

# ENERGY AUDIT REPORT

of

Shri Wagheshwar Gramvikas Pratishthan's,  
Shri Vasantao Pharate Patil Arts, Commerce & Science College,  
Mandavgan Pharata, Taluka: Shirur, District: Pune



Year: 2020-21

Prepared by

**ENRICH CONSULTANTS**

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

**MAHARASHTRA ENERGY DEVELOPMENT AGENCY**

An ISO 9001 : 2000 Reg. no. : RQ 91 / 2462



**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](mailto:eee@mahaurja.com), Web: [www.mahaurja.com](http://www.mahaurja.com)

ECN/2021-22/CR-14/1577

22<sup>nd</sup> April, 2021

**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 Enrich Consultants**  
Yashashree, Plot No. 26, Nirmal Bag Society,  
Near Muktangan English School, Parvati,  
Pune - 411009.
- Registration Category** : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*
- Registration Number** : *MEDA/ECN/2021-22/Class A/EA-03*

- 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 **21<sup>st</sup> April, 2023** 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)

## Enrich Consultants

Yashashree, 26, Nirmal Bag Society,  
Near Mukangan English School, Parvati, Pune 411 009  
Tel: 020-24220747 Email: [enrichcons@gmail.com](mailto:enrichcons@gmail.com)

Ref: EC/SVPPACSC/20-21/01

Date: 13/6/2021

### CERTIFICATE

This is to certify that we have conducted Energy Audit at Shri Wagheshwar Gramvikas Pratishthan's Shri Vasantao Pharate Patil Arts, Commerce & Science College, Mandavgan Pharate, Taluka: Shirur, District: Pune in the year 2020-21.

The College has adopted Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Installation of Solar Thermal Water Heating System at Hostel Block

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

**For Enrich Consultants,**

**A Y Mehendale,**  
Certified Energy Auditor: EA-8192

## INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	7
1	Introduction	8
2	Study of Connected Load	9
3	Study of Electrical Energy Consumption	10
4	Carbon Foot printing	12
5	Study of Usage of Alternate Energy	14
6	Study of Usage of LED Lights	15

## **ACKNOWLEDGEMENT**

We Enrich Consultants, Pune, express our sincere gratitude to the management of Shri Wagheshwar Gramvikas Pratishthan's Shri Vasantao Pharate Patil Arts, Commerce & Science College, Mandavgan Pharate, Taluka: Shirur, District: Pune, for awarding us the assignment of Energy Audit of their Mandavgan campus for the Year: 20-21.

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

## EXECUTIVE SUMMARY

1. Shri Wagheshwar Gramvikas Pratishthan's Shri Vasantao Pharate Patil Arts, Commerce & Science College, Mandavgan Pharate, Taluka: Shirur, District: Pune consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

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

No	Parameter	Energy Consumed, kWh	CO <sub>2</sub> emissions, MT
1	Total	10269	9.24
2	Maximum	6590	5.93
3	Minimum	150	0.14
4	Average	855.75	0.77

### 3. Various Measures Adopted for Energy Conservation:

- Usage of Energy Efficient LED fittings
- Maximum Usage of Day Lighting
- Solar Thermal Water Heating System at the Hostel Block

### 4. Usage of Alternate Energy Source:

- The College has installed Solar Thermal Water Heating System at the Hostel Block
- The College has yet to install Roof Top Solar PV Plant.
- The % of Annual Power requirement met by Alternate Energy is Nil

### 5. Usage of LED Lighting to Total Lighting Load:

- The LED Lighting Load is **2.234 kW**.
- The Total Lighting Load is **3.044 kW**.
- The percentage of LED Lighting Total Lighting load works out to be **76.35 %**

### 6. Assumption:

- 1 kWh (Unit) of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere

### 7. Reference:

- For CO<sub>2</sub> Emission Calculations: [www.tatapower.com](http://www.tatapower.com)

## **ABBREVIATIONS**

AC	:	Air conditioner
SWGP	:	Shri Wagheshwar Gramvikas Pratishtan
BEE	:	Bureau of Energy Efficiency
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
PC	:	Personal Computer
MT	:	Metric Ton
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited

## **CHAPTER-I INTRODUCTION**

### **1.1 Objectives:**

1. To study Connected Load
2. To study Present Energy Consumption
3. To Study CO<sub>2</sub> emissions
4. To study Scope for usage of Alternate / Renewable Energy
5. To study usage of LED Lighting

### **1.2 Table No-1: General Details of College:**

<b>No</b>	<b>Head</b>	<b>Particulars</b>
1	Name	Shri Wagheshwar Gramvikas Pratishtan's Shri Vasantao Pharate Patil Arts, Commerce & Science College,
2	Address	Mandavgan Pharate, Taluka: Shirur, District: Pune 412 211
3	Affiliation	Savitribai Phule Pune University



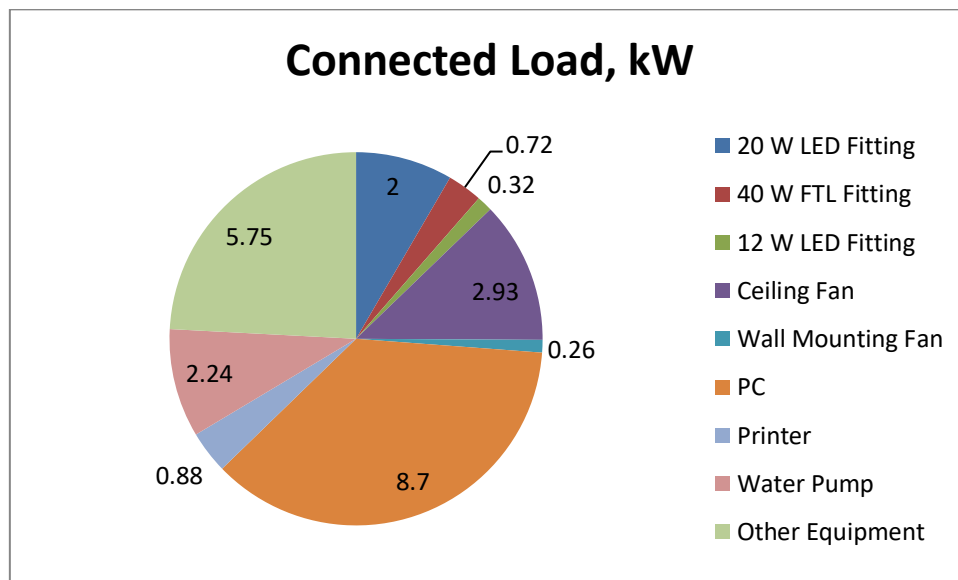
## CHAPTER-II STUDY OF CONNECTED LOAD

In this chapter, we present the details of various Electrical loads as under

**Table No 2: Study of Equipment wise Connected Load:**

No	Equipment	Qty	Load, W/Unit	Load, kW
1	20 W LED Fitting	100	20	2
2	40 W FTL Fitting	18	40	0.72
2	12 W LED Fitting	27	12	0.32
3	Ceiling Fan	45	65	2.93
4	Wall Mounting Fan	5	52	0.26
5	PC	58	150	8.7
6	Printer	5	175	0.88
7	Water Pump	1	2238	2.24
8	Other Equipment	23	250	5.75
9	<b>Total</b>			<b>23.79</b>

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

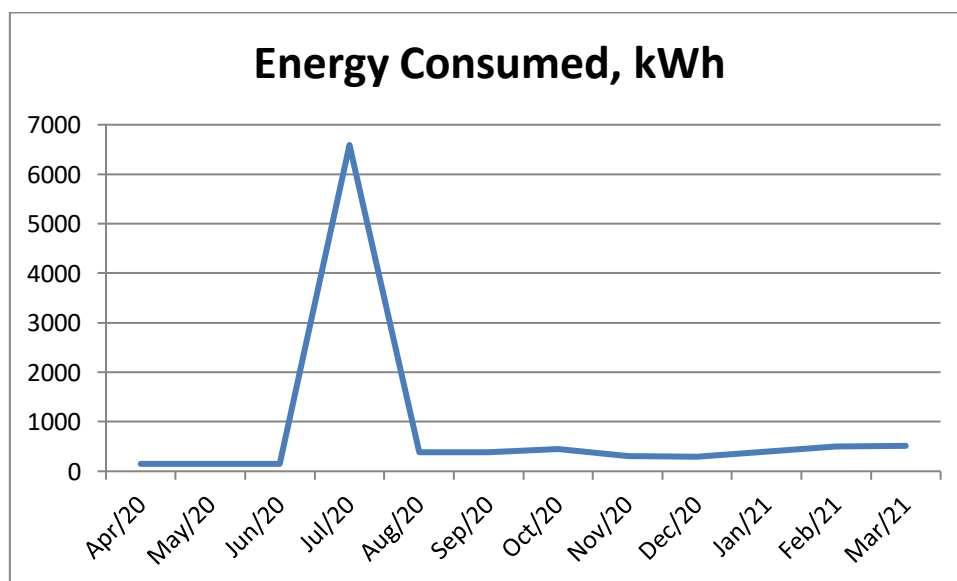


## CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Energy Consumed  
**Table No 3: Electrical Energy Consumed: 20-21:**

No	Month	Energy Consumed, kWh
1	Apr-20	150
2	May-20	150
3	Jun-20	150
4	Jul-20	6590
5	Aug-20	385
6	Sep-20	390
7	Oct-20	450
8	Nov-20	309
9	Dec-20	290
10	Jan-21	395
11	Feb-21	495
12	Mar-21	515
13	Total	10269
14	Maximum	6590
15	Minimum	150
16	Average	855.75

**Chart No 2: To study the variation of Month wise Energy Consumed, kWh:**



**Table No 4: Important parameters:**

<b>No</b>	<b>Parameter</b>	<b>Energy Consumed, kWh</b>
1	Total	10269
2	Maximum	6590
3	Minimum	150
4	Average	855.75

## CHAPTER-IV CARBON FOOT PRINTING

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 College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

### Basis for computation of CO<sub>2</sub> Emissions:

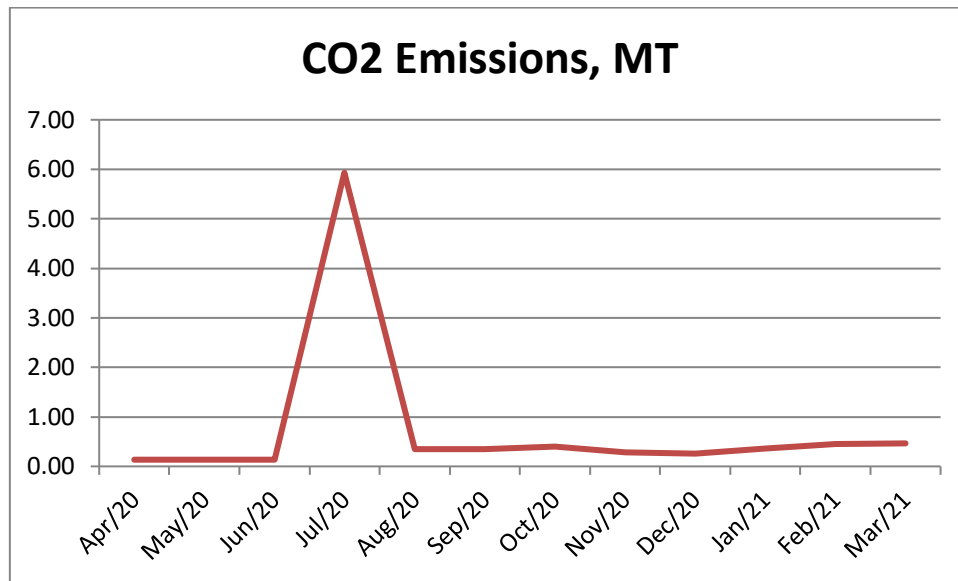
The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere

Based on the above Data we compute the CO<sub>2</sub> emissions which are being released in to the atmosphere by the College due to its Day to Day operations

**Table No 5: Month wise CO<sub>2</sub> Emissions:**

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Apr-20	150	0.14
2	May-20	150	0.14
3	Jun-20	150	0.14
4	Jul-20	6590	5.93
5	Aug-20	385	0.35
6	Sep-20	390	0.35
7	Oct-20	450	0.41
8	Nov-20	309	0.28
9	Dec-20	290	0.26
10	Jan-21	395	0.36
11	Feb-21	495	0.45
12	Mar-21	515	0.46
13	Total	10269	9.24
14	Maximum	6590	5.93
15	Minimum	150	0.14
16	Average	855.75	0.77

**Chart No 3: Representation of Month wise CO<sub>2</sub> Emissions:**



**Table No 6: Key observations:**

No	Parameter	Energy consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Total	10269	9.24
2	Maximum	6590	5.93
3	Minimum	150	0.14
4	Average	855.75	0.77

## **CHAPTER-V**

### **STUDY OF USAGE OF ALTERNATE ENERGY**

The College has installed Solar Thermal Water Heating System at the Hostel Block

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

As on Date the percentage of Annual Power requirement by Alternate Energy is nil.

**Photograph of Roof Top Solar Thermal Water Heating System:**



## CHAPTER-VI

### STUDY OF USAGE OF LED LIGHTS

In the following Table, we present the percentage of usage of LED lights to Total Lighting Load.

**Table No 7: Study of % LED Lighting Load to Total Lighting Load:**

No	Particulars	Value	Unit
1	Qty of 20 W LED Fitting	100	Nos
2	Load of 40 W FTL Fitting	20	W/unit
<b>3</b>	Total Load of 40 W FTL Fitting	<b>2</b>	kW
4	Qty of 40 W FTL Fitting	18	Nos
5	Load of 20 W LED Fitting	40	W/unit
<b>6</b>	Total Load of 20 W LED Fittings	<b>0.72</b>	kW
8	Qty of 12 W LED Fitting	27	Nos
9	Load of 12 W LED Fitting	12	W/unit
10	Total Load of 12 W LED Fittings	<b>0.324</b>	kW
<b>11</b>	Total LED Lighting Load=3+9	<b>2.324</b>	kW
<b>12</b>	Total Lighting Load=3+6+9	<b>3.044</b>	kW
<b>13</b>	% of LED to Total Lighting Load= $11 * 100 / 12$	<b>76.35</b>	%