



ENERGY AUDIT REPORT: 2023-24

SARUPATHAR COLLEGE, GOLAGHAT (ASSAM)



PREPARED BY:

**IQAC, SARUPATHAR COLLEGE IN
COLLABORATION WITH
OFFICE OF THE CO-DISTRICT ENGINEER
SARUPATHAR ELECTRICAL SUB-DIVISION,
SARUPATHAR, ASSAM-785601**


ENERGY AUDIT CERTIFICATE

This is to certify that an "ENERGY AUDIT" for SARUPATHAR COLLEGE, PO: SARUPATHAR, GOLAGHAT, PIN -785601, ASSAM has been conducted in December, 2024 to assess energy costs, availability and reliability of supply of energy, energy conservation technologies and way to reduce energy consumption.

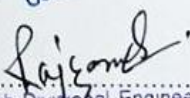
Energy Auditors

1. Dr. Jayanta Barukial, Principal, DR College, Golaghat:

Signature & Seal


Principal
Debraj Roy College (Autonomous)
Golaghat, Assam

2. Mr. Raju Boraik, SDO, APDCL, Sarupathar Co-District:


Sub-Divisional Engineer
Sarupathar Electrical Sub-Division
APDCL Sarupathar

ENERGY AUDITING TEAM
SARUPATHAR COLLEGE

SL No	Name	Designation	Committee Role
1	Dr. Jayanta Barukial	Principal, DR College, Golaghat	Auditor
2	Mr. Raju Boraik	SDO, APDCL, Sarupathar Co-District	Auditor
3	Dr. Prapti Thakur	Principal Sarupathar College	Chairperson, IQAC
4	Dr. Ridip Khanikar	Assistant Professor	Co- Ordinator, IQAC
5	Mr. Bipul Das	Assistant Professor	Member
6	Mr. Ashim Gogoi	Electrician	Member

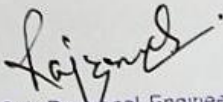
ACKNOWLEDGEMENT:


We are sincerely thankful to the Sarupathar College authority for giving us the opportunity to conduct energy audit in Sarupathar College campus. We express our sincere gratitude to all other concerned officials for their support and guidance during the conduct of this exercise.

Auditors

Dr. Jayanta Barukial, Auditor

Mr. Raju Boraik, Auditor


Sub-Divisional Engineer
Sarupathar Electrical Sub-Division
APDCL Sarupathar


Principal
Debraj Roy College (Autonomous)
Golaghat, Assam

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1. INTRODUCTION:

Energy is a basic requirement for economic development in almost all major sectors of Indian economy i.e., agriculture, industry, transport, commercial, residential (domestic) and educational institutions. Consequently, consumption of energy in different forms has been steadily rising all over the country, which has maintained a steady growth pattern in the past and the trend is likely to continue in future as well. This has increased the dependence of the state on fossil fuels and electricity. The Government of India enacted the Energy Conservation Act, in October 2001. The Energy Conservation Act, 2001 became effective from 1st March, 2002. The Act provides for institutionalizing and strengthening delivery mechanism for energy efficiency programs in the country and provides a framework for the much-needed coordination between various Government entities.

Sarupathar College, Sarupathar an educational institute in Golaghat district of Assam taking voluntary objective of reducing energy intensity in the College Campus for conducting Energy Audit. To conduct the energy audit, the audit team visited the campus on 25th of July, 2024 to collect data and to take some measurement for assessment of different energy consuming components.

2. Methodology for the Energy Audit:

The methodology for energy audit consists of preliminary audit, pre- audit and post audit stages.

i. Building a team for Energy Conservation Committee (ECC):

During preliminary audit and energy conservation committee is formed with Principal as the team leader. The idea of energy audit is a collective effort. It is essential that an energy conservation team is formed to carry forward the objective of energy audit.

ii. Walk in Audit:

After formation of ECC members along with energy auditor goes round the entire campus to take stock of various electrical power consuming devices including lighting system, fan and various blocks in the college campus.

iii. Assessment of actual operating load and scope for optimizing:

Review of existing electrical load in the campus.

Review of electrical load based on actual requirement

iv. Study of individual units and means to conserve electrical power:**Study of existing use of power**

Review of unit wise electrical load based on requirement

Recommendation for saving electricity

v. Energy conservation in Air-conditioning and water pumping system:

Observation in use of power and water

Methods to save power and water

vi. Diesel Generator (DG) SET:

Existing standard of operation

Performance of DG set in terms of specific fuel consumption

vii. Data Collection:

Data collection was done in the sectors such as sources of energy and energy consumption pattern. College records and documents were verified to clarify the data received through survey and discussions.

viii. Site Tour

Site inspection was done along with staff. Questionaries were answered during the site tour.

ix. Review of Documents and Records

Documents such as electricity bills, fuel consumptions were collected and reviewed.

1. Energy Consumption Areas in Sarupathar College:

- i. Two hostels,
- ii. Two Administrative Bock
- iii. Teachers' Cabin
- iv. Academic Classrooms

- v. Two Conference Halls
- vi. Computer Lab
- vii. Sankardeva Bhawan,
- viii. KKHOU Centre,
- ix. Library,
- x. Auditorium,
- xi.** Canteen and
- xii.** Guest house.

2. Energy Scenario of Sarupathar College:

The total energy consumption and electricity bill paid during the financial year 2023-2024 has shown below.

Table: I

SL. NO	Data on power supply	Value
1	Connected Load (APDCL)	45KW
1.1	Contracted Demand	53kva
2	Installed capacity of DG set	1. 25Kva (1No) Make: Kirloskar Oil Engine Limited, Engine SL No.:47.3027/1101665 2. 10Kva (1 No) Make: Kirloskar Electric Engine No:04.2009/0500671 3. 58.5 Kva (1 No) Sudhir Power Limited Model: SPL-58.5 Sr.No.: 2408.BO902M
3	Annual electricity consumption (June 2023 to May 2024)	36858.41 kwh
4	Annual cost of electricity consumption.	Rs. 4,97,183.00
5	Annual cost of electricity consumption through DG set	Rs. 1,58,563.00
6	Total cost of electricity (utility + DG sets)	Rs. 6,55,746.00
7	Total numbers of building covered	14
8	Working hours (Academic and Administration building)	8 Hrs. (9 AM to 5 PM)
9	Working hours (Hostel building)	24 Hrs. x7 days
10	Working Days/ Week	6 Days
11	Whether sub-metering of electricity consumption for each building	No

5. Key Findings and Observations of Energy Usages:

The base of energy audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events and procedures to ensure that they are carried out according to system requirements and in the correct manner. The essence of any energy audit is to find out how well energy management equipment is performing. Each of the components are crucial in ensuring that the organization's energy performance meets the goals set in its energy policy.

6. Present Energy Scenario:

At present the overall energy consumption is catered by the electricity supply from Assam Power Distribution Company Limited and own DG sets. Total Connected load of Sarupathar college is 45 KW and Contracted Demand is 53KVA. There are fourteen (14) Solar photovoltaic street light (60 watt) and total 3 numbers of DG sets (25kVA, 10kVA, 58.5kva) are used to supply power during load shading hours.

7. Experimental And Data Collection:

All required data is collected by the committee of Sarupathar College. In building, in every room, how much fans, tube light, Soller Street light, computer, instrument AC, etc. are there, is measured. According to survey following data is collected.

Table: II- Total Power Requirement of Various Department:

Department/Room	Ceiling Fan	LED Light	Tube Light	AC	Computer	Printer	Xerox machine	Projector/ Smart Board	CC Camera	Led Halogen Light	Soller Street Light
Principal office room	2		3	2	1	1			1		
Vice -Principal room	2		2						1		
Administrative building 1	5	1	4		4		2		1		
Administrative building 2	4	3	3			1	1		1		
Computer room	4	4			10				1		
Exam cell	2		2						1		
Library	15	14	1		6	1	1		3		
Class room 23 to 29	28	16						7	7		
Class room 5 to 12	36	20	13					7	8		
Class room 21,22	18	6	6						4		
Class room 13,14	10	4	4					2	2		
Class room 31 to 39	20	4						4	3		
Digital Conference Cum Class room	8	10	0		1			1	4		
Conference room	8	7	2	2				1	2		
Boys common room	1	1							1		
Departmental Staff room 8 Nos. (Arts)	16	16	2		7	7					

Departmental staff room (Commerce)	6	4									
IQAC room	4		3	1	3			1	1		
Canteen	5	10									
Boys hostel	9	40									
Girl's hostel	54	100	2						5		
Warden girls' hostel	2	6									
Girls common room	1	1	1								
Digital class room 7 Nos.	28	2	28		1						
Pavilion	5	20									
Auditorium	31	81	13						4		
Teachers' urinal M/F		4									
Canteen boy's hostel	4	5									
Canteen girl's hostel	4	4	2								
Bhupen Hazarika study center	2	2							1		
Guest house	10	7		4					1		
outside class room		17	15						30	10	14
Koshal Konwar Bhawan	18	20							2		
Sankardeva Bhawan	53	31							4		
Satra Bandhu	1	1							1		
Gym Boy's	1	3									
Gym Girls	1	3									
Principal Quarter	7	40		2							

Table: III- Average monthly power consumption in 2023-2024

SL NO.	Month	Consumption in kwh
1	June	3164.960
2	July	1637.900
3	August	5359.770
4	September	5237.280
5	October	4159.480
6	November	2981.920
7	December	1713.640
8	January	1401.760
9	February	1794.180
10	March	2448.400
11	April	2313.310
12	May	4645.810
Total		36858.41 kwh

Table: IV- Monthly Electricity bill paid in 2023-2024

Sl. No.	Month	Bill in Rupees
1	June	40660.00
2	July	26987.00
3	August	61247.00
4	September	63744.00
5	October	52653.00
6	November	40734.00
7	December	29307.00
8	January	25641.00
9	February	28716.00
10	March	35893.00
11	April	34185.00
12	May	57416.00
Total		4,97183.00

8. Water Pumping System:

The campus has total six (6) numbers of water pumps in working condition. Detail specification along with installed location are given below-

SL No.	Location	Capacity	Quantity	Type	Make/Model
1	Boys Hostel	1 hp	1	surface	LUBI SL No. 2002404
2	Girls Hostel	1hp	1	submersible	CROMPTON Model: 3W12AK1A THP
3	Garden	1hp	1	surface	POLYCAB MODEL: GALAXY
4	Wash room	1hp	1	surface	SILVER MODEL: SKY100X
5	Central	1hp	1	submersible	KSB
6	Principal Quarter	1hp	1	surface	CROMPTON MODEL: MINI CHAMP PLUS II

9. Recommendations for better Energy Efficiency:

Based on the analysis of the power consumption data, certain steps have been recommended for improving energy efficiency of this campus. Also, a number of general measures for energy efficiency have been listed.

a. Low Cost in Housekeeping:

- The windows should be cleaned so that ample sunlight can enter classes and the usage of daylight can be maximised.
- The ceiling fans should be cleaned.
- The switches of Ceiling fans and lights in the classrooms should be properly grouped so as to switch off the unwanted lights instead of operating all the tube lights and ceiling fans.
- Energy awareness camps to be conducted twice in a year in the campus to impart energy conservation knowledge to the students.

b. Training & Awareness:

Maintenance & operating staff should be trained / informed about the energy management issues & procedures. To implement an effective preventive maintenance program, the operational staff must be given comprehensive training on each type of equipment, regarding system fundamentals, use of reference material & manuals, maintenance procedures, service guidelines & warranty information. Proper maintenance schedules could be supplied to them for different equipment.

c. Other Savings:

New computers available in the market offer built in power saving modes. These monitors are called as Energy Star compliant monitors. However, it was found that most of the users are not aware of this facility. Therefore, steps should be taken to inform every one of this & any such future options. Switches for computers should be made more accessible, so that employee can turn off their terminals when not in use.

d. Medium Investment / Short term replacements:

Use of master switch outside each Room: Installation of master switch outside a room can make it easy for a person to switch off all the appliances of a room in case if someone forgets to switch off while leaving the room. This can help improving energy efficiency.

e. High Investment / Long term replacements:

Replacement of Overhead Electrical power supply line to Underground line. As the overhead line is passing through the areas where tree touching is common issue. Due to frequent faults in the overhead line, there are frequent power outages due to which the Diesel Generator is started frequently to maintain power supply in the campus. After changing the overhead line with underground cable, the reliability of power supply is maintained and the diesel engine usage can be minimised thereby improving the overall energy efficiency and saving of additional fuel cost.

10. Photographs:**(i) Solar Street Light:**



(ii) Assam Power Distribution Limited (APDCL):



(iii) DG SET



(iv) New DG Set:



(v) Solar Energy:



