KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION
(DEEMED TO BE UNIVERSITY)

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ENERGY AUDIT REPORT

2024-25

Report prepared by

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KARE Energy Conservation

Energy Audit at Central Library

A detailed energy audit was conducted at Central Library by TryCAE Engineering for sustainable solutions, Madurai. The findings are listed below:

- The redundant lights were identified and recommended to remove as well as to switch off those lights.
- It was noticed that the UPS was on for 24 hrs. whereas no critical load is installed in the library. Therefore, the UPS was switched off after office hours.
- The university is in the process of replacing inefficient lights with energy efficient LED and slim tube lights
- 5 Star rated energy efficient and low energy consuming geysers are installed in guest house
- The details of energy consumption observed in the library is shown in the below table 1:

Table 1 Electricity Consumption observed in Central Library

Date	Energy Meter Reading noted		Total	Night hr consumption	Remark
	Opening (9.00 AM)	Closing (8.0 PM)	CONSUMPTON		
16.7.24	296	401	105	-	Lighting panel without UPS
17.7.24	401	486	85	-	
20.7.24	489	571	82	-	
21.7.24	588	647	59	17	Night hr consumption by UPS
22.7.24	665	722	57	18	
23.7.24	740	796	56	18	
24.7.24	811	873	62	15	

There are 131 no of fittings with 3 CFLs of each 36 W and 23 nos of 15 W LEDs are installed. All lights have individual switches and operated manually. The lux (Light intensity) level was measured which showed an average of 280 Lux on reading tables. The following measures are suggested to reduce the lighting load during day time.

- ✓ Since the recommended lux level for a normal person to read is 200 Lux the present lux level could be brought down by reducing the no. of lights in each fixture as shown in the following fig. 1

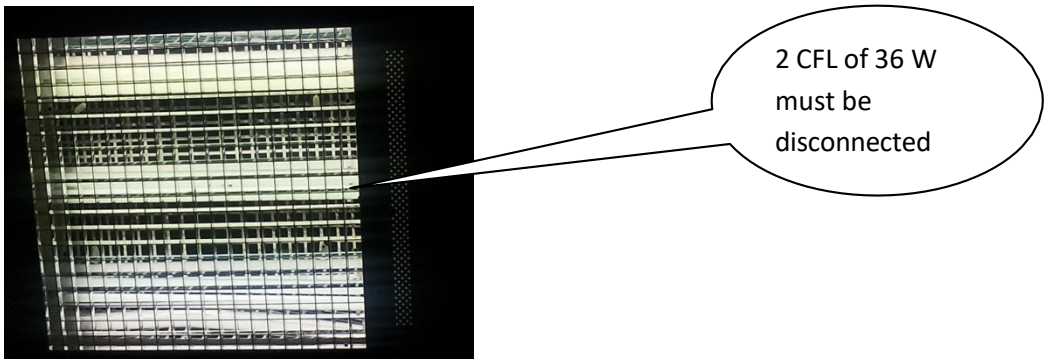

Figure 1 CFL Fixture with three lamps

- ✓ During day time alternate light must be switched on and night hours all lights can be switched on. This can be done by color marking the switches as shown in the following figure 2

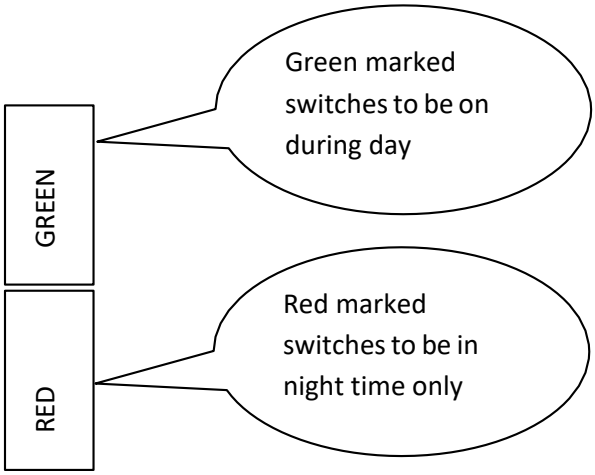

Figure 2 Recommended Color identification of switches

- ✓ The central lights provided at the roof of the building must be switched off during day time as these lights are not required and was redundant. These is suggestion is implemented immediately
- ✓ It was observed there were no long time readers in the library and most of the readers just came to browse the titles and go away or take the books and go away during the audit period. Since the availability of net and changed reading habits of students there is no need of much light intensity. Therefore it is recommended to change all the 36 W CFLs to 15 W LEDs in one row of reading hall throughout the library.

No. of fixtures to be changed	=	30 nos
Saving in kW	=	30*(36*3-15)
	=	2790 W
Energy consumption saving/day	=	2790*11/1000
	=	30 Units
Annual saving	=	30*350 days
	=	10500 units

- ✓ In all future purchase the institute must go for slim tube lights of 22 W/36 W instead of 46 W tube lights.
- ✓ Electronic ballast only to be purchased.
- ✓ All departments are instructed to switch off the lights during day time.

UPS is installed in the library and connected to all computer systems. These UPS is on for 24 hrs. However there is no critical system which need 24 h power supply. UPS alone consumes 17 units on an average during night hrs. It is recommended to switch off the UPS during night hours. This will reduce power consumption by 17 units /day.

Present consumption by UPS during night hr	=	17 units
By switching off the UPS energy saved	=	17 units/day
Annual saving for 365 days	=	6205 units

This must be done in all laboratories and wify connectivity. All UPS must be switched off during night hours. In case of critical loads localized small UPS must be installed to support during night hours. The summary of energy and carbon savings are presented in table 5.2.

KARE uses energy efficient electrical appliances in guest house. All geysers are being replaced in phased manner with BEE- 5 star rated geysers in guest house

Table 2 Summary of Energy & Carbon Saving Measures suggested in Library

Area	Recommendations	Estimated energy saving (kWh/yr	Estimated carbon saving (tO2/Yr)
Lighting	Installing Energy efficient Lighting	10500	11.55
UPS	Switching off UPS in library	6205	6.83
	Total	16705	18.38

All the recommendations suggested in this study are implemented in other areas wherever possible through electrical maintenance department. Carbon saving is estimated with an emission factor of 1.1tCO2/MWh as recommended by CEA, Govt. of India for the southern region.

Energy audit in progress at Central Library & Energy Audit Instruments

Remote Monitoring of Electricity Consumption

KARE has installed a demo version of SMART JOULES software with smart energy meter to closely monitor the electricity consumption in one the hostel feeders. The system profiles the electricity consumption on an hourly basis. The system profiles the A, V, kW, KVA, kWh, Cost, CO2 emission corresponding to the units consumed on hourly basis. The system helps to monitor the energy consumption profile and find the period on which the energy consumption is high and low. This is also helpful to know the consumption pattern during night hrs and holidays. With the available information corrective measures can be taken to minimize the wastages thus reducing energy consumption.

The introduction of this system will help the university to optimism it electrical energy consumption. The electrical energy consumed for the last six months is presented in table 3.

Table 3 Campus electrical energy consumption

Supply : TNEB
Contracted demand : 900 KVA

Month (2024)	Power Factor	Units Consumed
March	0.95	338816
April	0.95	418397
May	0.94	251136
June	0.93	219808
July	0.94	364826
Aug	0.95	395151

A conservative estimate of 5% could be reduced in next one year by adopting energy saving measures and using energy efficient lighting systems.