GREEN AUDIT REPORT

Prabhakar Patil Education Society's,

ARTS, COMMERCE AND SCIENCE COLLEGE,

Veshvi, Taluka: Alibag, District: Raigad 402 209

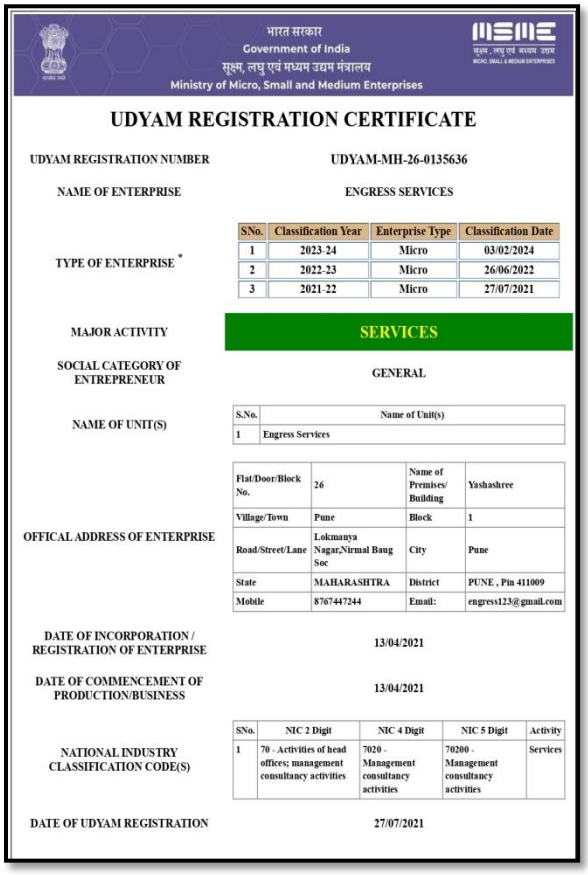
Year: 2023-24

Prepared by:

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: engress123@gmail.com

Registration Certificates: UDYAM, MEDA, ASSOCHAM GEM-CP, ISO: 9001 & 14001:



भारत सरकार
Government of India
सूक्ष्म, लघु एवं मध्यम उद्यम मंत्रालय
Ministry of Micro, Small and Medium Enterprises

UDYAM REGISTRATION CERTIFICATE

UDYAM REGISTRATION NUMBER	UDYAM-MH-26-0135636
NAME OF ENTERPRISE	ENGRESS SERVICES

TYPE OF ENTERPRISE *

SNo.	Classification Year	Enterprise Type	Classification Date
1	2023-24	Micro	03/02/2024
2	2022-23	Micro	26/06/2022
3	2021-22	Micro	27/07/2021

MAJOR ACTIVITY	SERVICES
SOCIAL CATEGORY OF ENTREPRENEUR	GENERAL

NAME OF UNIT(S)

S.No.	Name of Unit(s)
1	Engress Services

OFFICAL ADDRESS OF ENTERPRISE

Flat/Door/Block No.	26	Name of Premises/ Building	Yashashree
Village/Town	Pune	Block	1
Road/Street/Lane	Lokmanya Nagar,Nirmal Baug Soc	City	Pune
State	MAHARASHTRA	District	PUNE , Pin 411009
Mobile	8767447244	Email:	engress123@gmail.com

DATE OF INCORPORATION / REGISTRATION OF ENTERPRISE	13/04/2021
DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS	13/04/2021

NATIONAL INDUSTRY CLASSIFICATION CODE(S)

SNo.	NIC 2 Digit	NIC 4 Digit	NIC 5 Digit	Activity
1	70 - Activities of head offices; management consultancy activities	7020 - Management consultancy activities	70200 - Management consultancy activities	Services

DATE OF UDYAM REGISTRATION 27/07/2021

ASSOCHAM

GEM Certificate

ASSOCHAM hereby certifies that

Mr. A Y Mehendale

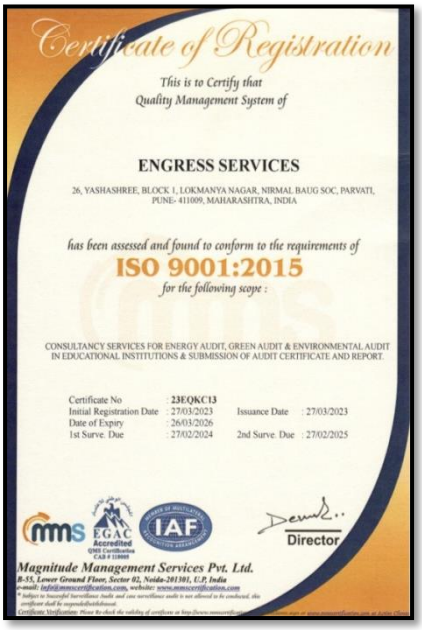
has successfully passed the
Green and Eco-friendly Movement Certified Professional Test (GEM CP)
with
"Excellent Performance"
on
06 June, 2022

He/she is now eligible to execute the GEM Sustainability Certification Projects. ASSOCHAM feels proud to award the GEM Certified Professional title to him/her.

Pankaj R. Dharkar
Chairman, GEM

GEM CP 22/788

Deepak Sood
Secretary General, ASSOCHAM



Certificate of Registration

This is to Certify that
Quality Management System of

ENGRESS SERVICES

26, YASHASHREE, BLOCK 1, LOKMANYA NAGAR, NIRMAL BAUG SOC, PARVATI, PUNE- 411009, MAHARASHTRA, INDIA

has been assessed and found to conform to the requirements of

ISO 9001:2015

for the following scope :

CONSULTANCY SERVICES FOR ENERGY AUDIT, GREEN AUDIT & ENVIRONMENTAL AUDIT IN EDUCATIONAL INSTITUTIONS & SUBMISSION OF AUDIT CERTIFICATE AND REPORT.

Certificate No	: 23EQKC13		
Initial Registration Date	: 27/03/2023	Issuance Date	: 27/03/2023
Date of Expiry	: 26/03/2026		
1st Surve. Due	: 27/02/2024	2nd Surve. Due	: 27/02/2025

EGAC Accredited

Director

Magnitude Management Services Pvt. Ltd.
B-55, Lower Ground Floor, Sector 02, Noida-201301, U.P, India

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
(Government of Maharashtra Institution)
Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary, Aundh, Pune, Maharashtra 411067
Ph No: 020-35000450
Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2022-23/CR-43/1709 10th May, 2022

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

We hereby certify that, the firm having following particulars is registered with *MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)* under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : M/s Engress Services
Yashshree, 26, Nirmal Bag Society,
Near Muktangan English School,
Parvati, Pune – 411 009.

Registration Category : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

Registration Number : *MEDA/ECN/2022-23/Class A/EA-32.*

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **09th May, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

Certificate of Registration

This is to Certify that
Environmental Management System of

ENGRESS SERVICES

26, YASHASHREE, BLOCK 1, LOKMANYA NAGAR, NIRMAL BAUG SOC, PARVATI, PUNE- 411009, MAHARASHTRA, INDIA

has been assessed and found to conform to the requirements of

ISO 14001:2015

for the following scope :

CONSULTANCY SERVICES FOR ENERGY AUDIT, GREEN AUDIT & ENVIRONMENTAL AUDIT IN EDUCATIONAL INSTITUTIONS & SUBMISSION OF AUDIT CERTIFICATE AND REPORT.

Certificate No	: 23EEKW20		
Initial Registration Date	: 29/03/2023	Issuance Date	: 29/03/2023
Date of Expiry	: 28/03/2026		
1st Surve. Due	: 29/02/2024	2nd Surve. Due	: 28/02/2025

EGAC Accredited

Director

Magnitude Management Services Pvt. Ltd.
B-55, Lower Ground Floor, Sector 02, Noida-201301, U.P, India

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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Prabhakar Patil Education Society's, Arts, Commerce and Science College, Veshvi, Tal: Alibag, District: Raigad for awarding us the assignment of Green Audit of their Campus for the Year: 2023-24.

We are thankful to all the staff members for helping us during the field study.

EXECUTIVE SUMMARY

1. Prabhakar Patil Education Society's, Arts, Commerce and Science College, Veshvi, Tal: Alibag, District: Raigad consumes Energy in the form of **Electrical Energy;** used for various gadgets, Office & other facilities.

2. Present Energy Consumption & CO_2 Emission:

No	Particulars	Value	Unit
1	Annual Energy Consumed	**34321**	kWh
2	Annual CO_2 Emissions	**30.89**	MT

3. Usage of Renewable Energy:

- The College has yet to install Roof Top Solar PV Plant

4. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Provision of Bio Composting Bed
3	Sanitary Waste	Disposal through an NGO
4	Lab Liquid Waste	Provision of Soak Pit

5. Rain Water Management:

The College has installed Rainwater Management Project. The rain water falling on the terrace is collected through pipe and is stored in an underground Water Tank and further used for domestic purpose.

6. Green & Sustainable Practices:

- Maintenance of good Internal Road
- Tree Plantation in the campus.
- Provision of Ramp for Divyangajan
- Creation of awareness on Energy Conservation Display of Posters

7. Assumption:

1. **1 kWh** of Electrical Energy releases **0.9 Kg** of **CO_2** into atmosphere

8. Reference:

- For CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

BEE	Bureau of Energy Efficiency
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO_2	Carbon Di Oxide
Qty	Quantity

CHAPTER-I
INTRODUCTION

1.1 Introduction:

A Green Audit is conducted at Prabhakar Patil Education Society's, Arts, Commerce and Science College, Veshvi, Tal: Alibag, District: Raigad.

1.2 Key Study Points:

No	Particulars
1	Study of Present Energy Consumption & CO_2 Emission
2	Study of Usage of Renewable Energy
3	Study of Waste Management Practices
4	Study of Rain Water Management
5	Study of Green & Sustainable Initiatives

1.3 College Location Image:

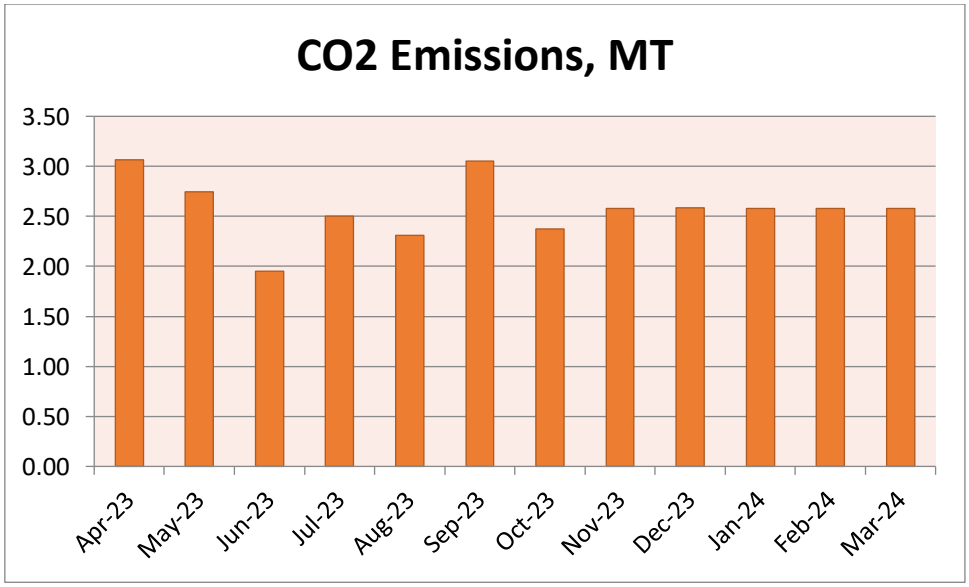
CHAPTER-II
STUDY OF ENERGY CONSUMPTION & CO_2 EMISSION

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. **Basis for computation of CO_2 Emissions: 1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere.

Table No 1: Month wise Energy Consumption & CO_2 Emissions:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-23	3405	3.06
2	May-23	3051	2.75
3	Jun-23	2166	1.95
4	Jul-23	2783	2.50
5	Aug-23	2567	2.31
6	Sep-23	3388	3.05
7	Oct-23	2635	2.37
8	Nov-23	2863	2.58
9	Dec-23	2874	2.59
10	Jan-24	2863	2.58
11	Feb-24	2863	2.58
12	Mar-24	2863	2.58
13	Total	34321	30.89
14	Maximum	3405	3.06
15	Minimum	2166	1.95
16	Average	2860.08	2.57

Chart No 1: Month wise CO_2 Emissions:



CHAPTER III
STUDY OF USAGE OF RENEWABLE ENERGY

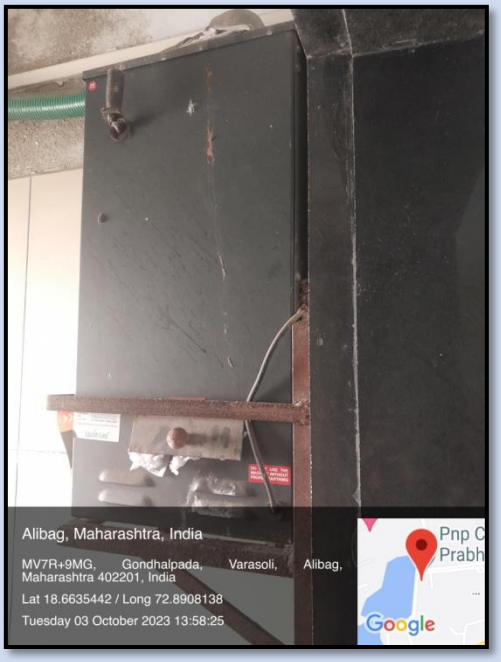
The College has yet to install Roof Top Solar PV Plant.

CHAPTER IV
STUDY OF WASTE MANAGEMENT

In this Chapter, we present the Waste Management Practices, followed by the College.

Details of Waste Management Practices:

No	Head	Observation	Photograph
1	Solid Waste	Segregation of Waste at Source: Provision of Waste Collection Bins	Waste Collection Bin: 
2	Organic Waste	Provision of Bio Composting Bed: For conversion into Bio Compost	Bio Composting Bed: 

3	**Sanitary Waste**	**Provision of Sanitary Waste Incinerator**	**Sanitary Waste Incinerator:** 
4	**Lab Liquid Waste**	**Provision of Soak Pit**	**Soak Pit** 

CHAPTER-V
STUDY OF RAIN WATER MANAGEMENT

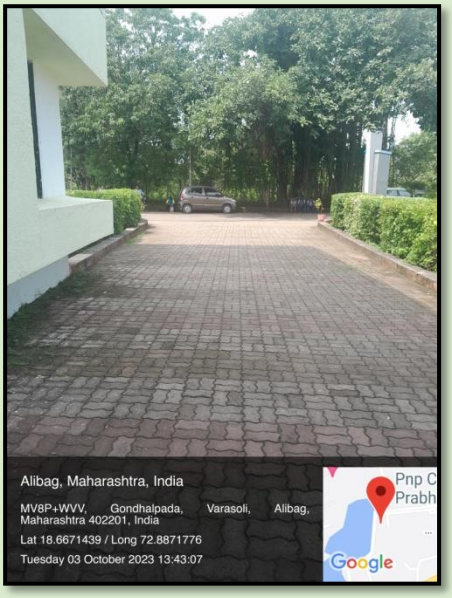
The College has installed Rainwater Management Project. The rain water falling on the terrace is collected through pipe and is stored in an underground Water Tank and further used for domestic purpose.

Photograph of Underground Rain Water Storage Tank:

CHAPTER-VI
STUDY OF GREEN & SUSTAINABLE PRACTICES

In this Chapter, we present the Green & Sustainable Practices followed by the College.

Green & Sustainable Practices:

No	Head	Observation	Photograph
1	**Easy Movement of Stake Holders**	Provision of Good Internal Road within the Campus	**Internal Road:** 
2	**Tree Plantation**	Internal Tree Plantation in the Campus	**Internal Tree Plantation:** 

3	**Facilities for Divyangajan**	Provision of Ramp for Divyangajan	**Ramp for Divyangajan:** 
4	**Creation of Awareness among Stake Holders**	**Display of Poster on Energy Conservation**	**Poster on Energy Conservation:** 

ANNEXURE-1:
LIST OF TREES& PLANTS IN THE CAMPUS:

No	Common name	Type (Tree, Shrub, Grass)	Quantity
1.	Hibiscus	Shrub/small tree	62
2.	Sunflower	Shrub	02
3.	Guava	Tropical tree/shrub	16
4.	Pine tree	Woody tree	01
5.	Kaner (C. thevetia)	Tropical shrub	88
6.	Gulmohor (Fire tree)	Woody tree	37
7.	Coconut	Woody herb	30
8.	Paper flowers	Shrub or small tree	05
9.	Bor (Jujube)	Tree/shrub	06
10.	Jamun	Tropical tree	06
11.	Beech tree	Woody tree	04
12.	Ashoka	Woody tree	02
13.	Badam	Deciduous tree	01
14.	Chafa	Large shrub/tree	03
15.	Sonchafa	Large shrub/tree	01
16.	Neem	Tree	02
17.	Fig tree	Bush	01
18.	Bidi leaf tree	Flowering shrub	01

ENERGY AUDIT REPORT

Prabhakar Patil Education Society's,

ARTS, COMMERCE AND SCIENCE COLLEGE,

Veshvi, Taluka: Alibag, District: Raigad 402 209

Year: 2023-24

Prepared by:

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Phone: 09890444795 Email: engress123@gmail.com

REGISTRATION CERTIFICATES: BEE, UDYAM, MEDA, ISO-9001 & 14001:

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- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

Regn. No. EA-8192 — No. 2942

National Productivity Council
(National Certifying Agency)
PROVISIONAL CERTIFICATE

This is to certify that Mr. / Ms. *Achyut Yashavant Mehendale*
son / daughter of Mr. *Yashavant*
has passed the National Certification Examination for Energy Auditors in April - 2007, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India.

He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for the Accredited Energy Auditor and issue of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.

Place : Chennai, India
Date : 10st August 2007

Controller of Examination

भारत सरकार
Government of India
सूक्ष्म, लघु एवं मध्यम उद्यम मंत्रालय
Ministry of Micro, Small and Medium Enterprises

UDYAM REGISTRATION CERTIFICATE

UDYAM REGISTRATION NUMBER	UDYAM-MH-26-0135636
NAME OF ENTERPRISE	ENGRESS SERVICES

TYPE OF ENTERPRISE *

SNo.	Classification Year	Enterprise Type	Classification Date
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2	2022-23	Micro	26/06/2022
3	2021-22	Micro	27/07/2021

MAJOR ACTIVITY: SERVICES

SOCIAL CATEGORY OF ENTREPRENEUR: GENERAL

NAME OF UNIT(S)

S.No.	Name of Unit(s)
1	Engress Services

OFFICAL ADDRESS OF ENTERPRISE

Flat/Door/Block No.	26	Name of Premises/ Building	Yashashree
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Road/Street/Lane	Lokmanya Nagar,Nirmal Baug Soc	City	Pune
State	MAHARASHTRA	District	PUNE , Pin 411009
Mobile	8767447244	Email:	engress123@gmail.com

DATE OF INCORPORATION / REGISTRATION OF ENTERPRISE: 13/04/2021

DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS: 13/04/2021

NATIONAL INDUSTRY CLASSIFICATION CODE(S)

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DATE OF UDYAM REGISTRATION: 27/07/2021

Certificate of Registration

This is to Certify that
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ENGRESS SERVICES

26, YASHASHREE, BLOCK 1, LOKMANYA NAGAR, NIRMAL BAUG SOC, PARVATI, PUNE- 411009, MAHARASHTRA, INDIA

has been assessed and found to conform to the requirements of
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for the following scope :

CONSULTANCY SERVICES FOR ENERGY AUDIT, GREEN AUDIT & ENVIRONMENTAL AUDIT IN EDUCATIONAL INSTITUTIONS & SUBMISSION OF AUDIT CERTIFICATE AND REPORT.

Certificate No : 23EEKW20
Initial Registration Date : 29/03/2023 — Issuance Date : 29/03/2023
Date of Expiry : 28/03/2026
1st Surve. Due : 29/02/2024 — 2nd Surve. Due : 28/02/2025

Director

Magnitude Management Services Pvt. Ltd.
B-55, Lower Ground Floor, Sector 02, Noida-201301, U.P. India

Certificate of Registration

This is to Certify that
Quality Management System of

ENGRESS SERVICES

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6	Study of Renewable Energy & Energy Efficiency	12

ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Prabhakar Patil Education Society's, Arts, Commerce and Science College, Veshvi, Tal: Alibag, District: Raigad for awarding us the assignment of Energy Audit of their Campus for the Year: 2023-24.

We are thankful to all the staff members for helping us during the field study.

EXECUTIVE SUMMARY

1. Prabhakar Patil Education Society's, Arts, Commerce and Science College, Veshvi, Tal: Alibag, District: Raigad consumes Energy in the form of **Electrical Energy;** used for various gadgets, Office & other facilities.

2. Present Connected Load & Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	**43.58**	kW
2	Annual Energy Consumed	**34321**	kWh

3. Per Capita Energy Consumption:

No	Particulars	Value	Unit
1	Annual Energy Consumed	34321	kWh
2	No of students studying in the College	1136	Nos
3	Per Capita Energy Consumption **=(1) / (2)**	**30.21**	kWh/Annum

4. Study of Lighting Power Density & % Usage of LED Lighting:

No	Particulars	Value	Unit
1	Lighting Power Density	**2.99**	W/m^2
2	% of Usage of LED Lighting to Total Lighting Load	**3.03**	%

5. Renewable Energy & Energy Efficiency Projects:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment

6. Assumption:

1. **1 kWh** of Electrical Energy releases **0.9 Kg** of **CO_2** into atmosphere

7. References:

- Audit Methodology: www.mahaurja.com
- Energy Conservation Building Code: ECBC-2017: www.beeindia.gov.in
- For CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

LED	:	Light Emitting Diode
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
IQAC	:	Internal Quality Assurance Cell
BEE	:	Bureau of Energy Efficiency
FTL	:	Fluorescent Tube Light
CFL	:	Compact Fluorescent Light
PV	:	Photo Voltaic
Kg	:	Kilo Gram
kWh	:	kilo-Watt Hour
CO_2	:	Carbon Di Oxide
MT	:	Metric Ton

CHAPTER-I
INTRODUCTION

1.1 Introduction:

An Energy Audit is conducted at Prabhakar Patil Education Society's, Arts, Commerce and Science College, Veshvi, Tal: Alibag, District: Raigad.

The guidelines followed for conducting the Energy Audit are:

- BEE India's Energy Conservation Building Code: ECBC-2017
- Maharashtra Energy Development Agency (www.mahaurja.com)
- Tata Power: www.tatapower.com

1.2 Key Study Points:

No	Particulars
1	Study of Present Connected Load
2	Study of Present Energy Consumption
3	Study of Per Capita Energy Consumption
4	Study of Lighting
5	Study of Energy Efficiency & Renewable Energy

1.3 College Location Image:

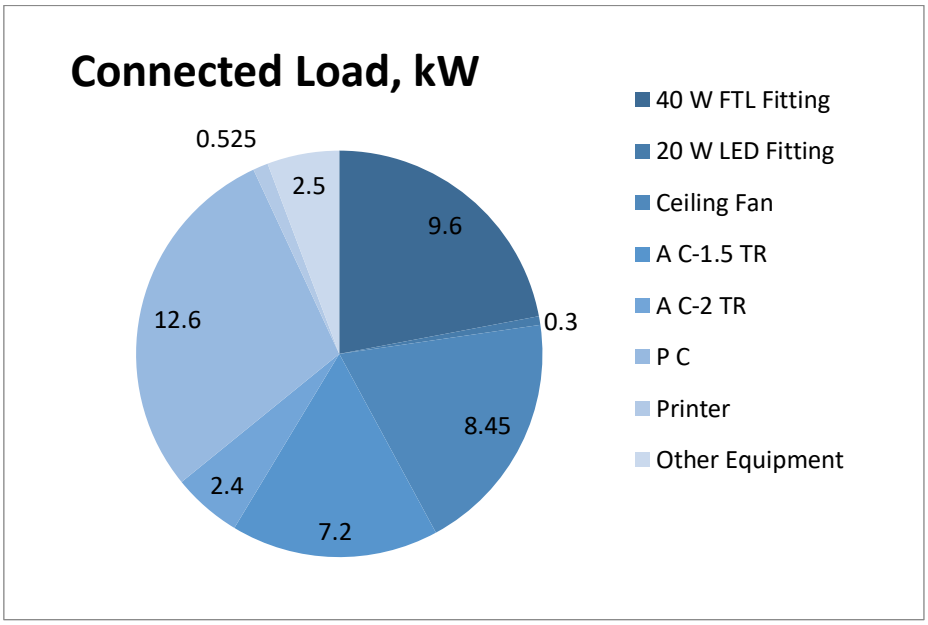
CHAPTER-II
STUDY OF CONNECTED LOAD

The major contributors to the connected load of the College include:

Table No 1: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/unit	Load, kW
1	40 W FTL Fitting	240	40	9.6
2	20 W LED Fitting	15	20	0.3
3	Ceiling Fan	130	65	8.45
4	A C-1.5 TR	4	1800	7.2
5	A C-2 TR	1	2400	2.4
5	P C	84	150	12.6
6	Printer	3	175	0.525
7	Other Equipment	10	250	2.5
8	**Total**			**43.58**

Chart No 1: Study of Connected Load:



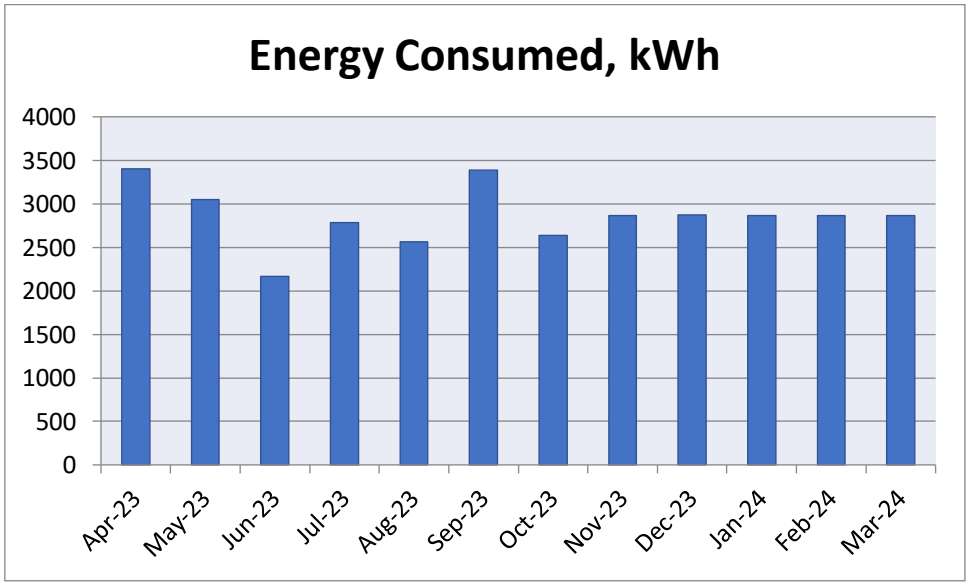
CHAPTER-III
STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electrical Energy Consumption.

Table No 2: Electrical Energy Consumption Analysis- 2023-24:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-23	3405	3.06
2	May-23	3051	2.75
3	Jun-23	2166	1.95
4	Jul-23	2783	2.50
5	Aug-23	2567	2.31
6	Sep-23	3388	3.05
7	Oct-23	2635	2.37
8	Nov-23	2863	2.58
9	Dec-23	2874	2.59
10	Jan-24	2863	2.58
11	Feb-24	2863	2.58
12	Mar-24	2863	2.58
13	Total	34321	30.89
14	Maximum	3405	3.06
15	Minimum	2166	1.95
16	Average	2860.08	2.57

Chart No 2: Variation in Monthly Energy Consumed, kWh:



CHAPTER-IV
STUDY OF PER CAPITA ENERGY CONSUMPTION

Per Capita Energy Consumption Index: Per Capita Energy Consumption Index of an educational Institute/College is its Annual Energy Consumption in Kilo Watt Hours per student studying in the Institute/College.

It is determined by:

$$\text{Per Capita Energy Consumption Index} = \frac{\text{(Annual Energy Consumption in kWh)}}{\text{(Total No of students studying)}}$$

Now we compute the EPI for the College as under:

Table No 3: Computation of Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Consumed	34321	kWh
2	Total Built up area of College	1136	Nos
3	Energy Performance Index **=(1) / (2)**	**30.21**	kWh

CHAPTER-V
STUDY OF LIGHTING

Terminology:

1. Lumen is a unit of light flow or luminous flux. The lumen rating of a lamp is a measure of the total light output of the lamp. The most common measurement of light output (or luminous flux) is the lumen. Light sources are labeled with an output rating in lumens.

2. Lux is the metric unit of measure for illuminance of a surface. One lux is equal to one lumen per square meter.

3. Circuit Watts is the total power drawn by lamps and ballasts in a lighting circuit under assessment.

4. Installed Load Efficacy is the average maintained illuminance provided on a horizontal working plane per circuit watt with general lighting of an interior. Unit: lux per watt per square metre (lux/W/m^2)

5. Lamp Circuit Efficacy is the amount of light (lumens) emitted by a lamp for each watt of power consumed by the lamp circuit, i.e. including control gear losses. This is a more meaningful measure for those lamps that require control gear. Unit: lumens per circuit watt (lm/W)

6. Lighting Power Density: It is defined as Total Lighting Load in a room divided by the Area of that Room in square meters.

In this Chapter we compute the Lighting Power density and the percentage usage of LED Lighting to total Lighting Load of the College.

Table No 4: Computation of Lighting Power Density: IQAC Room:

No	Particulars	Value	Unit
1	Qty of 40 W Fittings in IQAC Room	2	Nos
2	Load of 40 W Fitting	40	W/unit
3	Total Load of 2 Nos, 40 W Fittings	**80**	W
4	Built up area of IQAC Room	**26.76**	m^2
5	**Lighting Power Density = (3)/(4)**	**2.99**	W/m^2

Table No 5: Percentage Usage of LED Lighting to Total Lighting Load:

No	Particulars	Value	Unit
1	No of 40 W FTL Fittings	240	Nos

2	Load per unit of 40 W FTL Fitting	40	W
3	Total Load of 40 W FTL Fittings	**9.6**	kW
4	No of 20 W LED Fittings	15	Nos
5	Load per unit of 20 W LED Fitting	20	W
6	Total Load of 20 W LED Fittings	**0.3**	kW
7	Total LED Lighting Load= 6	**0.3**	kW
8	Total Lighting Load= 3+6	**9.9**	kW
9	% of Usage of LEDs to Total Lighting Load=**7*100/8**	**3.03**	%

CHAPTER-VI
STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

6.1 Usage of Renewable Energy:

The College has yet to install Roof Top Solar PV Plant.

6.2 Energy Efficiency Measures adopted:

- The College has Energy Efficient LED Fittings.
- Usage of BEE STAR Rated Equipment

Photographs of Energy Efficient BEE STAR Rated AC: