

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



Year: 2017-18



Prepared by:

Enrich Consultants

Yashashree, 26, Nirmal Bag Society, Near Mukhtangan English School, Parvati, Pune 411009
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Principal

Sevaldal Mahila Mahavidyalaya
Umer Road, Nagpur-9.

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 Muktangam 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.


(Smita Kudarikar)
General Manager (EC)


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Ref: EC/SMM/17-18/02

Date: 21/04/2018

CERTIFICATE

This is to certify that we have conducted Energy Audit at Sevadal Mahila Mahavidyalaya, Nagpur – 440 024 in the Academic year 2017-18.

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 Sevadal Mahila Mahavidyalaya, Nagpur, for awarding us the assignment of Energy Audit of their Campus for the Academic Year: 17-18.

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



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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	12438	11.194
2	Maximum	1573	1.415
3	Minimum	514	0.462
4	Average	1036.5	0.932

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.

5. Usage of LED Lighting:

- The Total Annual Lighting Demand of the College is **2367.36 kWh**.
- The Total Annual LED Lighting Demand is **293.76 kWh**.
- The percentage of Annual LED Lighting to Annual Lighting Demand is **12.41 %**.

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


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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



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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



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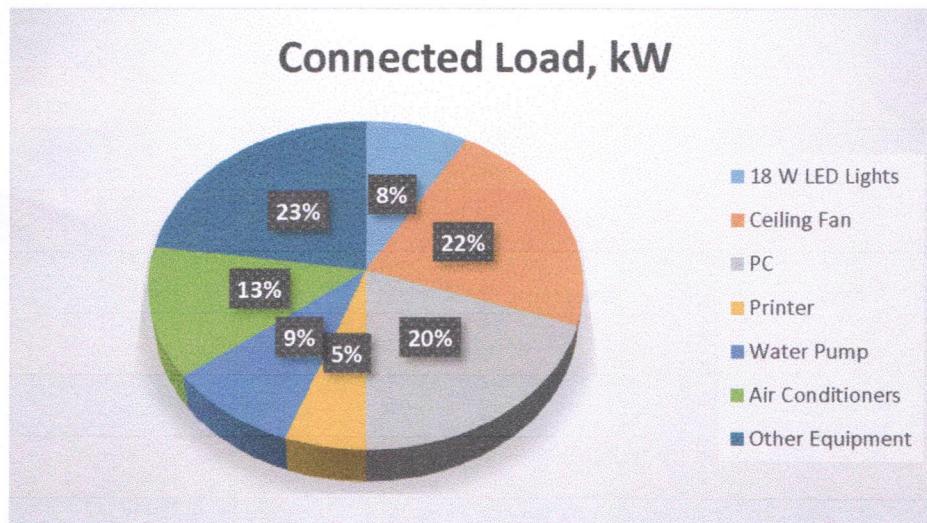
CHAPTER-II STUDY OF CONNECTED LOAD


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	Total			66

Chart No 1: Study of Connected Load:




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CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 3: Electrical Bill Analysis- 2017-18:

No	Month	Energy Purchased, kWh
1	Apr-17	1026
2	May-17	1036
3	Jun-17	741
4	Jul-17	1322
5	Aug-17	1452
6	Sep-17	1573
7	Oct-17	1415
8	Nov-17	514
9	Dec-17	705
10	Jan-18	596
11	Feb-18	740
12	Mar-18	1318
13	Total	12438
14	Maximum	1573
15	Minimum	514
16	Average	1036.5

Chart No 2: Variation in Monthly Energy Consumption:

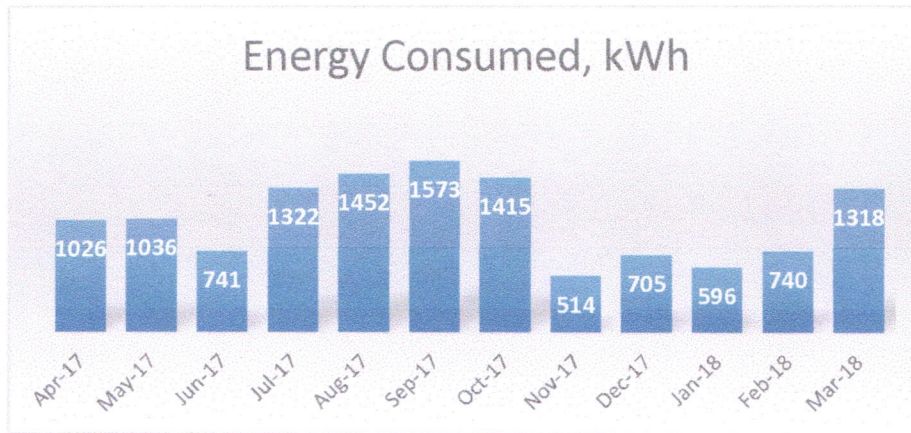


Table No4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	12438
2	Maximum	1573
3	Minimum	514
4	Average	1036.5

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-17	1026	0.9234
2	May-17	1036	0.9324
3	Jun-17	741	0.6669
4	Jul-17	1322	1.1898
5	Aug-17	1452	1.3068
6	Sep-17	1573	1.4157
7	Oct-17	1415	1.2735
8	Nov-17	514	0.4626
9	Dec-17	705	0.6345
10	Jan-18	596	0.5364
11	Feb-18	740	0.666
12	Mar-18	1318	1.1862
13	Total	12438	11.1942
14	Maximum	1573	1.4157
15	Minimum	514	0.4626
16	Average	1036.5	0.93285


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Chart No 3: Month wise CO₂Emissions:

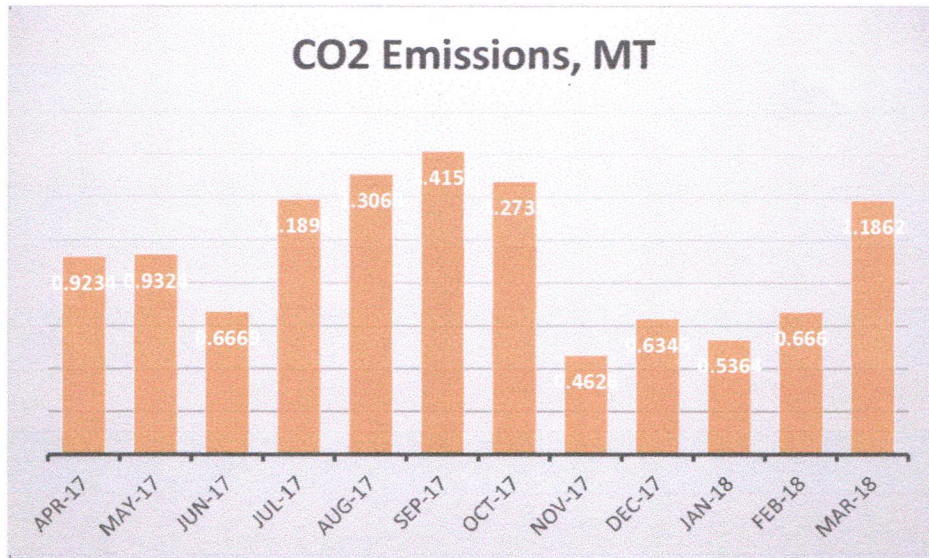


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	12438	11.1942
2	Maximum	1573	1.4157
3	Minimum	514	0.4626
4	Average	1036.5	0.93285


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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.




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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	34	Nos
2	Demand of 18 W LED Light Fitting	18	W/Unit
3	Total Electrical Load of 18 W LED Light Fittings	0.612	kW
4	No of 40 W FTL Tube Lights	108	Nos
5	Demand of 40 W FTL Tube Light	40	W/Unit
6	Total Electrical Load of 40 W FTL Fittings	4.32	kW
7	Total Lighting Load=3+6	4.932	kW
8	Total LED Lighting Load= 6	0.612	kW
9	Average Daily Usage Period	4	Hours
10	Annual Working Days	120	Nos
11	Annual Total Lighting Load = 7*9*10	2367.36	kWh
12	Annual LED Lighting Load = 8*9*10	293.76	kWh
13	Annual Lighting Requirement met by LED= $12 \times 100 / 11$	12.41	%


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