

ENERGY AUDIT REPORT
OF
VIVEKANAND MAHAVIDYALAYA
BHADRAVATI- 442 902



Year: 2020-21

Prepared by:

Enrich Consultants

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MAHARASHTRA ENERGY DEVELOPMENT AGENCY

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



Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

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ECN/2021-22/CR-14/1577

22nd 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 **21st 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

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Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/VM/19-20/11

Date: 16/08/2020

CERTIFICATE

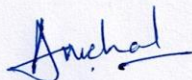
This is to certify that we have conducted Energy Audit at Vivekanand Mahavidyalaya, Bhadravati in the Academic year 2020-21.

The College has adopted following Energy Efficient practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting

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

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 Vivekanand Mahavidyalaya, Bhadravati for awarding us the assignment of Energy Audit of their Campus for the Academic Year: 20-21.

We are thankful to all the Principal and Staff members for helping us during the field study.



EXECUTIVE SUMMARY

1. **Vivekanand Mahavidyalaya, Bhadravati** 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	12368	11.131
2	Maximum	3103	2.792
3	Minimum	647	0.582
4	Average	1030.666	0.927

3. **Energy Conservation projects already installed:**

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

4. **Usage of Alternate Energy:**

- As on today College has not installed solar rooftop power plant. It is recommended to install solar power rooftop system on the college building as per availability of funds.

5. **Usage of LED Lighting:**

- The Total Annual Lighting Demand of the College is **768 kWh**.
- The Total Annual LED Lighting Demand is **768 kWh**.
- 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. **100 LPD** Solar Thermal System saves **1500 kWh** of Electrical Energy per Annum.
3. Daily working hours-**4 Nos**(For Lighting Calculations)
4. Annual working Days-**120 Nos**(For Lighting Calculations)

7. **References:**

- 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
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton

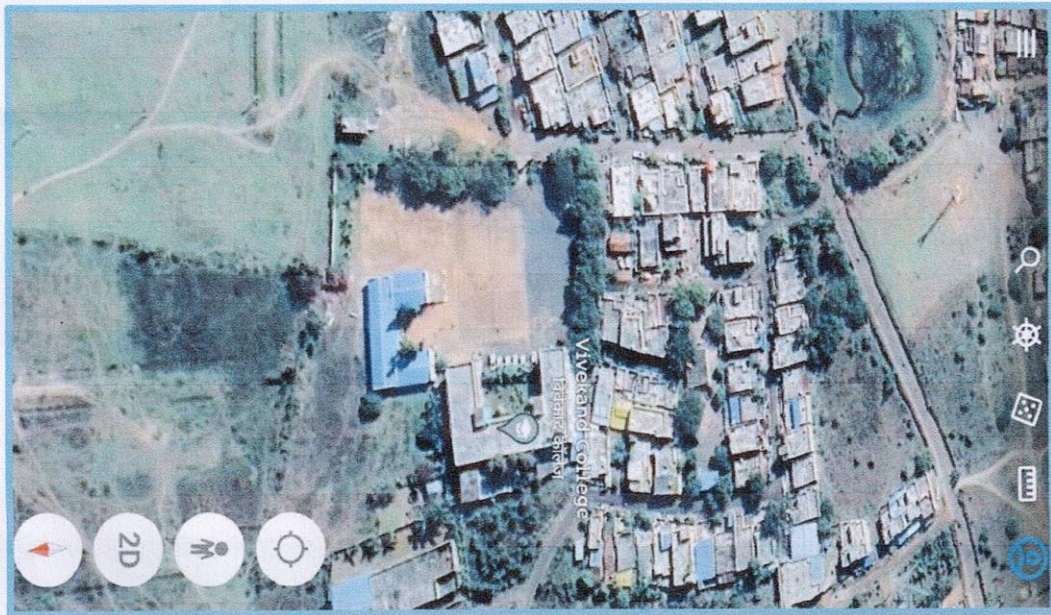
CHAPTER-I INTRODUCTION

1.1 Objectives:

1. To study 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 College:

No	Head	Particulars
1	Name of Institution	Vivekanand Mahavidyalaya
2	Address	Vijasan Road, Bhadravati
3	Affiliation	Gondwana University, Gadchiroli



CHAPTER-II

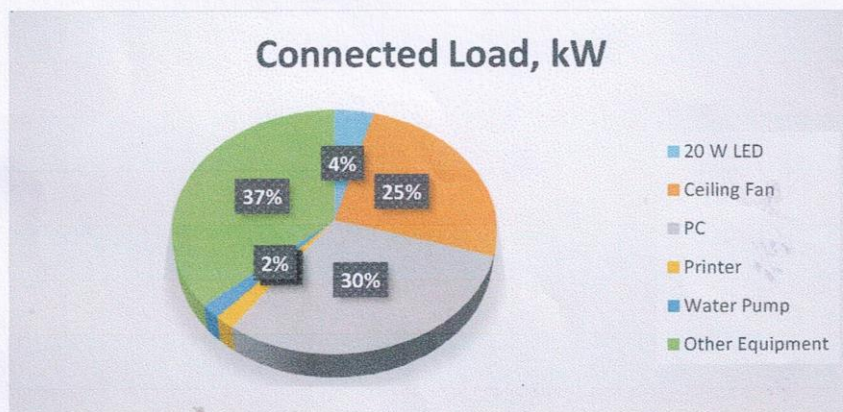
STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	20 W LED	88	20	1.76
2	Ceiling Fan	161	65	10.465
3	PC	83	150	12.45
4	Printer	5	150	0.75
5	Water Pump	1	746	0.746
6	Other Equipment	100	150	15
7	Total			41

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 3: Electrical Bill Analysis- 2020-21:

No	Month	Energy Purchased, kWh
1	Apr-20	949
2	May-20	949
3	Jun-20	949
4	Jul-20	3103
5	Aug-20	858
6	Sep-20	870
7	Oct-20	902
8	Nov-20	803
9	Dec-20	647
10	Jan-21	756
11	Feb-21	768
12	Mar-21	814
13	Total	12368
14	Maximum	3103
15	Minimum	647
16	Average	1030.66

Chart No 2: Variation in Monthly Energy Consumption:

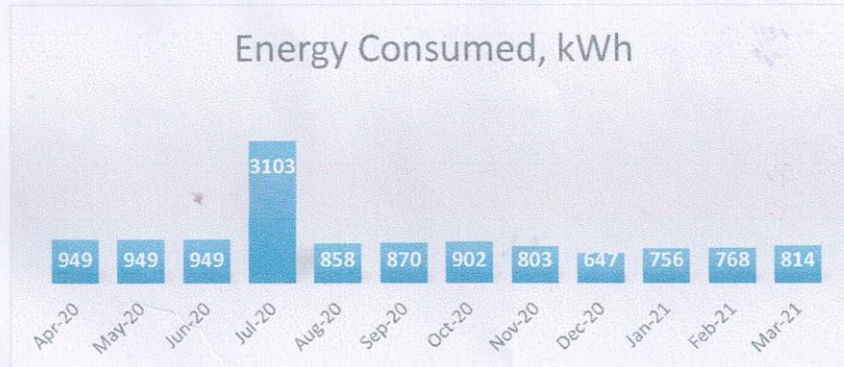


Table No4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	12368
2	Maximum	3103
3	Minimum	647
4	Average	1030.66

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 taking into account the usage of the Electrical Energy.

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 College due to its Day to Day operations

Table No5: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-20	949	0.8541
2	May-20	949	0.8541
3	Jun-20	949	0.8541
4	Jul-20	3103	2.7927
5	Aug-20	858	0.7722
6	Sep-20	870	0.783
7	Oct-20	902	0.8118
8	Nov-20	803	0.7227
9	Dec-20	647	0.5823
10	Jan-21	756	0.6804
11	Feb-21	768	0.6912
12	Mar-21	814	0.7326
13	Total	12368	11.1312
14	Maximum	3103	2.7927
15	Minimum	647	0.5823
16	Average	1030.666	0.9276

Chart No 3: Month wise CO₂ Emissions:

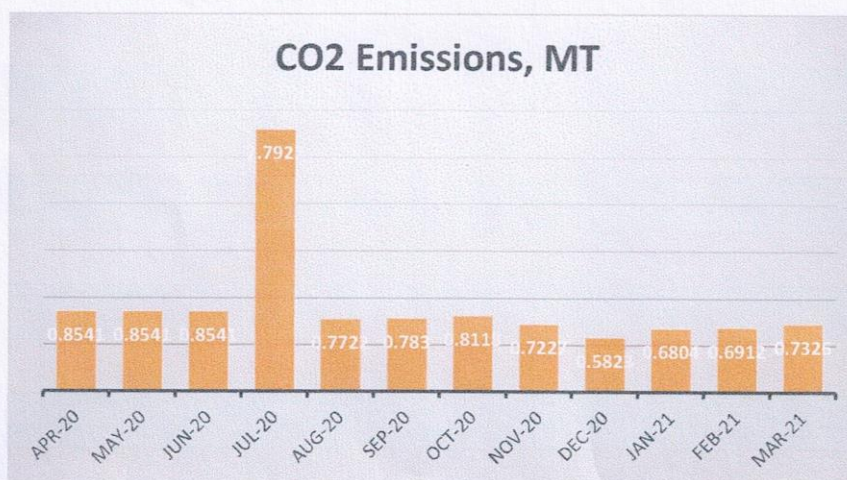


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	12368	11.131
2	Maximum	3103	2.792
3	Minimum	647	0.582
4	Average	1030.66	0.927

CHAPTER V

STUDY OF USAGE OF ALTERNATE ENERGY

As on today College has not install solar roof-top PV plant, Solar thermal water heating plant; the percentages of uses of alternate energy to the annual energy demand work to be zero percent.



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 Tube Lights	80	Nos
2	Demand of 20 W LED Tube Light	20	W/Unit
3	Total Electrical Load of 20 W LED Fittings	1.6	kW
4	Total Lighting Load	1.6	kW
5	Total LED Lighting Load	1.6	kW
6	Average Daily Usage Period	4	Hours
7	Annual Working Days	120	Nos
8	Annual Total Lighting Load	768	kWh
9	Annual LED Lighting Load	768	kWh
10	Annual Lighting Requirement met by LED	100.00	%