ENERGY AUDIT REPORT

T.K. MADHAVA MEMORIAL COLLEGE

NANGIARKULANGARA, ALAPPUZHA

MARCH 2022

Energy Management Centre – Kerala
Dept of Power, Govt of Kerala.
State Designated Agency
Sreekrishna Nagar, Sreekariyam P.O.,
Thiruvananthapuram – 695 017
Ph: 0471 - 2594922, 2594924
Fax: 0471 – 2594923
email: emck@keralaenergy.gov.in

ENERGY AUDIT AT

T.K. MADHAVA MEMORIAL COLLEGE
NANGIARKULANAGAR, ALAPPUZHA, KERALA

Conducted By

ENERGY MANAGEMENT CENTRE – KERALA
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Ph: 0471 - 2594922, 2594924, Fax: 0471 – 2594923
Email: emck@keralaenergy.gov.in

Prepared by

Indira Babu Energy Ventures Pvt Ltd.
Thiruvathira, CP III 520
Kottamughal, Nalanchira P O
Thiruvananthapuram, Kerala- 695015

ACKNOWLEDGMENT

We, hereby express sincere thanks and gratitude to **Smt. Dr. Sharmila .P.P, Principal, TKMM College** for the whole hearted support, extended for the Energy Audit. Also, sincere thanks to **Smt. Dr. Induja .I.J, Assistant Professor, Department of Physics** and **Sri. Jithin, Lab Assistant** for their co- operation and the needful assistance, extended to us, during the conduct of the Energy Audit.

Energy Management Centre(EMC)-Kerala has entrusted **M/s. Indira Babu Energy Ventures Pvt. Ltd, (Vydyuthi Energy Services),** the work of conducting an Energy Audit, at TKMM College, Nangiarkulangara, Alappuzha.

The Energy Audit was carried out by the following energy audit team of Vydyuthi Energy Services.

1. Er. Sudha Kumari. R (BEE Certified Energy Auditor), Head of Energy Efficiency
2. Dr. Vani Vijay, Technology & Research expert
3. Er. Kokila Vijayakumar, Operations & Data analytics consultant
4. Er. Akhil Dev D.J, Energy & Market Analyst
5. Er. Shabinsha, Electrical Specialist
6. Er. Sruthy A.A, Energy Engineer

Director

Energy Management Centre

Thiruvananthapuram
08.04.2022

Contents

Basic details – TKMM College, Nangiarkulangara

Sl. No	Items	Details
1	Name of the building	TKMM College, Nangiarkulangara
2	Category/Type of building (Govt. Office, Hospital, LSGD etc.)	Govt. Aided College
3	Name of the Assembly Constituency with District	Harippad, Alappuzha
4	Address with phone number and e-mail ID	TKMM College, Nangiarkulangara, Harippad Alappuzha-690513
5	Name of the Contact Person with Contact details	Dr. Induja .I.J Assistant Professor, Dept. of Physics, TKMM College Mob: 9496016262
6	Energy audit last conducted (Year)	Not conducted
7	Name of the audit firm	Not applicable
8	Number of Government offices/Departments	Not available
9	Number of Staff (Permanent)	40
10	Number of Staff (Contract)	18
11	No of Working Hours/day	7
12	No of Working days/Year	220
13	Staff Canteen/Restaurant	1
14	Scope for renewable energy integration	Yes
15	Roof type (Concrete, MP Tiles etc)	Concrete, MP Tiles, Aluminium Sheet
16	Roof – Shape (Flat/ Sloping roof)	Flat, Sloping roof
17	Roof Area (Sq. M)	5614 sq.m
18	Reflective coating on roof (Y/N)	Yes
19	Type of Glazing used in windows (Single Glazed/Double Glazed Window)	No
20	Whether UPS is placed inside an air conditioner room (Y/N)	No
21	Is false ceiling provided in air conditioned area? (Y/N)	Yes
22	Automatic Lighting Controls (Y/N)	Yes

Basic Energy Details: TKMM College, Nangiarkulangara

Sl. No	Items	2019-20	2020-21
1	Name of the building	TKMM College	
2	KSEBL Consumer No:	1157255009302	
3	KSEBL Section Office	Pallipad section	
4	Connected Load (kW)	40	40
5	Contract Demand (kVA)	39.33	39.33
6	Recorded Average Maximum Demand (kVA)	Nil	Nil
7	Total Transformer Capacity (kVA)	Nil	Nil
8	Average Power Factor	Not Available	Not Available
9	Air Conditioned area (Sq.M)	250	250
a	Less than 50%	Yes	Yes
b	More than 50%	-	-
10	Annual electricity consumption of the building (kWh)	18325	9790
11	Total built up area of the building (Sq. M)	8545	8545
12	Specific Energy Consumption (kWh/Sq.m)	2.14	1.14
13	Water Source (Open well/KWA)	Open well	Open well
14	Water consumption per year (kL)	Nil	Nil
15	Annual Water bill (KWA) Rs.	Nil	Nil
16	Number of vehicles – 4 wheeler (Own)	Nil	Nil
17	Number of vehicles – 4 wheeler (Contract)	Nil	Nil
18	Number of vehicles (2 Wheeler)	Nil	Nil
19	Total Diesel/Petrol consumption of the vehicles	Nil	Nil
20	Number of electric vehicles (if any)	Nil	Nil
21	Renewable Energy (Solar PV – kWp) – Installed Capacity	1 (Off-grid)	1 (Off-grid)
22	Renewable Energy (Bio gas plant – Cub. M)	3	3
23	Present status of the RE system (Working or Not) if any	Working	Working
24	Own Diesel Generator (kVA)	30	30
25	Annual Diesel Consumption for DG (Lts)	110	110

1. Executive Summary

Table 1.a. Retrofitting in College buildings
(Consumer no. 1157255009302*, connected load-* 40kW*)]*

Sl. No	Description of Work	No. of Equipment	Annual Energy Saving Potential (kWh)	Annual Financial Savings (Rs.)	Investment Required (Rs.)	Payback Period (Years)
1	Retrofitting of 52W (T12) ordinary tube light with 18W LED tube light	21	468	3039	8400	2.76
2	Retrofitting of 36W (T8) ordinary tube light with 18W LED tube light	57	889	5779	22800	3.95
3	Retrofitting of 14W CFL with 7W LED Bulb	4	20	130	560	4.30
4	Retrofitting of existing inefficient ceiling fan with BEE star rated (BLDC) ceiling fan	179	6959	45234	537000	11.87
	Total		**8336**	**54182**	**568760**	**10.50**

Energy saving potential of about 8336kWh per year, with an Annual financial savings of Rs. 54182(approx.). Investment required is about Rs. 568760

Table 1.b. Solar Energy Potential (Recommendation)

Sl No	Description	Annual Energy Generation from Solar Plant (kWh)	Annual Energy (in Rs.)	Investment Required (Rs.)	Payback Period in Years
1	Installation of 17kWp On-grid solar plant in the college premises.	24480	159120	1105000	6.94
	Total		**159120**	**1105000**	**6.94**

2. Introduction

2.1. Energy Management Centre (EMC) – Kerala

Energy Management Centre (EMC) – Kerala under Department of Power, Government of Kerala, is working towards attaining energy efficiency in all sectors of economy. EMC is formulating and implementing energy conservation projects and programs. In compliance with the Energy Conservation Act - 2001, Government of Kerala has designated EMC as the State Designated Agency (SDA) to enforce, regulate and co-ordinate the activities of Energy Conservation Act. Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India is the coordinating agency to implement the Act in the country. EMC is working very closely with Bureau of Energy Efficiency, Government of India and all the stake holders in initiating and implementing energy efficiency measures in the State.

With intention to enhance the energy efficiency of the various sectors of the economy EMC have envisaged various programs. To enhance energy conservation and energy efficiency of Low tension (LT) consumers a preliminary LT energy audit has been designed as a walk through energy audit.

Energy Management Centre (EMC) – Kerala has entrusted M/s. Indira Babu Energy Ventures Pvt Ltd for conducting an energy audit at TKMM College, Nangiarkulanagara, Alappuzha.

Major Activities of EMC

1. Monitoring and Verification of Energy Data of Designated Consumers and their PAT Scheme.
2. Mandatory Energy Audit for HT & EHT Consumers
3. Energy Efficiency training programme at Industrial Clusters/Parks/Estates
4. Energy Conservation Building Code (ECBC)
5. Energy Efficient Street Lighting
6. Municipal Demand Side Management (MuDSM)
7. Agriculture Demand Side Management (AgDSM).
8. Go-Electric Campaign
9. Urjayan Scheme for Legislative Assembly constituencies.
10. Energy Meter Calibration & LED Testing Lab
11. Kerala State Energy Conservation Award
12. Smart Energy Program for Students
13. Energy Efficiency Capacity Building Program
14. Urjakiran - Awareness programs for general public
15. Energy Clinic
16. Research & Studies

2.2. Vydyuthi Energy Services (VES)

Vydyuthi Energy Services (VES) under Indira Babu Energy Ventures Pvt. Ltd, located in Kerala, India with services focused on energy sector. VES helps businesses and organizations across sectors to identify energy efficiency drivers and enable them to adopt viable action plans.

VES is empaneled as Energy Auditing Firm under Energy Management Centre Government of Kerala with Empanelment No: EMCEEA-4720E

VES works with the vision of supporting the economy in achieving the Sustainable Development Goals (SDG) target by 2030. The important focus of the activities is to Enhance awareness, acceptability and applicability of energy efficiency and renewable energy technologies and provide energy services to build a sustainable future for generations to come Other than energy auditing, VES offers consulting, training, project management services and R&D in the below areas for businesses in India and abroad

- Energy Efficiency
- Renewable Energy
- Power Quality assessment
- E-Mobility
- Carbon Accounting.

2.3. T.K.M.M College

The College is named after the great freedom fighter and social reformer Sri. T.K. Madhavan. As a tribute to his selfless service to humanity this temple of learning was established in 1964 through the combined efforts of Karthikappally, Karunagappally and Mavelikkara SNDP Unions. Sri. R. Shankar, former Chief Minister of Kerala and the Founder Manager of Sree Narayana Colleges, formally inaugurated the college on July 4, 1964. During the last 4 decades T.K. Madhava Memorial College has carved a niche for itself among this illustrious cluster of institutions. The college is affiliated to the University of Kerala, which comes under 12(f) 2(B) Act of UGC with a strength of about 2500 students. The college offers quality education and maintains consistently high academic standards, giving students equal opportunity for themselves and bettering their own life. The prime aim of the college is to reach out to students from socially and economically backward sections of society and to equip them with the necessary skills and education to meet the challenges of a rapidly changing world.

Data regarding connected loads and usage pattern, were identified during the Energy Audit and preliminary survey on 19.03.2022. The basic details are shown in below tables 2.3.1, 2.3.2.

Table 2.3.1: Details of built up area

Block	Built up Area in m^2
College Buildings	8545

Table 2.3.2: Details Occupants

Category	in Number
Permanent Staff	40
Contract Staff	18
Total	**58**

3. Energy & Utility Description

Electricity supply provider: Kerala State Electricity Board. Bill details are as shown below

Consumer No. : 1157255009302	
Buildings	Main Building, Zoology Block, Chemistry Block, Maths Block.
Name of Consumer	TKMM College
Connected Load	40 kW
Measured Connected Load	49.47 kW
Tariff	LT-6A/Three
Annual Energy Consumption(kWh)	18758
Name of Section Office	Electrical Section Pallipad

Sl. No	Consumption (Month)	Consumption (kWh)	Monthly Average Consumption (kWh)	Energy Charge (Rs.)
1	December 2021	1813	689	11784.50
2	February 2022	1673	1458	10874.50

Most of the lights used are LED lights, which are comparatively energy efficient. T12/T8 Fluorescent Tube lights are also used, which are not energy efficient. Fans used are of ordinary inefficient type. Electronic fan regulators are used, which are energy efficient. The details of each appliance, in terms of location and numbers along with load details are provided in Annexure 1 of this document. The contribution of each category of appliance to total connected load is shown in images 3.a for building and energy consumption is shown in image 3.b.The percentage of lighting and ventilation load in each area are shown in image 3.c

Image 3.a: Load Distribution TKMM College

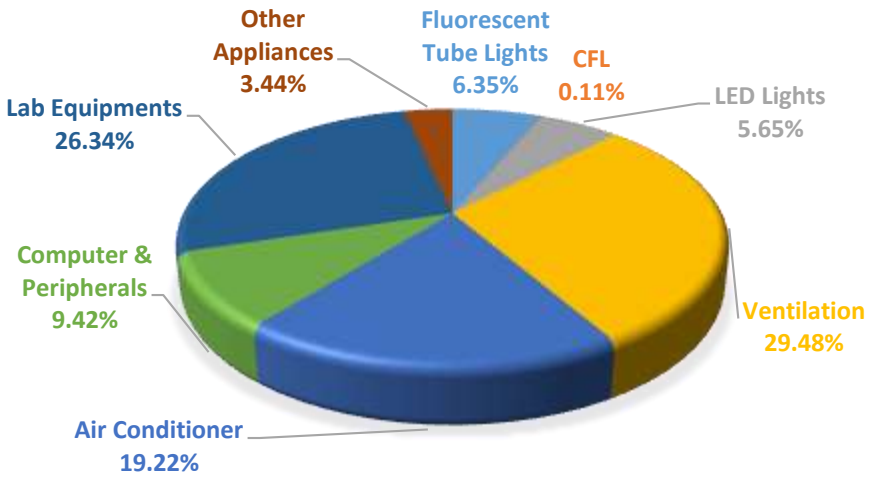


Image 3.b: Annual energy consumption chart TKMM College

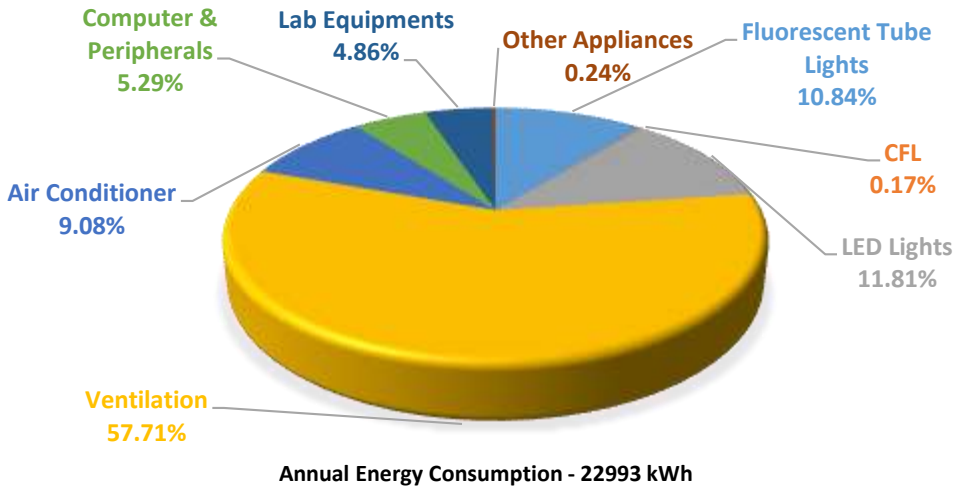
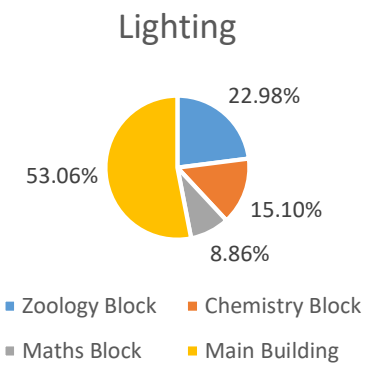


Image 3.c: Area wise Light and Ventilation(fan) Load



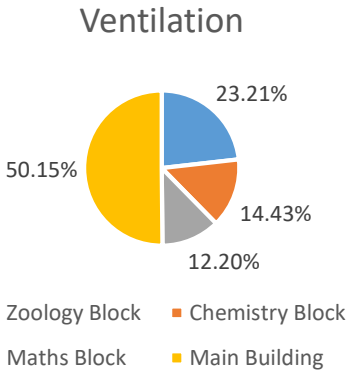


Image 3.d : Energy efficient air conditioner in Seminar Hall

Image 3.e : Energy efficient LED lights in Waiting Area

4. Energy Performance

The details of calculated approximate annual energy consumption of various loads, are shown in tables 4.a. From the pie charts in images 3.b, it can be seen that major energy consumption are by ventilation (Fan), Computer and peripherals and lighting load. The existing inefficient T12 & T8 fluorescent tube lights can be replaced with LED lights. Inefficient CFL can be replaced with LED bulbs. The fans used are of ordinary inefficient types and these can be retrofitted with BEE Star labelled ceiling fans (BLDC)

Table 4.a: Annual energy consumption-Equipment wise (Consumer No: 1157255009302)

Load	Annual Energy Consumption in kWh	Percentage of Annual Energy consumption
Fluorescent Tube Lights	2493.18	10.84%
CFL	40.04	0.17%
LED Lights	2714.45	11.80%
Ventilation	13270.30	57.71%
Air Conditioner	2087.01	9.07%
Computer & Peripherals	1216.14	5.28%
Lab Equipment	1117.84	4.86%
Other Appliances	55	0.23%
Total	**22993.96**	**100.00%**

Table 4.b: Annual Energy Consumption

	2021-22
Annual Energy Consumption(kWh) as per KSEB Bills	18758
Annual Diesel Consumption in Ltrs.	110

Table 4.c: Energy Performance details

Description	Value
Total Annual Energy Consumption as per audit data in kWh	22993.96
Total built up area in m2	8545
Specific Energy Consumption kWh/m2	2.69

5. Climate Impact

Climate change is disrupting the economies and lives of people in every country in every continent. In recent years, Kerala has seen the worst changing weather patterns, rising sea levels and greenhouse gas emissions are now at the highest levels in history. Wildfires, floods and temperature rises have become a threat to the state of Kerala. Greenhouse gases dominated by Carbon di-oxide emission is the major reason for global warming and consequent climate change and carbon accounting provides a quantification of greenhouse gas emitted by the organization. In carbon accounting the major reasons of carbon emission within the organization are identified and quantification of the weight of carbon dioxide emitted is done based on scientific calculations and standard assumptions.

Emission due to electricity consumption from grid

Every unit of electricity consumption is associated with carbon emission according to the methods of power generation in the utility grid of the region According to Indian grid standards, 0.79 Kg is emitted per kWh of electricity generated.

CO_2 emissions due to electricity consumption [kg]

= Grid emission factor [0.79Kg/kWh] X Electricity imported [kWh]

- Grid emission factor: The emission factor value for electricity consumption from grid is 0.79 Kg/kWh according to Central Electricity Authority database.
- Consumption of the institution: Annual value according to survey = 22993.96 kWh/Year
- CO_2 emission by electricity consumption by the campus= 18165.22 Kg

Fuel Consumption by Diesel Generator

CO_2 emissions due to diesel fuel consumption [t]

= Emission factor [tCO2/Liter] X Quantity of diesel use [Liters]

- Emission factor (diesel): 0.00267 tCO2/Liter, (calculated based on 2006 IPCC guidelines for national greenhouse gas inventories volume - 2, energy, default emission factors for stationery combustion in manufacturing industries and construction)
- Diesel Consumption of the office- Annual value according to survey(2020-21) = 110liter/year
- CO_2 emission by diesel usage in the office = 0.2937 tCO_2/Year

The CO2 emission and there by impact on environment and climate can be reduced by implementing the energy saving recommendations and utilizing more renewable energy sources.

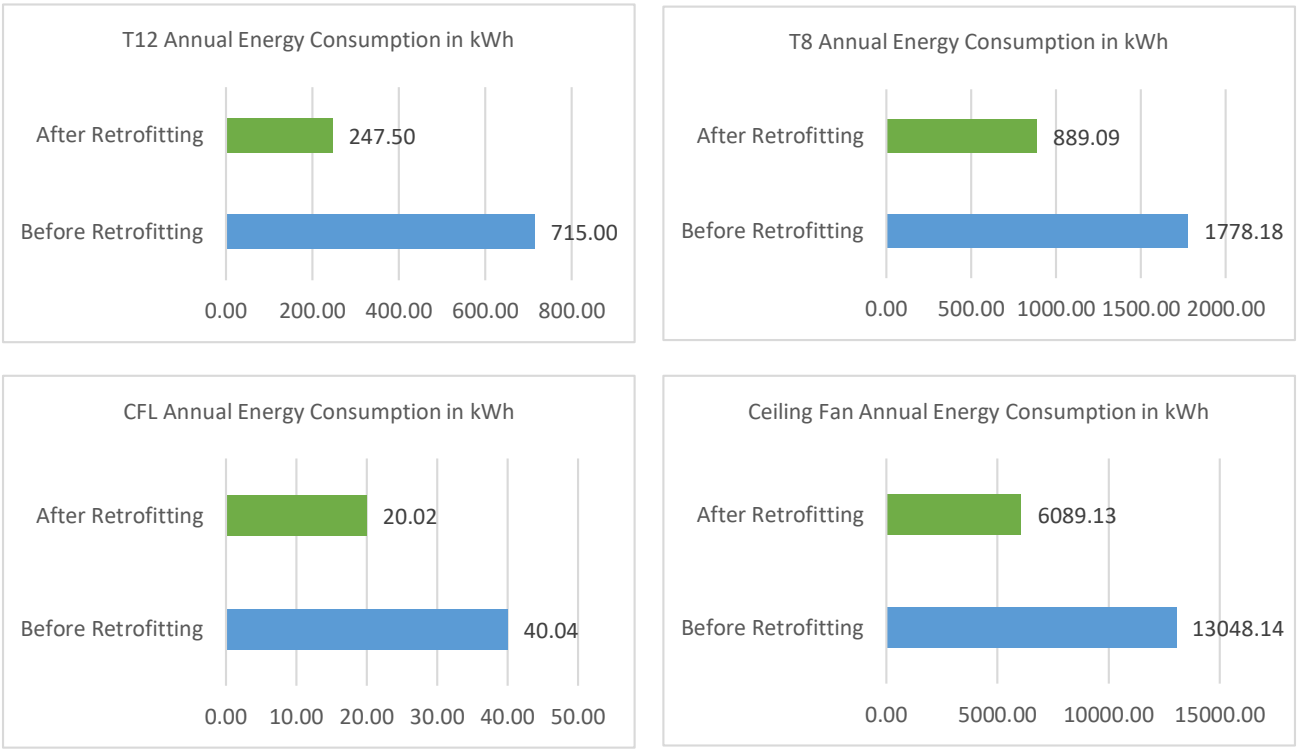
6. Recommendations for Energy Conservation

Consumer No: 1157255009302, connected load: 40 kW

Calculation Table: Light Load			
Description	**Name of equipment**		
	T12	**T8**	**CFL**
Annual working hours (Average)	655	867	715
No. of fittings(nos.)	21	57	4
Wattage of one light fitting(kW)	0.052	0.036	0.014
Total load(kW)	1.092	2.052	0.056
Annual Energy Consumption(kWh)	715.00	1778.18	40.04
Wattage of one retrofitting light fitting (kW)	0.018	0.018	0.007
Savings of wattage with replacement ,for one light fitting(kW)	0.034	0.018	0.007
Total savings of wattage(kW)	0.714	1.026	0.028
Annual Energy Saving potential by replacement(kWh)	467.50	889.09	20.02
Annual Financial Saving potential (@Rs. 6.5/unit)- Rs.	3038.75	5779.09	130.13
Investment required, for replacement (@ Rs.400 per LED Tube light) & Rs.140 per LED Bulb.	8400	22800	560
Pay Back Period in years	**2.76**	**3.95**	**4.30**

Calculation Table: Fan Load	
Description	**Name of equipment**
	Ceiling Fan
Annual working hours (Average)	972
No. of Fans (nos.)	179
Wattage of one Fan (kW)	0.075
Total load(kW)	13.425
Annual Energy Consumption (kWh)	13048.14
Wattage of one retrofitting fan (kW)	0.035
Savings of wattage with replacement, for one Fan (kW) – replacing the inefficient Fan with BEE STAR labelled Fan (BLDC).	0.04
Total savings of wattage(kW)	7.16
Annual Energy Saving potential by replacement(kWh)	6959.01
Annual Financial Saving potential (@Rs. 6.5/unit)- Rs.	45233.56
Investment required, for replacement(@ Rs.3000 per ceiling Fan)	537000
Pay Back Period in years	**12**

Image 6.1: Comparison of Energy Consumption before and after Retrofitting Major Loads.
Consumer No: 1157255009302



Immediate energy savings, can be achieved from the effective usage of lights, Fans. The following activities, having no/low investment, can be adopted in these areas.

- Replace the existing Fluorescent Tube lights T12 and T8 with LED lights, (see the Executive Summary).
- Replace the existing CFL with LED bulbs, (see the Executive Summary).
- Replace old/ inefficient fans with BEE star rated (BLDC) ceiling fans (see the Executive Summary).
- Switch OFF appliances, when not in use.
- Utilize BEE 5 star labeled appliances, as far as possible.
- Maintain standard Electrical wiring, to avoid energy loss.
- Avoid very old and obsolete appliances and replace with energy efficient and environment friendly appliances.
- Keep the computers in sleep/shut down mode, when not in use.(i.e, during lunch time)
- Regular cleaning of glass panes of Windows, light fixtures, Fans and other appliances, to get maximum output.
- Utilize the natural lights and wind, as far as possible, to reduce energy consumption.
- An Energy Conservation cell/club can be constituted and arrange Energy

Conservation awareness programs. Create awareness among the students & employees, about the importance and practice of Energy Conservation and monitor, regularly, the energy conservation activities.

- Investigate possibilities of using renewable energy solutions and take steps to implement the same.
- Promote use of Electric Vehicles by employees and support e mobility through installation of EV charging stations.

7. Energy Policy

It is recommended that the management shall take necessary steps to formulate and follow energy policy within the organization based on the international standard ISO 50001:2018 - Energy management systems - Requirements with guidance for use. The standard is applicable to any organization regardless of its type, size, complexity, geographical location, organizational culture or the products and services it provides. It provides guidelines pertaining to activities affecting energy performance that are managed and controlled by the organization.

Based on this standard, the organization shall:

- Establish, document, implement and maintain and improve an EnMS (Energy Management System) in accordance with the requirements of this International Standard;
- Define and document the scope and the boundaries of its EnMS
- Determine how it will meet the requirements of this international standard in order to achieve continual improvement of its energy performance and of its EnMS.

Top management shall define the energy policy and ensure that

- It is appropriate to the nature and scale of the organization's energy use and consumption and Includes a commitment to continual improvement in energy performance
- It includes a commitment to ensure the availability of information and of necessary resources to achieve objectives and targets
- It includes a commitment to comply with applicable legal requirements and with other requirements to which the organization subscribes which relate to its energy use, consumption, and efficiency
- It provides the framework for setting and reviewing energy objectives and targets
- It supports the purchase of energy efficient products and services and design for energy performance improvement
- It is documented and communicated at all levels within the organization and regularly reviewed, and updated as necessary

8. Renewable Energy Potential (Solar)

Installation of a solar plant of capacity 17kWp can generate approximately 2040 units per month, which can meet the monthly energy consumption of the building. (Subjecting to the approval of the capacity of the Solar Plant from Kerala State Electricity Board Ltd.)

9. Annexures

9.1. Annexure I. Load Matrix

This document contains data collected during the walk-through audit and survey conducted on 19-03-2022. The number of appliances and hours of usage are indicated, with respect to each room/area in the building.

- Zoology Block

SL. NO	APPLIANCE	T12	T8	CFL	LED TUBE	LED BULB	EXHAUST FAN	PEDESTAL FAN	WALL FAN	CEILING FAN	AC			COMPUTER	PRINTER	PROJECTOR	REFRIGERATOR		AUTOCLAVE	CENTRIFUGE
	Name of Building/Room/Place/Area/Location	nos.	nos.	nos.	nos.	nos.	nos.	nos.	nos.	nos.	rating	ton	nos.	nos.	nos.	nos.	rating	nos.	nos.	nos.
	COMMERCE & ZOOLOGY BLOCK																			
	GROUND FLOOR																			
1	Dept. of Commerce - Staff Room	1			3			3		3										
2	Toilet					1														
3	Lecture Hall - M.Com			3		7		1		5			2			1				
4	Lecture Hall - B.Com				3					4										
5	NSS Store Room																			
6	Lecture Hall - B.Com		2		2					4										
7	Lecture Hall	2			1					2										
8	Lecture Hall 1st B.Com Travel	4	1							4										
	FIRST FLOOR																			
9	Dept. of Zoology - Staff Room		1		1					1				1	1					
10	Museum				1				1	1							5	1		
11	Toilet			1			1													
12	Zoology Lab				13			1		5									2	1
13	Attenders Room				1					1										
14	Zoology Lecture Hall		2		2					3										
15	Botany Lab		1		3					4										
16	Dept. of Botany - Staff Room				1					1										
17	Outdoor - Ladies Toilet	1								2										
	Total Nos.	**8**	**7**	**4**	**31**	**8**	**1**	**5**	**1**	**40**			**2**	**1**	**1**	**1**		**1**	**2**	**1**

- Chemistry Block

SL.NO	APPLIANCE	T12	T8	LED TUBE	EXHAUST FAN 60W	PEDESTAL FAN	WALL FAN	CEILING FAN	CENTRIFUGE	BUNSEN BURNER	OVEN
	Name of Building/Room/Place/Area/Location	nos.	nos.	nos.	nos.	nos.	nos.	nos.	nos.	nos.	nos.
	CHEMISTRY BLOCK										
1	Lecture Hall - Maths	1		1				2			
2	NCC Office		1					1			
3	Lecture Hall - Maths			2				4			
4	Lecture Hall -MSc. Chemistry		1					2			
5	Lecture Hall - Msc. Chemistry			1				2			
6	Lecture Hall - Msc. Chemistry			1				2			
7	Lecture Hall - IC			3				2			
8	Lecture Hall - Bsc. IC		1	4				3			
9	Store Room - Chemistry	1	2								
10	Store Room			1			1				
11	Balance Room	2									
12	Chemistry Lab 1	1		3	3	1	1		2	5	1
13	Room			1							
14	Store Room			1				1			
15	Chemistry Lab 2		2	2	2						
16	Lecture Hall - B.Com			1				3			
	Total Nos.	**5**	**7**	**21**	**5**	**1**	**2**	**22**	**2**	**5**	**1**

- Maths Block

SL.NO	APPLIANCE	T8	LED TUBE	LED FLOODLIGHT	PEDESTAL FAN	CEILING FAN	COMPUTER	PRINTER
	Name of Building/Room/Place/Area/Location	nos.	nos.	nos.	nos.	nos.	nos.	nos.
	MATHS BLOCK							
	GROUND FLOOR							
1	Dept. of Maths & Statistics	3				2		
2	Dept. of Physical Education	1				1		
3	Passage	1						
4	Lecture Hall - Maths		3			4		
5	Lecture Hall - Chemistry		2			2		
6	IQAC Room	1				1		
7	Dept. of Chemistry - Staff Room	1	2		1	2		1
8	Dept. of Hindi & Malayalam		2			2	1	
	FIRST FLOOR							
9	Lecture Hall		1			2		
10	Employees Co-op Society		1			1		
11	Lecture Hall		2			2		
12	Lecture Hall		1			2		
13	NSS Room							
14	Lecture Hall		1			2		
15	NCC Room							
16	Outdoor			2				
	Total Nos.	**7**	**15**	**2**	**1**	**23**	**1**	**1**

- Main Building

SL.NO	APPLIANCE	T12	T8	LED	LED	LED	LED	LED	LED	WALL	PEDESTA	CEILING	AC 2T			AC 1.5T		
	Name of Building/Room/Place/Area/ Location	nos.	nos.	nos.	nos.	nos.	nos.	nos.	nos.	nos.	nos.	nos.	rating	ton	nos.	rating	ton	nos.
	MAIN BUILDING																	
	GROUND FLOOR																	
1	RDC Office	1	1									4						
2	Room	1										1						
3	Retiring Room			1								1						
4	Examination Room		2	1								1						
5	Passage			7														
6	Office		4	9								6						
7	Visitors Area							2										
8	Principal Room							8				4	5	2	1			
9	Store Room 1		1									1						
10	Toilet					1												
11	Store Room					1						1						
12	Dept. of Economics - Staff Room		1	2								2						
13	Lecture Hall - Economics		1									2						
14	Lecture Hall - Economics		1	1								4						
15	Lecture Hall - 2nd BA Economics		1	1								4						
16	Lecture Hall		3	1								3						
	FIRST FLOOR																	
17	Library	3	2	1								4						
18	Library 2		1	8								4						
19	Library 3			2								4						
20	6. Lecture Hall			2								4						
21	Dept. of English - Staff Room		1	1							2	1						
22	Computer Lab				2							1						
23	7. Lecture Hall			1								2						
24	8. Lecture Hall			1								2						
25	9. Computer Lab		6									6						
26	Seminar Hall		4	2			3	8		2		7				2	1.5	3
	SECOND FLOOR																	
27	10. Lecture Hall			1								2						
28	UG Lab - Physics		3	2								6						
29	Computer Lab - Old		1									1						
30	Dept. of Physics - Staff Room		1	1								2						
31	11. Lecture Hall -BSc. Physics			1								2						
32	HOD Room	1										1						
33	MSc. Lab 1	1	1									2						
34	MSc. Lab 2		1									2						
35	Lecture Hall - MSc. Physics			1								2						
36	11. MSc. Physics					1						1						
37	Conference Room	1				1					1	2						
	THIRD FLOOR																	
38	3rd BSc. Physics											2						
39	Outdoor								4									
	Total Nos.	**8**	**36**	**47**	**2**	**4**	**3**	**18**	**4**	**2**	**3**	**94**			**1**			**3**

SL.NO	APPLIANCE	COMPUTER	PRINTER	XEROX	PROJECTOR	INDUCTION COOKER	MAGNETIC STIRRER	HEATING MANTLE	HOT AIR OVEN	MUFFLE FURNACE	CRO	HOT PLATE
	Name of Building/Room/Place/Area/Location	**nos.**	**nos.**	**nos.**	**nos.**	**nos.**	**nos.**	**nos.**	**nos.**	**nos.**	**nos.**	**nos.**
	MAIN BUILDING											
	GROUND FLOOR											
1	RDC Office											
2	Room											
3	Retiring Room					1						
4	Examination Room											
5	Passage											
6	Office	1		1								
7	Visitors Area											
8	Principal Room	1	1									
9	Store Room 1			1								
10	Toilet											
11	Store Room											
12	Dept. of Economics - Staff Room	1										
13	Lecture Hall - Economics											
14	Lecture Hall - Economics											
15	Lecture Hall - 2nd BA Economics											
16	Lecture Hall											
	FIRST FLOOR											
17	Library											
18	Library 2	4	1									
19	Library 3											
20	6. Lecture Hall											
21	Dept. of English - Staff Room											
22	Computer Lab	1	1									
23	7. Lecture Hall											
24	8. Lecture Hall											
25	9. Computer Lab	22										
26	Seminar Hall				1							
	SECOND FLOOR											
27	10. Lecture Hall											
28	UG Lab - Physics	2					1	1	1	1		
29	Computer Lab - Old											
30	Dept. of Physics - Staff Room											
31	11. Lecture Hall -BSc. Physics											
32	HOD Room											
33	MSc. Lab 1										8	2
34	MSc. Lab 2											
35	Lecture Hall - MSc. Physics											
36	11. MSc. Physics											
37	Conference Room											
	THIRD FLOOR											
38	3rd BSc. Physics											
39	Outdoor											
	Total Nos.	**32**	**3**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**8**	**2**

9.2. Annexure II. Electricity Bills

KERALA STATE ELECTRICITY BOARD LIMITED

DEMAND CUM DISCONNECTION NOTICE

(As per Regulation 122 & 123 of Kerala Electricity Supply Code 2014)

Section	[5725]-Electrical Section Pallippad	Phone#	0479-2406200	Customer Care	1912
Consumer#	1157255009302	Reg. Mob# 980xxxx414		Regular CC Bill	KSEBL GSTIN: 32AAECK2277NBZ1

Name & Mailing Address

T.K.M.M.COLLEGE
Nangiyarkulara
Harippad

For redressing complaints/grievance approach the concerned CGRF

South: Chairperson,CGRF(South),KSEB Ltd, Vydythi Bhavanam,Kottarakkara-691506, Ph:0474-2060220
Central: Chairperson,CGRF(Central),KSEB Ltd, Power House Building Ernakulam-682018, Ph:0484-2394288
North: Chairperson,CGRF(North),KSEB Ltd,Gandhi Road,Kozhikode-32, Ph:0495-2357820
State Electricity Ombudsman, Pallikkavil Building,Mamangalam, Edappally, Kochi-682024 Ph:0484-2346488

Bill#	5725220400963	Bill Area	M03/1	DTR	TKMM COLLEGE
Billing Period	4/2022[Monthly]	Tariff/Phase	LT-6A/Three	Pole#	(TR.15)_5524
Bill Date	01-04-2022	Due Date	11-04-2022	DC Date	26-04-2022
Contract Demand	(Nil) VA [75% : 0KV, 130% : 0KV]	Connected Load	39330 Watts	Security Deposit	Rs.17234.00

Meter#	SCM5725M00KSB57683	Average consumption(Monthly)	
Meter Digits	6.0	Power Unit/Zone	CUMULATIVE
Meter Type/Owner	Static/KSEB	KWH	1458

Last Billed Rdg. Date	Prev. Rdg. Date	Prev. Meter Rdg. Status	Prst. Rdg. Date	Prst. Meter Rdg. Status
02-03-2022	02-03-2022	Working	01-04-2022	Working

Power Unit	Zone	Trading	Initial Reading(IR)	Final Reading(FR)	OMF	Units*
KWH	Cumulative	Import	111361.00	113247.00	1	1886

Remarks :

Last Paid Amount - Rs.16101.00
Last Payment Date - 04-04-2022

Bill Details			[INR] Amount(Rs.)
a)	Fixed Charges	Fixed Charge[FC]	2600.00
		Sub Total	2600.00
b)	Energy Charges	Energy Charge[EC]	12259.00
		Sub Total	12259.00
c)	Other Charges	Electricity Duty[ED]	1225.90
		Meter Rent[MR]	15.00
		Sub Total	1240.90
d)	GST	MR-CGST	1.35
		MR-SGST	1.35
		Sub Total	2.70
e)	Round Off		0.40
f)	Total Amt.(Bill#5725220400963) (a+b+c+d+e)		16103.00
g)	Surcharge		0.00
h)	Reconnection Fee		0.00
i)	Interim Bills		0.00
j)	Arrears		0.00
k)	Less paid/adj.		-16103.00
l)	Less Advance		-0.00
	Net Payable(f+g+h+i+j-k-l)		0.00

Demand for 4/2022 is Rupees Sixteen Thousand One Hundred and Three Only

E&OE Payment Options: Cash,Cheque,DD,MO. Online: www.kseb.in (Debit/Credit Cards,Net Banking). Other Platforms: BBPS,Friends,Akshaya,CSC,NACH

Senior Superintendent

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9.3. Annexure III- Standard Data

Standard watts of fitting		
Sl. No.	**Item**	**Watts**
1	T12 Fluorescent tube light	52
2	T8 Fluorescent tube light	36
3	Old Ceiling Fan	75
4	CFL	14
5	LED Tube Light	18

9.4. Annexure IV- Vendor Details

Item	Brands
LED Tube Light	Philips, Havells, Wipro, Syska
BEE Certified star rated/BLDC ceiling fan	Crompton Greaves, Havells, Luminous, Atomberg
Led Bulb	Havells, Syska, Philips, Wipro

ENERGY MANAGEMENT CENTRE - KERALA

Save Energy Save our Planet

Energy Management Centre - Kerala
Department of Power, Government of Kerala
Sreekariyam P.O., Thiruvananthapuram 695017
Email : emck@keralaenergy.gov.in, Web : www.keralaenergy.gov.in