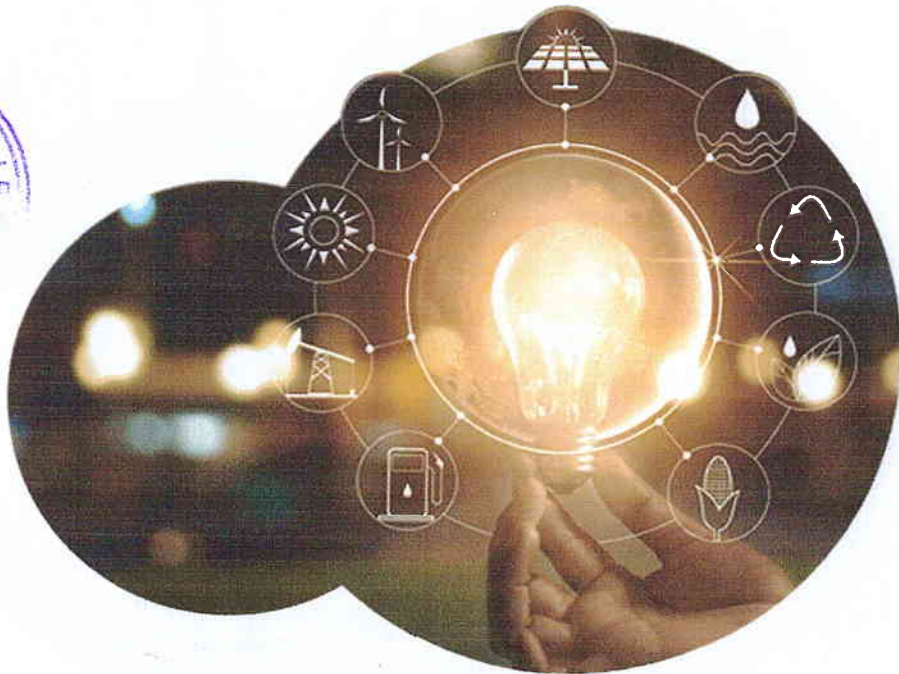




# ENERGY AUDIT REPORT

Year: 2023-2024

KARANJIA AUTONOMOUS COLLEGE, KARANJIA, MAYURBHANJ  
(MAHARAJA SRIRAMCHANDRA BHANJA DEO UNIVERSITY)



Conducted By

- Dr. Laxmi Kanta Mishra, Lect.in Physics
- Dr. Sibadatta Senapati, Lect.in Chemistry.
- Sri Souranshu Parida, SDO Karanjia Electrical Subdivision, TPNODL

## PREFACE

Energy has been known as a vital and balancing factor in the indices for sustainable development since the Earth Summit in 1992. Especially in the contemporary scenario, it is acknowledged that the heavy and unbalanced energy consumption adversely affects energy price and economic growth, and most countries now give priority to energy conservation methods. 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 and an action plan to reduce energy consumption. It facilitates a orderly 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 energy audit of Karanjia (Auto) College was carried out by an energy committee (Faculties of Physics and Chemistry) on behalf of IQAC, under the supervision of the Energy Audit team. This report is our effort 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 possible solutions based on the outcome of our analysis of data, and our recommendations, which can be executed wholeheartedly in the campus in order to ensure reducing energy waste and maximizing energy potential. We hope in all intense that these will be given its due and that the audit will be fruitful in terms of energy conservation.

## ENERGY AUDIT TEAM

1. Dr Laxmi Kanta Mishra, Lecturer in Physics

2 Dr Sibadatta Senapati, Lecturer in Chemistry

Supported by all faculties of Science, Arts Commerce department and coordinated by IQAC, Karanjia (Auto) College, Karanjia.



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## 1. Introduction

- **Name of the College** : Karanjia Autonomous College  
Karanjia, Mayurbhanj, pin-757037
- **University recognition** : Maharaja Sriram Chandra Bhanja Deo  
University  
Baripada, Mayurbhanj, Odisha
- **Campus area** : 15 acres
- **Date of establishment** : 1<sup>st</sup> July 1964
- **Brief History:** Karanjia (Auto) College is a pioneer Institution of higher education, is located about 130 kms to the MSCB University, Baripada on the heart of Mayurbhanj district. This college is established in 1<sup>st</sup> July 1964 with the permission from the Uttkal University of Bhubaneswar, and later affiliated by MSCB University under UGC Act 1956 under section 2(F) and 12(B). The College offering a large number of subjects in Arts and Science and Commerce stream in the Under Graduate level, and has been able to attract students from the entire North Eastern region. This college has been re-accredited with “B” Grade() by NAAC in 2024.

## 2. Energy Auditing

Energy auditing is a routine procedure of observing power consumption of the institute performed on annual basis. According to Energy Conservation Act, 2021, Energy Audit is defined 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 and an action plan to reduce energy consumption”. For the fruitful implementation of an energy efficient campus, Karanjia (Auto) College has focused a lot on the improvement and consciousness among the students, teachers, and other members of the institution on Energy alternatives such as solar energy. As the issue of saving our environment has attained a global prominence in the present time, Karanjia (Auto) College has also taken it extremely essential to work sincerely in the matter of environment consciousness with green energy initiatives. In it strive for a clean, green and energy efficient campus, every possible step is taken by every member or cell of the institution to create a sense of responsibility




among the students pertinent to the sustenance of healthy environment in the form of various programmes and project works

### 3. Energy Consumption Data

The electricity supply for Karanjia (Auto) College is provided by Tata Power Northern Odisha Distribution Limited (TPNODL). The energy consumed by Karanjia (Auto) College falls under HT public purpose(Education) Category. The Contracted Demand is 18 KW and the connected load voltage is 11 KV. The energy consumption of the whole campus is facilitated through a Transformer having rating of 63 KVA.

### 4. Consumer details



Name of the Consumer	Tariff Category	Consumer Account No
Karanjia (Auto) College(Main Supply)	HT (Public purpose ,Education Sector)	523201340215
Girls Hostel-1(Gadabari Hostel)	HT(Commercial)	523221161016
Girls Hostel-2(Narmoda Hostal)	HT(Commercial)	523221162159
Ugc Women Hostel	HT(Commercial)	523221163618
Boys Hostel-1	HT(Commercial)	523201340215
Boys Hostel-2	HT(Commercial)	523221010445

The energy efficiency assessment was conducted for the load connected to the mains supply.

Generally the electric energy is used for the following purposes:

- Lighting's load
- Fan
- Air conditioners
- Water pump
- Science lab equipment
- Computers
- Smart board

## 5. Monthly Energy Consumption (2023-2024)

### For Whole College (Except Hostel)

Month	kVAh	PF	kWh	Total Current Bill(Rs)
June-July-2023	5282	0.99	5229	30,901
August-2023	4576	0.99	4530	26,775
September-2023	5037	0.99	4986	29,468
October-November-2023	4689	0.99	4642	27436
December-2023	3982	0.99	3942	23300
January-2024	3777	0.99	3739	22100
February-2024	4081	0.99	4040	23875
March-2024	5055	0.99	5004	29576
April-2024	5752	0.99	5694	33,654
May-2024	5238	0.99	5185	30,643
Total	47469		46991	277,728

### Girls Hostel-1(NARMADA)

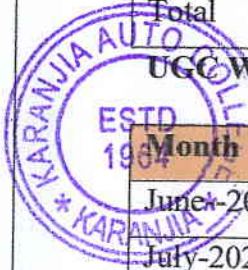
Month	kVAh	PF	kWh	Total Current Bill(Rs)
June-july-2023	598	0.99	592	3500
Aug-November-2023	4888	0.99	4840	28600
Dec-Jan -2023-24	1805	0.99	1787	10560
Feb-March-2024	883	0.99	874	5170
April-2024	1132	0.99	1121	6626
May-2024	894	0.99	885	5234
Total	10200		10099	59690

### Girls Hostel-2(GADABARI)

Month	kVAh	PF	kWh	Total Current Bill(Rs)
June--2023	245	0.99	243	1437
July-2023	502	0.99	497	2938

August-2023	807	0.99	798	4721
Sept-2023	717	0.99	710	4198
Oct-2023	808	0.99	800	4729
November-2023	451	0.99	447	2644
December-2023	448	0.99	444	2625
January-2024	519	0.99	514	3038
February-2024	434	0.99	430	2544
March-2024	944	0.99	935	5527
April-2024	643	0.99	637	3767
May-2024	59	0.99	58	346
Total	6577		6513	38514

**UGC Women Hostel**



Month	kVAh	PF	kWh	Total Current Bill(Rs)
June-2023	672	0.99	666	3937
July-2023	1302	0.99	1289	7619
August-2023	2323	0.99	2299	13590
Sept-2023	1670	0.99	1653	9773
Oct-2023	2413	0.99	2389	14119
November-2023	1236	0.99	1224	7236
December-2023	1030	0.99	1019	6031
January-2024	1198	0.99	1186	7010
February-2024	815	0.99	806	4768
March-2024	1907	0.99	1888	11158
April-2024	1947	0.99	1928	11395
May-2024	199	0.99	197	1166
Total	16712		16544	97802

**Boys Hostel-1**

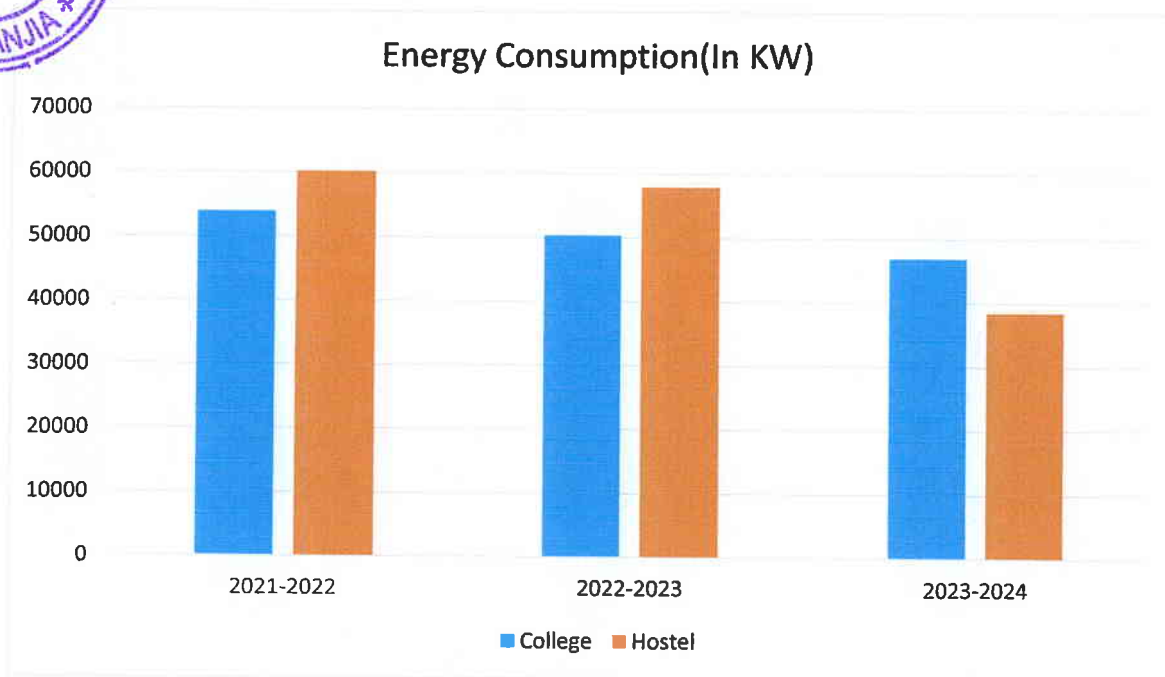
Session	Total Current Bill(Rs)
2023-2024	12,000(approx. )



## Boyes Hostel- 2

Month	kVAh	PF	kWh	Total Current Bill(Rs)
July-Sept-2023	1321	0.99	1308	7732
Oct-Nov-2023	1193	0.99	1181	6981
Dec-2023	552	0.99	547	3234
Jan-2024	574	0.99	568	3361
Feb-March2024	1092	0.99	1081	6392
April-May-2024	667	0.99	660	3904
Total	5399		5345	31604

### Comparative analysis of power consumption to previous year



From above data it is clearly observed that the rate of consumption of electrical energy is going on decreasing due to the replacement of some old wiring, led bulb replacement and other low wattage electrical appliances in the college and hostel.

**Equipment wise power consumption of all departments of college (total watt)**

Department	Tube light	LED tube	LED bulb	CFL	FAN	AC	Aqua guard	Lab instrument	Computer with printer	Total wattage
Physics	0	360	150	80	1200	0	0	1000	140	2930
Chemistry	0	20	200	80	480	0	40	1500	200	2530
Mathematics	0	20	20	40	180	0	0	0	0	260
Botany	0	180	70	40	840	0	0	2000	140	3270
Zoology	0	180	100	40	420	0	0	300	0	1040
New Academic Block	0	1680	0	0	4800	0	300	0	0	6780
IT lab	0	40	20	0	120	0	0	100	1200	1480
Arts Block	40	360	0	20	2100	0	0	0	0	2500
Commercee Block	0	60	20	0	240	0	0	0	0	320
Common class(25,26)	0	180	0	0	1200	0	0	0	0	1380
14 Smart board	0	0	0	0	0	0	0	0	0	2800
New 5T class room(27,28,29,30)	0	750	0	0	3000	0	0	0	0	3750
E library	0	120	0	0	800	0	0	0	3300	4220
Conference room	0	0	500	0	2100	0	0	0	0	2600
Office (Head Clerk)	0	80	60	0	480	1000	0	0	250	1870
Principle office	0	60	80	0	240	2000		0	280	1980
Library	0	360	0	0	480	0	0	0	140	980
Exam section	0	60	30	0	300	1000	0	0	320	1710
SAMS+Scholarship	0	20	30	0	120	1000	0	0	280	1450
NCC office	0	60	20	0	120	0	0	0	0	200

Indoor Stadium	0	0	0	480 (hlgn)	360	0	0	0	0	840
Language Lab	0	0	50	20	300	2000	0	0	80	2450
Girls Hostel-1	0	740	250	0	1500	0	160	0	0	2650
Girls Hostel-2	0	240	220	0	540	0	40	0	0	1040
Ugc Women hostel	0	560	500	100	1980		230	0	0	3450
Boyes hostel-1	0	0	180	0	480	0	0	0	0	660
Boyes hostel-2	0	420	390	0	1560	0	40	0	0	2410
Total	40	6550	2890	120	25940	0	470	4900	6330	57550



### Approximate average power Consumption in a month (in%)

Block	Consumption%
Science Block	27.18
Arts Block	8.7
Commerce Block	4.72
New Academic Block	15.3
Administrative Bock	16.77
Library and e library	3.82
Hostel	23.11
Others	5.88

## 6. Major Findings

- **Establish energy consumption in the organisation**

- (a) The science block record the highest consumption based on end use.
- (b) The Hostels record the highest rate of consumption.
- (c) Laboratory equipment show the highest rate of consumption equipment-wise
- (e) The time slots in the Afternoon record the highest consumption on a normal working day.

- **Identify the easiest areas of attention**

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

- (a) Old wiring cables in many parts of the campus leading to loss of energy
- (b) Old water pipelines in several parts of the campus leading to waste of energy
- (c) Use of incandescent bulbs in certain rooms
- (d) Electric supply still depending on State Electricity Board, instead of solar panels
- (e) Use of old equipment such as refrigerators in laboratories
- (f) Uneven lighting facility certain classrooms are under-illuminated, certain classes have more lights than required.

- **Estimate the Scope for Saving**

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

- (a) Updating of technologies in laboratory equipments.
- (b) Replacing old electrical cables and pipelines
- (c) Ensuring even lighting facilities in rooms.
- (d) Use of Solar panels as a main source of lighting, especially common areas and grounds. (e) Replacing old gadgets in laboratories.

- **Identify immediate areas of improvement**

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

- (a) Replacing solar light in all around the campus.
- (b) Repairing and updating laboratory equipment.
- (c) Encouraging students and staff to switch off electrical gadgets and turn off the electrical switch in day tim when not in use.

- **Identify areas of more detailed study**

The study could also identify certain areas that necessitated more detailed study and long-term planning. These were

- (a) Planning the electrical wiring more efficiently, doing away with unused power points and redundant electrical gadgets.
- (b) Installing solar panels in possible buildings/ blocks.

## **7. Energy conservation**

With the rising awareness on the necessity to save energy, the college has resorted to ways and means for saving electricity. Efforts are made to shift to solar energy phase wise.


- The classrooms and laboratories are in such manner that they allow sufficient light and air during class hours and as a result, much electricity is saved.
- In its drive for saving energy, Karanjia (Auto) College has taken steps to replace all existing bulbs and lights with LED lights phase wise. In fact, all newly constructed buildings have been equipped with LED lights and 5-star rating ceiling fans with a view to reducing the consumption of energy.
- The campus also has a total 14 solar street lights installed in various places. Each of solar streetlights are having power of 20-30 Watt.

## **8. E-waste management**


E-wastes such as damaged computer parts, batteries, electronic items, electrical appliances, empty toner containers, are disposed as scrap and given away to agencies and the NAC, that recycle such products.



# SOME PICTURE DURING ENERGY AUDITING PROCESS



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## BILL OF SUPPLY FOR ELECTRICITY

**Area Details**


Division : RED RAIRANGPUR  
Sub-Division : SDO KARANJIA  
Section : ESO KARANJIA NO-1  
DT No. :  
Pole No. :  
MRU No. :  
Walking Sequence :  
Organization Type :  
Connection Type :

**Connection Details**

Tariff Category : SPECIFIED PUBLIC PURPOSE  
Category Type : HT  
Contract Demand : 50 KW  
Supply Voltage : 11 KV  
Own Transformer : NO  
ED Exemption : YES  
Date of Connection : 04/09/2015  
Security Deposit : 1,54,360.00  
Metering Side : HT  
Consumer Status : Active  
Transformer Rating : 63 KVA

**Supply and Meter Details**

Power Factor : 0.9974  
Power ON Hour : 816  
Billable Demand-KVA : 26,000  
Meter Sl. No. : TPNB4329  
Col. Meter No. :  
Bill Period : 25/06/2023 - 28/07/2023  
Bill Days/Months : 34/1,0000  
Load Factor : 20.6200  
Meter Reading : ACTUAL METER  
Main Meter MF : 100.00



**Meter Reading Details**

Parameter	Prev Reading	Current Reading	Diff	T.F.L. (Ks)	Total
	89,3000	127,6000	38,5000	0.00	3,660,0000
	89,5000	128,2000	38,7000	0.00	3,870,0000
	0,1720	0,2270	0,0000	0.00	22,7000

**Due Date: 17/08/2023**  
(Immediate for Arrears)  
Total Amount Payable  
Rs. 30,901.00  
Net Current Payment after Digital  
Rs. 30,085.00

Bill Amt (Rs.)	Pymt Recvd (Rs.)	Rebate (Rs.)	Gr. Sundry Adj. (A)	Net Arrear (Rs.)	Net Payable Amount
69,219.20	68,808.00	213.81	0.00	197.99	Before Rbf. Dt (Rs.)
30,389.50	314.12	0.00	0.00	0.00	After Rbf. Dt (Rs.)

**Current Bill Details**

Slab	Unit	Rate	Amount
1	1 KVAH	3870	22,639.50

Particulars	Amount
1. Bill Rev Adj(B)	0.00
Debit	0.00
Credit	0.00
2. Interest on SD(After TDS)	0.00
3. Total Current Bill(Aft Adj/Inst)	30,389.50
4. Rebate Allowable	303.90
Prompt Payment+Rural+Special Rebate	0.00
5. Net Current payment after Rebate	30,085.60
Digital Payment Rebate	0.00
6. Net Current payment after Digital	30,085.60
7. Gross Subsidy Charges	0.00
8. Disputed Amount	0.00
9. Last Rebate Allowed	0.00
10. ASD Claimed	213.81
Message	0.00
11. Meter Rent	1,000.00
12. Customer Service Charge	260.00
13. R.I. Surcharge	0.00
14. Tax Collection at Source	0.00
15. Current Total (11+12+13+14)	30,389.50

**Division Office**  
THE MANAGER-ELECT. RED, RAIRANGPUR, MAYURBHANJA PIN-751043

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J. Mohant  
Principal  
Karanjia Autonomous College  
Karanjia, Mayurbhanj, 17.8.23

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*Accountant  
Make payment  
J. Mohant  
17.8.23*

*R. Khatke  
Make payment  
16/8/23*

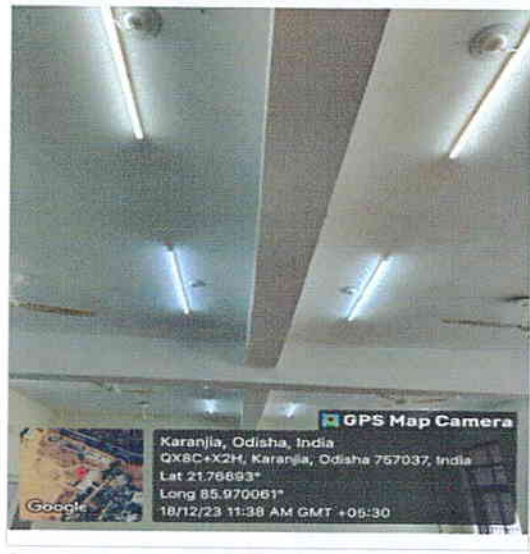
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 Sotransan Parida  
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