MIRAJ MAHAVIDYALAYA MIRAJ

ENERGY AUDIT REPORT

2021–22

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1. Abstract:

For the academic year 2021-22, 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
	Total	**170**	**91**	**92**	

6. Ladies Hostel - Department wise number of electric equipments

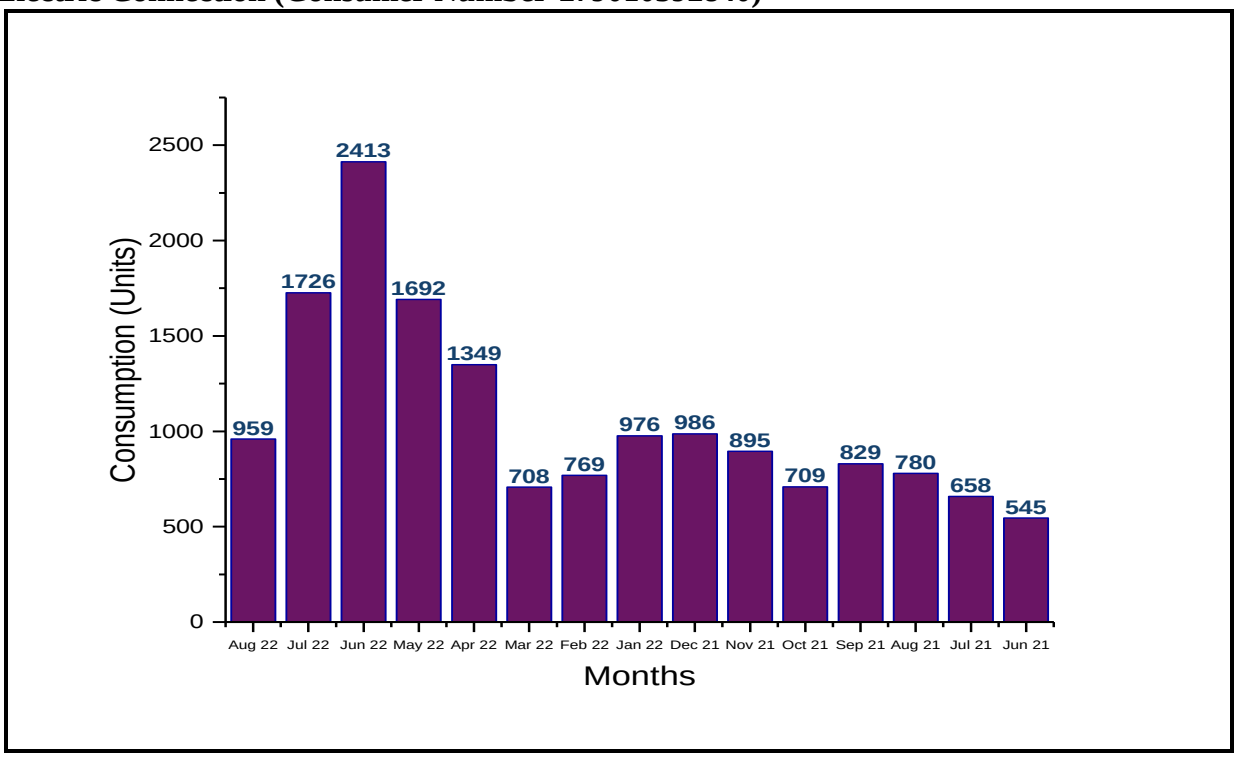
Sr.No.	Department/Room	Tube	Fan	PC	Other Major Instruments
1	Canteen	2	1		Feeze-2,oven Mixer1
2					Submersible pump-1
3	BASE	7			
3	LH1	4	2		1 bulb
4	LH2		1		
5	LH3	2	1		
6	LH4	1	1		1
7	MCVC	2	2	1	CRO
8	Chairman Sir	2	1		
9	NAAC	2	1	2	
10	NSS	2	1		
11	NCC	1	1		
12	LH6	4	2		3BULB
13	LH7	4	2		
14	LH8	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	
	GRAND TOTAL	**248**	**126**	**95**	

7 . Month wise consumption of Electricity

7.1 Month wise consumption of Electricity in units (Year 2021-22) Consumer Number -279010392840

Bill Month	Consumption (Units)	Bill Amount
Aug 2022	959	8530.00
Jul 2022	1726	15000.00
Jun 2022	2413	18650.00
May 2022	1692	18340.00
Apr 2022	1349	16670.00
Mar 2022	708	5760.00
Feb 2022	769	6220.00
Jan 2022	976	7780.00
Dec 2021	986	7860.00
Nov 2021	895	7130.00
Oct 2021	709	5670.00
Sep 2021	829	6630.00
Aug 2021	780	12420.00
July 2021	658	6030.00
June 2021	545	570.00
Total	**15994**	**143260**

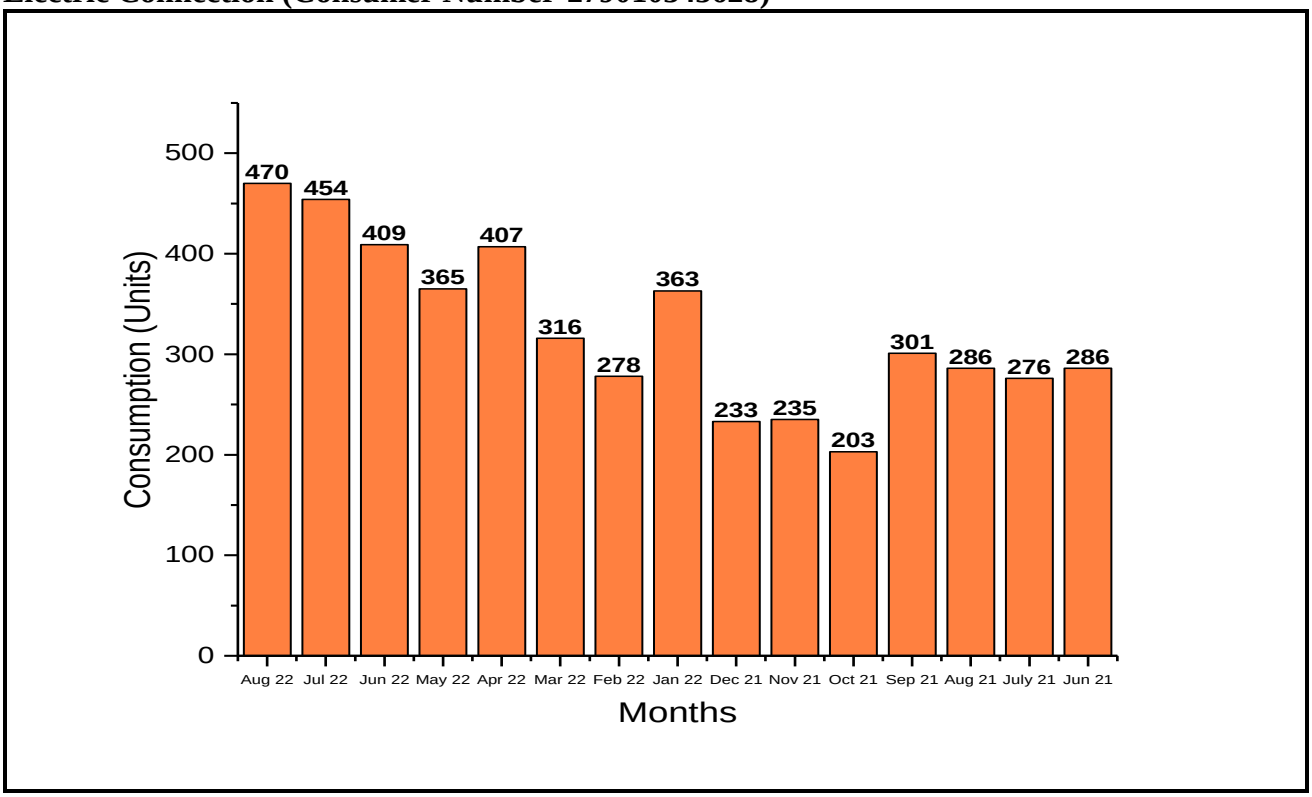
Graphical Representation of Electric Power Consumption for the Year 2021-22 by the Electric Connection (Consumer Number-279010392840)



7. II -Month wise consumption of Electricity in units (Year 2021-22) Electric Bill for Consumer Number -279010343628

Bill Month	Consumption (Units)	Bill Amount
Aug 2022	470	4430.00
Jul 2022	454	4290.00
Jun 2022	409	3550.00
May 2022	365	2930.00
Apr 2022	407	3590.00
Mar 2022	316	2820.00
Feb 2022	278	2550.00
Jan 2022	363	3180.00
Dec 2021	233	2210.00
Nov 2021	235	2200.00
Oct 2021	203	1930.00
Sep 2021	301	2690.00
Aug 2021	286	2580.00
July 2021	276	2500.00
June 2021	286	2600.00
Total	**4882**	**44050**

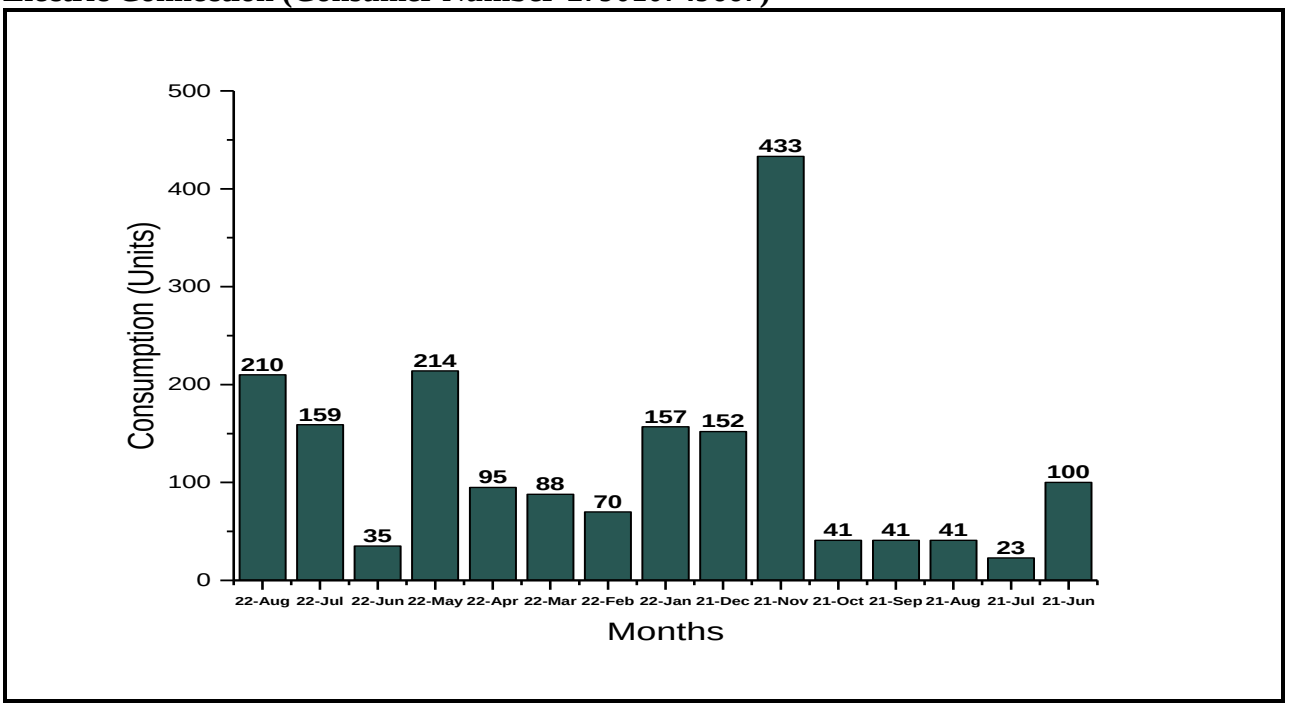
Graphical Representation of Electric Power Consumption for the Year 2021-22 by the Electric Connection (Consumer Number-279010343628)



7. III-Month wise consumption of Electricity in units (Year 2021-22) Consumer Number -279010749667

Bill Month	Consumption (Units)	Bill Amount
Aug 2022	210	2130.00
Jul 2022	159	1270.00
Jun 2022	35	0.00
May 2022	214	3100.00
Apr 2022	95	1140.00
Mar 2022	88	1060.00
Feb 2022	70	930.00
Jan 2022	157	1550.00
Dec 2021	152	1520.00
Nov 2021	433	2650.00
Oct 2021	41	720.00
Sep 2021	41	630.00
Aug 2021	41	0.00
July 2021	23	0.00
June 2021	100	2260.00
Total	**1859**	**18960**

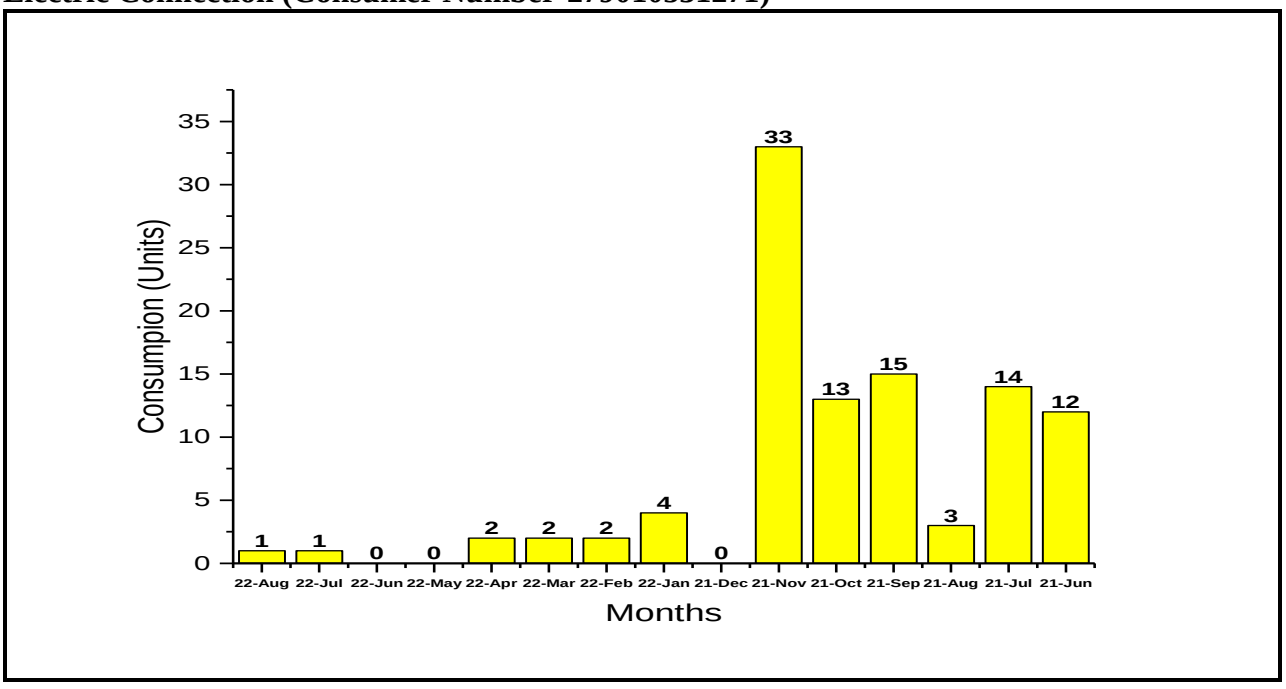
Graphical Representation of Electric Power Consumption for the Year 2021-22 by the Electric Connection (Consumer Number-279010749667)



7. IV Month wise consumption of Electricity in units (Year 2021-22) Consumer Number -279010531271

Bill Month	Consumption (Units)	Bill Amount
Aug 2022	1	0.00
Jul 2022	1	780.00
Jun 2022	0	780.00
May 2022	0	0.00
Apr 2022	2	470.00
Mar 2022	2	460.00
Feb 2022	2	480.00
Jan 2022	4	510.00
Dec 2021	0	700.00
Nov 2021	33	550.00
Oct 2021	13	560.00
Sep 2021	15	370.00
Aug 2021	3	560.00
July 2021	14	0.00
June 2021	12	2660.00
Total	**102**	**8880**

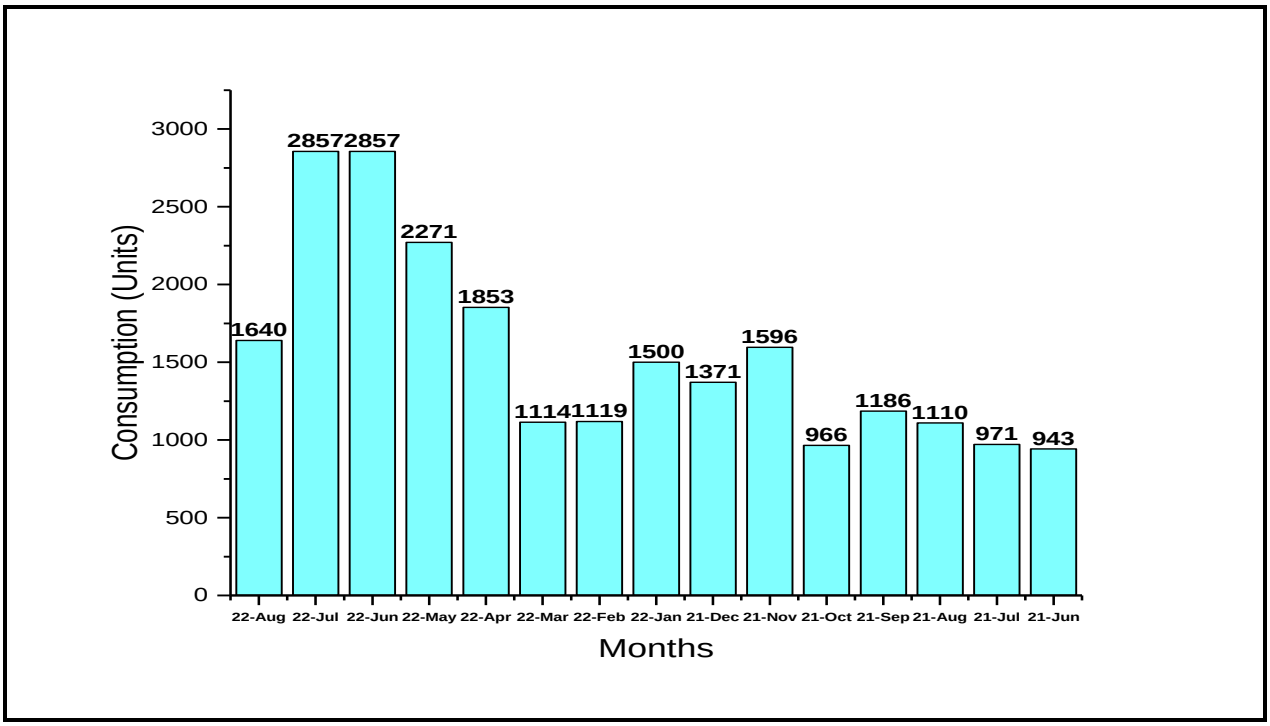
Graphical Representation of Electric Power Consumption for the Year 2021-22 by the Electric Connection (Consumer Number-279010531271)



8. Total Electric Power Consumption for the Year 2021-22 by all the Electric Connections

Bill Month	Consumption (Units)	Bill Amount
Aug 2022	1640	15090
Jul 2022	2857	21340
Jun 2022	2857	22980
May 2022	2271	24370
Apr 2022	1853	21870
Mar 2022	1114	10100
Feb 2022	1119	10180
Jan 2022	1500	13020
Dec 2021	1371	12290
Nov 2021	1596	12530
Oct 2021	966	8880
Sep 2021	1186	10320
Aug 2021	1110	15560
July 2021	971	8530
June 2021	943	8090
Total	**23354**	**215150**

Graphical Representation of Total Electric Power Consumption for the Year 2021-22 by all the Electric Connections



9. 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
	Important Facts	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
	Light Output	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.

10. 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.

11. 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.

12. 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 audit of the college.

13. References:

Website: http:/www. Compare LED Lights vs CFL vs Incandescent Lighting Chart.mht

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