

**Azad College of Education Energy Audit Report**  
**Of**  
**Rayat Shikshan Sanstha's**  
**Azad College of Education Satara-415001**  
**Energy Audit of the Year: 2017-18 to 2021-22**



**By**

**Prof. Er. Dr. EA. Dhananjay Bhagawandas Devi,**

**M.Tech.( Energy Tech.) ,B.E. ( Electrical), E. Å., D.C.S., D. N., M.I.E.,**

**Certified Energy Auditor (BEE) (EA-6470)**

**Doctor of Naturopathy & Magneto Therapy**

**Member: Indian Society of Heating, Refrigerating & Air Conditioning Engineers, New Delhi**

**Life Member: Indian Society for Technical Education, New Delhi**

**Associate Professor, Electronics & Telecommunication Engineering Department**

**Rayat Shikshan Sanstha's Karmaveer Bhaurao Patil College of Engineering, Camp- Satara-415001.**

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## Acknowledgement

The Energy and specifically electrical energy is the cleanest source of energy and getting utilized to the highest extent due to flexibility and effective utilization. Conservation of energy does not mean to limit the use of energy but to use it most effectively, efficiently and optimally.

The purpose of preliminary energy audit is to confirm whether the energy is used effectively, efficiently and optimally. Another focus is to identify the areas of Energy Conservation and to suggest measures to conserve the same.

The initiative of Rayat Shikshan Sanstha's Azad College of Education , Satara towards Carrying out Energy Audit is deeply appreciated and is indicative of institute's keen attention towards conservation of energy.

The Energy Audit team of Karmaveer Bhaurao Patil College of Engineering Camp, Satara, is thankful to the Principal Dr. Mrs. V. S. Nalawade, Prof. A.B. Patil, Prof. Kharat, Shri. Salunkhe Rohit, Shri. Kale R.J. Smt. Payal Kshirsagar, supporting staff of Azad College of Education Satara for the cooperation.

  
15/07/2022

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Associate Professor, Electronics & Telecommunication Engineering Department,

Rayat Shikshan Sanstha's, Karmaveer Bhaurao Patil College of Engineering, Camp- Satara-415001



Dr. A.C. Attar,

Principal

Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil College of Engineering,

Camp- Satara-415001



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## Executive Summery

The preliminary energy audit report is submitted of the various electrical installations of various locations, laboratories of Rayat Shikshan Sanstha's Azad College of Education, Satara, a premier Education, Teaching methodology institute

The major and most of energy utilization is in the form of electrical energy and hence audit of electrical energy is primary consideration.

The objective of this audit is to assess primarily the electrical installations in the institute buildings, campus and suggest energy conservation majors. The electrical installations of this institute had not been assessed for its electrical power utilization since 2017.

During this preliminary energy audit; electrical equipments, laboratory equipments and lighting systems are reviewed on 13/07/2022 & 14/07/2022.

## Summary of observations and recommendations

1. The energy audit conducted is a preliminary energy audit.
2. Electrical power utilization is mainly for lighting and utilities.
3. The monthly energy bill of institute can be reduced with revision of tariff & revision of three phase connection especially for gents & Ladies Hostel.
4. The institute is educational institute and the laboratory equipment usage is dependent on usage by students. The computed average monthly energy usage for a) college building varies from 511 KWh in 2017-18 to 393 KWh in 2021-22 b) Gents Hostel varies from 468 KWh in 2017-18 to 111 KWh in 2021-22 & c) Ladies Hostel varies from 677 KWh in 2017-18 to 189 KWh in 2021-22 . Decrease in power consumption is because of Covid-19 pandemic situation.
5. **Electrical Load on three phases should be balanced.**
6. **Earthing at all panels, equipments should be as per ISI & IES. It is recommended to check earth to neutral voltage frequently & accordingly earth points be treated to improve earthing**
7. Detailed electrical schematic diagram should be prepared with load details, to enable further detailed audit.
8. Electrical power distribution panel room must be clean & should be easily accessible to cut of power in case of emergency. Proper illumination should be provided at this place.
9. UPS battery room need to maintain appropriately and must be properly ventilated. Regular maintenance of batteries is must.
10. UPS batteries please be recycled properly. Institution name board be illuminated using 50W LED ( at least Two Nos.) flood lights
11. Compact fluorescent lamps in Principal cabin be replaced by retrofit type LED lamps. Also old type conventional fittings be phased out & replaced by retrofit type LED tubes.

  
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## 1. Introduction

The Rayat Shikshan Sanstha is one of the prominent educational Institutions in Maharashtra. It emphasized on the education of the poor and down-trodden who really form the major bulk of society. The founder, Late Dr. Karmaveer Bhaurao Patil, was a man of the masses who devoted all his mind and heart to the cause of their education. He established Rayat Shikshan Sanstha in 1919.

"There should not be a village without school and a school without a trained teacher." This is the ideal, the founder of the Rayat Shikshan Sanstha; the late Padmabhushan Dr. Karmaveer Bhaurao Patil cherished and earnestly struggled for throughout his life. He sincerely believed, a teacher from masses who knows the rural community with all its ills can effectively instruct the students belonging to the rural areas. How to get trained teachers in such a large number was a genuine problem. To fulfill the growing demand of the trained teachers for the secondary schools which he has started in nooks and corners in remote areas of Maharashtra for the education of masses, he strongly felt the need of having Sanstha's own secondary teachers' training college.

Before the beginning of twentieth century, there was dearth of secondary teachers' training college. Even in the previous Bombay state there was not a single secondary teachers' training college. The first secondary teachers' training college was started in 1906 at Mumbai. Afterwards the colleges were started in the cities as Poona, Belgaum, Ahmadabad, Baroda and Kolhapur. These colleges were established mainly in big cities with restricted intake capacity. It created many limitations in the qualitative and quantitative development of Secondary education. To meet the dire need of the trained teachers for the secondary schools, particularly in the rural areas more training colleges were required. Moreover the Government was not in a position to open secondary training colleges so the Rayat Shikshan Sanstha, the voluntary agency vehemently decided to enter in the field of teacher education at secondary level with or without Government financial assistance. By this time the Rayat Shikshan Sanstha has successively started number of secondary schools in the remote areas of the state with co-operation of rural people. These schools needed a large number of trained teachers for the effective functioning. Realizing the basic need of secondary schools, the founder of the Sanstha opened a secondary teachers' training college in 1955 at the historical place Satara city. To commemorate the memory of the late Honorable Moulana Abul Kalam Azad, the then first Education Minister of Government of India the college was renamed as Azad College of Education in 1958.

The College was started in a very critical situation in the year 1955, was affiliated to Pune University till 1961. After 1962 it is affiliated to Shivaji University, Kolhapur. It is informed that in the beginning, the college was started in the rented godown owned by the philanthropic industrialist Annasaheb Kalyani in the Camp area of Satara city which was very close to the present Zilla Parishad building. Initially the course introduced was B.T. (Bachelor of Teaching) and the medium of instruction was English.

### **Description of facility, building Audited**

The institute is located within the Campus of Rayat Shikshan Sanstha, Taluka & District Satara, on the Palace Street of Satara city over the area of 3.5 acres.

Total area occupied is 7279.74 sq. meter (built up area is 4222 sq. ft) by various academic departments, library, administrative building etc.

### **Scope of Audit**

The scope of this Energy Audit is limited to preliminary energy audit with the intention to identify possible opportunities for revision and modifications to improve energy efficiency, pertaining to electrical power utilization. Major energy used is electrical energy for lighting, equipments, computers, etc.



## 2. Methodology and Instrumentation

Electrical energy data & diesel consumption data for last Five years is submitted by the institute and is verified locally. .

Ratings of lighting system, equipments and installations are verified and confirmed with Volt Amp meters, Digital Power Analyzer wherever necessary.

Available data is further analyzed to find out the discrepancies and opportunities to improve performance and effective utilization of electrical energy.

## 3. Observations

- The institute is visited by Prof. Dr. Dhananjay Devi & Prof. Dr. Dilip Aldar on 13/07/2022 and also 14/07/2022.
- Representative of institute Principal Dr. Mrs. V. S. Nalawade, Prof. A.B. Patil, Prof. Kharat, Shri. Salunkhe Rohit, Shri. Kale R.J. Smt. Payal Kshirsagar, supporting staff of Azad College of Education Satara were present during physical inspection. .
- The Institute is an educational institute.
- Major electrical power is available through a three phase LT connection & two single phase connections from MSEDCL.

Consumer number	Connected Electrical Load in KW (As mentioned on Bill of supply)	Type of Connection	Date of connection
190560099375 (College Building)	20KW	3 phase	01/04/1973
190560024103 (Gents Hostel)	0.1 kW	1 phase	03/04/1971
190560606544 ( Ladies Hostel)	1.5kw	1 phase	01/05/2004

Details of Electrical Energy Consumption as per received data is as under

Consumer No.		190560099375(College Building)		20KW	3 phase
Year	Total Units consumed No. of Units	Amount Paid	Avg. Monthly Units	Per Unit Charges Paid Rs.	Data / Bills received
2017-18	6131	58220	511	9.50	12 months
2018-19	8204	105356	684	12.84	12 months
2019-20	7348	75830	612	10.32	12 months
2020-21	5932	53860	494	9.08	12 Months
2021-22	4719	39790	393	8.43	12 months



Consumer No.		190560024103 (Gents Hostel)		0.1 kW	1 phase
Year	Total Units consumed No. of Units	Amount Paid	Avg. Monthly Units	Per Unit Charges Paid Rs.	Data / Bills received
2017-18	5617	53320	468	9.49	12 months
2018-19	6322	52390	527	8.29	12 months
2019-20	3330	32210	278	9.67	12 months
2020-21	1225	14850	102	12.12	12 Months
2021-22	1337	13990	111	10.46	12 months

Consumer No.		190560606544 (Ladies Hostel)		1.5kw	1 phase
Year	Total Units consumed No. of Units	Amount Paid	Avg. Monthly Units	Per Unit Charges Paid Rs.	Data / Bills received
2017-18	8118	95585	677	11.77	12 months
2018-19	7455	102331	627	13.73	12 months
2019-20	8560	113430	713	13.25	12 months
2020-21	5000	66520	417	13.30	12 Months
2021-22	2268	28280	189	12.47	12 months

- Potable Water supply is available through a 25 mm pipe as a educational water connection. The
  - The Water Consumption data as per received data is as under

Consumer No.		SA4606	Potable water	MJP Camp, Satara	
Year	Total Units consumed	Amount Paid	Avg. Monthly Units in Ltr.	Per 1000 Ltr Charges Paid Rs.	Data / Bills received
2017-18	878000	28000	73167	31.89	12 months
2018-19	1290000	43089	107500	33.40	12 months
2019-20	2006000	69890	167167	34.84	12 months
2020-21	1562400	53860	130200	43.51	12 Months
2021-22	2170400	39790	180866	46.68	12 months

- Power backup is provided through generator set.
  - DG set Honda Make , 2.20 kVA, 220 V, 0.8 power factor
  - As single phase generator is rarely used energy generated are not available to find out effective utilization of generator. Log book of Petrol Consumption ( Utilization ) is not maintained
  - Generator is very rarely used & maintained properly.
- The computed average monthly energy usage for a) college building varies from 511 KWh in 2017-18 to 393 KWh in 2021-22 b) Gents Hostel varies from 468 KWh in 2017-18 to 111 KWh in 2021-22 & c) Ladies Hostel varies from 677



KWh in 2017-18 to 189 KWh in 2021-22 . Decrease in power consumption is because of Covid-19 pandemic situation.

- No reliable measurements are available of Earth resistance at each earth point. We have taken readings at Office Printer, UPS room, Principal cabin, Computer Laboratory, Library. However potential difference between neutral and earth point is noted to be less than 4 Volts, but at some points but is more (12 V) than accepted value at some places.
- It is noted that the Voltage between Neutral Earth is very high especially at Principal cabin & Library which may lead to frequent maintenance of the electrical & electronics parts.
- Incoming electrical power distribution is through singular 63A ICTP Main switch and three phase Copper bus bar
- Laboratory equipments are used as per requirements of students and its usage is not available.
- Schematic of Electrical power distribution, control, protections and load connections is not available.
- The UPS Units are observed to be operational & frequent, battery maintenance record is not available.
- Institute has installed 420W Solar Photovoltaic Panel (100W\*3 & 40W\*3) with One 150Ah battery. This solar energy is used to illuminate parking & street light lighting. The average solar energy available 806 Kwh.
- The institute has water connection from Maharashtra Water Management Division Camp Satara. The water bills of last three years were submitted. Possibility of bore well be explored to reduce this cost with the recommendation of rain water harvesting.
- Institute has provided RO filter facility for drinking water. The filter maintenance is in order & up to date.

#### **4. Conclusion & Recommendations**

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## Annexure & references

- 1) Energy data sheets submitted by the institute.
- 2) Old Energy Audit Report dated 05/10/2018.
- 3) Bills & other Certifications submitted by institute in connection with Energy Audit.



# Energy Audit Certificate

This is to certify that Rayat Shikshan Sanstha's Azad College of Education, Satara has conducted preliminary Energy Audit of their campus. The energy activities & measures carried out by the institute have been physically varied on 14/07/2022 & 15/07/2022.

The detail findings, conclusions & recommendations are annexed separately in the energy audit report.

Some of the energy conservations opportunities have been identified by the institute & some of the energy conservations & saving opportunities are suggested.

The positive attitude of the institute towards energy, environment & sustainability is appreciable

 15/07/2022

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