

# ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School,  
Parvati, Pune 411 009 Tel: 09890444795 Email: [engress123@gmail.com](mailto:engress123@gmail.com)  
**UDYAM** Regn. No: UDYAM-MH-26-0135636,  
**MEDA** Regn. No: ECN/2023-24/CR-43/1709  
**ISO: 9001-2015** Certified (Cert No: 23EQKC13),  
**ISO: 14001-2015** Certified (Cert No: 23EEKW20)



## ENERGY AUDIT CERTIFICATE

**Certificate No: ES/ RJSPMACSC/23-24/01**

**Date: 22/4/2024**

This is to certify that we have conducted Energy Audit at Rajmata Jijau Shikshan Prasarak Mandal's Arts, Commerce & Science College, Landewadi, Bhosari in the Year 2023-24.

The College has adopted following Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Installation of 10 kWp Capacity Roof Top Solar PV Plant

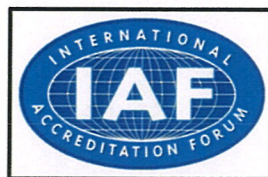
We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Energy Efficient.

**For Engress Services,**



**A Y Mehendale,**

B E-Mechanical, M Tech- Energy  
BEE Certified Energy Auditor, EA-8192



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**ISO: 9001-2015** Certified (Cert No: 23EQKC13),  
**ISO: 14001-2015** Certified (Cert No: 23EEKW20)



## GREEN AUDIT CERTIFICATE

Certificate No: ES/ RJSPMACSC/23-24/02

Date: 22/4/2024

This is to certify that we have conducted Green Audit at Rajmata Jijau Shikshan Prasarak Mandal's Arts, Commerce & Science College, Landewadi, Bhosari in the Year 2023-24.

The College has adopted following Green & Sustainable Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Installation of 10 kWp Capacity Roof Top Solar PV Plant
- Segregation of Waste at Source
- Bio composting Bed for conversion of Organic Waste
- Implementation of Rain Water Management Project
- Maintenance of Good Internal Road
- Maintenance of Internal Garden
- Provision of Ramp for Divyangajan
- Creation of Awareness on Water Conservation by Display of Posters

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Engress Services,

**A Y Mehendale,**

B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192  
ASSOCHAM GEM Certified Professional: GEM: 22/788



# ENGRESS SERVICES

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MEDA Regn. No: ECN/2023-24/CR-43/1709  
ISO: 9001-2015 Certified (Cert No: 23EQKC13),  
ISO: 14001-2015 Certified (Cert No: 23EEKW20)



## ENVIRONMENTAL AUDIT CERTIFICATE

Certificate No: ES/ RJSPMACSC /23-24/03

Date: 22/4/2024

This is to certify that we have conducted Environmental Audit at Rajmata Jijau Shikshan Prasarak Mandal's Arts, Commerce & Science College, Landewadi, Bhosari in the Year 2023-24.

The College has adopted following Eco-Friendly practices:

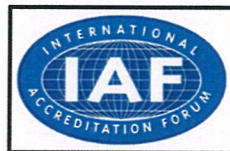
- Usage of Energy Efficient LED Fittings
- Installation of 10 kWp Capacity Roof Top Solar PV Plant
- Segregation of Waste at Source
- Bio composting Bed for conversion of Organic Waste.
- Implementation of Rain Water Management Project
- Maintenance of Internal Garden
- Creation of Awareness on Water Conservation by Display of Posters

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green and Eco Friendly.

For Engress Services,

A Y Mehendale,

B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192  
ASSOCHAM GEM Certified Professional: GEM: 22/788



# ENERGY AUDIT REPORT

## RAJMATA JIJAU SHIKSHAN PRASARAK MANDAL'S, ARTS, COMMERCE & SCIENCE COLLEGE,

Landewadi, Bhosari, Pune 411 039



Year: 2023-24

Prepared by:

### ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society  
Near Mukhtangan English School, Parvati, Pune 411009  
Phone: 09890444795 Email: [engress123@gmail.com](mailto:engress123@gmail.com)



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

MAHARASHTRA ENERGY DEVELOPMENT AGENCY  
**Maharashtra Energy Development Agency**  
 (Government of Maharashtra Institute)  
 Aashdi Road, Opposite Spicet College Road, Near Commissionerate of Animal Husbandary,  
 Aashdi, Pune, Maharashtra 411007  
 Ph No: 020-35000430  
 Email: ee@maharaja.com, Web: www.maharaja.com

ECN-2022-23/CR-43/1709 10<sup>th</sup> 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 Engross Services  
 Yashshree, 26, Nirmal Bang Society,  
 Near Mukanganj English School,  
 Parvati, Pune - 411 009

Registration Category : Empowered Consultant for Energy Conservation Programme for Class 'A'

Registration Number : MEDA/ECN/2022-23/Class AEA-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 empowerment is valid till 09<sup>th</sup> 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)

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 : 10<sup>th</sup> August 2007

*Illegible Signature*  
 Controller of Examination

भारत सरकार  
 Government of India  
 सूक्ष्म, सघु 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 :

S.No.	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	Engross Services

OFFICIAL ADDRESS OF ENTERPRISE :

Flat/Door/Block No.	26	Name of Premises/ Building	Yashshree
Village/Town	Pune	Block	1
Road/Street/Lane	Lokmanya Nagar, Nirmal Bang Soc	City	Pune
State	MAHARASHTRA	District	PUNE, Pin-411009
Mobile	8767447244	Email:	engross123@gmail.com

DATE OF INCORPORATION / REGISTRATION OF ENTERPRISE : 15/04/2021

DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS : 15/04/2021

NATIONAL INDUSTRY CLASSIFICATION CODE(S) :

S.No.	NIC 2 Digit	NIC 4 Digit	NIC 5 Digit	Activity
1	79	7929	79290	Services
				Activities of head offices; management consultancy activities
				Management consultancy activities
				Management consultancy activities

DATE OF UDYAM REGISTRATION : 27/07/2021

**Certificate of Registration**

This is to Certify that  
 Environmental Management System of

**ENGRESS SERVICES**  
 26, YASHASHREE, BLOCK 1, LOKMANYA NAGAR, NIRMAL BANG 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 : 23EERW20  
 Initial Registration Date : 29/03/2023  
 Date of Expiry : 28/03/2026  
 1st Surve. Due : 29/02/2024 2nd Surve. Due : 28/02/2025

*Illegible Signature*  
 Director

MMS EGAC IAF  
 Magnitude Management Services Pvt. Ltd.  
 B-15, Lower Ground Floor, Sector 02, Noida-201301, U.P. India  
 www.magnitudecertification.com, website: www.magnitudecertification.com

**Certificate of Registration**

This is to Certify that  
 Quality Management System of

**ENGRESS SERVICES**  
 26, YASHASHREE, BLOCK 1, LOKMANYA NAGAR, NIRMAL BANG 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 : 23EQW13  
 Initial Registration Date : 27/03/2023  
 Date of Expiry : 26/03/2026  
 1st Surve. Due : 27/02/2024 2nd Surve. Due : 27/02/2025

*Illegible Signature*  
 Director

MMS EGAC IAF  
 Magnitude Management Services Pvt. Ltd.  
 B-15, Lower Ground Floor, Sector 02, Noida-201301, U.P. India  
 www.magnitudecertification.com, website: www.magnitudecertification.com

## INDEX

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## **ACKNOWLEDGEMENT**

We at Engress Services, Pune, express our sincere gratitude to the management of Rajmata Jijau Shikshan Prasarak Mandal's Arts, Commerce & Science College, Landewadi, Bhosari, Pune for awarding us the assignment of Energy Audit of their Landewadi Campus for the Year:2023-24.

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

## EXECUTIVE SUMMARY

1. **Rajmata Jijau Shikshan Prasarak Mandal's Arts, Commerce & Science College, Landewadi, Bhosari, Pune** 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	69.65	kW
2	Annual Energy Purchased	187865	kWh

### 3. Per Capita Energy Consumption:

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	187865	kWh
2	Annual Energy Generated	12000	kWh
3	Annual Energy Consumed=1+2	199865	kWh
4	Total No of Students	2218	Nos
5	Per Capita Energy Consumption = (3) / (4)	90.11	kWh/Annum

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

No	Particulars	Value	Unit
1	Lighting Power Density	0.97	W/m <sup>2</sup>
2	% of Usage of LED Lighting to Total Lighting Load	100	%

### 5. Renewable Energy & Energy Efficiency Projects:

- Usage of Energy Efficient LED fittings
- Installation of **10 kWp** Roof Top Solar PV Plant

### 6. Assumption:

1. **1 kWh** of Electrical Energy releases **0.93 Kg of CO<sub>2</sub>** into atmosphere
2. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
3. Annual Solar Energy Generation Days: **300 Nos**

### 7. References:

- Audit Methodology: [www.mahaurja.com](http://www.mahaurja.com)
- Energy Conservation Building Code: ECBC-2017: [www.beeindia.gov.in](http://www.beeindia.gov.in)
- For CO<sub>2</sub> Emissions: [www.ccd.gujarat.gov.in](http://www.ccd.gujarat.gov.in)
- For Solar PV Energy generation: [www.solarrooftop.gov.in](http://www.solarrooftop.gov.in)



## **ABBREVIATIONS**

LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
BEE	: Bureau of Energy Efficiency
ECBC	: Energy Conservation Building Code
RSSPM	: Rajmata Jijau Shikshan Prasarak Mandal
PV	: Photo Voltaic
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO <sub>2</sub>	: Carbon Di Oxide
MT	: Metric Ton

# CHAPTER-I INTRODUCTION

## 1.1 Introduction:

An Energy Audit is conducted at Rajmata Jijau Shikshan Prasarak Mandal's Arts, Commerce & Science College, Landewadi, Bhosari, Pune.

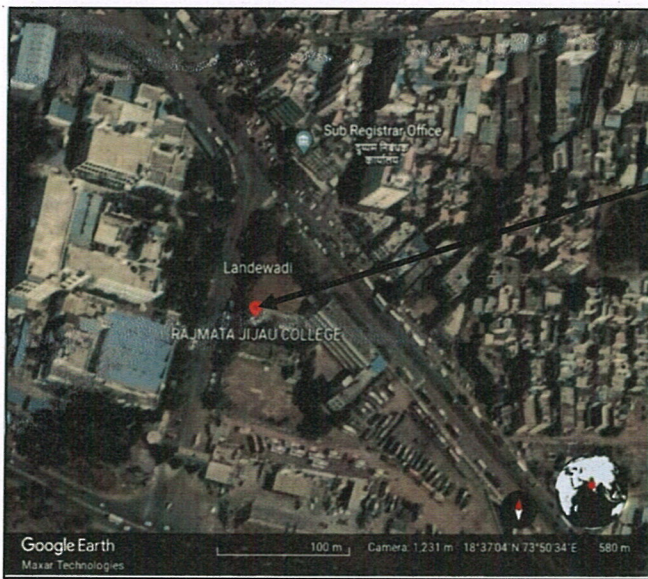
The guidelines followed for conducting the Energy Audit are:

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



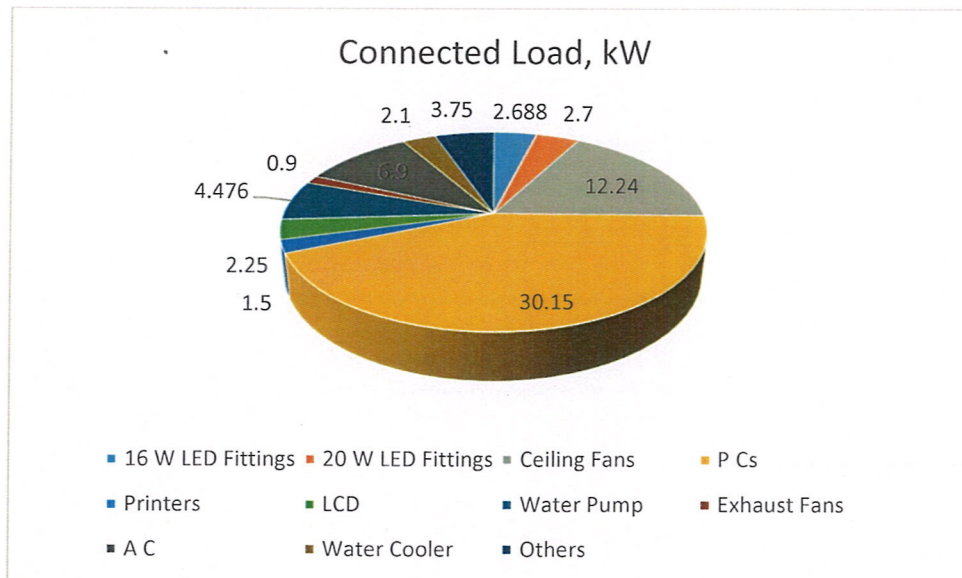
## CHAPTER-II STUDY OF CONNECTED LOAD

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	16 W LED Fittings	168	16	2.688
2	20 W LED Fittings	135	20	2.7
3	Ceiling Fans	170	72	12.24
4	P Cs	201	150	30.15
5	Printers	10	150	1.5
6	LCD	15	150	2.25
7	Water Pump	2	2238	4.476
8	Exhaust Fans	6	150	0.9
9	A C	4	1725	6.9
10	Water Cooler	6	350	2.1
11	Others	25	150	3.75
<b>12</b>	<b>Total</b>			<b>69.65</b>

**Chart No 1: Study of Connected Load:**



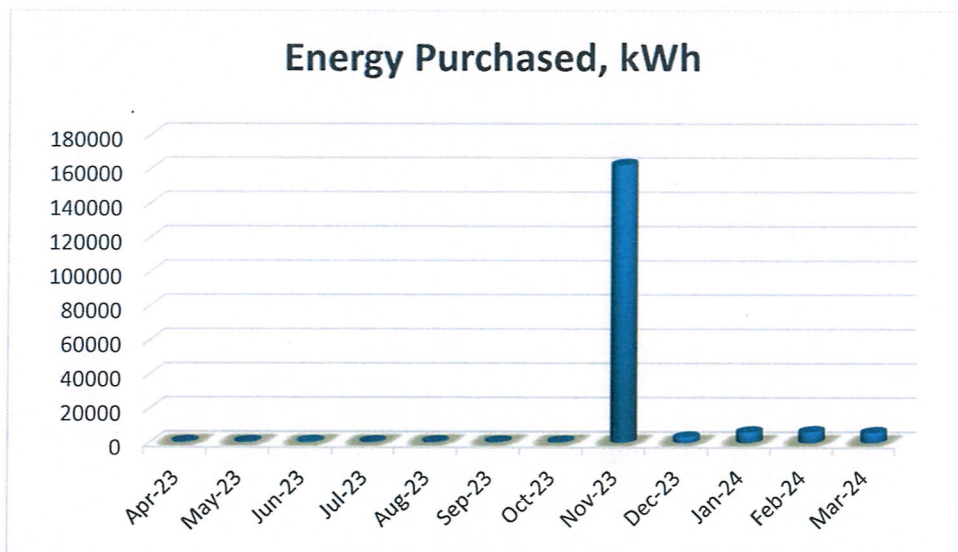
### CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

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

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

No	Month	Energy purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Apr-23	500	0.47
2	May-23	500	0.47
3	Jun-23	650	0.60
4	Jul-23	500	0.47
5	Aug-23	500	0.47
6	Sep-23	500	0.47
7	Oct-23	500	0.47
8	Nov-23	162327	150.96
9	Dec-23	3178	2.96
10	Jan-24	6277	5.84
11	Feb-24	6450	6.00
12	Mar-24	5983	5.56
13	Total	187865	174.71
14	Maximum	162327	150.96
15	Minimum	500	0.47
16	Average	15655.42	14.56

**Chart No 2: To study the variation of Monthly Electrical Energy Purchased:**



## CHAPTER-IV STUDY OF PER CAPITA ENERGY CONSUMPTION

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

It is determined by:

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

**Table No 3: Computation of Per Capita Energy Consumption:**

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	187865	kWh
2	Annual Energy Generated	12000	kWh
3	Annual Energy Consumed=1+2	199865	kWh
4	Total No of Students	2218	Nos
5	Per Capita Energy Consumption = (3) / (4)	90.11	kWh/Annum

## 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<sup>2</sup>)

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 percentage usage of LED Lighting to total Lighting Load.

**Table No 4: Computation of Lighting Power Density: Class Room: 1:**

No	Particulars	Value	Unit
1	Qty of 20 W LED Fittings in Class Room: 1	3	Nos
2	Load of 20 W Fitting	20	W/unit
3	Total Load of 3 Nos, 20 W Fittings	60	W
4	Built up area of Class Room: 1	62.13	m <sup>2</sup>
5	<b>Lighting Power Density = (3)/(4)</b>	<b>0.97</b>	W/m <sup>2</sup>

### Computation of Percentage Usage of LED Lighting to Total Lighting Load:

1. In this Chapter Total Lighting Load of the College is **5.388 kW**
2. Total Light Fittings are LEDs
3. The percentage of Usage of LEDs to Total Lighting Load is **100 %**

## CHAPTER-VI

### STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

#### 6.1 Usage of Renewable Energy:

The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**

#### Photograph of 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 LED Lighting:



# GREEN AUDIT REPORT

## RAJMATA JIJAU SHIKSHAN PRASARAK MANDAL'S, ARTS, COMMERCE & SCIENCE COLLEGE,

Landewadi, Bhosari, Pune 411 039

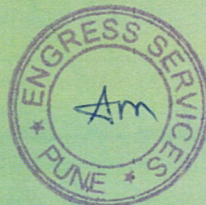


Year: 2023-24

Prepared by:

### ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society  
Near Mukhtangan English School, Parvati, Pune 411009  
Phone: 09890444795 Email: [engress123@gmail.com](mailto: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

S.No.	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

TYPE OF ENTERPRISE: SERVICES

MAJOR ACTIVITY: SERVICES

SOCIAL CATEGORY OF ENTREPRENEUR: GENERAL

NAME OF UNIT(S):

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

OFFICIAL ADDRESS OF ENTERPRISE:

Flat/Door/Block No.	26	Name of Premises/Building	Yashashree
Village/Town	Pune	Block	1
Road/Street/Lane	Lokmanya Nagar, Nirmal Bag Soc	City	Pune
State	MAHARASHTRA	District	PUNE, Pin 411009
Mobile	8787447244	Email:	regprv123@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):

S.No.	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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY  
Maharashtra Energy Development Agency  
(Government of Maharashtra Institution)  
Aashil Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary, Aashil, Pune, Maharashtra 411007  
Ph No: 020-35000450  
Email: eece@maharaja.com, Web: www.maharaja.com

ECN/2022-23/CR-43/1709 10<sup>th</sup> 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.

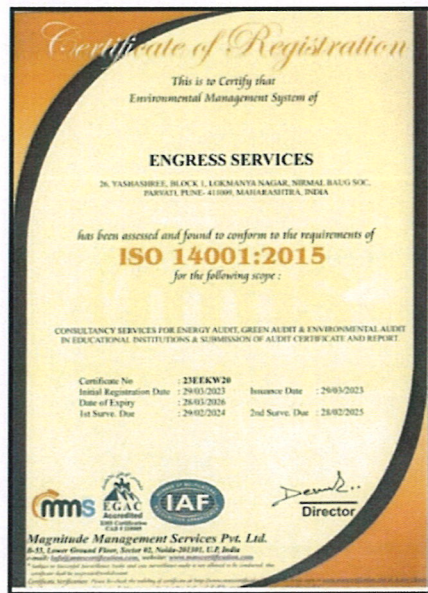
Name and Address of the firm: M/s Engress Services, Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune - 411 009.

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

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

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General Manager (EC)



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## **ACKNOWLEDGEMENT**

We at Engress Services, Pune, express our sincere gratitude to the management of RJSPM's Arts, Commerce & Science College, Landewadi, Bhosari, Pune for awarding us the assignment of Green Audit of their Landewadi Campus for the Year: 2023-24.

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

## EXECUTIVE SUMMARY

1. **Rajmata Jijau Shikshan Prasarak Mandal's Arts, Commerce & Science College, Landewadi, Bhosari, Pune** consumes Energy in the form of Electrical Energy used for various gadgets, Office & other facilities.

### 2. Present Energy Consumption & CO<sub>2</sub> Emission:

No	Particulars	Value	Unit
1	Annual Energy Purchased	187865	kWh
2	Annual CO <sub>2</sub> Emissions	174.71	MT

### 3. Renewable Energy & Reduction in CO<sub>2</sub> Emissions:

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- The Energy generated by Solar PV Plant in 2023-24 is **12000 kWh**.
- Reduction in CO<sub>2</sub> Emissions in 2023-24 is **11.16 MT**.

### 4. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Provision of Bio Composting Bed
3	E Waste	Disposed of through M/s. Green India

### 5. Rain Water Management:

The College has installed Pipes from the terrace and the Rain water falling on the terrace is used to increase the Underground Water Table.

### 6. Green & Sustainable Practices:

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

### 7. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.93 Kg** of CO<sub>2</sub> into atmosphere
2. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
3. Annual Solar Energy Generation Days: **300 Nos**

### 8. References:

- For CO<sub>2</sub> Emissions: [www.ccd.gujarat.gov.in](http://www.ccd.gujarat.gov.in)
- For Solar PV Energy generation: [www.solarrooftop.gov.in](http://www.solarrooftop.gov.in)

## **ABBREVIATIONS**

RJSPM	Rajmata Jijau Shikshan Prasarak Mandal
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO <sub>2</sub>	Carbon Di Oxide
Qty	Quantity

## CHAPTER-I INTRODUCTION

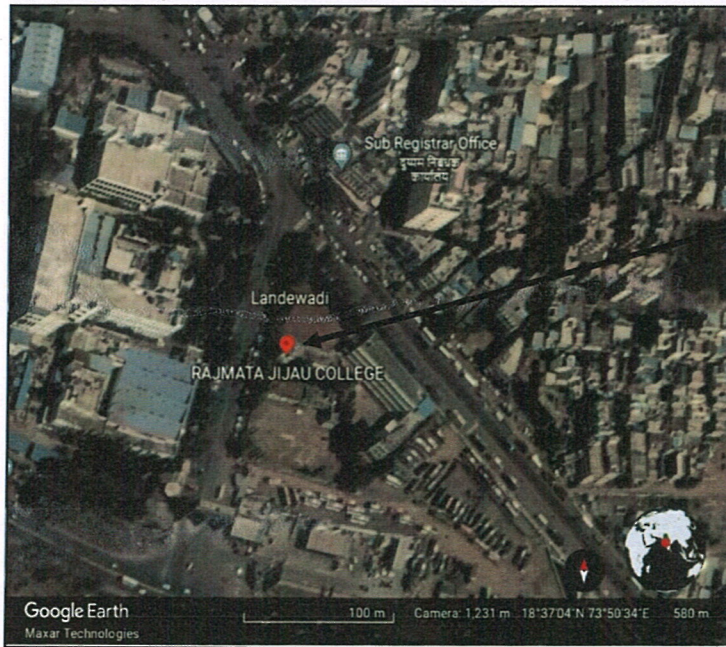
### 1.1 Introduction:

A Green Audit is conducted at Rajmata Jijau Shikshan Prasarak Mandal's Arts, Commerce & Science College, Landewadi, Bhosari, Pune.

### 1.2 Key Study Points:

No	Particulars
1	Study of Present Energy Consumption & CO <sub>2</sub> 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:



College  
Campus

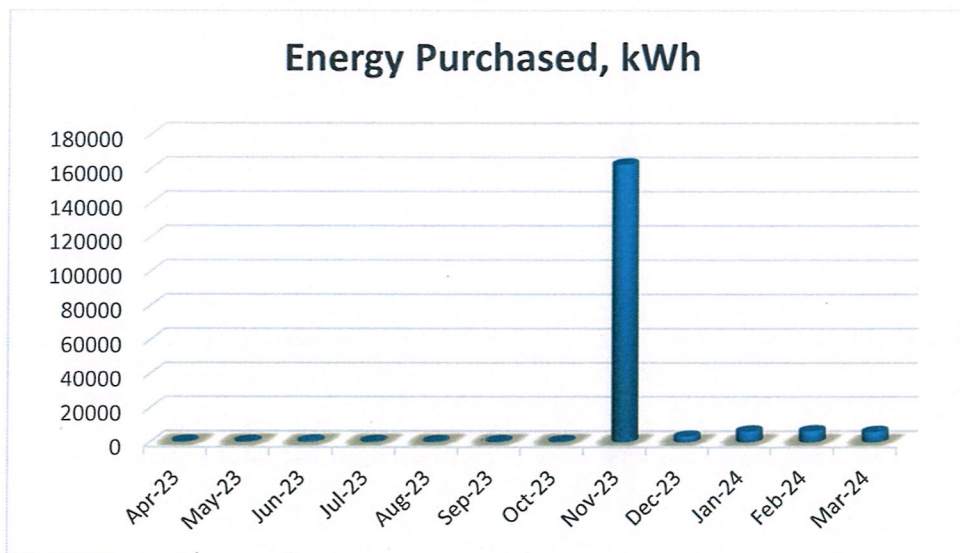
## CHAPTER-II STUDY OF ENERGY CONSUMPTION & CO<sub>2</sub> EMISSION

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. **Basis for computation of CO<sub>2</sub> Emissions: 1 kWh of Electrical Energy releases 0.93 Kg of CO<sub>2</sub> into atmosphere.**

**Table No 1: Month wise Energy Consumption & CO<sub>2</sub> Emissions:**

No	Month	Energy purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Apr-23	500	0.47
2	May-23	500	0.47
3	Jun-23	650	0.60
4	Jul-23	500	0.47
5	Aug-23	500	0.47
6	Sep-23	500	0.47
7	Oct-23	500	0.47
8	Nov-23	162327	150.96
9	Dec-23	3178	2.96
10	Jan-24	6277	5.84
11	Feb-24	6450	6.00
12	Mar-24	5983	5.56
13	Total	187865	174.71
14	Maximum	162327	150.96
15	Minimum	500	0.47
16	Average	15655.42	14.56

**Chart No 1: Month wise CO<sub>2</sub> Emissions:**



### CHAPTER III

## STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**  
In the following Table, we present the reduction in CO<sub>2</sub> emissions due to Solar Energy:

**Table No 2: Computation of Reduction in CO<sub>2</sub> Emissions:**

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	10	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy Generation Days	300	Nos
4	Energy Generated in the Year: 23-24	<b>12000</b>	kWh
5	1 kWh of Electrical Energy saves	<b>0.93</b>	Kg/kWh
6	<b>Qty of CO<sub>2</sub> Saved by Solar PV Plant = (4)*(5) /1000</b>	<b>11.16</b>	<b>MT of CO<sub>2</sub></b>

**Photograph of Roof Top Solar PV Plant:**




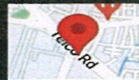




## CHAPTER IV STUDY OF WASTE MANAGEMENT

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

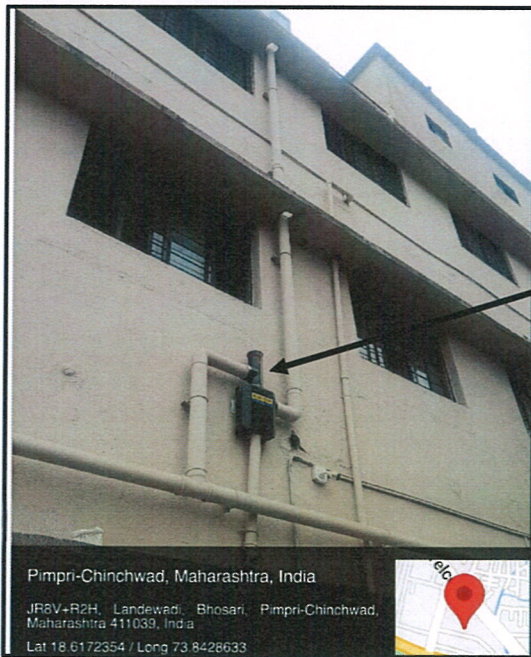
### Details of Waste Management Practices:

No	Head	Observation	Photograph
1	Solid Waste	Segregation of Waste at Source: Provision of Waste Collection Bins	<p><b>Waste Collection Bin:</b></p>  <p>Pimpri-Chinchwad, Maharashtra, India 5. Pune Nashik Hwy, Landewadi, Jjc, Pimpri-Chinchwad, Maharashtra 411026, India Lat 18.6180375 / Long 73.8426382</p> 
2	Organic Waste	Provision of Bio Composting Bed for conversion of Leafy Waste	<p><b>Bio Composting Bed:</b></p>  <p>Pimpri-Chinchwad, Maharashtra, India JRBV-957, Bhosari Telco Rd, Landewadi, Bhosari, Pimpri-Chinchwad, Maharashtra 411030, India Lat 18.618478 / Long 73.8425733</p> 
3	E Waste	Disposed of through M/s. Green India	

## CHAPTER-V STUDY OF RAIN WATER MANAGEMENT

The College has installed Pipes from the terrace and the Rain water falling on the terrace is used to increase the Underground Water Table.

### Photograph of Rain Water Collecting Pipe:

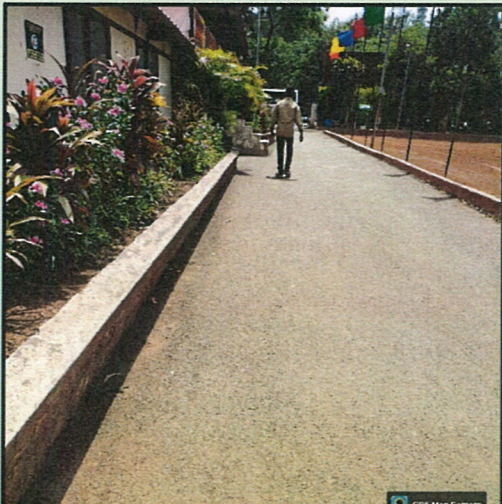





Rain Water Carrying  
Pipe & Filter  
Arrangement

## 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	<p style="text-align: center;"><b>Internal Road:</b></p>  <p style="text-align: center;">Pune, Maharashtra, India 24, Pasaydan, near Muktaangan High School, Nirmal Baug Colony, Sivadarshan Poorgrasta Vasahat, Parvati Paytha, Pune, Maharashtra 411009, India Lat 18.489197° Long 73.853128° 19/06/23 01:45 PM</p>
2	Tree Plantation	Internal Tree Plantation in the Campus	<p style="text-align: center;"><b>Internal Tree Plantation:</b></p>  <p style="text-align: center;">Pune, Maharashtra, India 24, Pasaydan, near Muktaangan High School, Nirmal Baug Colony, Sivadarshan Poorgrasta Vasahat, Parvati Paytha, Pune, Maharashtra 411009, India Lat 18.489197° Long 73.853128° 19/06/23 01:34 PM</p>

<p>3</p>	<p><b>Facilities for Divyangajan</b></p>	<p>Provision of Ramp for Easy Movement for Divyangajan</p>	<p><b>Ramp For Divyangajan:</b></p>  <p>Pune, Maharashtra, India 74, Pasaydan, near Mukhtangan High School, Nirmal Baug Colony, Shivdarsan Pooigrasta Vasahat, Parvat: Paytha, Pune, Maharashtra 411009, India Lat 18.489197° Long 73.853128° 19/08/23 01:45 PM</p>
<p>4</p>	<p><b>Creation of Awareness among Stake Holders</b></p>	<p>Display of Poster on Water Conservation</p>	<p><b>Poster on Water Conservation:</b></p>  <p>Pimpri-Chinchwad, Maharashtra, India JRSV+22C, Landewadi, Bhosari, Pimpri-Chinchwad, Maharashtra 411039, India Lat 18.6176754 / Long 73.8427588</p>

**ANNEXURE-1:**  
**LIST OF TREES IN THE CAMPUS:**

**List of Trees in the Campus:**

No	Name of Plant
1	Fig Tree
2	Lemon Tree
3	Indian Soap Berry
4	Indian Gooseberry
5	Mlabar Nut
6	Ginger
7	Curry Leaves
8	Air Plant/ Life Plant
9	Ashwagandha
10	Amaltas / Golden Shower Tree
11	Bahera / Beleris
12	Arjuna
13	Basil
14	Ram Tulasi
15	Holy Basil
16	Fern
17	Insulin Plant
18	Lemon Grass
19	Brahmi
20	Adulsa
21	Jasmine
22	Rudraksha
23	Shatavari
24	Mint
25	Karanti
26	China Rose
27	Aloe Vera
28	China Roase
29	Curry Leaves
30	Tulasi
31	Mimosa Pudica

# ENVIRONMENTAL AUDIT REPORT

## RAJMATA JIJAU SHIKSHAN PRASARAK MANDAL'S, ARTS, COMMERCE & SCIENCE COLLEGE,

Landewadi, Bhosari, Pune 411 039

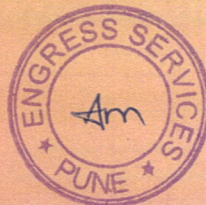


Year: 2023-24

Prepared by:

### ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society  
Near Muktangnan English School, Parvati, Pune 411009  
Phone: 09890444795 Email: [engress123@gmail.com](mailto:engress123@gmail.com)



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

**UDYAM REGISTRATION CERTIFICATE**

UDYAM REGISTRATION NUMBER: UDYAM-MH-26-0135636

NAME OF ENTERPRISE: ENGRESS SERVICES

S.No.	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): 1. Engross Services

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

Flat Door/Block No.	Name of Premises/ Building	Yashshree
26	Yashshree	

OFFICIAL ADDRESS OF ENTERPRISE:

Village/Town	Pin	Block	I
Lokmanya Nagar, Nirmal Bag Soc			

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

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

S.No.	NIC 2 Digit	NIC 4 Digit	NIC 5 Digit	Activity
1	79 - Activities of head offices; management consultancy activities	7020 - Management consultancy activities	78200 - Management consultancy activities	Services

DATE OF UDYAM REGISTRATION: 27/07/2021



**Maharashtra Energy Development Agency**  
(Government of Maharashtra Institution)  
Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary, Aundh, Pune, Maharashtra 411007  
Ph No: 020-35000450  
Email: eeec@maharashtra.com, Web: www.maharashtra.com

ECN/2022-23/CR-43/1709 10<sup>th</sup> 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.

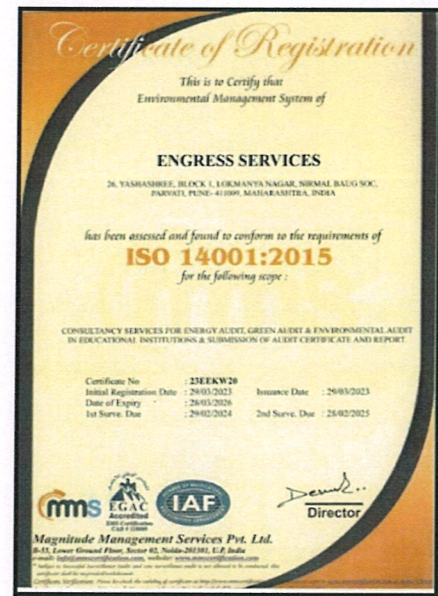
Name and Address of the firm: M's Engross Services, Yashshree, 26, Nirmal Bag Society, Near Mukangan English School, Parvati, Pune - 411 009.

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

Registration Number: MEDA/ECN/2022-23/Class A/EA-12.

- 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 **09<sup>th</sup> 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)**



## INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	4
II	Executive Summary	5
III	Abbreviations	7
1	Introduction	8
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3	Study of Usage of Renewable Energy	11
4	Study of Indoor Air Quality	12
5	Study of Indoor Lux & Noise Parameters	13
6	Study of Rain Water Management	14
7	Study of Waste Management	15
8	Study of Eco-Friendly Practices	16



## **ACKNOWLEDGEMENT**

We at Engress Services, Pune, express our sincere gratitude to the management of RJSPM's Arts, Commerce & Science College, Landewadi, Bhosari, Pune for awarding us the assignment of Environmental Audit of their Landewadi Campus for the Year: 2023-24

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

## EXECUTIVE SUMMARY

**1. Rajmata Jijau Shikshan Prasarak Mandal's Arts, Commerce & Science College, Landewadi, Bhosari, Pune** consumes Energy in the form of Electrical Energy used for various gadgets, Office & other facilities.

### 2. Pollution due to College Activities:

- **Air pollution:** Mainly CO<sub>2</sub> on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste, Paper & Plastic Waste
- **Liquid Waste:** Human & lab Liquid Waste

### 3. Present Energy Consumption & CO<sub>2</sub> Emission:

No	Particulars	Value	Unit
1	Annual Energy Purchased	187865	kWh
2	Annual CO <sub>2</sub> Emissions	174.71	MT

### 4. Renewable Energy & Reduction in CO<sub>2</sub> Emissions:

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- The Energy generated by Solar PV Plant in 2023-24 is **12000 kWh**.
- Reduction in CO<sub>2</sub> Emissions in 2023-24 is **11.16 MT**.

### 5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	93	56	68
2	Minimum	86	52	64

### 6. Indoor Lux & Noise Level Parameters:

No	Parameter/Value	Lux Level	Noise Level, dB
1	Maximum	249	48
2	Minimum	218	45

### 7. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Provision of Bio Composting Bed
3	E Waste	Disposed of through M/s. Green India

### **8. Rain Water Management:**

The College has installed Pipes from the terrace and the Rain water falling on the terrace is used to increase the Underground Water Table.

### **9. Environment Friendly Initiatives:**

- Tree Plantation in the campus.
- Creation of awareness on Water Conservation by Display of Posters

### **10. Assumptions:**

1. **1 kWh** of Electrical Energy releases **0.93 Kg** of **CO<sub>2</sub>** into atmosphere
2. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
3. Annual Solar Energy Generation Days: **300 Nos**

### **11. References:**

- For CO<sub>2</sub> Emissions: [www.ccd.gujarat.gov.in](http://www.ccd.gujarat.gov.in)
- For Various Indoor Air Parameters: [www.ishrae.com](http://www.ishrae.com)
- For AQI Quality Standards: [www.cpcb.com](http://www.cpcb.com)
- For Solar PV Energy generation: [www.solarrooftop.gov.in](http://www.solarrooftop.gov.in)

## **ABBREVIATIONS**

Kg	: Kilo Gram
RSSPM	: Rajmata Jijau Shikshan Prasarak Mandal
MT	: Metric Ton
kWh	: kilo-Watt Hour
LPD	: Liters per Day
LED	: Light Emitting Diode
AQI	: Air Quality Index
PM-2.5	: Particulate Matter of Size 2.5 Micron
PM-10	: Particulate Matter of Size 10 Micron
CPCB	: Central Pollution Control Board
ISHRAE	: The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

## CHAPTER-I INTRODUCTION

### 1. Important Definitions:

#### 1.1. Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

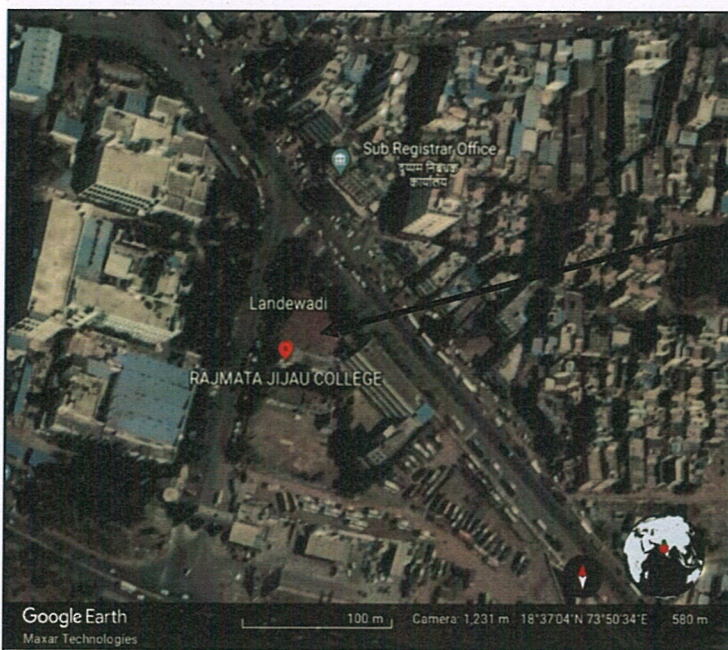
#### 1.2. Environmental Audit: Definition:

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment

#### 1.2 Key Study Points:

No	Particulars
1	Study of Present Resource Consumption & CO <sub>2</sub> Emission
2	Study of Usage of Renewable Energy
3	Study of Indoor Air Quality
4	Study of Indoor Lux & Noise Level
5	Study of Water Management
6	Study of Waste Management Practices
7	Study of Environment Friendly Practices

#### 1.3 College Location Image:



College  
Campus

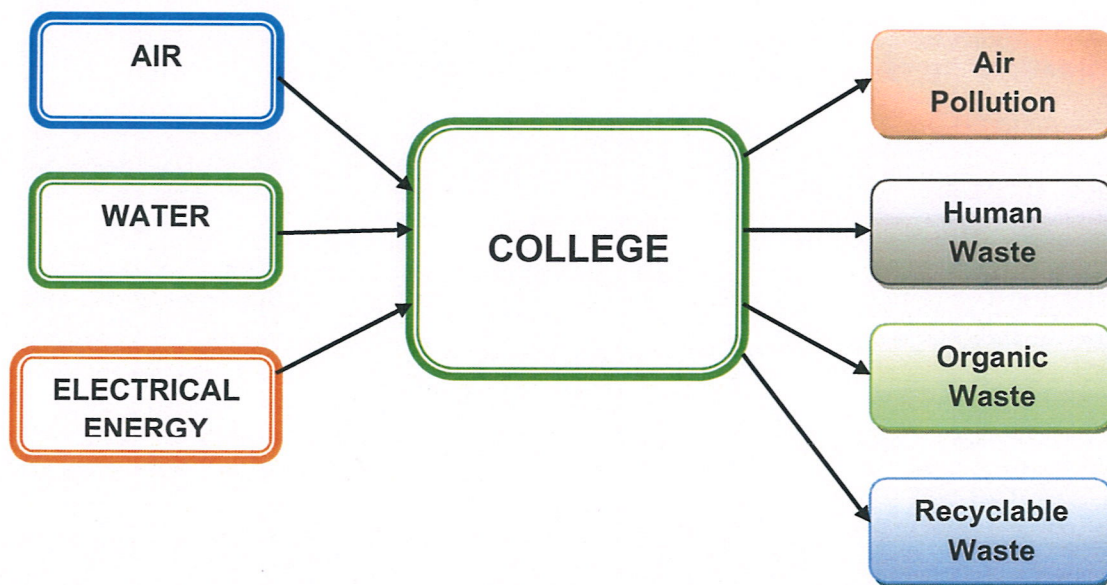
## CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO<sub>2</sub> EMISSION

The College consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the College System & Environment as under.

**Chart No 1: Representation of Resource Requirement & Waste of a College:**



Now we compute the Generation of CO<sub>2</sub> on account of consumption of Electrical Energy. The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy is as under.

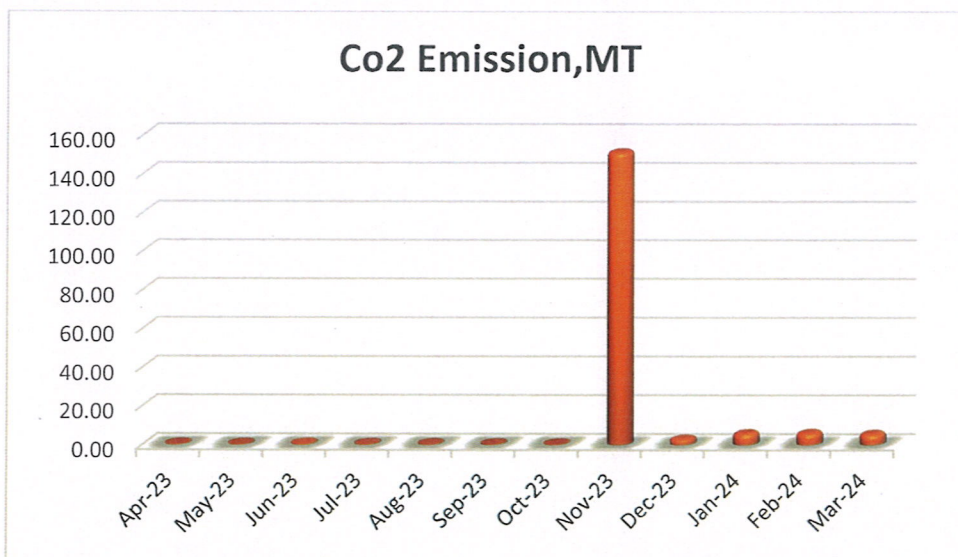
- 1 kWh of Electrical Energy releases 0.93 Kg of CO<sub>2</sub> into atmosphere

**Table No 1: Study of Purchase of Energy & CO<sub>2</sub> Emissions: 2023-24:**

No	Month	Energy purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Apr-23	500	0.47
2	May-23	500	0.47
3	Jun-23	650	0.60
4	Jul-23	500	0.47
5	Aug-23	500	0.47
6	Sep-23	500	0.47
7	Oct-23	500	0.47

8	Nov-23	162327	150.96
9	Dec-23	3178	2.96
10	Jan-24	6277	5.84
11	Feb-24	6450	6.00
12	Mar-24	5983	5.56
13	Total	187865	174.71
14	Maximum	162327	150.96
15	Minimum	500	0.47
16	Average	15655.42	14.56

**Chart No 2: Month wise CO<sub>2</sub> Emissions:**



### CHAPTER III

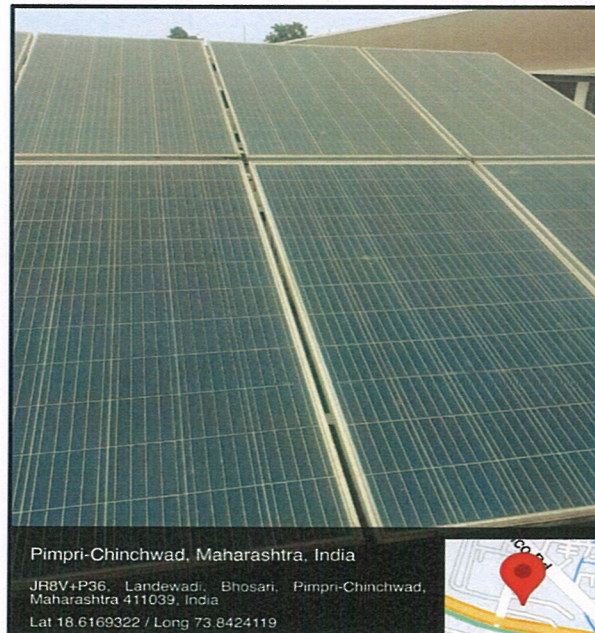
## STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**  
In the following Table, we present the reduction in CO<sub>2</sub> emissions due to Solar Energy:

**Table No 2: Computation of Reduction in CO<sub>2</sub> Emissions:**

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	10	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy Generation Days	300	Nos
4	Energy Generated in the Year: 23-24	<b>12000</b>	kWh
5	1 kWh of Electrical Energy saves	<b>0.93</b>	Kg/kWh
6	<b>Qty of CO<sub>2</sub> Saved by Solar PV Plant = (4)*(5) /1000</b>	<b>11.16</b>	<b>MT of CO<sub>2</sub></b>

**Photograph of Roof Top Solar PV Plant:**





## CHAPTER IV STUDY OF INDOOR AIR QUALITY

**1. Air:** The common name given to the atmospheric gases used in breathing and photosynthesis.

**2. Air quality** is a measure of the suitability of air for breathing by people, plants and animals.

**3. Air Quality Index: Air Quality Index (AQI)** is a number used by government agencies to measure the **Air Pollution** levels and communicate it to the population.

In this Chapter, we present three important Parameters: **AQI**- Air Quality Index, **PM-2.5**- Particulate Matter of Size 2.5 micron and **PM-10**- Particulate Matter of Size 10 micron

**Table No 3: Indoor Air Quality Parameters:**

No	Location	AQI	PM2.5	PM10
1	Biotechnology Lab	86	52	64
2	Library	90	54	67
3	Classroom	93	56	68
4	Seminar Hall	91	55	66
5	Studio & recording Lab	88	53	65
	Maximum	<b>93</b>	<b>56</b>	<b>68</b>
	Minimum	<b>86</b>	<b>52</b>	<b>64</b>

**Table No 4: Air Quality Index Values & Concentration of PM 2.5 & PM10: (By CPCB):**

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

### Conclusion:

From the above measured values, we conclude that the observed values of AQI, PM-2.5 & PM-10 are in the **Satisfactory Range**, as per the guidelines given by Central Pollution Control Board.

## CHAPTER V STUDY OF INDOOR LUX & NOISE PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit. The Parameters include: **Lux Level and Noise Level.**

**Table No 5: Study of Indoor Lux Level and Noise Level Parameters:**

No	Location	Lux Level, Lumen	Noise Level, dB
1	Biotechnology Lab	239	48
2	Library	218	46
3	Classroom	226	45.7
4	Seminar Hall	247	45
5	Studio & recording Lab	249	46
	Maximum	<b>249</b>	<b>48</b>
	Minimum	<b>218</b>	<b>45</b>

**Recommended Lux & Noise Level: As per BEE & ISHRAE Guidelines:**

A) Noise Level Reference:		
No	Location	Noise Level Range, dB
1	Offices	45-50
2	Occupied Class Room	40-45
3	Libraries	35-40
B) Reference Lux Level, Lumens:		
1	For Class Rooms	<b>200 Plus</b>
2	For Reading Rooms	<b>200 Plus</b>

### Conclusion:

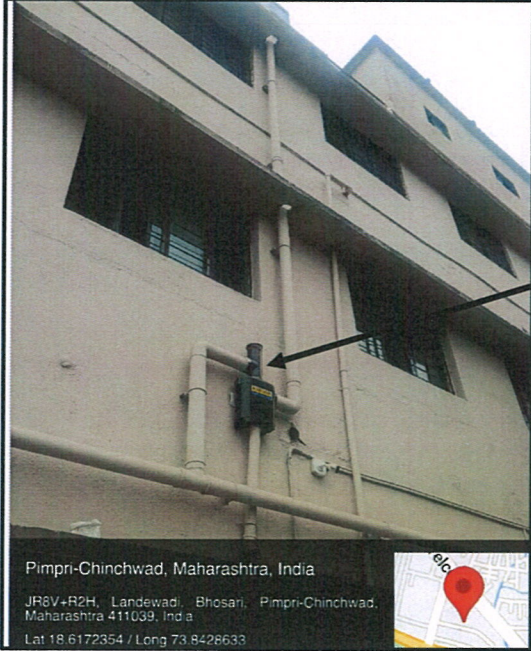
From the above measured values, we conclude that:

- The Noise Level is within the prescribed Limit
- The Lux Level at various locations is Okay

## CHAPTER VI STUDY OF RAIN WATER MANAGEMENT

The College has installed Pipes from the terrace and the Rain water falling on the terrace is used to increase the Underground Water Table.

### Photograph of Rain Water Collecting Pipe:




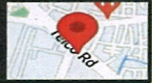


Rain Water Carrying  
Pipe & Filter  
Arrangement

## CHAPTER-VII STUDY OF WASTE MANAGEMENT

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


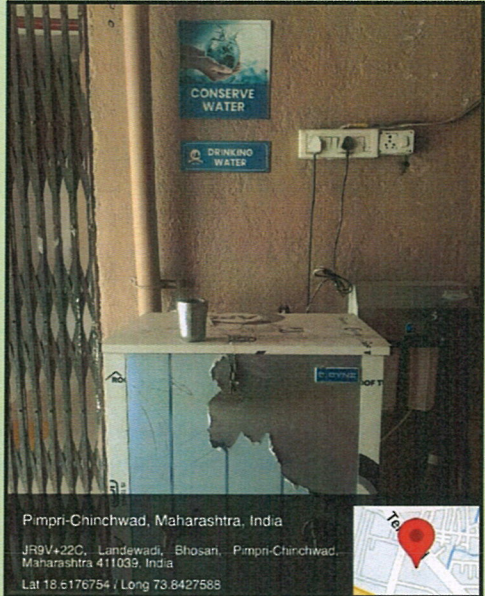
### Details of Waste Management Practices:

No	Head	Observation	Photograph
1	Solid Waste	Segregation of Waste at Source: Provision of Waste Collection Bins	<p><b>Waste Collection Bin:</b></p>  <p>Pimpri-Chinchwad, Maharashtra, India 5, Pune - Nashik Hwy, Landewadi, Jc, Pimpri-Chinchwad, Maharashtra 411026, India Lat 18.6180375 / Long 73.8426382</p> 
2	Organic Waste	Provision of Bio Composting Bed for conversion of Leafy Waste	<p><b>Bio Composting Bed:</b></p>  <p>Pimpri-Chinchwad, Maharashtra, India JR9V+927, Bhosari Telco Rd, Landewadi, Bhosari, Pimpri-Chinchwad, Maharashtra 411039, India Lat 18.618478 / Long 73.8425733</p> 
3	E Waste	Disposed of through M/s. Green India	

## CHAPTER-VIII STUDY OF ECO-FRIENDLY PRACTICES

In this Chapter, we present the Eco-Friendly Practices, followed by the College.

### Details of Eco-Friendly Practices:

No	Head	Observation	Photograph
1	Tree Plantation	Tree Plantation in the Campus	<p style="text-align: center;"><b>Photograph</b> Internal Tree Plantation:</p>  <p>Pune, Maharashtra, India 24, Pasaydan, near Muktagan High School, Nirmal Bhaug Colony, Shivdarsan Poongrasta Vasahat, Parvati Paytha, Pune, Maharashtra 411009, India Lat 18.489197° Long 73.853128° 19/06/23 01:34 PM</p>
2	Creation of Awareness among Stake Holders	Display of Poster on Water Conservation	<p style="text-align: center;"><b>Poster on Water Conservation:</b></p>  <p>Pimpri-Chinchwad, Maharashtra, India JR9V422C, Landewadi, Bhosari, Pimpri-Chinchwad, Maharashtra 411039, India Lat 18.6176754 / Long 73.8427588</p>