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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(2022-23)

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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),
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]

About EEPL

Empirical Exergy Private Limited (EEPL), incorporated under the Companies Act 2013 is an ISO 9001:2015 certified company based in Indore, Madhya Pradesh.

Empirical Exergy Private Limited (EEPL) is Empanelled as an accredited energy auditing firm with the Bureau of energy efficiency (BEE), Ministry of Power, and Government of India for Mandatory Energy Audit as per Energy Conservation Act 2001.

EEPL is registered with the "National Small Industries Corporation (NSIC) A Government of India Enterprise under Micro Small Enterprises (MSEs) is notified by the Govt. of India.

EEPL is managed by highly qualified experienced professionals "Accredited Energy Auditor (AEA), Certified Energy Auditor (CEA), and Certified Energy Managers (CEM) from the Bureau of Energy Efficiency (BEE) and the team of engineers to assured quality services for our valuable customers.

The Audit Team

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

- **Mr. Rakesh Pathak** [Director]
- **Mr. Rajesh Kumar Singadiya [**Director & Accredit Energy Auditor **]**
- **Mr. Hemendra Khedekar** [Reviewer]
- **Mrs. Laxmi Raikwar Singadiya**[Energy Engineer]
- **Mr. Ajay Nahra** [Sr. Project Manager]
- **Mr. Praveen Punasiya** [Asst. project Engineer]

CERTIFICATE OF ACCREDITATION

ENERGY IS LIFE
BEE
CONSERVE IT

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 9th 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 5th day of October, 2018

Secretary,
Bureau of Energy Efficiency
New Delhi

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. .

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.

- **SENSOR 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.

- **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.

- **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 initiative for energy monitoring as well as demo project for the students and management.

- **SOME OTHER OBSERVATIONS**

  Energy audit team was observed that many electrical penal are in 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, students 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.

ENERGY CONSERVATION MEASURES FOR ELECTRICAL SYSTEM

Case Study	Section	Identification	Observation	Recommendation	Annual energy saving (kWh)	Annual cost saving (Rs.)	Investment (Rs.)	Simple payback Period (Year)
1	Lighting System	191 no. FTL tube light	Power consumption by T-12 LED 40 Watt (10 watt blast power)	Replacement of conventional (T-12) with (T-5)	6723	73,282	12,600	0.17
2	Ceiling 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	11,509	1,25,456	5,90,100	4.7

CHAPTER-1
INTRODUCTION

1.1About College

Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur in the holy land of Guru Gorakhpur, located in Diwan bajar in Gorakhpur city was, established by Smt. Chandrakanti Devi Arya Mahila Sans than 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.

❖ **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

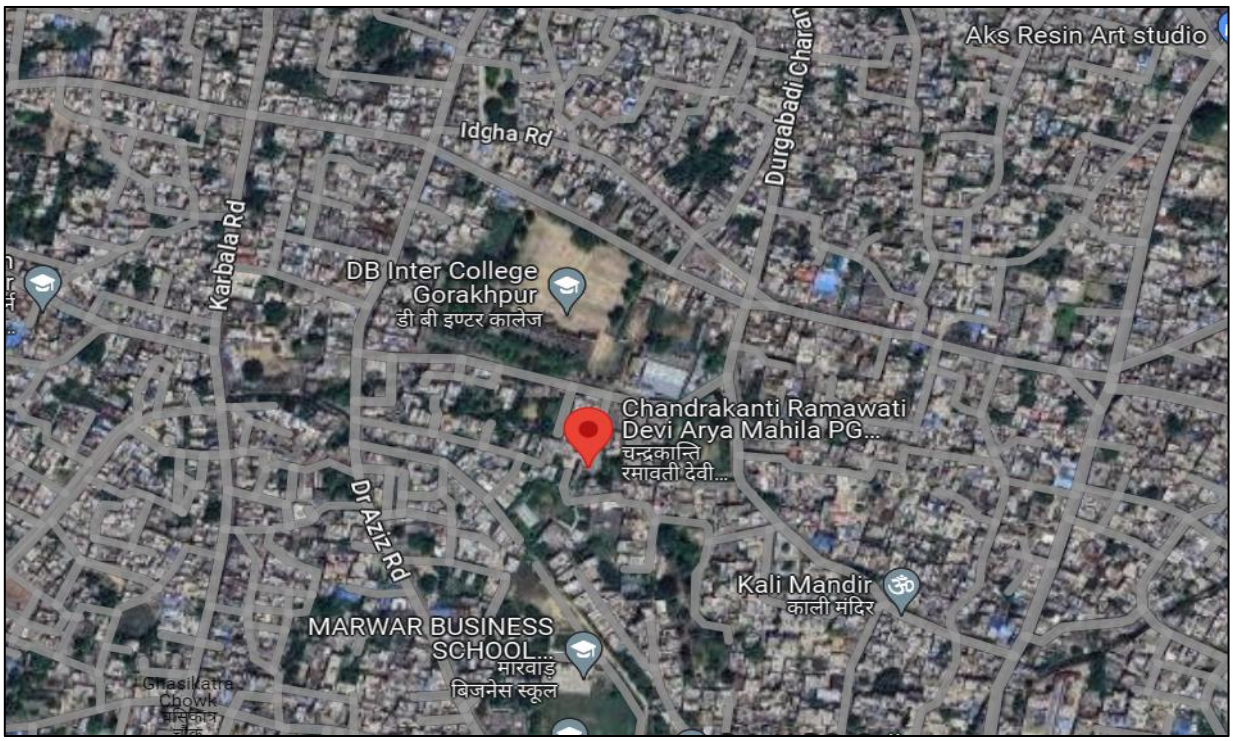

Figure 1.1: - Satellite Image of College from Google map

1.2 About Campus

Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur total campus area is 7159.85 m^2

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

Name of Buildings in campus & Built-up area of Buildings	
Floor wise Built-up area in Sq.m	
Floor	**Proposed**
Ground floor	918.9708
First floor	918.9736
Second floor	918.9717
Third floor	918.9717
Total Built-up Area	3675.8878

1.3 COLLEGE LAYOUT OF VARIOUS BUILDINGS

1.3 Figure. Layout map of College

1.4 Green Monitoring Committee.

Estb. Year 1990

Chandrakanti Ramawati Devi Arya Mahila P.G. College

Gorakhpur, U.P.

NAAC ACCREDITED

Website-www.crdpgcollege.edu.in

Mob. : 7275618230

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

Ref. 2284/C.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 Rawat	Office Superintendent	Administration Office

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

Principal

1.5 Green Monitoring Policy

Estb. Year 1990

Chandrakanti Ramawati Devi Arya Mahila P.G. College

Gorakhpur, U.P.

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Website-www.crdpgcollege.edu.in

Mob. : 7275618230

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Ref. 2284/C.M.-D/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

प्राचार्या
चन्द्रकान्ति रमावती देवी आर्य महिला
पी० जी० कालेज, गोरखपुर

1.6 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.

1.7 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 collected 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 consumption.
- 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 plans for improvements reduction in specific energy consumption.

1.8 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 15,003 unit period from July- 2022 to Jun- 2023.

College has 10 KWp solar photovoltaic roof top grid connected system installed on college building.

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 LMV4 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-1	Technical Specification DG Set-2
1	Make	Stamford	Kirloskar
2	Serial No	N11D146214	200708013
3	Capacity (KVA)	50	50
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 consumption with respect to unit generation.

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

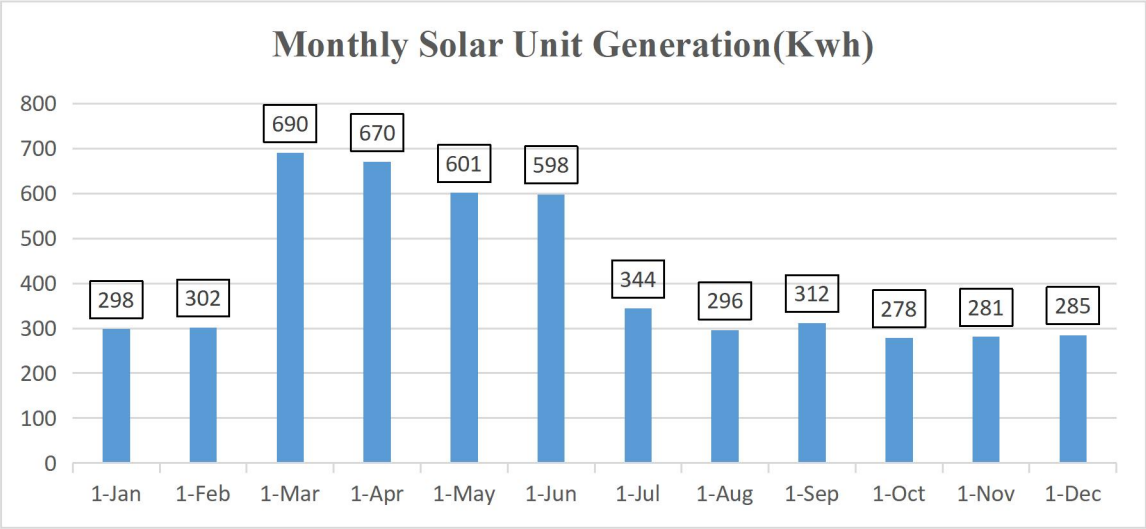
Table: - 2.6 solar plants detailed

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

Total Solar unit generation

Table 2.7:- Total solar unit generation July-2022 to Jun-2023

Sr. No.	Month /year	Unit Generation (kWh)
1	22-Jul	344
2	22-Aug	296
3	22-Sep	312
4	22-Oct	278
5	22-Nov	281
6	22-Dec	285
7	23-Jan	298
8	23-Feb	302
9	23-Mar	690
10	23-Apr	670
11	23-May	601
12	23-Jun	598
	Total	**4955**

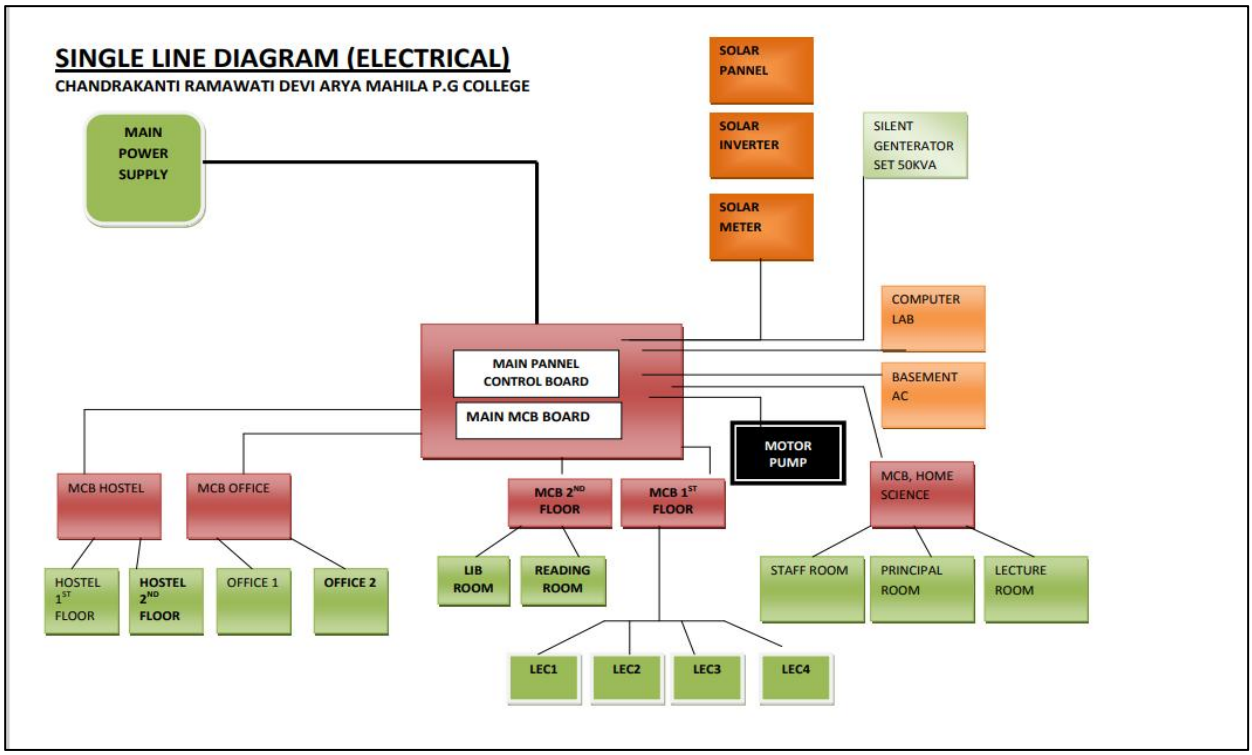


Graphical presentation of solar unit generation

Observation

Total unit generation from installation from solar system is 4955 unit.

2.4 Single Line Diagram



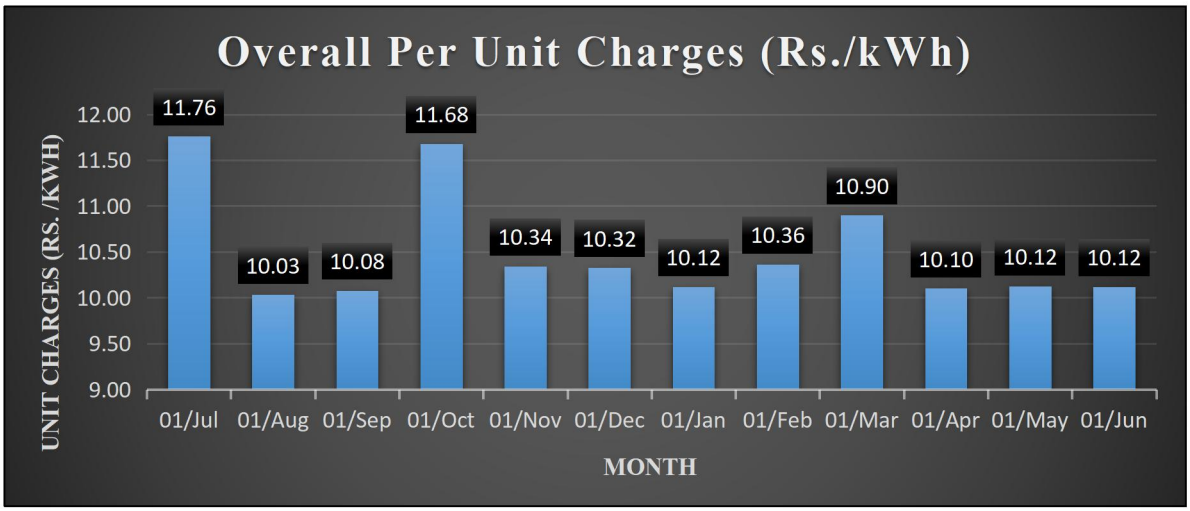
CHAPTER- 3
ELECTRICITY BILL ANALYSIS

3.1 Monthly electrical energy consumption 2022-23

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

Table 3.1 Energy consumption and billing amount (year 2022-23)

Sr. No.	Month & Year	Contact Demand (kW)	Energy Consumption (kWh)	Billing Amount (Rs.)	Overall Per Unit Charges
1	22-Jul	10	1018	11,973/-	11.76
2	22-Aug	10	1458	14,625/-	10.03
3	22-Sep	10	1243	12,527/-	10.08
4	22-Oct	10	1718	20,064/-	11.68
5	22-Nov	10	1082	11,189/-	10.34
6	22-Dec	10	933	9,633/-	10.32
7	23-Jan	10	1663	16,827/-	10.12
8	23-Feb	10	1822	18,875/-	10.36
9	23-Mar	10	820	8,938/-	10.90
10	23-Apr	10	1123	11,344/-	10.10
11	23-May	10	1060	10,732/-	10.12
12	23-Jun	10	1663	16,827/-	10.12
			15,003	**1,63,554/-**	**10.90**



Graphical presentation of energy consumption year 2022-23

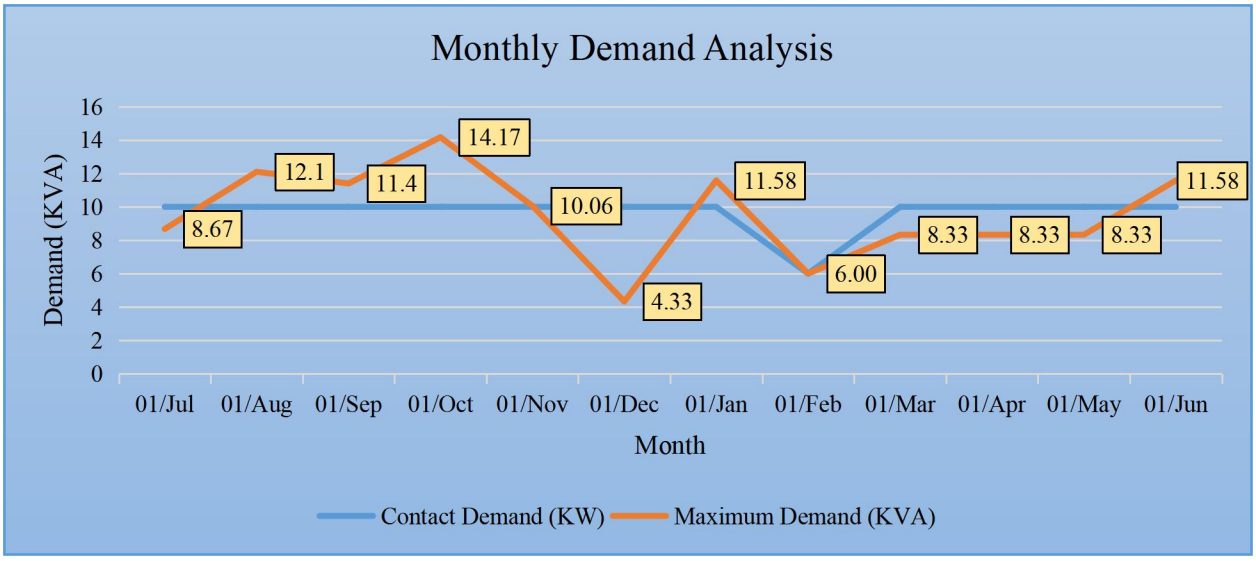
Observation: It was found out that total energy consumption in last 12 month was 15,003 units.

3.2 Monthly electrical energy consumption 2022-23

The monthly electrical consumption for the college is given in the table

Table 3.2 Energy consumption and billing amount

Sr.No.	Month & Year	Contact Demand (KW)	Maximum Demand (KVA)
1	22-July	10	8.67
2	22-Aug	10	12.1
3	22-Sep	10	11.4
4	22-Oct	10	14.17
5	22-Nov	10	10.06
6	22-Dec	10	4.33
7	23-Jan	10	11.58
8	23-Feb	10	8.22
9	23-Mar	10	8.33
10	23-Apr	10	8.33
11	23-May	10	8.33
12	23-Jun	10	11.58
	Avg.		**9.8**
	Max.		**14.17**
	Min.		**4.33**



Energy consumption (kWh)

Observation

It was find out that total energy consumption in last 12 month was 15,003 units.

3.3 Power Factor

Sr.No.	Month & Year	Power Factor
1	22-Jul	0.98
2	22-Aug	0.98
3	22-Sep	0.93
4	22-Oct	0.99
5	22-Nov	0.99
6	22-Dec	0.99
7	23-Jan	0.98
8	23-Feb	0.99
9	23-Mar	0.98
10	23-Apr	0.99
11	23-May	0.99
12	23-Jun	0.98
	Avg.	**0.98**

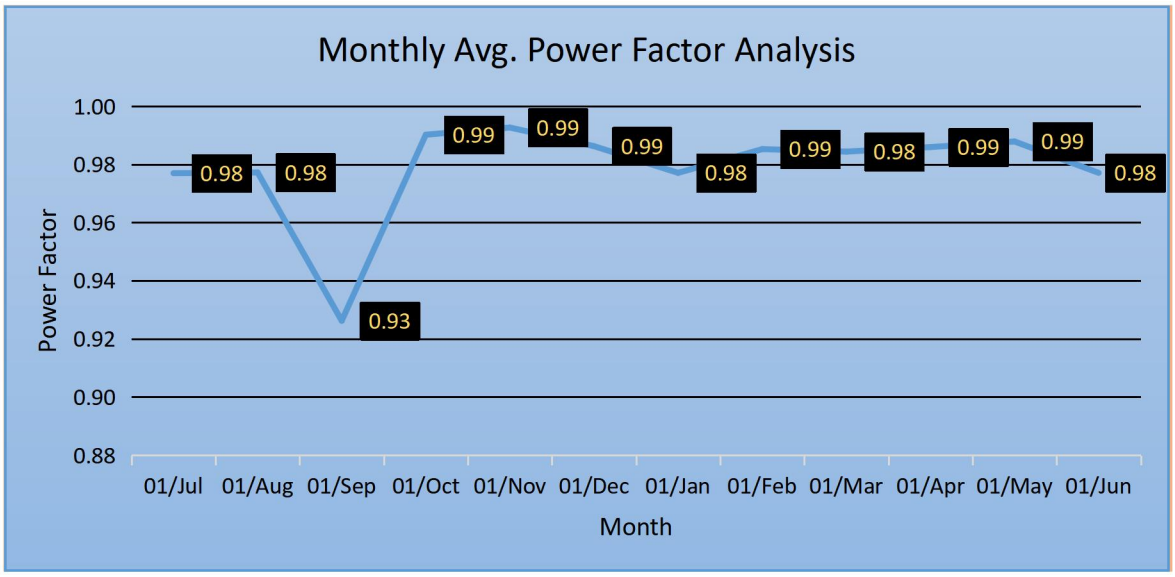


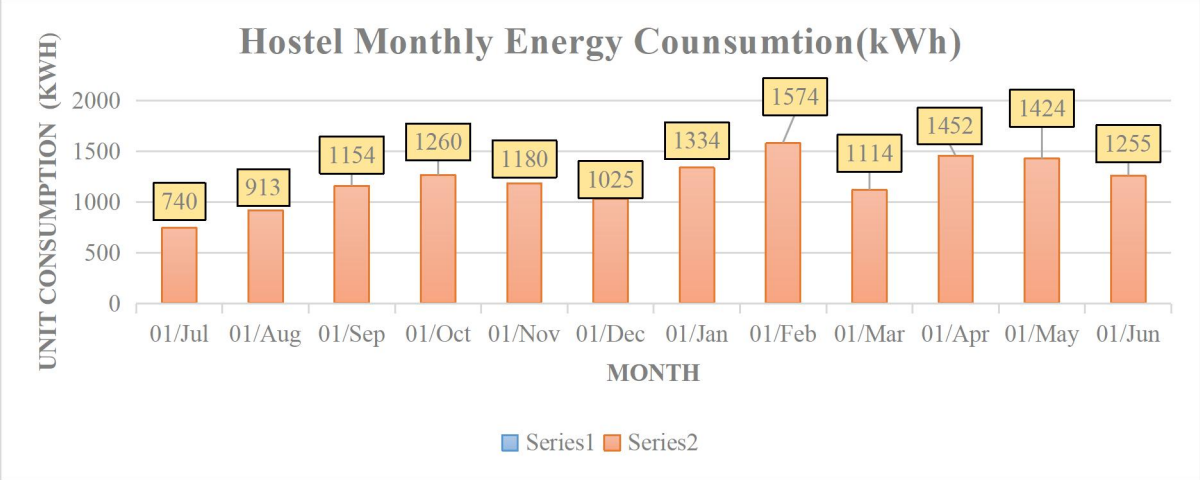
Figure 3.3 Graphical presentation of power factor analysis

Observation

The average power factor is 0.98 in the last 12 month.

3.4 Hostel Building Unit Consumption

Sr.No.	Month & Year	Sanction Load (KW)	Energy Consumption (kWh)
1	22-Jul	6	740
2	22-Aug	6	913
3	22-Sep	6	1154
4	22-Oct	6	1260
5	22-Nov	6	1180
6	22-Dec	6	1025
7	23-Jan	6	1334
8	23-Feb	6	1574
9	23-Mar	6	1114
10	23-Apr	6	1452
11	23-May	6	1424
12	23-Jun	6	1255
		Total	**14,425**



3.5 Connected load of college

Table 3.6:- Connected load of building wise

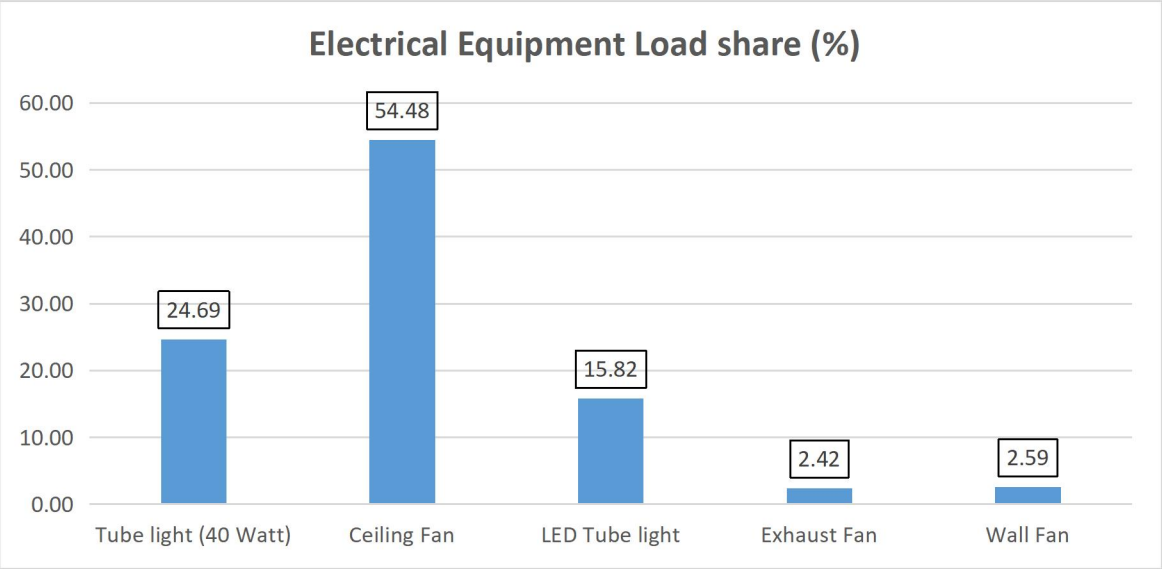
Sr. No	Location	Tube light (40W)	LED (15W)	Exhaust Fan (40W)	Wall Fan (60W)
1	Room No-013 B.Ed. Staff	2	3	0	0
2	Room No-014 IQAC	2	3	0	0
3	Room No-015 Principal	2	2	0	0
4	Ladies Staff washroom	2	0	0	0
5	Room No-012 Home SC.	8	1	1	1
6	Room No-016 EDP	1	1	0	1
7	017 office	2	0	0	0
8	008 Server Room	0	2	0	0
9	009 Staff Room	5	1	2	1
10	007 ICT LAB	4	1	0	0
11	006 Smart Room	4	1	0	0
12	005 Lecture Room	4	0	0	0
13	004 Store Room	2	2	0	0
14	003 Lecture Room	5	1	0	0
15	002 Computer Room	5	2	0	1
16	001 Store Room	0	1	0	0
17	Girls washroom	1	2	0	0
18	101 Store room-3	0	1	0	0
19	102 Music Room	1	0	0	0
20	103 Lecture Room	4	2	0	0
21	104 Fine Art Lab-1	4	0	0	0
22	105 Fine Art Lab-2	4	0	0	0
23	106 Lecture Room	4	0	0	0
24	010 Health Care	0	0	0	1
25	011 Lecture Room	4	0	0	0
26	107 NCC Store Room	1	0	0	0
27	108 Lecture Room	3	0	0	0
28	109 Lecture Room	2	0	0	0
29	110 Lecture Room	2	0	0	0
30	111 Lecture Room	2	1	0	0
31	Gents washroom	1	0	0	0
32	112 Science Lab	2	0	0	0
33	113 Lecture Room	2	1	0	0
34	114 Lecture Room	1	1	0	0
35	115 Record Room	2	2	0	0

Sr. No	Location	Tube light (40W)	LED (15W)	Exhaust Fan (40W)	Wall Fan (60W)
36	Water Point	0	2	0	0
37	213 Psychological Lab	1	0	0	0
38	214 Lecture Room	1	0	0	0
39	212 Lecture Room	2	3	0	0
40	Ladies Staff washroom	0	2	0	0
41	210 Lecture Room	2	1	0	0
42	209 Central Library	8	3	0	1
43	211 Lecture Room	2	1	0	0
44	212 Lecture Room	2	1	0	0
45	208 Reading Room	4	3	0	1
46	207 Common Hall	2	2	0	0
47	206 Lecture Room	0	7	0	0
48	205 Lecture Room	0	7	0	0
49	204 Lecture Room	0	7	0	0
50	Girls washroom	1	1	0	0
51	203 Lecture Room	0	6	0	0
52	202 Textile Room	2	0	0	0
53	201 Store Room-5	1	0	0	0
54	018 Reception	0	2	0	0
55	Baramda	1	3	0	0
56	019 Vice Principal Room	1	2	0	0
57	020 NCC Office	1	2	0	0
58	021 Founder Room	1	2	0	0
59	022 Specially Abled	1	1	0	0
60	023 Rovers Rangers	1	1	0	0
61	116 Sports Room	1	2	0	0
62	117 NSS Office	1	2	0	0
63	Baramda	0	4	0	0
64	118 Lecture Room	1	2	0	0
65	119 Lecture Room	1	2	0	0
66	Canteen	0	6	0	0
67	001 RRP Memorial Hall	12	40	0	0
68	Washroom	0	5	0	0
69	101 RRP Lecture Room	0	10	0	0
70	102 Lecture Room	0	10	0	0
71	103 M.ed Staffroom	0	16	0	0
72	104 M.Ed Office	0	4	0	1
73	Manager Office	0	2	0	0
74	Room No-1 Hostel UG	1	2	0	0

Sr. No	Location	Tube light (40W)	LED (15W)	Exhaust Fan (40W)	Wall Fan (60W)
75	Room No-2	1	2	0	0
76	Room No-3	1	0	0	0
77	Room No-4	1	0	0	0
78	Room No-5	2	2	0	0
79	Room No-6	3	2	0	0
80	Room No-7	1	0	0	0
81	Room No-8	1	1	0	0
82	Room No-9	1	1	0	0
83	Room No-10	1	1	0	0
84	Room No-11	1	1	0	0
85	Room No-12	1	1	0	0
86	Room No-13	1	1	0	0
87	Hostel Office	1	3	0	0
88	Guest Room	1	3	0	0
89	Room No-14	1	2	0	0
90	Room No-15	1	1	0	0
91	Room No-16	4	2	0	0
92	Room No-17	1	2	0	0
93	Room No-18	1	2	0	0
94	Room No-19	1	2	0	0
95	Room No-20	1	2	0	0
96	Room No-21	1	0	0	0
97	Washroom Hostel	2	0	0	0
98	Bhoj Nalay Kauch	4	10	2	0
99	Room No-22	1	2	0	0
100	Room No-23	1	3	0	0
101	Room No-24	1	2	0	0
102	Room No-25	1	2	0	0
103	Room No-26	1	2	0	0
104	Washroom	0	2	0	0
105	Room No-27	3	2	0	0
106	Room No-28	1	2	0	0
107	Room No-29	1	2	\0	0
108	Room No-30	1	2	0	0
109	Room No-31	1	1	0	0
110	Room No-32	1	2	0	0
111	Room No-33	1	2	0	0
112	Room No-34	1	2	0	0
113	Reading Room No-35	2	4	0	0
114	Room No-36	1	2	0	0
	Total	**191**	**272**	**5**	**8**

Connected load Summary

Sr. No	Equipment	Unit Watt	Quantity	Total Watt	Load share (%)
1	Tube light (40 Watt)	40	191	7640	24.69
2	Ceiling Fan	60	281	16860	54.48
3	LED Tube light	18	272	4896	15.82
4	Exhaust Fan	150	5	750	2.42
5	Wall Fan	100	8	800	2.59
	Total Connected load			**30946**	**100**



Connected load of the college campus

3.6 Some Photograph of Electrical Equipment's

Electrical Equipment in College Camps

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	Total Power Consumption by T-12 Conventional tube light	40	Watt
2	No of T-12	191	Nos.
3	Working Hrs./Day	8	Hrs./Day
4	Working Hrs./Year	250	Days/Year
5	Rated Power of Energy Efficient T-5(LED)	18	W
6	Energy Saving Potential	8404	kWh/Year
7	Load Factor	0.8	
8	Expected Annual Energy Saving	6723.2	kWh/Year
9	Overall Per Unit Charges	10.9	Rs./kWh
10	Expected Money Saving	73282	Rs./Year
11	Cost of T-5	200	Rs./ Pices
12	Investment on New Light Purchasing	12000	Rs.
13	Maintenance Investment@ 5%	600	Rs.
14	Total Investment	12,600	Rs
15	Simple payback Period	2	Month

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

Case Study No. -02

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

Sr. No	Item	Parameter	Unit
1	Rated Power of Conventional Ceiling Fan	60	W
2	No. of Fan	281	Nos
3	Working Hrs./Day	8	Hrs./Day
4	Working Days/Year	200	Days/Year
5	Energy Efficient BLDC Fan Rated power	28	W
6	Energy Saving Potential	14387.2	kWh/Year
7	Load Factor	0.8	
8	Expected Annual Energy Saving	11509/-	kWh/Year
9	Per Unit Charges	10.9	Rs/kWh
10	Expected Money Saving	1,25,456/-	Rs./Year
11	Cost of New Ceiling Fan	2,000/-	Rs./Pices
12	Investment on New Fan Purchasing	5,62,000/-	Rs.
13	Maintenance Investment@5%	28,100/-	Rs.
14	Total Investment	5,90,100/-	Rs.
15	Simple Pay Back Period	4.7	Year

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