

**ENERGY AUDIT REPORT**  
of  
**SIPNA SHIKSHAN PRASARAK MANDAL AMRAVATI'S**  
**Arts Science & Commerce College,**  
**Chikhaldara**



Year: 2020-21

Prepared by

**Enrich Consultants**

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**MAHARASHTRA ENERGY DEVELOPMENT AGENCY**

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



**Maharashtra Energy Development Agency**

(Government of Maharashtra Institution)

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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)



# Enrich Consultants

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Ref: EC/SSPMAASCCC/20-21/01

Date: 12/8/2021

## CERTIFICATE

This is to certify that we have conducted Energy Audit at Sipna Shikshan Prasarak Mandal Amravati's Arts, Science & Commerce College, Upper Plateau Chikhaldara 444807, 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 the 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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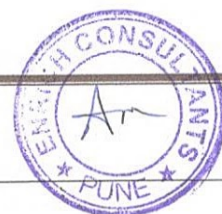
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## **ACKNOWLEDGEMENT**

We Enrich Consultants, Pune, express our sincere gratitude to the management of Sipna Shikshan Prasarak Mandal Amravati's Arts, Science & commerce college, Upper Plateau Chikhaldara 444807, for awarding us the assignment of Energy Audit of their Chikhaldara campus for the Year: 2020-21.

We are thankful to all faculty members and staff members for helping us during the field study.



## EXECUTIVE SUMMARY

1. **Sipna Shikshan Prasarak Mandal Amravati's Arts Science & Commerce College, Chikhaldara 444 807** consumes Energy in the form of **Electrical Energy** used for various gadgets, Office & other facilities.

### 2. Present Level of Energy Consumption & CO<sub>2</sub> Emissions:

No	Parameter	Energy consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Total	43758	39.38
2	Maximum	28299	25.47
3	Minimum	309	0.28
4	Average	3646.5	3.28

### 3. Various Majors Adopted for Energy Conservation:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated equipment

### 4. Usage of Alternate Energy Source:

The College has yet to install Roof Top Solar PV Plant. Therefore as on the Date, the usage of Alternate Energy to Annul Energy requirement works out to be nil.

### 5. Usage of LED Lighting:

- The Total Lighting load is **4.2 kW**.
- The LED Lighting Demand is **2.25 kW**.
- The percentage of usage of LED to total Lighting Load is **35 %**

### 6. Notes & Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere

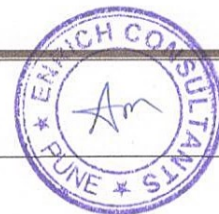
### 7. Reference:

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



## ABBREVIATIONS

SSPM	:	Sipna Shikshan Prasarak Mandal
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
FTL	:	Fluorescent Tube Light
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
PC	:	Personal Computer
MT	:	Metric Ton



## CHAPTER-I INTRODUCTION

### 1.1 Objectives:

1. To study Connected Load
2. To study present Energy Consumption
3. To Study the CO<sub>2</sub> emissions
4. To study Usage of Alternate Energy
5. To study usage of LED Lighting

### 1.2 Table No 1: General Details of College:

No	Head	Particulars
1	Name	Sipna Shikshan Prasarak Mandal Amravati's Arts Science & Commerce College
2	Address	Upper Plateau, Chikhaldara 444807
3	Affiliation	Sant Gadgebaba Amravati University

### 1.3 Aerial View of College:





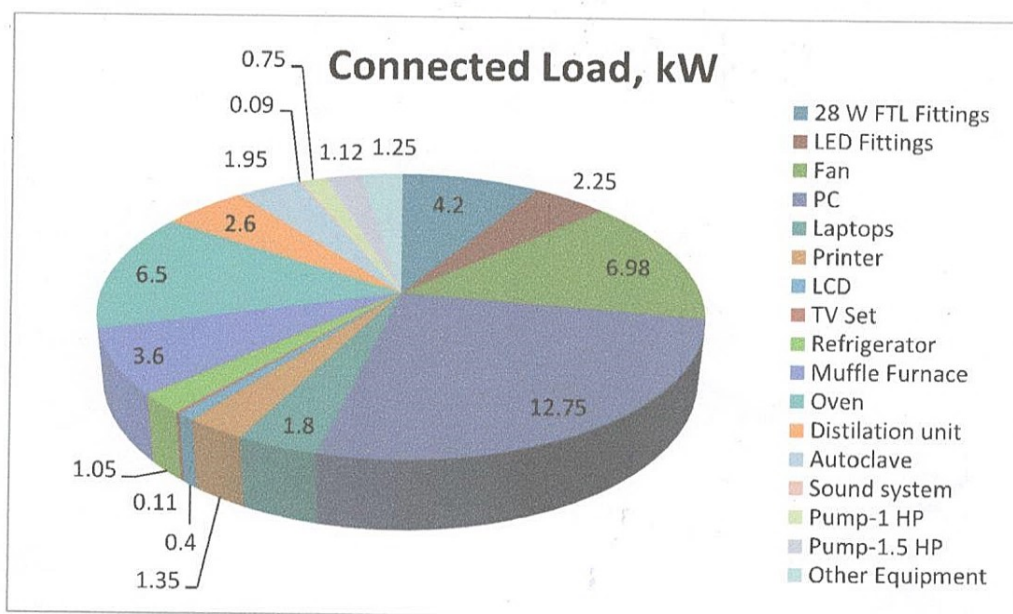
## CHAPTER-II STUDY OF CONNECTED LOAD

In this chapter, we present the details of various Electrical loads as under

**Table No 2: Equipment wise Connected Load:**

No	Equipment	Qty	Load, W/Unit	Load, kW
1	28 W FTL Fittings	150	28	4.2
2	LED Fittings	150	15	2.25
3	Fan	97	72	6.98
4	PC	85	150	12.75
5	Laptops	20	90	1.8
6	Printer	9	150	1.35
7	LCD	4	100	0.4
8	TV Set	2	55	0.11
9	Refrigerator	3	350	1.05
10	Muffle Furnace	5	720	3.6
11	Oven	10	650	6.5
12	Distillation unit	4	650	2.6
13	Autoclave	3	650	1.95
14	Sound system	1	85	0.09
15	Pump-1 HP	1	746	0.75
16	Pump-1.5 HP	1	1119	1.12
17	Other Equipment	5	250	1.25
<b>18</b>	<b>Total</b>			<b>49</b>

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



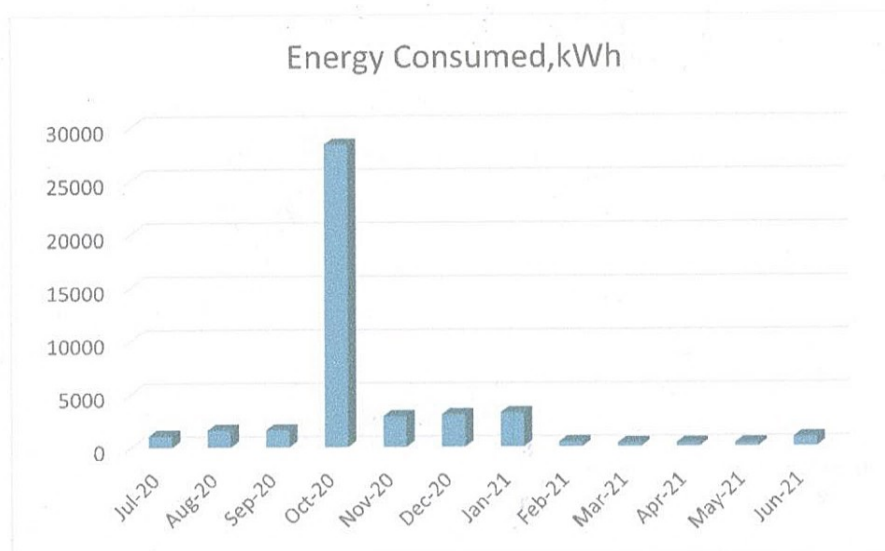
### CHAPTER-III STUDY OF ELECTRICAL ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Bills

**Table No 3: Electrical Bill Analysis- 2020-21:**

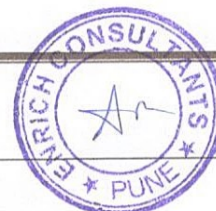
No	Month	Energy Purchased-Meter-1, kWh	Energy Purchased-Meter-2, kWh	Total Energy Consumed, kWh
1	Jul-20	1000	58	1058
2	Aug-20	1000	576	1576
3	Sep-20	1000	576	1576
4	Oct-20	22824	5475	28299
5	Nov-20	2636	223	2859
6	Dec-20	2636	378	3014
7	Jan-21	2636	535	3171
8	Feb-21	79	349	428
9	Mar-21	19	294	313
10	Apr-21	0	309	309
11	May-21	3	308	311
12	Jun-21	511	333	844
13	Total	34344	9414	43758
14	Maximum	22824	5475	28299
15	Minimum	0	58	309
16	Average	2862	784.5	3646.5

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



**Table No 4: Key observations:**

No	Parameter	Energy consumed, kWh
1	Total	43758
2	Maximum	28299
3	Minimum	309
4	Average	3646.5



## 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 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 CO<sub>2</sub> Emissions:

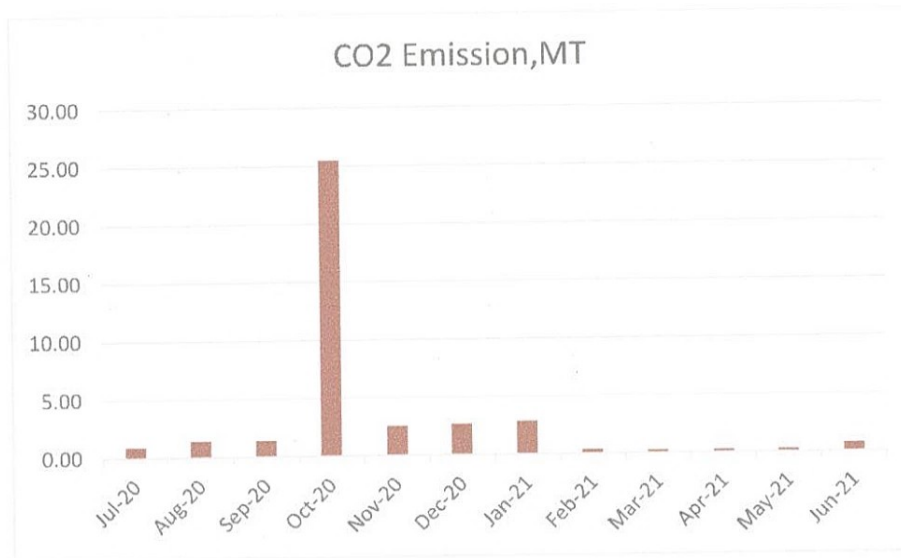
The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere

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 No 5: Month wise CO<sub>2</sub> Emissions:**

No	Month	Energy Purchased-Meter-1, kWh	Energy Purchased-Meter-2, kWh	Total Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Jul-20	1000	58	1058	0.95
2	Aug-20	1000	576	1576	1.42
3	Sep-20	1000	576	1576	1.42
4	Oct-20	22824	5475	28299	25.47
5	Nov-20	2636	223	2859	2.57
6	Dec-20	2636	378	3014	2.71
7	Jan-21	2636	535	3171	2.85
8	Feb-21	79	349	428	0.39
9	Mar-21	19	294	313	0.28
10	Apr-21	0	309	309	0.28
11	May-21	3	308	311	0.28
12	Jun-21	511	333	844	0.76
13	Total	34344	9414	43758	39.38
14	Maximum	22824	5475	28299	25.47
15	Minimum	0	58	309	0.28
16	Average	2862	784.5	3646.5	3.28

**Chart No 3: Representation of Month wise CO<sub>2</sub> emissions:**



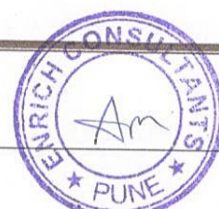
**Table No 6: Key observations:**

No	Parameter	Energy consumed, kWh	CO2 Emissions, MT
1	Total	43758	39.38
2	Maximum	28299	25.47
3	Minimum	309	0.28
4	Average	3646.5	3.28

## **CHAPTER-V**

### **STUDY OF USAGE OF ALTERNATE ENERGY**

The College has yet to install Roof Top Solar PV Plant. Therefore as on the Date, the usage of Alternate Energy to Annul Energy requirement works out to be nil.



## CHAPTER VI STUDY OF USAGE OF LED LIGHTING

In the following Table, we present the percentage of usage of LED lights to the annual Lighting power requirement.

**Table No 7: Computation of % Usage of LED Lighting to Annual Lighting Demand:**

No	Particulars	Value	Unit
1	No of 28 W FTL Fittings	150	Nos
2	Demand of FTL Fitting	28	W/Unit
3	Total Demand of FTL Fittings	4.2	kW
4	No of 15 W LED Fittings	150	Nos
5	Demand of 18 W LED Fitting	15	W/Unit
6	Total Demand of 18 W LED Fittings	2.25	kW
7	Total Lighting Load= 3+6	4.2	kW
8	Total LED Lighting Load= 6	2.25	kW
9	% of LED Lighting to Annual Lighting Load= $(8)*100/(7)$	35	%