

ENERGY AUDIT REPORT

Shri Sharda Bhavan Education Society's
INSTITUTE OF TECHNOLOGY & MANAGEMENT
VIP Road, Nanded



Year: 2023-24

Prepared by:

ENGRESS SERVICES

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

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

MAHARASHTRA ENERGY DEVELOPMENT AGENCY
(Government of Maharashtra Institution)
Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandry,
Aundh, Pune, Maharashtra 411067
Ph No: 020-25009450
Email: ee@maharaja.com, Web: www.maharaja.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
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-J2.

- 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
fulfilment 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 : 10th 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 *

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	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	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)

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

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
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 82, Noida-201301, U.P. India
www.magnitudecertification.com, website: www.magnitudecertification.com
* subject to successful surveillance audit and surveillance audit is not allowed to be conducted, this
certificate shall be suspended/withdrawn
Certificate Validity: Please check the validity of certificate on the IAF website

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
Date of Expiry : 26/03/2026
1st Surve. Due : 27/02/2024 2nd Surve. Due : 27/02/2025

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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Institute of Technology & Management, Nanded 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. **Institute of Technology & Management, Nanded** consumes Energy in the form of **Electrical Energy**: used for various Equipment & other facilities.

2. Present Connected Load & Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	71	kW
2	Annual Energy Consumed	99540	kWh

3. Per Capita Energy Consumption:

No	Particulars	Value	Unit
1	Total Annual Energy Consumed	99540	kWh
2	No of students studying in the College	1533	Nos
3	Per Capita Energy Consumption $= (1) / (2)$	64.93	kWh

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

No	Particulars	Value	Unit
1	Lighting Power density	1.24	W/m ²
2	% of Usage of LED Lighting to Total Lighting Load	32.47	%

5. Renewable Energy & Energy Efficiency Projects:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment
- Installation of 60 kWp Roof Top Solar PV Plant

6. Assumption:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

7. References:

- Audit Methodology: www.mahaurja.com
- Energy Conservation Building Code: ECBC-2017: www.beeindia.gov.in
- For CO₂ 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 Institute of Technology & Management, Nanded.

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:



College
Campus

CHAPTER-II

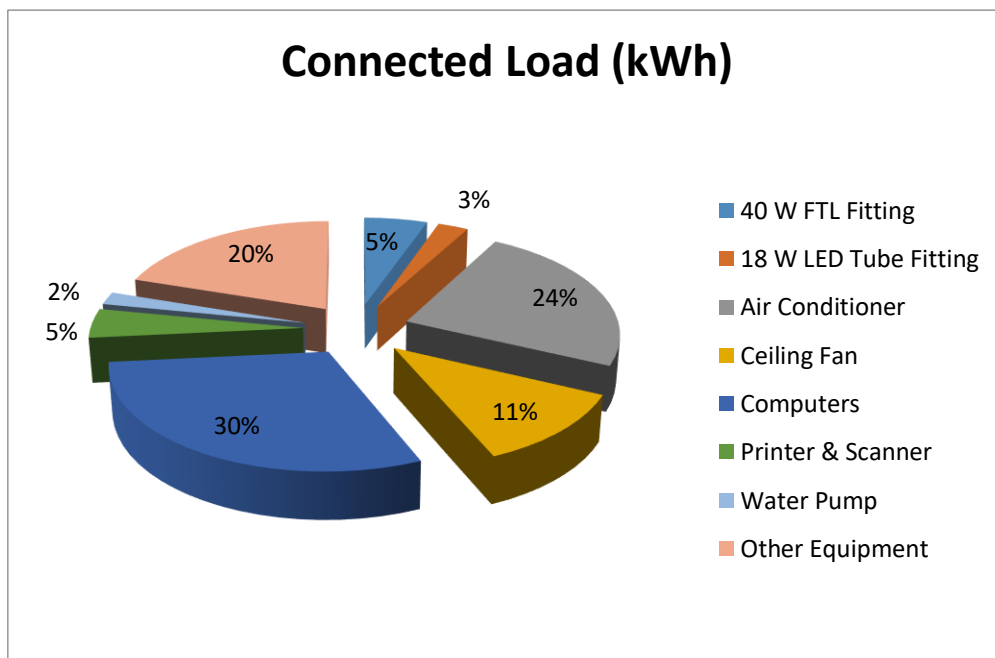
STUDY OF CONNECTED LOAD

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	102	40	4
2	18 W LED Tube Fitting	109	18	2
3	Air Conditioner	12	1500	18
4	Ceiling Fan	134	65	9
5	Computers	150	150	23
6	Printer & Scanner	23	150	3
7	Water Pump	2	746	1
8	Other Equipment	100	150	15
9	Total			71

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	LPG Consumption, Kg	CO2 Emissions, MT
1	Mar-23	10211	5	9.20
2	Apr-23	10110	5	9.11
3	May-23	10623	4	9.57
4	Jun-23	9140	5	8.24
5	Jul-23	7384	6	6.66
6	Aug-23	8341	6	7.52
7	Sep-23	8925	9	8.06
8	Oct-23	7789	9	7.03
9	Nov-23	4792	8	4.33
10	Dec-23	5798	8	5.24
11	Jan-24	5402	9	4.89
12	Feb-24	11025	9	9.95
13	Total	99540	83	89.81
14	Maximum	11025	9	9.95
15	Minimum	4792	4	4.32
16	Average	8295	6.92	7.48

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

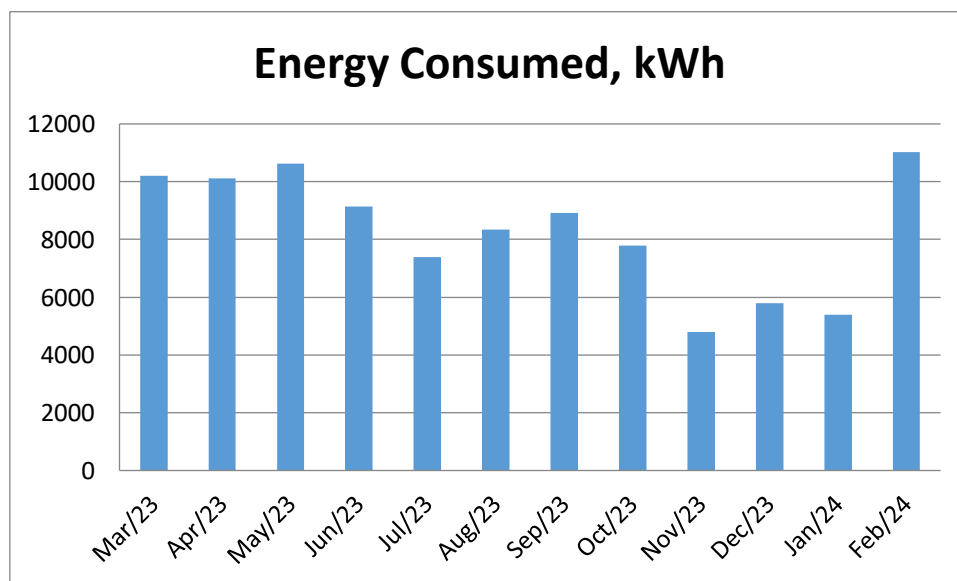
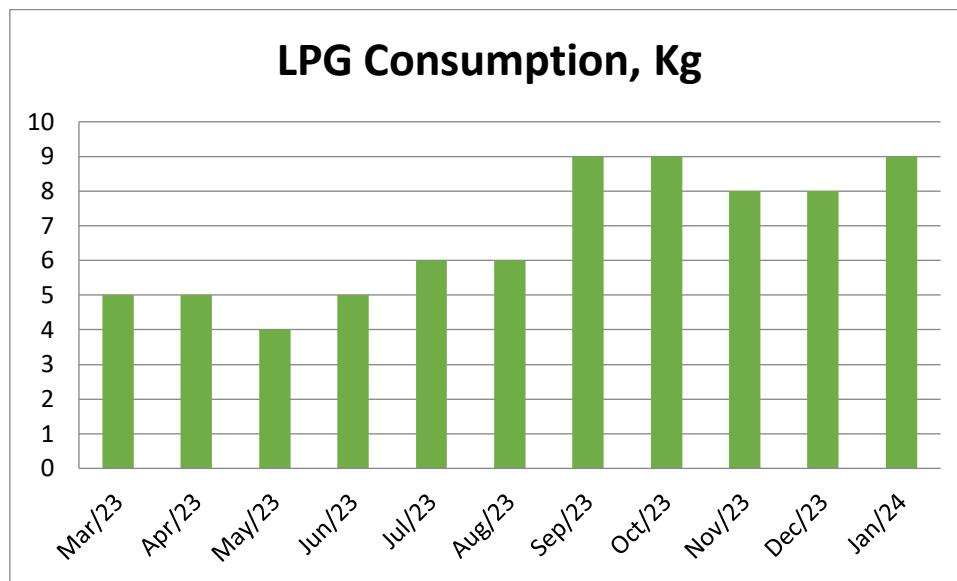


Chart No 3: Variation in Monthly LPG Consumption:



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	99540	kWh
2	Total Built up area of College	2229.67	Nos
3	Energy Performance Index =(1) / (2)	44.64	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/m²)

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:

No	Particulars	Value	Unit
1	No of 20 W LED Tube Lights in Class Room	6	Nos
2	Demand of 20 W LED Tube Light	18	W/Unit
3	Total Lighting Load in the Class Room= (1) * (2)	108	W
4	Area of Class Room	86.95	m ²
5	Lighting Power Density = (3)/ (4)	1.24	W/m ²

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

No	Particulars	Value	Unit
1	Qty of 40 W FTL Light Fittings	102	Nos
2	Load per Fitting	40	W/Unit
3	Total Load of 40 W FTL Fitting	4.08	kW
4	Qty of 18 W LED Light Fittings	109	Nos
5	Load per Fitting	18	W/Unit
6	Total Load of 18 W LED Fitting	1.962	kW
7	Total Lighting Load=3+6	6.042	kW
8	Total LED Lighting Load=6	1.962	kW
9	% of Total Lighting Demand met by LED Lighting= $23 \times 100 / 22$	32.47	%

CHAPTER-VI

STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

6.1 Usage of Renewable Energy:

The College has installed a **60 kWp** capacity Roof top Solar PV Plant this year.
Now we compute the Percentage of Alternate Energy to Annual Energy demand:

Table No 7: Computation of % Annual Energy Demand met by Alternate Energy:

No	Particulars	Value	Unit
1	Energy Purchased from MSEDCL	99540	kWh
2	Installed Roof Top Solar PV Plant Capacity	60	kWp
3	Average Daily Energy Generated	4	kWh/kWp
4	Annual Generation Days	300	Nos
5	Annual Solar Energy Generated	72000	kWh
6	Total Energy Demand = (1) + (5)	171540	kWh
7	Expecting % of Usage of Alternate Energy to Total Annual Energy Demand for Current Year Consumption= (5)*100/ (6)	41.97	%

Photograph of Roof Top Solar PV Plant:

