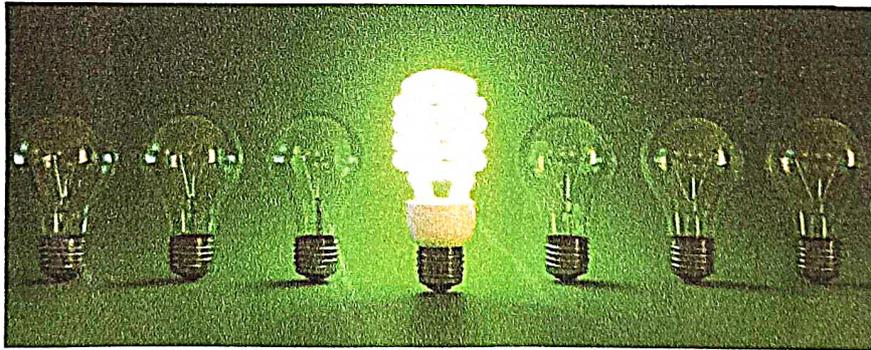


**A REPORT ON
Energy Audit 2021-2022
Of
Rangapara College**



**Rangapara College
Rangapara, Sonitpur-784505, Assam,
India**

<http://www.rangaparacollege.com>



Assam Power Distribution Company Limited
Reg. Office: - Bijulee Bhawan, Paltanbazar, Guwahati - 781001
Office of the Asstt. Executive Engineer
Balipara Electrical Sub Division:: APDCL(CAR), Balipara
CIN No. U 40109AS2003SGC007242 Ph. :(03714)-234325
E-mail:- besdsde@gmail.com

Forwarding Certificate

This is certified that the detailed Energy Audit in electrical consumptions has been carried by me in Rangapara College, Rangapara-784505, Sontipur, Assam, India; in order to find the energy consumption pattern in Rangapara College and accordingly to find out the conservation potentials and opportunities.

Place: - *Balipara*

Date: - *29/09/2022*

Signature
Sub-Divisional Engineer
(Balipara Electrical Sub-Division
APDCL, CAR, Balipara)

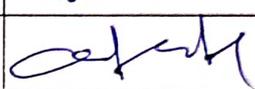
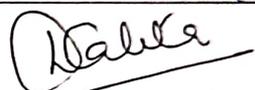
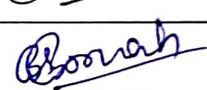
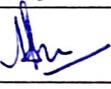
(Sarangapani Saha) *(Kia)*
98641-39090

(Dr. Ranjan Kalita)
Principal
Rangapara College

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**RANGAPARA COLLEGE, RANGPARA, SONITPUR-784505, ASSAM,
INDIA**

ENERGY AUDIT COMMITTEE

Sl. No	Name	Designation	Signature
1	Dr. Ranjan Kalita	Principal	
2	Dr. Ranendra Mohan Deka	Vice-Principal	
3	Mr. Atul Sarmah	IQAC Coordinator	
4	Dr. Dipankar Kalita	Auditor HOD, E.E. GIMT- Tezpur	
5	Dr. Bijoy Sankar Boruah	Coordinator	
6	Dr. Luxmi Machahari	Member	
7	Dr. Gitartha Kaushik	Member	
8	Ms. Joon Moni Haloi	Member	


**(Dr. Ranjan Kalita)
Principal
Rangapara College**

ACKNOWLEDGEMENT

At the very beginning, I, Dr. Bijoy Sankar Boruah would like to acknowledge to our honorable Principal Dr. Rajan Kalita, Rangapara College for his support, motivation and inspiration during the preparation of energy report. I would also like thank the IQAC cell and all the members of energy audit committee for their suggestion at different stage for making this report in a proper way. I am also thankful to B.Sc. 4th semester Physics major students for their involvement in data collection process.

Place: Rangapara College, Rangapara

Date: 29/09/2022



Dr. Bijoy Sankar Boruah
Coordinator of Energy Audit
Assistant Professor, Rangapara College



(Dr. Rajan Kalita)
Principal
Rangapara College

ENERGY AUDIT CERTIFICATE

This is certify that the “Energy Audit 2021-2022” for Rangapara College, Rangapara-784505, Sonitpur Assam, India has been conducted to assess the energy cost, methods adoption for energy conservation and way to reduce energy consumption.

Place: Rangapara College, Rangapara

Date : 29/09/2022


Dr. Ranjan Kalita
Principal, Rangapara College
Chairman, Energy Audit Committee
(Dr. Ranjan Kalita)
Principal
Rangapara College


Dr. Dipankar Kalita
Auditor
HOD, Department of Electrical Engineering
GIMT-Tezpur


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Principal
Rangapara College

PREFACE

Energy audit implies the analysis of energy consumed per year and how much of cost for it. Energy audit is a key factor that will provide a systematic approach for making decision in the area of energy management. It tells us the way how to reduce the cost of energy consumption, how to conserve energy and what are the approaches that we may take to conserve energy. For a developing country for obtaining the sustainable development energy audit is very important. In this report, we have reported the energy audit of 2021-2022 of Rangapara College for the period of October 2021 to August 2022. All the required data such as number of fan, LEDs, Tube lights, A/C, electronics instruments etc. are collected by visiting each and every part of the college campus. The final reported is prepared base on the electricity bill provided by power distribution company, Assam power distribution corporate limited (APDCL).


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1. INTRODUCTION

Energy plays an important role for a developing country. Energy implies the ability to do work. It means that more and more use of energy, more and more work is done, i.e. fast development. But we want a sustainable development for our country. Therefore our aim is to use of energy in such a way that it may give us a sustainable development without affecting the environment.

Educational institutes are the one of the basic building block of a society. To create a healthy society, we require a healthy environment. A proper planning only can create a good healthy and sustainable development society. Therefore analysis of energy used in an educational institution becomes a very important parameter to measure sustainable development. The analysis report will help us to figure out the various sectors in which how much energy is consumed. After analyzing the report we can definitely make an energy conservation plane.

Energy audit is a key factor that will provide a systematic approach for making decision in the area of energy management. It tells us the way how to reduce the cost of energy consumption, how to conserve energy and what are the approaches that we may take to conserve energy. According to Energy conservation act 2001, energy audit is not only the monitoring, verification and analysis of consumption of energy but also submission of a technical report that must have a planning for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption. An energy audit has three phases -pre audit phase, audit phase and post audit phase.

In this report, we have reported the energy audit of 2021-2022 of Rangapara College for the period of October 2021 to August 2022. All the required data such as number of fan, LEDs, tube lights, A/C, electronics instruments etc. are collected by visiting each and every part of the college campus. The final reported has been prepared base on the electricity bill provided by Assam power distribution corporate limited (APDCL).



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2. PRE AUDIT PHASE

2.1 DATA COLLECTION

Table 1: Consumption of electric energy and bill amount

Sl. No.	Month	Consumption Unit (Kwh)	Bill Amount (Rs)
1	October-2021	6999.020	58699.00
2	November-2021	5069.340	45160.00
3	December -2021	4510.310	40841.00
4	January-2022	3868.340	36493.00
5	February-2022	3978.620	36224.00
6	March-2022	5646.880	48538.00
7	April-2022	4259.190	41644.00
8	May-2022	6203.210	54742.00
9	June-2022	6320.380	55209.00
10	July-2022	7723.170	65438.00
11	August-2022	9307.190	79843.00
Total		63,885.65	5,62,831.00

The average per month electric energy consumption= $63,885.65 \div 11 = 5,807.78$ Kwh

And the average per month electricity bill amount Rs.= $5,62,831.00 \div 11 =$ Rs. 51,166.45


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2.2 ELECTRIC ENERGY CONSUMED ELEMENTS

Table 2: List of Electric energy consumed elements

LED	281
FAN	342
Stand fan	4
Wall fan	3
Led Tube light	319
CCTV	33
TV	3
AC	8
Ex-fan	13
Printer	11
Desktop	42
Laptop	6
Inverter	6
Wifi	5
Projector	2
Display	1

Filter	2
Sound box	6
Microphone sound box	3
MIC	2
Sanitizer machine	1
Sound system	1
Punching machine	1
Street light	13
freeze	1
Water Pump	1
Electrical instrument in Chemistry Lab	6
Electrical instrument in Zoology Lab	8
Electrical instrument in Physics Lab	79
Electrical instrument in Botany Lab	11

3. AUDIT PHASE

3.1 DATA ANALYSIS AND OBSERVATION

In the table 1, we have shown the electric energy consumed data and the bill amount and these data are collected from Assam Power Distribution Company Limited from October 2021 to August 2022. In the table 2, we have shown the number of electric energy consumed elements


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within Rangapara college campus. Based on the table 1 we have made two pie diagrams as shown in figure 1 and figure 2.

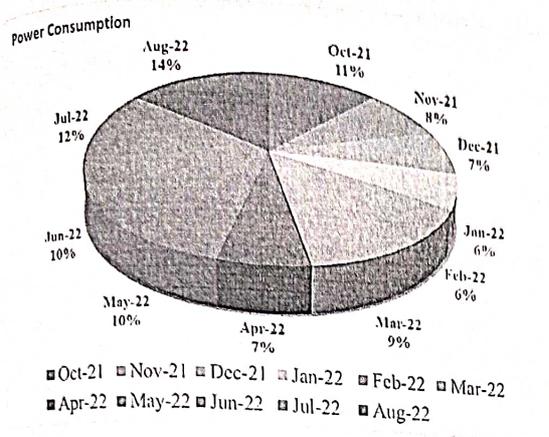


Figure1: Power consumption pattern from October-2021 to August 2022.

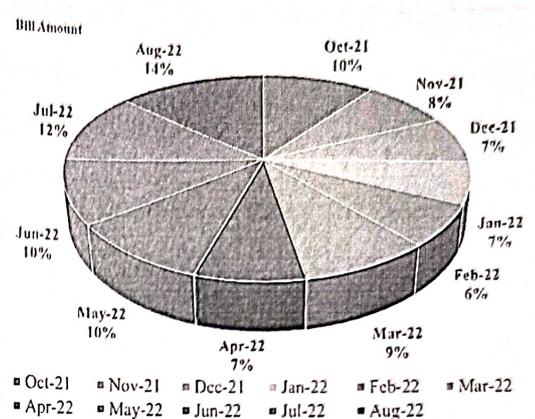


Figure2: Electric energy bill from October-2021 to August 2022

Figure 1 represents the consumption of electric energy in Kilowatt hour per month. From this figure we can conclude that in the month of August 2022, consumption of electric energy is 14% while in the month of July 2022, it is 12%. The highest electric energy consumption occurs in these months because of summer season. It is also noticed the lowest electric energy consumption take place in January 2022 and February 2022. For both of these two months consumption of electric energy is found 6% only. The reason for the low electric energy consumption is because of winter season. From the figure 1 we also observe a seasonal variation of electric energy consumption from summer to winter. In figure 2, we represent the per month electric energy consumption bill amount. It is noticed that the bill amount is minimum in the month of January 2022 and February 2022 while bill amount is higher in the month of July 2022 and August 2022. From the table 1 we can easily calculate that the average per month electric energy consumption is 5,807.78 Kwh and the average per month electricity bill amount is Rs. 51,166.45. During the data collection it is also found that Rangapara College has a one electricity generator, and 8 solar street lights. In the College campus LPG cylinder are used in both girl's and boy's hostels. Also in canteen LPG cylinders are used for cooking purpose. In chemistry Laboratory there is a two LPG cylinder for practical purpose. The number of LPG cylinder required per month in the Rangapara College campus is approximately 10.

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3.2 COMPARISON OF 2020-2021 ENERGY AUDIT WITH 2021-2022 ENERGY AUDIT

1. In 2020-2021 Energy Audit the average per month electric energy consumption was found 5018.22 Kwh and the average per month electricity bill amount was Rs. 43,700.00. But in 2021-2022 Energy Audit, it is observed that the average per month electric energy consumption is 5,807.78 Kwh and the average per month electricity bill amount is Rs. 51,166.45. The consumption of electric energy increases in 2021-2022 session as shown in figure 3. This is because of construction of new buildings and increasing number of computer users.

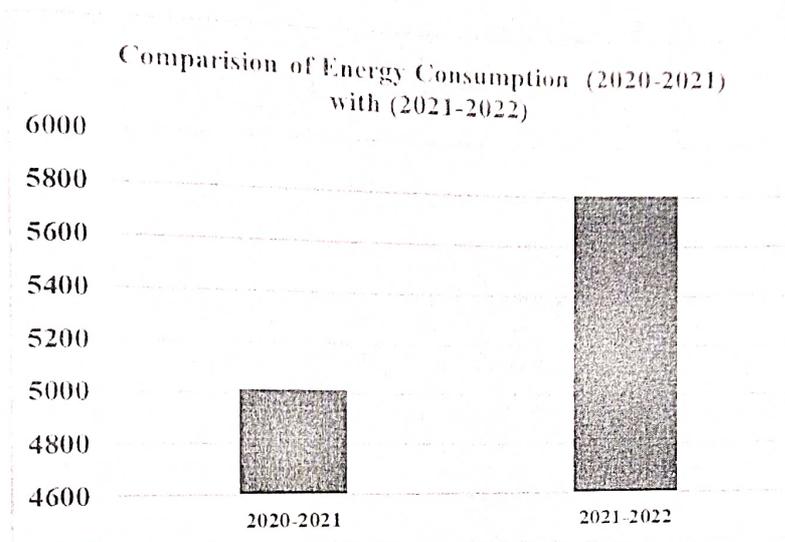


Figure: Comparison of Energy Consumption for the session 2020-2021 with session 2021-2022.

2. According to the suggestion of Energy audit 2020-2021, all the bulbs are replaced by LED bulb for better energy efficiency.

3. Manual Street lights are converted to automatic switches street lights.

4. For saving water as well as electric energy, automated sensors are installed in the college central water tank in the session 2021-2022.

WL
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 Principal
 Rangapara College

5. During this session 2021-2022, college has received solar power installation of 10 KW in the college central Library. The award letter attached as below

GOVT OF ASSAM
OFFICE OF THE EXECUTIVE ENGINEER, P.W.D. TEZPUR ELECTRICAL DIVISION
TEZPUR, SONITPUR.

No. EST/TED/ED/T-04/ 1423 Dtd. 24/03/2022

To,
The Principal,
Rangapara College,
Rangapara, Sonitpur

Sub - Submission of Estimate for the work. "Supply and Installation of 10 KW Solar Power Plant (Off Grid) in the Library and 2 (Two) nos. of 30 Mtrs. LED High Mast Light in the Campus of Rangapara College at Rangapara, District Sonitpur."

Sir,

With reference to the above, I have the honour to submit herewith the estimate for the above mentioned work for favour of your countersignature and kindly return the same to the undersigned for further taking necessary actions from this end.

Encl: Estimate - 1 (One) nos.
In quadruplicate

Yours Faithfully

Executive Engineer P.W.D.
Tezpur Electrical Division,
Tezpur

Memo No. EST/TED/ED/T-04/ 1424 Dtd. 24/03/2022

Copy to:-
1. The Asstt. Executive Engineer, P.W.D., Tezpur Electrical Sub-Division for information.

sd/
Executive Engineer P.W.D.
Tezpur Electrical Division,
Tezpur

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Principal
Rangapara College

3.3 SUGGESTIONS FOR BETTER ENERGY EFFICIENCY

1. Replace all street light by solar light.
2. Use computers and all other electronic equipment in power saving mode.
4. Use automated sensors in washroom to stop water waste when not in use.
5. Turn off the appliance when we go out of the room.
6. Replace all the old electrical and electronics goods with new high rating one.
7. Run Ac in-between 24 to 25 degree temperature only.

3.4 CONSOLIDATION OF AUDIT FINDINGS

1. The per month use of electricity in the college is not too high.
2. The methods adopted by the college to reduce the energy consumption are sufficient.

4. POST AUDIT PHASE

4.1 ACTION PLAN FOR REDUCING ENERGY CONSUMPTION

Energy audit is a continuous process that has to be done per year. From the energy audit one can easily able to know how much of energy consumed in a year and how much per month. So it will help us to take the necessary steps to reduce the energy consumption. To reduce the energy consumption awareness programs will be a part of our action plane. Use of banner and sign indication within the college campus also helps us to save energy.

5. CONCLUSION

Conclusively, the energy report of Rangapara College has been done for the year 2021 -2022. From the energy report it is clear that college has focus on the point of sustainable development. It is also noticed that there is seasonal variation of electricity demand in the college campus. College has a very good number of LED bulbs and LED tube lights that helps to reduce the electric energy consumption.



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