ENERGY AUDIT REPORT

ST. JOSEPH'S COLLEGE OF PHARMACY

CHERTHALA

Executed by



2024



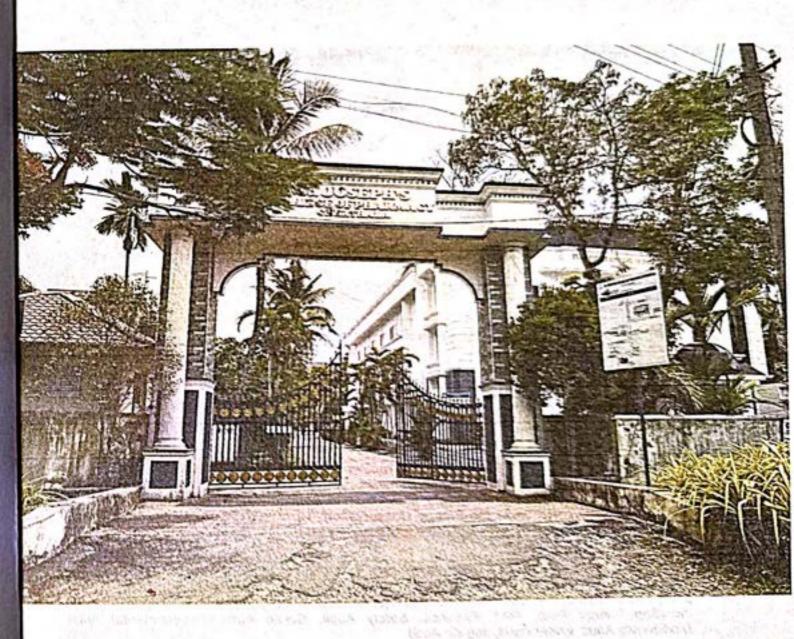
Accredited Energy Auditor: AEA-33 Empanelled Accredited Energy Auditor: EmAEA-33 Bureau of Energy Efficiency, Government of India.



Empanelled Energy Auditor: EMCEEA-0211F, EMC (Energy Management Centre-Kerala)

ENERGY AUDIT REPORT ST. JOSEPH'S COLLEGE OF PHARMACY

CHERTHALA





Energy Audit Report St. Joseph's College of Pharmacy, Cherthala Report No: EA 1143 2024 May



Empaneled Accredited Energy Auditor, AEA 33 Bureau of Energy Efficiency Government of India



Empaneled Energy Auditor, EMCEEA-0211F, Energy Management Centre Government of Kerala.



Authorized Energy Auditor, GEDA/ENC/EAC: Autho/2014/8/103/2316, Gujarat Energy Development Agency Government of Gujarat



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About OTTOTRACTIONS

Established in 2005, OTTOTRACTIONS is a renowned organization with extensive expertise in energy, engineering, and environmental services. We hold the distinction of being the first Accredited Energy Auditor from Kerala authorized to conduct Mandatory Energy Audits for Designated Consumers under the Energy Conservation Act of 2001. Our excellence in energy auditing was recognized by the Government of Kerala with the prestigious "Kerala State Energy Conservation Award 2009."

OTTOTRACTIONS is an ISO 9001:2015, ISO 17020:2012, and ISO 14001:2015 certified organization, underscoring our commitment to quality and excellence in service delivery. With a proven track record, we have successfully completed over 3,000 audits across various domains including Energy Audit, PAT, Electrical Safety Audit, Green Audit, Environmental Audit Biodiversity Audit, Water Audit, and Air Audit.

Acknowledgment

We were privileged to work together with the administration and staff of St. Joseph's College of Pharmacy, Cherthala. We are grateful to them for the timely help extended to complete the audit and bringing out this report.

With gratitude, we acknowledge the diligent effort and commitments of all those who have helped to bring out this report.

We also take this opportunity to thank the bona-fide efforts of audit team for unstinted support in carrying out this audit.

We thank our consultants, engineers and backup staff for their dedication to bring this

Thank you.

For OTTOTRACTIONS

Accredited Energy Auditor AEA 33, Bureau of Energy Efficiency

Government of India



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Certification

This is to certify that

The data collection has been carried out diligently and truthfully;

All data monitoring devices are in good working condition and have been calibrated or certified by approved agencies authorised and no tampering of such devices has occurred:

All reasonable professional skill, care and diligence had been taken in preparing the energy audit report and the contents thereof are a true representation of the facts;

Adequate training provided to personnel involved in daily operations after implementation of recommendations; and

The energy audit has been carried out in accordance with the Bureau of Energy Efficiency (Manner and Intervals of Time for the Conduct of Energy Audit) Regulations, 2010.

SURESH BABU B V
ACCREDITED ENERGY AUDITOR (AEA 33)
BUREAU OF ENERGY EFFICIENCY
GOVERNMENT OF INDIA



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Executive Summary Consolidated Cost Benefit Analysis of Energy Efficiency Improvement Projects St. Joseph's College of Pharmacy Cost Energy Investment SPB SI saving saved Projects No kWh/Yr (Lakhs Rs) (Rs)/Yr Months Energy Saving in Lighting by replacing 0.15 1320 0.15 12 existing 50 No's T8 (40W) Lamps to 18W LED Tube Energy Saving by replacing existing 600 No's in-efficient ceiling fans with 21312 2 18.00 2.44 88 Energy Efficient Five star fans Total 18.15 2.60 50.12 22632.00

(The saving are projected as per the assumed operation time observed based in the discussions with the plant officials. The data of saving percentages are taken from BEE guide books and field measurements.)

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Introduction

A detailed energy audit has been carried out at St. Joseph's College of Pharmacy, Cherthala by OTTOTRACTIONS in May 2024. During the energy audit energy saving opportunities has been identified to help improving energy efficiency of the facility. OTTOTRACTIONS is an Accredited Energy Auditor of Bureau of Energy Efficiency and Empaneled Energy Auditor of Energy Management Centre, Government of Kerala.

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This energy audit report complies with the clauses in Energy Conservation Act. 2001 on mandatory energy audit (Form 4 [refer regulation 6(2)] guidelines for preparation of energy audit report) and complies with the G.O (Rt) No.2/2011/PD dated 01.01.2011 issued by Government of Kerala on mandatory energy audit.

1.1. General Building details and descriptions

AS A STATE THE PROPERTY OF THE SECOND

St. Joseph's College of Pharmacy is situated in Cherthala, the land of back waters amidst panoramic beauty in close proximity to Kumarakom, the renowned tourist spot and National Aquatic Bird Sanctuary. It is a unit of the Nirmala Province of the Medical Sisters of St. Joseph (MSJ Dharmagiri) Aluva, Kerala. The congregation of the Medical Sisters of St. Joseph is dedicated to the healing ministry and allied medical education, aiming to uplift the suffering humanity devoid of profit motive.



The College offers B.Pharm, M.Pharm, Pharm.D and D.Pharm programmes and is pledged to provide advanced facilities to comply with technological advancements in pharmaceutical sciences. The institute is highly research oriented and enjoys great Academic - Industrial interactions.

Occupancy Details	3
Particulars	2023-24
Total Students	413
Staffs	63
Total Occupancy of the college	476

For calculating specific energy consumption, the total built-up area is considered. should be properly being being corned out as its servers

Energy audit team your way was such a second act of the break

The Energy Audit team is listed below. Besides this list various domine experts also participated in this project. general beganning boo yarehay

- Suresh Babu B V, Accredited Energy Auditor, AEA 33
- 2. B. Zachariah, Chief Technical Consultant
- 3. Abin Baby, Project Engineer
- 4. Jomon J S, Project Engineer
- Vishnu S S, Project Engineer
- Reshma S P, Data Analyst
- 7. Anjana B S, Project Assistant

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Building description

The energy audit has been carried out at St. Joseph's College of Pharmacy, Cherthala. The following is the baseline data of this building.

	F	orm-A					
91	BASELINE DATA SH	EET FO	R GR	EEN A	UDIT		1.00
1	Name of the Organisation	St. Joseph's College of Pharmacy				n and	
2	Address (include telephone, fax & e-mail)	Dharmagiri College Campus Naipunr Road, Cherthala Alappuzha, Kerala, Pin - 688 524					
2	Year of Establishment	1944					
3	Name of building and Total No. of Electrical Connections/building	St. Joseph's College of Pharmacy(7)				y(7)	
4	Total Number of Students	Boys	-	Girls	-	Total	413
5	Total Number of Staff	63					
6	Total Occupancy		476				
7	Total area of green cover		E 6.		60%	i din	Mario 11 21
8	Type of Electrical Connection	HT					
9	Total Connected Load (kW)				85	701	* 3
11	Total built up area of the building (M ²)	7964					
12	Number of Buildings	150	7				11 11 11
13	Average system Power Factor		50.00	1	0.98	Ave 1	
14	Details of capacitors connected			364	-	1 117	Carl 1944
15	Transformer Details (Nos., kVA,	TR 1 TR 2			118	15 NEEDE	
	Voltage ratio)	-	-		- 50		No.
16	DG Set Details (k)(A)	DG1	DG2	DG3	DG4	DG5	Remarks
10	DG Set Details (kVA)	62.5	-		1		
47	Details of maters	Ra	ting	No	os.	Re	emarks
17	Details of motors	5 to	10		2		The Late



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Energy and utility system description

3.1.1 Electricity

HILL IS AND THE OF BUILDING

The institution procures electricity from Kerala State Electricity Board (KSEB) through Seven LT feeder. Details regarding this connection are provided below. Additionally, the campus utilizes a diesel generator of 62.5kVA, and a grid-tied solar power plant with a capacity of 140 kWp.

-11	Electrici	ty Connection Details
		's College of Pharmacy
1	Name of the Consumer	St. Joseph's College of Pharmacy
2	Tariff	LT 6B Ndom
	GOODWA	1155127001836
Ans	mes 2002 Plan and a Lynnin	1155127020395
3	Consumer Numbers	1155127024177
,		1155121023494
	incinion, the of action of	1155127001759
		1155120024402
4	Contract Demand (IAVA)	1155126023569
	Contract Demand (kVA)	85
5	Annual Electricity Consumption (kWh)	33499



3.2. Thermal Energy / Transportation

The college maintains buses for student transportation. Exploring alternative fuel options for these buses and the on-site diesel generator could enhance the college's power input redundancy.

	Diesel Const	umption Details	6 7 300	Statistics and
V	Transportation	Generator	Total	cost
Year	in L	in L	in L	in Rs
2023-24	7690	224	7914	767658

LPG Consumption De	tails
	2023-24
No Cylinders	28
Canteen/Lab LPG Consumption in kg	532.0
Total in kg	532.0

Discutally Connection 5

The second second	1	E4 - 1900 V	Biogas Consumption	mission of die of engine
	m3	kcal/m3	Daily production kCal	Annual production (kCal)
Biogas plant 1	6	3500	21000	4620000
Biogas plant 2	2	3500	7000	1540000
2000 10 10 10	8			4620000

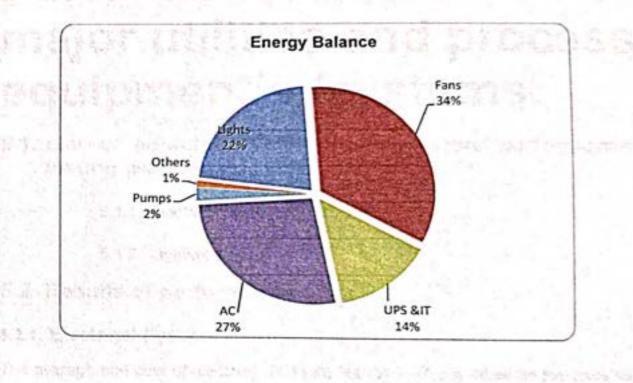
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Energy Balance



Fans account for 34% of the overall energy consumption in this facility, while lighting utilizes 22%, UPS and IT contribute 14%, and other miscellaneous uses constitute 1%. Additionally, 26% of the total energy is consumed by air conditioning systems.



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Performance evaluation of major utilities and process equipment's /systems.

- 5.1. List of equipment and process where performance testing was done.
 - 5.1.1. Electrical System
 - 5.1.2. Lighting & Fans
- 5.2. Results of performance tests

5.2.1. Electrical System

The average unit cost of electricity is 11.48 Rs/kWh. This is taken as the basis for the financial analysis of electrical energy efficiency projects. The information on average energy consumption is taken from the historical electricity bill analysis.

Annual Electricity Consumption (kWh)					
SI No	Consumer No	Annual Electricity Consumption (kWh)			
1	1155127001836	792			
2	1155127020395	8226			
3	1155127024177	10000			
4	1155121023494	11544			
5	1155127001759	1262			
6	1155120024402	940			
7	1155126023569	364			
8	1155127027553	371			
	Total	33499			



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Consumer No.

Diesel

The college operates a diesel generator of 62.5kVA. The details of Diesel consumption are given below.

Electricity Generated	through DGs	1000
Generator		1000
in L	kWh /yr	COS
224	672.0	in R 2172
	Generator in L	in L kWh /yr

Biogas

		1130	Biogas Consumption	-3 17 12 6 16 1 2 3 16
	m3	kcal/m3	Daily production kCal	Annual production (kCal)
Biogas plant 1	6	3500	21000	4620000
Biogas plant 2	2	3500	7000	1540000
	8			4620000



Biogas Plant

LPG

LPG is consumed in the Canteen.

LPG Consumption Det	tails
	2023-24
No Cylinders	28
Canteen/Lab LPG Consumption in kg	532.0
Total in kg	532.0



Transportation

The campus has three vehicles in Operation. The details of Diesel consumption is given below

	Diesel Consumption [Details	
NA LANGE	Transportation	Total	cost
Year	in L	in L	in Rs
2023-24	7690	7690	745930



- 57	Base Line Energy Data	The second secon
- 5	St. Joseph's College of Pharmac	су
	(Deligiowania) is a second	2023-24
1	Electricity KSEB (kWh)	33499
-2	Electricity DG (kWh)	672
3	Electricity Solar , Off grid (kWh)	108588
4	Electricity (KSEB + DG + Off grid) kWh	142759
5	Electricity Solar Grid Tied (kWh)	70263
6	Diesel (L)	7914.0
7	LPG (kg)	532.00
8	Biogas generated/year (kg)	1320

	Energy Consumption Pro	ofile
SI No	Fuel	2023-24
1	Electricity	122772310
2	Diesel	83097000
3	LPG	6384000
4	Biogas	4620000
	Total	216873310



SOLAR SYSTEM

A 140kWp on grid solar power plant installed in the campus.

Solar Pov	wer Plant Det	lails	V 0 17/35	
Plant 1	Plant 2	Plant 3	Plant	16.3
10	5	15		Total
On-Grid	Off-Grid	On-Grid	-11.0	110
12775	6388			OHIL
843	0		0	1405
11932	6388		102200	1520
	Plant 1 10 On-Grid 12775 843	Plant 1 Plant 2 10 5 On-Grid Off-Grid 12775 6388 843 0	10 5 15 On-Grid Off-Grid On-Grid 12775 6388 19163 843 0 14360	Plant 1 Plant 2 Plant 3 Plant 4 10 5 15 80 On-Grid Off-Grid On-Grid off-Grid 12775 6388 19163 102200 843 0 14360 0



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Energy efficiency in utility and process system

The specific energy consumption or Energy Performance Index (EPI) is normally taken as the ratio of total energy consumed to the total are of building.

1 1111	OTTOTRACTIONS- ENERGY AUDI	1
	St. Joseph's College of Pharmacy	/
	Energy Performance Index (EPI)	A COM
SI No	Particulars	2023-24
1	Total building area (m²)	7964
2	Annual Energy Consumption (kCal)	216873310
3	Annual Energy Consumption (kWh)	252178
4	Total Energy in Toe	21.69
5	Specific Energy Consumption kWh/m²	31.66

The Energy Performance Index (EPI) is

31.66 kWh/m2

The EPI of 2023-24 may be taken as benchmark.

Emergy thankspanning policy

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Evaluation of energy management system

Energy management policy

There is no written energy policy available, but environment policy is available which includes energy conservation also. A draft energy management policy is given below. The management may constitute an energy management policy and display the same in the plant to motivate the staff.

seen and parent or venerall authorities of him to have access

St. Joseph's College of Pharmacy, Cherthala

ENERGY POLICY (Draft)

We are committed to optimally utilize various forms of energy in a cost-effective manner to effect conservation of energy resources. We are committed to conserve the energy which is a scarce resource with the requisite consistency in the efficiency, effectiveness in the cost involved in the operations and ensuring that service quality and quantity, environment, safety, health of people are maintained. We are also committed to increase the renewable energy share of the total energy we use.

We are also committed to monitoring continuously the saving achieved and reduce its specific energy consumption by minimum of 2% every year.

Date	
Head of th	e Institution



7.1. Energy management monitoring system

- Energy Management Cell has to be constituted with an objective to revise action plan for energy conservation thereby reducing the production cost.
- Energy conservation tips/ posters are displayed in crucial points.
- Use of renewable energy has to be encouraged.

7.2. Training to staff responsible for operational and Documentation.

- The staff and students need to be made more aware of the importance of energy saving and management.
- Log books shall be maintained to record Electricity Consumption and Diesel aconsumption.
- Meter reading shall be taken and compared with KSEBL regularly.
- Better operating practices regarding appliances and fixtures should be taught to the staff.

7.3. Best Practices

- Have solid Waste management program.
- Have different social and environmental clubs
- E-waste on campus is managed by an external agency.
- Conducted Energy Conservation Training Programs.
- Conducted Green Audit
- Installed 140kWp Solar power plant
- Biogas plants are installed for cooking.

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Energy Conservation Measures and Recommendations

OTTOTRACTIONS- ENERGY AUDIT

Energy Saving Proposal Code

Energy Saving in Lighting by replacing existing 50 No's T8 (40W) Lamps to 18W LED Tube

Existing Scenario

50 numbers of T8(40 W) lamps were identified during the energy audit field survey in the facility. During discussion with officers it is observed that the average utility of these fittings are of 30%.

Proposed System

The existing T8 may be replaced to LED Tube of 18W in phased manner and the savings will be of 55% (inclusive of improved light output and reduced energy consumption)

Financial Analysis

2400
50
2.00
2400
1320
11.48
0.15
0.15
11.88



OTTOTRACTIONS- ENERGY AUDIT

Energy Saving Proposal

Energy Saving by replacing existing 600 No's in-efficient ceiling fans with Energy

Efficient Five star fans

Existing Scenario

There are 600 numbers of ceiling fans installed in the facility with minimum 8 hrs a day operation. All are conventional type and most of them are very old.

Proposed System

There is an energy saving opportunity in replace the existing fans with new five star labelled fans. The five star labelled fans give a savings up to 30% with higher service value (air delivery/watt).

Financial Analysis

Financial Analysis	(A) 12.00
Annual working hours (hrs)	2400
Total numbers of ordinary fans	600
Total load (kW)	48.00
Annual Energy Consumption (kWh)	57600
Expected Annual Energy saving, for total replacement(kWh)	21312
Cost of Power (Rs)	11.48
Annual saving in Lakhs Rs (1st year)	2.45
Investment required for a total replacement (Lakhs Rs)[@3000 Rs per Fan with 50W at full speed]	18.00
Simple Pay Back (in Months)	88.29



Technical Supplements

027553	-24	kWh	38	13	29	17	43	58	46	31	28	19	31	18	371
1155127	2023	Month	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Total

B-Pharm (1155127020395)	2023-24	kWh	469	726	637	820	855	689	544	422	695	870	647	852	8226
B-Pharm		Month	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Total

	(119301710011) 1916011	M-Pharm (11	M-Pharm (1155121023494)
203	2023-24	203	2023-24
Month	kWh	Month	kWh
Apr-23	898	Apr-23	1298
May-23	1066	May-23	984
Jun-23	756	Jun-23	789
Jul-23	298	Jul-23	957
Aug-23	987	Aug-23	847
Sep-23	1027	Sep-23	983
Oct-23	921	Oct-23	687
Nov-23	726	Nov-23	1209
Dec-23	637	Dec-23	1190
Jan-24	820	Jan-24	1023
Feb-24	1019	Feb-24	879
Mar-24	845	Mar-24	698
Total	10000	Total	11544

EA 1143 – St. Joseph's College of Pharmacy, Cherthala

Animal House(1155127001836) 2023-24 Month kWh Apr-23 127 Jun-23 127 Aug-23 154 Oct-23 135 Feb-24 121
--

M (1155	Mess Hall (4155127001759)	(11551	Convent (1155120024402)
2	2023-24	30	2023-24
Month	kWh	Month	kWh
Anr-23	205	Apr-23	126
Jun-23	222	Jun-23	167
Aug-23	213	Aug-23	154
Oct-23	198	Oct-23	157
Dec-23	170	Dec-23	145
Feb-24	254	Feb-24	191
Total	1262	Total	940

Security Room (1155126023569)	2023-24	Month kWh	Apr-23 65	Jun-23 68	Aug-23 49	Oct-23 68	Dec-23 45	Feb-24 69	Total
		Mo	Ap	Jul	Aug	ő	De	Fet	F

