



Jyothi Engineering College

NAAC Accredited College with NBA Accredited Programmes*

Approved by AICTE & affiliated to APJ Abdul Kalam Technological University

A CENTRE OF EXCELLENCE IN SCIENCE & TECHNOLOGY BY THE CATHOLIC ARCHDIOCESE OF TRICHUR

JYOTHI HILLS, VETIKATTIRI P.O., CHERUTHURUTHY, THRISSUR, PIN-679531 PH : +91- 4884-259000, 274423 FAX : 04884-274777



NBA accredited B.Tech Programmes in Computer Science & Engineering, Electronics & Communication Engineering, Electrical & Electronics Engineering and Mechanical Engineering valid for the academic years 2016-2022. NBA accredited B.Tech Programme in Civil Engineering valid for the academic years 2019-2022.

7.1.6 Quality audits on environment and energy– Audit Reports

INDEX SHEET

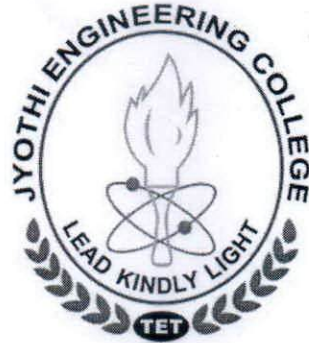
Sl. No.	Particulars
1	Energy Audit Report

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Sunny

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ENERGY AUDIT - 2020



CREATING TECHNOLOGY
LEADERS OF TOMORROW
ESTD 2002.

JYOTHI ENGINEERING COLLEGE - CHERUTHURUTHY
THRISSUR
KERALA

EXECUTED BY



ATHUL ENERGY CONSULTANTS PVT LTD

4th FLOOR, CAPITAL LEGEND BUILDING,
KORAPPATH LANE, ROUND NORTH, THRISSUR, KERALA-680020
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March 2020

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ACKNOWLEDGEMENTS

We express our sincere gratitude to the **Jyothi Engineering College, Thrissur** for giving us an opportunity to carry out the project of Energy Audit. We are extremely thankful all the staffs for their support to carry out the studies and for input data, and measurements related to the project of Energy audit. Here we are presenting the whole hearted support from the management of Jyothi engineering college as

- | | |
|--------------------------------------|-------------------------|
| 1 Rev. Fr. Roy Joseph Vadakkan | Secretary & Campus Head |
| 2 Rev. Dr. Jose Kannampuzha | Director of Academics |
| 3 Fr. Dr. Jaison Paul Mulerikkal CMI | Principal |


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

ELECTRICAL SAFETY & ENERGY 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
- 3. Jaideep P P**
Senior Project Engineer, ME – Energy Engineering

Yours faithfully




Managing Director
Athul Energy Consultants Pvt Ltd

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**EXECUTIVE SUMMARY****1. ANNUAL ENERGY CONSUMPTION**

Annual cost for energy consumption during last 12 months (Mar-2019 to Feb-2020).

Particulars	Unit	Quantity	Average Cost (Rs Lakhs)
Electricity	kWh	308862	2669341

TABLE 1: ANNUAL ENERGY COST**2. ENERGY SAVING PROPOSALS**

The following table shows the energy saving proposals

Sl. no	Energy conservation measures	Annual Energy Savings kWh	Annual Financial Savings Rs	Investment Rs	Simple payback period Months
2	Replacement of ceiling fans with BLDC fans (350no: Preferred to change in Office, Staff room, security cabin and then hostels)	31500	198450	10,50,000	64
3	Replacement of Fluorescent tubes with energy efficient LED lights (60 of T-8 and 800 of T-12No: Office, staff room, Hostels)	44832	282442	301000	13
4	Removal extra batteries in UPS 30kVA and 15 kVA UPS	4000	25200	Nil	Nil
5	Replacement of existing old air conditioners in Computer room (1.5) and server rooms(01TR) 01 no each	3290	20727	42000	24
	Total	83622	526819	13,93,000	32

TABLE 2: ENERGY SAVING PROPOSALS

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3. AUDIT SUMMARY - ACTIONS

The actionable summary of the audit report is given in the table below.

Sl No:	Particulars	Location	Action to be taken	Remarks
1	Power factor improvement by avoid leading power factor	Main distribution panel	Fine tuning of capacitors in APFC panel or bypass the harmonic filter	Which results in increasing the rate of incentives
2	Replacement of ceiling fans with BLDC fans	Classrooms, Staff rooms	Change the existing old ceiling fans with BLDC fans	Energy consumption will come down
3	Replacement of old split AC with New 5 star rated ones	Computer room	Change the old existing ACs with 5 star ACs.	Energy consumption will come down
4	Replacement of old split AC with new Inverter AC	Server Room	Change the existing AC to Inverter type AC for less power consumption	In Server room AC is working continuously and the payback period will immediate
5	Replacement of Fluorescent lights with LED	Class rooms, Staff rooms	Replace with LED lights.	Energy consumption will come down

TABLE 3: ENERGY AUDIT SUMMARY - ACTIONS

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4. ENERGY AUDIT SUMMARY & RECOMMENDATIONS

The summary of the report with respect to each section is as follows.

1. Electricity consumption analysis:

- **Demand analysis:** The demand analysis gives an output that recorded maximum demand in the last 12 months was always below the minimum value which is 75% of the contract demand. In only few months it came above the minimum billing demand.
- **Power factor analysis:** For last month, the pf was found to be low and there are penalties.

2. Electricity performance

- **Voltage:** The Voltage found to be low at the time of audit and unbalance was observed.
- **Capacitors:** From the analyzation of active and reactive power with Power factor, the present installation method of capacitors at the transformer end, is not satisfactorily maintained. By replacing the existing inline capacitors with APFC panel at the Main Switch board in both transformers, will optimize the PF to near unity.
- **Air conditioners:** Replacement of old AC's with new energy efficient star rated AC's.
- **Light loads:** Majority of the lighting fixtures are fluorescent type (T12). By replacing these loads with LED light fittings will reduce the overall power consumption.
- **Ceiling fan loads:** Ceiling fans are installed in majority of the areas by replacing it with Brushless DC fans which consumes in the range of 25 to 30W at full speed, instead of 70W in normal fans, will reduce the power consumption considerably. Also while purchasing new fans priority should be given for BLDC.
- **Solar power plant:** Jyothi Engineering College already installed on 63.7 kWp grid solar power plant in its building and approximately 75000kWh units are as annual savings.
- College students conducted various programs and projects for promoting energy conservation in its campus and outside.

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5. ENERGY PERFORMANCE INDEX (EPI)

EPI was based on the energy consumption in Mar-19 to Feb-20. The futuristic energy consumption after the implementation of energy saving proposals is given in the tables below.

Parameters	Values
Present Annual Electricity Consumption (kWh/year)	308862
Building area of college in M²	14000
Total annual electricity cost (Rs.)	2669341
Present Specific Electricity Consumption (kWh/M ²)	22.06
After Energy Saving Implementation	
Annual electricity consumption (kWh/year)	225240
Present Specific Electricity Consumption (kWh/M ²)	16.09
Total electricity Savings in %	27
Total electricity cost savings in %	19.7

TABLE 4: ENERGY INDEX

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ABBREVIATIONS

APFC	:	Automatic Power Factor controller
AVG	:	Average
BDV	:	Breakdown voltage
BEE	:	Bureau of energy efficiency
CEA	:	Central electrical authority
CFL	:	Compact fluorescent lamp
CFM	:	Feet cube per minute
DB	:	Distribution Board
DG Set	:	Diesel Generator Set
EC	:	Energy Conservation
FD	:	Forced draft
HPSV	:	High-pressure sodium vapour
HT	:	High Tension
ID	:	Induced draft
IEC	:	International electro technical commission
IEEE	:	The Institute of electrical and electronics engineers
IS	:	Indian Standard
KG	:	Kilogram
KVA	:	Kilo Volt Ampere
KVAH	:	Kilo volt Ampere Hour
KVAR	:	Kilo volt-ampere
KW	:	Kilo Watts
KWH	:	Kilowatt-hour
LED	:	Light emitting diode
MAX	:	Maximum
MH	:	Metal halide
NEMA	:	National Electrical Manufacturers Association
OLTC	:	On load tap changer
ONAN	:	Oil natural air natural
PCC	:	Point of common coupling
PSI	:	Pound square inch
RMD	:	Registered Maximum demand
SEC	:	Specific electricity consumption
SFU	:	Switch Fuse Unit
SLD	:	Single Line Diagram
TDD	:	Total demand distortion
THD	:	Total harmonics distortion
TOE	:	Tonne of oil equivalent
UPS	:	Uninterruptible power supply
VFD	:	Variable frequency drive

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INSTRUMENTS USED

SL.NO	EQUIPMENT DESCRIPTION	MAKE & MODEL
1	Power energy & harmonic Analyser	Krykard ALM 35
2	Thermal Imager	FLIR E50

TABLE 5: INSTRUMENTS USED

REFERENCES

1. BEE energy audit books
2. CEA regulations of grid connectivity-2007
3. IEEE Std. 519-1992.
4. National lighting code - 2010

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CERTIFICATES



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 2nd 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 12th day of February, 2018

Secretary,
Bureau of Energy Efficiency
New Delhi

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Amrith

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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 20th December 2020

Issuing Date: 01/01/2018

Place: Thiruvananthapuram

Director,
Energy Management Centre Kerala

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7.1.6 Quality audits on environment and energy– Audit Certificates

INDEX SHEET

Sl. No.	Particulars
1	Energy Audit Certificate

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No: AEC/GAC/28

20-03-2020

Audit Certificate

This is to certify that **Jyothi Engineering College Cheruthuruthi**, Thrissur have successfully completed the **Energy Audit** of their buildings and campus conducted on 12 March 2020 for the year 2019. They have submitted all necessary data and credentials for scrutiny.

We, **Athul Energy Consultants Pvt Ltd**, Thrissur congratulate the Management, Principal, staff members and students for the successful completion and participation in the audit report process.



Managing Director

Athul Energy Consultants Pvt Ltd

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[Handwritten Signature]

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7.1.6 Quality audits on environment and energy – Relevant Information

INDEX SHEET

Sl. No.	Particulars
1	Environment Audit- Carbon Study Report
2	Environment Audit – Soil Carbon Report- KFRI
3	Smart Campus Award- Application -Final Report
4	Beyond the Campus Environment Promotion Activity- CWRE – Water Consultancy (Concessional Rates and On the Spot Inspection)- Relevant Pages from CWRE Report

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REPORT

ON

CARBON STUDY

FOR

JYOTHI ENGINEERING COLLEGE, THRISSUR

1. Introduction

This carbon footprint report has been prepared in full accordance with the Greenhouse Gas Protocol (GHG), the most widely used international carbon calculation methodology, compatible with other GHG standards such as the ISO 14064, which also allows for direct integration with national and international greenhouse gas (GHG) registries.

The carbon footprint gives a general overview of the possible greenhouse gas emissions from the institution, converted into CO₂ -equivalents and it is based on reported data from internal and external systems. The purposes of the carbon indicators are to measure the carbon intensity per unit of product, in addition to showing environmental transparency towards external stakeholders.

2. Methodology

The carbon footprint reporting approach undertaken in this study follows the guidelines and principles set out in the "Greenhouse Gas Protocol Corporate Accounting and Reporting Standard" (hereafter referred to as the GHG Protocol) developed by the Greenhouse Gas Protocol Initiative and international standard for the quantification and reporting of greenhouse gas emissions -ISO 14064. This is the most widely used and accepted methodology for conducting corporate carbon footprints.

This involves accounting for, and reporting on, the GHG emissions from all those activities for which the institution is directly responsible. The items quantified in this study are as classified under the ISO 14064 standards: This includes electricity, LPG consumption as well as emission associated with diesel consumption in the institute vehicle. Emissions from business activities are generally classified as scope 1, 2 or 3 areas classified under the ISO 14064 standards.

Scope 1: Direct emissions (mandatory reporting)

This level concerns all emissions from sources owned or controlled by the JEC. Scope 1 includes All direct emissions from the institution owned or controlled sources, such as institute vehicles, and heat generation (LPG). The study has made all efforts possible to use the best available emissions factors available at the time and has cited the source of all emission factors used.

There are three Tiers presented in the 2006 IPCC Guidelines for estimating emissions from fossil fuel combustion. The study has considered Tier 1 method. The Tier 1 method is fuel-based since emissions from all sources of combustion can be estimated on the basis of the quantities of fuel combusted (usually from national energy statistics) and average emission factors.

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The quality of these emission factors differs between gases. For CO₂, emission factors mainly depend upon the carbon content of the fuel. Combustion conditions are relatively unimportant. Therefore, CO₂ emissions can be estimated fairly accurately based on the total amount of fuels combusted and the averaged carbon content of the fuels. Hence, for CO₂ in general, a Tier 1 method based on fuel carbon and fuel amount used will often suffice and the same approach is used in the report for calculating the GHG emissions from the combustion of fuels.

The activity data for calculating the GHG emissions is the amount of fuel combusted. The direct measurement has been used as the preferred method for the data collection of fuel combusted to calculate the emissions so as to reasonably minimize the uncertainty. When there is no accessibility to the direct measurement, emissions have been calculated through the application of documented models or facility specific correlation or through the mass balance approach.

Scope 2: Indirect emissions (mandatory reporting)

This level concerns all emissions from purchased energy. This means the purchase of electricity from the KSEB (Kerala State Electricity Board) which is connected to the Indian Grid. The electricity CO₂ emission factor is calculated from the India electricity production mix, which is the suitable emission factor used for the Indian Grid.

Scope 3: Other Indirect Emissions

All other indirect emissions as a consequence of the activities of the institute that occur from sources neither owned nor controlled by the institution (e.g. outsourced distribution). Emissions covered under Scopes 1 and 2 are mandatory for reporting, while Scope 3 emissions can be reported on a voluntary basis.

Apart from the emissions from the institution, the possibilities of carbon sequestration by the vast area of college campus by soil and rich vegetation, is also explored in this carbon study.

3. Data Requirements and Emission Factors

The various data required and respective emission factors used in this study are shown in Table 1.

Table 1 Data Requirements and Emission Factors

Sl. No.	DATA		EMISSION FACTORS	
	Item	Unit of Data	Carbon equivalent	Unit
<i>Scope 1: Direct Emissions</i>				
1	Diesel Usage in Labs	litres of diesel/year	2.79	kg per litre
2	LPG (Hostels+ Canteen+Labs)	litre or kg of LPG / year	1.5	kg per litre
3	Incinerator	kg per year	1	kg per kg

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4	Transport			
	College Bus	disel fuel consumed / year	2.79	kg per kg
	HOD Van	Dist. travelled/ year	0.209	kg per km
	Other Adminstrative cars	Dist. travelled/ year	0.117	kgco2 per km
	Other Adminstrative bikes	Dist. travelled/ year	0.0542	kgco2 per km
	<i>Scope 2: InDirect Emissions</i>			
1	Grid Electricity	kW/year		
2	Solar Power	kW/year		
		Net	0.81	kg per kWh
3	Annual Consumption			
	Paper	kg per year	0.876	kg per kg
	Hostel Provisions for Food	No.of students plus other inmates	2.42	kg percapit per day
	<i>Scope 3: Other Indirect Emissions</i>			
1	Annual waste			
	Agricultural/garden	kg per year		
	Paper	kg of paper/year	0.21	kg per kg
2	Annual Purchases			
	Computer Accessories			D
	1. Computers	Number	660	kg per number
	2. Laptop	Number	260	kg per number
	Chemicals	kg per year	2	kg per kg
	Electronics and Electrical (Copper)	kg per year	2	kg per kg
	Engineering Workshops (Metal)	kg per year	2	kg per kg
3	Transport Other than College buses			
	Bike passes	Dist. travelled/ year	0.0542	kgco2 per km
	Car passes	Dist. travelled/ year	0.117	kgco2 per km
	Utility vehicles(Tempo, truck)	Dist. travelled/ year	0.5928	kgco2 per km
	Local Buses	pax. Dist. travelled/ year	0.015161	kgco2 per pax km

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The emission factors are deduced from the various secondary sources, reports and research papers. The institution has a solar power plant of 63 KW, which augments the energy needs in a sustainable way. The energy savings in this regard is assessed from an Energy audit conducted by an audited agency.

4. Conclusion

The total carbon emissions in Scope 1, Scope 2 and Scope 3 are estimated to be 329327 kg CO₂, 431353 kg CO₂ and 257744 kg CO₂ for the period April 2019 – March 2020. The total emissions of 1018424 kgCO₂ is expected to be generated by the institution accounting to about 0.63 tonnes per student on a per capita basis calculation.

The college campus spreading over 14.14 hectares of land diverse with rubber plantation, coconut plantation, trees and shrubs, potted plants and lawns is a potential source for carbon sequestration. The above ground biomass provided carbon are calculated with the help of carbon equivalency factors deduced from literature review. The below ground soil Carbon was estimated by Kerala Forest Research Institute by conducting carbon study on soil obtained from a set of sample test pits. The abundance of vegetation has elevated the chances of the institution to pose itself as a carbon neutral institution as the sequestered carbon is much more than the estimated carbon emission.

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14.01.2021

SOILS/STR/03/2021

Sri MG Cyriac
Jyothi Engineering College

Sir,

The submitted samples were analyzed and the carbon stocks assessed are given below

Site	Soil carbon stocks (t / Ha)
PIT 1 U	79.09
PIT 1 M	56.11
PIT 1 L	63.36
PIT 2 U	15.78
PIT 2 M	35.90
PIT 2 L	56.65

Yours faithfully

SANDEEP S.
Sr. Scientist, Dept. of Soil Science
KFRI, Peechi

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QUESTIONNAIRE FOR AICTE CLEAN AND SMART CAMPUS AWARD 2020

Sr. No.	Sub Part	Questionnaire
1.	A	<p>Is the segregation & measurement of different types of solid waste generated on campus being done?</p> <p>a. YES. SEGREGATION & MEASUREMENT FOR EACH TYPE OF SOLID WASTE IS UNDERTAKEN.</p> <p>b. PARTIAL. NO SEGREGATION, BUT TOTAL SOLID WASTE GENERATED IS BEING MEASURED.</p> <p>c. NO. NO SEGREGATION/ MEASUREMENT UNDERTAKEN. ✓</p>
	B	<p>If the answer to 1.A is YES/PARTIAL, kindly provide the data in the enclosed format attached. (Format is enclosed in the mail) (To be arrived at from recorded data of last year)</p>
2.	A	<p>Does the institute have a dedicated staff for waste collection or disposal?</p> <p>a. NO</p> <p>b. YES ✓</p>
	B	<p>Does the institute segregate its solid waste at the source of the generation?</p> <p>a. NO</p> <p>b. YES ✓</p>
	C	<p>What in-house disposal facilities are used by the institute to dispose off the solid waste:</p> <p>a. NONE</p> <p>b. COMPOSTING UNIT</p> <p>c. BIOGAS PLANT</p> <p>d. BIO METHYLATION PLANT</p> <p>e. ORGANIC WASTE CONVERTER</p> <p>f. INCINERATORS ✓</p> <p>g. SANITARY LANDFILLS</p> <p>h. OTHERS – PLEASE SPECIFY</p>
	D	<p>Does your institution recognize the services for cleanliness of the campus by Sweeping/Cleaning staff?</p> <p>a. No</p> <p>b. YES ✓</p>

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3.		<p>In case an in-house solid waste disposal facility is not available, then select the external agencies used by the institute to dispose off the solid waste:</p> <p>a. MUNICIPALCORPORATION b. PRIVATECONTRACTOR c. OTHERS - PLEASESPECIFY</p>
4.	A	<p>Does the institute have any green club/sustainability cell?</p> <p>a. NO b. YES ✓</p>
	B	<p>If the answer to 4. A is YES, then provide the details of date of establishment, list of activities done, no. of Students/Faculty involved. Also, provide the documents/ Photographs wherever applicable. (Upload pdf of max size 1 mb)</p>
5.		<p>How does the campus waste/sewage/effluent disposal system function?</p> <p>a. NO SEPARATION OF DISCHARGE. THE DISPOSAL IS COMMON. ✓ b. SYSTEM SEPARATES GREY AND BLACKWATER</p>
6.		<p>Does the institute recycle waste water?</p> <p>a. NO ✓ b. YES</p>
7.		<p>How does the institute use recycled water?</p> <p>a. DUAL PLUMBING -FLUSHING b. GARDENING/ARBORICULTURE c. VEHICLE WASHING (VEHICLES INCLUDE INSTITUTE CARS, BUSES AND SOON) d. OTHERS – PLEASESPECIFY</p>
8.		<p>What percentage of Wastewater recycling is being undertaken on the campus?</p> <p>a. NONE ✓ b. UPTO25% c. 25% - 40% d. ABOVE40% e. MORE THAN 60%</p>
9.	A	<p>Does the institute use water-efficient appliances on the campus (e.g., using sensors/automated hand washing taps, high efficient toilet flush,etc)?</p> <p>a. NO ✓ b. YES</p>
	B	<p>If yes, please mention the types of appliances and procedure used for water conservation which invariable used with Traditional and Indian Knowledge Systems aspects(IKS):</p> <p>----- NOT MORE THAN 200 WORDS</p> <p style="text-align: right;">Dr. SUNNY JOSEPH KALAYATHANKAL M.Tech, MCA, M.Phil, B.Ed Ph.D (Computer Science), Ph.D (Maths) PRINCIPAL</p>



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10.	A	<p>Whether the institute conducts the Energy audit?</p> <p>a. NO</p> <p>b. YES ✓</p>
	B	<p>If answer to 10. A is YES, then provide the Energy Audit Report of your institutewhich includes (yearly per capita electricity consumption of the institute, percentage of energy efficient appliances in the campus (to include star-rated appliances, LED light bulbs, sensor based automatic light, appliances based on Traditional Indian Knowledge systemetc.)</p>
11.		<p>Which of the following renewable energy source(s) is/are present on the campus? (You may select one or more from the following answers)</p> <p>In Others, Please specify source based on Traditional Indian Knowledge system. If any.</p> <p>a. NONE</p> <p>b. SOLAR POWER ✓</p> <p>c. BIODIESEL</p> <p>d. CLEAN BIOMASS</p> <p>e. GEOTHERMAL</p> <p>f. WIND POWER</p> <p>g. HYDROPOWER</p> <p>h. COMBINE HEAT ANDPOWER</p> <p>i. OTHERS (PLEASE SPECIFY)</p>
12.		<p>What percentage of total electricity use is drawn from renewable electricity?</p> <p>a. NONE</p> <p>b. 1% - 25% ✓</p> <p>c. 25% -50%</p> <p>d. 50% -75%</p> <p>e. MORE THAN 75%</p>
13.	A	<p>Does the campus have a sub - meters to monitor and assess the resource consumption patterns of major work areas (eg Mess building, hostel, administrative blocks etc)?</p> <p>a. NO</p> <p>b. YES ✓</p>
	B	<p>If answer to above is 'YES', is the energy metering system made 'online' where the consumption pattern can be seen in real/ near real time through a dashboard?</p> <p>a. NO ✓</p> <p>b. YES</p>
	C	<p>If answer to above is 'YES', has any mobile app been developed for viewing the dashboard on smart phone?</p> <p>a. NO ✓</p> <p>b. YES</p>

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14.	A	<p>Is eco-friendly conveyance being used for local in-house mobility by on campus residents (including day workers)?</p> <p>a. NO ✓</p> <p>b. YES</p>
	B	<p>If yes, please mention the various of conveyance (eg golf carts, battery skate boards, battery assisted pedal bicycle etc.)</p>
15.		<p>What is the total green area per capita of the campus?</p> <p style="text-align: center;">77.66</p>
16.		<p>Please provide the estimated percentage of total green area occupied by each of the following:</p> <p>a. LAWN(GRASS) <u>8500</u> SQMTRS</p> <p>b. TREE COVER(WOODEDAREA) <u>108000</u> SQMTRS</p> <p>c. SHRUBSANDHEDGES <u>750</u> SQMTRS</p> <p>d. POTTEDPLANTS <u>250</u> SQMTRS</p> <p>e. OTHERS –POND, COCONUT PLANTATION <u>14530</u>SQMTRS</p>
17	A	<p>DOES THE INSTITUTE HAVE A CAMPUS BIODIVERSITY REGISTER?</p> <p>a) NO</p> <p>b) YES ✓</p>
	B	<p>If answer to 17. A is YES, then How many species of plants does the campus have?</p> <p>a. LESS THAN 10</p> <p>b. 11 TO20</p> <p>c. 21 TO30</p> <p>d. MORE THAN 30 ✓</p>
18.	A	<p>How many plants have been sowed per capita in the last year in/Outside the campus?</p> <p>a. LESS THAN 5 ✓</p> <p>b. 5 TO10</p> <p>c. 10 TO20</p> <p>d. MORE THAN 20</p>
	B	<p>How many number of Students/ Faculty/Staff involved in the above initiative?</p> <p>-----NOT MORE THAN 25 WORDS -----</p> <p>A group of 100 students and 4 staff members distributed saplings to nearby houses and encouraged care for nature in the last academic year.</p>
19.		<p>Is the campus green rated?</p> <p>a. NOTRATED ✓</p> <p>b. RATED</p>
20.	A	<p>Does the campus calculate its overall carbon footprint?</p> <p>a. NO</p> <p>b. YES ✓</p>
	B	<p>If yes, please mention the recent score withdate:</p> <p>SCORE NIL</p> <p>DATE 30/09/2020</p>

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	C	<p>What are the steps institute has taken to reduce its carbon footprints?</p> <p>Steps to Reduce Carbon Foot Prints</p> <ol style="list-style-type: none"> 1) Planting more trees/shrubs in the premises of the college 2) Modernization of various equipment in the college and hostels 3) Using renewable form of energy- solar power 4) Use of led and similar type of low energy consuming electrical appliances
21.	A	<p>Is there active students' involvement in Govt. initiated/private organization initiated/self- initiated green programs and projects?</p> <ol style="list-style-type: none"> a. NO b. YES✓
	B	<p>If YES, Number of projects carried out in the last academic year: -</p> <ol style="list-style-type: none"> a. 0 TO5 b. 6 TO10 c. 11 TO20 d. MORE THAN 20✓
	C	<p>If YES, How many number of students involved in the above initiative?</p> <p>-----NOT MORE THAN 25 WORDS -----</p> <p>In the last academic year, 100 students involved in various initiatives such as Swatch Bharat Summer Internship, Minimize Plastic Waste – Awareness Campaign, HarithaJyothi - Plantation Drive, Kalamadalam Frontage Cleaning drive, Highway side cleaning</p>
22	A	<p>Does the institute have valid documented and well-circulated green policies/Guidelines?</p> <ol style="list-style-type: none"> a. NO b. YES✓
	B	<p>Do you have any approval/ authorisation from pollution control board/ statutory bodies? If applicable, please provide the copy of the relevant approval(s). (For eg. E-WASTE RULES 2016 CLEARANCE, HAZARDOUS WASTE RULES 2016 CLEARANCE, SOLID WASTE RULES 2016 CLEARANCE, BIO-MEDICAL WASTE RULES 2016 CLEARANCE, AIR ACT 1981, WATER ACT 1974, ENVIRONMENT PROTECTION ACT 1986, GREEN POLICIES, OTHERS)</p> <p>Yes, approval of Kerala state pollution control board Proof is attached</p>
23	A	<p>Does the institution oversee any programme/Project/Campaign for implementation of green programs in the neighboring communities?</p> <ol style="list-style-type: none"> a) NO b) YES✓
	B	<p>If answer to 23. A is YES, then following information be provided (You may select one or more from the following)</p> <ol style="list-style-type: none"> a. Green programs during Lockdownperiod(COVID-19) b. Any green program using Indian KnowledgeSystem c. Anyother✓

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	C	<p>How many number of Students/Faculty/Staff involved in the above initiative?</p> <p>The following green program during covid 19 period</p> <p>A) Program for conservation of Bharathapuzha , 2nd longest river in the state ,</p> <p>B) Conducted 12 programs during 2019 by the NSS of the institution</p> <p>C) First programme is being carried out by civil department with collaboration a group of people namely Friends of Bharatahapuzha (FOB)headed by E .Sreedharan ,the most efficient civil engineer in India , popularly known as metro man. A comprehensive study is underway to propose remedies for pollution and for conservation of the river .</p> <p>Other programmes are carried out by national service scheme of the institution and the total participants for all are more than 100</p>
24	A	<p>Has the institute participated in UBA/SAGY/ One student one Tree/ Jal Shakti Abhiyan?</p> <p>a. NO</p> <p>b. YES ✓</p>
	B	<p>If YES, how many programs were done in the past year?</p> <p>a. 0 TO5 ✓</p> <p>b. 6 TO10</p> <p>c. 11 TO20</p> <p>d. MORE THAN 20</p>
25	A	<p>Does the institute participate in technology or innovation-related programs/competitions (ex. Hackathon)?</p> <p>a. NO</p> <p>b. YES ✓</p>
	B	<p>If YES, please mention the No of programs/competitions participated from June 2019 to September 2020.</p> <p>9</p>
26		<p>Does the campus participate in climate change related events (workshops, conferences, and training)?</p> <p>a. NO ✓</p> <p>b. YES</p>
27		<p>How many climate change-related events did the institute organize on/off campus in the past academic year?</p> <p><NUMERICVALUE></p>
28	A	<p>Has the campus partnered with any external organizations to implement a technologically-driven environment and sustainable solutions?</p> <p>a. NO</p> <p>b. YES ✓</p>
	B	<p>If yes, how many collaborations were done in last one year?</p> <p>2</p>
29		<p>Are there signage's on the campus that help in promoting hygiene, sanitation and eco-friendly habit lifestyle?</p>

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30		<p>Does the Institute have smart displays and interactive models?</p> <p>a. NO b. YES ✓</p>
31	A	<p>Is there any paperless policy implemented on the campus?</p> <p>a. NO b. YES ✓</p>
	B	<p>What is the extent of the paperless office implemented in the institute?</p> <p>a. LESS THAN 25% ✓ b. 25 – 50% c. 50 -75% d. MORE THAN 75%</p>
32	A	<p>Has the campus networked its sensors to create smart campus?</p> <p>(a) NO ✓ (b) YES</p>
	B	<p>If yes, what are the type of applications being utilized for monitoring and control of such utilities? (You may select one or more from the following answers)</p> <p>a. WEB APPLICATION(DASHBOARD) b. MOBILE APPLICATION c. MAIL ALERT d. SMS BASEDALERT e. OTHERS</p>
33		<p>Is the campus entry based on ease of access via Smart Card/ Biometrics system?</p> <p>a. NO ✓ b. YES</p>
34		<p>Does the campus have tools for automation of functionalities like Timetable, Library Management, Book Issue/ Return, Dues Collection, student dash board, parent dash board etc.?</p> <p>a. NO b. YES ✓</p>
35.		<p>Has the campus implemented smart solutions like ERP for administration, academic, and finance?</p> <p>a. NO b. YES ✓</p>
36		<p>Has the campus implemented an online platform like MOODLE for teaching and learning process?</p> <p>a. NO b. YES ✓</p>
37.	A	<p>Does the institute restrict fuel based vehicle on campus and allow only selective barrier-free entry/exit?</p> <p>a. NO ✓</p>

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	B	If the answer to above question is <u>YES</u> , does the campus have smart-assist parkingsystem at a central parking location (WiFi, Sensor-enabledparking)? a. NO✓ b. YES
38.		Does the campus have Security and Surveillance system? a. NO b. YES✓
39.	A	Does the institute support and encourage ease of accessibility for Divyangjan? a. NO b. YES✓

	B	If yes, mention the types of the assistance being facilitated for independent accessibility. (You may select one or more from the following answers) a. RAMP b. METALSTRIPS c. BATTERY-ASSISTEDWHEELCHAIRS d. SEPARATE WASHROOMS✓ e. TACTILE PAVING FOR THEBLIND f. OTHERS
40.		Provide the number/Percentage(%) of people reporting sick in last one year in the health centre (if any) of the institute? In the last year, 164 people reported in the health centre because of fever, injuries, C & D and for BP measurement.
41.		Has the institute set up the SDGs (Sustainable Development Goals) related teaching courses in the curriculum or additional activities? a. NO b. YES✓
42.		Is the campus measuring the Air Quality in and around their campus? a) NO✓ b) YES
43.		Has your institute promoted the Indian Knowledge Systems (IKS) in the curriculum or related activities? a. NO b. YES✓
44.	A	Did you raise the awareness on the AICTE's environmental policy? a) NO b) YES✓

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B	<p>If YES, What are the specific activities that you developed related to AICTE Environmental Policy? (You may Select one or more from the following answers)</p> <ul style="list-style-type: none"> g. NON -CREDIT /CREDIT COURSE ON ENVIRONMENTSCIENCE h. SMART INDIA HACKATHON SOLVING ENVIRONMENTALCHALLENGES i. INCLUSION IN CURRICULUM ✓ j. ENVIRONMENTALAWARDS k. OTHERS (PLEASESPECIFY) ✓ <ul style="list-style-type: none"> - Add on course on environments subjects
45	<p>What is the financial saving/benchmark impact which has been achieved by turning your institute into smart campus?</p> <p>By turning our campus in to a smart one we have achieved significant improvement in aspects of our working . We have mobile alert for giving attendance information to parents. We have financial gain by reducing paper usage.</p>
46	<p>What change has been achieved by implementing Smart Technologies in your campus which was not achievable prior to such implementation</p> <p>By adopting various smart technology options we could improve the overall performance of the institution in respect of administration, improvement in teaching and learning process, improvement in monitoring attendance etc.</p>
47	<p>How the Smartness is being leveraged physically by on campus society (Students, Faculty, Administrators etc.)</p> <p>Students Faculties, Managers use the tools regularly in their day to day engagement and we are constantly deriving advantages in all spheres of working of the institute</p>
48	<p>Whether the institute use any tools like IOT /Big data analysis /AI for students Equity/adaptive learning?</p> <p>The digitally connected campuses enhance student learning and environmental sustainability. IoT innovation in the campus starts from whiteboards and connected school buses, moving toward smart lighting and security cameras—all of which provide real-time data and valuable insights to students, parents, faculty and administration. The most common IoT devices used in the classroom include: Interactive whiteboards, Student ID cards, automated attendance tracking system etc. This implementation let faculty to focus more on the primary work that is, teaching and to focus less on managing the workflow of the classroom. Campus automated software CampusBook used in our campus are used to track students who skip their classes, send alerts help students to concentrate academic work regularly. Students can use smartphones, PDA to access their homework assignments, and test performance through online portals. Videos can be uploaded in the cloud, online video Lecturing enables Students to attend classroom lectures remotely.</p>
49	<p>Does institute use any Emerging Technologies like Artificial Intelligence, IOT, Data Analysis etc. for helping disabled students or Rural/Agriculture Sector to promote Entrepreneurship/skilling/heath monitoring/Waste Management?</p> <p>YES. We use emerging technologies for helping disabled people for their improvement. For example, Lyza, for women, is a sanitary napkin developed by students with the support of institute that gives an alert about the time to change the pads through a mobile application. Lyza is specially designed for paralyzed women, autistic and mentally retarded women. With the invent of the product women will be more safe and comfortable in using pads as our product contains pure cotton.</p>

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50	<p>Does the institute have any smart system to monitor fire safety measures?</p> <p>No</p>
51	<p>Has Institute taken any step for ensuring cyber security related issues?</p> <p>The campus is equipped with a Unified Threat Management appliance to secure the network against harmful intrusions. The appliance currently installed is Cyberoam 300ING. Considering the increasing threats and extensive usage of the Internet the IT Team here is currently studying various options available in the market to upgrade the same with the latest solutions.</p> <p>Students are encouraged to learn ethical hacking and find loopholes in our own network and applications. OS updates are done for better security.</p> <p>The campus automation management system, named CampusBook, is developed in-house to ensure that the data is safe and secure.</p> <p>A central server running Active Directory Domain Service (AD DS) authenticates and authorizes all users and computers assigning and enforcing security policies for all computers and installing or updating software.</p> <p>Manual backups are taken periodically to safeguard the centrally stored data. The team is also studying the opportunities for implementing the automated backup system. Staff & Students are advised and proper awareness is provided on best security measures to be followed when using a system.</p>
52	<p>Whether the institute has been awarded any kind of special recognition? If yes, Provide details with photographs/ Document.</p> <p>Accreditation by National Board of Accreditation for 5 branches ie Civil, Mechanical, Electrical, computer science and electronics and communication Accreditation by National Assessment and Accreditation Council (NAAC), Atal Ranking of Institutions on Innovation Achievements</p> <p>Proof is attached</p>
53	<p>Has the institute planted any type of Traditional Medicinal Herbal plants in the campus based on Indian Knowledge System (IKS)? If yes, Please provide the List and Photographs.</p> <p>Yes</p> <p>Details attached</p>
54	<p>Provide the case study on Implementation of Traditional Indian Knowledge System (IKS) which includes food, water, Sanitation, Health, Management, Rain water harvesting etc. relevant to guidelines of Clean and Smart campus Award. Give details not more than 150 words (it may include pictorial representation/Videos/Photographs may also attached pdf of max size 1 MB)</p> <p><i>(Please note:-Separate award will be given to the deserving institute in this context)</i></p> <p>Rain water harvesting system</p>

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c) Minimum Rate for Analysis = Rs 250

d) Concessional rate for all staff and students @60% of prescribed cost subjected to a minimum of Rs 150

e) For residents of Panjal and Vallathol nagar panchayath the rate is fixed at 75% of the total cost with minimum of Rs 200-copy of ration card / other proof to be produced

f) All the payments in advance

2) Role of Office Bearers for Analysis of Water Samples and Answering of Web Site Questions

a) Acceptance of water sample for testing after initial interaction /Fixing the parameters and fee / verification of remittance of fee in the office – Co-Ordinator / HOD Civil/Asst co-ordinator)

b) Fee will be remitted in advance in the college office as per the guidelines at the time of sample acceptance

c) Supervision of laboratory activities – Co-Ordinator/ Asst co-ordinator

d) Verification and interpretation of results and secondary interaction- Co-Ordinator / HOD civil

e) Result to be prepared by the co-ordinator sent to the principle through the HOD civil

f) Verification of all Activities and files , Remittance of fee ,Signing of Results etc – Principal

3) Answering of Web Site Questions

a) Activities of Co-ordinator

All the questions will be reproduced in the concerned register and answers will be prepared in consultation with the consultants

b) Activity of HOD civil

Verification of answers and posting in the website

4) Publication of small booklets in Malayalam

Final approval to be given by Fr Roy Vadakken

5) Training programmes for housewife's on water related subjects

Generally permitted but the normal procedure as per the college regulation is to be followed

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- 2) Approval of Role of Office Bearers for Analysis of Water Samples
- 3) Approval of Role of Office Bearers in Answering of Web Site Questions
- 4) Approval of Proposed Current Activities
- 5) Approval of urgent requirements of the Centre
- 6) Approval and discussion on interaction table and format for entering result

Approval has been given as detailed below

1 a) Proposed rates for water testing are approved as under

Sl no	Parameter	Rate for Analysis in Rupees
1	Turbidity	20
2	pH	20
3	TDS	20
4	Alkalinity	50
5	Total Hardness	50
6	Chloride	60
7	Fluoride	60
8	Nitrate	70
9	Iron	60
10	Manganese	60
11	Suphate	40
12	Sulphide	40
13	DO	50
14	COD	100
15	BOD	120
16	Oil and grease	200
17	Residual chlorine	15
18	Suspended solids	40
19	Coliform /100ml	250
20	E_Coli /100ml	250

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Additional provisions as regards to water testing

b) The parameters to be tested is to be fixed after interaction with the customer depending upon his interest and his requirement. Person Interacting from the CWRE shall be the **Dr. Sunny Joseph Kalayathankal** (Ph.D. (Quality Control), M.Sc. (Maths), B.Ed) **PRINCIPAL** civil/Asst Co-ordinator

Jyothi Engineering College
Cheruthuruthy P.O.- 679 531

Victor Manjila
Manjila (H)
Bairvoor (P.O)
Thrissur - 14.

To,

The Principal
Jyothi Engineering College
Cheruthuruthy.

Sir, ഞാൻ വിദിപതിനാരിൽ ചില മലിനീകരണ പ്രവർത്തനങ്ങളിൽനിന്നും CWRE-യിൽനിന്നും സെമിനാർ കിന്നാരിനെ ശ്രദ്ധിക്കുകയാണെന്നപ്രകാരം നിർദ്ദേശങ്ങൾ നൽകണമെന്ന് അഭ്യർത്ഥിക്കുന്നു.

ഞാൻ. വിദിപതിനാരിൽ
മേൽപ്പറഞ്ഞ
മേൽപ്പറഞ്ഞ
തൊഴിൽ പി.ഒ
മേൽപ്പറഞ്ഞ - 14

True Copy Attested

hanny

Sunny

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M.Tech, MCA, M.Sc, M.Phil, B.Ed
Ph.D (Computer Science), Ph.D (Maths)
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Approved by AICTE & affiliated to APJ Abdul Kalam Technological University

A CENTRE OF EXCELLENCE IN SCIENCE & TECHNOLOGY BY THE CATHOLIC ARCHDIOCESE OF TRICHUR

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NBA accredited B.Tech Programmes in Computer Science & Engineering, Electronics & Communication Engineering, Electrical & Electronics Engineering and Mechanical Engineering valid for the academic years 2016-2022. NBA accredited B.Tech Programme in Civil Engineering valid for the academic years 2019-2022.



DEPARTMENT OF CIVIL ENGINEERING

CENTRE FOR WATER RESEARCH & EDUCATION

Approved by Kerala State Pollution Control Board as a commercial laboratory
vide order no : PCB/Lab approval 85/2019/valid upto 29.10.2021

Water Quality Test Data

Name of Customer : *Victer Manjila, Manjila(H), Baimoor.*

Type of Source :

Date of Collection : *29.12.20.*

Date of Testing : *29.12.20 - 30.12.20.*

Standard Followed : IS 10500 - 2012

S/no	Parameter	Unit	Acceptable limit	Permissible limit	Content in the sample
1	Turbidity	NTU	1	5	
2	pH	No unit	6.5-8.5	No relaxation	
3	TDS	Mg/Litre	500	2000	
4	Alkalinity	Mg/Litre	200	600	
5	Total Hardness	Mg/Litre	200	600	
6	Chloride	Mg/Litre	250	1000	
7	Fluoride	Mg/Litre	1	1.5	
8	Nitrate	Mg/Litre	45	No relaxation	
9	Iron	Mg/Litre	0.3	No relaxation	
10	Manganese	Mg/Litre	0.1	0.3	
11	Sulphate	Mg/Litre	200	400	
12	Sulphide	Mg/Litre	0.05	No relaxation	
13	Dissolved Oxygen	Mg/Litre	-		
14	COD	Mg/Litre	-		<i>-28-</i>
15	BOD	Mg/Litre	-		
16	Coliform/100 ml	Number	Nil	Nil	
17	E_coli/100 ml	Number	Nil	Nil	

Remarks and Recommendations :

True Copy Attested

Amrith
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