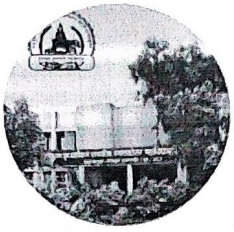
ENERGY AUDIT REPORT

Sant Guru Ghasidas Govt. PG College Kurud, Dist. Dhamtari (CG)



Submitted

to

IQAC

Sant Guru Ghasidas Govt. PG College Kurud, Dist. Dhamtari (CG)

Submitted by

Energy Audit Committee

Sant Guru Ghasidas Govt. PG College Kurud, Dist. Dhamtari (CG)

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Assistant Engineer (S/Dn.)
C.S.P.D.C.L. Kurud

2022/12/15 16:08

OFFICE OF THE SUB-DIVISIONAL OFFICER

CSPDCL, Sub-division Kurud, Dist.- Dhamtari (C.G.)

Energy Audit Certificate

This is to certify that Department of CSPDCL has conducted energy audit of Sant Guru Ghasidas Govt. P. G. College Kurud, District– Dhamtari, (C. G.), and submitted report under their Policy for Green Campus of the Institute.

Name of the Institute	Sant Guru Ghasidas Govt. P. G. College Kurud, District – Dhamtari (C.G.)
Contact Details	Tel. – 07705223375 E-mail: pgcollegekurud@gmail.com Website: www.govtcollegekurud.com
Name of Principal	Dr. O. P. Chandraker
Details of the facilities audited	Office, All the departments, Laboratories, Classrooms, Seminar Hall, Library, B. P. Ed. Building, Scienc Block I, II & III.
Date of Audit Conducted	21-22 November 2022
Name of Energy Auditor	Shri S. K. Kosare Assistant Engineer CSPDCL Kurud

(S. K. Kosare)
Assistant Engineer
CSPDCL Kurud

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1. Preface

Data collection for an energy audit of the Sant Guru Ghasidas Govt. PG College Kurud, Dist. Dhamtari (CG) Campus was carried out by the audit committee for the period of 1 Feb 2021 to 31 Jan 2022. The aim of this audit was over sighted to inquire about convenience to progress the energy competence of the campus. This audit is required to recognize the mainly energy proficient appliances. Besides, several each-day processes concerning common appliances have been provided which facilitate sinking the energy expenditure. The energy audit survey was completed by the energy audit committee. All data was collected from each classroom, laboratory, every room. The work is completed by considering, how many tubes, fans, A. Cs, electronic instruments, etc in each room. How much was the participation of each component in total electricity consumption?

Suresh Kosre
EMP No. 9511221
Assistant Engineer (S/D)
C.S.P.D.C.L. Kurud

Objectives:

Energy conservation means a reduction in energy consumption without making any sacrifice of quantity or quality. A successful energy management program begins with energy conservation; it will lead to the adequate rating the of equipment, using high-efficiency equipment, and change of habits which causes enormous wastages of energy. By observing all these studies lack electricity and huge electricity demands. It is necessary to plan to be self-sufficient in electricity requirements.

The Energy Audit was defined to meet the following objectives:

- Conduct a simple Walk-Through audit or observation of the energy consumption of electrical appliances within the college building.
- Review and analyze energy usage history to create a baseline for which savings can be measured in the audited building.
- Determine what can be done to reduce energy consumption throughout the buildings and what options are available for system improvements if funding is available.
- Identify and evaluate measures that could improve the environmental performance of the buildings/wards and provide recommendations.

2. INTERPRETATION

In this report, unless the contrary intention appears;

- ***Energy Conservation*** means steps taken to reduce and to use as much energy as necessary through changing energy consumption behavior, e.g. Switching off lights when not in use.
- ***Energy Efficiency*** means using less energy to provide the same service/output, e.g. Replacing inefficient 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.
- ***Retrofitting*** means upgrading an existing system to improve energy efficiency.
- ***Tariff*** means the amount of money charged 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. SUMMARY OF RECOMMENDATIONS

Below are some recommendations based on general observations carried out throughout the college building. The recommendations are categorized with A being the most urgent where immediate actions are needed to be executed. B can be 1 to 2 months after receiving this report, while C will depend on the availability of funds.

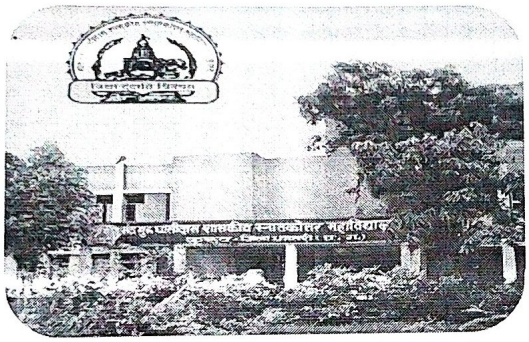
Recommendations			
S.No.	**Category A**	**Category B**	**Category C**
01	Apply energy conservation measures. Isolate or unplug vampire loads from power when not in use (i.e., rechargeable equipment, computer, and any other electronic devices with standby modes).	Establish Energy Efficiency and Conservation steering committee to take lead with EE&C initiatives and management within the college buildings.	Where applicable, replace all Double Frame light fittings (double tube) with a single frame (single tube) throughout the building. Also, remove unnecessary lights or reduce the number of lights per location.
02	Remove faulty light holders and bulbs or remove the live wire from the socket inside the light holder.	Renovate or improve the lighting control, i.e., add more switches to existing rooms/spaces where only one switch controls more than 10 lights, especially the lights in the conference/meeting room.	Replace all lights with energy-efficient light bulbs, i.e., Replace Tube light (36 watts) Fluorescent tubes with Tube light (15 watts) retrofits.
03	Remove any faulty appliances located in the building.	Use fans in places where possible (especially in unsealed rooms, indoor corridors, conference rooms, etc.).	The conservation and efficiency mechanisms are tools for reducing the energy consumption
04	Isolate or unplug faulty air conditioners if found within the building (working but no cold air coming out) and, OR service the air conditioner units quarterly.	Remove air conditioner if the room is very poorly sealed (i.e., if the room has no seals on the door and is frequently open at times).	Replace old existing outdoor air conditioner units with efficient ones (if funding is available).

4. Description of Building

The college main office in the old building is located in the middle of the playground of the college as shown in Figure

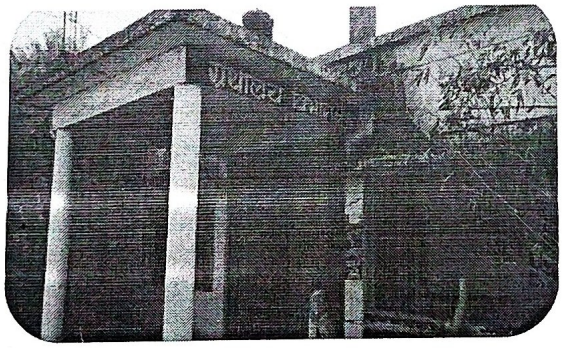
The college has seven buildings. Which are

1. Main Office Building (Old Building)
2. Vigyan Prayogshala Building (Science Block-01)
3. Library Building
4. B.P.Ed Building
5. Atrikt Kakch Bhavan (Science Block-02)
6. Atrikt Kakch RUSA Bhavan (Science Block-03)
7. Atal Munch

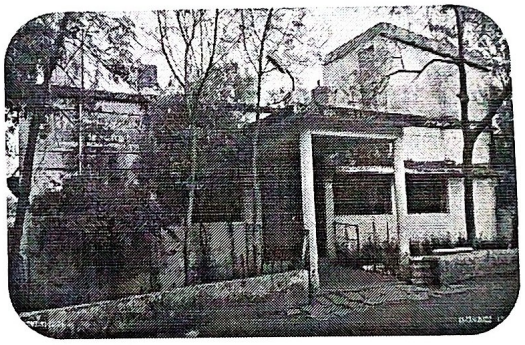


1. Main Office Building (Old Building)

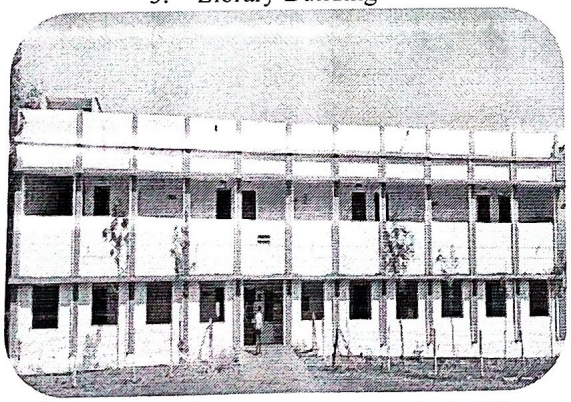
2. Vigyan Prayogshala Building (Science Block-01)



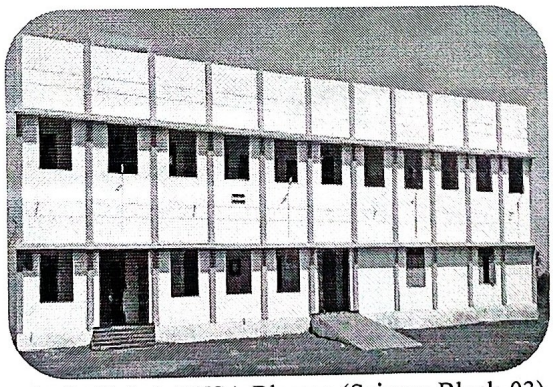
3. Library Building



4. B.P.Ed Building



5. Atrikt Kakch Bhavan (Science Block-02)



6. Atrikt Kakch RUSA Bhavan (Science Block-03)

7. Atal Munch

5.FINDINGS

I. Vampire Loads Findings

i. Issue(s)/Observation(s)

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

ii. Recommendation(s)

- All Electronic appliances should always be 'unplugged' or turned from the power sockets, after office hours.
- try to avoid putting appliances on 'STANDBY MODE'.
- Remove faulty lightings.

II. Lighting

Lighting is the most common load which is used in all the rooms and outdoors. Here are some of the aspects and faults that were discovered:

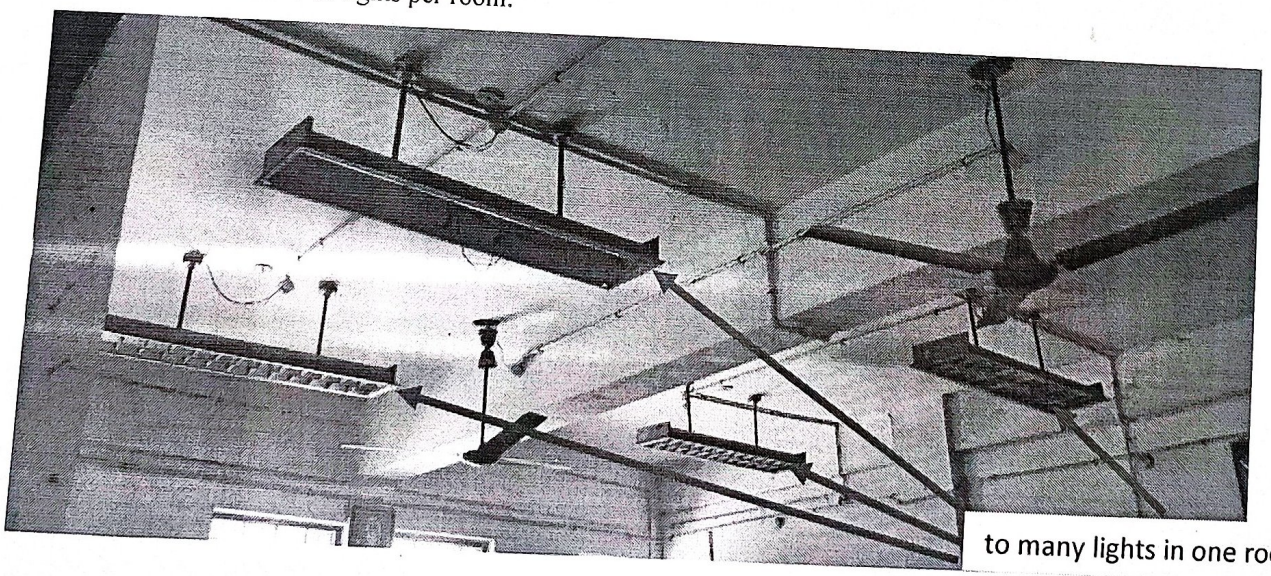
i) Findings of lightings

a. Observation(s)/Issue(s): -

- It has been observed there are a lot of unnecessary lights in one single room (see Figure 2)
- Too many lights are assigned to 1 switch.

b. Recommendation:

- Turn OFF lights when not used.
- Reduce the number of lights per switch, to better manage light.
- Reduce the number of lights per room.



to many lights in one room

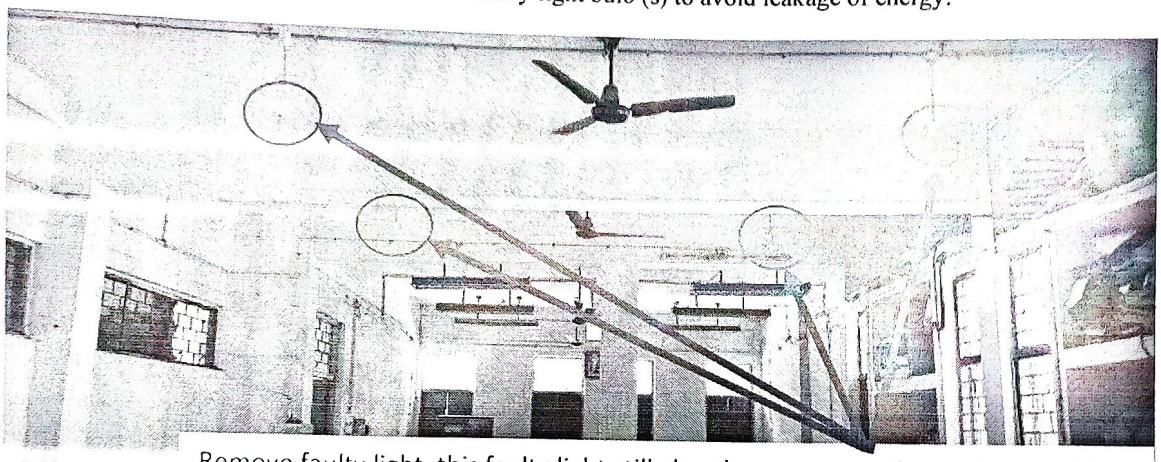
ii) Faulty lights

a. **Observation(s)/Issue(s):**

The ballast of faulty light will draw power when the lights are ON even though it is not working.

b. **Recommendation(s):**

Disconnect the live wire connected to the faulty light bulb (s) to avoid leakage of energy.



Remove faulty light, this faulty light still absorb power even though it is not ON.

III. Air conditioners

i. Air Conditioning Management:

a. Observation(s)/Issue(s):

- Brand & model are not consistent throughout the building which is expensive for maintenance.
- Officers leave the door open when entering and exiting the room where the air conditioner is located. - air conditioning contributes to about 62% of the overall power consumption of the buildings.
- windows and doors of the air-conditioned rooms not sealed properly i.e. using louvers is 'highly Not recommended'.

b. Recommendation(s)

- Use the same brand throughout (cheap for maintenance cost)
- It is recommended that the air conditioners be serviced quarterly.
- use sealed glass windows and sealed glass doors.
- always close the door when entering/exiting an air-conditioned room (put a notice on the front and back of the door as a reminder).
- Keep and maintain the temperature at **23** °C during summer and occasionally used in winter.
- Switch OFF when not in use but avoid reducing to a lower temperature and leave it ON
- Use an electric fan whenever possible.
- Use outside Freeze, when possible, should the air conditioner be turned off completely to minimize the cost of electricity.
- Installation of correct sizing of air conditioner in the rooms.
- All installed air conditioners should be serviced at least one times a year.

IV. Office Equipment (Computers, printers, and network accessories)

i. Findings of Office Equipment

a. Issue(s)/Observation(s):

-Most of the office equipment is usually left without turning them off after working hours and are using electricity as Vampire loads.

- Electronics appliances (computer, printer, etc.) are still ON when connected to PowerPoint even though they are turned off.

b. Recommendation(s)

-all office equipment such as printers, computers i.e. PC, monitors, etc. must be turned off on the PowerPoint or unplugged from the PowerPoint

- Avoid putting equipment on 'STANDBY MODE'

Experimental and data collection:

All required data is collected by the energy audit committee. In the building, in every room, how many fans, tubes, fans, computers, instrument AC, etc will these be measured. According to the survey following data is collected.

Department/instrument	Fan/ Exhaust Fan	LED	CFL/ Bulb	Tube light	AC/ cooler	Fridge	Computer/ Smart TV	Printer/ photo-copy	Scanner	Proj-ector	Pump /water cooler
Principal office	04+01	02	-	04	01	01	01+01 TV	-	-	-	-
Office	10	02	-	06	-	-	03	02+01	01	-	-
Library	24+02	02	02	36	01	-	03	00+01	-	-	-
Physics lab	09+04	-	-	12	-	-	01	-	-	01	-
Chemistry lab	14	-	-	12	-	-	-	-	-	-	-
Zoology lab	06	-	-	04	-	01	01	01	-	01	-
Botany lab	10	04	-	08	-	-	-	-	-	01	-
Biotechnology lab	10	04	-	08	-	-	01	-	-	01	-
Computer lab	05	-	-	10	-	-	26	-	-	-	-
English Lang. Lab	06	-	-	06	-	-	01	-	-	01	-
Geography Lab	06	-	02	04	-	-	02	-	-	01	-
E-Class Room	04	-	-	06	-	-	01+01TV	-	-	01	-
HOD Office	08	05	-	10	-	-	01	-	-	-	-
BPED Building	24+02	04	02	20	-	-	01	00+01	-	01	-
Science Budling-01	08	-	-	08	00+02	-	-	-	-	-	00+01
Science Budling-02	12+02	02	-	18	-	-	-	-	-	-	01+01
Science Budling-03	16+02	-	-	28	-	-	-	-	-	-	00+01
OLD Building	126+05	10	20	86	01	-	-	-	-	-	00+01
Atal munch	06	02	-	06	-	-	-	-	-	-	-

6. HISTORICAL DATA ANALYSIS

Energy Balance Table shows the electricity consumption of college for 1 year. average estimated power consumption was calculated

Electricity bill budget for college									
S.No.	Month	Power Consumption/Month							
		Main Building	Library Building	BPED Building	Science Building-01	Science Building-02 & 03	Atal Bhawan	pump	Total Electricity Consumption/Month
01	Feb 2021	2851	91	97	101	577	00	964	**4681**
02	March 2021	2556	141	139	122	188	00	933	**4079**
03	April 2021	00	101	17	68	117	00	863	**1166**
04	May 2021	1509	72	67	43	82	00	812	**2585**
05	June 2021	1560	6	33	37	239	00	714	**2589**
06	July 2021	1969	64	101	133	332	00	696	**3295**
07	August 2021	1493	00	361	29	180	00	537	**2600**
08	September 2021	1215	150	56	37	169	00	552	**2179**
09	Qctober 2022	4143	352	106	118	214	00	379	**5312**
10	November 2021	2177	97	710	128	122	00	470	**3704**
11	December 2021	3637	92	140	128	218	00	695	**4910**
12	January 2022	1216	103	142	88	198	00	267	**2014**
Total		**24326**	**1269**	**1969**	**1032**	**2636**	**00**	**7882**	**39114 Unit/ Month**

From Table, the average of the monthly consumption is calculated to be: 3259.5 Unit/Mont, Thus, the yearly consumption is **39114 Unit/ Month.**

One unit is equal to 1000 watt so total yearly consumption to be 3911.4 **kw.**

Conclusion:

In conclusion, data generated in energy audits are useful for understanding the energy distribution and utilization of college. The college needs a maximum 3911.4 KW of electricity. In other words, college needs 39114 Units/year.

Recommendation:

1) Replace all CFL Tube light using LED Bulb, to save more power.
2) Replace CRT monitor using LED or LCD monitor.
3) Separate connection of office, Computer Lab. and classroom.

Results and discussion:

As far concerning the energy audit, electricity audit is main concern regarding educational institution. We have collected data by considering the tube light, fan, computer, printer, A.C and other instruments. The total required energy is 3911.4 KW. Energy Consumption through all device is 39114Unit /Month.