KAMLA SHIKSHAK PRASHIKSHAN MAHAVIDHYALAYA

KAMLA SHIKSHAK PRASHIKSHAN
MAHAVIDHYALAYA DHOLPUR (RAJASTHAN)

ENERGY AUDIT REPORT

2022-2023

PREPARED BY
EHS ALLIANCE SERVICES

Contents

CERTIFICATE

EHS alliance

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PRESENTED TO

KAMLA SHIKSHAK PRASHIKSHAN MAHAVIDHYALAYA, DHOLPUR (RAJASTHAN)

Near Narrow Gauge Railway Line, Girraj Colony, Dholpur

That has been assessed by EHS Alliance Services for the comprehensive study of Energy Audit on institutional working framework to fulfill the requirement of

ENERGY AUDIT

ACADEMIC YEAR 2022 - 2023

The energy-saving initiatives carried out by the institution have been verified in the report submitted and were found to be satisfactory.

The efforts taken by management and faculty towards all types of energy used in the institution and sustainability are highly appreciable and noteworthy.

EHS ALLIANCE SERVICES GURGAON

SIGNATURE

23.03.2024
DATE OF AUDIT

EHS ALLIANCE SERVICES, PLOT A-72, SURYA VIHAR, GURUGRAM, 122001
WWW.EHSALL.IN | BUSINESS@EHSALL.IN | EHSALLIANCE@GMAIL.COM

ACKNOWLEDGEMENT

EHS Alliance Services would like to thank the management of Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan) for assigning this important work of Energy Audit. We appreciate the co-operation of the teams for completion of assessment.

First of all, we would like to thank ***Prof. R. R. L. Sharma – Chairman*** for giving us an opportunity to evaluate the environmental performance of the campus.

We would also like to thank ***Dr. Yugal Bihari Parashar- Principal*** **& Audit Coordinator** for his continuous support and guidance, without which the completion of the project would not have been possible. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

We are also thankful to

Prof. Rajesh Kumar Sharma – Director, Kamla PG College, Dholpur (Rajasthan)

Mr. Mandeep Sharma – Director, Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan)

DISCLAIMER

EHS Alliance Services Energy Audit Team has prepared this Energy Audit Report for Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan) based on input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the conclusions are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

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Vijay Singh
Lead Auditor EMS & Energy

Dr. Uday Pratap
Co-Auditor EMS & Energy

ABBREVIATION

A	**Amps**
AC	**Air Conditioner**
AC	**Alternating Current**
AMET	**Academy of Maritime Education and Training**
CFL	**Compact fluorescent lamp**
CIP	**Comprehensive Inspection Program**
DC	**Direct Current**
HSD	**High-Speed Diesel**
Hz	**Hertz**
kg	**Kilogram**
kVA	**kilo-volt-ampere**
kW	**kilo Watts**
kWh	**kilowatt hour**
kWp	**Kilowatt peak**
LED	**Light Emitting Diode**
LPG	**Liquefied Petroleum Gas**
MMS	**Module mounting structure**
MPPT	**Maximum Power Point Tracker**
NAAC	**The National Assessment and Accreditation Council**
SEC	**Specific Energy Consumption**
SPV	**Solar Photovoltaic**
STC	**Standard Test Condition**
TV	**Television**
V	**Volts**
W	**Watts**
W/m2	**watt per square meter**

OVERVIEW OF THE COLLEGE

As a unique experiment, probably the first of its kind in the country to provide higher education to students, a well-formed institution, named “Kamla Shikshak Prashikshan Mahavidhyalaya,, Dholpur, Rajasthan” was established by the Raman Society, Dholpur. The college provide full-fledged facilities for recreation, games, sports, music, etc. The students are coached to pursue studies leading to some programs. The Institute is inspired by a vision of a person drawn from life, and its prime purpose is the higher education and training of students. It extends its services to members of other communities to the extent possible. It also seeks to develop in its students the ability to think logically, critically, and creatively, and to communicate effectively. By striving after character formation based on the love of God and the service of people the college endeavors to contribute to the training of citizens who live by the principles of social justice, equality of opportunity, genuine freedom, and respect for religious and moral values enshrined in the constitution so that all people may live with human dignity and self-respect.

MISSION & VISION

MISSION

- ✓ The vision of the college is the holistic development of the students by imparting traditional and modern education along with making them competent as digital learners for the upliftment of the future generations studying in the Schools of rural India.
- ✓ To focus on women's education for the real upliftment of future generations.
- ✓ To produce quality teachers competent in all aspects for imparting quality education in educational institutes.
- ✓ To promote skill development in youth, especially in rural backward areas.

VISION

- ✓ We are committed to ensure the physical, mental and moral growth of the students for holistic development.
- ✓ To impart the fusion of traditional, modern and digital education to make them fine human being of digital India

Geo Location
Geo Coordinates from Google maps:
26.7093829, 77.8958465

AUDIT PARTICIPANTS

On behalf of the college

Name	Designation
Prof. R. R. L. Sharma	*Chairman, Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan)*
Dr. Yugal Bihari Parashar	*Audit Coordinator and Principal, Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan)*
Prof. Rajesh Kumar Sharma	*Director, Kamla PG College, Dholpur (Rajasthan)*
Dr. L. P. Sharma	*Assistant Professor*
Dr. Manju Tiwari	*Assistant Professor*
Dr. Nitu Sharma	*Assistant Professor*
Dr. Veenu Chaturvedi	*Assistant Professor*
Mr. Pawan Kumar Tyagi	*Assistant Professor*
Mr. Gajendra Giri	*Assistant Professor*
Mr. Vishnu Shrotiya	*Office Assistant*

On behalf of EHS Alliance Services

Name	Position	Qualifications
Mr. Vijay Singh	Lead Auditor	*M.Sc. M. Tech (Environment Science & Engineering), Energy Auditor, Post Diploma in Industrial Safety Management*
Dr. Uday Pratap	Co-Auditor	*Ph.D., EMS: Lead Auditor ISO14001:2015, QCI–WASH*

EXECUTIVE SUMMARY

The purpose of this Energy Audit was to seek opportunities to improve the energy efficiency of the Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan). Reducing the energy consumption despite improving the human comfort, health and safety were of primary concern.

Beyond just identifying the energy consumption pattern, this audit sought to detect and categorize the most energy efficient appliances. Additionally, some daily practices relating common appliances have been shared which may help reducing the energy consumption. Data collection for energy audit of the campus was carried out by the EHS Alliance Team. The Energy Audit Report accounts for the energy consumption patterns of the institution on actual survey and detailed analysis during the audit.

The work comprehends the area wise consumption traced using suitable equipment. The analysis was carried out by our team with the support of the staff members from Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan). The report provides a list of possible actions to preserve and efficiently access the available source, resources and their saving potential was also identified. We look forward towards optimization that the authorities, students and staff members would follow the recommendations in the best possible way. The report is based on certain generalizations including the approximations wherever necessary. The views conveyed may not reveal the general opinion. They merely represent the opinion of the team guided by the interviews of clients. We are happy to submit this Energy audit report to the Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan).

ENERGY AUDIT - ANALYSIS

1. ENERGY CONSUMPTION

To understand the Energy Consumption trends and for analyzing the average monthly consumption we have collected electricity energy bills from July 2022 to June 2023

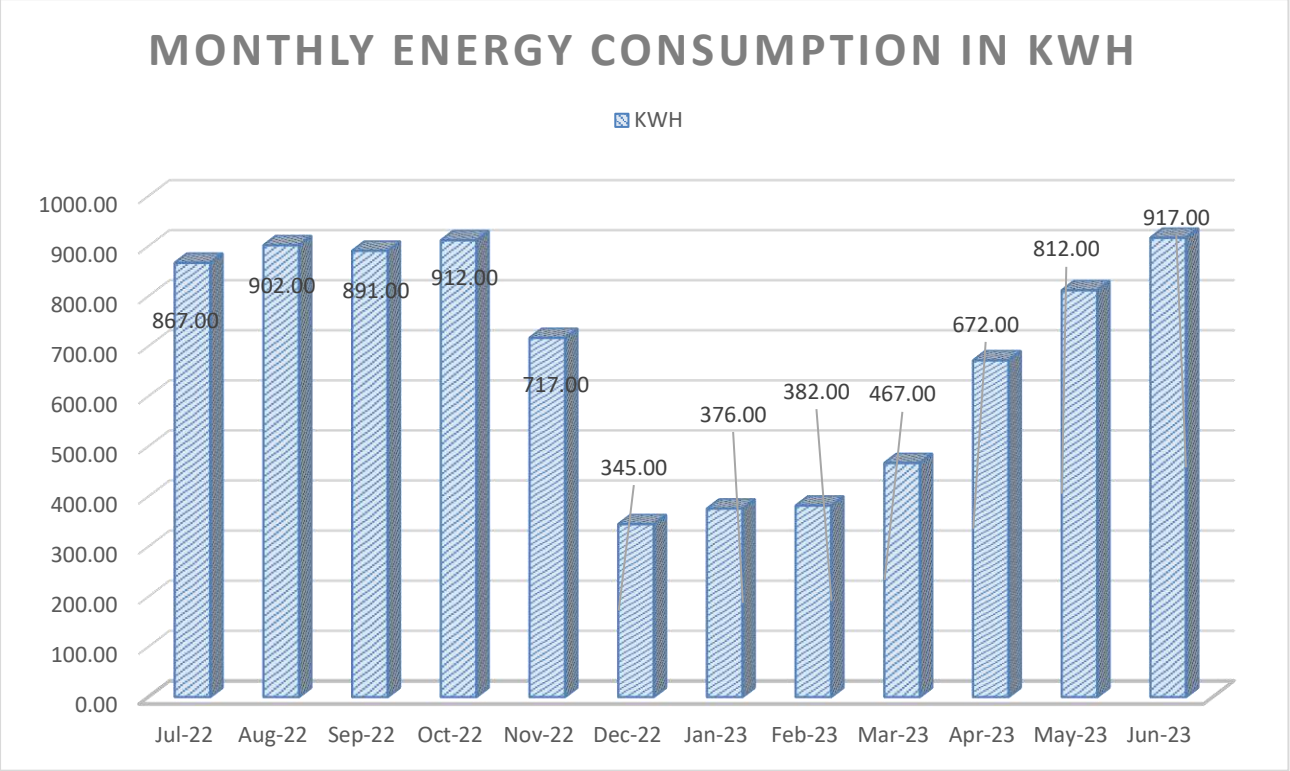
The details of **"Meter Connection"** at **"Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan)"** are as follows-

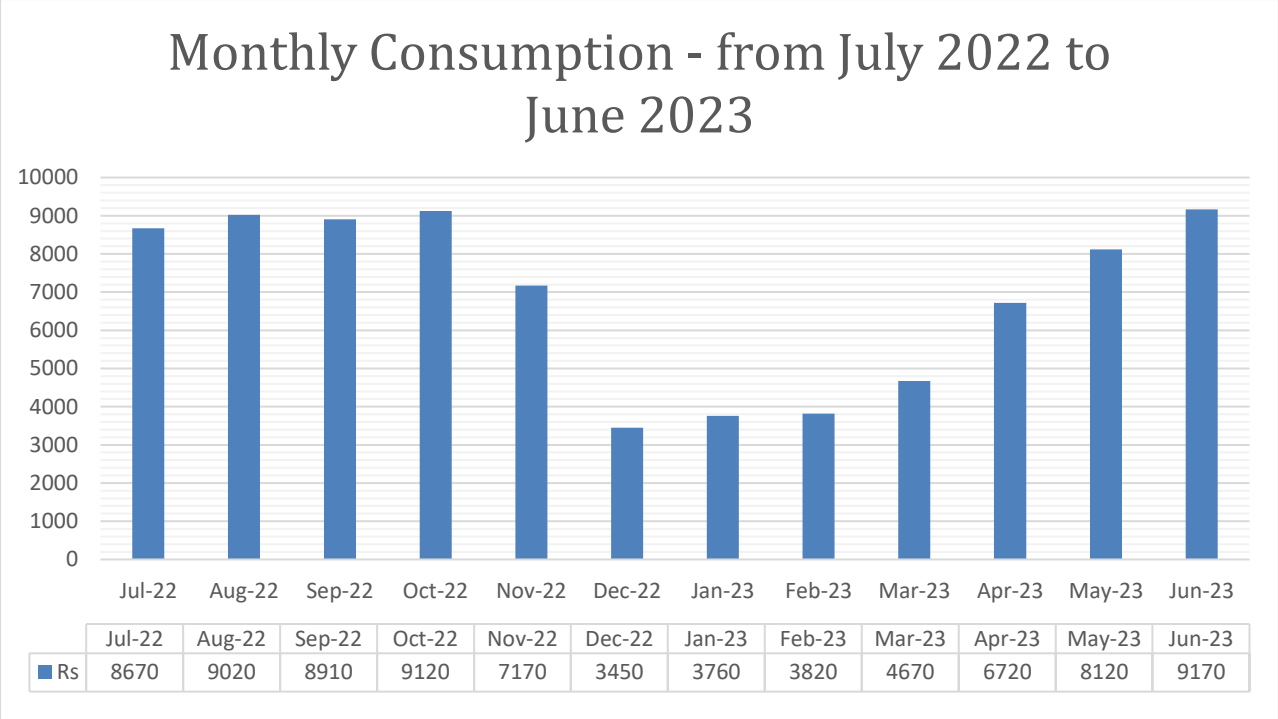
Name	-	Shri Ramraj Lal Shara, Kamla Mahavidyalaya
CA No.	-	22060819

1.1 Summary of Monthly Electricity Consumption and Total Bill Amount

To understand the Energy consumption trend and for developing the baseline parameter we have collected monthly energy bill for the 12 months i.e. from July 2022 to June 2023

Month	Grid Billing	Rate INR	Amount in INR
Jul-22	867.00	10.00	8670
Aug-22	902.00	10.00	9020
Sep-22	891.00	10.00	8910
Oct-22	912.00	10.00	9120
Nov-22	717.00	10.00	7170
Dec-22	345.00	10.00	3450
Jan-23	376.00	10.00	3760
Feb-23	382.00	10.00	3820
Mar-23	467.00	10.00	4670
Apr-23	672.00	10.00	6720
May-23	812.00	10.00	8120
Jun-23	917.00	10.00	9170
SUM	**8260**		**82600**





2. DIESEL CONSUMPTION

Below is the diesel consumption details in litres from July 2022 to June 2023.

Period	Diesel consumption (in litres)
Jul-22	5.00
Aug-22	5.00
Sep-22	5.00
Oct-22	5.00
Nov-22	5.00
Dec-22	5.00
Jan-23	5.00
Feb-23	5.00
Mar-23	5.00
Apr-23	5.00
May-23	5.00
Jun-23	5.00
Total	**60.00**

3. ANALYSIS OF DG SETS

In the campus, there is only one Diesel Generator (DG) set for its electrical power needs in case of Grid power failure. DG sets capacity is 25 kVA.

DG Set Design Details		
Description	***Unit***	***DG at Station 1***
Rated capacity	kVA	25
Hz		50
Sl No.		C178448
Make		Tanwar Industries
Volts	Volts	240
PF		80
Phase		1
RPM		1200
Amps	Amps	75.5
Mfg.		2018

DG Set Operation details		
Operating hours during testing	Hours	0.50
% Loading	%	73.35
Energy Generation	kWh	35.22
Load	kVA	92.76
Fuel consumption during testing	Litre	5
Specific energy generation	kWh/litre	3.2

Observation and Suggestions: -

Soundproof silent generators are an efficient tool to keep both noise and vibration at low levels. For the power backup of the institution, the soundproof model is installed near herbal garden of the institution.

As per the trial taken during the energy audit the percentage loading of DG set is 73.35% which is ok and specific energy consumption of DG Sets 3.2 kWh/Litre which is satisfactory because as per manufacturer recommendation, best practices for SEC in DG sets range from 3.0 to 3.5 kWh/Litre and above.

We recommend college to initiate periodic maintenance schedule and stack monitoring of DG set through authorized lab.

4. AC SYSTEM

Energy Efficiency Ratio (EER): Performance of smaller chillers and rooftop units is frequently measured in EER rather than kW/ton. EER is calculated by dividing a chiller's cooling
Capacity (in Btu/h) by its power input (in watts) at full-load conditions. The higher the EER, the More efficient the unit. The cooling effect produced is quantified as tons of refrigeration (TR). The above TR is also called as air-conditioning tonnage.

There are Split ACs installed in Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan) in various areas of various capacity which detail is given below:-

Sl No.	Location/Identification	AC Type	Quantity	1.5 TR	Room Temp. (°C)	AC-Tout (°C)	AC-Tin (°C)	Room-RH (%)	Air velocity (m/s)	Enthalpy Hout	Enthalpy Hin	Heat Load in TR	KW supplied	(Eff.) Power per Ton (KW /TON)	EER
1	Principal Room	S	1	1.5	24.0	10.0	18.0	52.0	2.4	24.0	37.0	0.4	0.5	1.5	2.3
2	Staff Room	S	1	1.5	24.0	11.0	19.0	52.0	2.0	22.0	37.0	0.3	0.6	1.7	2.0
3	Smart Room	S	2	1.5	24.0	11.0	19.0	52.0	2.6	24.0	37.0	0.4	0.6	1.5	2.3
4	Library	S	2	1.5	24.0	10.0	18.0	52.0	2.4	24.0	37.0	0.4	0.5	1.5	2.3

Remarks: - We have checked Energy Efficiency Ratio of AC's and EER of AC's is fairly OK. But in future you should purchase 5-Star rated invertor based split AC's because power consumption of Inverter based BEE 5-Star rated AC's is less than non-star rated AC's.

Also, we recommend Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan) to organize periodic maintenance schedule and take corrective actions for insulating of AC's refrigerant lines in order to protect energy losses.

5. FANS ANALYSIS

In the Kamla Shikshak Prashikshan Mahavidhyalaya, Dholpur (Rajasthan) there are 58 fans installed, all ceiling fans are of 70W. The observation and suggestion are given below.

Sl No.	Location/ Identification	Ceiling Fan-70W
1	Principal Room	1
2	Chairman Room	1
3	Staff Room	1
4	IQAC Room	1
5	Office Room	1
6	Reception	2
7	Porch	4
8	Class Room 1	4
9	Class Room 2	4
10	Class Room 3	4
11	Class Room 4	4
12	Smart Room	4
13	Library	8
14	ICT Lab	2
15	Psychology Lab	1
16	Science Lab	2
17	Fine Art	2
18	Girls Common Room	1
19	Canteen	1
20	Health Centre Room	1
21	Auditorium Hall	8
22	Store Room	1

Observation and Suggestions: -

In the college, all the ceiling fans are of 70 W but BEE 5 Star Rated of 30W Ceiling Fans are present in the market. We recommend to consider purchasing BEE 5 Star-rated 30W fans for all future purchases.

Note:- Energy saving will increase or decrease if the operating hours of machine /equipment will be increased or decreased and payback period will also increase or decrease if cost of investment (Cost of machine/equipment/accessories of machine) will increase or decrease because cost of investment is taken on tentative basis.

6. ANALYSIS OF LIGHTING SYSTEM

6.1 Brief description of the existing system

For assessing the energy efficiency of the lighting system, an Inventory of the Lighting System has been noted/collected, with the aid of a lux meter, measurement and documentation of the lux levels at various locations at working level have been done.

6.2 Inventory of Lighting

Sl. No.	Location/ Identification	18W-LED Tube Light	36W Tube Light	12 W LED Bulb	200W-LED High Mast
1	Principal Room	2		1	
2	Chairman Room	1		1	
3	Staff Room	2			
4	IQAC Room	2		1	
5	Office Room	2			
6	Reception	4		2	
7	Porch			4	
8	Class Room 1	4			
9	Class Room 2	4			
10	Class Room 3	4		2	
11	Class Room 4	4		2	
12	Smart Room	4			
13	Library	8		2	
14	ICT Lab	2		2	
15	Psychology Lab			2	
16	Science Lab			2	
17	Fine Art			2	
18	Girls Common Room	1		1	
19	Canteen			2	
20	Health Centre Room	1		1	
21	Auditorium Hall	3	5		2
22	Store Room			2	
23	Record Room			2	
	TOTAL	**48**	**5**	**31**	**2**

6.3 Lux Measurement

Description	Lux	Remark
Class Rooms	120 to 235	Acceptable
Offices	130 to 240	Acceptable
Corridors	35 to 90	Acceptable
Washrooms	45 to 76	Acceptable
Outdoor	36 to 95	Acceptable
Computer Lab	150 to 289	Acceptable
Parking area	45 to 94	Acceptable
Canteen	69 to 185	Acceptable

Observation

The college has initiated an LED-based lighting solution, but still, there are 5 (36W) tube lights. LEDs save energy, the life span is much greater, and emit virtually no heat. We recommend replacing the tube lights with LEDs.

Additionally, we recommend installing motion sensor-based lights in common areas such as libraries, washrooms, corridors, etc.

We also recommend using solar lights for open areas like parking, ground, street lights, etc. Table below shows the performance characteristics comparison of all luminaries.

Table - Luminous Performance Characteristics of Commonly Used Luminaries					
Type of Lamp	Lumens/Watt		Colour Rendering Index	Typical Application	Typical Life
	Range	Avg.			
Incandescent	8-18	14	Excellent (100)	Homes, restaurants, general lighting emergency lighting	1000
Fluorescent lamps	46-60	50	Good w.r.t coating (67-77)	Offices, shops, hospitals, homes	5000
Compact fluorescent Lamps	40-70	60	Very Good (85)	Hotels, shops, homes, offices	8000-10000

(CFL)					
High-pressure mercury (HPMV)	44-57	50	Fair (45)	General lighting in factories, garages, car parking. floodlighting	5000
Halogen lamps	18-24	22	Excellent (100)	Display, flood lightening, stadium exhibition grounds, construction areas	2000 - 4000
High-pressure sodium (HPSV) SON	67-121	90	Fair (22)	General lighting in warehouses, factories, street lighting	6000 - 12000
Low-pressure sodium (LPSV) SOX	101-175	150	Poor (10)	Roadways, tunnels, canals, street lighting	6000 - 12000
Metal halide lamps	75-125	100	Good (70)	Industrial bays, spotlighting, floodlighting, retail stores	8000
LED Lamps	30-50	40	Good (70)	Reading lights, desk lamps, night lights, spotlights, security lights, signage lights, etc.	40000 - 100000

7. OTHER POWER CONSUMPTION

7.1 Inventory of IT Infrastructure

Sl No.	Location/ Identification	Desktop	Printers	Scanners	Smart Screen	Projector
1	Principal Room	1				1
2	Office Room	1	1	1		
3	Auditorium Hall	1				1
4	IQAC Room	1	1	1		1
5	Smart Class Room				1	
	TOTAL	**4**	**2**	**2**	**1**	**3**

7.2 Water pump details

Sr. No.	Description	Unit	Pump No.-1
1	Rated Power of Motor	KW	0.75
2	Motor Eff.	%	80%
3	Discharge Head	m	70
4	Suction Head	m	650
5	Pump Type	Submersible/Monoblock/Centrifugal Etc.	Submersible

7.3 Exhaust fan details

Sl No.	Location/Identification	Air Coolers 600W	RO-200W
1	Porch		1
2	Principal Room	1	

ANALYSIS

There should be a regular maintenance schedule of equipment like pumps, exhaust fans, and IT equipment. Electronics such as computers, printers, scanners, etc. more than 3 years or 5 years (as per their life) should be replaced with new computers/laptops. Ideal Temperature should be maintained for all electronic appliances.

***** **END OF THE REPORT** ******