

# GREEN AUDIT - 2019



## SREEPATHY INSTITUTE OF MANAGEMENT & TECHNOLOGY

VAVVANOOR, PATTAMBI  
PALAKKAD

*EXECUTED BY*



**ATHUL ENERGY CONSULTANTS PVT LTD**

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## ACKNOWLEDGEMENTS

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We express our sincere gratitude to the management of Sreepathy Institute of Management and Technology (SIMAT) for giving us an opportunity to carry out the project of Green Audit. We are extremely thankful to the SIMAT for their support to carry out the studies and for input data, and measurements related to the project of Green audit.

### SIMAT

- |   |                |                |
|---|----------------|----------------|
| 1 | Dr. George C T | Principal      |
| 2 | Mr. Renjith PC | Asst. Profesor |
| 3 | Mr. Suhas N    | Lab Instructor |

Also congratulating our Green audit team members for successfully completing the assignment in time and making their best efforts to add value.

### Green Audit Team

- 1. Mr. Santhosh A**  
Registered Energy Auditor of Bureau of Energy Efficiency (BEE – Govt. of India)  
Accredited Energy Auditor No – EA 7597
- 2. Mr. Ashok KMP**  
Registered Energy Manager of Bureau of Energy Efficiency (BEE – Govt. of India)  
Energy Manager No – EA 25612, Griha Professional
- 3. Ms. Jijiraj K R**, Project Engineer, B-Tech – Electronics and communication.
- 4. Mr. Harikrishnan K**, Project Engineer, B-Tech - Production Engineering.



Yours faithfully

Managing Director  
Athul Energy Consultants Pvt Ltd

## EXECUTIVE SUMMARY

### 1. GREEN AUDIT

#### A. GREEN AUDIT SUMMARY:

Sl. No	Particulars	Annual Energy/ Fuel Consumption	Carbon dioxide Emission	Annual Savings by replacement/ Production	Carbon dioxide emission – Reduced
			tons/ year		tons/ year
1	Transport (Litres)	30031.71	80.48	NIL	80.48
2	LPG (Litres)	6184	9.34	NIL	9.34
3	Electrical energy (KSEBL) (kWh)	51594	26.83	3472	25.02
4	Solar PV - 30 kW grid tied system	42000	2.1		2.1
	<b>TOTAL</b>		<b>118.75</b>		<b>116.94</b>

Table 1: EXECUTIVE SUMMARY

#### B. CO<sub>2</sub> SUMMARY – CARBON NEUTRAL

Present Carbon dioxide Emission	Carbon dioxide sequestered	Carbon neutral (Yes/no)
Tons/ year	Tons/year	
118.75	<b>191.81</b>	<b>Yes</b>

Table 2: CO<sub>2</sub> SUMMARY

#### Water resources:

- There are 5 bore wells and one open well in the college campus which supplies water to the whole campus, in which 3 bore wells were functioning.
- Water recharging is provided to two non-functioning bore wells which increased the ground water level significantly.

## GENERAL DETAILS

The general details of the SIMAT is given below in table based on the data availed from the college, in between the Jan 2019 to Dec 2019. The data based on the electricity bill, solar and diesel generated units, human resources and finance department of the college.

SL. NO	PARTICULARS	DETAILS
1	Name & Address	Sreepathy institute of Management & technology Vavvanoor, Koottanad Pattambi, Palakkad Dist – 679533 Ph: 0466 2370200
2	Contact person	Dr. George CT, Principal
3	No. of Employees	110
4	Building area (m <sup>2</sup> )	14420
5	Number of students (Nos)	640
7	Annual Diesel Consumption (Litres) (Transport + DG)	32293.71
8	Annual Diesel generated units (kWh) (DG)	6559
9	Annual Electricity Consumption (KSEBL)	51594
10	Solar generated units (kWh)	35000
11	Contract Demand (kVA)	100
12	Maximum Demand (kVA)	63.68
13	Average Power factor	0.91

**TABLE 3: GENERAL DETAILS**

## DESCRIPTION OF SITE

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Sreepathy Institute of Management and Technology (SIMAT) is the offspring of the Sreepathy Trust which is formed with the collective participation of dedicated technocrats, engineers, industrialists, philanthropists and individuals having the common goal of establishing a platform to promote quality higher education and research avenues in professional disciplines like technical and engineering subjects, medical and paramedical, management studies, agriculture, biotechnology and cultural disciplines in order that the deserving cross section of the society irrespective of their cast, colour and creed are provided with an opportunity to groom.

The devoted teaching faculty of SIMAT with consistent academic records is headed by a qualified, talented and professional Director to excel in all sphere of the institution activities. The institution has put in place the state- of- the -art infrastructure and laboratory facilities to enrich the student's academic profiles. SIMAT Faculty members include PhD holders and academically proven Postgraduates who enjoy the working environment well besides availing the pay and benefits which are at par with AICTE guidelines. The college is approved by AICTE and affiliated to APJ Abdul Kalam Technological University and Calicut university.

The college provides the following engineering courses with state-of-the-art facilities.

- Civil engineering
- Electronics and communication engineering
- Mechanical engineering
- Computer science and engineering
- Electrical and electronics engineering





## LAYOUT

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**FIGURE 1: GOOGLE LAYOUT**

## OBJECTIVE – GREEN AUDIT

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The whole world is on the road to a sustainable development, and the environment conservation is the top priority among the list as every human activity has its effect on their surroundings, which is the environment. Hence be it a house, a commercial building, an industrial building, or any other construction will disturb the balance of the environment. It is very important to do a detailed study about the effects on the environment. This is conducted under the name of *Green Audit*, which can be defined as *the official examination of the effects a company or other organization has on the environment, especially the damage that it causes*. The objectives of the green audit can be listed as follows:

- Including participants from every section of the organization in the auditing process.
- Understanding the environment by drawing a simple sketch of the total area.
- Identifying the activities in the premises and listing them.
- Calculating the resource consumption like the land and water.
- Assessing the waste management and disposal.
- Study the energy usage pattern.
- Identify the good practices.
- Suggest the viable solutions to improve the sustainable nature of the organization.
- Compile the report with the above-mentioned details.
- Conduct a walkthrough audit to verify the suggestions implemented by the organization.

### 1. CAMPUS ENVIRONMENT

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The environment in and around the college campus plays an important part in maintaining a healthy atmosphere in nurturing talents. As we can see from the satellite image the college environment is green with numerous trees, providing a pleasant atmosphere for both the students and faculty. Around nineteen species of trees summing to a total of more than 200 trees are found in the area of 2.1 Acres land. The coconut trees occupy the major share of the trees with 86 of them. The students are also involved in the activities like beautification of the college campus with plants, cultivation of vegetables and planting trees.



**FIGURE 2: COLLEGE**

Trees are the major source of the oxygen we breathe and receiver of the carbon dioxide we exhale. The sustainability of an ecosystem depends on the number of plants and trees in and around the surroundings. There is well maintained garden and ponds inside of the college.

The entire greenery of the campus can be divided into landscaped terraces of vast meadows, extensive flower gardens and orchards of fruit bearing trees. Bamboo lends the natural glow of yellow to the campus.

The speciality of college campus is that the balance area after the buildings and ground, filled with variety of trees (flowering, fruit trees) and orchids, variety of grass, bamboo etc. Due to variety of species attracting lot of birds and butterflies to the campus.

Scientific studies are proved that the nature can able to cure any diseases and this will reduce the stress among students during theirs studies and also increase the compassion among them and to nature. Ultimately the campus is maintaining natural equilibrium trees, birds and water bodies with human beings. Gardens and landscape are an aesthetic delight and it promotes attentiveness of students. Persons exposed to plants have higher level of positive feelings (pleas ants, calm) as opposed to negative feelings (anger, fear).

## 2. SUSTSINABLE CONSTRUCTION OF BUILDINGS

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SIMAT has developed and ecological design in their buildings and adopted minimum negative impact on ecosystem. They approach the constructional activities consciously to conserve energy and ecology and avoid the adverse effects of ecological damage.

Energy consuming devices installed to achieve the comfort levels for the occupants of the building gives rise to heat generation which adversely affects the environment within the building and in the surrounding. Buildings are thus the major pollutants that affect the urban air quality and

contribute to climate change. Buildings are the major consumers of energy during their construction, operation and maintenance.

SIMAT management constructed the building to optimum utilisation of land and classrooms and with abundant light and natural ventilation. Maximum day light ingress and natural ventilation increases the indoor air quality and avoid the sick building syndrome. The whole facility and buildings are designed to maximum and optimum utilisation of land without affecting the natural hill area design and thus avoiding the land slides.

### 3. LIST OF TREES

Trees are the major source of the oxygen we breathe and receiver of the carbon dioxide we exhale. The sustainability of an ecosystem depends on the number of plants and trees in and around the surroundings. The list of the trees in the college premises and carbon dioxide sequestered by them are calculated and is provided in the following table.

Sl.No	Tree	Biological Name	Diameter	Height	Quantity	Total CO2 Sequestered
			inches	foot		kg
1	Arecanut Tree	Areca catechu	5	39	7	1236
2	Tambagam	Hopea parviflora	6	36	17	3962
3	Arana		7	39	1	346
4	Maramulla	Murraya exotica	7	34	5	1514
5	Aryaveppu	Azadirachta indica	7	36	3	952
6	Vatta	Macaranga peltata	8	33	8	3013
7	Mahagani	Swillemia mahagani	8	43	3	1469
8	Coconut tree	Cocos nucifera	11	39	86	73487
9	Elenji	Mimusofs elenji	12	33	1	508
10	Thek	Tectone grandis	15	38	53	48423
11	Pongilliam	Ailanthus excelsa	17	39	8	9796
12	Aanjili	Arttocarpus hirstus	19	43	10	16571
13	Nelli	Phyllanthus emblica	22	39	1	2051
14	Vaga	Delonix regia	22	38	3	5896
15	Sapota	Achras sapota	24	36	1	2237
16	Thallitenga	Terminalia catapa	25	43	1	2869
17	Mango tree	Magnifera Indica	26	43	3	9309
18	Christmas tree		29	29	1	3563
19	Naga tree		33	39	1	4614
	<b>TOTAL</b>					<b>191816</b>

TABLE 4: CO2 SEQUESTRATION

**Inference**

- The minimum carbon dioxide sequestered through the campus trees is 191.81 tons.



**FIGURE 3: FORESTRY IN COLLEGE**

#### 4. CARBON DIOXIDE LEVELS

Air quality is a major area of concern inside a building. The percentage share of oxygen and carbon dioxide should be such that the occupants are able to perform their tasks without any discomfort. This is generally done through a provision of fresh air duct for the air conditioning systems or by providing windows. Numerous factors need to be considered for the design and fabrication of the fresh air supply system like the number of occupants, weather pattern and air quality of the location, and so on. For the human comfort, production of carbon-dioxide (CO<sub>2</sub>) within a building space is the prime area of consideration. This is associated with respiration which produces CO<sub>2</sub>. As a result, the carbon-dioxide levels will increase if ventilations are not provided.

As per various standards (like the ASHRAE Standard 62.1-2016), indoor CO<sub>2</sub> concentrations up to 1200 ppm is considered acceptable. For a typical outdoor condition, this value may change from 300 to 500 ppm.

The measurements were recorded along different locations inside the campus and the peak values are given in the following sections. The key concentration was on the study of carbon dioxide levels. The measurement has been done. The measured readings are given below in Table.

Sl. No.	AREA	Measured CO <sub>2</sub>	Standard Maximum CO <sub>2</sub> level	Remarks
1	Class rooms	415	410	Satisfactory
2	Staff rooms	412	410	Satisfactory
3	Air-conditioned labs	520	410	Good

TABLE 5: CARBON DIOXIDE LEVELS

## Special initiatives of college

### Establishment of oxygen park,

Plantation of oxygen rich plants Our college has a beautiful green campus. We have skilfully planted the plants like, Neem Trees and Tulsi so as to make the campus full of oxygen. The greenery has remained useful in developing Oxygen Park in our college.

### “Parking bay for Vehicles”:-

To avoid the air pollution the vehicles are not allowed in the campus, but they are parked in the parking area, reasonably away from college. Our college has a separate parking area to avoid pollution

### Compulsory pollution check-up of 2W/4W

To have a PUC certificate is a mandatory document by RTO authorities; we are creating awareness and instructing students through periodic notices to go for PUC certification of their vehicles.

### Silence zones in the college

Various display boards have been placed in the library and other places for awareness to maintain silence in the college

## 5. WATER RESOURCES

The bore wells are the main source of water resource in the college campus. There are 5 bore wells in which three are functioning and 2 open wells in which one is used. Consumption over the past one year is found with the data given by the authority about the pump hours and the capacity of water tanks.

Location	Tank Capacity	Daily consumption	Average working days	Total consumption
	m <sup>3</sup>	m <sup>3</sup>	Days	kL
<b>Canteen block</b>	2	4	200	800
<b>A block library</b>	6	8	200	1600
<b>C block</b>	3	5	200	1000
<b>Total annual consumption (m<sup>3</sup>)</b>				<b>3400</b>

TABLE 6: WATER CONSUMPTION

## 6. GROUND WATER RECHARGING

Rainwater harvesting (RWH) is a technique of collection and storage of rainwater into natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers (before it is lost as surface runoff). One method of rainwater harvesting is rooftop harvesting. With rooftop harvesting, most any surface — tiles, metal sheets, plastics, but not grass or palm leaf — can be used to intercept the flow of rainwater and provide a household with high-quality drinking water and year-round storage. Other uses include water for gardens, livestock, and irrigation, etc. The tanks also served as natural aquifers and helped recharge groundwater.

Rainwater harvesting for ground water recharge.

Aim and Objectives:

- Conservation of rainwater for future use
- To use rainwater for gardening Activity: Conservation of rainwater in soil or in a container is known as rain-water harvesting.

The rainwater from entire college campus and roof top of building is flowing according to slope of ground in college campus is accumulates in different three places. These three natural sites are selected for rainwater harvesting, ground water recharge, and bore well recharge



Preferred Location	Source	Result
Old borewell near ground	Runoff water from the ground	Improved ground water level near banana plantation
Canteen	Roof	Resource for borewell and increase of water table
North of college well	College roof	Avoid water wastage to outside
Playground soak pit on side	Rainwater of ground	Avoid the washing of top sand from ground and increase of water table.

**TABLE 7: RECHARGING PITS - STRATEGY****Notes:**

- The use of biomass in the form coconut shells can be used to cover the foot of the trees which can behave as recharging soak pits.
- Developo “Mazhakuzhi “in different areas and fill this with coconut shells and stones and this will percolate the water to ground and avoid sudden impact of flowing water in hilly areas
- Plant vetiver (Ramacham) in sloppy land to avoid the top sand removal during heavy rain. This will protect the sand as well as the avoid the landslides to an extent.



## 7. STUDENT ACTIVITIES AND INITIATIVES

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College has been continuously conducting awareness programmes for staff, students and society for protecting and maintaining environment. The awareness is also done by arranging programmes, rallies on various issues related to environment and health. The college students and faculty Members are involved in the activities through NSS/NCC.

- ❖ **Nila Project** :As a part of a project for the conservation of river Bharathapuzha; a meeting conducted on the theme "SAVE NILA", By friends of Bharathapuzha (A group formed for the river conservation) at Thrithala on 13/07/2019.The programme was inaugurated by Dr. E Sreedaran (Metro man) along with chief guest Mr. Hormis Tharakan (retired DGP). Dr Shobindran (socialist) also participated in the program. The NSS volunteers from SIMAT attended the meeting and extended the wholehearted voluntary supports for the implementation of the project. As a first step of this project a survey work was assigned to the volunteers of SIMAT at Pattambi municipality to find out various sources casing pollution in the river.
- ❖ First year students group of college planted samplings in the college and they are pledged to take care of plants.



FIGURE 4: NILA PROJECT AND NEW STUDENTS PLANT TREE SAMPLE



- ❖ **Kerala Flood Relief works:** The NSS volunteers of SIMAT with the support of staff, students and management of Sreepathy College distributed food kits and cleaning kits to 50 flood affected families in Trithala Panchayath, Palakkad. The kits were received by Sri. A Krishnakumar, President, Trithala Panchayath. He expressed his sincere gratitude to the volunteers and staff for their whole-hearted support and service for the flood affected families. The volunteers were also involved in cleaning and maintenance of affected homes in the Panchayath



Figure 5: Flood Relief

- ❖ **Nila Project – Survey:** With the support Municipality of Pattambi, students, management of Sreepathy Institute of Management Technology (SIMAT), the NSS volunteers conducted a survey to identify the key polluting sources of Bharathapuzha river at Pattambi. The survey was conducted as per the guidelines of Dr. E Sreedharan (Metro man). Around 1125 houses and buildings situated 3 wards of Pattambi were covered during the survey. More than 60 volunteers participated in the survey. The staff members Mr. Syam Prasad G (NSS Program Officer), Mr. Sarath S (Asst Professor, ME), Bhagyasree PG (Asst Professor, AS&H) and Limisha (Asst Professor, EEE) guided the volunteers. The findings from the questionnaires were



reported to Dr. E Sreedharan for further proceedings of the project.

- ❖ **National Ayurveda Day - Ashtangam Visit:** The National Ayurveda Day is celebrated every year on Dhanwantari Jayanti (Dhanteras). Ayurveda is perceived as one of the most ancient and well documented system of medicine equally relevant in modern times. Its holistic approaches whether for healthy individuals or for diseased ones remains unparalleled. Prevention of disease and promotion of health is the main aim of Ayurveda. Lord Dhanwantari is considered as divine propagator of Ayurveda. He is conferred with the virtues of granting health and wealth. Therefore, Dhanwantari Jayanti was preferred for celebration of Ayurveda Day to nationalize this system of medicine which can prove to be a cornerstone for its ultimate globalization



FIGURE 6: AYURVEDA DAY CELEBRATION

- ❖ **National Education Day - Solar Lamp Assembly Workshop** National Education Day is an annual observance in India to commemorate the birth anniversary of Maulana Abdul Kalam Azad, the first education minister of independent India, who served from 15 August 1947 until 2 February 1958. National Education Day of India is celebrated on 11 November every year.

The NSS volunteers along with the IEDC Club of SIMAT observed the National Education Day by organizing a Solar Assembly Workshop-a project under certification of IIT Bombay. The session started with the welcome speech by Dr. George C.T (Principal, SIMAT) followed by the presidential address by Dr. K. N. Thrivikraman (Chairman-Sreepathy Trust).The session was inaugurated by the chief guest, Mrs. Rajeesha (President, Nagalassery Panchayath) by lighting the lamp. Gandhi Gram Solar Yathra was launched by presenting the solar lamp to chief guest by Mr. Varun V V (Volunteer Secretary, NSS SIMAT). After the inaugural session the workshop started at 1.00PM.


- ❖ **Campus Beautification** As a part of campus beautification work,the NSS volunteers of SIMAT conducted campus cleaning and flower pot painting on 25th jan 2020.The program started at 9:30 AM and ended by 1:30PM under the guidance of the program officer and staff.




FIGURE 7: CAMPUS BEATIFICATION



## ANNEXURE-1

 **BUREAU OF ENERGY EFFICIENCY**

Examination Registration No.: ..... **EA-7597** .....  
Accreditation Registration No.: ..... **AEA-0275** .....



### Certificate of Accreditation

This is to certify that Mr./Ms. .... **Santhosh. A** ..... having its trade/registered office at ..... **Kerala** ..... has been given accreditation as accredited energy auditor. The certificate shall be effective from ..... **2<sup>nd</sup>** day of ..... **November, 2017** .....


The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No. .... **0275** ..... in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this **12<sup>th</sup>** day of **February, 2018**

  
Secretary,  
Bureau of Energy Efficiency  
New Delhi



**Energy Management Centre - Kerala**  
(Department of Power, Govt of Kerala)

**CERTIFICATE OF EMPANELMENT**

This is to certify that **M/s. Athul Energy Consultants Pvt Ltd** (4/2, Capital Legend, Korapath Lane, Round North, Thrissur – 680 020) is empanelled as Energy Audit firm in Energy Management Centre Kerala to conduct mandatory energy audit as per Government of Kerala G.O (Rt) No.2/2011/PD dated 01.01.2011.

**Empanelment No:**  
**EMCEEA- 0811F-2**

Scope/Area	Building	Industry -Electrical	Industry Thermal
	Yes	Yes	Yes

*This empanelment is valid up to 20<sup>th</sup> December 2020*

*Issuing Date: 01/01/2018*

*Place: Thiruvananthapuram*

Director,  
Energy Management Centre Kerala



# CERTIFICATE



Ministry of New and Renewable Energy  
Government of India



GRIHA Council



The Energy and Resources Institute

This is to certify that

*Ashok K M P*

of

**Athul Energy Consultants Pvt Ltd, Thrissur**

has qualified as

**GRIHA Certified Professional**

on

**01st August 2018**

Sanjay Seth  
Chief Executive Officer  
GRIHA Council

*Note: This certification is valid for a period of 2 years from the date of qualification (exam).*



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@GRIHA Council



# CERTIFICATE OF CALIBRATION

ULR - CC232618000001494P

Page 1 of 4

Ref. No.: ET/190522G/01

Applicant: Athul Energy Consultants Pvt. Ltd., Trissur.

Device Calibrated : **Power Quality analyser with current probes.**  
Make / Model: Krykard/ALM 35      Sl.No.: 214353

Date of Receipt: 22-May-18  
Condition at receipt: Functional

Calibrated at: Inhouse  
Date of Calibration: 24-May-19  
Calibration due date: 24-May-20

*Certified that the above instrument has been calibrated by trained technical personnel of this centre using a calibration system traceable to National Standards. The calibration details attached with the certificate are authentic quantitative analysis of the instrument's credibility on the date of calibration and relate only to the instrument calibrated.*

Date of Issue: 31-05-2019

Lab in charge:  
SANGEETHA PAI

  
Approved Signatory  
Dr. J. JAGANNATH BHAT

**Note:**

- This certificate and report shall not be reproduced except in full without the written approval of this Centre.
- This instrument is calibrated for part of the range only.



**STIC**

**SOPHISTICATED TEST & INSTRUMENTATION CENTRE**  
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