish water, waste and energy management systems

31. Criteria Wise Recommendations

Water

- Remove damaged taps and install sensitive taps if possible.
- Drip irrigation for gardens and vegetable cultivation can be improved.
- Install Meters to monitor the water use
- Establish water treatment systems.
- Use waterless urinals
- Spray the water to the garden in the early morning of the day
- Use aerator in the taps to reduce the water consumption and wastage
- Use treated water for bus wash and other toilet use
- Conduct leak test at least once in two months
- Use water efficient garden techniques to reduce the water consumptions in garden
- Awareness programs on water conservation to be conducted.
- Install display boards to control over exploitation of water.



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Energy

- Conventional Fans needs to be replaced with energy efficient BLDC Fans.
- Conduct more save energy awareness programs for students and staff.
- Replace all conventional tube lights with LED lights
- Optimise the energy usage
- Automatic power on/off systems may be introduced.

Waste

- A model solid waste treatment system to be established.
- Maintain a plastic free campus.
- Avoid paper plates and cups for all functions in the college.

Green Campus

- All trees in the campus should be named scientifically.
- Create more space for planting.
- Grow potted plants at 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
- Providing funds to nature club for making campus more green
- Encouraging students not just through words, but through action for making the campus green
- Conducting competitions among departments for making students more interested in making the campus green.



Carbon footprint

- Establish a system of car pooling among the staff to reduce the number of four wheelers coming to the college.
- Increase effective use of college bus services to the students and staff.
- Encourage students and staff to use cycles.
- Establish a more efficient cooking system to save gas.
- Discourage the students using two wheelers for their commutation.
- More use of generators every day should be discouraged.



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32.Audit Report

We have conducted the Environment audit at all important areas up to our maximum possible extend. Overall performance of college is found satisfactory.

For Sri Energy Solutions,



M.Rameshkumar

BEE Certified Energy Auditor – EA 22303



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Annexure – A

Details of the Program offered

❖ U.G.Courses

- B.D.S

❖ P.G.Course

- M.D.S.,(Orthodontics)
- M.D.S.,(Dentofacial Orthopedics)
- M.D.S.,(Conservative Dentistry)
- M.D.S., (Endodontics)
- M.D.S., (Prosthodontics)
- M.D.S., (Crown and Bridge)
- M.D.S., (Oral and Maxillofacial Surgery)
- M.D.S., (Periodontics)
- M.D.S., (Pediatric and preventive dentistry)
- M.D.S., (Oral and Maxillo facial Pathology)



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Annexure – B

Bus Routes

The college has operated several buses in the following route for the convenience of the students and staffs

Bus Number	Route
TN19T9090	Melmaruvathur to Chennai
TN19V2232	Melmaruvathur to Pondicherry
TN31AD5443	APDCH to MAPIMS (Student Use)
TN19Z2727	APDCH to MAPIMS (Student Use)
TN19AM6336	Dental Camp



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Annexure – D

Model Environment Policy

M/s.Adhiparasakthi Dental College and Hospital is committed to being environmentally aware, actively support programs that reduce our college's environmental impact and continually improve our environmental performance as an integral part of our business strategy and operating procedures.

We seek to understand the effects our business activities have on the environment by supporting initiatives such as:

- Reduction of material, water and energy consumption
- Waste minimization
- Recycling of all resources

We will encourage our students, suppliers and other stakeholders to do the same.

We recognize that we have a responsibility to the environment to meet or exceed legislative and regulatory requirements.

We will ensure that this policy and all procedures relating to it are understood, implemented and maintained by all company employees



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Annexure – E



Center for Sustainability

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Future Support

Thanks for your co-operation to bring out this environment improvement operation. We will give necessary support to achieve your needs at any time.

THANK YOU

From,

M/s.Sri Energy Solutions

51, S.K.Puthur Post,

Udumalpet, Coimbatore

Pin : 642 113

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