ENERGY AUDIT REPORT

2021-22

AT

Dr. K. N. Modi Institute of Engineering and Technology

Modi Nagar, Ghaziabad (Uttar Pradesh)

By: -

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ENERGY AUDIT

This is a brief report covering all energy consuming equipment's used in the Institute campus. It has been prepared with the objective of investigating the energy saving potential with the least payback period. This provide the information on monthly energy consumption and list of block wise inventories such as fluorescent tube lights, ceiling fans , air conditioners , and other IT equipment's. We wanted to arrive at the total month wise energy consumption of all the connected inventories. The hours of working were collected after discussion with the staff. Based upon the same, we worked out annul energy consumption. Then we co-related it with actual and applied suitable factor like 75 % and 85%. On the basis of this energy consumption, we calculated saving potential.

Dr.K .N. Modi Institute of Engineering and Technology, Modi Nagar , a State Private Institute, situated on a sprawling 10.1 acres campus with sylvan surroundings is situated at Modi Nagar in the Ghaziabad district of Uttar Pradesh. It is being managed by Dr K N Modi Foundation, whose Founder Dr Kedar Nath Modi was a doyen in contributing to the cause of the Society and a pioneer in establishing educational institutions to offer quality and value based education – primary to higher levels of professional education – in the background of his committed belief, "Education Builds Nation" to the members of the learners community belonging to diverse economic and economic strata's of the society.

Institute has following Faculties:-

- **Faculty of Science, Engineering and Technology**
- **Faculty of Management and Business Studies**

Summary of Electrical Energy saving potential

CH NO	Narration	Saving Potentials			PBP
		Saving inKWH /month	Amount saved in Lacs /month	Expenditure Lacs	
1	**Power factor improvement**				
	Improving power factor from 0.85 to0.93	519	0.44203 Lacs	0.40 Lacs	1
2	**Lighting**				
	Replacing 1847 no of fluorescent Tube (each 40 Watt) with same number of LED (each 18Watt)	8127	0.79 Lacs	3.70Lacs	7.1
	Total Electrical saving	8646	1.23Lacs	4.1 Lacs	

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1. INTRODUCTION

1.1. **Objectives:** The Energy Audit was undertaken for meeting the following objectives

(i) Conduct as imple Walk- Through audit for observing the energy consumption of various electrical appliances within the different blocks in the College Campus.

(ii) Determine what can be done for reducing energy consumption throughout the buildings/ blocks and help in achieving green energy status.

2. INTERPRETATION

Energy Conservation means steps taken to consume as much energy as required through changing energy consumption behaviour, e.g. Switching off the equipment's when not in use.

Energy Efficiency means consuming less energy to provide the same service/ output, e.g. Replacing in efficient light bulbs with efficient ones

Faulty means equipment not working or made correctly, having defects.

Potential savings means the actual reduction in operating expenses from the improved energy efficiency generated by an energy conservation or efficiency activity.

Retro fitting means upgrading an existing system to improve energy efficiency. Tariff means the amount of money charge by the supplier (utility) per kWh for the use of electrical energy.

Vampire Load means the way power is consumed by electronic and electrical appliances while they are switched off or in standby mode (consuming electricity at a cost but not doing any work)

3. HISTORICAL DATA ANALYSIS

Appendix A: Monthly Power Consumption and Billing Data
Appendix B: Floor wise inventories of Lightings, Ceiling Fans, Air Conditioners and other IT equipment's.

4. FINDINGS AND RECOMMENDATIONS

4.1 Findings:

4.1.1. Vampire Loads Findings

Electronics appliances (computer, printer, etc.) are still ON even though they are turned off.

Appliances on STANBY MODE are draining power even though they are not doing any use full task.

- Faulty light fittings which are left without bulb and faulty bulb which is intact are also vampire loads.

All the ceiling Fans are running at full speed without regulator. Beside this, no reflector has been used for improving the illumination level caused by the fluorescent Tube light. Both of these two points are adding to extra energy loss.

About Electrical Supply equipments installed in Dr. K .N. Modi Institute of Engineering and Technology, Modinagar:

Particulars	Fy. Yr. 21-22
Supply voltage- KV	11KV
No of transformers- 11/0.433KV, 500KVA	1
Contract Demand -KVA	300KVA
Total D. G. sets- 180 KVA, 320KVA	2
Major loads – Nos	
` Light (**Fluorescent Tube, LED, Cancild**)	1847no's, Power Consumption / month= 11,229 KWh
Ceiling Fans(50 Watt average)	962nos,Power Consumption/month9620KWh
Air Conditioners	37 Nos, Power Consumption/ month =16, 539 KWh

Fig: 300KVA Transformer, 11/ 0.433 KV

Fig: DG sets and control panel

About Electricity Consuming equipments installed in Dr. K .N. Modi Institute of Engineering and Technology, Modinagar:

Fig: Window AC, 1.5 Ton

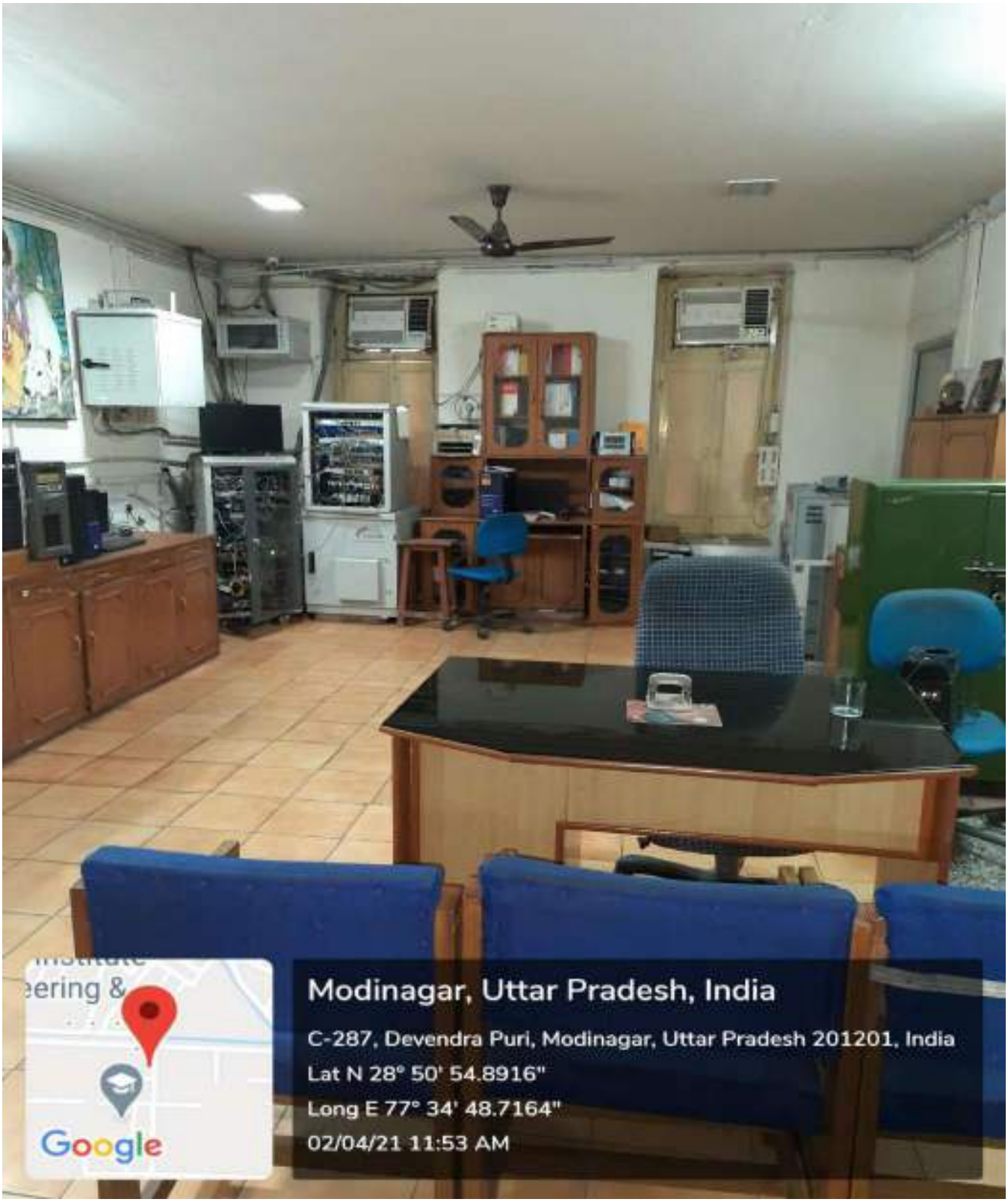
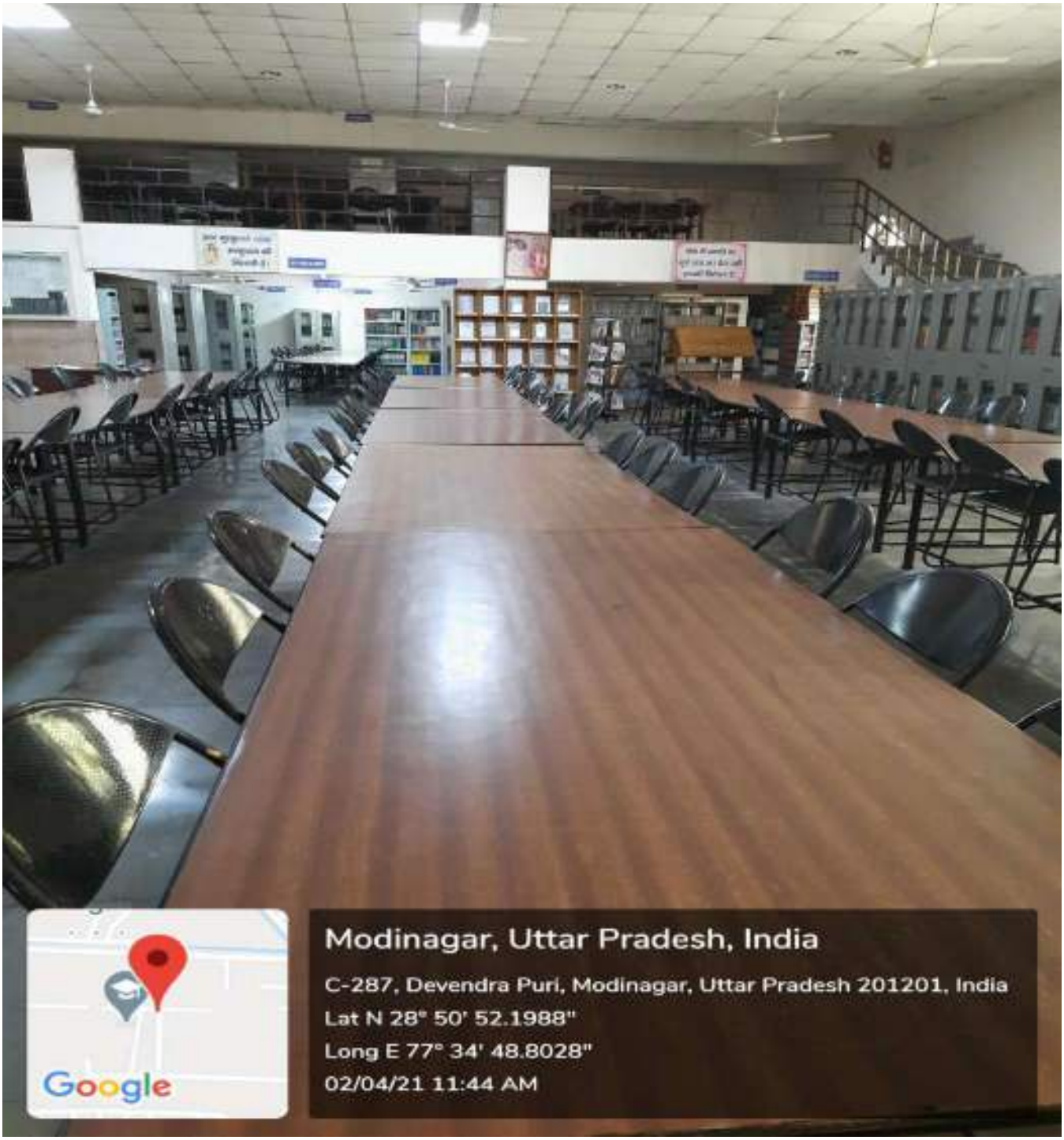


Fig: Server Room

Google
Modinagar, Uttar Pradesh, India
Kapda Mill, opposite SBI Main Branch, Modinagar, Uttar Pradesh 201204, India
Lat N 28° 50' 51.8316"
Long E 77° 34' 47.5176"
02/04/21 11:41 AM

Fig: Heat transformation Lab



In some areas, especially in one study room and stack area inside the central library, illumination level is lower than the required level.

Fig: In this photo, no regulator is found.

In many class rooms, number of Tube lights and Ceiling Fans are found to be more than required; this is causing additional energy loss.

Appendix: A

MONTH	Dr.K.N.Modi Institute of Engg. & Technology.									
	UNIT	BILL	UNIT	BILL	UNIT	BILL	UNIT	BILL	UNIT	BILL
	2017-18		2018-19		2019-20		2020-21		2021-22	
APRIL	115195	1,078,630.00	51744	588,948.00	44,860	525,928.00	23459	295502.00	77538	295502
MAY	135887	1,380,311.00	57990	636,404.00	52,647	589,443.00	32509	468874.00	15716	250238.00
JUNE	49191	549,362.00	43595	508,720.00	37,798	421,838.00	28358	177054.00	18460	314011.00
JULY	36114	549,362.00	31125	399,347.00	26,182	360,287.00	31131	258992.00	22492	214011.00
AUGUST	63392	675,458.00	55558	621,548.00	48,559	558,723.00	34292	282286.00	37752	439818.00
SEP	96535	967,159.00	60811	661,171.00	RDF Bill	470,683.00	35215	468874.00	19945	289148.00
OCT	16998	218,569.00	43518	509,233.00	9,762	787,206.00	44754	288860.00	29463	379202.00
NOV	30277	380,972.00	31686	409,129.00	16,600	255,545.00	48773	254046.00	23978	328163.00
DEC	32088	415,083.00	35655	444,304.00	21,055	299,516.00	53450	278738.00	33832	420157.00
JAN	31183	404,629.00	34067	426,193.00	26,130	354,087.00	60230	356082.00	37160	451112.00
FEB	29908	397,740.00	46122	532,113.00	27,056	357,669.00	66568	339829.00	25274	340111.00
MARCH	33002	420,761.00	28529	381,089.00	19,617	218735.00	72428	318735.00	26238	349205.00
TOTAL	669769	7,438,036.00	520400	6,118,199.00	330266	4,980,925.00	531167.00	3787872.00	367848	4070679.00
	IN LAC	74.38	IN LAC	61.18		49.81	IN LAC	37.87	IN LAC	40.71

Appendix: B

a). Academic Block :

FLOOR	Fluorescent Tube, 8hrs/day		Ceiling Fan (50W), 8hrs/day	TFT-PC (48 W), 8hr/day	Printer (5 W)	Scanner (10W), 5hr/day	Projector (280W)	Air Conditioner (1490 W), 8hr/day	Other loads
	18 w	36w							
Ground	202	824	413	370	07	02	07	08	Water cooler-04
First	1	112	292	Nil	04	nil	04	01(C.A)	Water cooler-02
Second	nil	nil	nil	Nil	nil	nil	nil	nil	nil
Total	203	936	705	370	11	02	11	09	06

b). Director's Wing:

FLOOR	Fluorescent Tube, 8hrs/day		Ceiling Fan (50W), 8hrs/day	TFT-PC (48 Watt), 8hr/day	Printer (5 Watt)	Scanner (10W), 5hr/day	Projector (280W)	Air Conditioner (1490 Watt), 8hr/day	Other loads
	18 w	36w							
Ground	105	72	45	120	6	nil	07	09	Water cooler-01
Total	105	72	45	120	6	nil	07	09	01

C). Administrative Block

FLOOR	Fluorescent Tube , 8hrs/day		Ceiling Fan (50W), 8hrs/day	TFT-PC (48W), 8hr/day	Printer(5 W)	Scanner (10W), 5hr/day	Projector (280W)	Air Conditioner (1490W), 8hr/day	Other loads
	18 w	36w							
Ground	45	12	27	07	08	03	nil	02	Water cooler-01
Total	45	12	27	07	08	03	nil	02	01

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d). Workshop:

FLOOR	Fluorescent Tube 8hrs/day		Ceiling Fan(50W), 8hrs/day	TFT-PC (48 W), 8hr/day	Printer (5 W)	Scanner (10W), 5hr/day	Projector (280W)	Air Conditioner (1490W), 8hr/day	Other loads
	18 w	36w							
Ground	nil	56	27	1	nil	nil	nil	nil	
Total	nil	56	27	1	nil	nil	nil	nil	

e). Admission Cell:

FLOOR	Fluorescent Tube (36 w), 8hrs/day	Ceiling Fan (50W), 8hrs/day	TFT-PC (48 W), 8hr/day	Printer (5 W)	Scanner (10W), 5hr/day	Projector (280W)	Air Conditioner (1490 W), 8hr/day	Other loads
Ground	69	10	03	01	nil	nil	04	Water cooler-01
Total	69	10	03	01	nil	nil	04	

f). Exam cell:

FLOOR	Fluorescent Tube (36 w) , 8hrs/day	Ceiling Fan (50W), 8hrs/day	TFT-PC (48 W), 8hr/day	Printer (5 W)	Scanner (10W), 5hr/day	Projector (280W)	Air Conditioner (1490 W), 8hr/day	Other loads
Ground	10	09	03	01	01	nil	nil	
Total	10	09	03	01	01	nil	nil	

g). Gyan Niwas Hostel:

FLOOR	Fluorescent Tube 8hrs/day		Ceiling Fan (50Watt), 8hrs/day	TFT-PC (48W), 8hr/day	Printer (5 W)	Scanner(10W), 5hr/day	Projector (280W)	Air Conditioner (1490 W), 8hr/day	Other loads
	18 w	36 w							
Ground	222	117	139	Nil	nil	nil	nil	13	Water cooler-01
Total	222	117	139	Nil	nil	nil	nil	13	Sodium Light-04

Appendix-C

Fig: Solar Geyser

Fig: Solar Panel

4.2 **Recommendations:**

(i) Power factor should be maintained very near to unity or at least 0.96. This will bring down the monthly energy bill significantly.

(ii) There is an only one distributions transformer:

500KVA with connected load of 175 KVA

(iii) We know that any machine gives maximum efficiency at or near full load condition. From the power ratings of the transformers, it is apparent that the 500KVA transformer is under loaded. It is suggested to consider this condition.

(iv)All the fluorescent tube lights should be replaced by energy efficient LED bulb of 18 Watt each.

(v). Air conditioners should be set at 26 ^{0}C Temp and Ceiling Fans should be kept on running .This combination will enable saving in electricity.

(vi) At present condition, number of Tube light sand Fans per room is more than student's occupancy. So there is provision of reducing the number of Tube lights and Fans per room.

(vii) At present, all the ceiling Fans are running without regulator, this practice should be avoided and it is suggested to run the fans with proper regulators or use star rated energy efficient Ceiling Fans.

(viii)All Electronic appliances should always be 'unplugged' or turned from the power sockets, after office hours, it is suggested to avoid putting appliances on 'STANBY MODE'

(ix) It is good to see that the Institute authority is putting their best effort in making the campus green through adopting various measures such as using direct solar water heater (Appendix-C), and installing PV based solar systems.