

**ENERGY AUDIT REPORT
OF
SONARI COLLEGE CAMPUS**



**SONARI COLLEGE
2022-2023
SONARI, CHARAIDEO, ASSAM**

PREFACE

Energy Audit of the Sonari College campus was initiated by a committee and it was formed by the principal of the college. A formal energy audit survey was done for the session of 2022-2023 within the college campus. It is important to mention here that an energy audit is a study of a plant or facility to determine how and where energy is used and to identify methods for energy savings. The main objective of this formal energy audit was to improve the energy efficiency of the campus and reduce energy consumption of the campus. However, the audit tried to identify some of the daily practices energy efficient appliances which will become helpful to reduce energy consumption.

Significantly, energy has been identified as a crucial and balancing factor in the indices for sustainable development since the Earth Summit in 1992. Now a day, it is seen that due to the development of science and technology the consumption percentage of energy is increasing day by day in everywhere of the world. That is why; this formal energy audit tries to make a humble attempt to improve energy consumption percentage within the Sonari College campus. The report primarily accounts for the consumption of energy of the academic area, Girls Hostel, Boys Hostel, Library, KKHSOU centre and the Canteen area. The work encompasses the area-wise energy consumption of the campus. The report is based on certain generalizations and approximations wherever necessary.

Energy Audit Team
Sonari College

Members of the Energy Audit Committee of Sonari College

The Energy Audit report of the college was prepared by the following members.

Convener:

Dr. Bikash Kumar Sarmah, Assistant Professor, Department of Chemistry

Members:

1. Dr. Lucky Chetia, Assistant Professor, Department of Political Science
2. Mrs. Gitika Talukdar, Assistant Professor, Department of Education

DETAILS OF CONSUMER

Consumer Details

The Principal,
Sonari College
Dhador Ali, Sonari
Sibasagar

Connected Load	30.00 kW
Contract Demand	35.00 kVA
Installation No	5000705942
Consumer Account No	196000000594
MRU	M1 32HDU1
Tariff Category	HT IV BULK SUPPLY (OTHERS)
Old Consumer No	64000002012
Pole No	132DU1TMP

1. Introduction

Consumption of energy is a basic requirement for the development of different sectors of economy like agriculture, industries, transport and communication etc. With the ever-increasing population of India, reaching up to 140 crores, evidently, the need of energy will only increase in upcoming future. Now about 70% of the energy required in India is produced from fossil fuels whose resources are depleting with time. Again, burning the fossil fuels means elimination of greenhouse gases like CO₂ which in turn contribute to the global warming. So, it is of utmost necessity that people understand the need for efficient utilization of energy and alternative greener energy sources. One of the basic requirements for this to carry out an energy audit, which is defined according to Energy Conservation Act, 2001 as “the verification, monitoring and analysis of use of energy including submission of technical report containing recommendation for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption”. An energy audit can help to figure out the efficient ways of energy utilization by depicting all requirements an institution needs.

2. Scope of the Study

2.1. Assess the actual operating load and scope for optimizing the same

- Review of present electrical load in the campus
- Assess the buildings wise electrical load

2.2. Study the energy conservation option in lighting system

- Review of present lighting system, lighting inventories and estimate the lighting load in different rooms, floor, corridor, outside the buildings, playground and other locations of the college campus.
- Detail lax level study at various locations and comparison with acceptable standards.
- Highlight the present lighting system and find out different ways for its improvement
- Exploring new energy conservation option in lighting system.

2.3. Energy Conservation in Air Conditioning and water pumping

- To observe details of energy consumption
- Exploring new energy conservation option

3. Methodology:

The following methods are followed for performing the energy audit of the college campus.

3.1. Survey of the campus:

First of all, all relevant data were collected which have been chosen as first hand data regarding energy consuming devices and equipments.

3.2. Document Review:

The committee reviewed all the related documents like electricity bills, original vouchers of the equipments and other documents which are available in the college.

3.3. Utility Analysis:

The study also covers the energy utility in the college premises. It includes energy usage, energy demand and energy consumption pattern of the college.

4. About the College

Sonari College is one of the pioneer higher educational institutes in Charaideo district. It is situated in the heart of the Sonari town with a total campus area of 20 bighas. This pioneering institution was established on 5th August, 1970 and offers higher secondary and graduate courses in two streams i.e., arts and science. All the teachers and students' fraternity of this college is well-aware of the need of efficient energy usage and is working continuously towards environmental wellness by adapting green energy initiatives.

5. Monthly energy consumption:

During 2022-23

Month	kWh	PF	Maximum demand (kVA)	Total current bill (Rs)
April-22	3173.39	0.99	25.92	32906
May-22	5066.5	0.99	32.9	48200
June-22	6467.43	0.99	34.84	59215
July-22	8077.28	0.99	39.0	75694
August-22	6348.71	0.99	43.65	67866
Sept-22	8504.4	0.998	44.26	85957
Oct-22	4405.28	0.997	36.09	44668
Nov-22	3081.37	0.995	17.28	33087
Dec-22	2696.52	0.98	15.6	30598
Jan-23				25997
Feb-23	2662.51	0.99	12.88	30014
March-23	3023.53	0.99	14.1	34282

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The college has celebrated its Golden Jubilee during the month of September, 2022. The preparation for the grand celebration of the program has led to the increase in the consumption of electricity which is reflected in the monthly consumptions of June, 2022 to September, 2022. Other than that, the monthly consumption of energy is mostly lower compared to the previous year.

6. Building-wise energy consumption in the college premises

6.1.College gate

Appliance	Power consumption
Light	96 W
Halogen	50 W
Fan	100 W

6.2.Canteen

Appliance	Power consumption
Light	54 W
Fan	1300 W
Aquaguard	100 W
Refrigerator	750 W
Water pump	1000 W

6.3.Auditorium

Appliance	Power consumption
Light	162 W
Halogen	100 W
Fan	1400 W
Sound system	200 W

6.4. Office of the Principal

Appliance	Power consumption
Light	83 W
Sensor light	9 W
Fan	400 W
Air-conditioner	1000 W
Printer	30 W
Inverter	900 W

6.5. Office of the Accountant

Appliance	Power consumption
Light	55 W
Fan	300 W
Air-conditioner	1000 W
Xerox machine	1300 W

6.6. Office

Appliance	Power consumption
Light	112 W
Sensor light	9 W
Fan	600 W
Air-conditioner	2000 W
Computer	600 W
Printer	30 W

6.7. Teacher's Common Room

Appliance	Power consumption
Light	334 W
Sensor light	18 W
Fan	700 W
Aquaguard	19 W

6.8. IQAC Room

Appliance	Power consumption
Light	18 W
Fan	200 W
Air-conditioner	1000 W

6.9. Library

Appliance	Power consumption
Light	405 W
Fan	2900 W
Computer	1600 W
Water heater	1000 W
Xerox machine	1300 W
Sound system	200 W

6.10. Exam branch

Appliance	Power consumption
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Light	63 W
Fan	400 W
Computer	200 W
Printer	30 W

6.11. Student Union room

Appliance	Power consumption
Light	9 W
Fan	100 W

6.12. Boy's Common Room

Appliance	Power consumption
Light	36 W
Fan	400 W

6.13. Girls' Common Room

Appliance	Power consumption
Light	54 W
Fan	800 W
Aquaguard	100 W

6.14. Exam Zone

Appliance	Power consumption
Light	117 W
Fan	600 W

6.15. KKHSOU centre

Appliance	Power consumption
Light	45 W
Fan	500 W
Computer	200 W
Printer	30 W

6.16. Virtual Classroom

Appliance	Power consumption
Light	336 W
Fan	600 W
Air-conditioner	2000 W

6.17. Computer science laboratory

Appliance	Power consumption
Light	96 W
Fan	700 W
Air-conditioner	2000 W
Computer	6400 W

6.18. Department of Assamese

Appliance	Power consumption
Light	18 W
Fan	400 W
Water heater	1000 W

6.19. Department of English

Appliance	Power consumption
Light	18 W
Fan	200 W

6.20. Department of Political Science

Appliance	Power consumption
Light	15 W
Fan	100 W

6.21. **Department of History**

Appliance	Power consumption
Light	9 W
Fan	100 W

6.22. **Department of Economics**

Appliance	Power consumption
Light	27 W
Fan	400 W
Projector	280 W

6.23. **Department of Education**

Appliance	Power consumption
Light	18 W
Fan	200 W

6.24. **Department of Botany**

Appliance	Power consumption
Light	108 W
Fan	600 W
Refrigerator	750 W

6.25. **Department of Chemistry**

Appliance	Power consumption
Light	265 W
Fan	900 W
Refrigerator	750 W

6.26. **Department of Mathematics**

Appliance	Power consumption
Light	18 W
Fan	400 W
Computer	2200 W

6.27. **Department of Physics**

Appliance	Power consumption
Light	121 W
Fan	1700 W
Refrigerator	750 W

6.28. **Department of Zoology**

Appliance	Power consumption
Light	189 W
Fan	1300 W
Refrigerator	750 W

6.29. **Classrooms**

Appliance	Power consumption
Light	689 W
Fan	7900 W
Sound system	200 W

6.30. **Tea Stall**

Appliance	Power consumption
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Light	15 W
Fan	100 W
Electric heater	1500 W

6.31. Boy's Hostel

Appliance	Power consumption
Light	225 W
Fan	2500 W
Aquaguard	19 W
Water Pump	1000 W

6.32. Girls' Hostel

Appliance	Power consumption
Light	1377 W
Fan	5700 W
Aquaguard	19 W
Water pump	2000 W
Water heater	3000 W

6.33. Quarter of Warden, Girl's Hostel

Appliance	Power consumption
Light	108 W
Fan	800 W
Inverter	900 W
Refrigerator	750 W

6.34. For general use

Appliance	Power consumption
Street Light	60 W
Water Pump	1000 W
Close Circuit Camera	200 W

The college has a total of 3 DG sets with cumulative load of 52 kW (2 sets with 20 kW and one with 12 kW) which are used during load shading from APDCL. There are also 3 sets of online UPS installed (two with 7.5 kVA capacity and one with 3 kVA capacity) in the Library, Computer Science Laboratory and the Mathematics department.

With a step towards a greener campus, the college premise also boasts of 8 solar street lights. Each of the solar street lights has power of 20-30 W. As was our goal, the college has also installed 4 sensor light bulbs in different parts of the campus.

7. Recommendations for Energy Savings

Based on the energy audit the followings have been recommended for improving energy efficiency of the campus.

7.1. Use of sensor: It is observed that there is no any Motion Sensors in Corridors and Toilets. All of us know that use of motion sensor in corridor areas and toilets can reduce energy consumption percentage. Motion sensors would detect the presence of any movement within its range which would trigger the power on/off system, thereby, helping in reducing undesired energy consumption. We have already progressing in this direction by installing 4 bulbs with motion sensors within campus.

- 7.2. Better Practices for A.C:** Sonari College has a total of seven numbers of Air Conditioners. During the time of audit, it is observed that all are not running in regular manner. The college family uses the most of the air conditioners occasionally. Therefore, it is recommended that the air conditioners used should be 5-star rated air-conditioners.
- 7.3.** It is seen that in some of the areas, 40 W FTL and CFLs have been used, so it is necessary to replace them with more efficient LED lights.
- 7.4.** It is noticed that all water pumps are not properly submersible. So, it is important to submerge all the water pump equally especially at the underground level.
- 7.5.** To reduce the energy consumption percentage of the college campus, it is necessary to plant solar system within the college campus.
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Fig 1: Solar street light



Fig 2: Diesel generator



Fig 3: Transformer