

Energy Audit Report  
For  
Rayat Shikshan Sanstha's  
Arts and Commerce College, Pusegaon



By



Karmaveer Bhaurao Patil College of Engineering, Satara.

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## Executive Summary

The Preliminary Energy Audit report is submitted for the electrical installations at various departments of Arts and Commerce College, Pusegaon, Tal. Khatav, Dist. Satara, an institute of Rayat Shikshan Sanstha, Satara.

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

The objective of this Preliminary Energy Audit is to assess primarily the electrical installations in the building and suggest energy saving majors. The electrical installations in an institute had not been assessed for its electrical power utilization since establishment and hence this energy audit is proposed.

Electrical equipments, laboratory equipments and lighting systems, reviewed during this primary audit in the month February 2020.

### Summary of recommendations

- The audit conducted is a preliminary energy audit; detailed audit after execution of recommendation will reduce energy dependency.
- Institute should prepare detailed electrical schematic, from electrical supply point to end load point.
- Institute should get all earth points to be salt treated to improve earthing.
- Institute should replace Fluorescent / CFL / filament bulb lighting by LED fixtures & fittings whenever possible.
- Institute should have a single, three-phase supply & to distribute the electrical load equally to avoid loss of revenue.



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### 3. Observations

- Prof. Rajan Devi and Prof. Dhananjay Devi visited the institute in the month of February 2020.
- Representative of institute Principal Dr. K. B. Jagdale, Prof. S. A. Mali, Prof. Nimse, Dr. Sanjay Kshirsagar and others concerned were present during physical inspection.
- The Institute is an educational institute imparting knowledge in the field of Arts and Commerce faculty. The power utilization is limited to lighting, utilities and computers. Institute do not use any heavy electrical equipment.
- The electrical power is available through a LT connection from MSEDCL through three separate single-phase electrical supply points and load is distributed randomly as per local need.
- The details of supply points are as listed below.

Consumer number	Sanctioned Electrical Load in KW
201860112090	5 kW
201860019081	5 kW
201860005986	1.1 kW

- Average monthly power consumption is 3618 Units, through three separate single-phase supply points. Unit consumption reading indicated for meter consumer number 201860019081 is not matching with billing.
- Power backup is provided through a generator set.
  - Generator set: Mhaswadkar make, model 6500, with 5 kVA, 230 V, Single phase 50Hz alternator. Fuel used is Petrol.
  - Generator is used for Office lighting, fans and computers, printers etc. and during emergency. The Connected load details & generator usage register are not available.
- Institute has installed 7.5 kVA UPS with 15 batteries of 24V 150 AH each. This UPS provides necessary backup for Computers in laboratories and office.
- Potential difference between neutral and earth point is noted which was varying between 6 to 22 volts at various points. Earthing at metering unit, water coolers and few electrical outlets is not in proper order.
- Majority of Electrical equipment are computers. Students are using Laboratory and Library equipments as per requirements and its usage is random. Usage depends on students' experimentation and activities.
- Usage of lighting is seasonal, but has scope for more effective utilization. Most of the lighting used is in day time. During winter vacation and summer vacation, the power utilization is observed as to be minimum.
- Schematic (Detailed electrical connection diagram / circuit diagram) of Electrical distribution, control, protections and load connections is not available. Diagram showing location of electrical control gears and supply points should be prepared and displayed to enable easy access in case of emergency.
- Computer LAN network cabling is not in proper order.

## Conclusion / Recommendations

The audit conducted is a preliminary audit and noted that some more focus is to be given on following points.

- Hence it is recommended to
  - 1) Distribute the electrical load on all the supply meters equally. Energy Meter having Consumer number 201860112090 is over loaded while other two meters are under loaded. Overloaded meter billing is in higher slab rate. Causing extra billing & loss of revenue. Even distribution of electrical load amongst all energy meters will reduce billed amount for same consumption.
  - 2) Have a single, three-phase supply & to distribute the electrical load equally ; as the Average monthly energy utilization is of 3618 units in total; from available three, single phase, electrical supply points which differs widely with computed value of 6500 units.
  - 3) Maintain the generator utilization log book registering the period of usage, energy generated and utilized in kWh (units) and fuel consumed during this period.
  - 4) Prepare proper electrical control panel for better safety and control. Use of MCBs and ELCB is recommended. Location should be easily accessible to cater with emergency. ELCB will help to protect from electrical leakages if any.
  - 5) Have Provision of fire extinguisher.
  - 6) Provide proper control gear and protection at point of supply. Rewiring and renovation of switchboards in computer laboratory is necessary where supply points are not in proper order and are hazardous.
  - 7) Maintain all the earth points by salting and watering regularly. It is necessary to maintain earth resistance less than one Ohm. It is necessary to provide additional separate earthing at all electrical meter units, water cooler units, and computer laboratory. Lack of proper earthing and increased neutral line voltage is harmful for computer systems.
  - 8) Display first aid charts to improve awareness of first aid support in case of electrical accident.
  - 9) Replace fluorescent light fittings including CFL by LED fixtures & fittings; gradually, when need repairs. To replace the fan regulators, currently of ballast (resistance) type, by electronic fan regulators.
  - 10) Reduce the need of electrical lighting in daytime by improving availability of natural light. Suggestion is to review the windows and other light openings and room interiors.
  - 11) Prepare diagram showing location of electrical control gears and supply points & to display it to enable easy access in case of emergency.