



Thunchath Ezhuthachan
Malayalam University

ENERGY AUDIT REPORT



ENERGY AUDIT REPORT



THUNCHATH EZHUTHACHAN MALAYALAM UNIVERSITY
VAKKAD, TIRUR, MALAPPURAM, KERALA
PIN: 676502 PHONE-04942631230
info@temu.ac.in

PREPARED BY



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SEETHI SAHIB MEMORIAL POLYTECHNIC COLLEGE
TIRUR PIN: 676105
PHONE-04942422234

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☒ www.ssmpoly.ac.in

☎ 0494 242 2234

☎ 0494 242 0580

☒ nbassm@ssmpoly.ac.in



**Seethi Sahib Memorial
Polytechnic College Tirur**

Government Aided Institution
Established in 1962

Dept. of Electrical &
Electronics
Engineering

hodelectrical@ssmpoly.ac.in

☎ 9847532913

CERTIFICATE

This is to certify that an “energy audit” for
**THUNCHATH EZHUTHACHAN MALAYALAM
UNIVERSITY TIRUR, VAKKAD, MALAPPURAM 676502**

Has been conducted in March -2024 to assess Energy costs,
availability and reliability of supply of energy, conservation
technologies and ways to reduce energy consumption.

Place : Tirur

Date : 26-03-2024

CONVENOR

Er:ANWAR S
CO-ORDINATOR (EMC)
DEPT. OF EEE
SSMPTC TIRUR
9895064497

CHAIRMAN

K BASHEER M-tech
HOD DEPT. OF EEE
SSMPTC TIRUR
9847532913

PREPARED BY
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SEETHI SAHIB MEMORIAL POLYTECHNIC COLLEGE TIRUR

ENERGY AUDITING COMMITTEE

SI. NO	NAME	DESIGNATION
1.	K BASHEER	CHAIRMAN
2.	S ANWAR	CONVEENER
3.	ANAS KUNJUMHAMMED	CO-ORDINATOR
4.	JIDIN PT	MEMBER
5.	KRISHNAND SANKER	MEMBER
6.	ADHITYAN P	MEMBER
7.	ASWIN KARTHIK P	MEMBER
8.	ARJUN P	MEMBER
9.	SANAL RAJ P	MEMBER
10.	ABHINAV P	MEMBER
11.	AMURTHESH PP	MEMBER
12.	ASWIN PK	MEMBER
13.	ABHIYAN N	MEMBER
14.	AFREED NC	MEMBER
15.	IMTHIYAS	MEMBER
16.	ABHINAV K	MEMBER
17.	MUHAMMED SHAHIN KP	MEMBER
18.	MUHAMMED NIHAL E	MEMBER

EXECUTIVE SUMMARY

Energy today has become a key factor in deciding the product cost at micro level as well as in dictating the inflation and the debt burden at the macro level. Energy cost is a significant factor in economic activity at par with factors of production like capital, land and labour. The imperatives of an energy shortage situation call for energy conservation measures, which essentially mean using less energy for the same level of activity. Energy Audit attempts to balance the total energy inputs with its use and serves to identify all the energy streams in the system and quantifies energy usage according to its discrete function. Energy Audit helps in energy cost optimization, pollution control, safety aspects and suggests the methods to improve the operating & maintenance practices of the system. It is instrumental in coping with the situation of variation in energy cost availability, reliability of energy supply, decision on appropriate energy mix, decision on using improved energy conservation equipment's Instrumentation and technology. Energy Audit is the key to a systematic approach for decision-making in the area of energy management. It attempts to balance the total energy inputs with its use, and serves to identify all the energy streams in a facility. It quantifies energy usage according to its discrete functions. The Energy Audit would give a positive orientation to the energy cost reduction, preventive maintenance and quality control programs which are vital for production and utility activities. Such an audit programme will help to keep focus on variations which occur in the energy costs, availability and reliability of supply of energy, decide on appropriate energy mix, identify energy conservation technologies, retrofit for energy conservation equipment etc. The primary objective of Energy Audit is to determine ways to reduce energy consumption per unit of product output or to lower operating costs. The present report shows the energy audit of Malayalam University, Tirur in terms of pre-audit phase and audit phase.

1. Introduction

In a broad sense, Energy Efficiency means economising on the use of energy without affecting economic growth and development. It includes improving the efficiency of energy extraction, Transmission and Distribution and increasing the productivity of energy use.

Bureau of Energy Efficiency (BEE)

The Bureau of Energy Efficiency is an agency of the Government of India, under the Ministry of Power created in March 2002 under the provisions of the nation's 2001 Energy Conservation Act. The agency's function is to develop programs which will increase the conservation and efficient use of energy in India

2. Energy Audit

As per the Energy Conservation Act, 2001, Energy Audit is defined as "the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption" There are three phases of Energy Audit

1) Pre audit phase 2) Audit phase 3) Post audit phase

Above phase include following stages:

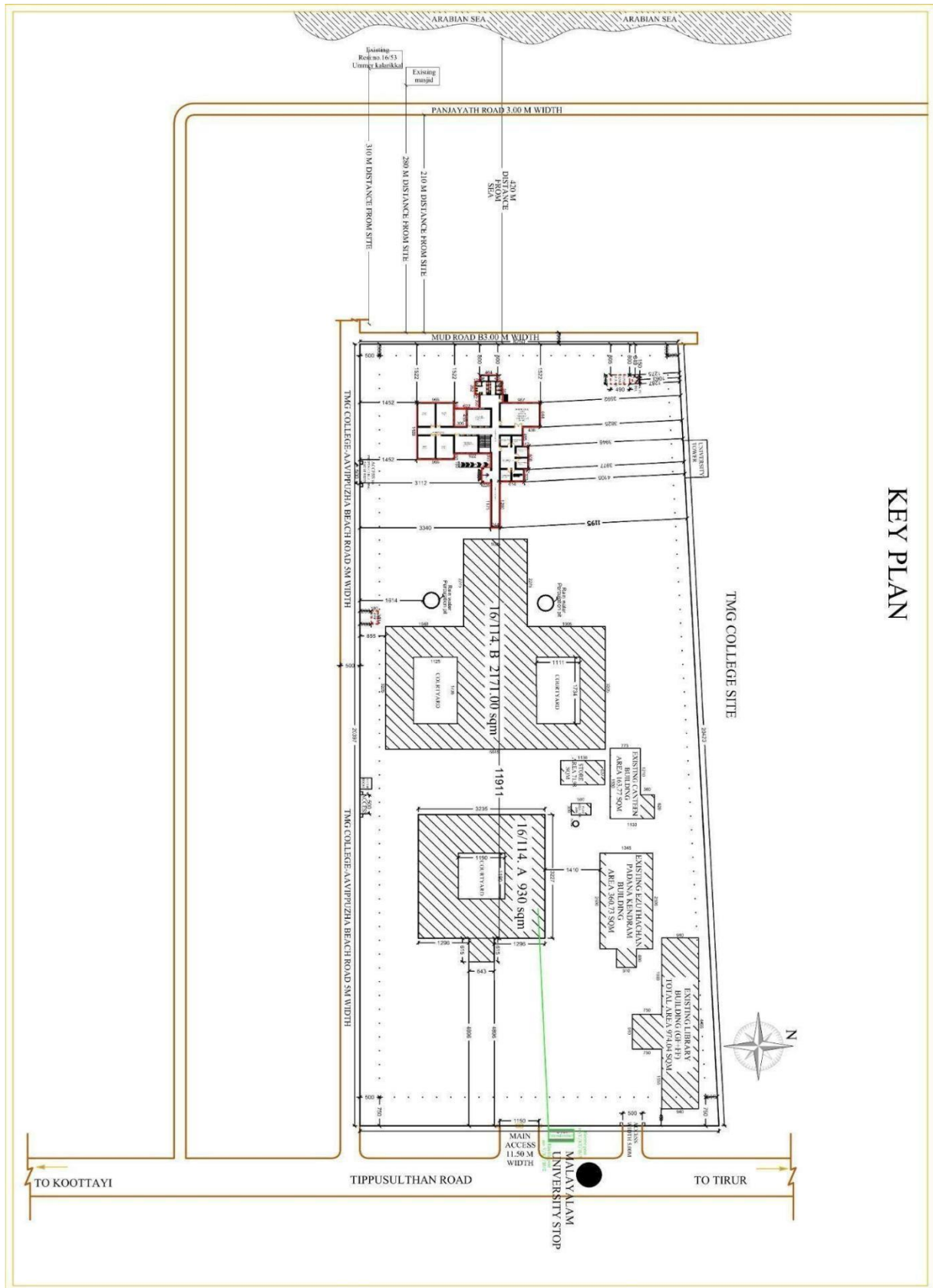
1. Data Collection - In preliminary data collection phase, exhaustive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurements. Following steps were taken for data collection:

- The team went to each lab, classes, offices, library, museum, auditorium, etc
- Data about the general information was collected by observation and interview
- The power consumption of appliances was recorded by taking an average value in some case.

2. Data Analysis - Detailed analysis of data collected include: calculation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by the Kerala State Electricity Board. Data related to water usages were also analysed using appropriate methodology.

3. Recommendation - On the basis of results of data analysis and observations, some steps for reducing power and water consumption were recommended. Proper treatments for waste were also suggested. Use of fossil fuels has to be reduced for the sake of community health.

SITE PLAN



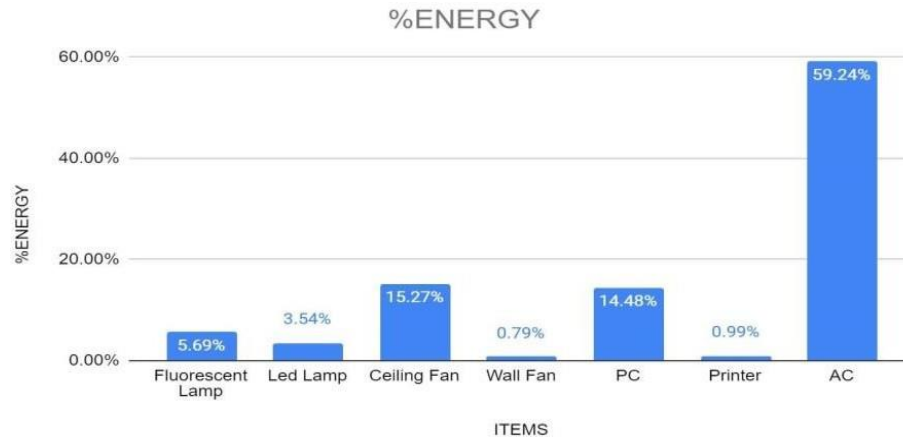
LOAD DISTRIBUTION AT THE MAIN PANEL

Panel name	AVG load (W)	Energy consumption (KWh)		
		per day	per month	%
Library block	28592	151.916	4557.48	26.19%
Ezhuthachan block	9348	52.084	1562.52	8.98%
New building	4342	27.826	834.78	4.80%
Canteen	1464	14.272	428.16	2.46%
Academic block	24004	119.048	3571.44	20.52%
Administrative block	50176	214.904	6447.12	37.05%
Total	117926	580.05	17401.5	100.00%

Note : The existing transformer is 100 KVA . It may enhance to 160 KVA

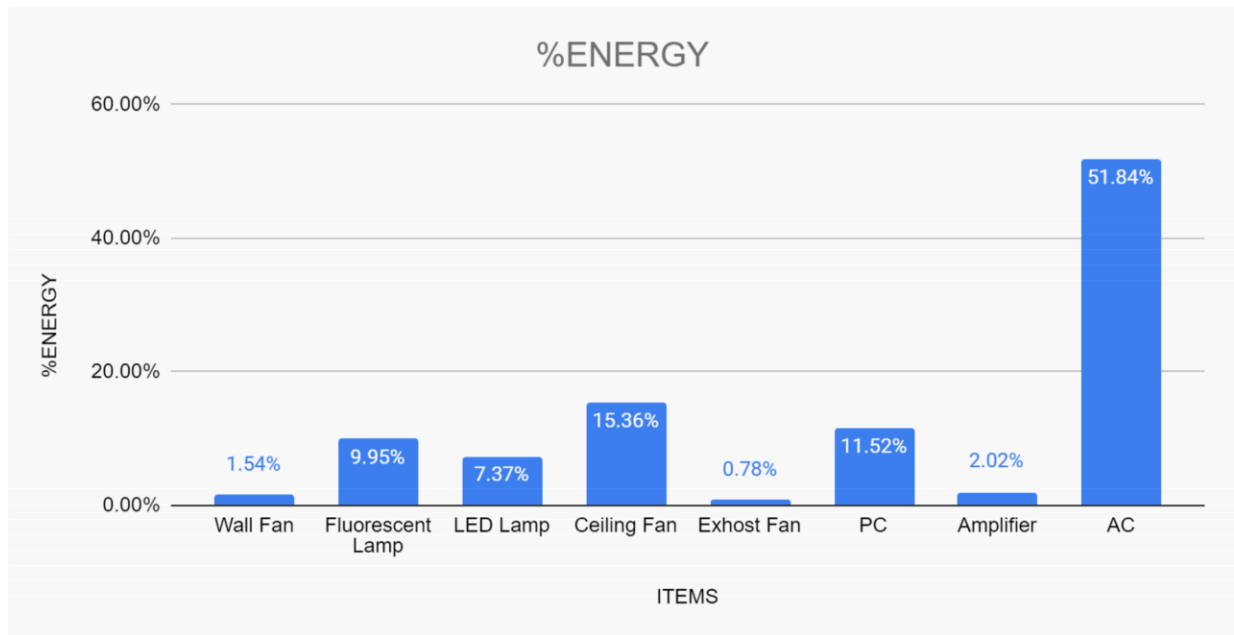
LIBRARY BLOCK

ITEMS	NO.	TOTAL POWER(W)	AVERAGE OPERATING HOUR	ENERGY CONSUMPTION PER DAY	MONTHLY ENERGY CONSUMPTION	%ENERGY
Fluorescent Lamp	30	1080	8	8.64	259.2	5.69%
Led Lamp	56	672	8	5.376	161.28	3.54%
Ceiling Fan	58	4640	5	23.2	696	15.27 %
Wall Fan	4	200	6	1.2	36	0.79%
PC	11	5500	4	22	660	14.48 %
Printer	3	1500	1	1.5	45	0.99%
AC	10	15000	6	90	2700	59.24 %
					0	
TOTAL	172	28592		151.916	4557.48	100%



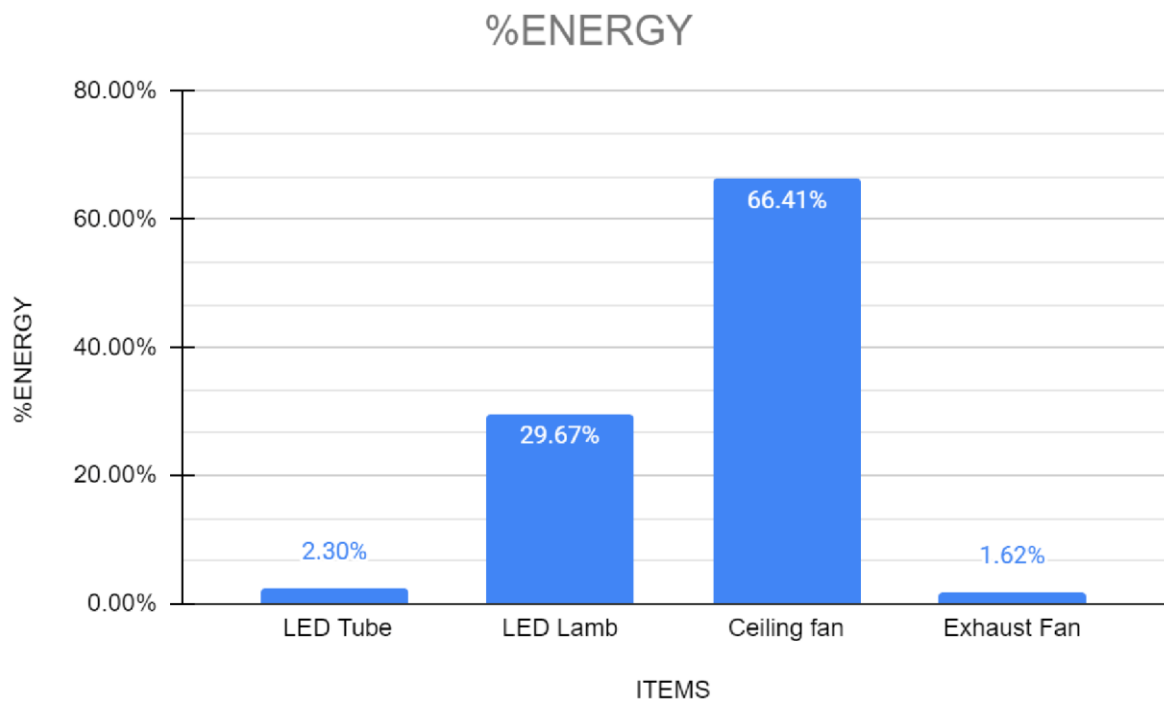
EZHUTHACHAN BLOCK

ITEMS	NO.	TOTAL POWER(W)	AVERAGE OPERATING HOUR	ENERGY CONSUMPTION PER DAY	MONTHLY ENERGY CONSUMPTION	%ENERGY
Fluorescent Lamp	18	648	8	5.184	155.52	9.95%
LED Lamp	40	480	8	3.84	115.2	7.37%
Ceiling Fan	20	1600	5	8	240	15.36%
Wall Fan	4	200	4	0.8	24	1.54%
PC	3	1500	4	6	180	11.52%
Amplifier	1	350	3	1.05	31.5	2.02%
AC	3	4500	6	27	810	51.84%
Exhaust Fan	2	70	3	0.21	6.3	0.40%
TOTAL	91	9348	41	52.084	1562.52	100%



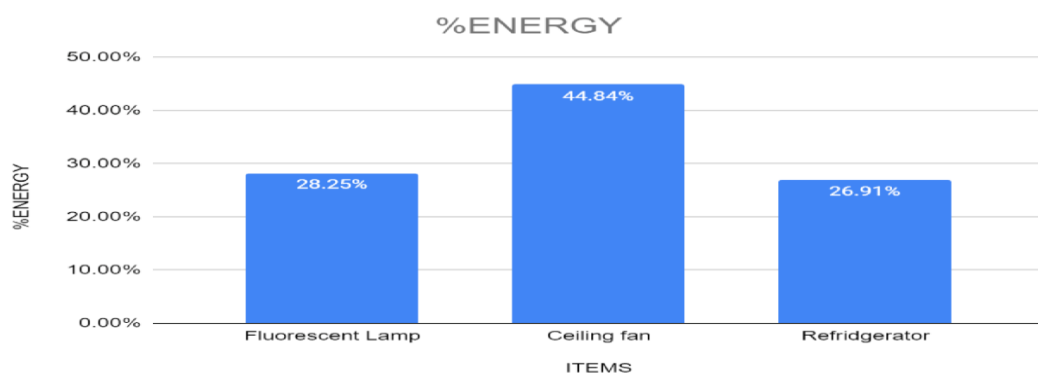
NEW BUILDING

ITEMS	NO.	TOTAL POWER(W)	AVERAGE OPERATING HOUR	ENERGY CONSUMPTION PER DAY	MONTHLY ENERGY CONSUMPTION	%ENERGY
LED Tube	4	80	8	0.64	19.2	2.30%
LED Lamp	86	1032	8	8.256	247.68	29.67%
Ceiling fan	44	3080	6	18.48	554.4	66.41%
Exhaust Fan	5	150	3	0.45	13.5	1.62%
TOTAL	139	4342	25	27.826	834.78	100%

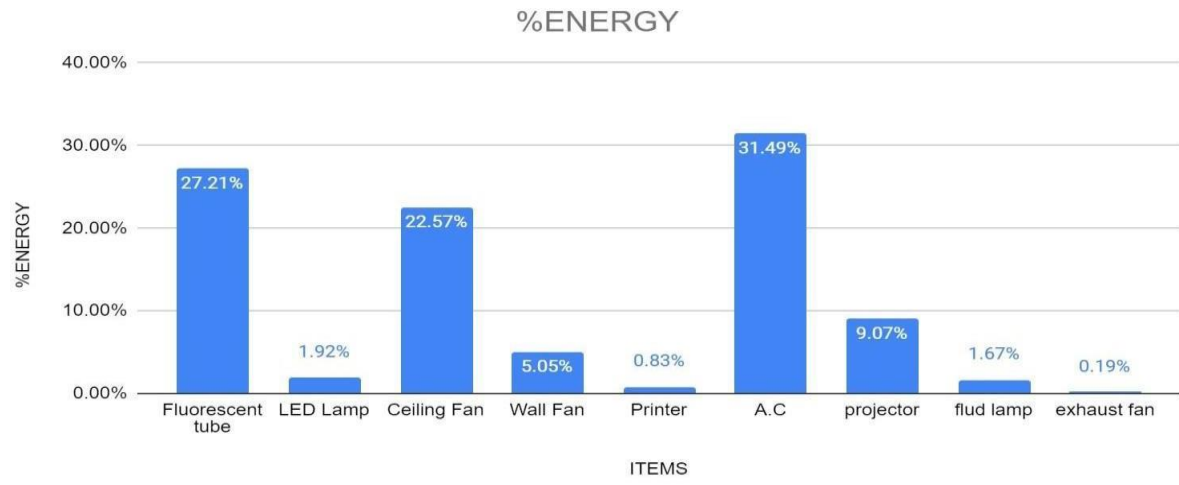


CANTEEN

ITEMS	NO.	TOTAL POWER(W)	AVERAGE OPERATING HOUR	ENERGY CONSUMPTION PER DAY	MONTHLY ENERGY CONSUMPTION	%ENERGY
Fluorescent Lamp	14	504	8	4.032	120.96	28.25 %
Ceiling fan	10	800	8	6.4	192	44.84 %
Refridgerator	1	160	24	3.84	115.2	26.91 %
TOTAL	25	1464	40	14.272	428.16	100 %

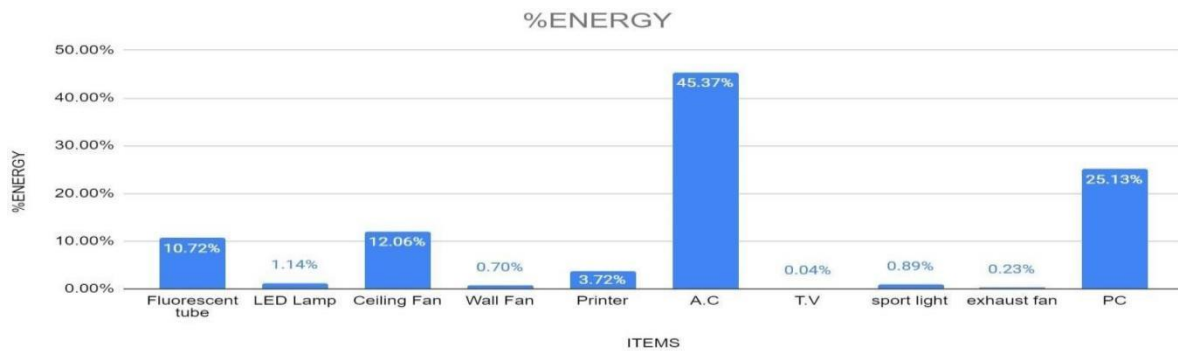


ACADEMIC BLOCK						
ITEMS	NO.	TOTAL POWER(W)	AVERAGE OPERATION HOUR	ENERGY CONSUMPTION PER DAY	MONTHLY ENERGY CONSUMPTION	%ENERGY
Fluorescent tube	150	5400	6	32.4	972	27.21%
LED Lamp	27	324	7	2.268	68.04	1.92%
Ceiling Fan	56	4480	6	26.88	806.4	22.57%
Wall Fan	24	1200	5	6	180	5.05%
Printer	2	1000	1	1	30	0.83%
A.C	5	7500	5	37.5	1125	31.49%
Projector	12	3600	3	10.8	324	9.07%
Flud lamp	8	400	5	2	60	1.67%
Exhaust fan	2	100	2	0.2	6	0.19%
TOTAL	286	24004	40	119.048	3571.44	100 %



ADMINISTRATIVE BLOCK

ITEMS	NO.	TOTAL POWER(W)	AVERAGE OPERATION HOUR	ENERGY CONSUMPTION PER DAY	MONTHLY ENERGY CONSUMPTION	%ENERGY
Fluorescent tube	80	2880	8	23.04	691.2	10.72%
LED Lamp	34	408	6	2.448	73.44	1.14%
Ceiling Fan	54	4320	6	25.92	777.6	12.06%
Wall Fan	6	300	5	1.5	45	0.70%
Printer	8	4000	2	8	240	3.72%
A.C	13	19500	5	97.5	2925	45.37%
T.V	1	38	2	0.076	2.28	0.04%
Sport light	40	480	4	1.92	57.6	0.89%
Exhaust fan	5	250	2	0.5	15	0.23%
PC	36	18000	3	54	1620	25.13%
TOTAL	277	50176	43	214.904	6447.12	100.00%



ENERGY BILL DATA

CONSUMER NO : 1167308013224						
MONTH	YEAR	MF	CURRENT UNIT	CONCEPTION	TARIF	BILL AMOUNT
June	2023	40	2886	8768	6A	70142
July			3433	10720		85739
August			3648	8600		69758
September			3934	11440		91073
October			4175	9664		77744
November			4472	11848		94135
December			4826	14168		112286
January	2024		5069	9720		78904
February			5359	11600		93013
March			5671	12484		99848

FAULT FINDINGS

NO	AREA	FAULT	SOLUTION	EACH RATE
1	ADMINISTRATIVE BLOCK AND OTHER BLOCKS	RUST IN THE DB BOARD	COVERED WITH PAINT	RS 250/
2	ACADEMIC BLOCK AND OTHER BLOCKS	CEILING FAN CAPACITOR IS WEAK	CHANGE CAPACITOR	RS 50/
3	ACADEMIC BLOCK AND OTHER BLOCKS	CEILING FAN IS DUSTED	CLEAN THE FAN FOR MORE EFFICIENCY	RS 50/
4	ACADEMIC BLOCK AND OTHER BLOCKS	WIRES HANGING FREELY	GIVE PROPER PROTECTION AND CLEANNESS TO WIRES	RS 800/
5	ADMINISTRATIVE BLOCK	AC VENTILATION IS NOT PROPERLY	CLEAN AC AND PROVIDE PROPER VENTILATION	RS 500/
6	ACADEMIC BLOCK	FAN REGULATOR KNOB MISSING IN CLASSROOMS	INSTALL NEW REGULATOR KNOB	RS 250/
7	TOILET	EXHAUST FANS ARE NOT PROPERLY WORKING	CLEAN IT / CHANGE IT	RS 1500/
8	TOILET	EXHAUST FANS MAKE NOISES	SOLVE THE SOUND ISSUE	RS 1000/

9	EZHUTHACHA NBLOCK	CPU BATTERY NOT WORKING	CLEAN AND GIVE PROPER SOLUTION	RS 1500/
10	SERVER ROOM, IBRARY BLOCK	CEILING IS OPEN AND WIRE HANGING	GIVE PROPER CEILING AND PROTECTION TO WIRES	RS 800/
11	OUT DOOR	CAMPUS LAMPS NOT WORKING PROPERLY	CHANGE TO SOLAR	RS 3500/
12	ACADEMIC BLOCK	ELCB NOT TRIPPING	SOLVE THE TRIPPING ISSUE	RS 3000/
13	ACADEMIC BLOCK AND OTHER BLOCKS	PATHWAY LAMPS NOT WORKING PROPERLY	CLEAN OR CHANGE THE LAMPS	RS 250
14	ADMINISTRATIVE BLOCK AND OTHER BLOCKS	EARTHING IS NOT PROPER	GIVE PROPER EARTHING	RS 1000/
15	ALL BLOCKS	LABELLING	GIVE LABELLINGFOR ALL ELECTRICAL EQUIPMENTS AND ALL DISTRIBUTIONBOARD	RS 5000/
16	ALL BLOCKS	UNNEEDE DPLUGS	REMOVE OR CHANGE UNNEEDEDPLUGS	RS 50/
17	ACADEMIC BLOCK	FLUORESCENT LAMPS ARE NOT WORKING	CHANGE THELAMP	RS 250/

SPECIFIC RECOMMENDATIONS				
-> Change normal fans to BLDC fans				
Type	Normal fan (per one)	BLDC fan (per one)	Difference	
WATT	80W	30W	50W(62.5%)	
Energy consumption per day	1.92KW	0.72KW	1.2KW(62.5%)	
Energy cost per day	₹11.52	₹4.32	₹7.2(62.5%)	
Estimated cost for one fan : ₹3000				
Estimated time for coast redemption : 14 months				
-> Charge fluorescent tube lamps to LED lamps				
type	Fluorescent lamp (per one)	LED lamp (per one)	Difference	
WATT	36W	10W	26W(72.2%)	
Energy consumption per day	0.86KW	0.24KW	0.62W (72.2%)	
Energy cost per unit	₹5.16	₹1.44	₹3.72 (72.2%)	
Estimated cost for one LED tube : ₹250				
Estimated time for coast redemption : 2.5 months				

INSTALLATION & BENEFITS OF SOLAR PANELS	
NEEDS	UNITS
On grid solar power plant	75 KW
Estimated cost	38 Lakh
Percent usage of unit per day in KWH	350 KWH
Unit per month	10500 KWH
Energy generation from solar panel eachday	300 KWH
Per year consumption	126000 KWH
Approximate area for installation	7500 sq ft
Save electricity bill per month	RS 75000
Save electricity bill per year	900000
Payback period	5 Years

PHOTOGRAPHY







CONCLUSION

The Energy Audit Conducted At Malayalam University Has Identified Significant Opportunities For Energy Conservation And Efficiency Improvements. The Audit Revealed That The University Can Reduce Its Energy Consumption By 60-70% Through Implementing Energy-Efficient Measures Such As LED Lighting, BLDC Ceiling fan, Solar Power Systems, And Optimizing HVAC Systems.

THE REPORT RECOMMENDS:

- 1. Replacing Traditional Lighting With LED Bulbs**
- 2. Installing Solar Panels To Generate Renewable Energy**
- 3. Upgrading To Energy-Efficient HVAC Systems**
- 4. Implementing Smart Energy Management Systems**
- 5. Conducting Regular Energy Audits To Monitor Progress**

By Implementing These Measures, Malayalam University Can Reduce Its Energy Expenses, Minimize Its Carbon Footprint, And Contribute To A Sustainable Future.