



ENERGY AUDIT REPORT

Year: 2021-2022

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



Conducted By

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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 Sibadatta Senapati, Lecturer in Chemistry

2. Dr Laxmi Kanta Mishra, Lecturer in Physics

Supported by all faculties of Science, Arts Commerce department and co-ordinated 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** : 1st 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 1st 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 2016.

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
GirlsHostel-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
- Computer

5. Monthly Energy Consumption (2021-2022)

For Whole College (Except Hostel)

Month	kVAh	PF	kWh	Total Current Bill(Rs)
June-2021	2870	0.98	2813	17800
July-2021	3048	0.98	2988	18900
August-2021	4483	0.98	4395	27800
September-2021	4596	0.97	4458	28500
October-November-2021	4394	0.98	4306	27,241
December-2021	4639	0.97	4598	28765
January-2022	3513	0.98	3443	21786
February-2022	3909	0.99	3869	24,241
March-2022	3839	0.98	3762	23,802
April-May2022	6889	0.97	6682	42,717
June-2022	3293	0.98	3227	20,418
July-August-2022	9619	0.97	9330	59,643

Girls Hostel-1

Month	kVAh	PF	kWh	Total Current Bill(Rs)
June-August-2021	9382	0.96	9006	58,165
Sept-2021	863	0.97	837	5353
October-2021	682	0.98	668	4478
November -2021	1029	0.98	1008	6629
Dec-21-January-22	839	0.98	822	5451
February-2022	929	0.98	910	5759
March-August-2022	8064	0.98	7902	50,000

Girls Hostel-2

Month	kVAh	PF	kWh	Total Current Bill(Rs)
August-Sept-2021	1726	0.96	1656	10,707
Sept-November-2021	579	0.97	561	3,590
December-2021	397	0.98	389	2,463
Jan-Feb-2022	1753	0.98	1718	10,874
Feb-March-22	366	0.98	358	2270

March-August-2022	3131	0.98	3068	19,416
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UGC Women Hostel

Month	kVAh	PF	kWh	Total Current Bill(Rs)
August-Sept-2021	4275	0.96	4106	26,510
Sept-November-2021	2669	0.97	2589	16,550
December-2021	1836	0.98	1799	11,385
Jan-Feb-2022	3052	0.98	2991	18,927
Feb-March-22	1617	0.98	1585	10,030
March-August-2022	7541	0.98	7302	46,200

Boys Hostel-1

Session	kVAh	PF	kWh	Total Current Bill(Rs)
2020-2021	1935	0.98	1896	12,000
2021-2022	1935	0.98	1896	12,000

Boyes Hostel- 2

Month	kVAh	PF	kWh	Total Current Bill(Rs)
August-Sept-2021	4258	0.96	4087	26400
Sept-November-2021	2750	0.97	2667	17050
December-2021	665	0.98	651	4426
Jan-Feb-2022	169	0.98	165	1422
Feb-March-22	1958	0.98	1918	12,570
April-2022	1476	0.98	1446	9,676

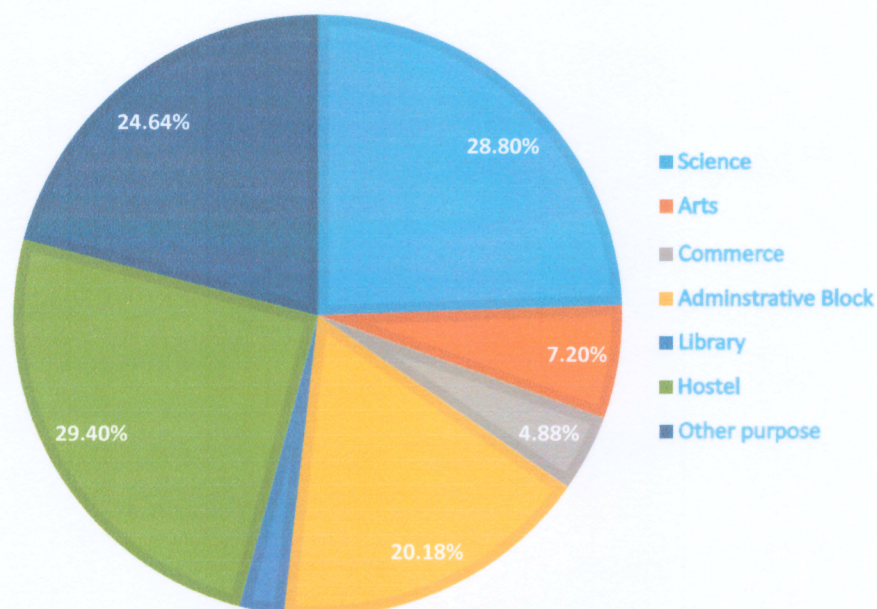
Equipment wise power consumption of all departments of college (total watt)

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
IT lab	0	40	20	0	120	0	0	100	1200	1480
Arts Block	40	360	0	20	2100	0	0	0	0	2500
Commerce Block	0	60	20	0	240	0	0	0	0	320
Common class(24,2526	0	180	0	0	1200	0	0	0	0	1380
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	4000	2390	900	15240	7000	510	4900	3030	37400

Approximate average power Consumption in a month (in%)

Block	Consumption%
Science Block	28.88
Arts Block	7.2
Commerce Block	4.88
Administrative Bock	20.18
Library	2.82
Hostel	29.4
Others	24.64

POWER CONSUMPTION BLOCK WISE



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) Replacing incandescent bulbs with LEDs.
- (d) Ensuring even lighting facilities in rooms.
- (e) Use of Solar panels as a main source of lighting, especially common areas and grounds.
- (f) 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 incandescent bulbs with LEDs
- (b) Repairing and updating laboratory equipments.
- (c) Encouraging students and staff to switch off electrical gadgets and turn off the water taps 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



Fig-1 Power supply source
Transformer

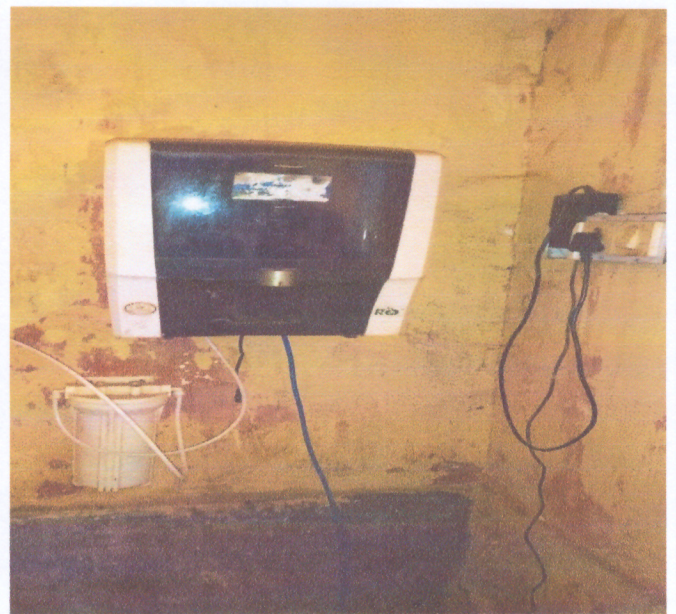
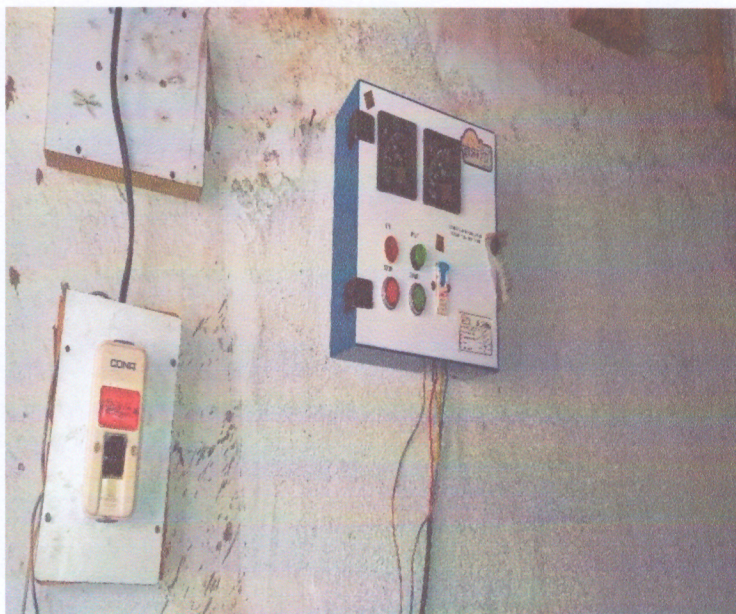


Fig-2 Water pump supply and low
wattage aqua guard



Fig-5 Solar Street Light and Led ball



Fig-6 Conservation of energy during day with open window

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