ENERGY AUDIT REPORT

Of

Govt. Naveen College Berla

District – Bemetara, Chhattisgarh

2019-20

Surveyed

By

Department of Physics

Energy Audit Report

Submitted to

Govt. Naveen College Berla District – Bemetara, Chhattisgarh

Submitted by

Prof. Anand Kumar Kurre (H.O.D. Physics)

Prof. G.S. Bhardwaj (H.O.D. Geography)

PRINCIPAL
Govt. Naveen College
Berla, Dist. Bemetara (C.G.)

PREFACE

In the contemporary scenario, Energy has been identified as a crucial and balancing factor in the indices for sustainable development. The heavy and unbalanced energy consumption adversely affects energy price and economic growth.

The Energy Conservation Act, 2001, defines Energy auditing 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 .It facilitates a systematic approach to the energy management in a system, trying to balance the total energy input with its use. It identifies all the energy streams in a system and quantifies the use of energy according to its discrete functions. It is a study to determine how and where energy is used, and to identify methods for energy savings. The Energy Auditing for a day is the index of the consumption which normalizes the situation of Energy crisis by providing the schemes for conservation of energy. The opportunities lie in the use of existing renewable energy technologies, greater efforts at energy efficiency and the dissemination of latest technologies.

This report is our mite in contributing to the larger picture of effective energy management and conservation. As is known, energy auditing is an on-going process, a part of a larger procedure to ensure long- term sustainable development.

We have enlisted credible solutions based on the outcome of our analysis of data, and our recommendations, which can be implemented totally in the campus in order to ensure minimizing energy waste and maximizing energy potential. We hope in all earnest that these will be given its due and that the audit will be fruitful in terms of energy conservation. Any suggestions to further enhance the quality of this work are always welcome. Kindly email your comments and suggestions to email: collegeberla2008@gmail.com.

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Introduction

Govt. Naveen College, Berla, District- Bemetara is a pioneer educational institution imparting higher education to whole of Bemetara district. This college was Established in 18 July 2008 . Bestowed with the legacy of spreading education it has almost reached the Milestone of 8 Year with the Increasing strength students. This college is affliated to Hemchand Yadav University Durg Chhattisgarh. Being located in the tribal and backward class dominated belt, the college is striving hard to cater to the needs of the Students through U.G. and P.G. Programmes in all the four faculties Arts, Science, Home Science and Commerce. Bemetara is an important district of Chattisgarh State. The college has always encouraged academic intercourse through organizing National Seminars, Workshops on specific disciplines and interdisciplinary subjects from time to time. It aims to become an affiliate to many other similar projects and has a vision to upgrades the institutions to the Zenith.

Under the various schemes of the University Grants Commerssion, the college has received financial grants to for the construction of class-rooms, Building Laboratory, Multipurpose Hall, Library Building, Multi-Gymn, Sports Equipment etc. Recently under UGC/NRC scheme UGC Network Resources Centre has been established in the college with an internet, intercom and Wi-fi system to keep the students updated in all aspects of learning. Research projects sponsored by UGC are being carried out at Doctorate and post Doctorate level.

Objectives

The Energy Audit Manual of the Energy Management Centre, Government of Chhattisgarh, defines the primary objective of any energy audit as determining “ways to reduce energy consumption per unit of product output or to lower operating costs” .The recommendations of the study will become a basis for future schemes of better energy consumption and preservation throughout the organization. Specific objectives of the study are:

- ✓ Verify the steps adopted for energy management in the campus
- ✓ Spot the inefficient or inadequate practices, if any
- ✓ Improve the energy preserving measures and methods

- ✓ Identify potential energy saving opportunities
- ✓ Formulate Possible steps and measures to be adopted in the campus

Methodology

An energy audit is an inspection, survey and analysis of energy flows, for energy conservation in a building, process system to reduce the amount of energy input into the system without negatively affecting the output. Method use for Energy audit is a Preliminary Audit. Preliminary audit uses existing data to look extensively at the existing energy consumption patterns and identifies the areas for improvement.

Data collection

For the purpose of this audit, audit groups for specific areas were formed. Data was collected through

- ✓ Inspection and observation
- ✓ Identification of energy consumption
- ✓ Calculations, analysis
- ✓ Validation

Data analysis

The gathered data was then quantified and separated according to the following criteria:

- ✓ Energy consumption by end use
- ✓ Average energy use block-wise
- ✓ Consumption equipment-wise
- ✓ Rate of consumption month-wise
- ✓ Rate of consumption time-wise

The quantified data are presented below as figures and tables for easy reference.

Figure 1. Shows the energy consumption by end use.

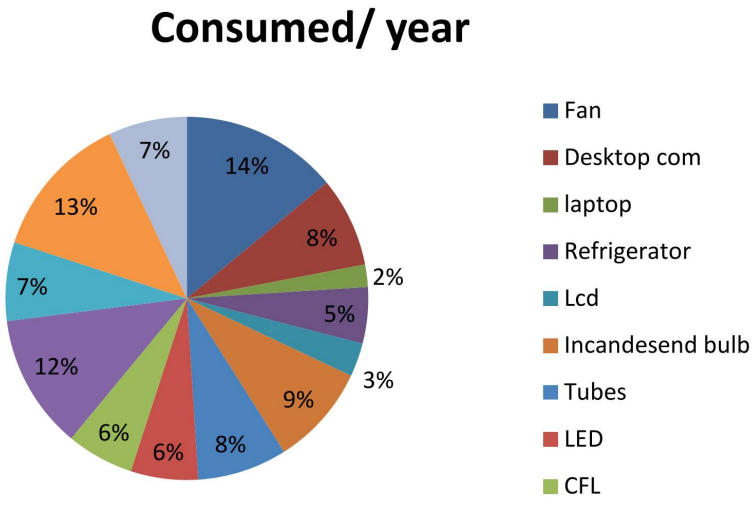


Figure -1

Table 1

The consumption of energy block-wise.

Sno.	Block	Energy Consume Per Year Block Wise (kwh)
01	Physics	2197
02	Chemistry	2201
03	Zoology	2098
04	Botany	2100
05	Mathematics	1100
06	Political Science	500
07	Sports	400
08	Canteen	400
09	Commerce	450
10	Library	1850
11	Principal Chamber	1100
12	Office	1005
13	Staff Room	825
14	English	725
15	Geography	1000
16	Economics	374
17	Common Room	425
18	Class Rooms	8004
19	IQAC	400

Table -2

Month-wise consumption rate of energy for the year 2019-20

Month	Energy Consumption
February – 19	2545
March – 19	2458
April – 19	3245
May – 19	4102
Jun – 19	1254
July – 19	1500
August - 19	1521
September – 19	6545
October – 19	2544
November – 19	2254
December – 19	6542
January - 20	2542

Figure – 02 Energy Consumption Month Wise Graph.

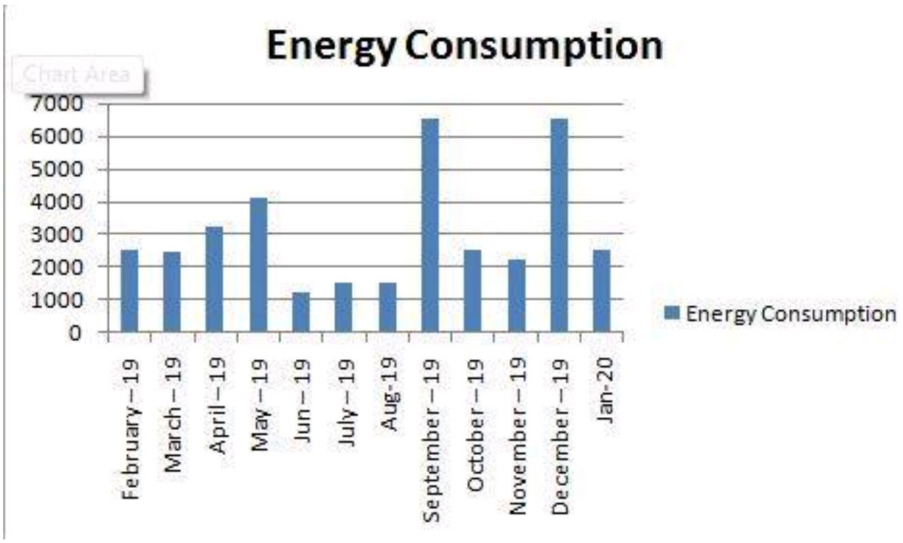
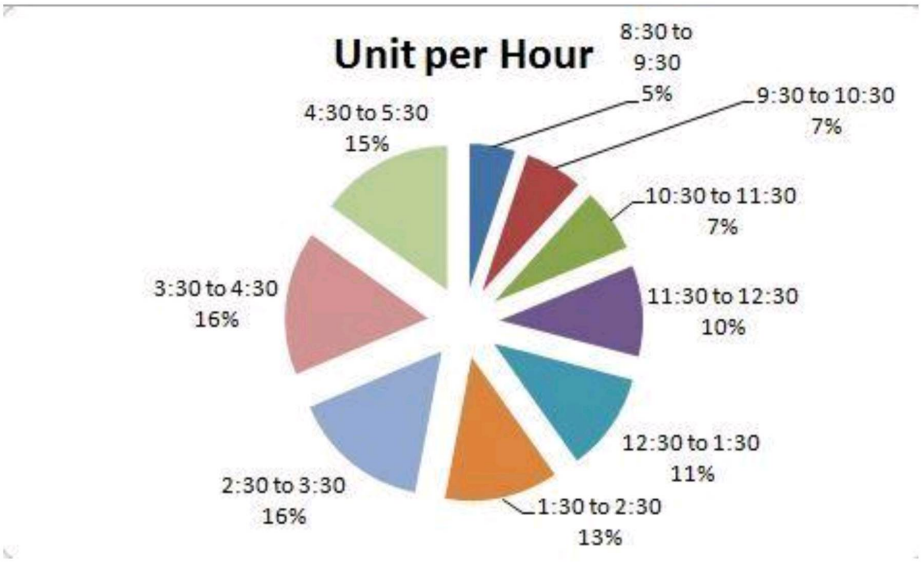


Table -03

Time Wise split up of energy consumption on a normal working day.

Time	Unit per Hour
8:30 to 9:30	**1.8**
9:30 to 10:30	**2.3**
10:30 to 11:30	**2.5**
11:30 to 12:30	**3.6**
12:30 to 1:30	**3.9**
1:30 to 2:30	**4.5**
2:30 to 3:30	**5.5**
3:30 to 4:30	**5.7**
4:30 to 5:30	**5.3**

Figure – 03 Time Wise split up of energy consumption on a normal working day.



Major Findings

Since this was a Preliminary Audit, the findings are formulated as per the norms for this stipulated by the Energy Audit Manual. Establish energy consumption in the organization from the quantitative analysis of the gathered data, the following findings have been reached.

1. The laboratories record the highest consumption based on end use
2. Classrooms records the highest rate of consumption
3. The month of September shows the peak in consumption.
4. The time slots in the Afternoon record the highest consumption on a normal working day

Identify easiest areas of attention

Based on the physical observation and the analysis of data collected, certain areas have been identified as areas of attention.

1. Old wiring cables in many parts of the campus leading to loss of energy.
2. Old water pipelines in several parts of the campus leading to waste of energy.
3. Use of incandescent bulbs and tubes in certain rooms.
4. There is less use of solar panels.
5. Use of old equipment in laboratories.

Estimate the Scope for Saving

The study could identify a large scope for saving energy in the campus, including -

1. Updating of technologies in laboratory equipment.
2. Replacing old electrical cables and pipelines.
3. Replacing incandescent bulbs and tubes with LEDs.
4. Ensuring even lighting facilities in rooms.
5. Use of Solar panels as a main source of lighting, especially common areas.

Identify immediate areas of improvement

Based on the study, certain areas were identified as requiring immediate improvement. These are

1. Replacing incandescent bulbs and tubes with LEDs
2. Repairing and updating laboratory equipment
3. Encouraging students and staff to switch off electrical instrument.

Table -4

Finding and recommendation of the Audit

Findings	Recommendations
The electrical wiring of many buildings was found to be old and inefficient.	Replace old electrical cables with new ones.
There seem to be a lack of judicious use of power among students and staff. During the study, it was found that lights, fans and computers were kept on working mode in many rooms, without a single person present.	Students and staff should be exhorted constantly to use energy judiciously. Posters and pamphlets should be distributed and notices about saving energy should be posted at major points of use.
Many Departments still use incandescent bulbs causing heavy power loss.	Incandescent bulbs should be replaced with LEDs.
AC, refrigerators and freezers used in many departments use obsolete technology and hence cause power loss.	Gadgets and equipment's should be repaired and/or replaced with latest ones to save energy.

Conclusion

A master switch located at a prominent place which can be directly supervised by the HOD/supervising staff would help avoid power wastage in closed rooms. A well-prepared electrical wiring plan for the campus, which would help to identify unused points and re-wiring. A training /lecture for both students and staff to awareness for the need of energy conservation. If everyone ensures switching off lights, fans and electrical instrument that are not in use, roughly 10% of energy saving is possible. The scope for non-conventional energy should be utilized.