ENERGY AUDIT REPORT

of

Shri Wagheshwar Gramvikas Pratishthan's,

Shri Vasantrao Pharate Patil Arts, Commerce & Science College,

Mandavgan Pharata, Taluka: Shirur, District: Pune

Year: 2019-20

Prepared by

ENRICH CONSULTANTS

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MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
(A Government of Maharashtra undertaking)
2nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,
Ph No: 020-26614393/266144403
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ECN/2018-19/CR-05/4174 — 19th September , 2018

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	:	**Enrich Consultants** Yashashree, Plot No. 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune - 411009.
Registration Category	:	Empanelled *Consultant for Energy Conservation Programme*
Registration Number	:	***MEDA/ECN/CR-05/2018-19/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 the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **31st March 2021** 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.

19/9/18

(Smita Kudarikar)
General Manager (EC)

Enrich Consultants

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Tel: 020-24220747 Email: enrichcons@gmail.com

Ref: EC/SVPPACSC/19-20/01 Date: 22/8/2020

CERTIFICATE

This is to certify that we have conducted Energy Audit at Shri Wagheshwar Gramvikas Pratishthan's Shri Vasantrao Pharate Patil Arts, Commerce & Science College, Mandavgan Pharate, Taluka: Shirur, District: Pune in the year 2019-20.

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

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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Shri Wagheshwar Gramvikas Pratishthan's Shri Vasantrao 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: 19-20.

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

EXECUTIVE SUMMARY

1. Shri Wagheshwar Gramvikas Pratishthan's Shri Vasantrao 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_2 Emission:

No	Parameter	Energy Consumed, kWh	CO_2 emissions, MT
1	Total	12599	10.08
2	Maximum	1231	0.98
3	Minimum	785	0.63
4	Average	1049.92	0.84

3. Various Measures Adopted for Energy Conservation:

- Usage of Energy Efficient LED fittings
- Maximum Usage of Day Lighting

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 **2.1 kW.**
- The Total Lighting Load is **3.3 kW.**
- The percentage of LED Lighting Total Lighting load works out to be **63.64 %**

6. Assumption:

- 1 kWh (Unit) of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

7. Reference:

- For CO_2 Emission Calculations: www.tatapower.com

ABBREVIATIONS

AC	:	Air conditioner
SWGP	:	Shri Wagheshwar Gramvikas Pratishthan
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_2 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:

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

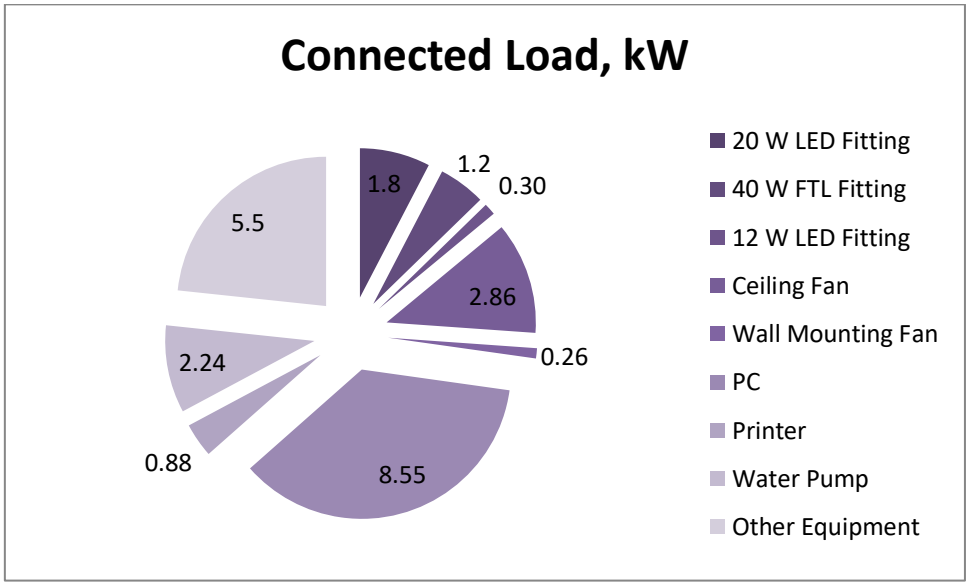
CHAPTER-II
STUDY OF CONNECTED LOAD

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	90	20	1.8
2	40 W FTL Fitting	30	40	1.2
2	12 W LED Fitting	25	12	0.30
3	Ceiling Fan	44	65	2.86
4	Wall Mounting Fan	5	52	0.26
5	PC	57	150	8.55
6	Printer	5	175	0.88
7	Water Pump	1	2238	2.24
8	Other Equipment	22	250	5.5
9	**Total**			**23.58**

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: 19-20:

No	Month	Energy Consumed, kWh
1	Apr-19	1179
2	May-19	989
3	Jun-19	785
4	Jul-19	1150
5	Aug-19	1231
6	Sep-19	1169
7	Oct-19	1098
8	Nov-19	997
9	Dec-19	1025
10	Jan-20	1086
11	Feb-20	992
12	Mar-20	898
13	Total	12599
14	Maximum	1231
15	Minimum	785
16	Average	1049.92

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

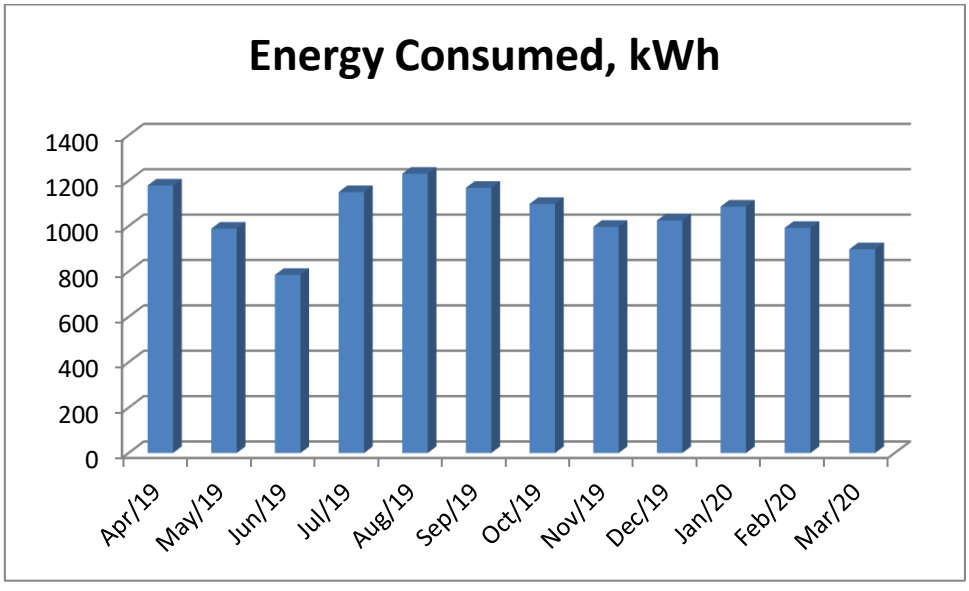


Table No 4: Important parameters:

No	Parameter	Energy Consumed, kWh
1	Total	12599
2	Maximum	1231
3	Minimum	785
4	Average	1049.92

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_2 Emissions:

The basis of Calculation for CO_2 emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Based on the above Data we compute the CO_2 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_2 Emissions:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-19	1179	0.94
2	May-19	989	0.79
3	Jun-19	785	0.63
4	Jul-19	1150	0.92
5	Aug-19	1231	0.98
6	Sep-19	1169	0.94
7	Oct-19	1098	0.88
8	Nov-19	997	0.80
9	Dec-19	1025	0.82
10	Jan-20	1086	0.87
11	Feb-20	992	0.79
12	Mar-20	898	0.72
13	Total	12599	10.08
14	Maximum	1231	0.98
15	Minimum	785	0.63
16	Average	1049.92	0.84

Chart No 3: Representation of Month wise CO_2 Emissions:

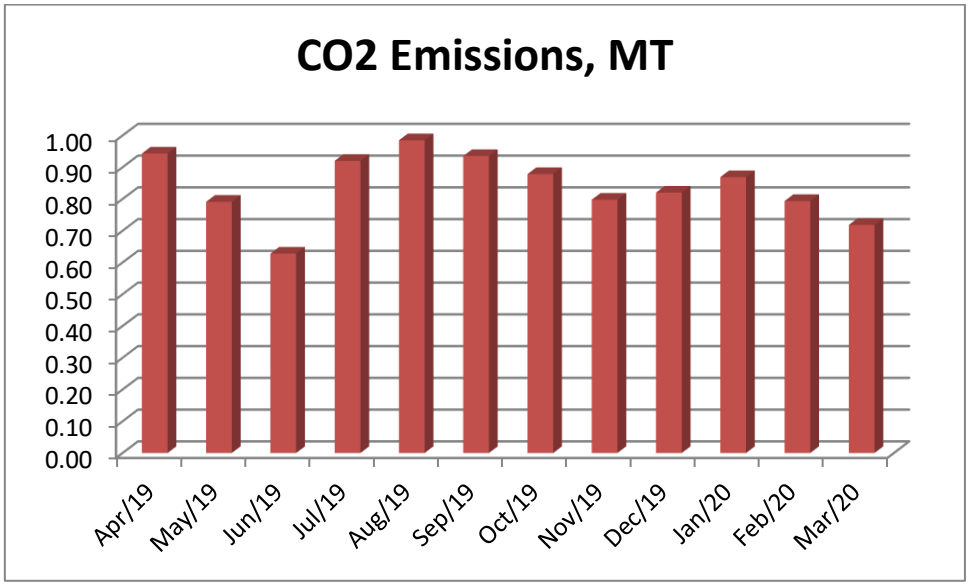


Table No 6: Key observations:

No	Parameter	Energy consumed, kWh	CO_2 Emissions, MT
1	Total	12599	10.08
2	Maximum	1231	0.98
3	Minimum	785	0.63
4	Average	1049.92	0.84

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	90	Nos
2	Load of 40 W FTL Fitting	20	W/unit
3	Total Load of 40 W FTL Fitting	**1.8**	kW
4	Qty of 40 W FTL Fitting	30	Nos
5	Load of 20 W LED Fitting	40	W/unit
6	Total Load of 20 W LED Fittings	**1.2**	kW
8	Qty of 12 W LED Fitting	25	Nos
9	Load of 12 W LED Fitting	12	W/unit
10	Total Load of 12 W LED Fittings	**0.3**	kW
11	Total LED Lighting Load=**3+9**	**2.1**	kW
12	Total Lighting Load=**3+6+9**	**3.3**	kW
13	% of LED to Total Lighting Load=**11*100/12**	**63.64**	%