

GREEN AUDIT REPORT FOR THE YEAR 2022



**PERIYAR
MANIAMMAI**
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University)
Established Under Sec. 3 of UGC Act, 1956 - NAAC Accredited
think • innovate • transform

Periyar Nagar, Vallam, Thanjavur - 613 403, Tamilnadu, India



Report Prepared By

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TO WHOM SO EVER IT MAY CONCERN

This is certify that myself Dr.M.Vivekanandan, Certified Energy Auditor of Bureau of Energy Efficiency, India bearing the registration no. EA-19216, had reviewed the Energy and Green audit at the Periyar Maniammai Institute of Science and Technology, Vallam, Thanjavur during Year 2022 and recommendations to conserve energy is given in the report. I thank the management of Periyar Maniammai Institute of Science and Technology for providing me the opportunity, I also thank the team members of energy audit and green audit for rendering their support to the audit.

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2017

2019

2020



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1.0 INTRODUCTION

1.1 PERIYAR MANIAMMAI INSTITUTE OF SCIENCE AND TECHNOLOGY – A BRIEF PROFILE

Periyar Maniammai Institute of Science and Technology (PMIST) is situated at Thanjavur, the granary of South India in the state of Tamilnadu. It is celebrating the Silver Jubilee Year, (1988 – 2013) with 25 years of Yeoman Service in the field of education, especially for the underprivileged and women of the rural masses. It was started as an Engineering college exclusively for women, the First of its kind in the entire world, by the Rationalist and progressive futuristic philosopher Thanthai Periyar and his dedicated wife Annai Maniammai with the sole objective of breaking the shackle of suppression of the women to actively take part in education. With its sustained and successful achievements, it had blossomed into a Institute and the Ministry of Human Resources Development (MHRD) and the Institute Grants Commission (UGC) had accorded the status of Deemed Institute under Section 3 of the UGC Act of 1956.

1.2 ENVIRONMENTAL FRIENDLY TOPOGRAPHY AND ECO-FRIENDLY LOCATION

The Periyar Maniammai Institute of Science and Technology is stretched in a lush green land area of 216 acres, which was once barren, dry and a laterite quarry. This land has been transformed and metamorphosed into a land of thick foliage, green vegetation and technology-hub. It is energy efficient, pollution-free, zero waste, well-laid campus, and is eco friendly in nature. The Institute is situated 10km from Thanjavur and 45km from Tiruchirappalli and is easily accessible by road, rail and air. The built-up area in the main campus at Vallam is 84,450sq.m. Vallam, the place wherein Periyar Maniammai Institute of Science and Technology situated is not only the center of environmental attraction but also the center of entire geography of Tamil Nadu. Periyar Maniammai Institute strives to achieve the twin factors of Environmental Protection and Environmental Management by

- Rainwater Harvesting
- Demonstration on practical technologies in the Rural areas and at selected field sites
- Training, capacity building and awareness on Solid Waste Management

- Creating and maintaining the Bio diversity of the campus
- Solid Waste Management through Biomethanisation
- Enhancing the Green cover for reducing Carbon emission and increasing nitrogen cycle
- Zero waste management campus keeping the philosophy of —Waste from Wealth
- Energy conservation steps right from the planning, execution and ensuring them through frequent green audits
- Demonstrations and usage of Bio-compost, Vermicompost, Biofertilizer, Protected cultivation, Water harvesting, Cultivation of medicinal & aromatic plants, Bio fencing, Bio briquetting etc. have been set up in our campus.

1.3 GREEN AUDIT CONTEXT

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of Environmental pollution and global warming through Carbon Footprint reduction measures.

In view of the NAAC circular regarding Green Auditing, the Management decided to conduct an external Green Evaluation by a competent Green Auditor along with a Green Audit Assessment Team headed by Dr.J.Santhosh, Director i/c, Centre for Energy & Environment & Dr.D.Thayalnayaki, Head, Department of Civil Engineering, Periyar Maniammai Institute of Science and Technology, Vallam, Thanajvur

Green Audit or Environment Audit focuses on the Water and wastewater Management, Solidwaste Management, Carbon Footprint reduction measures being implemented by the Management.

The auditing was done for the period extending from 01/07/2021 to 31/06/2022.

1.4 GREEN AUDIT CONCEPT

The term 'Environmental audit' or 'Green audit' means differently to different people. Terms like 'assessment', 'survey' and 'review' are also used to describe similar activities. Furthermore, some organizations believe that an 'environmental audit' addresses only environmental matters, whereas others use the term to mean an audit of health, safety and environment-related matters. Although there is no universal definition of Green Audit, many leading companies/institutions follow the basic philosophy and approach summarized by the broad definition adopted by the International Chambers of Commerce (ICC) in its publication of Environmental Auditing (1989). The ICC defines Environmental Auditing as:

A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environment and natural resources in its operations/projects.

In the present scenario organizations are facing numerous challenges, issues and risks Environmental changes, depletion of natural resources. A flexible, secure, dynamic infrastructure has to be devised to help organizations to address critical energy and power costs. Perhaps the time has come when it becomes immensely essential to unearth that up to what extent an organization is contributing towards environmental sustainability by adoption of techniques like Green Audit.

The Green Auditing is the process of determining whether our operations and practices are in compliance with regulatory requirements, institutional policies and procedures, and accepted standards. It is a systematic objective evaluation of facility activities for a finite review period designed to:

- Verify compliance with environmental regulations, internal policies, and accepted practices.
- Evaluate the effectiveness of environmental "management systems" in place, and identify and assess any reasonably foreseeable risks associated with hazardous conditions attributable to our operations and prevent or mitigate such risks.

1.5 OBJECTIVES OF GREEN AUDITING

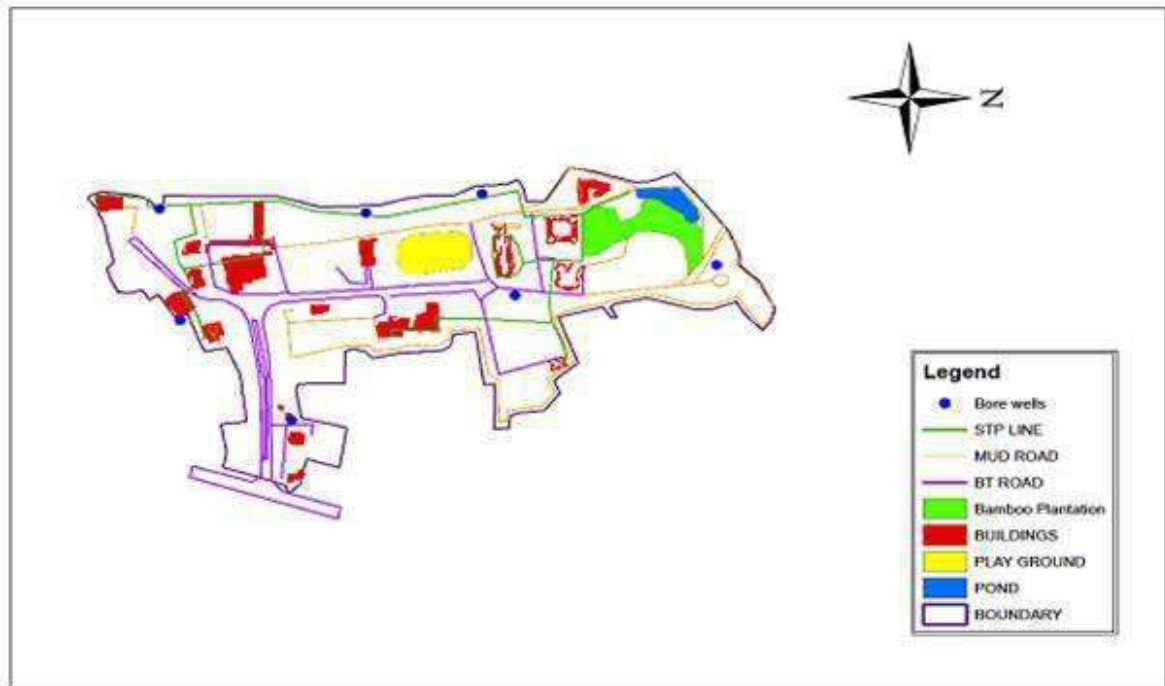
- To assess whether the measures implemented by PMIST have helped to reduce the Carbon Footprint.
- To assess whether investments made in increasing awareness among students regarding electricity, biodiversity and environment have helped the Institution achieve the required carbon dioxide emission and absorption in the campus.
- To assess whether non-academic activities of the Institution support the collection, recovery, reuse and recycling of solid wastes that harm the environment.
- To identify gaps and suggest recommendations to improve the Green Campus status of the institution.

1.6 BENEFITS OF THE GREEN AUDITING

- More efficient resource management
- To provide basis for improved sustainability
- To create a green campus
- To enable waste management through reduction of waste generation, solid- waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing and managing
- Empower the organizations to frame a better environmental performance
- Financial savings through a reduction in resource use
- Development of ownership, personal and social responsibility for the institute and its environment
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the institute.

1.7 TARGET AREAS OF GREEN AUDITING

Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.



Layout map of Periyar Maniammai Institute of Science & Technology, Vallam

Periyar Maniammai Institute of Science and Technology being one of the best green campus in the city, responds to eco concerns with its eco friendly initiatives. In our Institute, we have carried out energy audit and green audit in the areas of

- 1.0 Energy Conservation & Energy saving opportunities
- 2.0 Energy saving opportunities -Renewable Energy Devices
- 3.0 Water Quality and Conservation
- 4.0 Climate Change and Air Quality
- 5.0 Solid Waste Generation and Management
- 6.0 Alternating Building Materials

2.0 Energy Conservation & Energy saving opportunities – A Separate report is prepared and submitted

3.0 Energy saving opportunities -Renewable Energy Devices

Bio-Mass Gasifier



*200 kWe bio mass gasifier for power generation (100% producer gas mode)
Funded by MNRE, Govt. of India*

200 kwe bio-mass gasifier

Usage	: For Power Requirement
Operational viability	: Attractive ROI and cost effective
Energy Savings	: 25,000units/month (` Rs.125000 / \$2804.57)
Future Outlook	: Matches with conventional energy costs

The three branches and the woods mostly available on the waste lands are utilized for the Feed. The selected woods are seized and dried and used for power production. Thereby the environmental pollution is avoided. 60% of our campus electricity demand is fulfilled by using the biomass gasifier.

b) Thermal Gasifier

The thermal mode gasifiers are used for hostel cooking purpose.

Usage	: For cooking and heating
Operational viability	: Attractive ROI
Energy Savings	: 30 cylinder Month (Rs.37170/ \$833.97)
Future Outlook	: Matches with conventional energy cost
Cost	: Rs.1, 50,000 (Approx)



Biomass Thermal Gasifier 20kWe working at our Ladies Hostel]

c) Briquetting Unit

Briquetting is the transformation of a powdery or granular product into a larger more convenient size. This is accomplished by compacting the product with a screw press sometimes in the presence of a binder material. A briquette is a block of flammable matter used as fuel to start and maintain a fire. Rice husk, Sawdust and Coconut coir pith is used as feed materials. Collected materials are crushed into fine particles and dumped into the feed pit. From the pit the

material is raised through bucket elevator and fed into the heating chamber. Heating coils inside the chamber are heated up to a range of 350 °C to 400 °C. Hence the feed materials also get heated up to the coil temperature and at the same time pushed out by the screw. Pushed by the screw through the sleeve the feed material comes out as briquette in lengths.



Briquetting machine



Briquettes

d) Biomethanisation Practice – Nodal Agency of MNRE, Govt. of India

Periyar Maniammai Institute of Science and Technology is identified as the Nodal Agency by MNRE, Govt. of India for providing technical know how and guidance for installing the bio-gas based power generation units in the institutions like SASTRA University, Thanjavur, Indian Express Esates, Annasalai, Chennai, Vellore Institute of Technology, Vellore, Karpaga Vinayaga College of Engineering and Technology, Chinnakalambakkam, Tamilnadu.

The Biomethanisation plant in this Institute is multi feed with the following feeds like Cattle dung, Night soil, Vegetable waste and Food waste. The gas producing capacity of the digester is 500cu.m per day. The volume of gas produced will generate 60 KW of electricity. This will not only generate significant quantity of Biogas but also generate the digested material used as a high grade soil conditioner.

The Digester is of 16.2m diameter and 5.7m height. Quantity of feeding required per day is 10 tons. Different inlet units were constructed for Night soil, Vegetable waste and food waste.

Two inlet pipes are provided to feed the digester and one outlet pipe for collecting the digested effluent. One inlet pipe is exclusively for night soil and other for other wastes.



60 KWe-500m³ Biomethanisation plant inaugurated by former President of India, His Excellency Dr. A.P.J. Abdul Kalam on 27.7.2011

Vegetable wastes and food wastes are pulverised using rasper and sent to mixing unit. Then it is allowed to the digester. Cattle dung is also mixed in the same mixing unit and sent to the digester. The hydraulic retention time for producing the gas in this digester is 42 days. The digester is provided with Tarpaulin hood for holding the gas. To prevent the formation of scum, a pump is provided for re circulating the wastes.



An aerial view of the Biomethanisation plant. The gas production capacity of the plant is 500m³/day. Utilizing this gas the power produced is 60 kwe / hr. The digested material is converted into nutrient rich soil conditioner through vermicomposting process.

For generating power, Carbon di oxide and hydrogen sulphide gases are scrubbed off by providing a scrubber. The Scrubbed gas is stored in the Gas balloon and from there it is conveyed to the bio engine for power generation. Different sampling ports are provided for collecting the gas, influent and effluent samples for analysis purposes. Gas analyser, online pH indicator and Pressure Gauge are provided for monitoring the function of the digester. The following Research works are being carried out in this plant:

- Characterization of various solid wastes as input in this anaerobic digester
- Study of Suitable environmental factors which favours the anaerobic digestion.
- Lab scale study for optimization of the digestion using feed stocks

e) Solar Power Utilization



Solar Panel



Solar Street Light



Solar Water Heater



Solar Cooker

The unreliability of the rural electricity grid, made us decide to employ solar panels embedded in the arch for electricity generation. The arch hold the solar panels, oriented towards south-west, catering to the needs of the security cabins, entrance pathways and lights lighting the landscapes of Periyar Maniammai Institute of Science and Technology. Throughout the building proved to be a useful testing and teaming process for latest architectural technologies. It is a catalyst for further application of appropriate building, technologies in the interior and exterior constructions. And thus environmental sound solar energy trapping systems are maintained in the Periyar Maniammai Institute of Science and Technology campus.

Solar PV panels are installed at the hostels resulting in an annual savings of Rs.67,000/- and also reduces 10 tonnes of CO₂ emission. Solar water heaters installed in the hostels saves electricity and an annual savings of Rs.1, 65, 000/- along with reduction of 195 tonnes of CO₂ emission.

This SOLAR CAMPUS RIDER is specially designed to ride inside the campus replacing bikes, cars and other vehicles which emits CO₂ leading to endangering Global warming. It is an electric rider which can be charged using both solar and electrical energy. It is cost effective.

Eco Challenger is solar powered battery operated vehicle for differently abled people. This vehicle carries 120 kg, accelerates to about 25 kmphr and the mileage comes upto 45 km/charge.

Solar Car Fabricated by our students Maruti 800 engine has remodeled by traction batteries and motors. Thus by utilizing all the renewable energy resources, the wastes in our campus is minimized and the environmental pollution is avoided and the campus continues to flourish in a sustainable way.

f) **Paper Recycling Unit**



Processes taking place in Paper recycling unit. Sources for the paper recycling unit are retrieved from our Institute and reinforcing materials (cotton waste) are added to strengthen the quality of the paper.

Periyar TBI posses a Paper recycling unit called Periyar Paper Re-processing Unit. Sources for the paper recycling unit are retrieved from our Institute and reinforcing materials (cotton waste) are added to strengthen the quality of the paper. Two tonnes of paper/ year are produced by recycling as a result of this, 8.5 m³ of wood pulp is saved As a part of our mission towards green initiatives, a paper recycling unit is functioning in the campus. All the paper waste generated in the campus is recycled in this unit and reused. In this way, 1.2 tonnes of recycled paper is produced per year and utilized for office purpose files, paper bags, packing materials etc. As per the available data, 500 tonnes of fresh paper equals 401 tonnes of carbon where as recycled paper reduces the total carbon emissions by 329 tonnes of Carbon. In this way, *our green initiatives save 0.2 tonnes of carbon every year.* This unit is also serving as demonstration unit for an entrepreneur to establish recycle paper unit.



g) Alternate Building Materials Research Unit

Alternative building materials like hollow blocks, interlocking blocks, paver blocks are manufactured using innovative technologies to meet our own infrastructural requirements.



Alternative Building material research unit - Building materials like hollow blocks, interlocking blocks and paver blocks are manufactured. Fly ash bricks reduce 7.2 tonnes of CO₂ emission with less contribution to pollution.

This technology has avoided deforestation and soil erosion due to which 36,337 tonnes of wood and 21,173 m³ of fertile top soil are saved.

Cement less fly ash bricks are produced with same structural properties of conventional fly ash bricks that reduce 7.2 tonnes of CO₂ emission with less contribution to pollution.

4.0 WATER MANAGEMENT QUALITY AND CONSERVATION

4.1 Rainwater Harvesting (RWH):

Rainwater Harvesting (RWH) is the practice of collecting water from roof tops, paved or unpaved surface runoffs, storing and distributing rainwater to use it as an alternative source of water. Main advantages of RWH are that the resource is absolutely free and has very low contaminant level. For sustainable water resources development of the PMU Campus, rainwater harvesting and recycling of the domestic waste water are in addition to the utilization of ground water. The average annual rainfall, calculated from data collected for 45 years, is 1314 mm (Vallam Town Panchayat meteorological Station). Quantity of the open area runoff for average rainfall is 88,010 cum. The quantity of roof rainwater 38,527 cum and the quantity of metaled road rainwater 5756 cum. The total quantity is 132,294 cum per annum.

The built-up areas in the main campus at Vallam are around 84,450 Sq.m. This campus is having 22,000 cum capacity percolation ponds to store rainwater and grey water, 10,000 cum capacity pond to store storm water and 1300 cum capacity open well to store rainwater.

Contour Trench

The Campus topography is so designed in order to have gentle slope contour terrain. By using the slope, created nearly 600 m length, 1m width and 1m depth contour trench at 60metre intervals of 6 Nos. of contour trenches. Since rainwater has been stored in this trenches and there by ground water potential is in an enhanced condition.

4.2 Groundwater Resources

Ground water sources for the institute are only from the 7 bore wells of depths vary from 104 m to 162 m. Average pumping of water is around 100 cum per hour. Every day about 638 cum (2.32, 870 cum/year) of water is pumped out for domestic purpose. Water required for gardening purpose is 800 cum per day (2, 92,000 cum per annum). Total quantity of water required is 1438 cum per day (5, 24,870 cum per annum). But, only 55% of water is pumped out per day. To arrest the groundwater depletion due to pumping, it is practiced to recycle waste water to compensate the remaining requirements (45%).

4.4 Details of Over Head Water Tank & Sump

Sl.No	Name of Building	Type of Tank	Capacity (lit.)
1.	Periyar TBI	Over Head Tank (RCC) – 2 nos.	20720
2.	Hospital	Sintex Tank	1000
3.	TB -I	Over Head Tank (RCC) – 2 nos.	65630
4.		Sintex tank (RO)	2000
5.		Sump	2230
6.	TB - II	Sintex tank (RO) – 2 nos.	2000
7.		Sump	776970
8.	Education Block	Over Head Tank (RCC)	22120
9.		Sintex tank (RO)	2000
10.	Chakaravarthy Hostel	Over Head Tank (RCC) – 3 Nos.	72620
11.		Sintex tank (RO)	2000
12.		Sump	149320
13.	Millennium Cottage	Sintex tank (RO)	500
14.	Cora Cottage	Sintex tank (RO)	500
15.	Indoor Stadium	Over Head Tank (RCC) – 2 nos.	17000
16.	PKC	Over Head Tank (RCC)	24740

17.		Sintex tank (RO)	2000
18.	Nagammaiyyar Hostel	Over Head Tank (RCC) – 2 nos.	35000
19.		Sintex tank (RO)	2000
20.		Sump	104980
21.	Vittobai Hostel	Over Head Tank (RCC) – 2 Nos.	39000
22.		Sintex tank (RO)	2000
23.		Sump	208190
24.	Sorna Renganathan Hostel	Over Head Tank (RCC) – 2 Nos.	60000
25.		Sintex tank (RO)	1500
26.	Staff Quarters	Sintex Tank - 7 Nos.	1000
27.	Bank	Sintex Tank	1000
28.	Architecture	Sintex Tank	5000
29.	Periyar TBI	Over Head Tank (RCC)	5600
30.	Hospital	Over Head Tank (RCC)	1000
31.	TB -I	Over Head Tank (RCC)	20,000
32.		Over Head Tank (RCC)	20,000
33.		Sintex tank (RO)	2000
		Sump	16000
34.	TB - II	Sintex tank (RO)	1000
35.	Education Block	Over Head Tank (RCC)	12600
		Sintex tank (RO)	2000
36.	Chakaravarthy Hostel	Over Head Tank (RCC) – 3 Nos.	12,000
		Sump	16000
37.	Millennium Cottage	Sintex tank (RO)	500
38.	Cora Cottage	Sintex tank (RO)	500
39.	Indoor Stadium	Over Head Tank (RCC)	2000
40.	PKC	Over Head Tank (RCC)	22000
		Sintex tank (RO)	2000
41.	Nagammaiyyar Hostel	Over Head Tank (RCC)	6000
		Sump	12000
		Sump	
42.	Vittobai Hostel	Over Head Tank (RCC) – 2 Nos.	24,000
		Sintex tank (RO)	2000
43.	Sorna Renganathan Hostel	Over Head Tank (RCC) – 2 Nos.	30,000
		Sintex tank (RO)	2000
44.	Staff Quarters	Sintex Tank - 8 Nos.	1000
45.	Bank	Sintex Tank	1000
46.	Architecture	Sintex Tank	5000

4.5 Sump & Over Head Water Tank – Quantity Details

Tanks and Sumps Details with quantity at our Institute premises.

1.	TB - I	2-OHT	65.63 m ³	65630 litres
2.	TBI	2-OHT	20.72 m ³	20720 litres
3.	Hospital	Sintex	0.25m ³	250 litres
4.	Architecture	OHT	22.12m ³	22120 litres
5.	Chakkaravarthy Hostel	OHT-3	72.62m ³	72620 litres
		Sintex	10m ³	10000 litres
6.	Knowledge Centre	OHT	24.74m ³	24740 litres
7.	PKC -E	Sintex	5m ³	5000 litres
8.	Indoor stadium	OHT (O) -2	17m ³	17000 litres
9.	Nagammaiyar Hostel	OHT-2	35m ³	35000 litres
10.	Vittobai Hostel	OHT-2	39m ³	39000 litres
		TOTAL	312.03m ³	3,12,080 litres

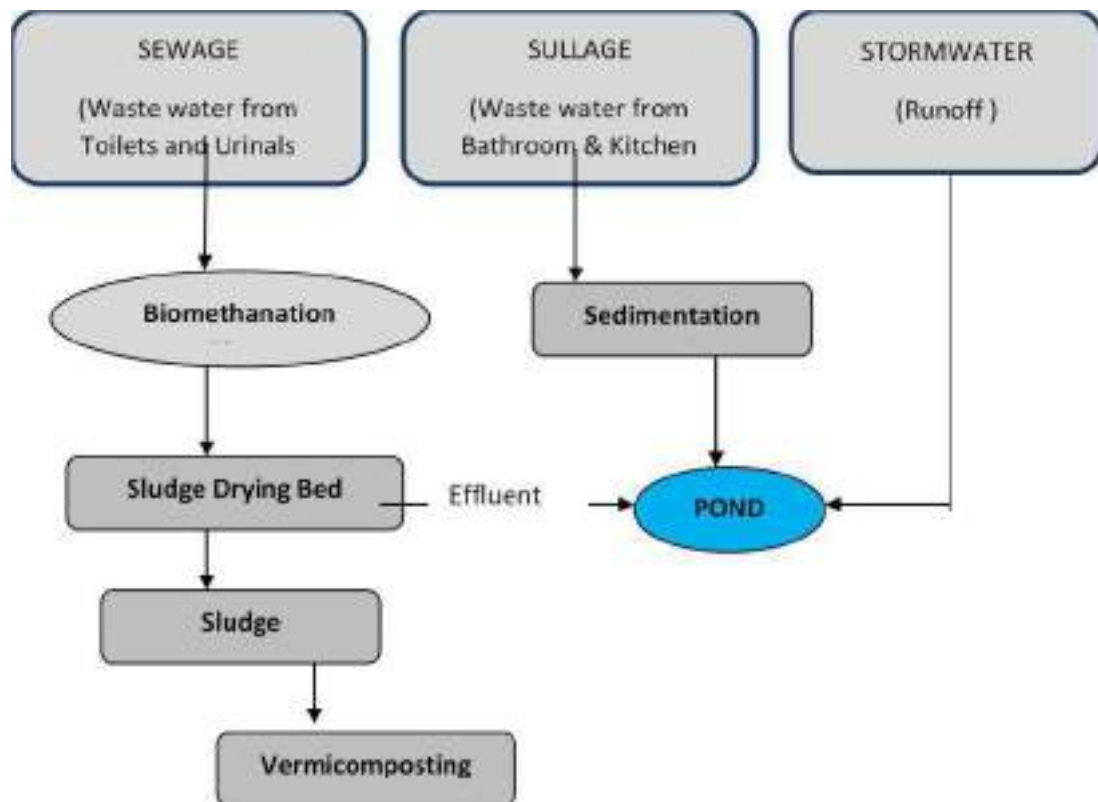
4.6 SUMP Details:

1.	Chemistry Lab	22.23 m ³	22230 litres
2.	TB - I	776.97 m ³	776970 litres
3.	B.Ed. block	20.7m ³	20700 litres
4.	Chakkaravarthy Hostel	149.32m ³	149320 litres
5.	Nagammaiyar Hostel	104.98m ³	104980 litres
6.	Vittobai Hostel	208.19m ³	208190 litres
		Total	12,82,390 litres

05. WASTEWATER MANAGEMENT

This campus is having 22,000 cum capacity percolation ponds to store rainwater and grey water, 10,000 cum capacity pond to store storm water and 1300 cum capacity open well to store rainwater.

The existing wastewater system in the institute is as shown below



5.1 Details of Toilet Facilities

Sl.No.	Description	Floor	No. of Rooms	No. of Toilets	Total
1.	Vittobai Hostel	Ground	24	24	108
		First	28	28	
		Second	28	28	
		Third	28	28	
2.	Sorna Renganathan Hostel	Ground	16	16	126
		First	26	52	
		Second	26	52	
		Third	11	22	
3.	Nagammiyar Hostel	Ground	63	65	191
		First	63	63	
		Second	63	63	
4.	Chakkaravarthy Hostel	Ground	37	24	166
		First	37	27	
		Second	37	27	
		Third	37	27	
		Fourth	37	27	
		Staff Room & Guest House	17	34	
5.	Technology Block- I			48	48
6.	Technology Block -II			37	37
7.	Architecture Block			24	24
8.	Education Block			10	10
9.	Canteen			10	10
10.	PKC			83	83
11.	Indoor Stadium			6	6
12.	Periyar TBI			32	32
				Total	841

Grey water is the domestic wastewater from bathrooms (bathing, Cloth washing) and Kitchens (Utensils washing). With minimum treatment, grey water can be recovered and used for applications such as toilet flushing, gardening and floor washing). Institute population is around 2300 numbers and water usage 130 cum per day. The waste water generated from our population is about 96.4 cum per day (35186 cu.m/year). The waste water (Grey water) is collected from all buildings through 150 mm diameter well laid conduits of PVC pipe. The total length of pipe line is 3258 m. Moreover, in order to collect storm water, 950m length open channel is provided. This grey water and storm water is allowed to sedimentation tank to remove settleable solids and it is collected in the 20,000 cum capacity percolation pond. This water will be pumped and used for watering to the entire campus plantations such as bamboo, coconut and lawns etc.

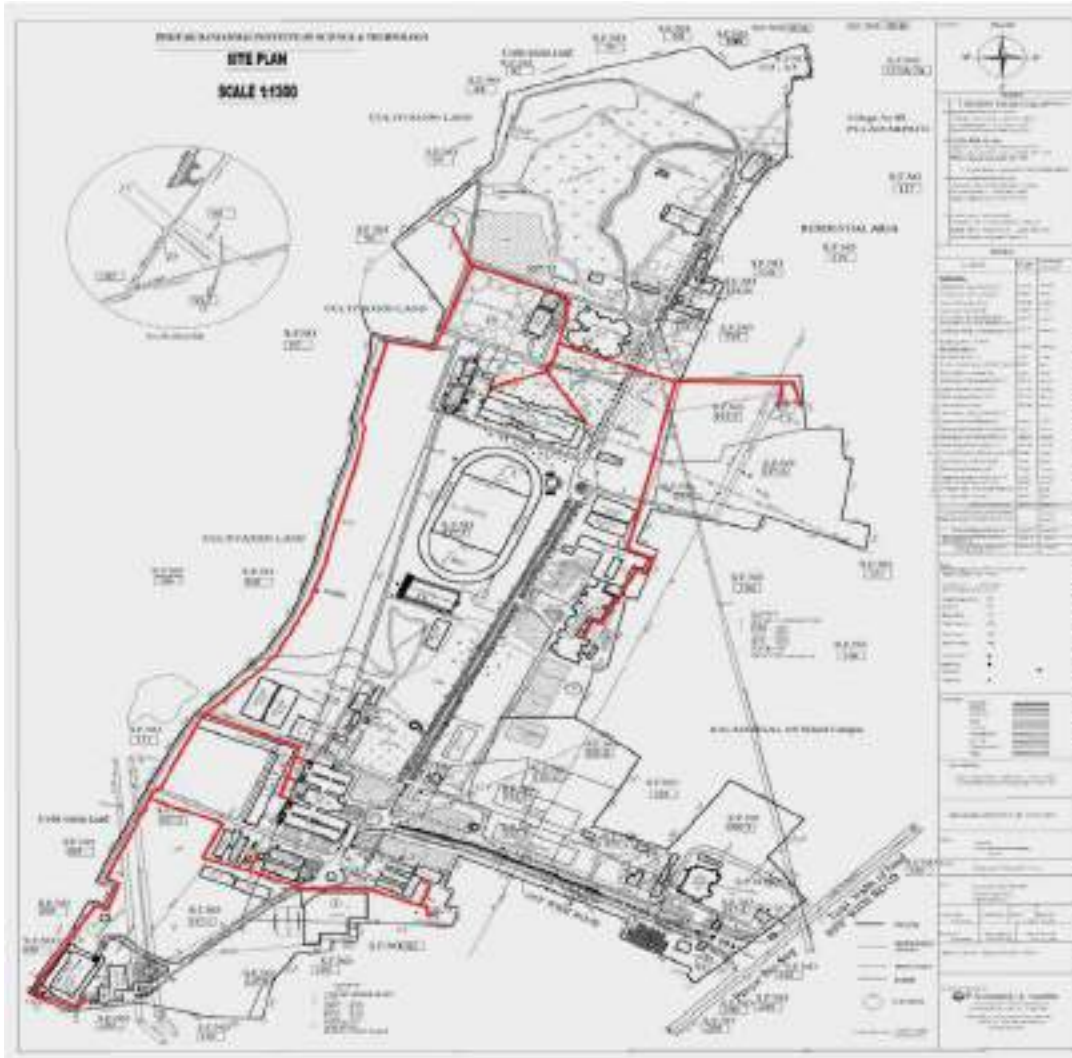


Fig 3.1 Waste water lines plotted in red in Institute layout

6.0 AIR QUALITY (CO₂, Temperature and Relative Humidity of various buildings)

S.NO.	PLACES	CO ₂ PPM	RELATIVE HUMIDITY	TEMPERATURE
1	TB-1 (EEE) LAB.	524	64.9	26.9
2	Transportation Lab	477	58.9	28.1
3	Civil HOD Room	400	57.6	31.3
4	Concrete Lab	524	53.1	26.9
5	Geotechnical Engg. Lab	842	64.6	28.0
6	Strength of Materials Lab	628	60.3	28.1
7	Electrical Machine Lab	620	64.1	27.0
8	EDC Lab	482	61.4	29.8
9	M & I LAB	480	59.4	30.2
10	Valluvar Hall	555	54.4	33.4
11	Main Office	487	64.3	27.5
12	VC Office	552	57.8	28.0
13	GIS Lab	725	62.3	30.5
14	Bio- Tech. Lab	532	59.2	28.2
15	Registrar Office	789	56.5	28.1
16	Control System Lab	410	51.4	29.9
17	Bio Process Lab	547	57.7	28.1
18	Chemistry Lab	602	55.3	28.6
19	Physics Lab	625	56.4	28.8
20	TB-1 302	458	53.4	29.9
21	Civil Engg. Staff Room	780	57.7	27.8
22	Maths Dept. Staff Room	809	57.5	29.7
23	Director CSAS Room	464	57.8	31.0
24	Administrative Office	507	57.4	28.1
25	Arch Studio-1	511	64.5	29.2
26	Studio-2	498	57.1	29.3
27	Canteen	547	56.1	28.8
28	Academic Affair Office	462	56.6	28.2
29	Library	578	54.5	34.0
30	CSE Lab 208	816	50.7	29.8
31	CSE Lab 207	795	56.1	28.4
32	Indoor Stadium	892	56.2	31.8
33	Substation	510	52.0	30.7
34	Aerospace Lab	486	52.1	31.0
35	Mechanical Lab	489	54.6	31.2
36	Generator Room	590	52.5	32.5

Using Digital Indoor Air Quality meter the CO₂ level, Relative Humidity, Temperature and Pressure at different points in the premises were measured and given below:

- **CO₂ level :** Min – 524 ppm ; Max.– 892 ppm (*As per ASHRAE, above 1000ppm CO₂ – requires adjustment of building's ventilation system*)

- **Relative Humidity (RH) :** Min – 51 % ; Max.– 64 %

(As per ASHRAE Standard 55, indoor humidity levels to be maintained between 30 - 65 percent for optimum comfort).

- **Temperature:** Min – 26.9° C ; Max.– 34° C

(As per ASHRAE Standard 55, recommended temperature ranges termed "comfortable" are 22.8 to 26.1°C in the summer and 20.0 to 23.6°C in the winter).

7.0 SOLID WASTE GENERATION AND MANAGEMENT

The 4R concept –REDUCE, REUSE, RECYCLE, RECOVER is being experimented with the solid waste collected in the campus. The wastes are segregated and composting of degraded materials in the process. To promote research and encourage young researchers National and International Level conferences are regularly hosted every year in collaboration with various agencies. Solid waste is segregated at source and recycled with focus on waste to wealth

- Periyar TBI posses a Paper recycling unit called Periyar Paper Re-processing Unit
- Sources for the paper recycling unit are retrieved from our Institute and reinforcing materials (cotton waste) are added to strengthen the quality of the paper.
- Two tonnes of paper/ year are produced by recycling as a result of this, 8.5 m³ of wood pulp is saved.



Solid waste is segregated at source by using 3 coloured bins and also using naturally grown bamboo bins instead plastics

7.1 Details of Garbage Bin Location

Sl.No.	Description	Floor	No. of Dustbin	Total
1.	Vittobai Hostel	Ground	42	189
		First	52	
		Second	50	
		Third	40	
		Common	5	
2.	Sorna Renganathan Hostel	Ground	-	40
		First	40	
		Second		
		Third	-	
3.	Chakkaravarthy Hostel	Ground	8	40
		First	8	
		Second	8	
		Third	8	
		Fourth	8	
		Fifth	8	
4.	Technology Block- I			50
5.	Technology Block -II			14
6.	Architecture Block			15
7.	Education Block			5
8.	Canteen & Store			10
9.	PKC			31
10.	Indoor Stadium			2
11.	Periyar TBI			5
12.	Pathway (Tricolour Coded Bins)		10	30
			Total	431

The Biomethanation plant in Periyar Maniammai Institute of Science & Technology is multifeed with the following feeds like cattle dung, night soil, vegetable waste and food waste. The gas producing capacity of the digester is 500cum per day. The human waste collected from all buildings through 200 mm diameter PVC pipe. The total length of laid pipe line is 4250 m to the plant. The volume of gas produced will generate 60 KWe of electricity. This will not only generate significant quantity of Biogas but also generate the digested material about 120 metric tons in year a used as a high grade soil conditioner for in house and locals atnormal cost. The Digester is of 16.2m diameter and 5.7m height. Quantity of feeding requiredper day is 10 tons. Nearly 2960 cum per year of waste water is generated from this plant. The waste water collected is also used for recycling and reusing after treatment.

7.2 E WASTE MANAGEMENT

E-Waste for short - or Waste Electrical and Electronic Equipment (WEEE) - is the term used to describe old, end-of-life or discarded appliances using electricity. It includes computers, consumer electronics, fridges etc which have been disposed of by their original users.

7.3 GREEN CAMPUS

The institute has area of 46964 Sq.m which has been transformed into a land of thick foliages, green vegetation 1618 Nos. of bamboo trees, 38,441 Nos. of other variety of trees such as Azadirachta indica (neem), Pongamia pinnata (pongai), Pterocarpus indicus (vengai), Albizia lebbek (vaagai), Casuarina equisetifolia (casuarinas), Pterocarpus sandalinus (red sandals), Tectona grandis (teak), etc. which were developed from waste water usage) and a technology-hub, energy efficient, pollution-free, zero waste and well-laid campus with an ambience for learning from barren and dry wasted land.

Establishment of Periyar Herbarium to introduce the 250 species of medicinal plants, Germplasm collection for medicinal plants to use the TBI. National mission on Bamboo application (NMBA) Project — Planting of bamboo seedlings 10 acres for demonstration plot



Timber Tree Saplings



Bio-Diesel plant Jatropha

- Seedlings are supplied at nominal price to individuals, farmers and for industrial green cover. Consultancy for industries, one public sector undertaking and private owners has been taken up.



Cultivation of Bambosa Bamboo



Medicinal Plants

- Every year, the Periyar Research Organization for Bio-Technic and Eco-System (PROBE) conducts a two-day national seminar concentrating mainly on revival of profitable farming practices for sustainable development
- Technical and entrepreneurial assistance is given to enterprising youth to establish rural industries. Industrious youth are identified and training is given to them to motivate entrepreneurship skills in them. Need-based training programmes are also conducted for those who opt for such skills.

8.0 GREEN PRACTICES

The following activities carried out in campus clearly prove that we are marching towards Clean Development Mechanism (CDM) and carbon footprint initiative.

Varieties of species and medicinal plants have been produced with the help of Tissue Culture (TC) techniques and quality seedlings produced by TC plant hardening centre.



Plants produced by Tissue Culture

a) Green Foliage

PMIST campus has around 4,500 shrubs and plant varieties, 26,000 native trees. Such thick foliage of vegetation releases oxygen of 8.4 tonnes per day and CO₂ absorption is around 1.6 tonnes per day.



PMU students walking in the shadows of trees

b) Bamboo Cultivation

Bamboo grove cultivated in the University requires one-tenth of the water compared to paddy cultivation and retains ground water. It has the survival of 40 years as a standing crop. Each bamboo clump liberates 850 grams of O₂ per day whereas the requirement of a single person per day is only 800 grams of O₂. Bamboo farm of 10 acres is developed inside the Institute campus in order to give training to the farmers. Bamboo minimizes Carbon-di-Oxide and generates up to 35% more Oxygen than equivalent stand of other trees.



A view of Bamboo garden in our campus

One acre of bamboo sequesters 25 tonnes of CO₂ /year. Apart from this, bamboo based home products are produced in the campus as substitute for plastics. These products are green and eco-friendly, stood as one of the important green practices. As one of our green practices, many important meetings are conducted in the bamboo groove which reduces the air conditioned hall electricity consumption and also feels good.

c) Farm Activities

In one of our adopted villages namely Aachampatti we have established a farm has a very thick foliage of around twenty thousand timber trees like red sanders, rose wood, teak and vengai and native fruit trees like coconut, mango, jackfruit, sappota and medicinal plants like amla and aloevera. To guard this agri-farm, an ideal bio-fence like ‘Sudan’ shrubs is planted. The coconut yields obtained here are in surplus, that we use it in the hostel and also put out for sales. Generally, coconut groves require plenty of water but due to our effective irrigation systems, the water usage is minimal. Periyar Bio-farm is a development of team work of agriculturists, farmers and technocrats and has created job opportunities too many people in the surrounding areas.

The land and socio-economic values of the surrounding areas have excessively increased from Rs.12, 500 per acre to Rs.10 lakhs per acre over a period of 15 years. Technical knowhow is disseminated to the nearby farms at Aachampatti for a betterment of their farms. Water conservation is also adopted by means of drip irrigation, check dams and soil erosion control. Two rainwater collection ponds serve as water storage and as a source of drinking water for grazing animals.



Aachampatti Farm

d) Organic Culture

The farm is completely grown by organic vegetation. Organic manure like vermicompost is used.



Vermicompost yard in our campus



Vermicompost Bags



Earth worms Eisenia Foetida

Highly efficient systems such as micro-irrigation and mulching technology are practised. Best fittings like efficient single lever taps, toilet flush tanks and double plumbing are used in the campus.



Mulching Technology



Micro Irrigation

e) Rainwater Harvesting Pond

After the blooming of Periyar Maniammai Institute of Science and Technology in this laterite arena, not even a single drop of rainwater is being wasted in the educational campus. Traditionally, rainwater harvesting has been practiced in arid and semi-arid areas, and has provided drinking water, water for campus use, livestock and small irrigation. It is the best way to recharge groundwater levels in and around Periyar Maniammai Institute of Science and Technology.

Rainwater harvesting systems are the needs of the hour that many educational institutions, industries, houses have to install the harvesting tanks. Water harvesting in this campus presents as an exemplary technique. Rainwater from rooftops of buildings is collected and fed into the collecting sumps located in four different places of Periyar Maniammai Institute of Science and Technology. Surplus water from the earth surface is collected and fed into two water storage ponds. Water from the sewage, from the buildings and constructions (hostels and institutional buildings) is utilized after proper treatment. The rainwater thus harvested and collected in the sumps is directly used as irrigation water for botanical gardens by suitable sprinklers in the campus. The recharged groundwater through deep bore well is utilized for all institutional needs and construction of buildings and laboratories. Similarly the sewage water after treatment is not at all wasted but is utilized for watering the ornamental plants and lawns.

Thus the entire water needs of the Institute are satisfied from the rain fed subsoil resources and no external water supply is drawn from any other source.



Rain water Harvesting Pond (4250m³)



Percolation Pond (2 TMC)

Sustainable Institutions of India (SII): Green Institutional Ranking Result

Periyar Maniammai Institute of Science & Technology has applied Green Institutional Ranking. The institute has been awarded with “**Green Institutional Ranking**” as **18th Rank across India from Sustainable Institutions of India (SII) organization** under R. World Institutional Ranking (R.WIR). This award explores the strength of the Institution and Comprehensive overview of the Environmental and Sustainable activities of the Institution. Further, PMIST aims for achieving Carbon Neutral through its Environmental promotional activities.



TAMIL NADU GREEN CHAMPION AWARD -2021

On the eve of World Environment Day, on 06.06.2022, Periyar Maniammai Institute of Science & Technology (PMIST) received TAMIL NADU GREEN CHAMPION AWARD -2021 which was announced by Tamil Nadu Pollution Control Board, Thanjavur. Thiru. Dinesh Ponraj Oliver, I.A.S, District Collector Thanjavur presented the award to The Registrar, PMIST. The Institute also received Cash award of Rs. 1 Lakh for this GREEN CHAMPION AWARD. The Faculty, Students and Management of the Institute are continuously showing their effort towards "GREEN AND CLEAN CAMPUS.



09. GREEN AUDIT RECOMMENDATIONS

01. WATER MANAGEMENT

The Management needs to consider the low –flow faucets, automatic faucets, and/or faucet aerators as the replacement for the existing conventional taps.

The management needs to install the metering arrangement to measure the water drawn from its main water sources.

College can undertake determination of water footprint and calibrate its specific water consumption with the established National and International Norms.

02. RENEWABLE ENERGY

The college needs to chalk out long term strategy towards carbon neutrality and install renewable electricity generation (solar PV) to offset emissions of grid based electricity generation.