

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



Year: 2021-22



Prepared by:

**Enrich Consultants**

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

  
**Principal**

Sevalal 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](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'*

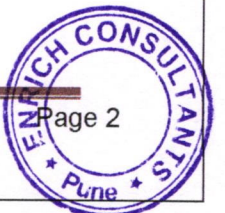
**Registration Number** : *MEDA/ECN/2021-22/Class A/EA-03*

- 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)

**Principal**

Sevadal Mahila Mahavidyalaya  
Umrer Road, Nagpur-9.



# Enrich Consultants

Yashashree, 26, Nirmal Bag Society,  
Near Mukhtangan English School, Parvati, Pune 411 009  
Tel: 09890444795 Email: [enrichcons@gmail.com](mailto:enrichcons@gmail.com)

Ref: EC/SMM/21-22/16

Date: 21/04/2022

## CERTIFICATE

This is to certify that we have conducted Energy Audit at Sevadal Mahila Mahavidyalaya, Nagpur – 440 024 in the Academic year 2021-22.

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: 21-22.

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 & CO<sub>2</sub> Emission:**

No	Parameter/ Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Total	4833	4.349
2	Maximum	568	0.511
3	Minimum	240	0.216
4	Average	402.75	0.362

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 proposed to install 10 kWp capacities solar rooftop projects on the college building.
- College has installed solar street light systems in the premises.

5. **Usage of LED Lighting:**

- The Total Annual Lighting Demand of the College is **2652.48 kWh**.
- The Total Annual LED Lighting Demand is **2652.48 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 **CO<sub>2</sub>** 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)

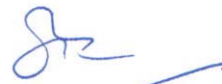
7. **References:**

- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://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 <sub>2</sub>	:	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 CO<sub>2</sub> 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,



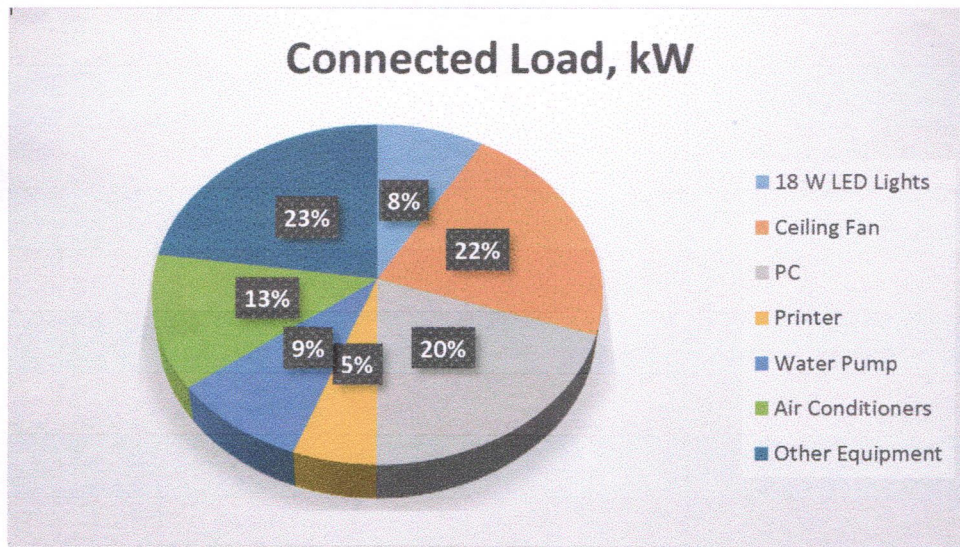
## CHAPTER-II STUDY OF CONNECTED LOAD


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 Lights	307	18	5.526
2	Ceiling Fan	222	65	14.43
3	PC	87	150	13.05
4	Printer	24	150	3.6
5	Water Pump	4	1492	5.968
6	Air Conditioners	4	2100	8.4
7	Other Equipment	100	150	15
8	<b>Total</b>			<b>66</b>

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



  
Principal  
Sevadal Mahila Mahavidyalaya  
Umrer Road, Nagpur-9.

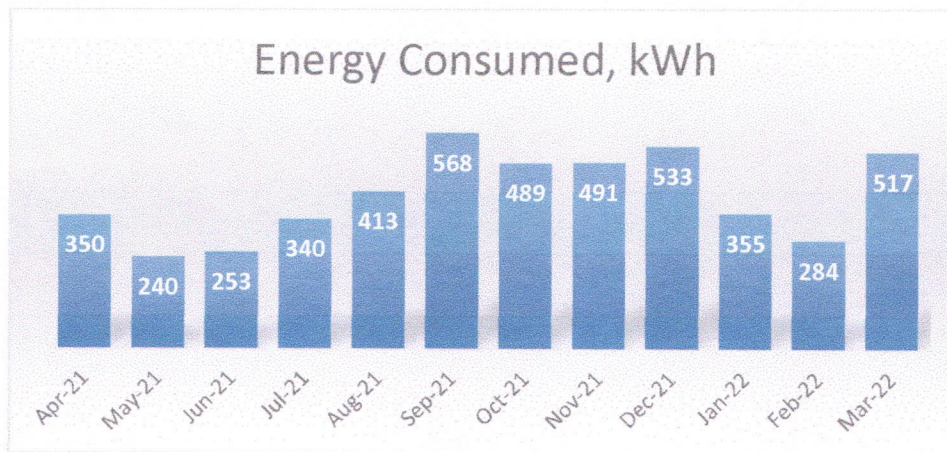
### CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electrical Energy Consumption.

**Table No 3: Electrical Bill Analysis- 2021-22:**


No	Month	Energy Consumed, kWh
1	Apr-21	350
2	May-21	240
3	Jun-21	253
4	Jul-21	340
5	Aug-21	413
6	Sep-21	568
7	Oct-21	489
8	Nov-21	491
9	Dec-21	533
10	Jan-22	355
11	Feb-22	284
12	Mar-22	517
13	Total	4833
14	Maximum	568
15	Minimum	240
16	Average	402.75

**Chart No 2: Variation in Monthly Energy Consumption:**



**Table No4: Variation in Important Parameters:**

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	4833
2	Maximum	568
3	Minimum	240
4	Average	402.75

  
Principal  
Sevadal Mahila Mahavidyalaya  
Umrer 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 CO<sub>2</sub> Emissions:

- 1 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 No5: Month wise CO<sub>2</sub> Emissions:

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Apr-21	350	0.315
2	May-21	240	0.216
3	Jun-21	253	0.2277
4	Jul-21	340	0.306
5	Aug-21	413	0.3717
6	Sep-21	568	0.5112
7	Oct-21	489	0.4401
8	Nov-21	491	0.4419
9	Dec-21	533	0.4797
10	Jan-22	355	0.3195
11	Feb-22	284	0.2556
12	Mar-22	517	0.4653
13	Total	4833	4.3497
14	Maximum	568	0.5112
15	Minimum	240	0.216
16	Average	402.75	0.362475



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

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

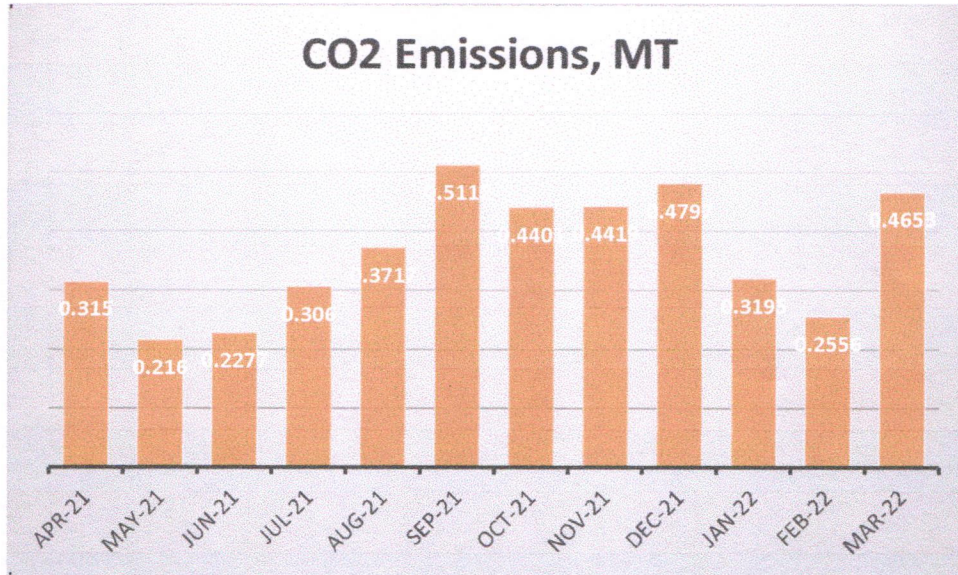


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	4833	4.349
2	Maximum	568	0.511
3	Minimum	240	0.216
4	Average	402.75	0.362

  
**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 and process for installation of 10 kWp solar rooftop on the college building is in process. The expected power generation after installation plant computed in Table no.7:

**Table No 7: Computation of Annual Energy Generated by Solar Power:**

No	Particulars	Value	Unit
2	Installed Roof Top Solar PV Plant Capacity	10	kWp
3	Average Daily Energy Generated	4	kWh/kWp
4	Annual Generation Days	300	Nos
5	Annual Solar Energy Generated	12000	kWh
6	Total Energy Generated	19282	kWh



  
Principal

Sevadal Mahila Mahavidyalaya  
Umrao 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 18 W LED Light Fittings	307	Nos
2	Demand of 18 W LED Light Fitting	18	W/Unit
3	Total Electrical Load of 18 W LED Light Fittings	<b>5.526</b>	kW
4	Total Lighting Load=3	<b>5.526</b>	kW
5	Total LED Lighting Load= 3	<b>5.526</b>	kW
6	Average Daily Usage Period	4	Hours
7	Annual Working Days	120	Nos
8	Annual Total Lighting Load = $4*6*7$	<b>2652.48</b>	kWh
9	Annual LED Lighting Load = $5*6*7$	<b>2652.48</b>	kWh
10	Annual Lighting Requirement met by LED= $12*100/11$	<b>100.00</b>	%

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