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**GOVERNMENT G.N.A. PG COLLEGE, BHATAPARA,
DIST- BALODA BAZAR, CHHATTISGARH**

Affiliated to Pt. Ravishanker Shukla University, Raipur (C.G.)

Accredited Grade "C" By NAAC



ENERGY AUDIT REPORT – 2023-24



ENERGY AUDIT COMMITTEE

***1-Dr. Vikas Gulhare 2-Dr.Sumit Pant 3-Deepak
Yadav***

Prepared by: Audit Team (Faculty, Staff, Students)



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CERTIFICATE

Certificate of Energy Audit

This is to certify that an energy audit was conducted at Government G.N.A. P.G. College, Bhatapara Sant Mata Karma ward, Bhatapara (C.G.) on March 2024 by Dr. Vikas Gulhare, HOD Department of Physics .

The audit was conducted in accordance with Relevant Standards and covered the following areas:

* Block-A, B, C, Sports Hall, Girls Hostel, Library

The audit identified the following key energy-saving opportunities:

Dr. Vikas Gulhare

HOD Department of Physics

Government G.N.A. P.G. College, Bhatapara (C.G.)



CONTENT

Sl. No.	Topic
01	Introduction
02	Energy Audit Report
03	Data Collection
04	Data Analysis
05	Energy consumption Report
06	Energy Saving Data
07	Suggestion & Recommendation
08	Conclusion
09	Photographs



Introduction

Executive Summary:

The objective of this audit was to analyze the electricity consumption patterns across the various buildings and facilities within the college campus, identify areas where energy usage can be reduced, and recommend cost-effective energy-saving measures. The college's total electricity consumption for the year is 37,900 units, with a per capita utilization of 103.83 units per day. Based on the audit findings, various energy-intensive systems and practices have been identified, and this report outlines potential strategies for reducing electricity consumption, promoting sustainability, and lowering operational costs.

Government GNA PG College started functioning in 1964. It became a government college in 1975 and was accredited with "C" level by NAAC. It Provides Co-education and Multi-faculty teaching facilities in Arts, Commerce and Science streams. It provides **23** regular undergraduate and Post Graduate courses.

It Provide **6** integrated courses, **2**-UG courses, **5**-PG courses, by self-financing mode. It has Science Block, Administrative block, RUSA Block, Girls Hostel and SPORTS HALL. In order to provide /Supply electricity a separate transformer is installed in the campus. There is huge electricity consumption in the class rooms, labs, corridor, offices, staff rooms, auditorium and uses of equipment's in different blocks of the college.

In broad sense energy efficiency means managing energy consumption in a more economical way otherwise it may increase the energy consumption cost and will be a financial burden for the institution. It includes improving the efficiency of energy extraction, transmission and increasing the productivity energy use. As part of the college's commitment to sustainability and cost reduction, an energy audit was conducted to identify key areas of energy consumption and suggest strategies for improvement. The audit covered various buildings and facilities including academic blocks, hostels, sports areas, and the library, with a specific focus on high-energy devices such as air conditioning, lighting, lab equipment, and other electrical appliances.

This report details the findings of the audit and outlines actionable recommendations to reduce electricity usage, enhance energy efficiency,



and encourage environmentally responsible practices across the campus.

Energy Audit

As per the energy conservation Act. 2001, energy audit is defined as the verification, monitoring, analysis and use of energy including submission of technical report containing recommendation for improving energy efficiency with cost benefit and an action plan to reduce energy consumption.

The energy audit includes following stages:

A team headed by **Dr. Vikas Gulhare**, Asst. Prof Physics with supporting staffs to collect data in Arts Block.

A team headed by **Dr. Deepak yadav** Asst. Prof. in Physics with supporting staffs to collect data from Science Block.

A team headed by **Dr. Sumit Pant** Asst. Prof. Maths with supporting staff to collect data from administrative & Rusa block.

In preliminary data collection phase, exhaustive data collection was performed using different tools. Different teams went to each block, departments, offices, library, auditorium etc. and collected the general information of each appliances and the power consumption of each appliance was recorded.

Detail analysis of data collected include calculation of energy consumption, analysis of latest electricity bill of the institute, understanding the tariff plan provided by CSPDCL. On the basis of results of data analysis and observation & some steps for reducing power were recommended.



Data Collection

The audit team visited different blocks of college and data of each electrical appliances with wattage or load of each block are collected. All the data were put in the table for each blocks with load in kW for easier understanding.

The energy consumption bills were collected from office for different months. It is then put in the tabular form and suitable diagram for easy reference and better understanding.

Electricity Consumption Overview:

Total Annual Consumption:

- Total Units Consumed (Annual): 37,900 units.
- Per Capita Utilization: 103.83 units per capita per day.

Monthly Consumption Breakdown (March - February):

Month	Meter No. & Building Names												Total Unit Consumption	Total Amount Paid
	S.No.1001782 863 (Block - C)		S.No.1007828 862 (Sports)		S.No.1001782 837 (Library)		S.No.10050852 36 (Hostel)		S.No.10089377 32 (Block - B)		S.No.10022257 47 (Block - A)			
	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount		
Mar.	49	1720	28	700	46	520	17	230	840	9540	2267	20430	3247	33140
April	49	1720	28	700	46	520	17	230	840	9540	2267	20430	3247	33140
May	0	297	0	613	52	552	0	166	620	7848	1703	16794	2375	26270
June	0	275	45	803	100	851	0	160	820	9507	2204	20703	3169	32299
July	108	1020	40	810	160	1320	0	160	620	8613	1744	18520	2672	30443



Aug.	166 1	2449 0	967	794 0	1	350	210	970	800	9410	1564	1635 0	520 3	59510
Sep.	0	2638	351	366 4	139	108 7	0	243	1000	1100 7	1836	1807 7	332 6	36716
Oct.	137 1	2029 0	403	350 0	128	110 0	210	970	1080	1176 7	1723	1755 0	491 5	55177
Nov.	797	1680 0	217	227 0	30	490	210	1060	400	6840	1710	1741 0	336 4	44870
Dec.	338	5169	358	305 1	78	703	210	1030	500	6997	1645	1662 8	312 9	33578
Jan.	238	3420	240	229 0	56	590	210	1030	360	5910	1124	1257 0	222 8	25810
Feb.	524	7720	165	174 0	55	740	210	1020	860	9810	2458	2372 0	427 2	44750
												Grand Total	4114 7	455703

Data Analysis

The collected data were then quantified according to the following criteria.

Energy load of each appliance.

Energy load in each block.

Energy load in the college.

The quantified data were put in a tabular form and with suitable diagram for easy reference and understanding of the energy consumption.

ENERGY AUDIT		
SL.NO.	NAME OF THE BLOCK	ELECTRIC LOAD IN WATT
1	ADMINSTRATIVE BLOCK	229602
2	ARTS BLOCK	128852
3	SCIENCE BLOCK	64837

TOTAL 423291

Findings from the Audit:

Energy-Intensive Areas:

- **Computer Labs and Classrooms:** Computers and related devices such as monitors, printers, and servers are significant consumers of electricity. Many labs and classrooms have multiple computers running for extended hours.
- **Air Conditioning and Ventilation Systems:** Several buildings,



especially in warmer months, rely heavily on air conditioning and ventilation systems. These units operate continuously during hot weather, contributing to high electricity consumption.

- **Lighting:** Inconsistent practices regarding lighting. Many lights remain on even when rooms or corridors are not in use, particularly in common areas and hallways.

Current Energy Practices:

- The college has limited adherence to energy-saving practices such as turning off equipment when not in use.
- Energy-saving equipment, such as LED lighting and energy-efficient air conditioners, are present in some areas but not uniformly distributed across all buildings.
- No central energy management system to monitor real-time consumption and control usage.

Energy Consumption Bill.

Recommendations for Energy Conservation:

Lighting Efficiency:

Switch to LED Lighting: Replace all incandescent and fluorescent lights with LED bulbs, which consume significantly less energy and have a longer lifespan.

1. **Install Motion Sensors:** Use motion sensors in classrooms, hallways, restrooms, and other frequently unoccupied areas to ensure that lights are only on when needed.
2. **Use Daylight Sensors:** Install daylight sensors in areas with sufficient natural light to reduce artificial lighting during the daytime.

Air Conditioning and Ventilation Systems:

1. **Upgrade to Energy-Efficient Air Conditioners:** Replace old AC units with energy-efficient models that consume less power and have better cooling performance.
2. **Routine Maintenance of HVAC Systems:** Ensure regular maintenance, such as cleaning filters and checking for leaks, to keep the systems running efficiently.
3. **Encourage Natural Ventilation:** Promote the use of natural ventilation during cooler months to reduce the reliance on air conditioning.

Computer and Electronic Equipment:

1. **Use Power Strips and Timers:** Encourage the use of power strips and



timers to ensure that all computers and electronic equipment are turned off when not in use.

2. **Upgrade to Energy-Efficient Devices:** Replace old desktop computers with energy-efficient laptops or all-in-one PCs, which use less power.
3. **Educate Users on Energy Efficiency:** Conduct awareness sessions for students and staff on turning off computers, monitors, and other devices when not in use.

Water Pumps and Coolers:

1. **Install Timers on Water Pumps:** Set water pumps to operate only during necessary hours to reduce electricity consumption during off-peak hours.
2. **Upgrade to Energy-Efficient Pumps and Coolers:** Use energy-efficient water pumps and coolers that consume less electricity for the same output.

Lab Equipment:

1. **Implement 'Shut-Down' Procedures:** Establish standard operating procedures for laboratory staff to ensure equipment is turned off when not in use.
2. **Invest in Energy-Efficient Lab Equipment:** Upgrade laboratory equipment to models that are designed to consume less electricity.

Behavioral and Awareness Measures:

1. **Energy Awareness Campaigns:** Launch an ongoing energy conservation campaign to raise awareness among students, staff, and faculty about the importance of turning off equipment when not in use and adopting energy-efficient practices.
2. **Energy Conservation Competitions:** Organize friendly competitions between departments to encourage energy-saving behaviors and track improvements.

Suggestion and Recommendation

From Physical observation and data analysis team recommended following



points:

- Upgrading of technologies in Laboratory equipment's.
- Replacing old electrical cables in some places in administrative block and science block for safety and power loss.
- Replacement of CFL bulb with LED.
- Replacement of LCD monitors with LED.
- Use of master switch outside each room to save energy.
- Old appliances should replace to reduce energy consumption.
- Replacement of old generation computer and TV with LED.
- MCB panel in each department for safety and to reduce power consumption.
- Installation of Diesel Generator in Administrative block to reduce annual electric bill.

Conclusion

Considering the fact that the organization is a well-established, long time run establishment with good reputation, there is significant scope for conserving energy and made the campus as self-sustained in of the energy conservation initiative taken by the institution are sustained. The energy efficiency lighting schemes awareness among stake holder and necessary power backup are being practiced by the institution. Electrical wire, switch board, stabilizer and WIFI switch is properly covered. In new arts block the electrical wiring (cable), switch, panel board, WIFI switch and etc are properly installed so that there is minimum power loss. Solar energy production in arts block to reduce electric bills almost zero. Administrative block and Science block in some place's cables are weak and of needs replacement to avoid energy loss. Each block needs installation



of meter and panel system in each department to avoid loss of energy. The roof top solar panel should be operational in administrative block to reduce electric energy load. It is better for conceal wiring in administrative block and science block to reduce power loss. Steps may be taken to install roof top solar panel in new science block to save energy bill. The overall electrical system in the college is satisfactory and needs further improvement.

By adopting the recommended energy-saving measures, the college can significantly reduce its electricity consumption, lower operational costs, and contribute to a more sustainable campus. Through consistent monitoring, staff and student engagement, and strategic investments in energy-efficient systems, the college can make meaningful strides toward reducing its environmental impact and achieving its energy conservation goals.



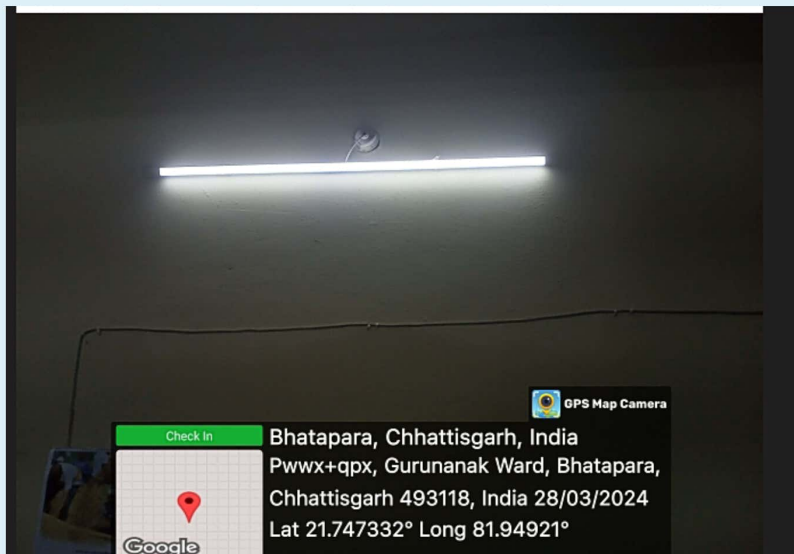
Generator set




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Solar light



LED light


प्रचार्य
शा. म. न. स्ना. कने. महाविद्यालय भाटापारा
जिला खलौदाबाजार-भाटापारा (छ.ग.)



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