



Yashwantrao Chavan Pratishthan's  
**Miraj Mahavidyalaya, Miraj**

Affiliated to Shivaji University, Kolhapur - Code  
Accredited by NAAC (3rd Cycle) with 'B+' Grade (CGPA 2.53)



# Energy Audit Report

## 2022-23

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## **1. Abstract:**

For the academic year 2022-23, Preliminary Energy Auditing has been conducted to the Miraj Mahavidyalaya, Miraj to estimate the energy consumed in a day, week and month. The Energy Auditing for a day is the index of the consumption which normalizes the situation of energy crisis by providing the conservation schemes. Any organization so called bulk consumer of electrical energy propose to adopt suitable technology or scheme of energy conservation to minimize the unwanted power shutdown either incidentally or by load shedding. Energy auditing has been a part and parcel of every consumer of any form of which energy is exhaustible and inexhaustible in nature. In olden days farmers used to exploitation of energy only when it is available. For example during crops harvesting wind blow in one direction was very essential for that they used wait overnight whenever wind blows little heavily harvesting process used to be done. Also they used select the season for harvesting exclusively for this purpose because ample labors were also available there will not rain and sufficient sun is available people will not be having any work in the field. That is how energy by nature was used by farmers. Now we are being literate energy being used without bothering its existence further. Energy auditing is one tool through which balancing of demand and supply is determined and it is a big step to adopt suitable technology or scheme of energy conservation for better tomorrow.

**Keywords:** conservation, recommendations,

## **2. Introduction**

Energy auditing is an integral part of energy conservation and energy management is also part and parallel of conservation. The “Energy Audit” is the key to a systematic approach for decision-making in the area of energy management. It attempts to balance the total energy inputs with their use, and serves to identify all the energy streams in a facility. It quantifies energy usage according to its discrete functions. Energy audit is an effective tool in defining and pursuing a comprehensive energy management program within a business. As per the Energy Conservation Act, 2001, passed by the government of India, energy audit is defined as “the verification, monitoring and analysis of use of energy including submission of technical reports containing recommendations

for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption.”

The energy audits can be classified into two types: Preliminary audit and detailed audit.

### **3. Need for Energy Audit**

In an organization like our College, the top operating expense is often found to be electrical energy. In most assessments of the manageability of the cost or potential cost savings in the above component, would invariably emerge as a top priority, and thus energy audit is necessary. Energy constitutes a strategic area for cost reduction. A well done energy audit will always help owners to understand more about the ways energy is used in their organizations, and help to identify areas where waste can occur and where scope for improvement exists.

The energy audit would give a positive orientation to the energy cost reduction, preventive maintenance, and quality control programs which are vital for production and utility activities. Such an audit program will help to keep focus on variations that occur in the energy costs, availability, and reliability of supply of energy, help decide on the appropriate energy mix, identify energy conservation technologies, retrofit for energy conservation equipment, etc. In general, the energy audit is the translation of conservation ideas and hopes into reality, by lending technically feasible solutions with economic and other organizational considerations within a specified time frame.

The primary objective of the energy audit is to determine ways to reduce energy consumption per unit of product output or to lower operating costs. The energy audit provides a benchmark, or reference point, for managing and assessing energy use across the organization and provides the basis for ensuring more effective use of energy.

### **4. Preliminary Energy Audit Methodology**

The preliminary energy audit uses existing or easily obtained data. It is a relatively quick exercise to:

- Determine energy consumption in the college
- Estimate the scope for saving
- Identify the most likely (and easiest areas) for attention

- Identify immediate (especially no-cost/low-cost) improvements/savings
- Identify areas for more detailed study/measurement

## 5. College-Department wise number of electric equipments

Sr. No.	Department/Room	Tube	Fan	PC	Other Major Instruments
1	Staff Room	6	4		
2	Ladies Room 1	3	2		
3	Office	10	7	10	Printer-7,Xerox machine-1, laptop-1,CCTV SYSTEM-UPS Inverter, Water Cooler-1
4	Chemistry	15	4	1	Distil Water Plant, Oven-1200WATT Polari-meter, Freeze, PRINTER-1,1 BULB LCD projector
	Room 1	4	-		
6	Ladies Room 2	3	1		
7	Room 2	10	2		
8	Microbiology	8	1	1	1 bulb Water Filter, Centrifuge Machine, Autoclave-4, Incubator-3,Oven-3,Water Bath-1, S-Filter, Hot Plate, uv chamber Cooling Freeze-2, cooling centrifuse-2,Sonicator 1, BOD Incubator, Water bath,
9	Hindi	3	1		
10	Room 9	9	4		Amplifier-1 LCD HOLDER
11	History	1	1	1	
12	Room 10	4	2		
13	Geography	2	1	2	1 CRT
14	Room 7	4	-		
15	Room 6	5	2		
16	Room 5	3	-		
17	Room 4	3	1		
18	Library	21	19	5	1 Audio Player, Xerox Machine-1
19	Computer	9	9	60	Printer2, LCD-2, ups-10KVA,5kva,generator-
20	Marathi	2	1		
21	Physics	14	10	1	CRO-3, Frequency generator, Polari-meter,
22	Botany	7	4	1	
23	Zoology	7	4		
24	Room 8	7	4		
25	Room 3	2	2		
26	Room G-7	4	2		
27	Store Room	2	1		
28	English	2	2	10	Printer-1,Plasma TV 1, LCD1
29	Ground				2 HIGH WATTAGE BULBS-1000WATTS
	<b>Total</b>	<b>170</b>	<b>91</b>	<b>92</b>	

## 6. Ladies Hostel - Department wise number of electric equipments

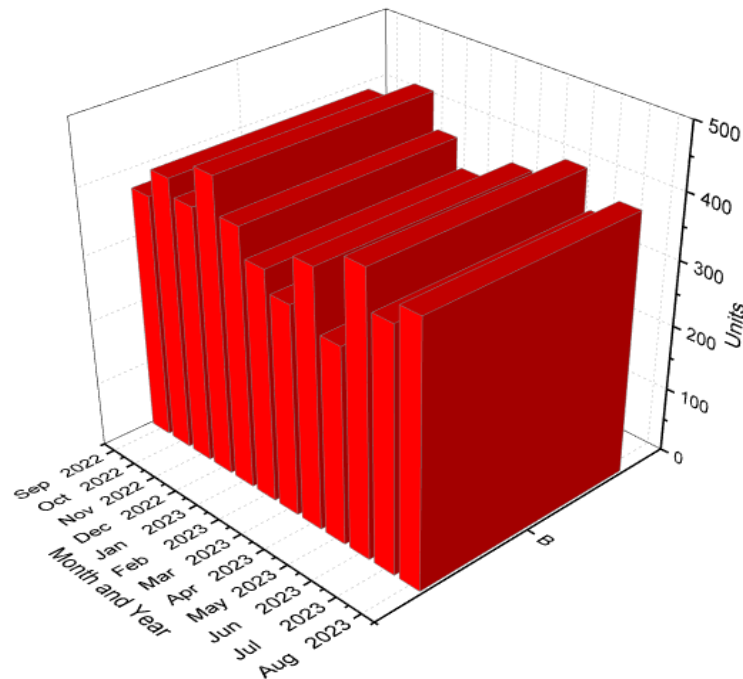
Sr.No.	Department/Room	Tube	Fan	PC	Other Major Instruments
1	Canteen	2	1		Feeze-2,oven Mixer1
2					Submersible pump-1
3	BASE	7			
3	LH1	4	2		1 bulb
4	LH2		1		
5	LH3	2	1		
6	LH4	1	1		1
7	MCVC	2	2	1	CRO
8	Chairman Sir	2	1		
9	NAAC	2	1	2	
10	NSS	2	1		
11	NCC	1	1		
12	LH6	4	2		3BULB
13	LH7	4	2		
14	LH8	1	1		
15	LH9	4	2		
16	LH10	4	2		
17	LH11	4	2		
18	LH12	4	2		
19	LH13	4	2		
20	LH14	4	2		
21	LH15	4	2		
22	LH16	4	2		
23	LH17	2	1		
24	LH18	2	1		
25	UPSTAIRS	8			
	Total	78	35	3	
	<b>GRAND TOTAL</b>	<b>248</b>	<b>126</b>	<b>95</b>	

## 7. Month wise consumption of Electricity

### 7.I Month wise consumption of Electricity in units (Year 2022-23) Consumer Number -279010392840

Bill Month	Consumption (Units)	Bill Amount
Aug 2023	1271	11080.00
Jul 2023	1382	12380.00
Jun 2023	2153	19840.00
May 2023	1226	14570.00
Apr 2023	1371	11080.00
Mar 2023	1060	0.00
Feb 2023	1287	10070.00
Jan 2023	1141	10070.00
Dec 2022	1507	13060.00
Nov 2022	1415	12080.00
Oct 2022	1387	12080.00
Sep 2022	983	17330.00
<b>Total</b>	<b>16183</b>	<b>143640</b>

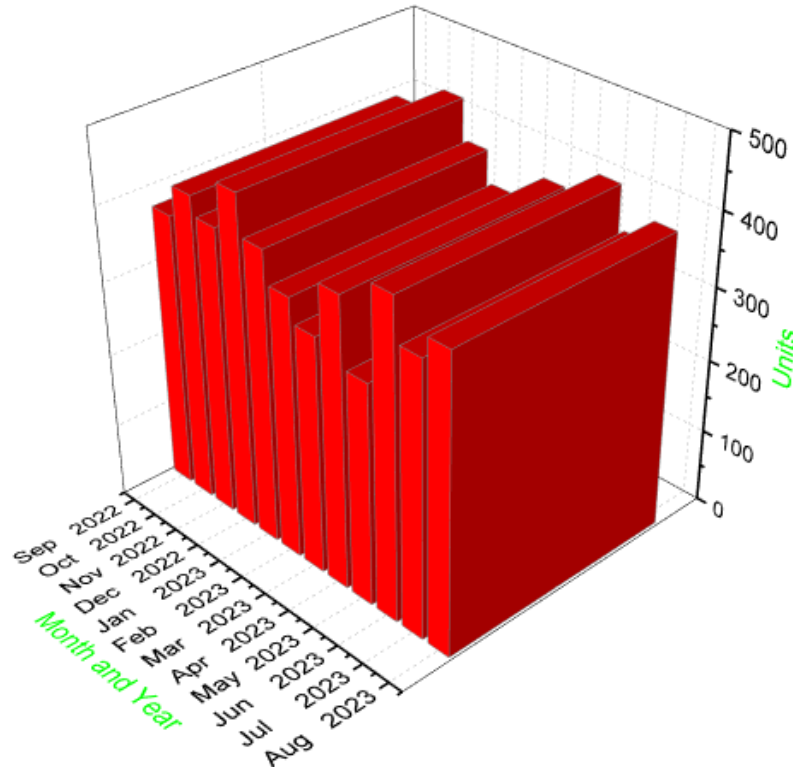
### Graphical Representation of Electric Power Consumption for the Year 2022-23 by the Electric Connection (Consumer Number-279010392840)



**7. II -Month wise consumption of Electricity in units (Year 2022-23) Electric Bill for Consumer Number -279010343628**

Bill Month	Consumption (Units)	Bill Amount
Aug 2023	400	0220.00
Jul 2023	371	7510.00
Jun 2023	428	4330.00
May 2023	301	3130.00
Apr 2023	393	3500.00
Mar 2023	322	0.00
Feb 2023	354	3600.00
Jan 2023	397	3940.00
Dec 2022	451	3740.00
Nov 2022	391	4230.00
Oct 2022	416	3790.00
Sep 2022	374	3820.00
<b>Total</b>	<b>4598</b>	<b>41810</b>

**Graphical Representation of Electric Power Consumption for the Year 2022-23 by the Electric Connection (Consumer Number-279010343628)**

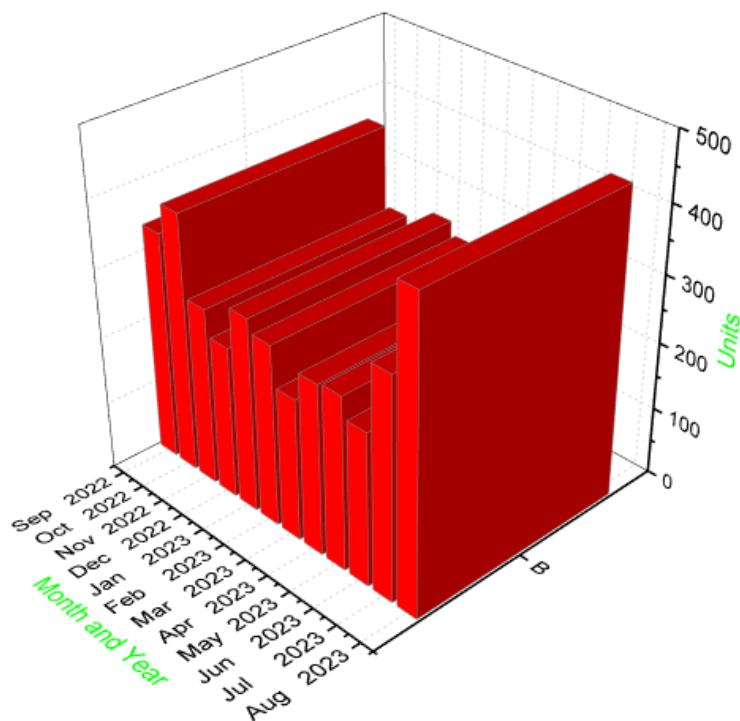




**7. III-Month wise consumption of Electricity in units (Year 2022-23) Consumer Number -279010749667**

Bill Month	Consumption (Units)	Bill Amount
Aug 2023	453	4410.00
Jul 2023	327	7600.00
Jun 2023	227	2440.00
May 2023	257	2630.00
Apr 2023	253	2480.00
Mar 2023	211	1960.00
Feb 2023	269	3160.00
Jan 2023	288	3520.00
Dec 2022	226	2280.00
Nov 2022	264	2240.00
Oct 2022	383	2750.00
Sep 2022	338	2780.00
<b>Total</b>	<b>3496</b>	<b>38250</b>

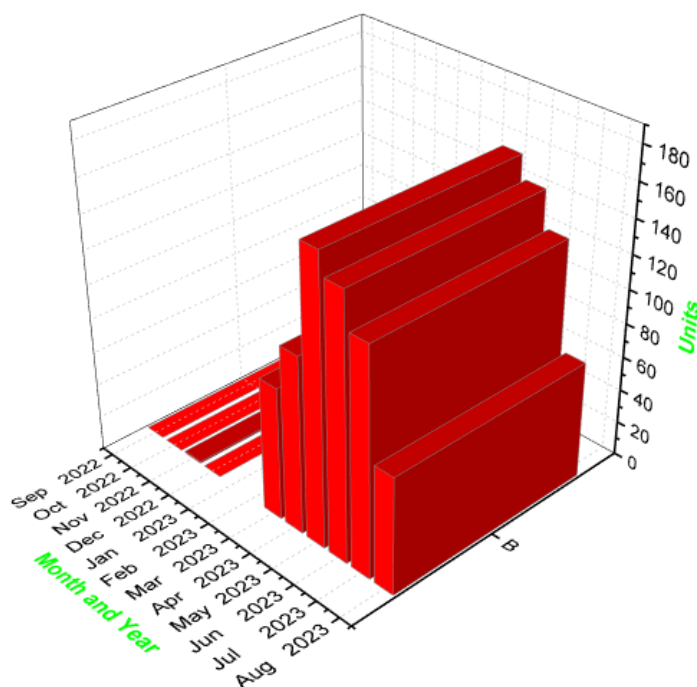
**Graphical Representation of Electric Power Consumption for the Year 2022-23 by the Electric Connection (Consumer Number-279010749667)**



**7. IV Month wise consumption of Electricity in units (Year 2022-23) Consumer Number -279010531271**

Bill Month	Consumption (Units)	Bill Amount
Aug 2023	69	1820.00
Jul 2023	133	0.00
Jun 2023	154	0.00
May 2023	167	2390.00
Apr 2023	104	1260.00
Mar 2023	78	0.00
Feb 2023	--	520.00
Jan 2023	--	1300.00
Dec 2022	0	1260.00
Nov 2022	1	0.00
Oct 2022	0	380.00
Sep 2022	0	570.00
<b>Total</b>	<b>706</b>	<b>9500</b>

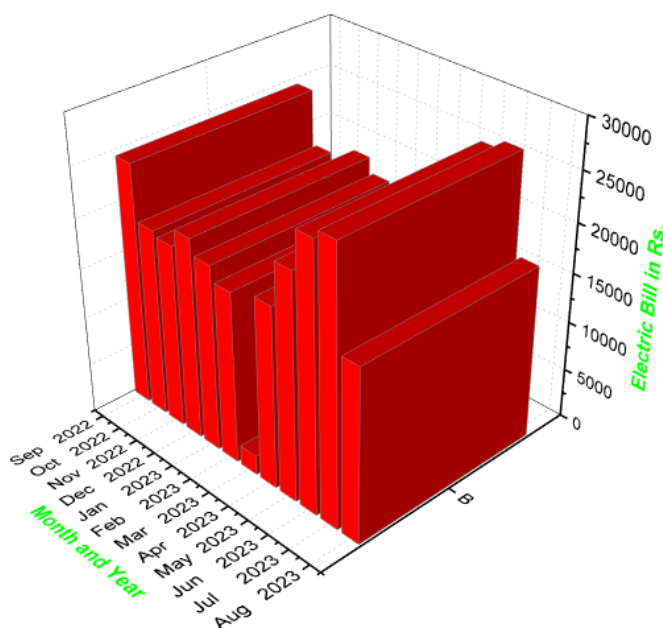
**Graphical Representation of Electric Power Consumption for the Year 2022-23 by the Electric Connection (Consumer Number-279010531271)**



### 8. Total Electric Power Consumption for the Year 2022-23 by all the Electric Connections

Aug-23	1271	400	453	69	2193
Jul-23	1382	371	327	133	2213
Jun-23	2153	428	227	154	2962
May-23	1226	301	257	167	1951
Apr-23	1371	393	253	104	2121
Mar-23	1060	322	211	78	1671
Feb-23	1287	354	269	--	1910
Jan-23	1141	397	288	--	1826
Dec-22	1507	451	226	0	2184
Nov-22	1415	391	264	1	2071
Oct-22	1387	416	383	0	2186
Sep-22	983	374	338	0	1695
	16183	4598	3496	706	<b>24983</b>

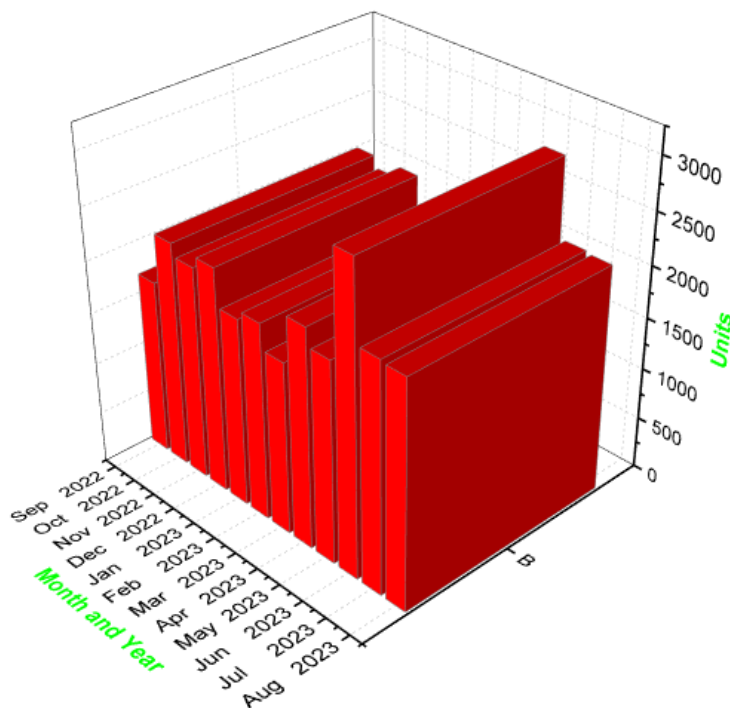
### Graphical Representation of Electric Bill in rupees for the Year 2022-23 by all the Electric Connections



### 9. Total Electric Power Bill for the Year 2022-23 by all the Electric Connections

Aug-23	11080	220	4410	1820	17530
Jul-23	12380	7510	7600	0	27490
Jun-23	19840	4330	2440	0	26610
May-23	14570	3130	2630	2390	22720
Apr-23	11080	3500	2480	1260	18320
Mar-23	0	0	1960	0	1960
Feb-23	10070	3600	3160	520	17350
Jan-23	10070	3940	3520	1300	18830
Dec-22	13060	3740	2280	1260	20340
Nov-22	12080	4230	2240	0	18550
Oct-22	12080	3790	2750	380	19000
Sep-22	17330	3820	2780	570	24500
	143640	41810	38250	9500	<b>233200</b>

**Graphical Representation of Total Unit consumption of power for the Year 2022-23 by all the Electric Connections.**



## 10. How to Save Electricity?

### Comparison Chart

#### LED Lights vs. Incandescent Light Bulbs vs. CFLs

Sr. No.	Energy Efficiency & Energy Costs	Light Emitting Diodes (LEDs)	Incandescent Light Bulbs	Compact Fluorescents (CFLs)
1	Life Span (average)	50,000 hours	1,200 hours	8,000 hours
2	Watts of electricity used (equivalent to 60 watt bulb). LEDs use less power (watts) per unit of light generated (lumens). LEDs help reduce greenhouse gas emissions from power plants and lower electric bills	6 - 8 watts	60 watts	13-15 watts
	Kilo-watts of Electricity used (30 Incandescent Bulbs per year equivalent)	329 KWh/yr.	3285 KWh/yr.	767 KWh/yr.
	Annual Operating Cost (30 Incandescent Bulbs per year equivalent)	2168/year	21686/year	5058/year
	Environmental Impact	Light Emitting Diodes (LEDs)	Incandescent Light Bulbs	Compact Fluorescents (CFLs)
	Contains the TOXIC Mercury	No	No	Yes - Mercury is very toxic to your health and the environment
	RoHS Compliant	Yes	Yes	No - contains 1mg-5mg of Mercury and is a major risk to the environment
	Carbon Dioxide Emissions (30 bulbs per year) Lower energy consumption decreases: CO2 emissions, sulfur oxide, and high-level nuclear waste.	451 pounds/year	4500 pounds/year	1051 pounds/year
	<u>Important Facts</u>	Light Emitting Diodes (LEDs)	Incandescent Light Bulbs	Compact Fluorescents (CFLs)
	Sensitivity to low temperatures	None	Some	Yes - may not work under negative 10 degrees

				Fahrenheit or over 120 degrees Fahrenheit
	Sensitive to humidity	No	Some	Yes
	On/off Cycling Switching a CFL on/off quickly, in a closet for instance, may decrease the lifespan of the bulb.	No Effect	Some	Yes - can reduce lifespan drastically
	Turns on instantly	Yes	Yes	No - takes time to warm up
	Durability	Very Durable - LEDs can handle jarring and bumping	Not Very Durable - glass or filament can break easily	Not Very Durable - glass can break easily
	Heat Emitted	3.4 btu's/hour	85 btu's/hour	30 btu's/hour
	<u>Light Output</u>	Light Emitting Diodes (LEDs)	Incandescent Light Bulbs	Compact Fluorescents (CFLs)
	Lumens	Watts	Watts	Watts
	450	4-5	40	9-13
	800	6-8	60	13-15
	1,100	9-13	75	18-25
	1,600	16-20	100	23-30
	2,600	25-28	150	30-55

It has been observed that there are around 27 locations as electrically dangerous locations because these points pose serious threat to the students.

## 11. Recommendations to save energy

- a) Tube lights should be replaced by LED bulbs
- b) Employees are advised to use only cotton clothes white or relatively white cloth during summer. Therefore they can avoid too much sweating with that the effect of dehydration can be minimized and the water consumption can be minimized through which cold water storage burden will reduce at least by 10- 20% of total consumption and also they will reduce the use of fans
- c) They can use cotton mini size umbrella it is not for rain protection it is exclusively to protect for direct attack of solar radiations, when they walk outside during afternoon. So

that soon after reaching college fan use can be minimized and it is healthy because immediate use of fan should be avoided as biologically certain harmonically imbalance takes place. Gradual body cooling is better.

- d) Use focused light for reading place or table lamp. Sometime recommended to avoid full room lighting it leads to wastage of illumination and disturbance of sleep to housemates which disturb their work efficiency at working place. Man-hour efficiency reduction is the national waste also insufficient sleeps leads to health problems.
- e) All Interior walls should be painted using Enameled paint which would reflect light
- f) One special provision can be made for cooled water storage facility wherever possible attached to room, so that multipurpose utilization of AC to cool the water will reduce the power consumption by 30%.
- g) Good light ventilation and Air ventilation to classrooms may solve the problem of Energy Consumption.
- h) Replacement of CRT monitor by LCD monitor not only gives the cost benefit interms of energy saving but also play a significant role of radiations due high potential when CRT is used high voltage level handling by CRT at HT electrodes may emit harmful radiations beyond the screen which affect the vision. Human being get in touch for trouble shooting may receive great risk of deadly shock if they touch the charged body which is normally charged up to 10000 volts (approximately) In LCD monitor all such problems can be minimized.
- i) Energy saving by replacing LCD desktop with LAPTOP illustrate the benefits in terms of portability, space saving, maintenance cost of desktop computers and additional cost of peripherals. Also cost of damage and other electrical problems. Critical space management and cost involved can be removed. Wiring for LAN and labor cost can also be prevented.
- j) Unnecessary power consumption by negligence of user and system administrator for not switching off while leaving the office/class room/lab will have more vulnerability for damage due to short circuit and heavy voltage due to lightning.
- k) It is recommended to replace Tube lights by LED which is handy by construction and possibility of breakage is less. Installation is easy and the labor charge required for replacement of burnt tubes and defected choke lamps is a costly affair. Disposal of burnt tubes will disturb the habitat place of both human being and animals. The release of krypton and argon gases is more dangerous, it may lead to ecological imbalance if it in mass destruction.

- l) Switch off the photocopier machine at the main outlet itself when not in use or in other words machine should not be kept in stand by and sleep mode which consumes power.
- m) Avoiding individual mobile phone facility at the working place during working hours is better; as they use charging facility which consume power and substandard battery chargers draws more current leads to more power consumption. There is also possibility of electrical short circuit. Common communication facility may lead to harmony among employs due to uniform facility it keeps the working atmosphere very clean and calm in addition to the cost benefit.
- n) Use good lighting system will reduce the power burden as a whole.
- o) Fans running without capacitor or under rated capacitor will draw more current therefore use of correct rated capacitor will reduce the power consumption.
- p) High/low KVA UPS must be avoided since they consume 40 percent power.
- q) Recommended to use online harmonics measurement system to monitor the harmonics. Higher level harmonics lead generate heat in the equipment may lead to greater power loss. Harmonics suppression equipment is necessary.
- r) Recommended to use solar water cooler in place of conventional one.
- s) WI-FI internet facility must be started to minimize power use.
- t) Many locations are to be repaired electrically to avoid electric shock.
- u) Many times it is observed that fans and tube lights are switched on in empty classrooms empty chairs and empty laboratories. Xerox machines PCs and other heavy equipments should be completely switched off after their use. Fans and tube lights must be switched off in empty classrooms, empty chairs and empty laboratories.

## **12. Conclusion**

This energy audit report gives strong warning not only in terms of the energy bills but also the energy crisis in the near future to all sectors of people. There is a scope of improvement to include the advanced lighting scheme and other replacement scheme to reduce further 30% of the cost.



### 13. Acknowledgements

I am very thankful to respected and honorable Prof. Sharad Patil, Chairman Yashwant Shikshan Sanstha and Dr. A.R.Jadhav Principal, for giving me opportunity to do the important work of energy auditing of the college.

### 14. References:

Website: <http://www.CompareLEDLightsvsCFLvsIncandescentLightingChart.mht>

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 <u>31/8/2023</u> <b>Dr. C. T. More</b> Convener, Energy Audit Committee		 <b>Dr. A. R. Jadhav</b> Principal, <b>PRINCIPAL,</b> MIRAJ MAHAVIDYALAYA, MIRAJ
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Yashwant Shikshan Sanstha's  
**Miraj Mahavidyalaya, Miraj**

Affiliated to Shivaji University, Kolhapur - Code  
Accredited by NAAC (3rd Cycle) with 'B+' Grade (CGPA 2.53)



## *Certificate*

*This is certify that the “Preliminary Energy Audit Report”, which is being submitted herewith to the Principal, Miraj Mahavidyalaya Miraj is the result of the study of electric energy consumption for the academic year 2022- 23. The recommendations to save electricity have also been communicated to the Principal.*

**Place: Miraj**

**Date: 24/10/2023**

**Dr. C.T.More**  
**Internal Energy Audit Convener**