



**Energy Audit Report  
Chandrakanti Ramawati Devi Arya  
Mahila P.G. College, Gorakhpur U.P  
Year-2021-22**



## **ENERGY AUDIT REPORT**



**Chandrakanti Ramawati Devi Arya  
Mahila PG College,  
Diwan Bazar,  
Gorakhpur, Uttar Pradesh 273001**

PREPARED BY

**EMPIRICAL EXERGY PRIVATE LIMITED**

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(2021-22)



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## **ACKNOWLEDGEMENT**

**Empirical Exergy Private Limited (EEPL), Indore (M.P)** takes this opportunity to appreciate & thank the management of **Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur** for giving us an opportunity to conduct energy audit for the college.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation the course of study.



**Rajesh Kumar Singadiya**

**(Director)**

M.Tech (Energy Management), PhD (Research Scholar)  
Accredited Energy Auditor [AEA-0284]  
Certified Energy Auditor [CEA-7271]  
(BEE, Ministry of Power, Govt. of India)  
Empanelled Energy Auditor with MPUVN, Bhopal M.P.  
Lead Auditor ISO50001:2011 [EnMS) from FICCI, Delhi  
Certified Water Auditor (NPC, Govt of India)  
Chartered Engineer [M-1699118], the Institution of Engineers (India)  
Member of ISHRAE [58150]



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**BUREAU OF ENERGY EFFICIENCY**

Examination Registration No.: ..... **EA-7271** .....

Accreditation Registration No.: ..... **AEA-284** .....



**Certificate of Accreditation**

This is to certify that Mr./Ms. **Shri. Rajesh Kumar Singadiya** having its trade/registered office at ..... has been given accreditation as accredited energy auditor. The certificate shall be effective from **9<sup>th</sup>** day of **May, 2018** .....


The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No. **284** in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this **5<sup>th</sup>** day of **October, 2018**

  
Secretary,  
Bureau of Energy Efficiency  
New Delhi



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**Green Monitoring Committee.**

Estb. Year 1990

**Chandrakanti Ramawati Devi Arya Mahila P.G. College**  
Gorakhpur, U.P.  
**NAAC ACCREDITED**  
Website-[www.crdpcollege.edu.in](http://www.crdpcollege.edu.in)  
Mob : 7275618230

(Affiliated to D.D.U. Gorakhpur University, Gkp. U.P.)


Ref. 2284/K.R.D/2022 Date 07/07/2022

**Energy, Water, Green & Environmental Audit  
Committee**

Energy, Water, Green & Environmental Audit Committee will consist of the following faculty members.

S.No.	Name	Designation	Department
01	Mr. Anant Kumar Pathak	Assistant Professor	B.Ed.
02	Dr. Rekha Srivastava	Assistant Professor	M.Ed.
03	Dr. Aparna Mishra	Assistant Professor	B.Ed.
04	Dr. Virendra Kumar Gupta	Assistant Professor	M.Ed.
05	Dr. Sarika Jaiswal	Assistant Professor	Home Science
06	Miss Ankita Upadhyay	Assistant Professor	Commerce
07	Miss Priya Kumari	Assistant Professor	Sociology
08	Dr. Rekha Rani Sharma	Assistant Professor	Fine Art
09	Mr. Narendra Singh Kawat	Office Superintendent	Administration Office

Time duration of this committee is 03 years up to June 2025, after which the committee will be reconstituted.

  
Principal

प्रधानी  
चंद्रकान्ति रामावती देवी आर्य महिला  
उच्च शिक्षण संस्थान, गोरखपुर



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**The Audit Team**

The study team constituted of the following senior technical executives from **Empirical Exergy Private Limited,**

- ✚ **Mr. Rajesh Kumar Singadiya** [ Director & Accredited Energy Auditor AEA-0284]
- ✚ **Mr. Rakesh Pathak,** [Director & Electrical Expert]
- ✚ **Mr. Sachin Kumawat** [ Sr. Project Engineer]
- ✚ **Mr. Charchit Pathak** [ Ass. Project Engineer]
- ✚ **Mr. Mohit Malviya** [ Fire safety Engineer]
- ✚ **Mr. Aakash Kumawat** [Site Engineer]
- ✚ **Mr. Ajay Nahra,** [Sr. Accountant & admin ]



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## **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, increase productivity inside the college campus.

### **ENERGY MANAGEMENT INITIATIVE TAKEN BY COLLEGE**

#### **✚ 10 KWp SOLAR PHOTOVOLTAIC ROOFTOP INSTALLATION:**

College has 10 KWp solar photovoltaic roof top grid connected system installed on various building. Total unit generation from May-2022 to Oct- 2022 is **2148 units**.

### **RECOMMENDATION:-**

#### **✚ SOLAR SYSTEM ON HOSTEL CONNECTION**

As per the unit consumption of hostel connection, there are good potential of installation 5 kWp solar system. At present this connection taking 100 % power from grid .**Details are given in chapter-04**

#### **✚ SASOR BASED LIGHTING SYSTEM**

Installation of Timer control on building focus light with sensor based in College campus.

#### **✚ LIGHTING SYSTEM**

It is observed that there is good potential for replacement of “conventional T-8 (40 Watt) tube light by 20-Watt energy efficient LED lighting. **Details are given in Chapter-04**

#### **✚ CEILING FAN**

Replacement of “conventional ceiling fan (60 Watt)” by energy efficient star rated fan or BLDC based energy efficient fan (28 Watt) in “admin building, class rooms, laboratories and faculties cabin” have great potential for energy saving. **Details are given in Chapter-04**



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**✚ IOT BASED ENERGY MONITORING SYSTEM AT MAIN FEEDER**

- Installation of “Cloud based (IoT based) energy monitoring system” on both feeder as well as energy monitoring on individual building will be good initiate for energy monitoring as well as student demo project for student and management .

**✚ SOME OTHER OBSERVATIONS :-**

- Energy audit team was finding many electrical penal are open condition. Also there is requirement cable scheduling to avoid any electrical hazards.
- It is observe that there are requirement of annually earth testing in every earth pit ,

**✚ Energy Management Workshop and Training:**

- Conduct awareness and training programs for faculty, student and non-teaching staffs. Conduct seminars, workshops and exhibitions on energy management education.
- Involve all stakeholders- encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in energy management system.





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## **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 (Year )</b>
1	Lighting System	191 No. FTL tube light	Power consumption by T-12 LED 40 Watt (08 to 10 watt blast power )	Replacement of conventional (T-12) with (T-5 Watt)	15,280	1,68,691	39346	0.3
2	Celling Fan	281 No ceiling fan working with 60 Watt	Power consumption by existing ceiling fan (60 Watt)	Replacement of 60W conventional ceiling fan by 28W BLDC energy efficient ceiling fan	17,984	1,98,543	7,23,575	3.65
3	Solar System	A separate connection for hostel	6 kW Separate connection for hostel,	Installation of 5 Kw solar system for hostel power supply	7,300	88,111	2,00,000	2.3



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**CHAPTER-1**  
**INTRODUCTION**

**1.1 About College**

Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur in the holy land of Guru Gorakhnath, located in diwan bajar in Gorakhpur city was, established by Smt. Chandrakanti Devi Arya Mahila Sansthan on the day of Kartik Shukla Navami in 1990. The aim of this institution is to promote conserve and encourage the Arya culture, science and literature language, civilization while working for the multi faceted development of the students along with the educational, social and economical revival of women in which the organization is constantly engaged. On graduation level B.A., B.Sc. (Home Science), and B.Com. and on Post-Graduation level Home Science, Visual Art, Education and Political Science under M.A. are being run by this college. B.Ed. and M.Ed. program are also being run for teacher-training by the faculty of Education. A study center has also been approved by the Uttar Pradesh Rajarshi Tandon University Prayagraj which is to be operated from session 2019-20. Since the beginning, this college is continuously working for the all round development of women- students. Co-curricular activities and cultural programs are run in regular form for the spiritual and intellectual development of women-students. The college students have so far received the highest marks in the university examination and have received gold medal at the university level. Various students have been selected for the National Camp and Pre RD Parade by the units of NCC and NSS, run in the college which is a milestone in fulfilling the purpose of the establishment of this college. The college is fully active for the promotion of Arya culture and the goal of women education and multifaceted development which was set at the time of the establishment of this college.



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**MISSION :-**

- ❖ To provide women a wider access towards education of excellence, Excellence of Education, knowledge, Skill, through our wider access of Exposure. Empowerment of Human Values and Indian Culture by Self Responsibility. Enhancing Potential through the way of Curricular Actions.

**VISION :-**

- ❖ To Promote the Efficiency of Society by Women Education Creation of Security and Ability on Student. Provision of Positive Energy and Self dependency for the Progress of the Nation



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**1.2 About Campus:** - Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur total campus area is 7159.85 Sq.m.

Table 1.1 Details are total build up area given in the table:-

<b>Name of Buildings in campus &amp; Built-up area of Buildings</b>	
<b>Floor wise Built-up area in Sq.</b>	
<b>Floor</b>	<b>Proposed</b>
Ground floor	918.9708
First floor	918.9736
Second floor	918.9717
Third floor	918.9717
<b>Total Built-up Area</b>	<b>3675.8878</b>

**Satellite Image of College campus from Google map**



Satellite image of college from Google map

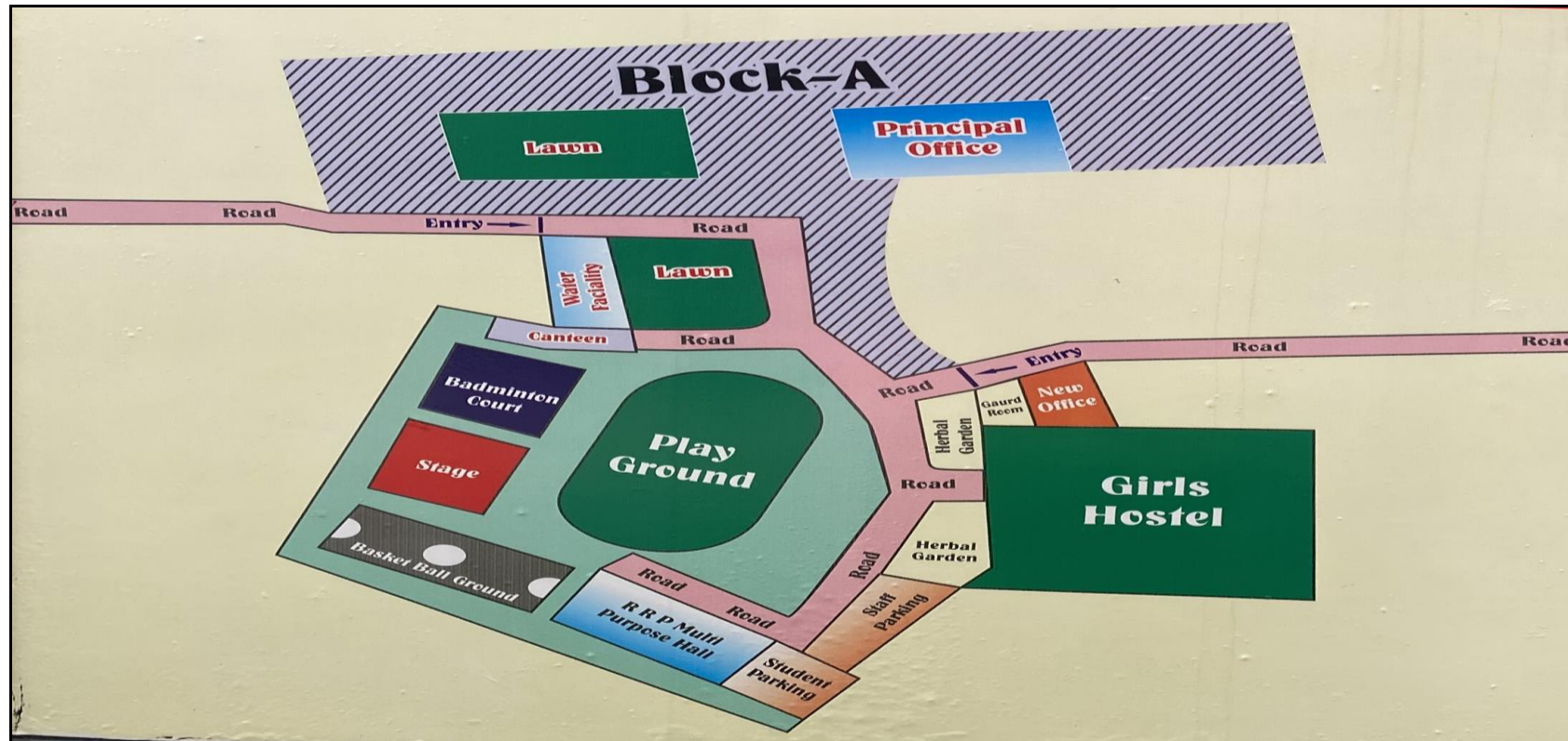


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**1.3 COLLEGE LAYOUT OF VARIOUS BUILDINGS**

**Layout map of College**





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#### **1.4 About Energy Audit**

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

Energy audit is the most efficient way to identify the strength and weakness of energy management practices and to find a way to solve problems. Energy audit is a professional approach in utilizing economic, financial, and social and natural resources responsibility. Energy audits “adds value” to management control and is a way of evaluating the system.

**Empirical Exergy Private Limited (EEPL)**, Indore M.P. carried out the “Energy Audit” at the site to find gaps in the energy consumption pattern for Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur. A technical report is prepared as per the need and the requirement of the project.

#### **1.5 Objectives of Energy Auditing**

An energy audit provides vital information base for 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 present pattern of energy consumption in different cost centers of operations.
- Relating energy inputs and production output.
- Identifying potential areas of 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.



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### **1.6 Methodology:**

Methodology adopted for achieving the desired objectives viz.: Assessment of the current operational status and energy savings include the following:

- ✚ Discussions with the concerned officials for identification of major areas of focus and other related systems.
- ✚ 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 same for the overall premises. The data was analyzed to arrive at a base line 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 equipment's, 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.



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**1.7 College Present Energy Scenario:**

College uses energy in the form of electricity purchased from grid and 10 KWp solar grid connected system for college campus. There are two feeders one is college building and other for Hostel building.

Annual energy consumption of College campus has been found to be about **33,003 unit** period from July- 2021 to Jun- 2022.

College has 10 KWp solar photovoltaic roof top grid connected system installed on college building. Total unit generation from May-2022 to Oct- 2022 is **2148 units**.





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**CHAPTER- 2**  
**POWER SUPPLY SYSTEM**

**2.1 Power Supply System**

The power supply for the Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur is from PVVNL with the help of 11 kV feeders. College has 02 No connection one is college connection are 10 KW and second is hostel connection with 6 KW.

**2.2 DG Set:-**

There are 2 DG sets in college campus. Detailed of the DG Sets are given table. 2.4

Table 2.1 Technical specifications for DG sets- 01 and 02

Sr. No.	Parameter	Technical Specification DG Set-01 (College Feeder)	Technical Specification DG Set-02 (Hostel Feeder )
1	Make	Stamford	Kirloskar
2	Serial No	N11D146214	200708013
3	Capacity (KVA)	50	7.5
4	Rated Voltage	230	230
5	Full load current	217.4	30
6	Frequency	50	50
7	Power factor	0.8	0.8
8	RPM	1500	1500
9	Phase	1	1



DG set in College Campus

**Observation:-**

- DG set use only in case of grid power failure.
- There is no system to monitor fuel consumptions w.r.t. unit generation.



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### 2.3 Grid Connected Solar Photovoltaic System (10 Kwp)

There is 10 KWp solar photovoltaic roof top grid connected systems installed on main building. System details are given below:

Table: - 2.6 solar plants detailed

Sr.No.	Description	Technical Specification
<b>1</b>	<b>Plant Information</b>	
1.1	Brand Name	NEOSOL
1.2	Plant Capacity	10KW
1.3	Location	Main Building
<b>2</b>	<b>PV Panel Details</b>	
2.1	Modal	NS72P6-420
2.2	Panel Wattage	420WATT
2.3	No. Of PV Panel	24
2.4	Panel Tilt Angle	23 DEGREE
<b>3</b>	<b>Inverter Information</b>	
3.1	Model Name	POLYCAB
3.2	Model Number	PSIT-10K
3.3	Capacity	11000 WATT
3.4	No. Of Inverter	1





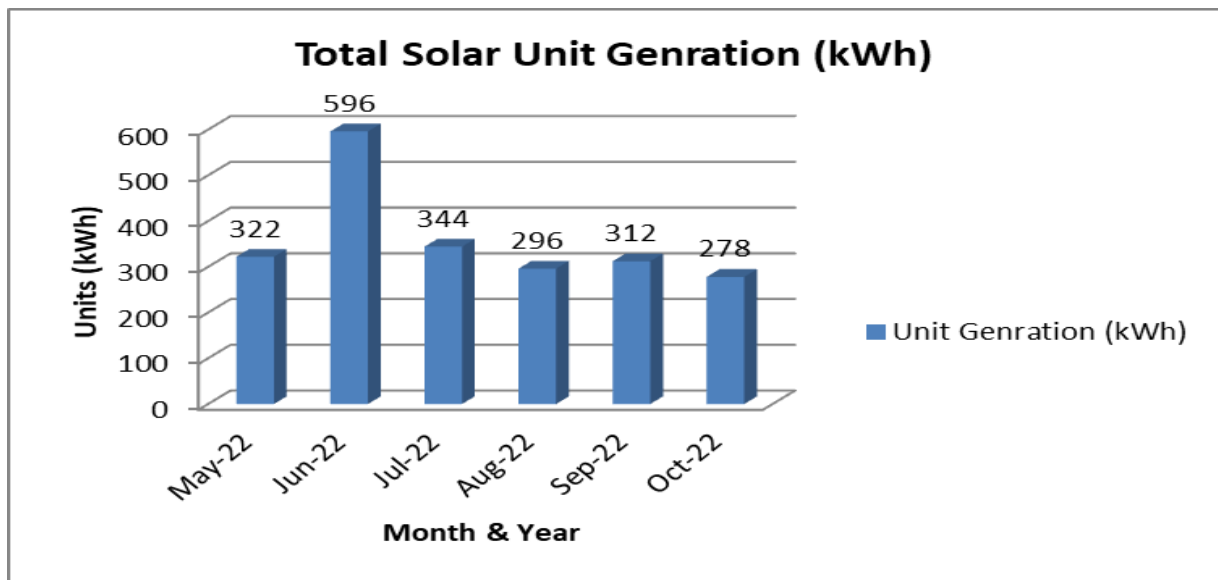
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**Total Solar unit generation:-**

Table 2.7:- Total solar unit generation May-2022 to Oct-2022

Sr. No	Month & Year	Unit Generation (kWh)
1	May-22	322
2	Jun-22	596
3	Jul-22	344
4	Aug-22	296
5	Sep-22	312
6	Oct-22	278
	Total	2148



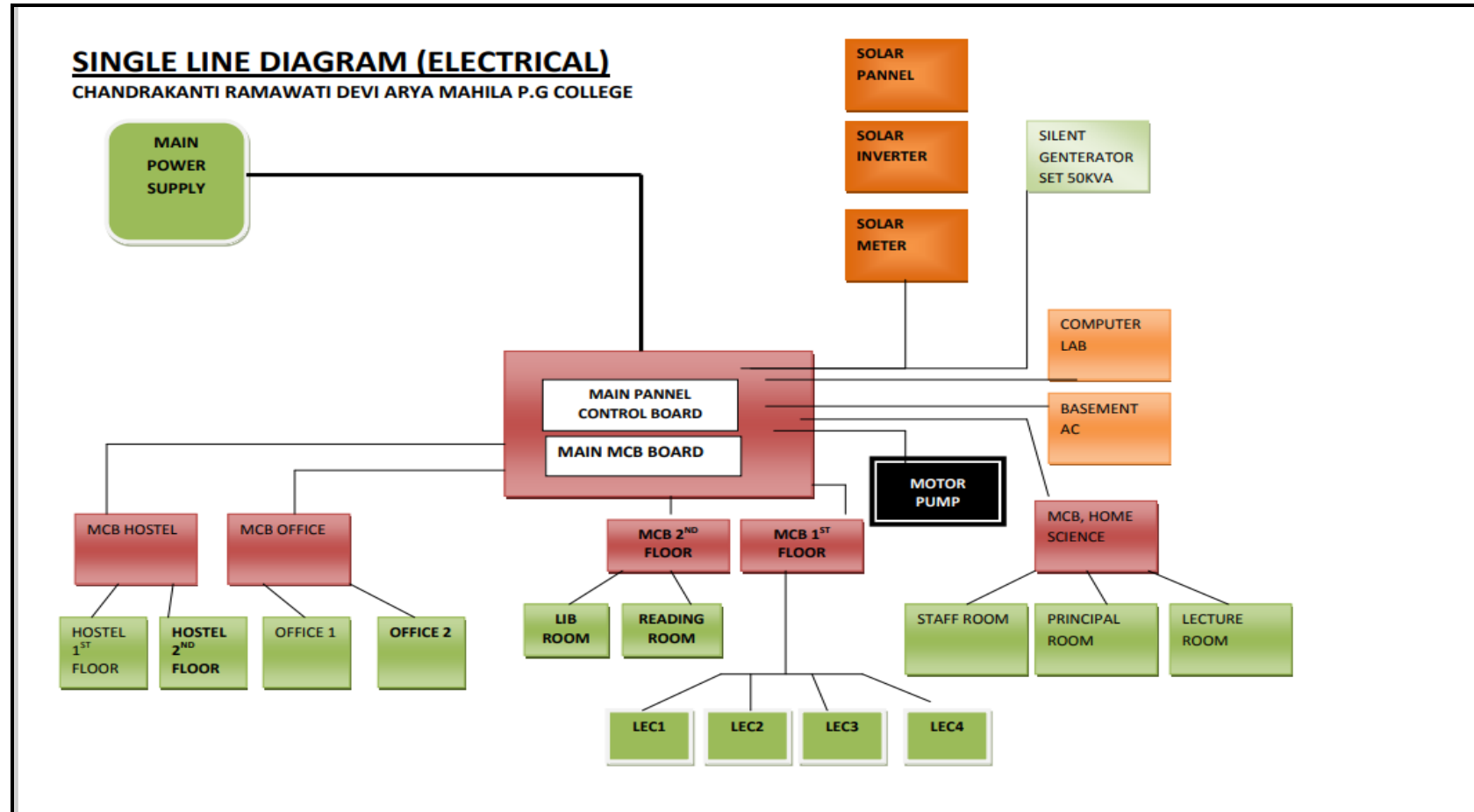
Graphical presentation of solar unit generation

**Observation: -**

Total unit generation from installation from solar system is 2148 unit.



## 2.4 Single Line Diagram





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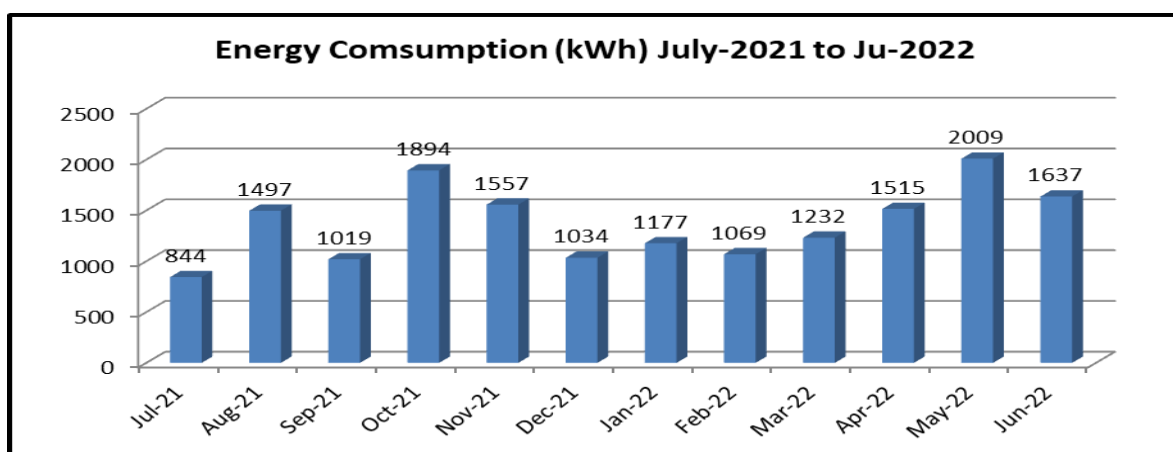
**CHAPTER- 3**  
**ELECTRICITY BILL ANALYSIS**

**3.1 Monthly electrical energy consumption 2021-22 (College Feeder)**

The monthly electrical consumption for the College is given in the table.

Table 3.1 Energy consumption and billing amount (year 2021-22)

Sr. no.	Month & Year	Sanction Load (KW)	Energy Consumption (kWh)	Energy Charges (Rs.)	Billing Amount (Rs.)	Over all Per Unit Charges
1	Jul-21	10	844	6936	10373	12.29
2	Aug-21	10	1497	12475	16149	10.79
3	Sep-21	10	1019	8411	11982	11.76
4	Oct-21	10	1894	15849	19792	10.45
5	Nov-21	10	1557	12984	16785	10.78
6	Dec-21	10	1034	8539	12117	11.72
7	Jan-22	10	1177	9372	12991	11.04
8	Feb-22	10	1069	8836	12429	11.63
9	Mar-22	10	1232	9734	13213	10.72
10	Apr-22	10	1515	12627	16436	10.85
11	May-22	10	2009	16828	20837	10.37
12	Jun-22	10	1637	13440	16541	10.10
			<b>16484</b>	<b>136031</b>	<b>179645</b>	<b>11.04</b>



Graphical presentation of energy consumption year 2021-22

**Observation:**

It was found out that total energy consumption in last 12 month was 16,484/- unit.



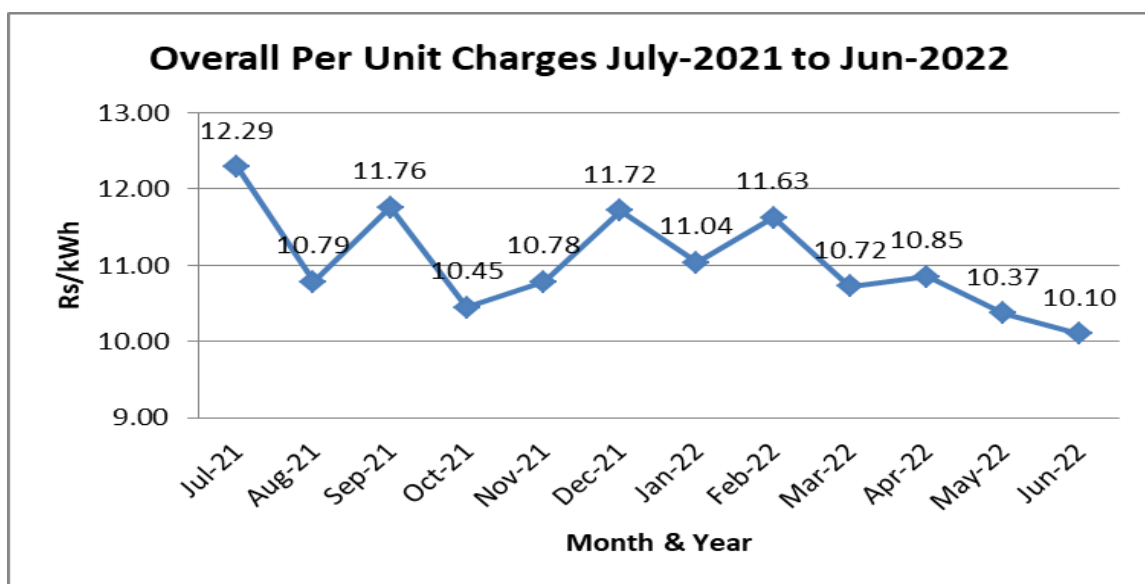
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### 3.2 Overall per unit charges (Rs/kwh) 2021-22

The Overall per unit charges (Rs/kwh) for the college is given in the table .3.2

Sr. no.	Month & Year	Over all Per Unit Charges
1	Jul-21	12.29
2	Aug-21	10.79
3	Sep-21	11.76
4	Oct-21	10.45
5	Nov-21	10.78
6	Dec-21	11.72
7	Jan-22	11.04
8	Feb-22	11.63
9	Mar-22	10.72
10	Apr-22	10.85
11	May-22	10.37
12	Jun-22	10.10
	Average	11.04



Graphical presentation of actual per unit charges year 2021-22

#### Observation:

It was found out that Average annual energy charges Rs 11.04 /kWh.



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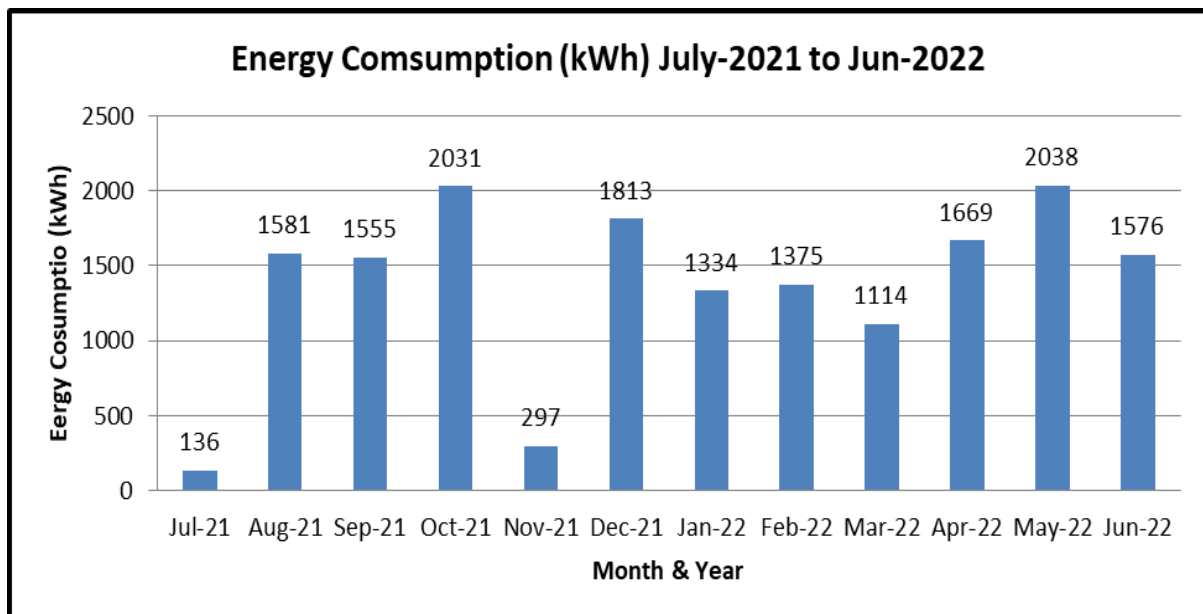


### 3.3 Monthly electrical energy consumption 2021-22 (Hostel Feeder)

The monthly electrical consumption for the hostel is given in the table.

Table 3.3 Energy consumption and billing amount (year 2021-22)

Sr. no.	Month & Year	Sanction Load (KW)	Energy Consumption (kWh)	Billing Amount (Rs.)	Over all Per Unit Charges (Rs/kWh)
1	Jul-21	6	136	2342	17.22
2	Aug-21	6	1581	16778	10.61
3	Sep-21	6	1555	17849	11.48
4	Oct-21	6	2031	21746	10.71
5	Nov-21	6	297	5297	17.84
6	Dec-21	6	1813	18563	10.24
7	Jan-22	6	1334	14551	10.91
8	Feb-22	6	1375	14934	10.86
9	Mar-22	6	1114	12714	11.41
10	Apr-22	6	1669	18370	11.01
11	May-22	6	2038	21406	10.50
12	Jun-22	6	1576	19092	12.11
		<b>Total</b>	<b>16519</b>	<b>183642</b>	<b>12.07</b>



Energy consumption (kWh) July-2021 to Jun-2022

#### Observation:

It was found out that total energy consumption in last 12 month was 16,519/- unit.



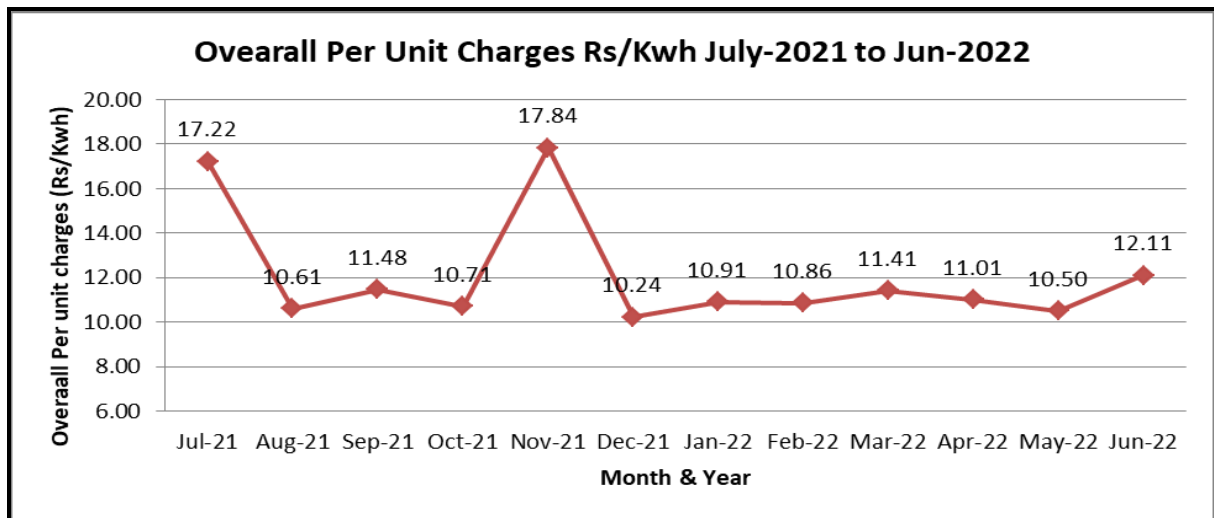
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### 3.4 Overall per unit charges (Rs/kwh) 2021-22 (Hostel Feeder)

The Overall per unit charges (Rs/kwh) for the college is given in the table .3.4

Sr. no.	Month & Year	Overall Per Unit Charges (Rs/kWh)
1	Jul-21	17.22
2	Aug-21	10.61
3	Sep-21	11.48
4	Oct-21	10.71
5	Nov-21	17.84
6	Dec-21	10.24
7	Jan-22	10.91
8	Feb-22	10.86
9	Mar-22	11.41
10	Apr-22	11.01
11	May-22	10.50
12	Jun-22	12.11
	<b>Average</b>	<b>12.07</b>



Overall per unit charges July-2021 to Jun-2022

#### Observation:-

Overall per unit charges is 12.07 kWh.

### 3.5 power measurement in College

Table 3.7 Operating load measurement on various building.

Sr. No	Building / Section	Voltage	Current	P.F	Total Kw
1	Main Building	446	9.2	0.865	6.14
2	Hostel Building	438	9.6	0.850	6.19
	Total Operating Load At 17/10/2022				12.33





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### 3.6 Connected load of college

Table 3.6:- Connected load of building wise

Sr. No	Location	Ceiling Fan	Tube light (40W)	LED 15W	Ex. Fan	Wall Fan
1	Room No-013 B.Ed. Staff	2	2	3	0	0
2	Room No-014 IQAC	2	2	3	0	0
3	Room No-015 Principal	2	2	2	0	0
4	Ladies Staff washroom	0	2	0	0	0
5	Room No-012 Home sc.	9	8	1	1	1
6	Room No-016 EDP	1	1	1	0	1
7	017 office	2	2	0	0	0
8	008 Server Room	1	0	2	0	0
9	009 Staff Room	12	5	1	2	1
10	007 ICT LAB	5	4	1	0	0
11	006 Smart Room	5	4	1	0	0
12	005 Lecture Room	5	4	0	0	0
13	004 Store Room	0	2	2	0	0
14	003 Lecture Room	5	5	1	0	0
15	002 Computer Room	3	5	2	0	1
16	001 Store Room	1	0	1	0	0
17	Girls washroom	0	1	2	0	0
18	101 Store room-3	0	0	1	0	0
19	102 Music Room	2	1	0	0	0
20	103 Lecture Room	5	4	2	0	0
21	104 Fine Art Lab-1	5	4	0	0	0
22	105 Fine Art Lab-2	5	4	0	0	0
23	106 Lecture Room	5	4	0	0	0
24	010 Health Care	1	0	0	0	1
25	011 Lecture Room	9	4	0	0	0
26	107 NCC Store Room	1	1	0	0	0
27	108 Lecture Room	3	3	0	0	0
28	109 Lecture Room	3	2	0	0	0
29	110 Lecture Room	4	2	0	0	0
30	111 Lecture Room	4	2	1	0	0
31	Gents washroom	0	1	0	0	0
32	112 Science Lab	2	2	0	0	0
33	113 Lecture Room	2	2	1	0	0
34	114 Lecture Room	2	1	1	0	0
35	115 Record Room	2	2	2	0	0
36	Water Point	0	0	2	0	0
37	213 Psychological Lab	1	1	0	0	0
38	214 Lecture Room	1	1	0	0	0
39	212 Lecture Room	2	2	3	0	0



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40	Ladies Staff washroom	0	0	2	0	0
41	210 Lecture Room	2	2	1	0	0
42	209 Central Library	8	8	3	0	1
43	211 Lecture Room	2	2	1	0	0
44	212 Lecture Room	2	2	1	0	0
45	208 Reading Room	2	4	3	0	1
46	207 Common Hall	4	2	2	0	0
47	206 Lecture Room	9	0	7	0	0
48	205 Lecture Room	9	0	7	0	0
49	204 Lecture Room	9	0	7	0	0
50	Girls washroom	0	1	1	0	0
51	203 Lecture Room	9	0	6	0	0
52	202 Textile Room	2	2	0	0	0
53	201 Store Room-5	1	1	0	0	0
54	018 Reception	1	0	2	0	0
55	Baramda	1	1	3	0	0
56	019 Vice Principal Room	1	1	2	0	0
57	020 NCC Office	1	1	2	0	0
58	021 Founder Room	1	1	2	0	0
59	022 Specially Abled	1	1	1	0	0
60	023 Rovers Rangers	1	1	1	0	0
61	116 Sports Room	2	1	2	0	0
62	117 NSS Office	1	1	2	0	0
63	Baramda	0	0	4	0	0
64	118 Lecture Room	1	1	2	0	0
65	119 Lecture Room	1	1	2	0	0
66	Canteen	0	0	6	0	0
67	001 RRP Memorial Hall	18	12	40	0	0
68	Washroom	0	0	5	0	0
69	101 RRP Lecture Room	6	0	10	0	0
70	102 Lecture Room	8	0	10	0	0
71	103 M.ed Staffroom	8	0	16	0	0
72	104 M.Ed Office	1	0	4	0	1
73	Manager Office	1	0	2	0	0
74	Room No-1 Hostel UG	0	1	2	0	0
75	Room No-2	1	1	2	0	0
76	Room No-3	1	1	0	0	0
77	Room No-4	0	1	0	0	0
78	Room No-5	2	2	2	0	0
79	Room No-6	3	3	2	0	0
80	Room No-7	1	1	0	0	0
81	Room No-8	1	1	1	0	0
82	Room No-9	1	1	1	0	0



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83	Room No-10	1	1	1	0	0
84	Room No-11	1	1	1	0	0
85	Room No-12	1	1	1	0	0
86	Room No-13	1	1	1	0	0
87	Hostel Office	1	1	3	0	0
88	Guest Room	1	1	3	0	0
89	Room No-14	1	1	2	0	0
90	Room No-15	1	1	1	0	0
91	Room No-16	2	4	2	0	0
92	Room No-17	2	1	2	0	0
93	Room No-18	1	1	2	0	0
94	Room No-19	1	1	2	0	0
95	Room No-20	1	1	2	0	0
96	Room No-21	1	1	0	0	0
97	Washroom Hostel	0	2	0	0	0
98	Bhoj Nalay Kauch	3	4	10	2	0
99	Room No-22	1	1	2	0	0
100	Room No-23	1	1	3	0	0
101	Room No-24	1	1	2	0	0
102	Room No-25	1	1	2	0	0
103	Room No-26	1	1	2	0	0
104	Washroom	0	0	2	0	0
105	Room No-27	4	3	2	0	0
106	Room No-28	1	1	2	0	0
107	Room No-29	1	1	2	0	0
108	Room No-30	1	1	2	0	0
109	Room No-31	4	1	1	0	0
110	Room No-32	2	1	2	0	0
111	Room No-33	1	1	2	0	0
112	Room No-34	1	1	2	0	0
113	Reading Room No-35	4	2	4	0	0
114	Room No-36	1	1	2	0	0
	<b>Total</b>	<b>281</b>	<b>191</b>	<b>272</b>	<b>5</b>	<b>8</b>

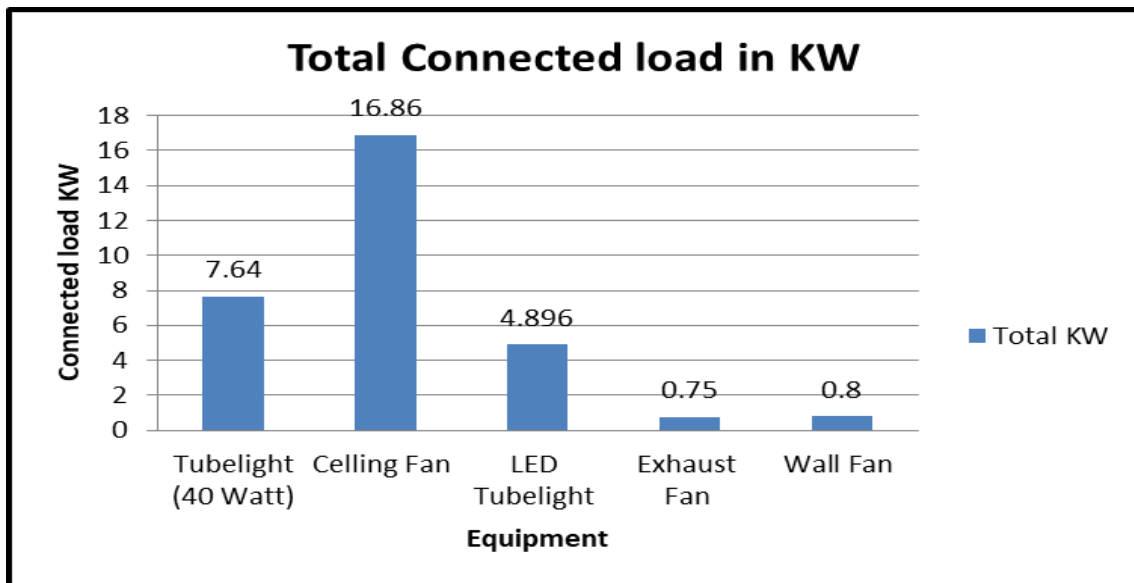


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**Connected load Summary :-**

Sr. No	Equipment	Unit Watt	Quantity	Total Watt
1	Tube light (40 Watt)	40	191	7.64
2	Ceiling Fan	60	281	16.86
3	LED Tube light	18	272	4.896
4	Exhaust Fan	150	5	0.75
5	Wall Fan	100	8	0.8
Total Connected load				30.946



Connected load of the college campus



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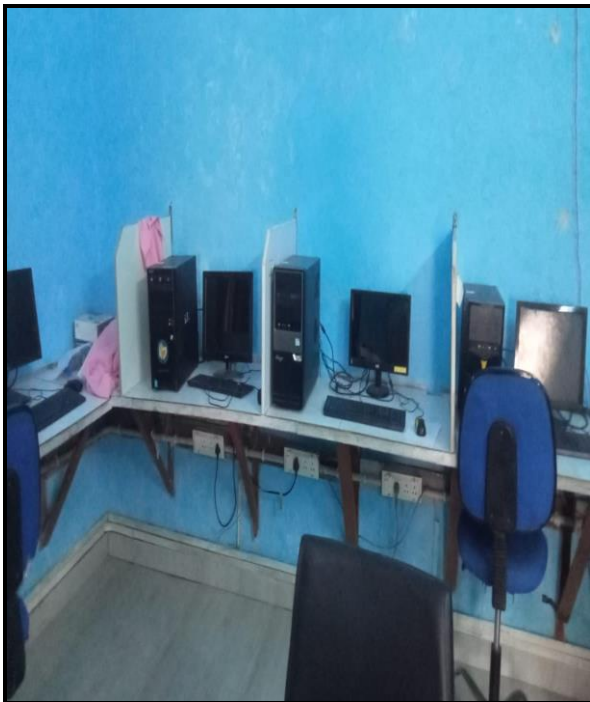
**3.8 Some Photograph of Electrical Equipment's: -**



Celling Fan



Water Cooler



Computer System



Tubelight

Electrical Equipment in College Camps



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**CHAPTER- 4  
ENERGY CONSERVATION MEASURES**



**Case Study No. -01**

**Replacement of conventional 40 Watt to energy efficient LED tube light 20 Watt in college campus:-**

Sr. No	Items	Parameters	Units
1	Power Consumption by FTL	40	W
2	No of T-8	191	Nos.
3	Working Hrs./Day	8	Hrs./Day
4	Working Days/Year	250	Days/Year
5	Energy Efficient T-5 (LED)	20	W
6	Expected Energy Saving	15,280	kWh/Year
7	Load Factor@90% Assume	0.90	NA
8	Overall Per Unit Charges	11.04	Rs./kWh
9	Expected Money Saving	1,68,691	Rs./Year
10	Cost of T-5	200	Rs./ Pices
11	Investment on New Light Purchasing	38,200	Rs.
12	Maintenance Investment @ 3%	1146	Rs.
13	Total Investment	39,346	Rs
14	Simple Pay Back Period	0.3	Year

**Total Calculated Monetary Saving Potential in lighting = Rs 1, 68,691/-**

**Note: - Energy saves depend on the operation hour per day and load factor of the systems.**

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### Case Study No. -02

**Replacement of 60W conventional ceiling fan by 28W BLDC Energy Efficient ceiling fan in College campus:-**

Sr. No	Items	Parameters	Units
1	Power Consumption by 60W	60	W
2	No of Fan	281	No's
3	Working Hrs./Day	8	Hrs./Day
4	Working Days/Year	250	Days/Year
5	Energy Efficient 28W	28	W
6	Expected Energy Saving	17,984	kWh/Year
7	Load Factor	0.9	NA
8	Per Unit Charges	11.04	Rs./kWh
9	Expected Money Saving	1,98,543	Rs./Year
10	Cost of New Ceiling Fan	2500	Rs./ Pices
11	Investment on New Fan Purchasing	7,02,500	Rs.
12	Maintenance Investment @ 3%	21,075	Rs.
13	Total Investment	7,23,575	Rs.
14	Simple Pay Back Period	3.65	Year

**Total Calculated Monetary Saving Potential in Ceiling Fan = Rs 1, 98,543/-**

**Note: - Energy saving depend on the operation hour per day and load factor of the systems.**



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**Case Study No. -03**

**Installation 5 kWp grid connected solar roof top system for hostel building.**

**Observation: -**

It is observed that there is good potential for installation of solar roof top grid connected system on bank premises.

**Recommendation:**

Installation 5 kWp Solar Photovoltaic Grid Connected System.

**Solar unit (Energy) Generation calculation: -**

Recommended capacity of solar PV system	= 5 kWp
Expected Annual energy generation @ 04 Unit /day /kWp	= 5 kWp x 4 kWh / days x 365 days = 7,300 kWh
Total Expected monetary saving potential @ Rs 12.07 per unit (Overall energy charges)	= 88,111
Total Expected investment @ Rs.40 /watt	= 2,00,000 /-
*Simple Payback period	= 2.3 year

**Note: - Energy saving depends on the operation hours per day and load factor of the systems.**





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**Annexure-01**

**Integrated Energy, Environment & Green Policy**

Estb. Year 1990

**Chandrakanti Ramawati Devi Arya Mahila P.G. College**  
Gorakhpur, U.P.  
NAAC ACCREDITED  
Website-[www.crdpgcollege.edu.in](http://www.crdpgcollege.edu.in)  
Mob. : 7279916230

(Affiliated to D.D.U. Gorakhpur University, Gkp. U.P.)

Ref. 2284/K-10/2022 Date 07/07/2022

**Integrated Energy, Environment & Green Policy**

Management of our institution is committed to go green for making our nation Atma-Nirbhar (i.e. Self-sustainable) in the Area of energy and environment.

Our emphasis is to-

1. Create awareness regarding necessity of energy conservation and making environment pollution free to all staff and students on a regular basis by arranging training workshop, seminars quiz, competitions etc.
2. Continuously monitoring the energy consumption pattern through periodic reviews and using latest informative system.
3. Use of energy efficient methods.
4. Have efficient waste management system.
5. Ensure water conservation methods.
6. Ensure participation of students and teachers in local environmental issues.
7. Increasing recycle education on campus.

Principal

*[Signature]*

प्राचार्या  
चंद्रकान्ति रामावती देवी आर्या महिला  
पी.जी. कॉलेज, गोरखपुर



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**END OF THE REPORT  
THANKS**