

ENERGY AUDIT REPORT

Year 2021-2022

HOLY CROSS COLLEGE (AUTONOMOUS)

Nagercoil

Tamilnadu 629004.



Audited by

**Mr. C.Jebaraj B.Tech.,
Certified Energy Auditor,**

Madurai-625 016.

ACKNOWLEDGEMENT

We at TJ Solutions, Madurai are thankful to the Principal for giving us the opportunity to carry out Energy audit of HOLY CROSS COLLEGE, Nagercoil- 629004, Tamilnadu, India. TJ Solutions team is also thankful to all other supporting Officers / Staffs of the above institute for their wholehearted support, hospitality and the courtesy extended to the Audit team during the course of the visit.

The following officers from TJ Solutions under the guidance of Mr.C.Jebaraj B.Tech., Certified Energy Auditor, have carried out the Energy Audit.

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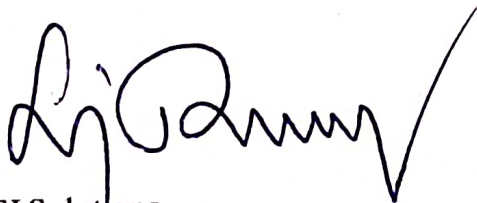
ENERGY SAVING POTENTIALS & RECOMMENDATIONS

- Conventional Fans shall be replaced with energy efficient fans in a phased manner.

Fans No	Existing Fan Watts	Energy Efficient Fan Watts	Power Savings / fan Watts	usage /day Hrs	Energy saving /day WH	GR G Hostel occupied / year Days	Energy saving potential /year Units
339	60	30	30	12	360	300	36,612

- Remaining Conventional Tube lights shall be replaced with LED tube lights in a phased manner
- 5 Star rating Energy efficient electrical equipment has been installed and shall be procured.
- Smart sensors shall be used in higher capacity AC systems to reduce the power consumption
- Automatic power(sensor based) switch off systems is installed and may be introduced in required areas
- Flow meter for Biogas plant shall be provided to study the performance
- In future, Green building should be constructed on basis of ECBC norms 2017

We are happy to submit this detailed energy audit report to the **HOLY CROSS COLLEGE, Nagercoil**


TJ Solutions
Madurai



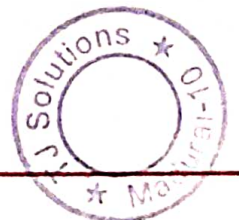
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1. TNEB GRID ELECTRICAL ENERGY CONSUMPTIONS

Sl. No.	Service no	Name	Load KW	Year 2021 -2022			
				Type	Average cost/unit Rs	unit consumed	Bill amount Rs
1	7123014167	College -LAB	50	LM2B1	7.2	46850	341385
2	7123014181	College	42	LM2B1	6.5	41490	271646
3	7123014166	Library	3	LM51	13.8	779	10821
4	7123014335	Sericulture	1	LM61	47.9	140	6712
5	7123014180	Botany	7	LM51	119.5	90	10760
6	7123014321	Computer LAB	17	LM51	12.3	6420	79050
7	7123010534	Zoology	9	LM51	12.2	3490	42620

Sl. No.	Service no	Name	Load KW	Year 2021 -2022			
				Type	Average cost/unit Rs	unit consumed	Bill amount Rs
1	7123014168	Hostel	5	LM51	104.5	50	5225
2	7123014169	Hostel	4	LM51	11.7	1780	20890
3	7123014170	Hostel	11	LM51	10.1	9890	99905
4	7123014171	Hostel	6	LM51	9.5	8250	78765



2. List of electrical equipments in college and hostel

- ❖ Number of Generators - 2
- ❖ Total number of CFL bulbs - 428
- ❖ Number of LED lights- 202
- ❖ Number of fans- 427
- ❖ Number of Air conditioners - 21
- ❖ Number of Street lights - 10
- ❖ Total Electrical Equipments in LAB - 93
- ❖ Number of Computers and laptops - 291
- ❖ Number of Projector - 4
- ❖ Number of Televisions - 13
- ❖ Number of Invertors- 19
- ❖ Smart class room-32

3. Energy audit and its purposes.

Energy audit is a systematic study or survey to identify how energy is being used in a building or plant, and identifies energy savings opportunities.

During energy audit the Basic Electrical Parameters in AC & amped systems - Voltage (V), Current (I), Power factor, Active power (kW), apparent power (demand) (KVA), Reactive power (KVAR), Energy consumption (kWh), Frequency (Hz), Harmonics, etc. will be measured which will provide details of the following,

1. Voltage fluctuations level
2. Voltage unbalance level
3. Power factor and required KVAR addition
4. Harmonics level
5. Condition of capacity banks
6. Earth leak current value
7. Maximum demand reached
8. Power Consumption patterns



9. Cable Terminals conditions

10. Cable conditions

11. Batteries condition

12. Equipment's performance

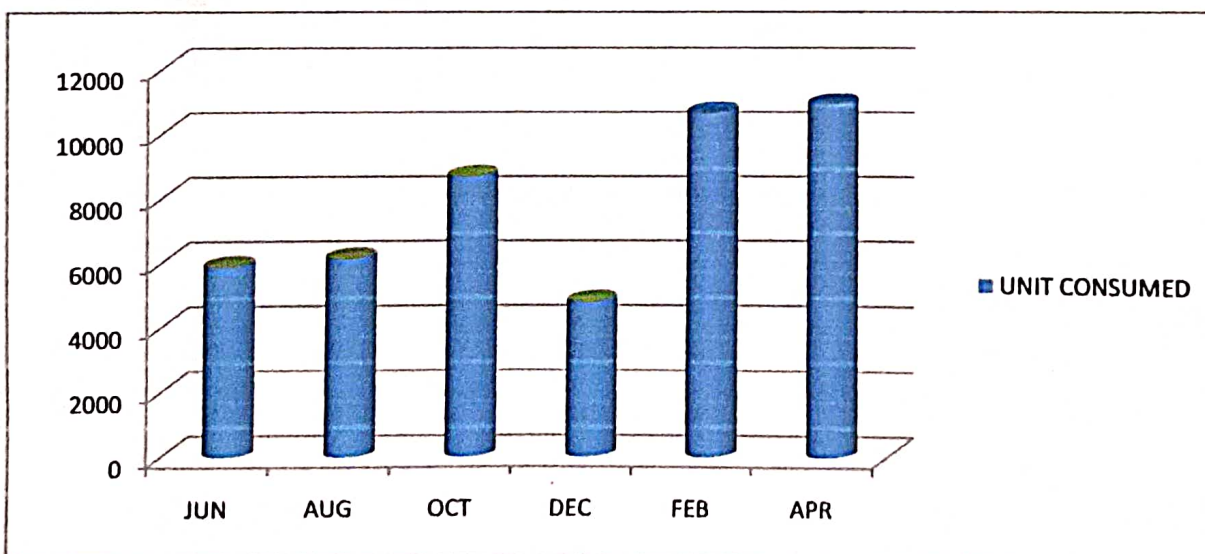
13. Earth pit condition

Based on Energy audit Report:

- Corrective action to reduce energy losses
- Improve the Electrical Safety of the system
- Improve the Performance of the equipments
- Do preventive maintenance and quality control programs
- Minimize energy costs/waste

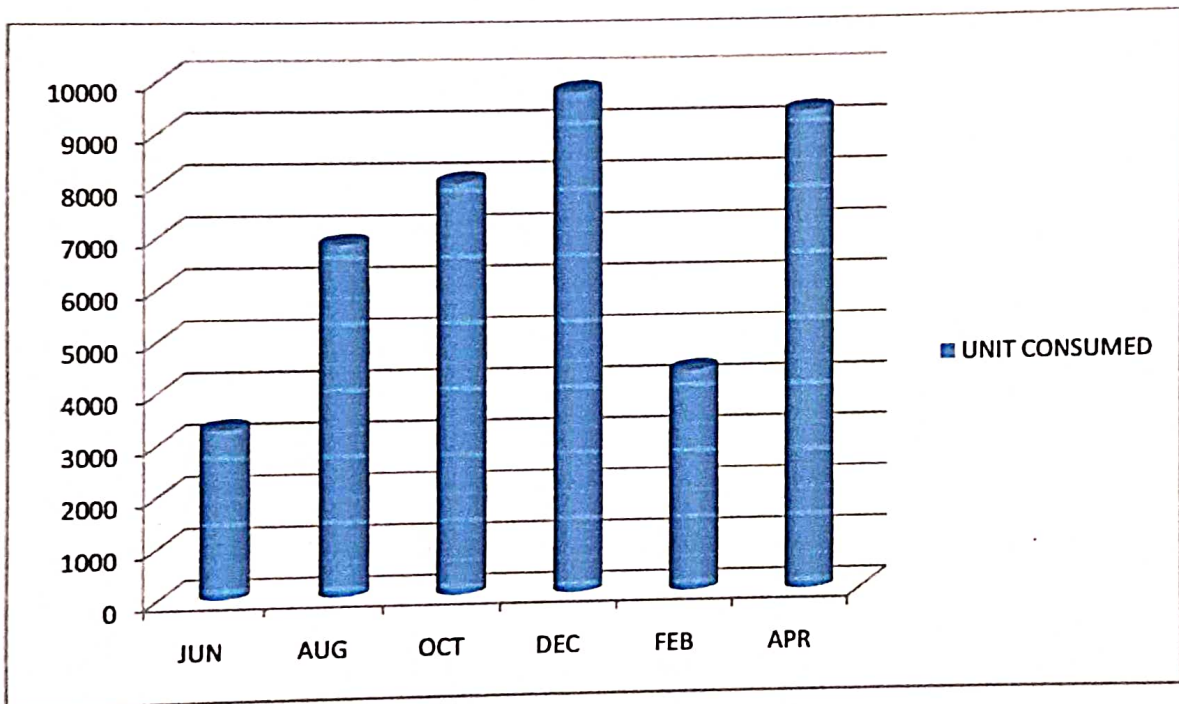
4.

Service No 7123014167 Load 50 KW Tariff LM2B1			
SI. No	Area College LAB	Units Consumed	Bill Amount in Rs
1		5860	45695
2		6100	47075
3		8640	61680
4		4750	39312
5		10620	73065
6		10880	74560
		46850	341387



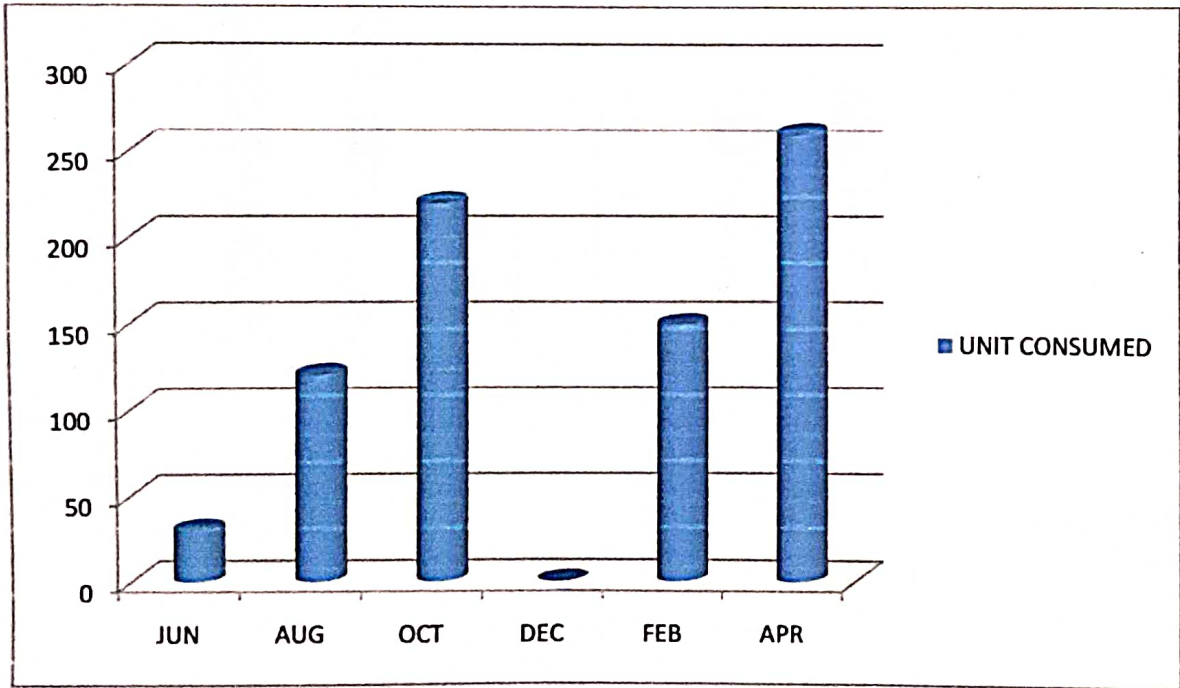
5.

Service No 7123014181 Load 42 KW Tariff LM2B1			
SI. No	Area College	Units Consumed	Bill Amount in Rs
1		3280	28940
2		6830	49272
3		8010	56057
4		9750	66062
5		4300	34725
6		9320	63590
		41490	271646



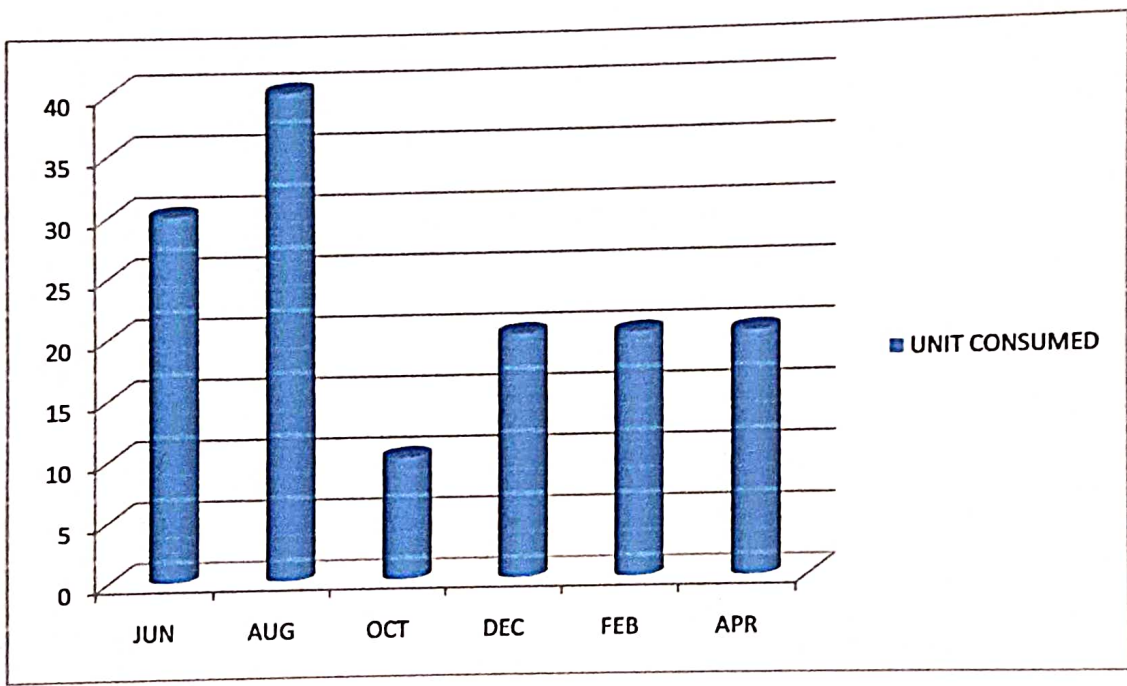
6.

Service No 7123014166 Load 3 KW Tariff LM51			
SI. No	Area	Units Consumed	Bill Amount in Rs
1	Library	30	1095
2		120	1860
3		220	2710
4		0	0
5		149	2106
6		260	3050
		779	10821



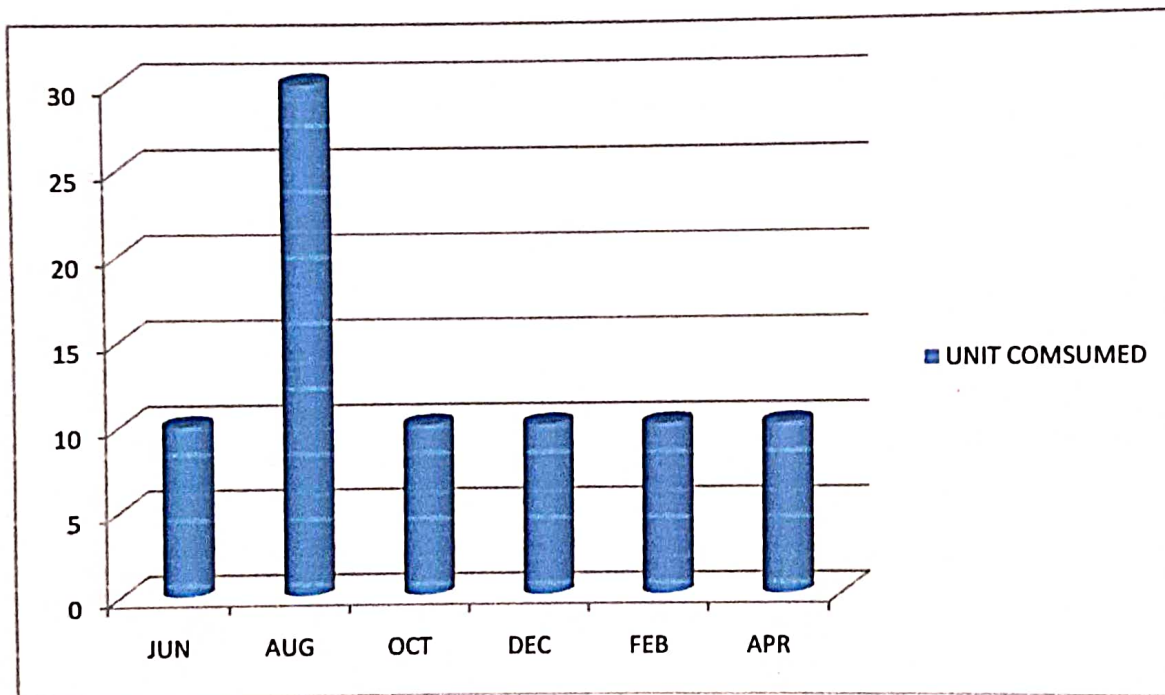
7.

Service No 7123014335 Load 1 KW Tariff LM61			
SI. No	Area Sericulture	Units Consumed	Bill Amount in Rs
1		30	1050
2		40	1170
3		10	1702
4		20	930
5		20	930
6		20	930
		140	6712



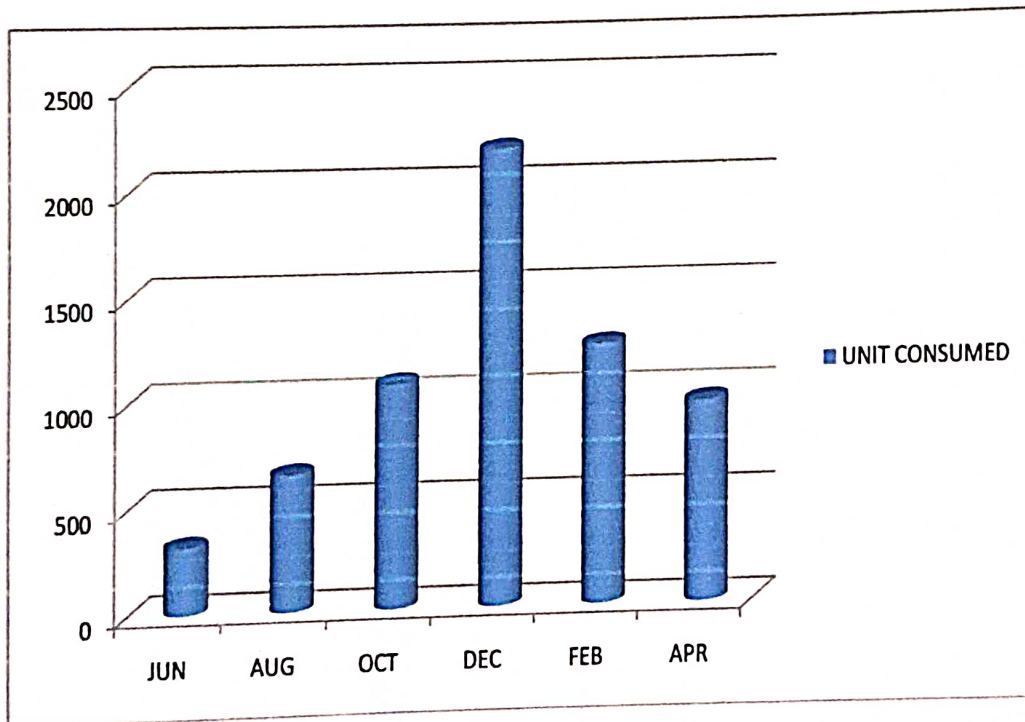
8.

Service No 7123014180 Load 7 KW Tariff LM51			
SI. No	Area Botany	Units Consumed	Bill Amount in Rs
1		10	1765
2		30	1935
3		10	1765
4		10	1765
5		10	1765
6		10	1765
		90	10760



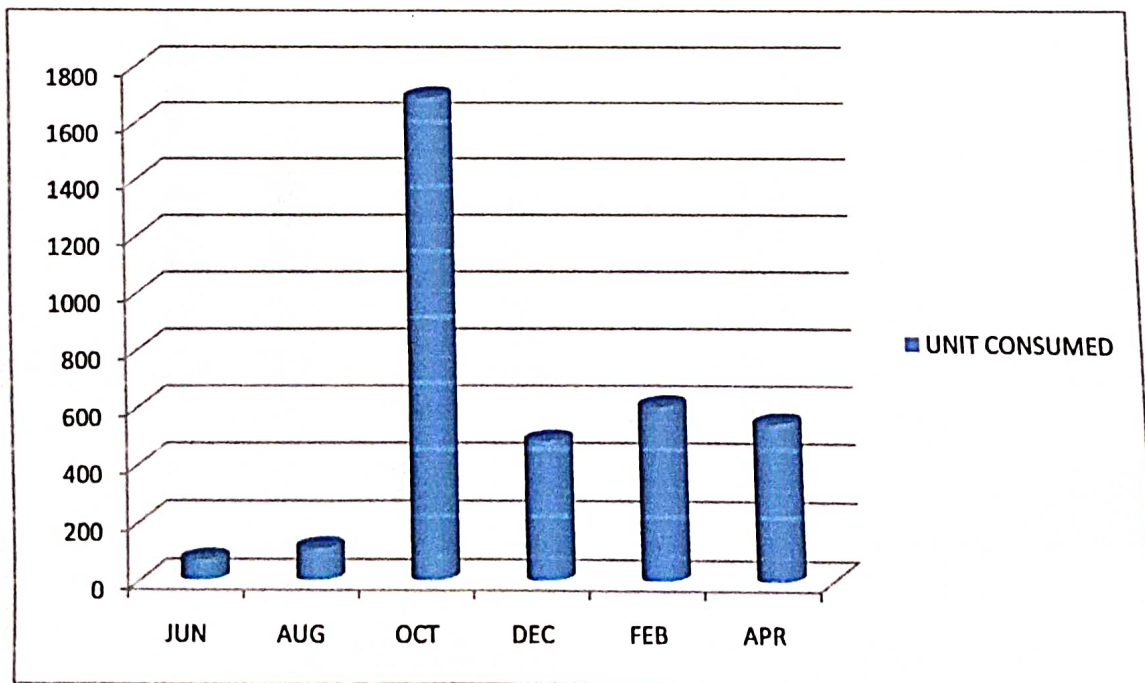
9.

Service No 7123014321 Load 17 KW Tariff LM51			
SI. No	Area College	Units Consumed	Bill Amount in Rs
1		320	6800
2		650	9605
3		1070	13175
4		2180	22610
5		1240	14620
6		960	12240
		6420	79050



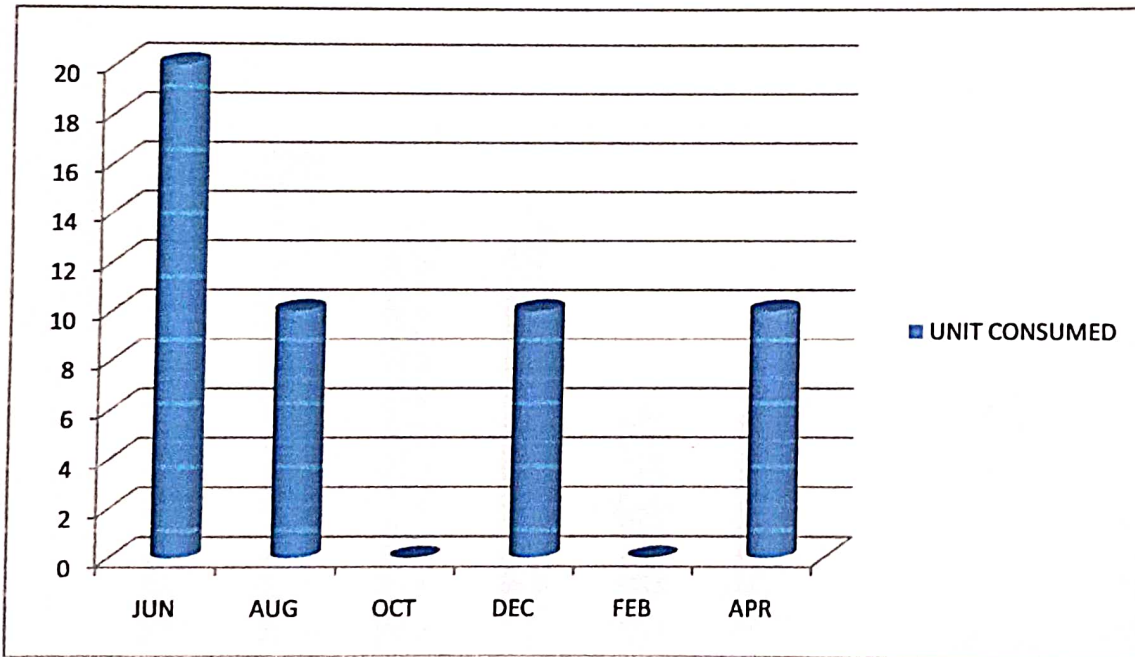
10.

Service No 7123014534 Load 9 KW Tariff LM51			
SI. No	Area Zoology	Units Consumed	Bill Amount in Rs
1		70	2750
2		110	3095
3		1690	16525
4		480	6240
5		600	7260
6		540	6750
		3490	42620



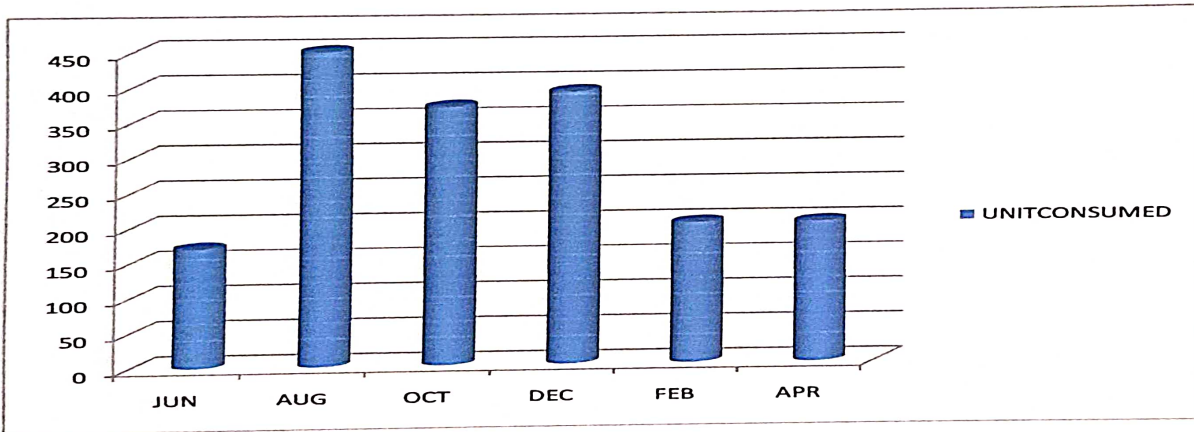
11.

Service No 7123014168 Load 5 KW Tariff LM51			
SI. No	Area Hostel	Units Consumed	Bill Amount in Rs
1		20	1370
2		10	1285
3		0	0
4		10	1285
5		0	0
6		10	1285
		50	5225



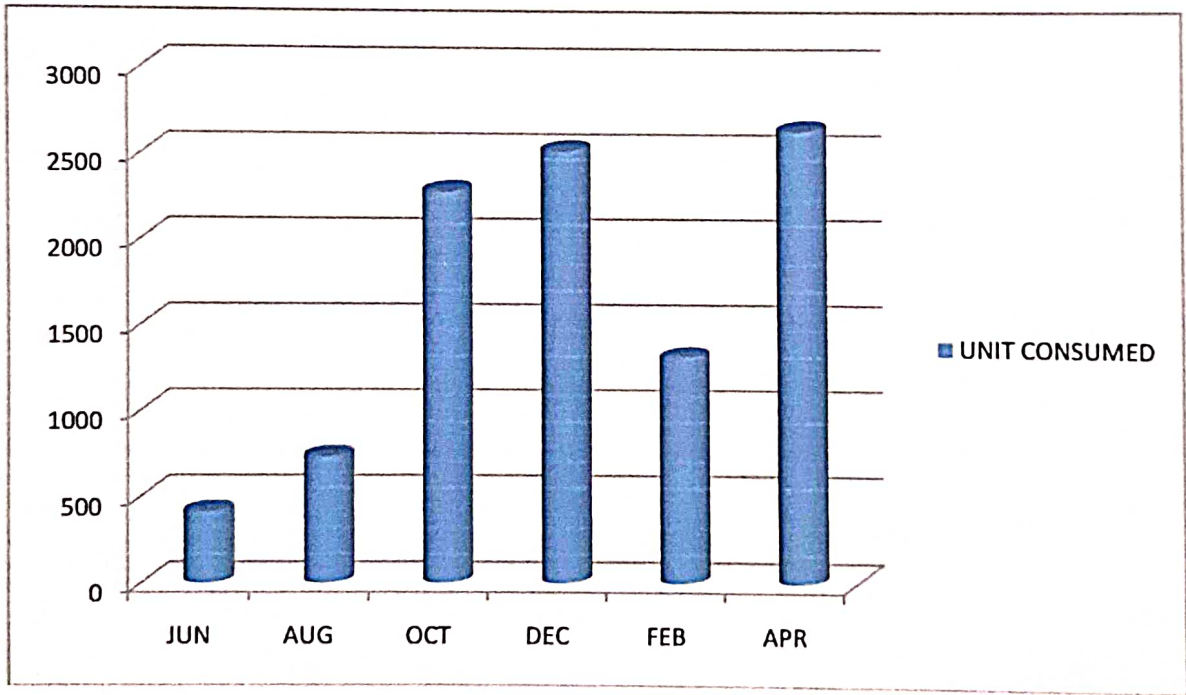
12.

Service No 7123014169 Load 4 KW Tariff LM51			
SI. No	Area Hostel	Units Consumed	Bill Amount in Rs
1		170	2405
2		450	4785
3		370	4105
4		390	4275
5		200	2660
6		200	2660
		1780	20890



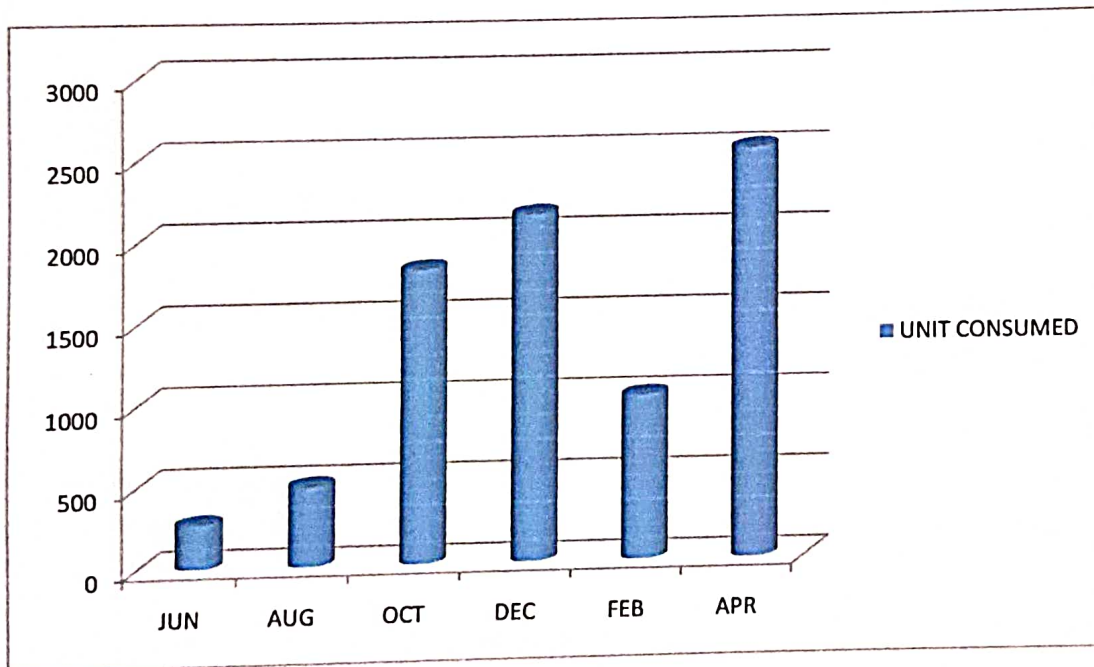
13.

Service No 7123014170 Load 11 KW Tariff LM51			
SI. No	Area Hostel	Units Consumed	Bill Amount in Rs
1		410	6125
2		730	8845
3		2280	22020
4		2520	24060
5		1310	13775
6		2640	25080
		9890	99905



14.

Service No 7123014171 Load 6 KW Tariff LM51			
SI. No	Area Hostel	Units Consumed	Bill Amount in Rs
1		270	3735
2		490	5605
3		1810	16825
4		2140	19630
5		1010	10025
6		2530	22945
		8250	78765



DIESEL POWER ELECTRICAL ENERGY GENERATION

15. Diesel Generator- Electrical energy generation in 2021-2022

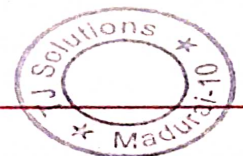
Sl. No	Location	Unit Consumption	Diesel Consumption (L)	Units/Liter
1	HOLY CROSS	750	250	3
	TOTAL	750		

16. SOLAR PV ELECTRICAL ENERGY GENERATION

Sl. No	Solar Capacity KW	Solar Power Generation Units
1	5	6387

17. TOTAL ELECTRICAL ENERGY CONSUMPTION

Sl.no	Source of electrical energy	No of units
1	TNEB Grid	119229
2	Diesel generators	750
3	Solar power plants	6387
	Total	126366



18.SOLAR THERMAL-SOLAR WATER HEATER

In the college hostel, to provide hot water for bathing purpose, 200 LPD solar water heater systems was installed

Capacity - 2, 00 LPD -1Nos

19. LPG CONSUMPTION

No of students & staffs stayed in the hostel during the year 2021-2022- 315

No. of days the hostel was occupied with students during the year 2021-2022 - 220

LPG gas cylinders consumed during the year 2021-2022 - 574 nos.

Quantity of LPG gas consumed for cooking - 10906 kg

20. Energy Conservation -Implementation & Achievement

Renewable Energy- Solar PV Power Plants

Solar Power plant installed at HOLY CROSS COLLEGE-5 KW

Consumption of Grid electrical energy reduced in HOLY CROSS COLLEGE during the year 2021-2022 due to usage of Solar Power Plant is 6387 units

Renewable Energy- Solar Thermal-Water Heaters

Solar Water Heater installed capacity at the hostel- 200LPD

Grid electrical energy(equivalent) saved due to Solar water heaters -3000 units/year



**Total renewable energy usage in HOLY CROSS COLLEGE AND HOSTEL
during the year 2021-2022**

Renewable Energy usage

Sl. No.	Renewable Energy	Electrical Energy/Equivalent Electrical Energy
1	Solar Photovoltaic	6387 units- Electrical Energy
2	Solar Thermal	3000 units- Equivalent Electrical Energy
	Total	9387 units

21. THE ENERGY CONSERVATION ACTIVITIES FOLLOWED

- The fans, lights, air-conditioners and other electronic and electrical equipment are switched off when not in use.
- Computers are switched to sleep mode or hibernate mode automatically when not in use
- Electrical equipment like CROs, Oscillators, Sodium lamps are switched off in the laboratory when the students complete their observations.
- At the end of every practical session, Computer monitors and UPS are switched off.
- In addition, post occupancy activities like utilizing renewable energy, minimizing waste generation to the least, proper disposal of E-waste and Bio-waste to the authorised recycler are carried out.
- 5 Star rating Energy efficient electrical equipment has been installed.
- Automatic power(sensor based) switch off systems may be installed in required areas



22. COMMON OBSERVATION& FEEDBACK

Battery rooms

- Petroleum jelly is applied to battery terminals to avoid corrosion
- Water levels in the batteries are maintained
- Fire extinguishers in the area are in good condition
- History card to be maintained for all UPS and batteries
- Unwanted materials (Not related to UPS/Battery) not to be kept in battery room.
- Cable identification tag to be provided.
- Battery earth pits conditions to be checked periodically

Earth Pits

- Earth pit identification to be done
- Resistance value to be checked periodically & marked
- Records to be maintained for all earth pits
- Earth pits which are disturbed due to construction activities are to be restored as early as possible



23. ENERGY SAVING POTENTIALS&RECOMMENDATIONS

- Conventional Fans shall be replaced with energy efficient fans in a phased manner.
 - Conventional Fans power consumption is around 60 watts
 - Energy efficient Fans power consumption is 30 watts
- Remaining Conventional Tube lights shall be replaced with LED tube lights in a phased manner
- 5 Star rating Energy efficient electrical equipment shall be procured
- Smart sensors shall be used in higher capacity AC system to reduce the power consumption
- Automatic power switch off systems may be introduced in required areas
- Flow meter for Biogas plant shall be provided to know the performance of the Biogas plant and utilize the plant to a maximum capacity
- Earth pits conditions to be checked in the hostel.
- Energy conservation training program for all staffs shall be planned periodically
- Some more displays on energy conservation shall be put up in suitable locations
- A power saving day is to be observed every year.
- Lightning Arrester must be installed in the college campus

