

ENERGY AUDIT REPORT

of

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

Year: 2017-18

Prepared by

ENRICH CONSULTANTS

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

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, Fax No: 020-26615031

Email: econ@mahaurja.com , Web: www.mahaurja.com

ECN/2017-18/CR-01/5726

30th November 2017

**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 under Save Energy Programme of MEDA.

Name and Address of the firm : Enrich Consultants
Yashashree, Plot No. 26, Nirmal Baug
Society, Parvati, Pune - 411009.

Registration Category : Empanelled *Consultant for Save Energy Programme.*

Registration Number : **MEDA/ECN/CR-01/2017-18/EA-37**

- The Save Energy 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 upto **3 year** from the date of registration, to carry out energy audits under the Save Energy Programme of MEDA.
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.


(Smita Kudarikar)
Manager (EC)

Enrich Consultants

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

Ref: EC/SVPPACSC/17-18/01

Date: 19/5/2018

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 2017-18.

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 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: 17-18.

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 & CO₂ Emission:

| No | Parameter | Energy Consumed, kWh | CO ₂ emissions, MT |
|----|-----------|----------------------|-------------------------------|
| 1 | Total | 10899 | 8.72 |
| 2 | Maximum | 1012 | 0.81 |
| 3 | Minimum | 798 | 0.64 |
| 4 | Average | 908.25 | 0.73 |

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 **1.516 kW**.
- The Total Lighting Load is **3.916 kW**.
- The percentage of LED Lighting Total Lighting load works out to be **38.71 %**

6. Assumption:

- 1 kWh (Unit) of Electrical Energy releases **0.8 Kg of CO₂** into atmosphere

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 CO₂ 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 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 |

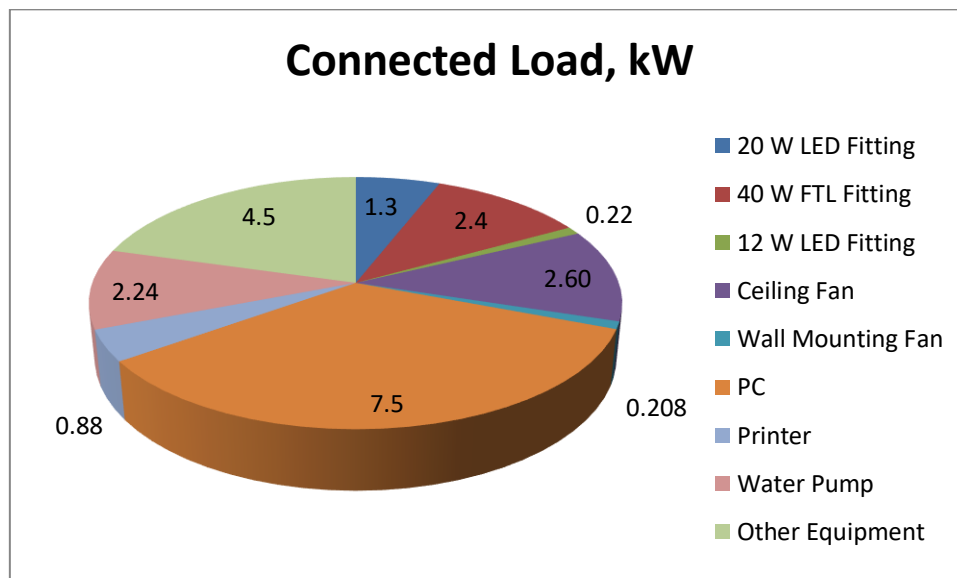
CHAPTER-II STUDY OF CONNECTED LOAD

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 | 65 | 20 | 1.3 |
| 2 | 40 W FTL Fitting | 60 | 40 | 2.4 |
| 2 | 12 W LED Fitting | 18 | 12 | 0.22 |
| 3 | Ceiling Fan | 40 | 65 | 2.60 |
| 4 | Wall Mounting Fan | 4 | 52 | 0.208 |
| 5 | PC | 50 | 150 | 7.5 |
| 6 | Printer | 5 | 175 | 0.88 |
| 7 | Water Pump | 1 | 2238 | 2.24 |
| 8 | Other Equipment | 18 | 250 | 4.5 |
| 9 | Total | | | 21.84 |

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: 17-18:

| No | Month | Energy Consumed, kWh |
|----|---------|----------------------|
| 1 | Apr-17 | 969 |
| 2 | May-17 | 897 |
| 3 | Jun-17 | 798 |
| 4 | Jul-17 | 969 |
| 5 | Aug-17 | 852 |
| 6 | Sep-17 | 805 |
| 7 | Oct-17 | 963 |
| 8 | Nov-17 | 936 |
| 9 | Dec-17 | 905 |
| 10 | Jan-18 | 895 |
| 11 | Feb-18 | 898 |
| 12 | Mar-18 | 1012 |
| 13 | Total | 10899 |
| 14 | Maximum | 1012 |
| 15 | Minimum | 798 |
| 16 | Average | 908.25 |

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

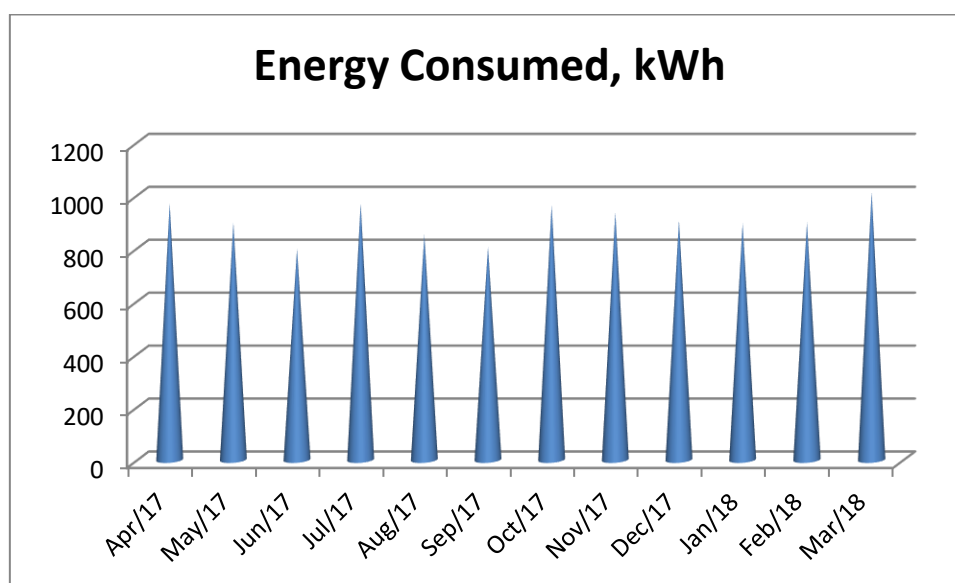


Table No 4: Important parameters:

| No | Parameter | Energy Consumed, kWh |
|-----------|------------------|-----------------------------|
| 1 | Total | 10899 |
| 2 | Maximum | 1012 |
| 3 | Minimum | 798 |
| 4 | Average | 908.25 |

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 CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.8 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 College due to its Day to Day operations

Table No 5: Month wise CO₂ Emissions:

| No | Month | Energy Consumed, kWh | CO ₂ Emissions, MT |
|----|---------|----------------------|-------------------------------|
| 1 | Apr-17 | 969 | 0.78 |
| 2 | May-17 | 897 | 0.72 |
| 3 | Jun-17 | 798 | 0.64 |
| 4 | Jul-17 | 969 | 0.78 |
| 5 | Aug-17 | 852 | 0.68 |
| 6 | Sep-17 | 805 | 0.64 |
| 7 | Oct-17 | 963 | 0.77 |
| 8 | Nov-17 | 936 | 0.75 |
| 9 | Dec-17 | 905 | 0.72 |
| 10 | Jan-18 | 895 | 0.72 |
| 11 | Feb-18 | 898 | 0.72 |
| 12 | Mar-18 | 1012 | 0.81 |
| 13 | Total | 10899 | 8.72 |
| 14 | Maximum | 1012 | 0.81 |
| 15 | Minimum | 798 | 0.64 |
| 16 | Average | 908.25 | 0.73 |

Chart No 3: Representation of Month wise CO₂ Emissions:

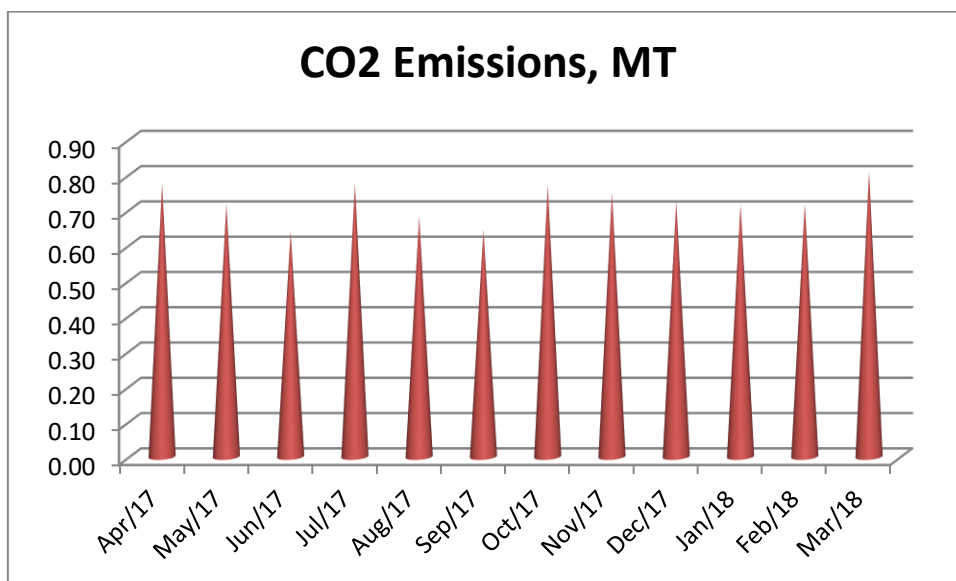


Table No 6: Key observations:

| No | Parameter | Energy consumed, kWh | CO ₂ Emissions, MT |
|----|-----------|----------------------|-------------------------------|
| 1 | Total | 10899 | 8.72 |
| 2 | Maximum | 1012 | 0.81 |
| 3 | Minimum | 798 | 0.64 |
| 4 | Average | 908.25 | 0.73 |

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 | 65 | Nos |
| 2 | Load of 40 W FTL Fitting | 20 | W/unit |
| 3 | Total Load of 40 W FTL Fitting | 1.3 | kW |
| | | | |
| 4 | Qty of 40 W FTL Fitting | 60 | Nos |
| 5 | Load of 20 W LED Fitting | 40 | W/unit |
| 6 | Total Load of 20 W LED Fittings | 2.4 | kW |
| | | | |
| 8 | Qty of 12 W LED Fitting | 18 | Nos |
| 9 | Load of 12 W LED Fitting | 12 | W/unit |
| 10 | Total Load of 12 W LED Fittings | 0.216 | kW |
| | | | |
| 11 | Total LED Lighting Load=3+9 | 1.516 | kW |
| 12 | Total Lighting Load=3+6+9 | 3.916 | kW |
| | | | |
| 13 | % of LED to Total Lighting Load= $11 \times 100 / 12$ | 38.71 | % |