



Energy Audit Report

For the year 2022-23

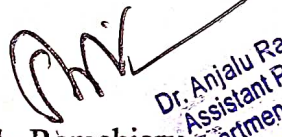
Pandit Deendayal Upadhyaya Adarsha Mahavidyalaya, Tulungia



Certificate

This is to certify that the Energy Audit 2022-23 of Pandit Deendayal Upadhyaya Adarsha Mahavidyalaya, Tulungia has been conducted by the Energy Audit Team consisting of faculty members and office staff of the college between the months of October, 2022 to March, 2023. The audit has been performed in order to assess the consumption and costs of energy and also methods of reduction of energy use in the college campus. I have reviewed the audit report and express my satisfaction at the process.

I hope this audit report will help the college to implement different developments in this regard in the future.


Dr. Anjalu Ramchiary
(External Member)
Energy Audit Team, PDUAMT

Dr. Anjalu Ramchiary
Assistant Professor
Department of Physics
Bodoland University
Kokrajhar-783370, Assam

Foreword from the Principal

Energy Audit 2022-23 is the first ever exercise of such an audit in the PDUAM, Tulungia. This audit has been conducted in compliance with the NAAC recommendations as per Criterion VII of assessment of academic institutions. The purpose behind Energy Audit is to assess the consumption and costs of energy and also methods of reduction of energy use in the college campus. The PDUAM, Tulungia is committed to reduce the cost of energy by using different alternative modes which are environment friendly as well.

I am hereby pleased to present the Green Audit 2022-23 report of the PDUAM, Tulungia which is the result of thorough study and comprehensive analysis of data by the energy audit team. I appreciate the sincere efforts of all members of the Energy Audit Team whose rigorous exercise has resulted in successful completion of this audit and preparation of this report. I sincerely hope that this audit will have positive impact on the college environment and guide future development projects.



Dr. Pranjal Morang
Principal (i/c)
PDUAM, Tulungia
Principal (i/c)
Pandit Deendayal Upadhyaya
Adarsha Mahavidyalaya
Tulungia, Bongaigaon

Acknowledgement

We are sincerely thankful to the PDUAM, Tulungia management for giving us the opportunity to conduct energy audit of the college. We are also thankful to Dr. Pranjal Morang, Principal (i/c) PDUAM, Tulungia for his constant help and guidance in preparation of the audit report. We are grateful to Dr. Nitashree Barman, Co-ordinator, IQAC for her kind co-operation in conducting the audit. We express our sincere gratitude to all stakeholders of the college including the faculty members, students and non-teaching staffs for their co-operation and help during the data collection and their valuable advice and timely suggestions.

Finally, we convey our gratitude to the external member(s) of the energy audit team for reviewing the report and their recommendations for better performance in energy safety measures.



Dr. Saurabh Jyoti Hazarika
Co-ordinator, Energy Audit Team
PDUAM, Tulungia

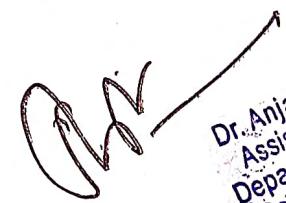
PDUAM, Tulungia Energy Audit Team

Sl. no.	Name	Designation	Role in the team
1	Dr. Pranjal Morang	Principal (i/c), PDUAM, Tulungia	Chairperson
2	Dr. Saurabh Jyoti Hazarika	Assistant Professor, Department of Physics, PDUAM, Tulungia	Coordinator
3	Mr. Atanu Kumar Mishra	Assistant Professor, Department of Accountancy, PDUAM, Tulungia	Co-coordinator
4	Dr. Anjalu Ramchiary	Assistant Professor, Department of Physics, Bodoland University	External Member
5	Dr. Rituparna Sarma	Assistant Professor, Department of Zoology, PDUAM, Tulungia	Member
6	Mr. Kishor Deka	Assistant Professor, Department of Physics, PDUAM, Tulungia	Member


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1. Background: Energy is one of the most important forces for the overall development of a nation. To cater to the needs of the present scenario where the natural sources and reserves of energy are fast depleting, it is important for everyone to be aware and also to spread awareness among the masses regarding energy consumption. As an institution of higher education, it is a major responsibility for the stakeholders to take effective measures for proper usage of energy. The Energy audit is a systematic method to assess, analyze and to work upon the existing ways to improve energy consumption in the college campus. This forms important criteria for placing Green audit under criterion VII for assessment under National Assessment Accreditation Council.

2. Energy audit: we have basically divided this procedure of energy audit into three stages: Pre-audit, audit and final audit stage.

2.1 Pre- audit stage:

The pre-audit stage involves the drafting of outline and discuss among the members

At the beginning, a meeting was held where different committees were formed for different sections of the green audit. For the energy audit, a committee has been formed and objectives and scopes of the audit were discussed. The roles and responsibilities of the committee members were also illustrated in the meeting.

2.2 Audit stage:

In the audit stage the following tasks are conducted-

1. After the initial meeting, the energy audit team visited different departments and facilities of the college for identifying different energy consuming appliances and utilities present.
2. The method of interview was conducted to get details of certain appliances regarding their pattern of use and general characteristics.
3. Documents regarding the consumption of electricity and other energy sources in various parts of the college campus were collected and studied thoroughly.

4. Questionnaires were distributed among different stakeholders to obtain have an idea and get their views regarding the energy conservation.

5. The audit team also identified the different energy saving practices adopted by the college.

2.3 Post Audit Stage

2.3.1 Energy Sources

The most of the energy consumed in the various activities of the college campus is in the form of electrical energy which is provided by Assam Power Distribution Company Limited (APDCL) from its Abhayapuri sub division. The college has the electricity connection having the consumer number 037000000589. Total connected load of PDUAM, Tulungia is 145 kW and contracted demand is 34 kVA. Apart from the electricity supplied by APDCL, the college has two DG sets which are used for supplying electricity when there is a power cut. One of the DG sets has a capacity of 100 kVA and the other one has the capacity of 3 kVA.

2.3.2 Energy Consumption (Key findings and observations of Energy usages):

A total of 15,281.10 units of electricity was consumed during the period from October 2022 to March 2023 and generated a total electricity bill amount of Rs. 1,50,819.09.(Table 1)

Table: 1 Energy consumption and bill amount for the months October 2022 to March 2023

Months	Units	Bill Amount (Rs.)
October	2613.60*	24009.78
November	2999.70*	27,089.81
December	2272.50*	22,166.12
January	2079.00*	21,480.67
February	2405.70*	28,894.68
March	2910.60*	27178.03
Total	15,281.10*	1,50,819.09

Estimated Units consumed as recorded by service provider

Graphical representation of the monthly energy consumption has been shown below:

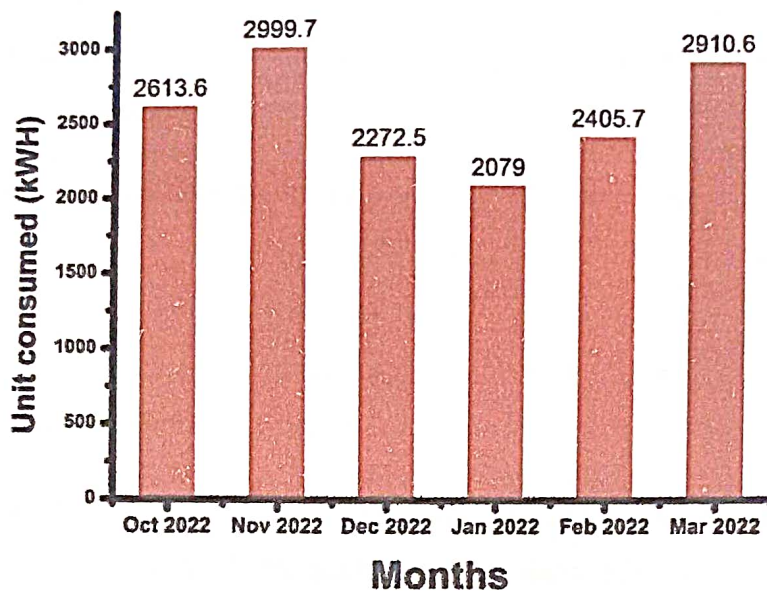


Fig. 1 Monthly energy consumption (From October 2022 to March 2023)

It has been observed from the electricity bills that the monthly average maximum demand for the duration of October 2022 to March 2023 was 18.04 kVA and average power factor was maintained at 86.

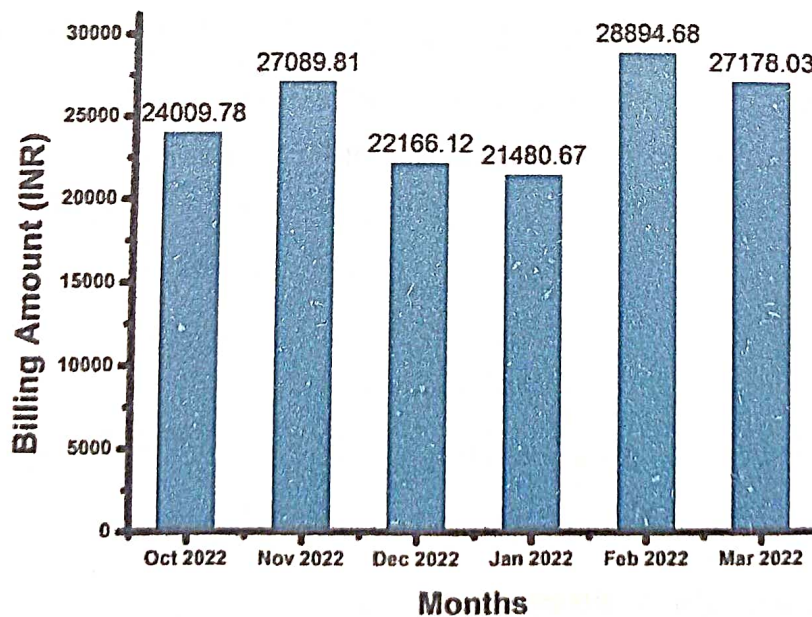


Fig. 2 Monthly energy bill (From October 2022 to March 2023)

Total electricity bill of PDUAM, Tulungia for the months October 2022 to March 2023 was Rs. 1, 50,819.09. The maximum electricity bill paid to APDCL during the period was for the month of February 2023 where the maximum demand was recorded as 43.8 kVA and the average power factor was maintained as 86.3.

The college campus has multiple buildings viz. academic cum administrative building, girls' hostel and the college canteen. The main college building is using energy efficient LED tubes and lights for less consumption of electric energy. At present the college is having 352 LED tubes, 01 LED bulb and 198 fans. In addition to that, a total of 12 LED lamp post are there in the college campus which is used during the dark hours.

Other energy consuming appliances are 33 sets of computers, 1 water pump, 07 printers, 02 CCTV monitors, 15 CCTV cameras, 02 photocopy machines, 198 fans, 02 air conditioners, 02 smart boards with projectors, 01 inverter, 02 online UPS and various laboratory equipments.

Apart from the college building, some electrical appliances are also there in the girls' hostel and the college canteen. In the girls' hostel, the major energy consuming appliances are 1 Geyser, 1 inverter, 1 water pump, 49 fans. For saving the energy, 95 LED tubes are installed in the girls' hostel. The college canteen is having 6 fans and 3 LED tubes.

In addition to electric energy, the college also consumes certain amount of LPG and diesel fuels. A total of about 1022 kgs of LPG are consumed in the girls' hostel every year, whereas, about 30 kgs of LPG are used annually in the chemistry laboratory. The college has two DC generators which are operated during electricity outage. An average of 450 litres of diesel is consumed annually during the use of these generators.

2.3.3 Survey response

During a questionnaire survey among the students of the college, following responses were obtained.

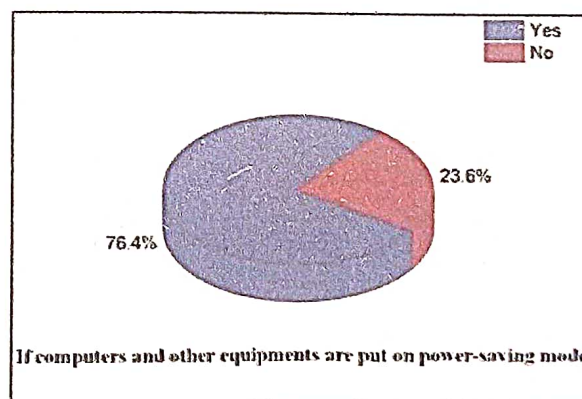
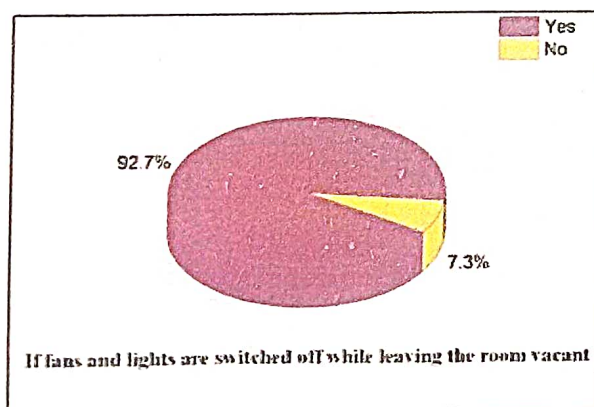
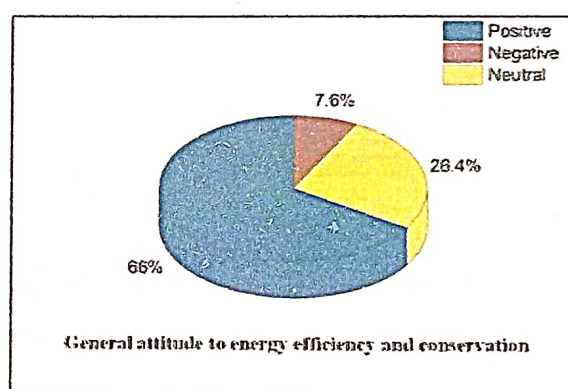
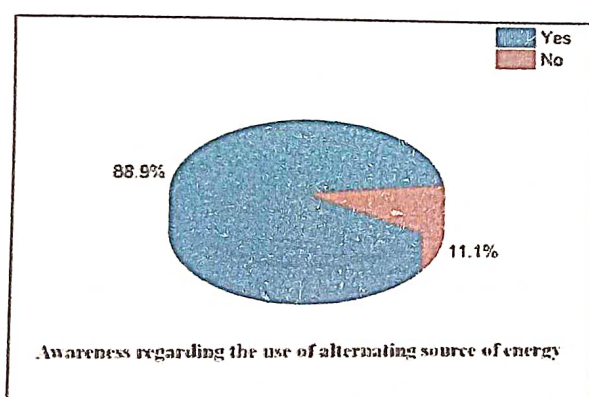
1. Among the students 88.9% are aware of the use of alternative energy sources.

2. 66.6% of the students are positive on the energy efficiency and conservation of energy while 7.6% have negative attitude towards energy efficiency and conservation. On the other hand 26.4% are neutral in this regard.

3. 92.7 % of the students switch off the electric appliances while leaving the classroom, whereas, 7.3% students have admitted that they never switch off the appliances.

4. Among the students, 76.4% keep their computers and other equipments in power saving mode while 23.6% don't use the power saving mode.

The responses of the students are represented through pie diagram as follows:



2.3.4 Existing power saving measures:

The measures already adopted by the college are as follows:

(i) To switch off the electrical appliances while not in use.

(ii) To replace all the light bulbs/tubes with energy efficient LED bulbs/tubes and to switch on lights only when required.

(iii) To use computers and other appliances in power saving mode.

(iv) Most of the programs of the college are conducted in open stage which saves power and energy.

2.3.5 Measures taken post audit

Following measures are adopted to create awareness among the students and different stakeholders of the college regarding the use of energy efficient sources for energy conservation as a part of post audit stage:

- a) Stickers have been pasted at the switch boards and the walls to keep reminding of the need of controlled use of electricity.
- b) College authorities are already taking necessary steps to install solar lamps in the college campus.

3. Recommendations