

ENERGY AUDIT REPORT
of
Jayawant Sikshan Prasarak Mandal's
Kautilya Institute of Management & Research,
Wagholi, Pune



Year: 2021-22

Prepared by:

ENGRESS SERVICES

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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

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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 Mukhtangan 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)

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society,
Near Mukhtangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com

Ref: ES/KIMR/21-22/01

Date: 11/5/2022

CERTIFICATE

This is to certify that we have conducted Energy Audit at Jayawant Shikshan Prasarak Mandal's Kautilya Institute of Management & Research, Wagholi, Pune, in the Academic year 2021-22.

.The Institute has adopted following Energy Efficient practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Maximum usage of Day Lighting
- Installation of 10 kWp Roof Top Solar PV Plant

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

For Engress Services,

A Y Mehendale,
Certified Energy Auditor
EA-8192

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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Jayawant Shikshan Prasarak Mandal's Kautilya Institute of Management & Research, Wagholi, Pune for awarding us the assignment of Energy Audit of their Campus for the Year: 2021-22.

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

EXECUTIVE SUMMARY

1. Jayawant Shikshan Prasarak Mandal's Kautilya Institute of Management & Research, Wagholi, Pune consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, Office & other facilities.

2. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	32876	30
2	Maximum	3983	3.58
3	Minimum	1709	1.54
4	Average	2740	2.47

3. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment
- Installation of 10 kWp Roof Top Solar PV Plant

4. Usage of Alternate Energy:

- The Institute has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- Energy purchased from MSEDCL is **32876 kWh**.
- Energy generated by Roof Top Solar PV Plant is **12000 kWh**.
- The percentage of Usage of Alternate Energy to Annual Energy Demand is **27 %**.

5. Usage of LED Lighting:

- The Total Lighting Load of the Institute is **6144 kW**.
- The Total LED Lighting Load of the Institute is **6144 kW**.
- The percentage of Annual LED Lighting to Annual Lighting Demand is **100 %**.

6. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Average Energy generated by **1 kWp** Solar PV Plant: **4 kWh/Day**
3. Annual Solar Energy Generation Days: **300 Nos.**

7. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar Energy generation: www.solarrooftop.gov.in

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 Objectives:

1. To study Connected Load and Present Energy Consumption
2. To Study the present CO₂ emissions
3. To study usage of Alternate Energy
4. To study usage of LED Lighting

1.2 Table No 1: General Details of the Institute:

No	Head	Particulars
1	Name of Institution	Jayawant Shikshan Prasarak Mandal's Kautilya Institute of Management & Research
2	Address	Wagholi, Pune 411 046
3	Affiliation	Savitribai Phule Pune University

1.3 Google Earth Image:



Institute Building

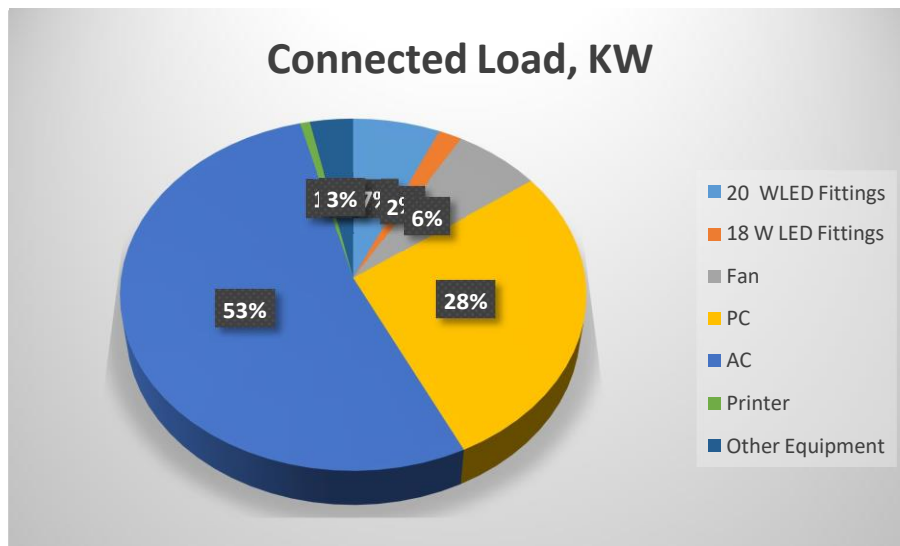
CHAPTER-II STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, KW
1	20 WLED Fittings	202	20	4.04
2	18 W LED Fittings	60	18	1.08
3	Fan	62	65	4.03
4	PC	113	150	16.95
5	AC	16	2025	32.4
6	Printer	3	150	0.45
7	Other Equipment	20	100	2
8	Total			61

Chart No 1: Study of Connected Load:



CHAPTER-III

STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Bills

Table No 3: Electrical Bill Analysis- 2021-22:

No	Month	Energy Purchased, kWh
1	Apr-21	2111
2	May-21	1763
3	Jun-21	1709
4	Jul-21	2384
5	Aug-21	2834
6	Sep-21	3024
7	Oct-21	3048
8	Nov-21	2723
9	Dec-21	3111
10	Jan-22	3156
11	Feb-22	3030
12	Mar-22	3983
13	Total	32876
14	Maximum	3983
15	Minimum	1709
16	Average	2740

Chart No 2: Variation in Monthly Energy Consumption:

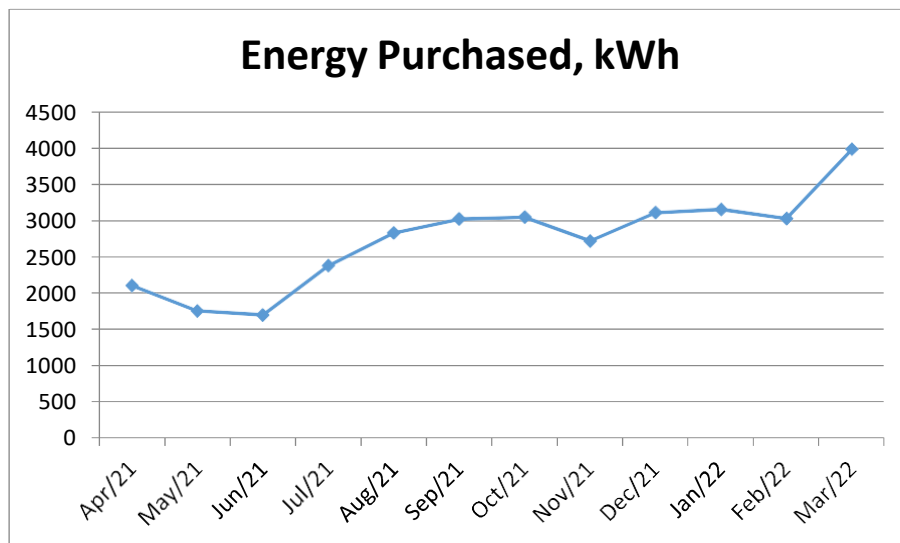


Table No 4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	32876
2	Maximum	3983
3	Minimum	1709
4	Average	2740

CHAPTER-IV CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the Institute for performing its day to day activities

The Institute uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

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

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the Institute due to its Day to Day operations

Table No 5: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-21	2111	1.90
2	May-21	1763	1.59
3	Jun-21	1709	1.54
4	Jul-21	2384	2.15
5	Aug-21	2834	2.55
6	Sep-21	3024	2.72
7	Oct-21	3048	2.74
8	Nov-21	2723	2.45
9	Dec-21	3111	2.80
10	Jan-22	3156	2.84
11	Feb-22	3030	2.73
12	Mar-22	3983	3.58
13	Total	32876	30
14	Maximum	3983	3.58
15	Minimum	1709	1.54
16	Average	2740	2.47

Chart No 3: Month wise CO₂Emissions:

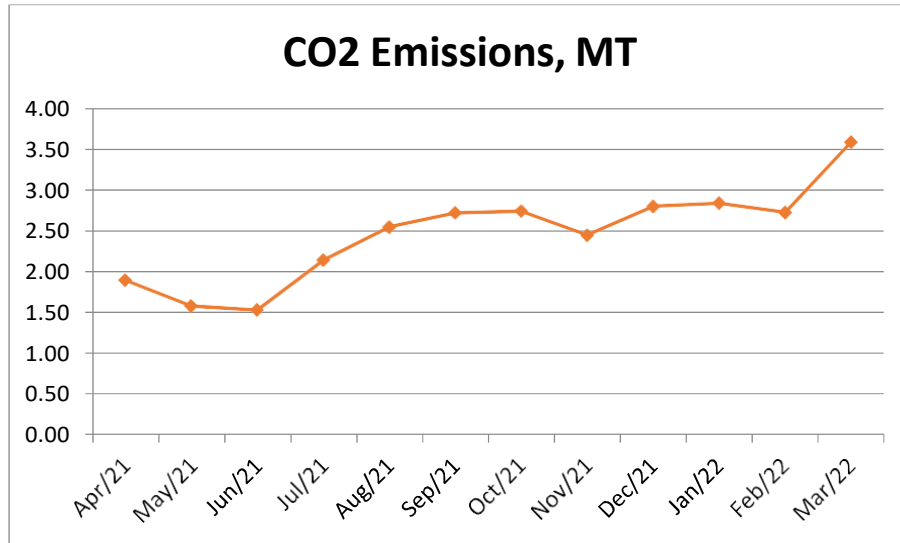


Table No 6: Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	32876	30
2	Maximum	3983	3.58
3	Minimum	1709	1.54
4	Average	2740	2.47

CHAPTER-V STUDY OF USAGE OF ALTERNATE ENERGY

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

In the following Table, we compute the percentage of Usage of Alternate Energy to Annual Energy Demand of the Institute.

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

No	Particulars	Value	Unit
1	Roof Top Solar PV Plant Capacity	10	kWp
2	Average Energy generated per kWp	4	kWh
3	Annual Energy Generation Days	300	Nos
4	Energy generated by Solar PV Plant in 21-22= 1*2*3	12000	kWh
5	Energy purchased from MSEDCL	27417	kWh
6	Total Energy Requirement = 4+5	39417	kWh
7	% of Usage of Alternate Energy = (4)*100/(6)	30.44	%

Photograph of Solar Thermal Water Heating System:




CHAPTER VI STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LED Lighting to Annual Lighting power requirement.

Table No 8: Percentage of Usage of LED Lighting to Annual Lighting Load:

No	Particulars	Value	Unit
1	No of 20 W LED Fittings	202	Nos
2	Demand of 20 W LED Fitting	20	W/Unit
3	Total Electrical Load of 20 W LED Fittings	4.04	kW
4	No of 18 W LED Fittings	60	Nos
5	Demand of 18 W LED Fitting	18	W/Unit
6	Total Electrical Load of 18 W LED Fittings	1.08	kW
7	Total Lighting Load=3+6	5.12	kW
8	Total LED Lighting Load= 3+6	5.12	kW
9	Total Lighting Requirement met by LED=(8)*100/(7)	100	%


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