# ENERGY AUDIT REPORT

## MAHADEVA LAL SCHROFF COLLEGE OF PHARMACY

Aurangabad, Bihar 842 101

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

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)

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 |
|---|---|---|---|
| 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

*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 — IAF — 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**

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 — IAF — Director

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

# INDEX

# ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of Mahadeva Lal Schroff College of Pharmacy, Aurangabad, Bihar for awarding us the assignment of Energy Audit of their Campus, for the Academic Year: 2023-24.

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

# EXECUTIVE SUMMARY

**1. Mahadeva Lal Schroff College of Pharmacy, Aurangabad, Bihar** 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 | **60** | kW |
| 2 | Annual Energy Purchased | **17546** | kWh |

**3. Per Capita Energy Consumption:**

| No | Particulars | Value | Unit |
|---|---|---|---|
| 1 | Total Annual Energy Purchased | 17546 | kWh |
| 2 | No of students in the College | 520 | Nos |
| **3** | Per Capita Energy Consumption**= (1) / (2)** | **33.74** | kWh/Annum |

**4. Study of % Usage of LED Lighting:**

| No | Particulars | Value | Unit |
|---|---|---|---|
| 2 | % of Usage of LED Lighting to Total Lighting Load | **100** | % |

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

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

**6. Assumption:**

1. **1 kWh** of Electrical Energy releases **0.93 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.ccd,gujarat.gov.in

# ABBREVIATIONS

| | |
|---|---|
| BEE | Bureau of Energy Efficiency |
| MSEDCL | Maharashtra Electricity Distribution Company Limited |
| kWh | Kilo Watt Hour |
| kWp | Kilo Watt Peak |
| Kg | Kilo Gram |
| MT | Metric Ton |
| $CO_2$ | Carbon Di Oxide |
| LPG | Liquefied Petroleum Gas |
| FTL | Fluorescent Tube Light |
| LED | Light Emitting Diode |

# CHAPTER-I
# INTRODUCTION

## 1.1 Introduction:

An Energy Audit is conducted at Mahadeva Lal Schroff College of Pharmacy, Aurangabad, Bihar.

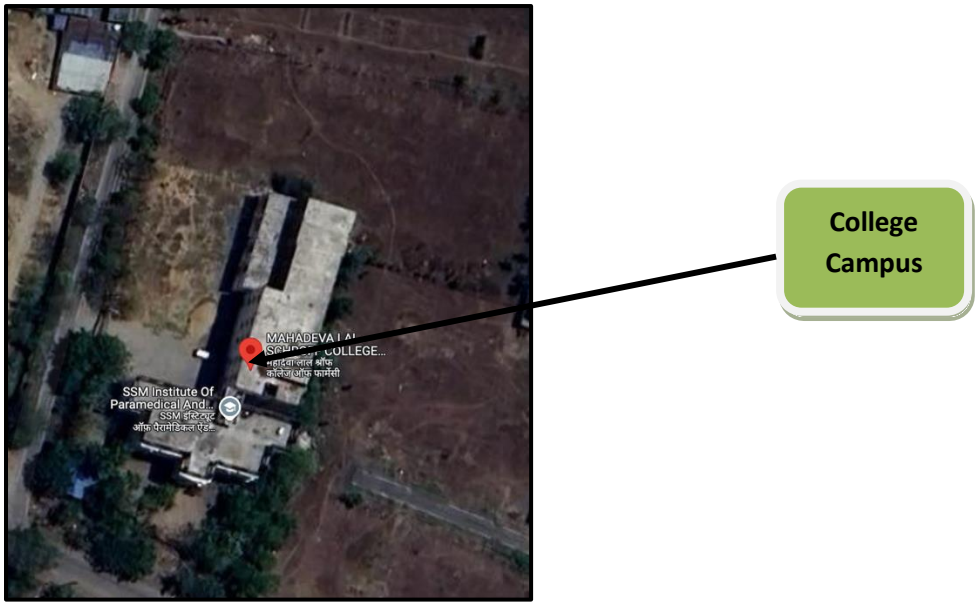
The guidelines followed for conducting the Energy Audit are:

- 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

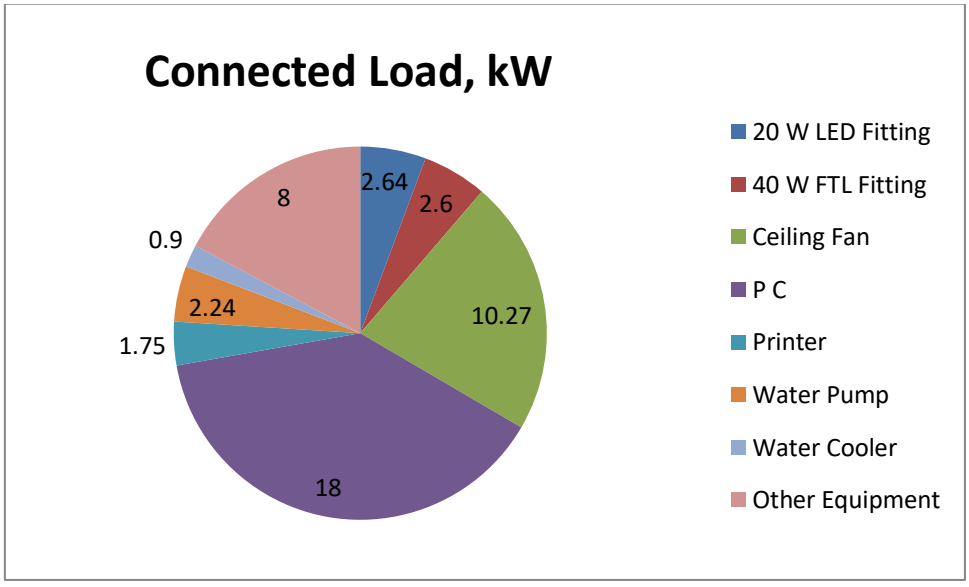
The major contributors to the connected load of the College are as under.

**Table No 1: Equipment wise Connected Load:**

| No | Equipment | Qty | Load/unit | Load, kW |
|---|---|---|---|---|
| 1 | 40 W FTL Fitting | 0 | 40 | 0 |
| 2 | 28 W T-5 Fitting | 0 | 28 | 0 |
| 3 | 20 W LED Fitting | 207 | 20 | 4.14 |
| 4 | Ceiling Fan | 148 | 65 | 9.62 |
| 5 | Exhaust Fan | 20 | 54 | 1.08 |
| 6 | PC | 48 | 150 | 7.2 |
| 7 | Printer | 5 | 175 | 0.875 |
| 8 | A C | 4 | 1000 | 4 |
| 9 | Other Equipment | 130 | 250 | 32.5 |
| | **Total** | | | **60** |

We present the above Data in a PIE Chart as under.

**Chart No1: Connected Load:**



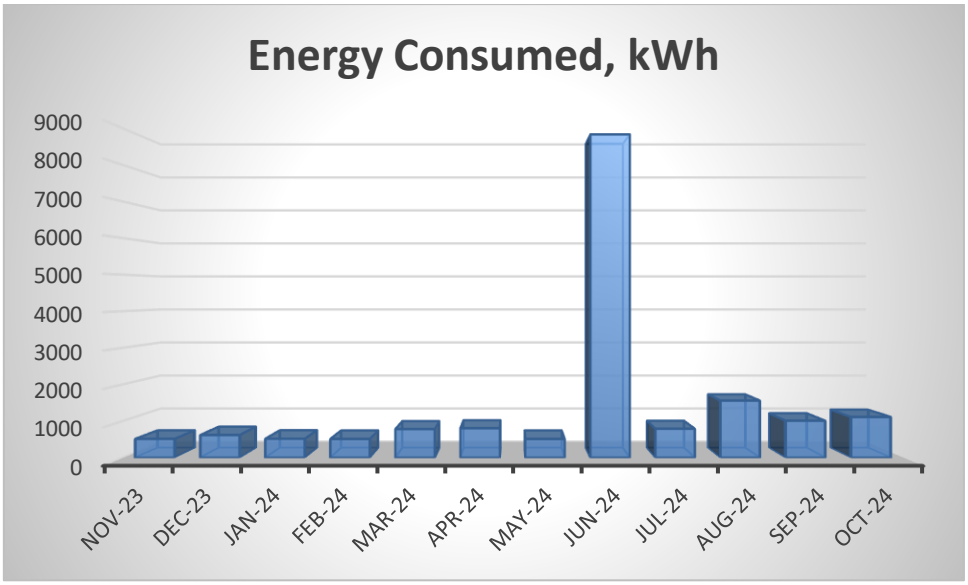
# CHAPTER-III
# STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Energy Consumption

**Table No 2: Study of Electrical Energy Consumption: 23-24:**

| No | Month | Energy Consumed, kWh | $CO_2$ Emissions, MT |
|---|---|---|---|
| 1 | Nov-23 | 512 | 0.48 |
| 2 | Dec-23 | 618 | 0.57 |
| 3 | Jan-24 | 515 | 0.48 |
| 4 | Feb-24 | 509 | 0.47 |
| 5 | Mar-24 | 780 | 0.73 |
| 6 | Apr-24 | 805 | 0.75 |
| 7 | May-24 | 509 | 0.47 |
| 8 | Jun-24 | 8831 | 8.21 |
| 9 | Jul-24 | 789 | 0.73 |
| 10 | Aug-24 | 1558 | 1.45 |
| 11 | Sep-24 | 1008 | 0.94 |
| 12 | Oct-24 | 1112 | 1.03 |
| 13 | Total | 17546 | 16.32 |
| 14 | Maximum | 8831 | 8.21 |
| 15 | Minimum | 509 | 0.47 |
| 16 | Average | 1462.17 | 1.36 |

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



# CHAPTER-IV
# STUDY OF PER CAPITA ENERGY CONSUMPTION

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

It is determined by:

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

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

| No | Particulars | Value | Unit |
|---|---|---|---|
| 1 | Total Annual Energy Purchased | 17546 | kWh |
| 2 | No of students in the College | 520 | Nos |
| **3** | Per Capita Energy Consumption**= (1) / (2)** | **33.74** | 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/$m^2$)

**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.

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

- The Total Lighting Load of the College is **4.14 kW**
- All the Light Fittings are **LEDs**
- The % if usage of LEDs is **100 %**

# CHAPTER-VI
# STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

## 6.1 Usage of Renewable Energy:

The College is in the process of installing a Solar PV Plant

## 6.2 Energy Efficiency Measures adopted:

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

## Photographs of STAR Rated AC & LED Lighting: