

## **Energy Audit Report**

**Dyal Singh College, Karnal, Haryana- 132001**

**Year: 2022-2023**



**Dyal Singh College,  
Karnal -132001, Haryana**

**Prepared by:**

**Ms. Nidhi Jast, Assistant Professor, Physics**

**Dr. Mandeep, Assistant Professor, Chemistry**

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# CERTIFICATION OF ACCREDITATION



**राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद**  
 विद्याविद्यालय अनुदान आयोग का स्वायत्त संस्थान  
**NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL**  
*An Autonomous Institution of the University Grants Commission*

## *Certificate of Accreditation*

*The Executive Committee of the  
 National Assessment and Accreditation Council  
 is pleased to declare  
 Dyal Singh College, Karnal  
 Dist. Karnal, affiliated to Kurukshetra University,  
 Haryana as  
 Accredited  
 with CGPA of 3.43 on four point scale  
 at A+ grade  
 valid up to May 18, 2028*

*Date : May 19, 2023*

  
  
 Director

EC(SC)/155/3<sup>rd</sup> Cycle/HBCOGN1131



**राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद**  
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## *Quality Profile*

Name of the Institution : Dyal Singh College, Karnal  
 Place : Dist. Karnal, Haryana

Criteria	Weightage (W <sub>i</sub> )	Criterion-wise Weighted Grade Point (Cr WGP)	Criterion-wise Grade Point Averages (Cr WGP / W <sub>i</sub> )
I. Curricular Aspects	100	355	3.55
II. Teaching-Learning and Evaluation	350	1212	3.46
III. Research, Innovations and Extension	110	290	2.64
IV. Infrastructure and Learning Resources	100	350	3.50
V. Student Support and Progression	140	540	3.86
VI. Governance, Leadership & Management	100	341	3.41
VII. Institutional Values and Best Practices	100	340	3.40
Total	$\sum_{i=1}^7 W_i = 1000$	$\sum_{i=1}^7 (Cr WGP) = 3428$	

$$\text{Institutional CGPA} = \frac{\sum_{i=1}^7 (Cr WGP)}{\sum_{i=1}^7 W_i} = \frac{3428}{1000} = 3.43$$

Grade = A+

*Date : May 19, 2023*

  
  
 Director

• This certification is valid for a period of Five years with effect from May 19, 2023  
 • An Institutional CGPA on four point scale in the range of 3.51 - 4.00 denotes A+ grade,  
 3.26 - 3.50 denotes A grade, 3.01 - 3.25 denotes A grade, 2.76 - 3.00 denotes B+ grade,  
 2.51 - 2.75 denotes B grade, 2.01 - 2.50 denotes B grade, 1.51 - 2.00 denotes C grade  
 • Scores rounded off to the nearest integer

EC(SC)/155/3<sup>rd</sup> Cycle/HBCOGN1131

## **ACKNOWLEDGEMENT**

We would like to extend our heartfelt gratitude to the Principal Dr. Ashima Gakhar, advisors of the Green Audit staff Advisors: Sh Sushil Kumar and Dr. Ritu Sharma for their invaluable guidance and support throughout the process of conducting this audit. Their expertise, insights, and dedication have been instrumental in shaping the direction of our efforts and ensuring the quality of our work.

We also wish to express our sincere appreciation to all faculties and technical staff who generously contributed their time, knowledge, and resources to assist us in collecting the necessary data for the Green Audit. Their cooperation and collaboration have been essential in gathering the information needed to compile a comprehensive and successful report.

Together, with the collective efforts of our advisors, faculties, and technical staff, we have made significant strides towards promoting environmental sustainability and fostering a culture of responsible stewardship within our organization. Thank you for your unwavering support and commitment to making a positive impact on our environment.

Ms. Nidhi Jast  
In-charge  
Energy Audit Committee

Dr. Mandeep  
Member  
Energy Audit Committee

### **3. Advisors**

1. Sh. Sushil Kumar
2. Dr. Ritu Sharma

### **4. Green Monitoring Committee**

A committee of the following members has been constituted for the conduction of Energy Audit.

1. Ms. Nidhi Jast
2. Dr. Mandeep
3. Sh. Balwant Singh
4. Sh. Sumit

Committee shall submit audit reports to the undersigned in addition to the above, Sh. Azad Singh (Offg. Deputy Supdt.) and Sh. Parveen Kumar (Clerk) will be responsible to provide all the required details and documents to the committee as and when required.

## **Energy conservation / Energy Saving Initiatives**

1. The Architecture of the college building is helpful in the conservation of natural resources and energy.
2. Provision of larger windows encourages natural light in the classrooms and fresh air makes the room atmosphere fresh and healthy.
3. Insisting the users to turn on power management features so that their desktops consume less power, when they are not using them.
4. Users are motivated to enable printer's power management functions.
5. Users are motivated to switch off monitor, when they are leaving their desk.
6. Making use of LED and CFL Lamps.
7. Shutting down the computer rather than signing off whenever it is possible.
8. Turning off redundant lights and uses sun light.
9. Using the fans when it required.

## **EXECUTIVE SUMMARY**

The executive summary of the energy audit report furnished in this section briefly gives the identified energy conservation measures and other recommendation during the project that can be implemented in a phased manner to conserve energy and increase productivity inside the college campus.

### **ENERGY MANAGEMENT INITIATIVES TAKEN BY COLLEGE**

#### **SOLAR SYSTEM**

Solar System installed in the Institute under The State Project data RUSA Haryana.

# **ENERGY AUDIT RECOMMENDATION**

## **+ LIGHTING SYSTEM**

College has already initiated installation of energy efficient lighting in building and replacement of “conventional tube light (**36 watt**) by energy efficient LED light (**20 watt**). Still there are good potential for replacement of **197** no. of conventional **T-8 (36 watt)**” tube light by energy efficient **20Watt LED** light in college. Estimated energy saving **11440** units/year.

## **+ CEILING FAN**

Replacement of “conventional ceiling fan (80 watt)” by energy efficient star rated fan or BLDC based energy efficient fan (28 watt) in class rooms , laboratory and staff cabins have great potential for energy saving.

## **+ TIMER CONTROL STREET LIGHTS**

It is recommended to install “timer control in street lighting” in the campus.

## **+ IOT BASED ENERGY MONITORING SYSTEM**

Installation of “Cloud based (IoT based) energy monitoring system” on electrical feeder as well as energy monitoring on individual building will be good initiate for energy monitoring.



## ENERGY CONSERVATION MEASURES FOR ELECTRICAL SYSTEM

<b>CASE STUDY</b>	<b>SECTION</b>	<b>IDENTIFICATION</b>	<b>OBSERVATION</b>	<b>RECOMMENDATION</b>	<b>ANNUAL ENERGY SAVING (KWh)</b>	<b>ANNUAL COST SAVING (Rs.)</b>	<b>INVESTMENT (Rs.)</b>	<b>SIMPLE PAYBACK PERIOD</b>
<b>1.</b>	<b>Ceiling Fan</b>	110 No Ceiling fan working with 80 Watt	Power consumption by existing ceiling Fan (80 Watt)	Replacement of 80W conventional ceiling fan by 28W BLDC energy efficient ceiling fan	11,440	1,09,183/-	2,31,000/-	2.1 year
<b>2.</b>	<b>Lighting system</b>	197 No. FTL tubelight	Power consumption by T-8	Power consumption by t-8 (20 W)	6,340	60,165/-	41370/-	8 month

## **CHAPTER-1**

### **INTRODUCTION**

#### **1.1 About College**

Dyal Singh College, Karnal, as it stands today, is a premier co-educational centre of learning of Northern India. With a strength of 3152 students, the college has all the three streams of learning - Arts, Science and Commerce, with Post Graduate courses in English, Hindi, Political Science, Commerce and Chemistry, along with the add-on and vocational courses. The college also offers a 5-year Integrated Course M.Sc. Forensic Science under innovative programme sponsored by the UGC. The college is making progress under the esteemed guidance of Shri D.K. Raina - an embodiment of rare wisdom, learning and love for academia-President, Dyal Singh College Governing Body, and the dynamic leadership of Vice Admiral (Retd.) Satish Soni, PVSM, AVSM, NM, a man of letters with administrative acumen, who holds the office of the General Secretary. This unique centre of teaching and learning completed hundred years and more than a decade of its birth and turned into a century-old Fortress of Learning and Education... maintaining the tradition of Spirituality and Scientific temper in a world of diminishing human values... inculcating in young minds. a harmonious blend of the "Wisdom of the East and West". To quote our honourable Ex- President, Dewan Gajendra Kumar, "The lead word in our motto is Wisdom and Morality and Ethics are not far behind." True to the Will of our Illustrious Founder, Late Sardar Dyal Singh Majithia, the path of Wisdom, Morality and Ethics has been the kindling force all along.

## **Vision**

Excellence is a journey, not an end.....

## **Mission**

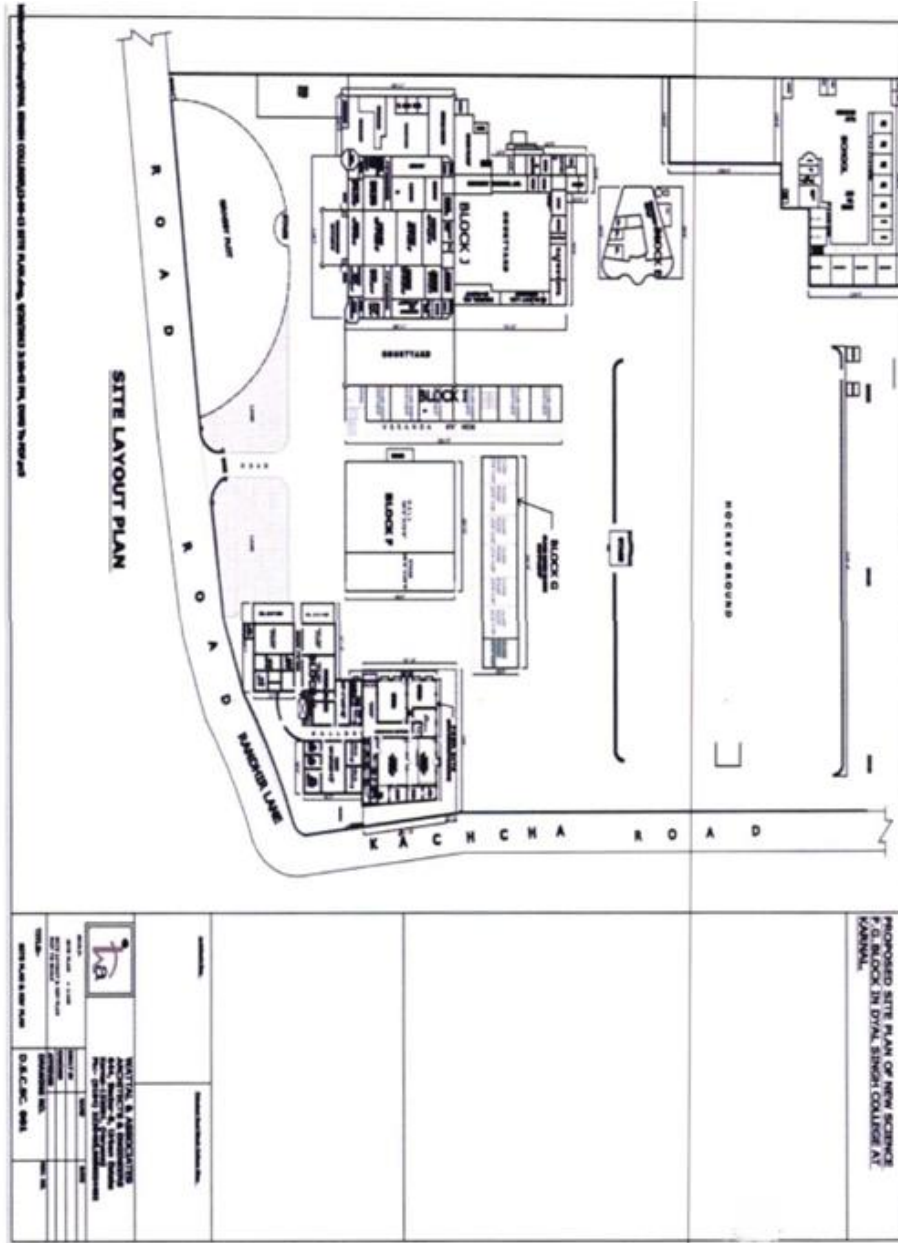
1. To create top quality human resource by developing the innate talent of our students.
2. To provide conducive environment for holistic development of personality and improve the overall academic performance.
3. To inculcate the spirit of Secularism, Nationalism, Communal Harmony & Rationalism.
4. To inculcate discipline as a value system and motivate youth to render service to the society at large.

## **College build-up area**

Details are the total build-up area given in the table :-

Campus area in sq. mts.	<b>32374.85</b>
Built up area in sq. mts.	<b>13310.53</b>

# Layout of college campus



## **1.2 About Energy Audit**

An energy audit helps to understand more about the ways energy is used in any college and helps in identifying areas where waste may occur and scope for improvement exists. The overall energy efficiency from generation to the final consumer becomes 50%. Hence one unit saved in the end user is equivalent to two units generated in the power plant.

An energy audit is the most efficient way to identify the strength and weaknesses of energy management practices and to find a way to solve problems. An energy audit is a professional approach to utilizing economic, financial, social, and natural resources responsibly. Energy audits "adds value" to management control and are a way of evaluating the system.

## **1.3 Objectives of Energy Auditing**

An energy audit provides a vital information base for an overall energy conservation program covering essentially energy utilization analysis and evaluation of energy conservation measures. It aims at:

- Identifying the quality and cost of various energy inputs.
- Assessing the present pattern of energy consumption in different cost centers of operations.
- Relating energy inputs and production output.
- Identifying potential areas of the thermal and electrical energy economy.
- Highlighting wastage in major areas.
- Fixing of energy-saving potential targets for individual cost centers.
- Implementation of measures for energy conservation & realization of savings.

## **1.4 Methodology**

The methodology adopted for achieving the desired objectives viz.: Assessment of the current operational status and energy savings includes the following:

- ✚ Discussions with the concerned officials for identification of major areas of focus and other related systems.

- ✚ A team of engineers visited the site and had discussions with the concerned officials/supervisors to collect data/information on the operations and load distribution within the plant and the same for the overall premises. The data were analyzed to arrive at a baseline energy consumption pattern.
- ✚ Measurements and monitoring with the help of appropriate instruments including continuous and/or time-lapse recording, as appropriate and visual observations were made to identify the energy usage pattern and losses in the system.
- ✚ Trend analysis of costs and consumptions.
- ✚ Capacity and efficiency test of major utility equipments, wherever applicable.
- ✚ Estimation of various losses
- ✚ Computation and in-depth analysis of the collected data, including utilization of computerized analysis and other techniques as appropriate, were done to draw inferences and to evolve suitable energy conservation plan's for improvements/ reduction in specific energy consumption.

### **1.5 Present Energy Scenario**

College uses energy in the form of electricity purchased from Uttar Haryana Bijli Vitran Nigam Limited grid with sanctioned load of 139 kW. Total billing amount of Dyal Singh College is Rs. 1225387/- with respect to annual energy consumption 1,45,128 unit analysis period from Jul-2022 to Jun-2023.

- ✚ Annual average per unit charges paid by college Rs. 9.15 per unit.

## CHAPTER-2

### POWER SUPPLY SYSTEM

#### 2.1 Transformer Details

The power supply for **Dyal Singh College, Karnal (H.R.)** is from Uttar Haryana Bijli Vitran Nigam Limited with sanctioned load of 139 kW. There is single transformer has capacity of 200 kVA. The details are given in following table 2.1

Table: 2.1 Technical details of transformer.

Sr. No.	Items	Technical Specification
1	Make	MELCON
2	Year	2013
3	Rating (kVA)	200
4	Volts at No load (HV / LV)	11000/433
5	Current Rating (HV / LV)	10.50/266.68
6	Frequency (Hz)	50
7	Impedance	4.5%
8	Vector group	Dyn-11
9	Type of cooling	ONAN

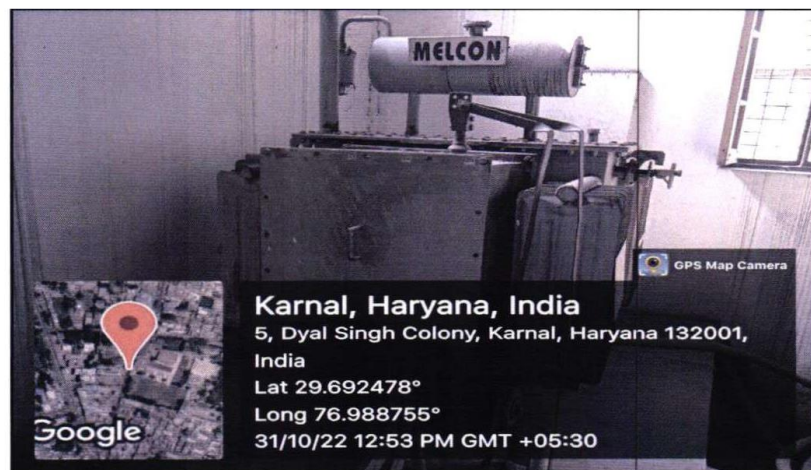


Image of 200 kVA Transformer

## Power Measurement and Loading of the Transformer

Sr. No.	Voltage	Current	Power Factor	KW	KVA	TR Loading %
1	419	49.8	0.9	32.53	36	18.07

### Observation :-

- ✚ It is observed that during the energy audit transformer was in working condition.
- ✚ Transformer loading is 18.07% It is acceptable.



## 2.2 DG Set

There is one DG set in the campus. Details of the DG Set is given table. 2.2

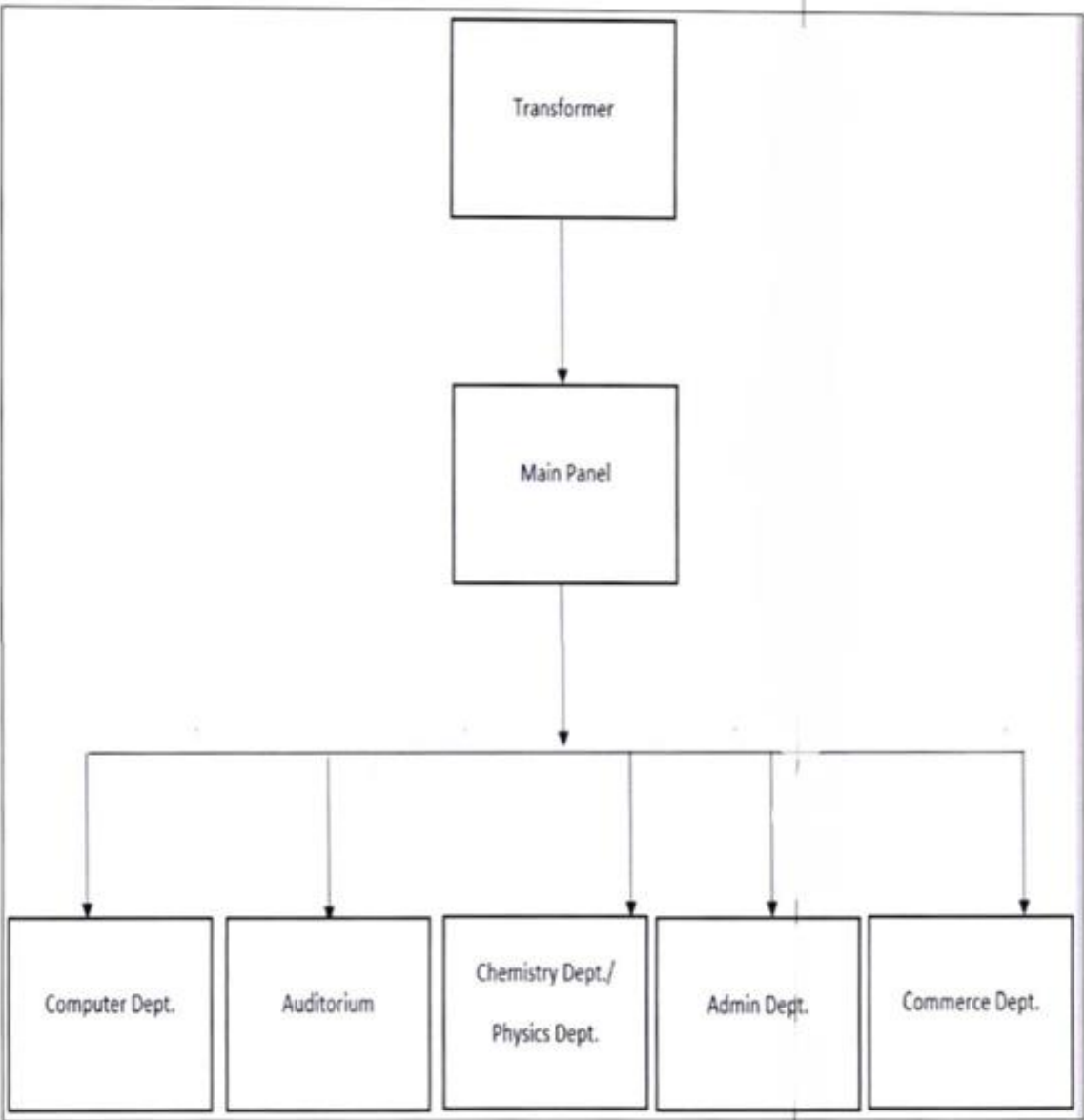
Table 2.2 Technical specifications for DG set

Sr. No.	Parameter	Technical Specification DG Set-01
1	Make	Kirloskar
2	M/C No	ES3H011C124751
3	Capacity (KVA)	125
4	Rated Voltage	415
5	Frequency	50
6	Power Factor	0.8
7	RPM	1500
8	Phase	3

### Observation

- ✚ DG set is used only in case of power failure.
- ✚ There is requirement of energy and fuel meters to monitor total unit generation with respect to fuel consumption.

**Single Line Diagram (SLD)**



## 2.3 Capacitor Bank

The energy audit team examine of existing capacitor bank at the power house. Details of the capacitor are given in table 2.3

Sr. No.	Location No.	Capacity KVAR	Phase	Measured Current	Rated Current	Output KVAR	% Derating	Remarks
1	Capacitor- 1	5	R	3.8	6.1	3.1	37.7	OK
			y	3.8				
			B	3.8				
			Avg	3.8				
2	Capacitor- 2	5	R	2.3	6.1	2.3	54.1	OK
			y	2.9				
			B	3.2				
			Avg.	2.8				
3	Capacitor- 3	10	R	12.9	13.1	9.8	2.3	OK
			y	12.8				
			B	12.7				
			Avg.	12.8				
4	Capacitor- 4	10	R	12.6	13.1	9.5	4.6	OK
			y	12.1				
			B	12.8				
			Avg.	12.5				
5	Capacitor- 5	10	R	12.6	13.1	9.7	2.5	OK
			y	12.8				
			B	12.9				
			Avg.	12.8				
6	Capacitor-6	20	R	24.5	26.2	12.4	37.9	Need to replaced
			y	24.3				
			B	0				
			Avg.	16.3				

**Observation :**

- ✚ The college has 60 kVAr capacitor bank for maintain the power factor.
- ✚ During the health check up capacitor bank and find out one capacitor is not working condition.
- ✚ Total capacitor output is 46.8 kVAr

## CHAPTER 3

### ELECTRICITY BILL ANALYSIS

#### 3.1 Monthly Electrical Energy

The monthly electrical consumption for the college is given in the table for the year 2022-2023.

S.No	Month & Year	Sanctioned Load	Total Consumption (kVAh)	Amount (Rs.)	Surcharge (Rs)	Overall Unit Charges (Rs./kWh)
1	Apr-22	139	13856	112518	NIL	13718
2	May-22	139	20524	151385	NIL	20292
3	June-22	139	18158	148182	NIL	17996
4	July -22	139	15162	128189	NIL	15026
5	Aug-22	139	12352	108855	NIL	12294
6	Sept-22	139	16740	138281	NIL	16606
7	Oct-22	139	9950	92321	NIL	9872
8	Nov-22	139	7466	75634	NIL	7388
9	Dec-22	139	7400	74772	NIL	7358
10	Jan-23	139	10414	95515	NIL	10344
11	Feb-23, Mar-23	139	13106	99735	NIL	13106-4180(Solar Unit ) = 8926
Total			145128	1225387		

#### 3.2 On site power measurement in the college

S.No	Location	Voltage (V)	Current (A)	Power Factor	Input Power KW
1	Computer Science	425	24.7	0.86	15.6
2	Chemistry Building	418	15.1	0.87	9.5
3	Admin Building	421	17.3	0.88	11.1
4	Auditorium Hall	420	5.8	0.88	3.7
5	Old Building	416	4.8	0.87	3.0
6	Commerce Building	415	5.1	0.85	3.1

## Chapter 4

### Connected Load

#### 4.1 Connected Load Detail of the College

S. No	Location	Ceiling Fan	Wall Fan	Exhaust Fan	Tube Light	LED Tube	LED Bulb	CFL	Air Cooler	Pedestal Fan	Electric Kettle	Oven
1	Administrative Office	10	1	1	9	2	2	1	0	1	1	1
2	Principal Office	4	0	2	1	7	3	0	0	0	1	0
3	Staff Room	3	4	1	7	0	5	0	0	0	0	1
4	Mathematics Department	2	1	0	0	1	1	1	0	0	0	0
5	Physics Department	39	2	2	11	11	7	0	0	0	1	0
6	Chemistry Department	19	0	13	16	0	t-light	2	0	0	0	0
7	Botany Department	19	0	2	5	0	12	16	0	0	0	0
8	Zoology Department	16	1	3	13	0	2	1	0	0	0	0
9	Biotechnology Department	5	0	1	1	0	7	0	0	0	0	1
10	Bio-Informatics Department	0	0	0	0	0	0	0	0	0	0	0
11	Forensic Department	17	0	2	0	0	0	3	0	0	0	2
12	Commerce Department	3	1	1	1	0	1	0	1	2	0	1
13	computer Department	44	0	2	0	12	19	15	0	1	0	0
14	Geography Department	22	5	6	12	5	10	2	0	0	0	0
15	Economics Department	1	1	0	1	0	0	1	0	0	0	0
16	English Department	1	2	0	1	2	0	0	0	0	0	0
17	Hindi Department	1	1	0	0	1	1	0	0	0	0	0
18	Punjabi Department	1	0	0	1	0	1	0	0	0	0	0
19	History Department	1	1	1	0	2	0	0	0	0	0	0
20	Pol. Science Department	1	0	0	0	2	0	0	0	0	0	0
21	NCC Air Wing	1	1	0	1	0	1	0	0	0	0	0
22	NCC Store Air Wing											

<b>S. No</b>	<b>Location</b>	<b>Ceiling Fan</b>	<b>Wall Fan</b>	<b>Exhaust Fan</b>	<b>Tube Light</b>	<b>LED Tube</b>	<b>LED Bulb</b>	<b>CFL</b>	<b>Air Cooler</b>	<b>Pedestal Fan</b>	<b>Electric Kettle</b>	<b>Oven</b>
23	NCC Army Wing	1	1	0	1	0	1	0	0	0	0	0
24	NCC Army Wing Store	0	0	0	0	0	0	0	0	0	0	0
25	NSS	1	0	1	1	1	0	0	0	0	0	0
26	Retiring Room (W)	0	0	0	0	0	0	0	0	0	0	0
27	Sports Department	2	0	0	1	0	1	1	0	0	0	0
28	TT Room	0	0	0	0	0	0	0	0	0	0	0
29	Women Development Centre	1	0	0	1	0	1	0	0	0	0	0
30	Department of Youth Welfare	1	0	0	1	1	1	0	0	0	0	0
31	UGC Room	0	0	0	0	0	0	0	0	0	0	0
32	Conference Room											
33	Red- Cross Room	1	0	0	2	0	0	0	0	0	0	0
34	Alumni Room	1	0	0	0	2	0	0	0	0	0	0
35	Examination Room	1	0	1	0	2	0	1	0	0	0	0
36	Girls Common Room	13	0	1	4	0	0	0	0	0	0	0
37	Library	32	0	1	46	12	0	0	0	3	1	0
38	Canteen	10	0	1	6	0	4	4	0	0	0	1
39	Auditorium	65	0	1	5	0	4	0	0	0	0	0
<b>Total</b>		<b>339</b>	<b>26</b>	<b>43</b>	<b>149</b>	<b>63</b>	<b>97</b>	<b>48</b>	<b>1</b>	<b>7</b>	<b>4</b>	<b>7</b>

Sr. No	location	Room Heater	Inverter	Computer	Printer	Scanners	Refrigerator	AC	Cooler	LED /LCD Projector	Overhead Projector	IFPD
1	Principal Office	4	2	10	9	3	1	3	0	1	1	0
2	Principal Room	1	0	1	0	0	1	3	0	0	0	0
3	Staff Room	0	0	0	0	0	1	3	0	1	0	0
4	Mathematics Department	1	0	1	1	0	0	0	0	1	0	0
5	Physics Department	3	0	46	4	1	1	2	0	1	0	1
6	Chemistry Department	0	0	7	2	0	1	0	0	1	1	1
7	Botany Department	2	0	2	1	0	1	0	0	1	0	0
8	Zoology Department	1	0	2	1	0	1	0	0	1	0	0
9	Biotechnology Department	0	1	1	0	0	2	0	0	1	0	0
10	Bio-Informatics Department	0	0	11	2	1	0	0	0	0	0	0
11	Forensic Department	1	0	4	1	1	1	0	0	1	0	0
12	Commerce Department	2	0	1	1	1	1	0	0	3	3	1
13	computer Department	1	0	180	1	1	1	6	0	3	0	1
14	Geography Department	1	0	1	3	2	1	0	0	1	1	1
15	Economics Department	0	0	1	1	0	0	0	0	1	1	0
16	English Department	1	0	1	1	0	0	0	0	0	0	0
17	Hindi Department	1	0	1	1	0	0	0	0	0	0	0
18	Punjabi Department	0	0	0	0	0	0	0	0	0	0	0
19	History Department	1	0	1	1	0	0	0	0	0	0	0
20	Pol. Science Department	1	0	1	1	0	0	0	0	0	0	0
21	NCC Air Wing	1	0	1	1	0	0	0	0	0	0	0
22	NCC Store Air Wing	0	0	0	0	0	0	0	0	0	0	0
23	NCC Army Wing	0	0	0	1	0	0	0	0	0	0	0
24	NCC Army Wing Store	0	0	0	0	0	0	0	0	0	0	0



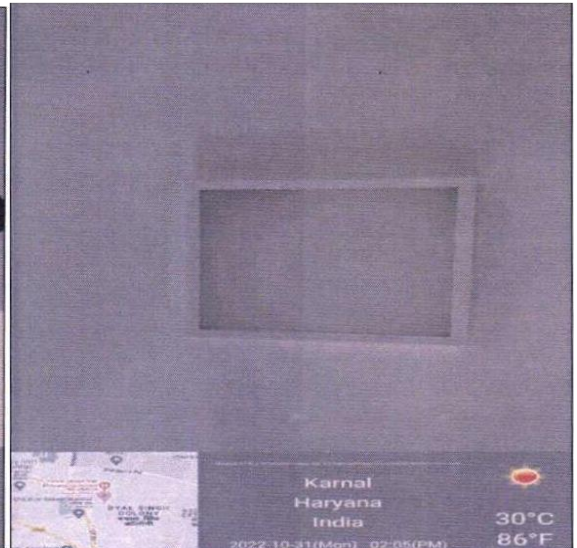
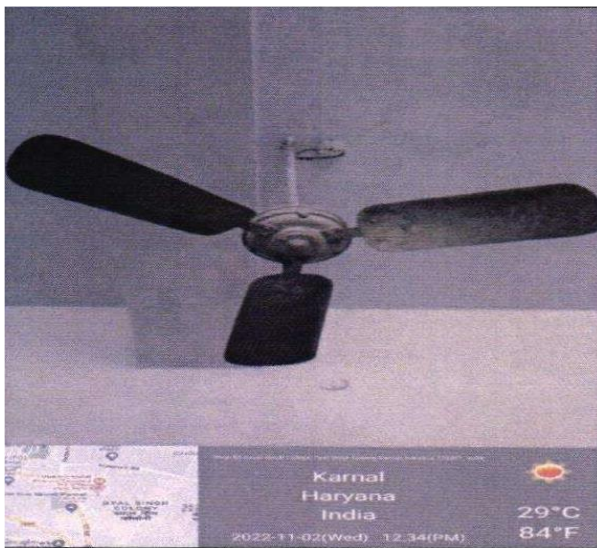
25	NSS	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Sr. No</b>	<b>location</b>	<b>Room Heater</b>	<b>Inverter</b>	<b>Computer</b>	<b>Printer</b>	<b>Scanners</b>	<b>Refrigerator</b>	<b>AC</b>	<b>Cooler</b>	<b>LED /LCD Projector</b>	<b>Overhead Projector</b>	<b>IFPD</b>
26	Retiring Room (W)	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
27	Sports Department	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
28	TT Room	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
29	Women Development Centre	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
30	Department of Youth Welfare	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
31	UGC Room	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
32	Conference Room/seminar r	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
33	Red- Cross Room	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
34	Alumni Room	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
35	Examination Room	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
36	Girls Common Room	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>
37	Library	<b>4</b>	<b>1</b>	<b>12</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
38	Canteen	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total</b>		<b>31</b>	<b>4</b>	<b>286</b>	<b>40</b>	<b>11</b>	<b>13</b>	<b>18</b>				<b>6</b>

<b>Sr. No</b>	<b>Location</b>	<b>LED Light</b>
<b>1</b>	Street Light (50W)	9
<b>2</b>	Street Light(Metal Helide (400W)	3
<b>3</b>	Street Light (120 W)	7
<b>4</b>	Auditorium(100W)	4
<b>5</b>	Auditorium(120 W)	1
<b>6</b>	Auditorium(12W)	12

## 4.2 Electrical Equipment's and Load Sharing

Sr. No	Equipment	Unit Power (Watt)	Quantity (No)	Total Power (Watt)	Load Share (%)
1	Fan	50	473	23,650	10.73
2	Wall Fan	50	30	1500	0.68
3	Tube Light	36	197	7092	3.22
4	LED Tube Light	24	127	3048	1.38
5	CFL	18	65	1170	0.53
6	Air Cooler	150	1	150	0.07
7	Pedestal Fan	30	7	210	0.10
8	Electrical Kettle	1500	4	6000	2.72
9	Microwave	2000	7	14000	6.35
10	Room Heater	400	31	12400	5.63
11	Inverter	3000	4	12000	5.24
12	Scanner	10	11	110	0.05
13	Printer	30	30	1200	0.54
14	Fan	80	110	8800	3.99
15	Exhaust Fan	70	286	20020	9.08
16	Computer	40	43	1720	0.78
17	AC	5275	18	94950	43.06
18	Refrigerator	500	13	6500	2.95
19	LED Projector	30	15	450	0.20
20	Overhead Projector	750	3	2250	1.02
21	IFPD	220	6	1320	0.28
22	Street Light	50	9	450	0.20
23	LED Street Light	120	7	840	0.38
24	Metal Helide	400	3	1200	0.54
25	LED Light	100	4	400	0.18
26	LED Light	150	1	150	0.07
26	LED Light	12	12	144	0.07
Total Power in Watt				221,580	100

### 4.3 Some Images of Electrical Equipment:



**FAN**

**AC**

## Chapter 5

### ENERGY CONSERVATION MEASURES

#### 5.1 Case Study

Replacement of 80W conventional ceiling fan by 28 Watt BLDC energy efficient Ceiling fan.

<b>S.No</b>	<b>Item</b>	<b>Parameter</b>	<b>Unit</b>
1	Rated Power of Ceiling Fan	80	W
2	No. of Fan	110	Nos
3	Working Hour/day	8	Hour/day
4	Working Days/Year	250	Days/Year
5	BLDC Fan Rated Power	28	W
6	Energy Saving Potential	11440	kWh/Year
7	Load Factor	0.8	
8	Expected Annual Energy Saving	9152	kWh/Year
9	Per Unit Charges	11.93	Rs./ kWh
10	Expected Money Saving	109183	Rs./Year
11	Cost of New Ceiling Fan	2,000	Rs./piece
12	Investment on New Fan Purchasing	220000	Rs.
13	Maintenance Investment @5%	11,000	Rs.
14	Total Investment	2,31,000	Rs.
15	Simple Payback Period	2.1	Year

**Total Calculated Monetary Saving Potential in Ceiling Fan = 1,09,183/-**

**Total electricity units saving using solar Panel = 4180 (Solar Unit )**

**Total Calculated Monetary Saving using solar Panel = 8926/-**

## 5.2 Case Study

### Replacement of conventional (tube light) 36 Watt by energy saving 20 Watt LED Tube Light.

S.No	Item	Parameter	Unit
1	Total Power Consumption by T-8 Light	36	W
2	No. of T-8	197	Nos
3	Working Hour/day	8	Hour/day
4	Working Days/Year	250	Days/Year
5	Rate Power of T-5 (LED)	20	W
6	Energy Saving Potential	6304	kWh/Year
7	Load Factor	0.8	
8	Expected Annual Energy Saving	5043	kWh/Year
9	Overall Per Unit Charges	11.93	Rs./ kWh
10	Expected Money Saving	60165	Rs./Year
11	Cost of T-5	200	Rs./piece
12	Investment on New Fan Purchasing	39400	Rs.
13	Maintenance Investment @5%	1970	Rs.
14	Total Investment	41370	Rs.
15	Simple Payback Period	8	Month

**Total Calculated Monetary Saving Potential in light = 60165/-**

**END OF THE REPORT**