

ENERGY AUDIT REPORT
OF
SEVADAL MAHILA MAHAVIDYALAYA
SAKKARDARA SQUARE UMRER ROAD,
NAGPUR- 440 024



Year: 2020-21



Prepared by:

Enrich Consultants

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

Principal
Sevaldal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.

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, Web: www.mahaurja.com

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)

Principal

**Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.**



Enrich Consultants

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

Ref: EC/SMM/20-21/21

Date: 24/04/2021

CERTIFICATE

This is to certify that we have conducted Energy Audit at Sevadal Mahila Mahavidyalaya, Nagpur – 440 024 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



Principal
Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.

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 Present Energy Consumption	11
4	Carbon Foot Printing	13
5	Study of Usage of Alternate Energy	14
6	Study of LED Lighting	15


Principal

Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.



ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Sevadal Mahila Mahavidyalaya, Nagpur 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.



Principal
Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.

EXECUTIVE SUMMARY

1. Sevadal Mahila Mahavidyalaya, Nagpur 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	4184	3.7656
2	Maximum	1047	0.9423
3	Minimum	0	0
4	Average	348.666	0.3138

3. Energy Conservation projects already installed:

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

4. Usage of Alternate Energy:

- As on today College has not installed solar rooftop power plant, solar thermal water heating plant. It is recommended to install solar power rooftop system and solar thermal water heating plant on the college building as per availability of funds.
- College has installed solar street light systems in the premises.

5. Usage of LED Lighting:

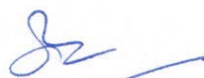
- The Total Annual Lighting Demand of the College is 2030.4 kWh.
- The Total Annual LED Lighting Demand is 475.2 kWh.
- The percentage of Annual LED Lighting to Annual Lighting Demand is 23.40 %.

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



Principal
Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.

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



Principal
Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.

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	Sevadal Mahila Mahavidyalaya
2	Address	Sakkardara Square Umrer Road, Nagpur 440 024
3	Affiliation	Rashtra Sant Tukodoji Maharaj, Nagpur, University



Principal
Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.

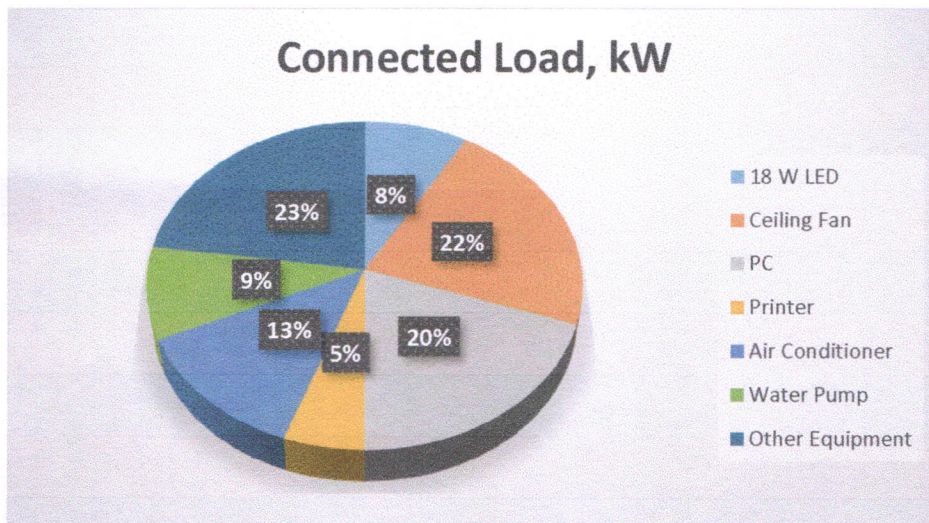
CHAPTER-II STUDY OF CONNECTED LOAD

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	18 W LED	307	18	5.526
2	Ceiling Fan	222	65	14.43
3	PC	87	150	13.05
4	Printer	24	150	3.6
5	Air Conditioner	4	2100	8.4
6	Water Pump	4	1492	5.968
7	Other Equipment	100	150	15
8	Total			66

Chart No 1: Study of Connected Load:




Principal
Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.

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 Consumed, kWh
1	Apr-20	0
2	May-20	56
3	Jun-20	1047
4	Jul-20	317
5	Aug-20	343
6	Sep-20	352
7	Oct-20	410
8	Nov-20	454
9	Dec-20	254
10	Jan-21	253
11	Feb-21	302
12	Mar-21	396
13	Total	4184
14	Maximum	1047
15	Minimum	0
16	Average	348.66

Chart No 2: Variation in Monthly Energy Consumption:

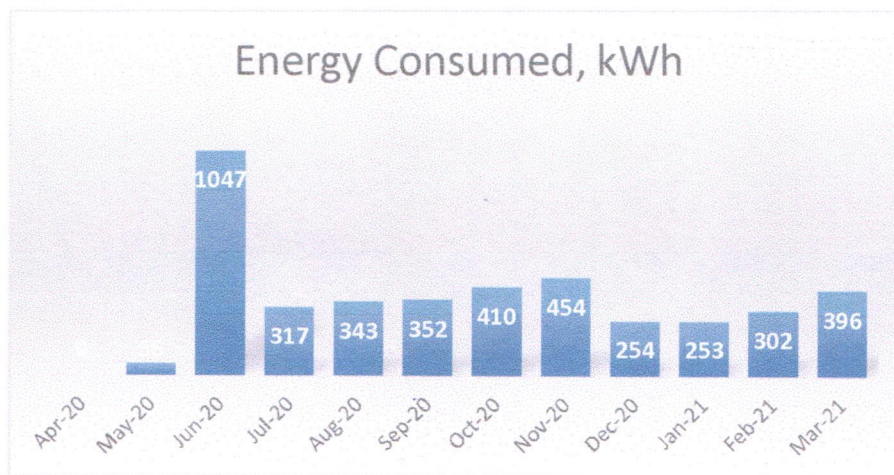


Table No4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	4184
2	Maximum	1047
3	Minimum	0
4	Average	348.66

[Signature]
Principal
Sevadal Mahila Mahavidyalaya
Umred Road, Nagpur-9.



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	0	0
2	May-20	56	0.0504
3	Jun-20	1047	0.9423
4	Jul-20	317	0.2853
5	Aug-20	343	0.3087
6	Sep-20	352	0.3168
7	Oct-20	410	0.369
8	Nov-20	454	0.4086
9	Dec-20	254	0.2286
10	Jan-21	253	0.2277
11	Feb-21	302	0.2718
12	Mar-21	396	0.3564
13	Total	4184	3.7656
14	Maximum	1047	0.9423
15	Minimum	0	0
16	Average	348.6666667	0.3138



Principal
Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.

Chart No 3: Month wise CO₂Emissions:

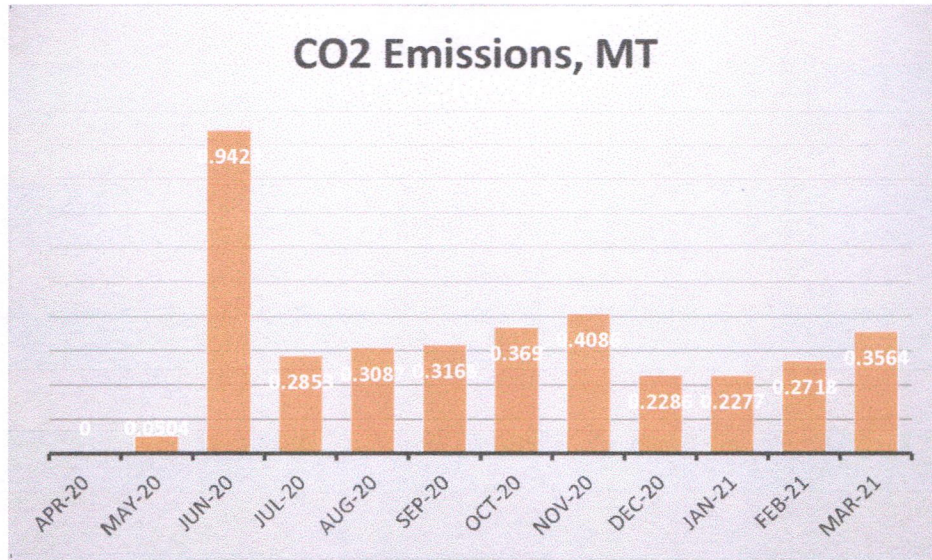



Table No 6: Important Parameters:


No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	4184	3.7656
2	Maximum	1047	0.9423
3	Minimum	0	0
4	Average	348.6	0.3138


Principal
Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.

CHAPTER V STUDY OF USAGE OF ALTERNATE ENERGY

As on today College has install solar street light in the premises. But it is recommended to installed solar rooftop project on the college building.




Principal
Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.

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 40 W FTL Light Fittings	81	Nos
2	Demand of 40 W FTL Light Fitting	40	W/Unit
3	Total Electrical Load of 40 W FTL Light Fittings	3.24	kW
4	No of 18 W LED Tube Lights	55	Nos
5	Demand of 18 W LED Tube Light	18	W/Unit
6	Total Electrical Load of 18 W LED Fittings	0.99	kW
7	Total Lighting Load=3+6	4.23	kW
8	Total LED Lighting Load= 6	0.99	kW
9	Average Daily Usage Period	4	Hours
10	Annual Working Days	120	Nos
11	Annual Total Lighting Load = 7*9*10	2030.4	kWh
12	Annual LED Lighting Load = 8*9*10	475.2	kWh
13	Annual Lighting Requirement met by LED= $12*100/11$	23.40	%



Principal
Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.