



**Sipna Shikshan Prasarak Mandal, Amravati's**  
**ARTS, SCIENCE AND COMMERCE COLLEGE**  
**CHIKHALDARA, DISTT. AMRAVATI (Maharashtra State)**  
**Accredited by NAAC with Grade B++ (CGPA 2.77)**



## **DVV Clarification For**

**7.1.3 Quality audits on environment and energy regularly undertaken by the Institution. The institutional environment and energy initiatives are confirmed through the following**

■ President  
**Shri. Jagdish M. Gupta**  
(Ex. Minister of State, Maharashtra)  
0721 (O)2522341 (R) 2572526



SIPNA SHIKSHAN PRASARAK MANDAL'S AMRAVATI  
**ARTS, SCIENCE &  
COMMERCE COLLEGE, CHIKHALDARA**

■ Principal  
**Dr. Rajesh S. Jaipurkar**  
(Mob.) 9423126066

Distt. Amravati (Maharashtra) 444 807  
NAAC Reaccredited 3rd Cycle with CGPA 2.77 at grade B++ (2018-2023)

■ E-mail : [ascc163@sgbau.ac.in](mailto:ascc163@sgbau.ac.in) ■ Website : [www.sipnaascc.ac.in](http://www.sipnaascc.ac.in) ■ Tel. (O) 07220-230309

Outward No :

Date : 23/09/2023

## DECLARATION

This is to declare that the information, photos, reports, true copies, numerical data, etc. furnished in this file as supporting documents for DVV clarification is verified by IQAC and found correct.

  
Dr. V.D. Kapse  
IQAC Coordinator  
Co-ordinator  
IQAC  
Arts, Science & Commerce College,  
Chikhaldara  
Distt.: Amravati (M.S.)



ML  
Dr. R. S. Jaipurkar  
Dr. R.S. Jaipurkar  
Principal  
Arts Science & Commerce College,  
Chikhaldara, Dist - Amravati



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



Year: 2021-22

Prepared by

**Engress Services**

Yashashree, 26, Nirmal Bag Society,  
Near Muktagan English School, Parvati, Pune 411009  
Phone: 09890444795, Email: [engress123@gmail.com](mailto:engress123@gmail.com)



MAHARASHTRA ENERGY DEVELOPMENT AGENCY



**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/2022-23/CR-43/1709

10<sup>th</sup> May, 2022

**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.

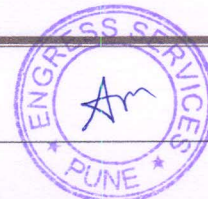
**Name and Address of the firm** : M/s Engress Services  
Yashshree, 26, Nirmal Bag Society,  
Near Muktangan English School,  
Parvati, Pune – 411 009.

**Registration Category** : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

**Registration Number** : *MEDA/ECN/2022-23/Class A/EA-32.*

- 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 **09<sup>th</sup> May, 2024** 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)



# Engress Services

Yashashree, 26, Nirmal Bag Society,  
Near Mukhtangan English School, Parvati, Pune 411 009  
Tel: 09890444795 Email: [engress123@gmail.com](mailto:engress123@gmail.com)

Ref: ES/SSPMAASCCC/21-22/02

Date: 13/5/2022

## CERTIFICATE

This is to certify that we have conducted Green Audit at Sipna Shikshan Prasarak Mandal Amravati's Arts, Science & Commerce College, Upper Plateau Chikhaldara 444807, in the year 2021-22.

The College has adopted following Green Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Maximum Usage of Day Lighting
- Segregation of Waste at source
- Provision of Bio Composting Pit
- Implementation of Rain Water Harvesting Project
- Maintenance of Good Internal Road
- Provision of Ramp for Divyangajan
- Development of Ethno botanical Garden with important medicinal plants
- Arranging various Environmental awareness Programs for students
- Wasteland restoration by Green, Medicinal Plants, Bee flora
- Creation of Awareness by Display of Poster on Swatcchh & Swastha Bharat

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Engress Services,



**A Y Mehendale,**  
Certified Energy Auditor  
EA-8192



## INDEX

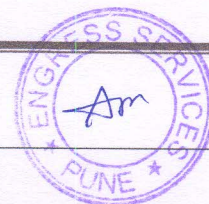
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## **ACKNOWLEDGEMENT**

We Engress Services, 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 Green Audit of their Chikhaldara campus for the Year: 2021-22.

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	4412	3.97
2	Maximum	759	0.68
3	Minimum	180	0.16
4	Average	401	0.36

### 3. Various initiatives taken for Energy Conservation:

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

### 4. Usage of Renewable Energy:

The College has yet to install Roof Top Solar PV Plant. Therefore as on the Date, the reduction in CO<sub>2</sub> emissions due to usage of Renewable Energy is Nil.

### 5. Waste Management:

#### 5.1 Segregation Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source and is handed over to Authorized waste collecting agent for further disposal.

#### 5.2 Organic Waste Management:

The College has installed a Bio Composting Pit and the organic Waste is composted in the Pit, which is further used in the own garden.

#### 5.3 Liquid Waste Management:

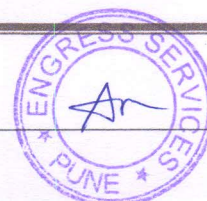
For treatment of laboratory chemicals, the College has a soak tank wherein the laboratory liquid waste is first mixed with water and then drained to the soak Tank which contains layers of sand and activated carbon.

#### 5.4 E-Waste Management:

It is recommended to handover the E Waste through Authorized E-Waste collecting agency.

### 6. Rain Water Harvesting:

The College has installed Rain Water Harvesting Project, wherein the Rain Water falling on the terrace is collected and is stored in a separate Water Storage Tank. The Water is further used for domestic purpose.



### 7. Green & Sustainable Initiatives:

- Maintenance of good Internal Road
- Maintenance of Internal Garden
- Provision of Ramp for Divyangajan
- Display of Poster on Swatchh & Swastha Bharat
- Development of Ethno botanical Garden with important medicinal plants
- Arranging various Environmental awareness Programs for students
- Wasteland restoration by Green, Medicinal Plants, Bee flora

### 8. Notes & Assumptions:

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

### 9. Reference:

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

## ABBREVIATIONS

SSPM	Sipna Shikshan Prasarak Mandal
kWh	Kilo Watt Hour
LED	Light Emitting Diode
Kg	Kilo Gram
MT	Metric Ton
CO <sub>2</sub>	Carbon Di Oxide
Qty	Quantity



## 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 Renewable Energy
4. Study of Waste Management
5. Study of Rain Water Harvesting
6. Study of Green & Sustainable Practices

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

No	Head	Particulars
1	Name of Institution	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:



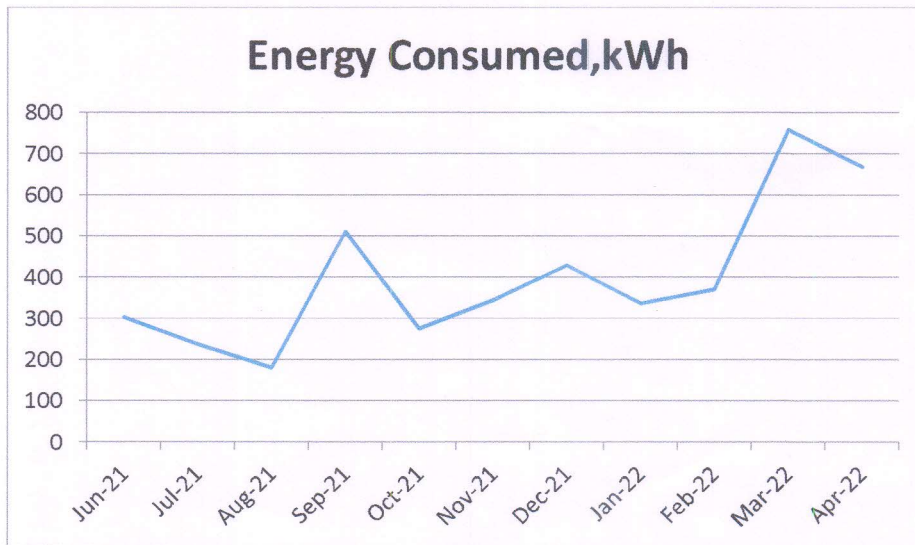
## CHAPTER-II STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Bills. As the Hostel facility is closed, we consider the consumption of only College premises.

**Table No 2: Electrical Bill Analysis- 2021-22:**

No	Month	Energy Consumed, kWh
1	Jun-21	303
2	Jul-21	237
3	Aug-21	180
4	Sep-21	511
5	Oct-21	275
6	Nov-21	344
7	Dec-21	429
8	Jan-22	336
9	Feb-22	370
10	Mar-22	759
11	Apr-22	668
12	Total	4412
13	Maximum	759
14	Minimum	180
15	Average	401

**Chart No 1: Variation in Monthly Energy Consumption:**



**Key Inference drawn:**

From the above analysis, we present following important parameters:

**Table No 3: Variation in Important Parameters:**

No	Parameter/ Variation	Energy Consumed, kWh
1	Total	4412
2	Maximum	759
3	Minimum	180
4	Average	401



### CHAPTER III

## STUDY OF 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 LPG & Electrical Energy are as under

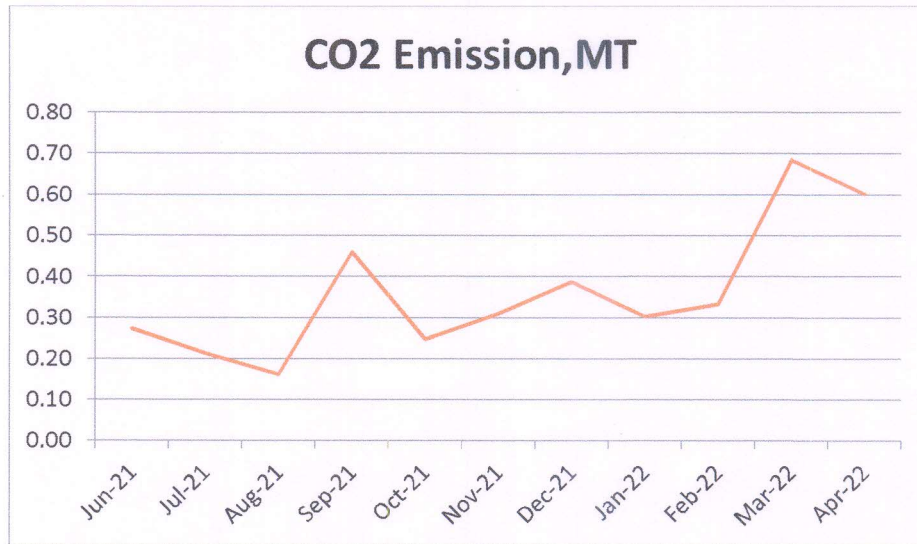
- 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere

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 No 4: Month wise CO<sub>2</sub> Emissions:

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Jun-21	303	0.27
2	Jul-21	237	0.21
3	Aug-21	180	0.16
4	Sep-21	511	0.46
5	Oct-21	275	0.25
6	Nov-21	344	0.31
7	Dec-21	429	0.39
8	Jan-22	336	0.30
9	Feb-22	370	0.33
10	Mar-22	759	0.68
11	Apr-22	668	0.60
12	Total	4412	3.97
13	Maximum	759	0.68
14	Minimum	180	0.16
15	Average	401	0.36

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



**Table No 5: Key observations:**

No	Parameter	Energy consumed, kWh	CO2 Emissions, MT
1	Total	4412	3.97
2	Maximum	759	0.68
3	Minimum	180	0.16
4	Average	401	0.36



## **CHAPTER IV STUDY OF USAGE OF RENEWABLE ENERGY**

The College has yet to install Roof Top Solar PV Plant. Therefore as on the Date, the reduction in CO<sub>2</sub> emissions due to usage of Renewable Energy is Nil.



## CHAPTER V STUDY OF WASTE MANAGEMENT

### 5.1 Segregation Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source and is handed over to Authorized waste collecting agent for further recycling.

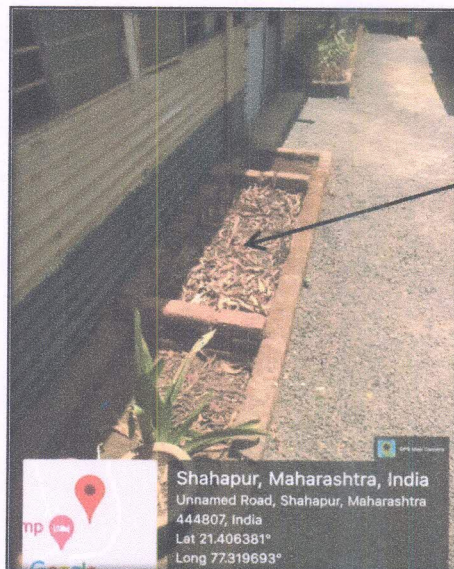
#### Photograph of Waste Collection Bin:



### 5.2 Organic Waste Management:

The Bio degradable waste like leafy waste is composted in a Bio Composting Pit.

#### Photograph of Bio Composting Pit:



Bio  
Composting Pit

### 5.3 Liquid Waste Management:

For treatment of laboratory chemicals, the College has a soak tank wherein the laboratory liquid waste is first mixed with water and then drained to a soak Tank which contains layers of sand and activated carbon.

#### Photograph of Liquid Waste Soak Tank arrangement:



### 5.4 E-Waste Management:

It is recommended to handover the E Waste through Authorized E-Waste collecting agency.

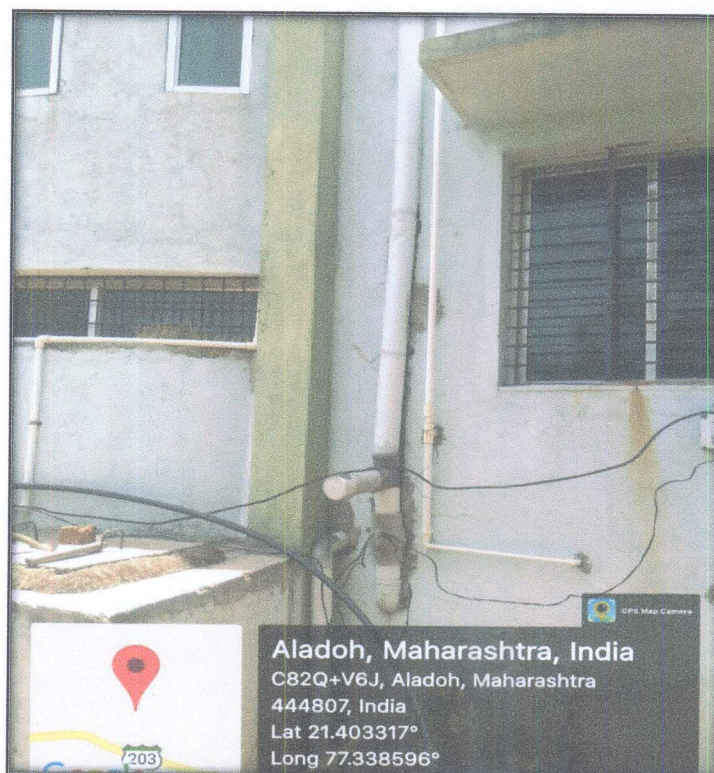
## CHAPTER-VI STUDY OF RAIN WATER HARVESTING

The College has installed Rain Water Harvesting Project, wherein the Rain Water falling on the terrace is collected and is stored in a separate Water Storage Tank. The Water is further used for domestic purpose.

### Water Storage Tank Details:

- Area of Tank: 1939 sq.ft.
- Tank Height: 2 meters
- Water Storage Capacity: 360400 Liters

### Photograph of Rain Water Storage Tank Facility:



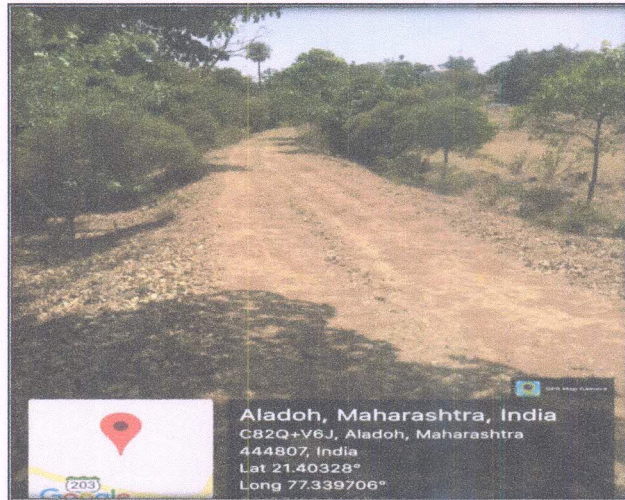
The Water is used for Girls Hostel & for Gardening purpose.

## CHAPTER-VII STUDY OF GREEN & SUSTAINABLE PRACTICES

### 7.1 Pedestrian Friendly Roads:

The College has well maintained internal road to facilitate the easy movement of the students within the campus.

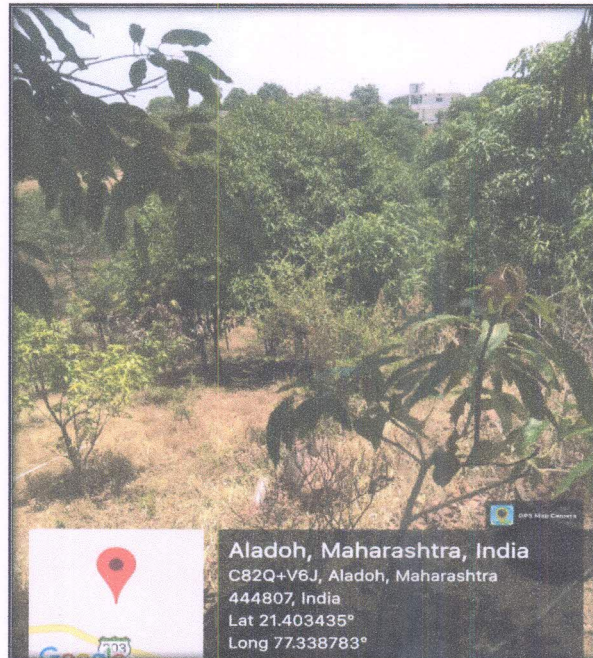
#### Photograph of Internal Road:



### 7.2 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

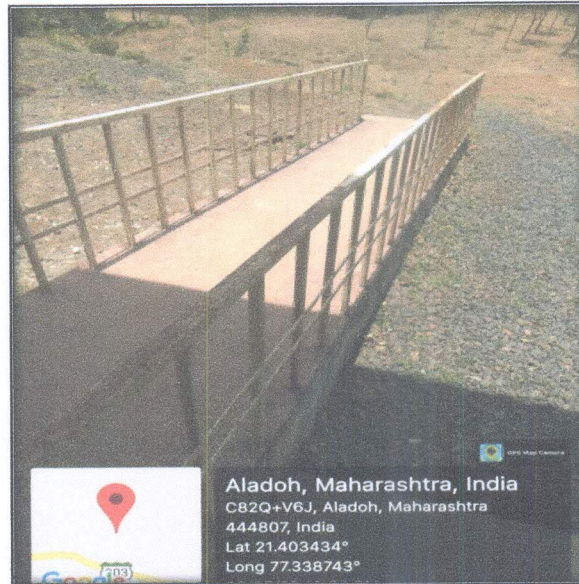
#### Photograph of Tree plantation:



### 7.3 Provision of Ramp:

For easy movement of Divyangajan, the College has made provision of Ramp.

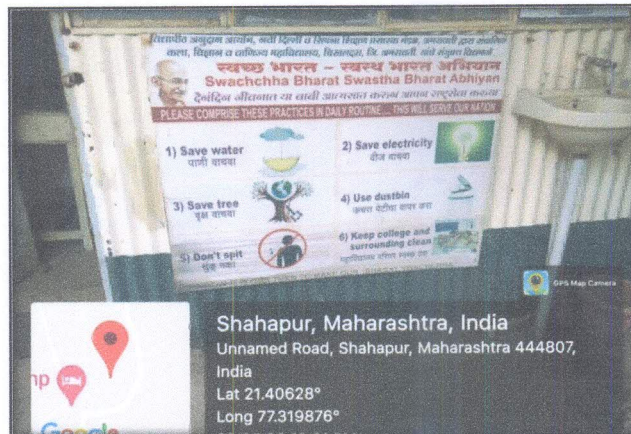
#### Photograph of Ramp:



### 7.4 Creation of Awareness on Swatcchh & Swastha Bharat Abhiyan:

The College is creating awareness on importance of Cleanliness, Hygiene and Good Health under the Swatcchh & Swastha Bharat Abhiyan.

#### Photograph of Poster on Swatcchh & Swastha Bharat Abhiyan:



### 7.5 Other Environment Friendly Initiatives:

- Development of Ethno botanical Garden with important medicinal plants
- Arranging various Environmental awareness Programs for students
- Wasteland restoration by Green, Medicinal Plants, Bee flora

**ANNEXURE-1:  
LIST OF TREES:**

The total Area under Tree Plantation is about 1.5 Acres.

**List of Trees:**

No	Name of Tree
1	Corkball
2	Wild arecanut
3	Jackfruit
4	Boat
5	Habit
6	Kapok
7	Gulmohor
8	Banyan
9	Fig
10	SilverOak
11	Yellow Flameboyant
12	Frangipani
13	Date Palm
14	Ashoka
15	Beech
16	Guava
17	Sandalwood
18	Mahagony
19	Jambolin
20	Silver Trumpet
21	Carribbean Trumpet
22	Teak
23	Tulip



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



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](mailto:enrichcons@gmail.com)



**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.

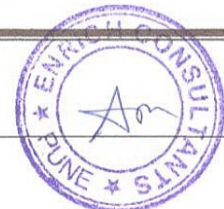
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General Manager (EC)



# Enrich Consultants

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Tel: 09890444795 Email: [enrichcons@gmail.com](mailto:enrichcons@gmail.com)

Ref: EC/SSPMAASCCC/20-21/02

Date: 12/8/2021

## CERTIFICATE

This is to certify that we have conducted Green 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 Green Initiatives:

- Usage of Energy Efficient LED Light Fitting
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- Maintenance of Good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Display of Poster on Plastic Ban
- Tree Plantation Drive in the campus
- Cleanliness Drive in the campus

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

**For Enrich Consultants,**



**A Y Mehendale,**  
Certified Energy Auditor  
EA-8192



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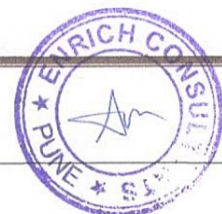
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### 2. Present Level of Energy Consumption & CO<sub>2</sub> Emissions:

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 initiatives taken for Energy Conservation:

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

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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.

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For treatment of laboratory chemicals, the College has a soak tank wherein the laboratory liquid waste is first mixed with water and then drained to the soak Tank which contains layers of sand and activated carbon.

#### 5.4 E-Waste Management:

It is recommended to handover the E Waste through Authorized E-Waste collecting agency.

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- Maintenance of Internal Garden
- Provision of Ramp for Divyangajan
- Display of Poster on Plastic Ban
- Tree Plantation Drive in the campus
- Cleanliness Drive in the campus

#### 8. Notes & Assumptions:

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#### 9. Reference:

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

## ABBREVIATIONS

SSPM	Sipna Shikshan Prasarak Mandal
kWh	Kilo Watt Hour
LED	Light Emitting Diode
Kg	Kilo Gram
MT	Metric Ton
CO <sub>2</sub>	Carbon Di Oxide
Qty	Quantity



## 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 Renewable Energy
4. Study of Waste Management
5. Study of Rain Water Harvesting
6. Study of Green & Sustainable Practices

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

No	Head	Particulars
1	Name of Institution	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:



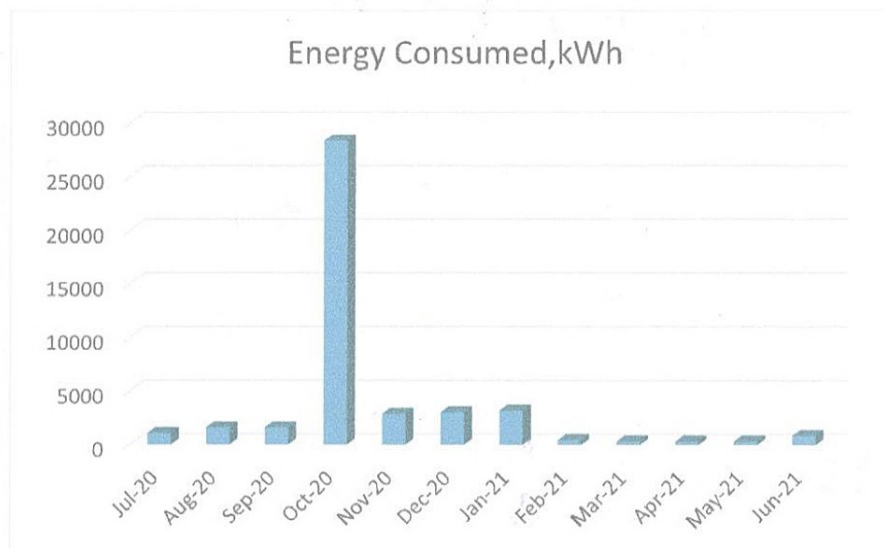
## CHAPTER-II STUDY OF PRESENT ENERGY CONSUMPTION

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

**Table No 2: 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 1: Variation in Monthly Energy Consumption:**



### 3.4 Key Inference drawn:

From the above analysis, we present following important parameters:

**Table No 3: Variation in Important Parameters:**

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

### CHAPTER III

## STUDY OF 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 LPG & Electrical Energy are as under

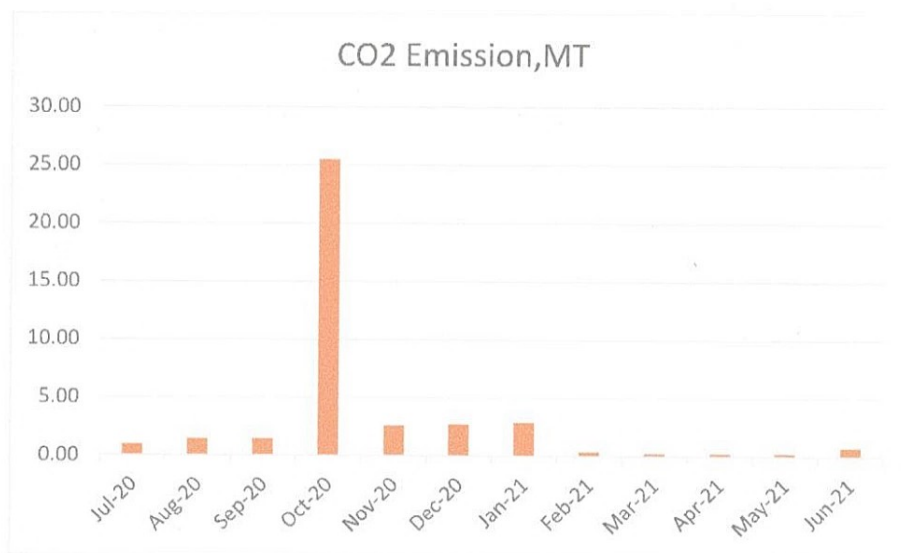
- 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere

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 No 4: 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 2: Month wise CO<sub>2</sub> Emissions:**



**Table No 5: 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 IV STUDY OF USAGE OF RENEWABLE ENERGY**

The College has yet to install Roof Top Solar PV Plant. Therefore as on the Date, the usage of Alternate Energy is nil.



## **CHAPTER V STUDY OF WASTE MANAGEMENT**

### **5.1 Segregation Waste at Source:**

The recyclable waste, like paper, plastic waste is segregated at source and is handed over to Authorized waste collecting agent for further recycling.

#### **Photograph of Waste Collection Bin:**



### **5.2 Organic Waste Management:**

The Bio degradable waste like leafy waste is composted in a Bio Composting Pit.

#### **Photograph of Vermi Composting Pit:**



### 5.3 Liquid Waste Management:

For treatment of laboratory chemicals, the College has a soak tank wherein the laboratory liquid waste is first mixed with water and then drained to a soak Tank which contains layers of sand and activated carbon.

#### Photograph of Liquid Waste Soak Tank arrangement:



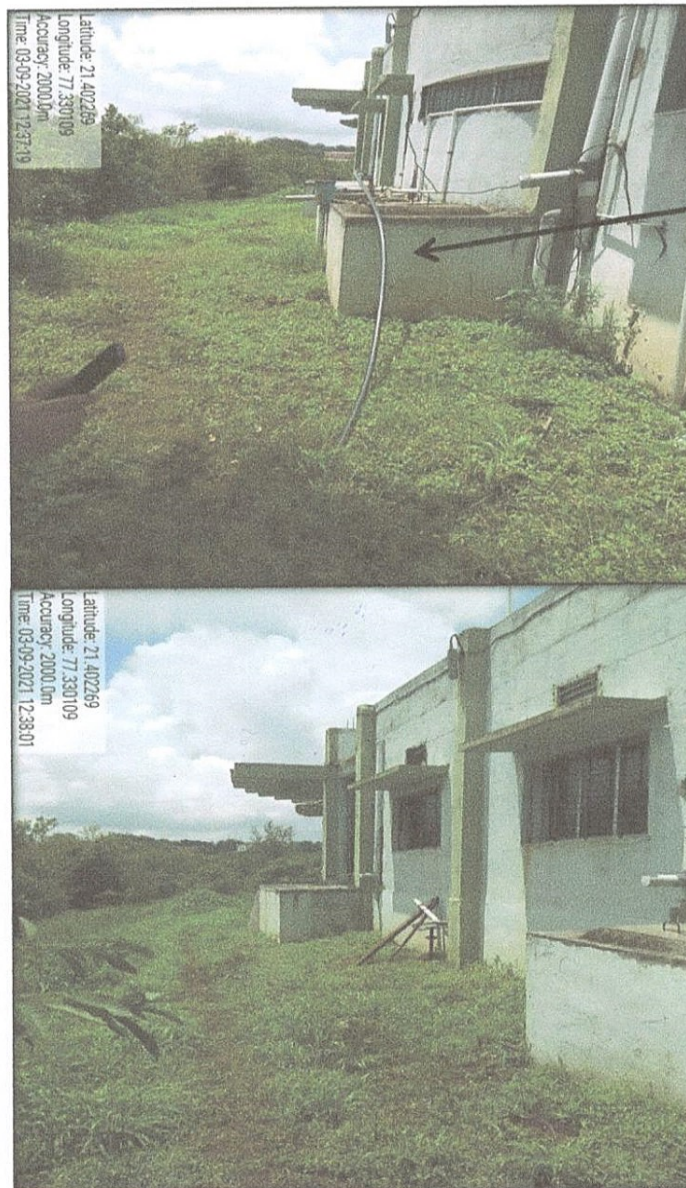
### 5.4 E-Waste Management:

It is recommended to handover the E Waste through Authorized E-Waste collecting agency.

## CHAPTER-VI STUDY OF RAIN WATER HARVESTING

The College has installed Rain Water Harvesting Project, wherein the Rain Water falling on the terrace is collected and is stored in a separate Water Storage Tank. The Water is further used for domestic purpose.

### Photograph of Rain Water Storage Tank Facility:

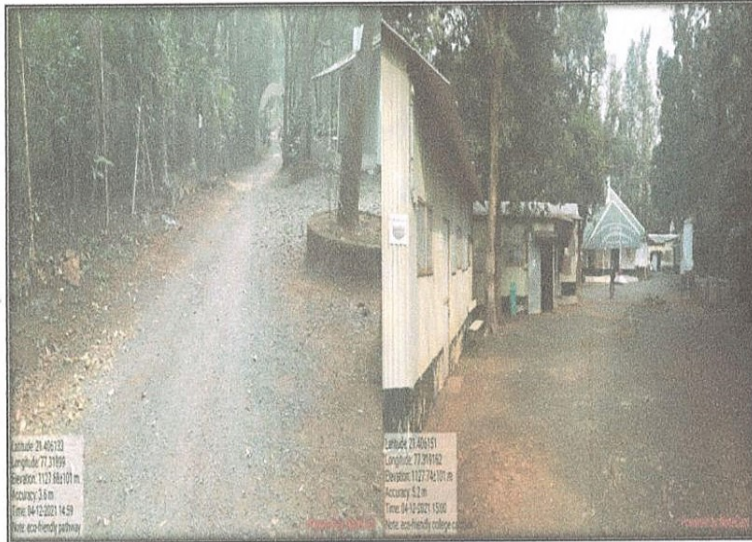


## CHAPTER-VII STUDY OF GREEN & SUSTAINABLE PRACTICES

### 7.1 Pedestrian Friendly Roads:

The College has well maintained internal road to facilitate the easy movement of the students within the campus.

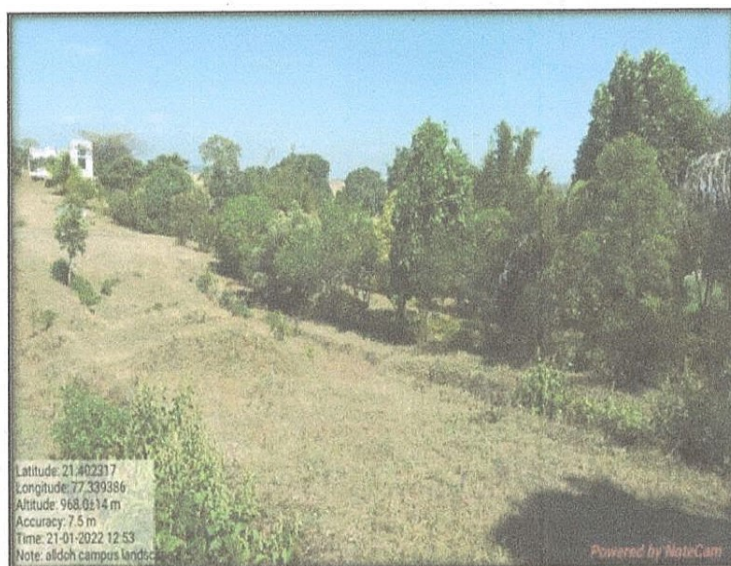
#### Photograph of Internal Road:



### 7.2 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

#### Photograph of Tree plantation:



### 7.3 Provision of Ramp:

For easy movement of Divyangajan, the College has made provision of Ramp.

#### Photograph of Ramp:



### 7.4 Creation of Awareness on Plastic Free Campus:

The College is creating awareness on Plastic Ban by Display of Posters.

#### Photograph of Poster on Plastic Ban:



### 7.5 Cleanliness Drive:

The College arranged Cleanliness Drive in the Campus under National Service Scheme.

#### Photograph of Cleanliness Drive:



### 7.6 Tree Plantation Drive:

The College arranged Tree Plantation Drive in the Campus under National Service Scheme.

#### Photograph of Cleanliness Drive:

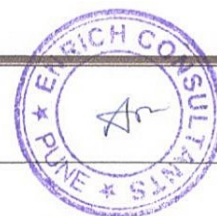


**ANNEXURE-1:  
LIST OF TREES:**

The total Area under Tree Plantation is about 1.5 Acres.

**List of Trees:**

No	Name of Tree
1	Corkball
2	Wild arecanut
3	Jackfruit
4	Boat
5	Habit
6	Kapok
7	Gulmohor
8	Banyan
9	Fig
10	SilverOak
11	Yellow Flameboyant
12	Frangipani
13	Date Palm
14	Ashoka
15	Beech
16	Guava
17	Sandalwood
18	Mahagony
19	Jambolin
20	Silver Trumpet
21	Carribbean Trumpet
22	Teak
23	Tulip



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



**Year: 2021-22**

Prepared by:

**Engress Services**

Yashashree, 26, Nimal Bag Society,  
Near Muktangan English School, Parvati, Pune 411009  
Phone: 09890444795, Email: [engress123@gmail.com](mailto:engress123@gmail.com)



MAHARASHTRA ENERGY DEVELOPMENT AGENCY



**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/2022-23/CR-43/1709

10<sup>th</sup> May, 2022

**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 Engress Services  
Yashshree, 26, Nirmal Bag Society,  
Near Muktangan English School,  
Parvati, Pune – 411 009.

**Registration Category** : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

**Registration Number** : *MEDA/ECN/2022-23/Class A/EA-32.*

- 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 **09<sup>th</sup> May, 2024** 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)



# Engress Services

Yashashree, 26, Nirmal Bag Society,  
Near Mukhtangan English School, Parvati, Pune 411 009  
Tel: 09890444795 Email: [engress123@gmail.com](mailto:engress123@gmail.com)

Ref: ES/SSPMAASCCC/21-22/03

Date: 13/5/2022

## CERTIFICATE

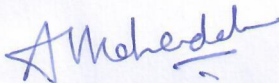
This is to certify that we have conducted Environmental Audit at Sipna Shikshan Prasarak Mandal Amravati's Arts, Science & Commerce College, Upper Plateau Chikhaldara 444807, in the year 2021-22.

The College has adopted following Green Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Maximum Usage of Day Lighting
- Segregation of Waste at source
- Provision of Bio Composting Pit
- Implementation of Rain Water Harvesting Project
- Development of Ethno botanical Garden with important medicinal plants
- Arranging various Environmental awareness Programs for students
- Wasteland restoration by Green, Medicinal Plants, Bee flora
- Creation of Awareness by Display of Poster on Swatcchh & Swastha Bharat

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Engress Services,



**A Y Mehendale,**  
Certified Energy Auditor  
EA-8192



## INDEX

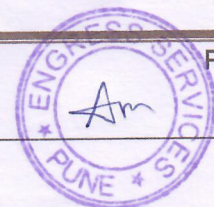
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## **ACKNOWLEDGEMENT**

We Engress Services, 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 Environmental Audit of their Chikhaldara campus for the Year: 2021-22.

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. Pollution due to College Activities:

- **Air pollution:** Mainly CO<sub>2</sub> on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste, Recyclable Waste
- **Liquid Waste:** Human liquid Waste & Laboratory Waste

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

No	Parameter/ Value	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Total	4412	3.97
2	Maximum	759	0.68
3	Minimum	180	0.16
4	Average	401	0.36

### 4. Various initiatives taken for Energy Conservation:

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

### 5. Usage of Renewable 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.

### 6. Indoor Air Quality:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	46	36	44
2	Minimum	25	10	12

### 7. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	30.9	69	176	45
2	Minimum	27.4	60	52	38.1

## 8. Waste Management:

### 8.1 Segregation Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source and is handed over to Authorized waste collecting agent for further disposal.

### 8.2 Organic Waste Management:

The College has installed a Bio Composting Pit and the organic Waste is composted in the Plant, which is further used in the own garden.

### 8.3 Liquid Waste Management:

For treatment of laboratory chemicals, the College has a soak tank wherein the laboratory liquid waste is first mixed with water and then drained to the soak Tank which contains layers of sand and activated carbon.

### 8.4 E-Waste Management:

It is recommended to handover the E Waste through Authorized E-Waste collecting agency.

## 9. Rain Water Harvesting:

The College has installed Rain Water Harvesting Project, wherein the Rain Water falling on the terrace is collected and is stored in a separate Water Storage Tank. The Water is further used for domestic purpose.

## 10. Environment Friendly Initiatives:

- Development of Ethno botanical Garden with important medicinal plants
- Arranging various Environmental awareness Programs for students
- Wasteland restoration by Green, Medicinal Plants, Bee flora
- Creation of Awareness by Display of Poster on Swatcchh & Swastha Bharat

## 11. Notes & Assumptions:

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

## 12. References:

- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)
- For indoor Air Quality: [www.cpcb.com](http://www.cpcb.com)
- For Various Indoor Air Parameters: [www.ishrae.com](http://www.ishrae.com)

## ABBREVIATIONS

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
LPD	:	Liters per Day
LED	:	Light Emitting Diode
AQI	:	Air Quality Index
PM-2.5	:	Particulate Matter of Size 2.5 Micron
PM-10	:	Particulate Matter of Size 10 Micron
CPCB	:	Central Pollution Control Board
ISHRAE	:	The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

## CHAPTER-I INTRODUCTION

### 1.1 Important Definitions:

#### 1.1.1 Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

#### 1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are complied with and adequate care has been taken towards environmental protection and preservation

*According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment"*

**1.1.3. Environmental Pollutant:** means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

#### 1.1.4. Relevant Environmental Laws in India: Table No-1:

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

#### 1.1.5. Some Important Environmental Rules in India: Table No-2:

1989	Hazardous Waste (Management and Handling) Rules
1989	Manufacture, Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Rules
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules
2011	E-waste (Management and Handling) Rules



2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

### 1.1.6 National Environmental Plans & Policy Documents: Table No-3:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research Institute)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency)
10.	The Road to Copenhagen; India's Position on Climate Change Issues (MoEF)

### 1.2 Objectives:

1. To study Resource Consumption & CO<sub>2</sub> Emissions
2. To Study CO<sub>2</sub> Emission Reduction
3. To study Indoor Comfort Condition Parameters
4. To Study of Waste Management
5. To Study of Rain Water Harvesting
6. To Study of Sustainable Initiatives

### 1.3 Aerial View of the College:



**1.4 General Details of College: Table No 4:**

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



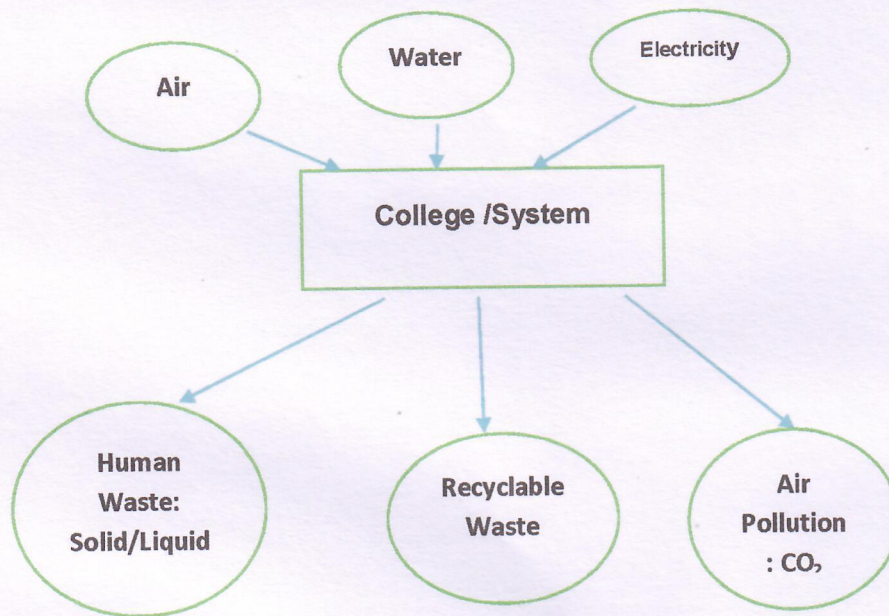
## CHAPTER-II STUDY OF CONSUMPTION OF RESOURCES & CO<sub>2</sub> EMISSION

2.1 The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the College System & Environment as under.

2.2 Chart No 1: Representation of Institute as a System:



Now we compute the Generation of CO<sub>2</sub> on account of consumption of Electrical Energy. As the Facility was closed, we consider the consumption of only College building. The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy are as under

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

Table No 5: Study of Consumption of Electrical Energy & CO<sub>2</sub> Emissions: 21-22:

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Jun-21	303	0.27
2	Jul-21	237	0.21
3	Aug-21	180	0.16
4	Sep-21	511	0.46
5	Oct-21	275	0.25
6	Nov-21	344	0.31

7	Dec-21	429	0.39
8	Jan-22	336	0.30
9	Feb-22	370	0.33
10	Mar-22	759	0.68
11	Apr-22	668	0.60
12	Total	4412	3.97
13	Maximum	759	0.68
14	Minimum	180	0.16
15	Average	401	0.36

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

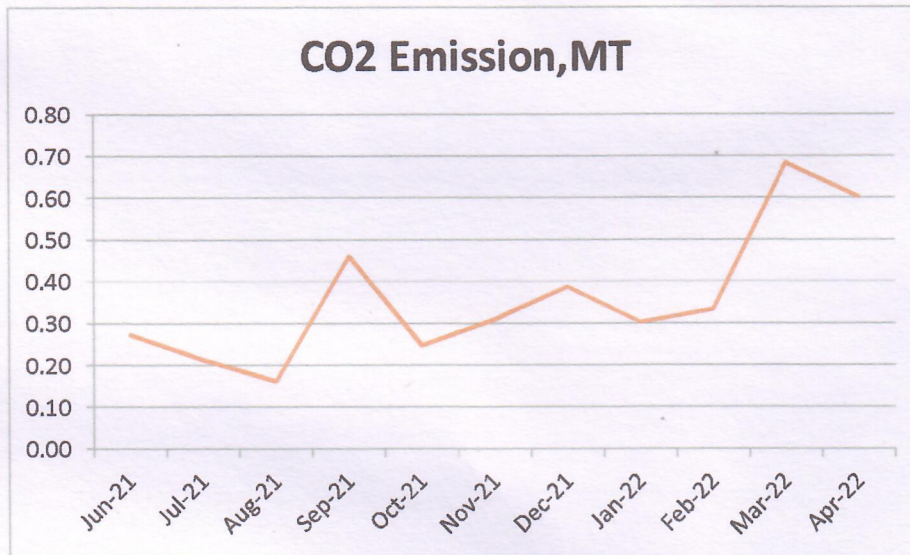


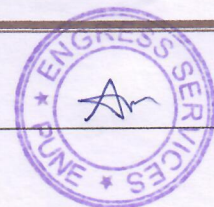
Table No 6: Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Total	4412	3.97
2	Maximum	759	0.68
3	Minimum	180	0.16
4	Average	401	0.36

### **CHAPTER III**

## **STUDY OF CO<sub>2</sub> EMISSION REDUCTION**

The College has yet to install Roof Top Solar PV Plant. Therefore as on the Date, the usage of Alternate Energy is nil.



## CHAPTER IV STUDY OF INDOOR AIR QUALITY

### 4.1 Importance of Air Quality:

**Air:** The common name given to the atmospheric gases used in breathing and photosynthesis.

By volume, Dry Air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.039% carbon dioxide, and small amounts of other gases.

On average, a person inhales about **14,000 liters** of air every day. Therefore, poor air quality may affect the quality of life now and for future generations by affecting the health, the environment, the economy and the city's livability.

Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981.

**Air quality is a measure of the suitability of air for breathing by people, plants and animals.**

According to Section 2(b) of Air (Prevention and control of pollution) Act, 1981 'air pollution' has been defined as 'the presence in the atmosphere of any air pollutant.'

As per Section 2(a) of Air (Prevention and control of pollution) Act, 1981 'air pollutant' has been defined as 'any solid, liquid or gaseous substance [(including noise)] present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment

### 4.2 Air Quality Index:

An **Air Quality Index (AQI)** is a number used by government agencies to measure the **air pollution** levels and communicate it to the population. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects. The measurement of the **AQI** requires an **air monitor** and an **air pollutant** concentration over a specified **averaging period**.

We present herewith following important Parameters.

1. AQI- Air Quality Index
2. PM-2.5- Particulate Matter of Size 2.5 micron
3. PM-10- Particulate Matter of Size 10 micron

**Table No 7: Indoor Air Quality Parameters:**

No	Location	AQI	PM 2.5	PM 10
1	Office	40	24	30
2	Env. Science Dept	36	22	28



3	Library	42	24	34
4	Comp. Lab	43	26	27
5	Botany Dept	45	28	30
6	Physics Dept	35	21	27
7	Class Room	27	16	27
8	Physical Education	46	28	44
9	Food Science	43	10	12
10	Industrial Dept	33	21	27
11	Geology	41	36	32
12	Staff	25	15	22
13	Seminar Hall	30	18	24
14	Maximum	46	36	44
15	Minimum	25	10	12



## CHAPTER V STUDY OF INDOOR COMFORT CONDITION PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit.

The Parameters include:

1. Temperature
2. Humidity
3. Lux Level
4. Noise Level.

**Table No 8: Study of Indoor Comfort Condition Parameters:**

No	Location	Temperature, °C	Humidity, %	LUX Level	Noise Level, dB
1	Office	27.4	68	145	41
2	Env. Science Dept	28.7	63	125	39.6
3	Library	29.6	69	92	45
4	Comp. Lab	29.4	63	89	40.5
5	Botany Dept	30.4	62	134	40.6
6	Physics Dept	30.8	61	63	39.6
7	Class Room	30.7	62	82	40.6
8	Physical Education	30	62	52	40.5
9	Food Science	30.5	60	52	41.6
10	Industrial Dept	30.4	60	83	41.3
11	Geology	30.9	60	71	41.3
12	Staff	29.8	64	69	38.1
13	Seminar Hall	29.2	63	176	41.3
14	Maximum	30.9	69	176	45
15	Minimum	27.4	60	52	38.1



## CHAPTER VI STUDY OF WASTE MANAGEMENT

### 6.1 Segregation Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source and is handed over to Authorized waste collecting agent for further recycling.

#### Photograph of Waste Collection Bin:



### 6.2 Organic Waste Management:

The Bio degradable waste like leafy waste is composted in a Bio Composting Pit.

#### Photograph of Bio Composting Pit:



Bio  
Composting Pit

### 6.3 Liquid Waste Management:

For treatment of laboratory chemicals, the College has a soak tank wherein the laboratory liquid waste is first mixed with water and then drained to a soak Tank which contains layers of sand and activated carbon.

#### Photograph of Liquid Waste Soak Tank arrangement:



### 6.4 E-Waste Management:

It is recommended to handover the E Waste through Authorized E-Waste collecting agency.

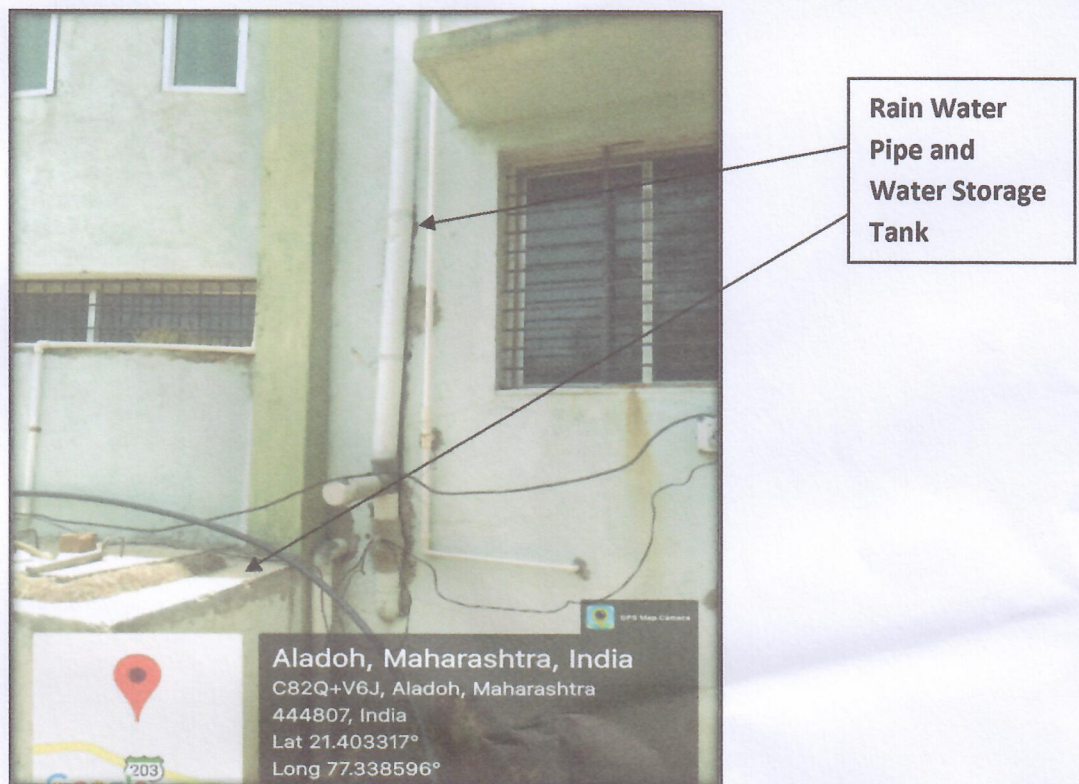
## CHAPTER-VII STUDY OF RAIN WATER HARVESTING

The College has installed Rain Water Harvesting Project, wherein the Rain Water falling on the terrace is collected and is stored in a separate Water Storage Tank.

### Water Storage Tank Details:

- Area of Tank: 1939 sq. ft.
- Tank Height: 2 meters
- Water Storage Capacity: 360400 Liters

### Photograph of Rain Water Storage Tank Facility:



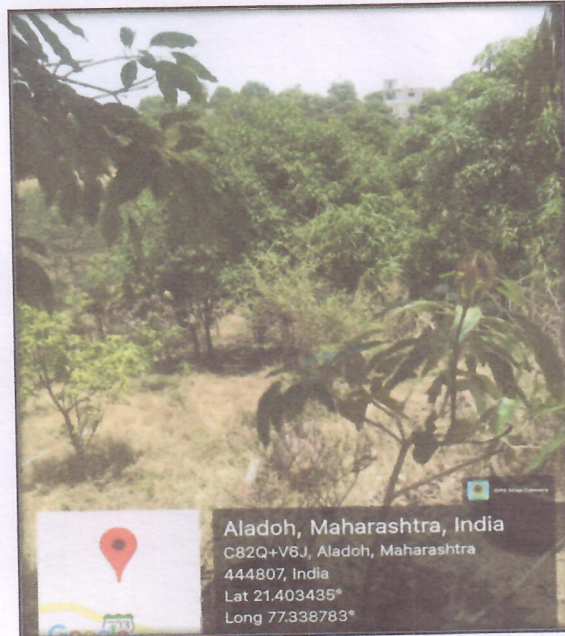
The Water is used for Girls Hostel & for Gardening purpose.

## CHAPTER-VIII STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

### 8.1 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

Photograph of Tree plantation:



### 8.2 Creation of Awareness on Swatcchh & Swastha Bharat Abhiyan:

The College is creating awareness on importance of Cleanliness, Hygiene and Good Health under the Swatcchh & Swastha Bharat Abhiyan.

Photograph of Poster on Swatcchh & Swastha Bharat Abhiyan:



### 8.3 Other Environment Friendly Initiatives:

- Development of Ethno botanical Garden with important medicinal plants
- Arranging various Environmental awareness Programs for students
- Wasteland restoration by Green, Medicinal Plants, Bee flora



**ANNEXURE-I:  
RECOMMENDED NOISE & INDOOR COMFORT STANDARDS:**

**1. Category Wise Air Quality Index Values & Concentration of PM 2.5 & PM10:**

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

**2. Recommended Water Quality Standards:**

No	Designated Best Use	Criteria
1	Drinking Water Source without conventional Treatment but after disinfection	pH between 6.5 to 8.5 Dissolved Oxygen 6 mg/l or more
2	Drinking water source after conventional treatment and disinfection	pH between 6 to 9 Dissolved Oxygen 4 mg/l or more
3	Outdoor Bathing (Organized)	pH between 6.5 to 8.5 Dissolved Oxygen 5 mg/l or more
4	Controlled Waste Disposal	pH between 6 to 8.5

### 3. Recommended Noise Level Standards:

No	Location	Noise Level dB
1	Auditoriums	20-25
2	Outdoor Playground	55
3	Occupied Class Room	40-45
4	Un occupied Class Room	35
5	Apartment, Homes	35-40
6	Offices	45-50
7	Libraries	35-40
8	Restaurants	50-55

### 4. Thermal Comfort Conditions: For Non-conditioned Buildings:

No	Parameter	Value
1	Temperature	Less Than 33°C
2	Humidity	Less Than 70%

**ENVIRONMENTAL AUDIT REPORT**  
Of  
**SIPNA SHIKSHAN PRASARAK MANDAL AMRAVATI'S**  
**Arts Science & Commerce College**  
**Chikhaldara**



**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](mailto:enrichcons@gmail.com)



**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,  
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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.

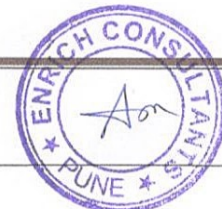
**Name and Address of the firm** : **M/s Enrich Consultants**  
Yashashree, Plot No. 26, Nirmal Bag Society,  
Near Muktangan English School, Parvati,  
Pune - 411009.

**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)



# Enrich Consultants

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

Ref: EC/SSPMAASCCC/20-21/03

Date: 12/8/2021

## CERTIFICATE

This is to certify that we have conducted Environmental 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 Green Initiatives:

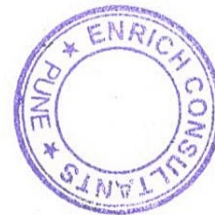
- Usage of Energy Efficient LED Light Fitting
- Maximum Usage of Day Lighting
- Segregation of Waste at source
- Provision of Bio Composting Pit
- Implementation of Rain Water Harvesting Project
- Tree Plantation in the campus
- Display of Poster on Plastic Ban
- Tree Plantation Drive in the campus
- Cleanliness Drive in the campus

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

**For Enrich Consultants,**

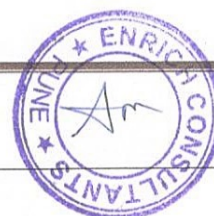


**A Y Mehendale,**  
Certified Energy Auditor  
EA-8192



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## **ACKNOWLEDGEMENT**

We Enrich Consultants, Pune, express our sincere gratitude to the management of Sipna Shikshan Prasarak Mandal Amravati's Arts, Science & commerce college, Upper Plateau Chikhaldara 444807, for awarding us the assignment of Environmental 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.





### 7.3 Liquid Waste Management:

For treatment of laboratory chemicals, the College has a soak tank wherein the laboratory liquid waste is first mixed with water and then drained to the soak Tank which contains layers of sand and activated carbon.

### 7.4 E-Waste Management:

It is recommended to handover the E Waste through Authorized E-Waste collecting agency.

### 8. Rain Water Harvesting:

The College has installed Rain Water Harvesting Project, wherein the Rain Water falling on the terrace is collected and is stored in a separate Water Storage Tank. The Water is further used for domestic purpose.

### 9. Environment Friendly Initiatives:

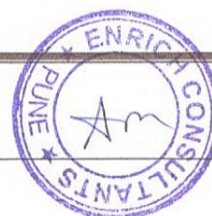
- Maintenance of Internal Garden
- Display of Poster on Plastic Ban
- Tree Plantation Drive in the campus
- Cleanliness Drive in the campus

### 10. Notes & Assumptions:

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

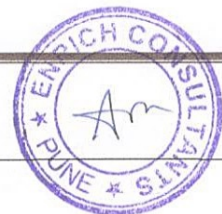
### 11. References:

- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)
- For Various Indoor Air Parameters: [www.ishrae.com](http://www.ishrae.com)



## **ABBREVIATIONS**

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
LED	:	Light Emitting Diode
ISHRAE	:	The Indian Society of Heating & Refrigerating & Air Conditioning Engineers



## CHAPTER-I INTRODUCTION

### 1.1 Important Definitions:

#### 1.1.1 Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

#### 1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

*According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment*

**1.1.3. Environmental Pollutant:** means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

#### 1.1.4. Relevant Environmental Laws in India: Table No-1:

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

#### 1.1.5. Some Important Environmental Rules in India: Table No-2:

1989	Hazardous Waste (Management and Handling) Rules
1989	Manufacture, Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Rules
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules
2011	E-waste (Management and Handling) Rules

2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

### 1.1.6 National Environmental Plans & Policy Documents: Table No-3:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research Institute)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency)
10.	The Road to Copenhagen; India's Position on Climate Change Issues (MoEF)

### 1.2 Objectives:

1. To study Resource Consumption & CO<sub>2</sub> Emissions
2. To Study CO<sub>2</sub> Emission Reduction
3. To study Indoor Comfort Condition Parameters
4. To Study of Waste Management
5. To Study of Rain Water Harvesting
6. To Study of Sustainable Initiatives

### 1.3 Aerial View of the College:



**1.4 General Details of College: Table No 4:**

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

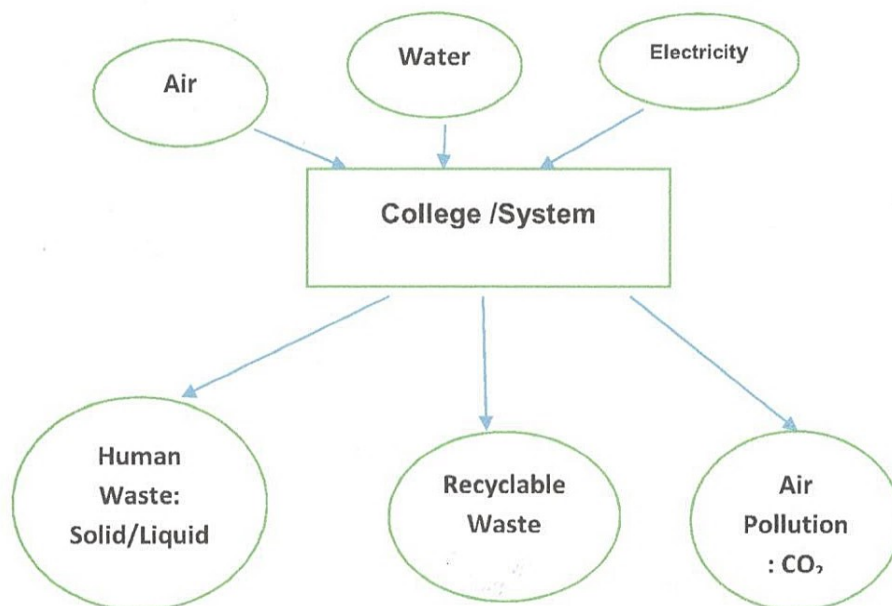


## CHAPTER-II STUDY OF CONSUMPTION OF RESOURCES & CO<sub>2</sub> EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the College System & Environment as under.



Now we compute the Generation of CO<sub>2</sub> on account of consumption of Electrical Energy.

The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy are as under

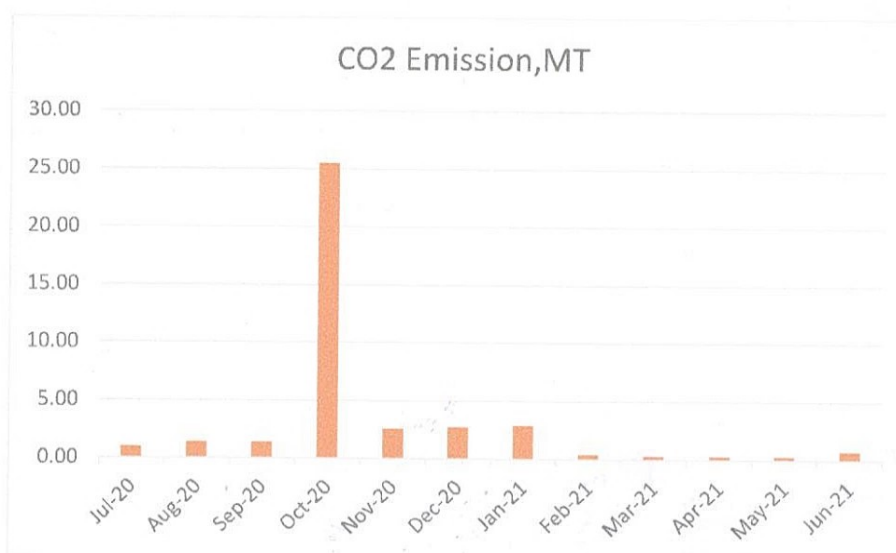
- 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere

**Table No 5: Study of Consumption of Electrical Energy & CO<sub>2</sub> Emissions: 20-21:**

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 2: Month wise CO<sub>2</sub> Emissions:**



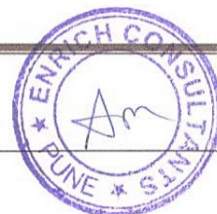
**Table No 6: Important Parameters:**

No	Parameter/ Value	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

### **CHAPTER III**

## **STUDY OF CO<sub>2</sub> EMISSION REDUCTION**

The College has yet to install Roof Top Solar PV Plant. Therefore as on the Date, the usage of Alternate Energy is nil.



## CHAPTER IV STUDY OF INDOOR COMFORT CONDITION PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit.

The Parameters include:

1. Temperature
2. Humidity
3. Lux Level
4. Noise Level.

**Table No 7: Study of Indoor Comfort Condition Parameters:**

No	Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	226	83	1332	67
2	Minimum	21.2	69	204	51

## **CHAPTER V STUDY OF WASTE MANAGEMENT**

### **5.1 Segregation Waste at Source:**

The recyclable waste, like paper, plastic waste is segregated at source and is handed over to Authorized waste collecting agent for further recycling.

#### **Photograph of Waste Collection Bin:**



### **5.2 Organic Waste Management:**

The Bio degradable waste like leafy waste is composted in a Bio Composting Pit.

#### **Photograph of Vermi Composting Pit:**



### 5.3 Liquid Waste Management:

For treatment of laboratory chemicals, the College has a soak tank wherein the laboratory liquid waste is first mixed with water and then drained to the soak Tank which contains layers of sand and activated carbon.

#### Photograph of Liquid Waste Soak Tank arrangement:



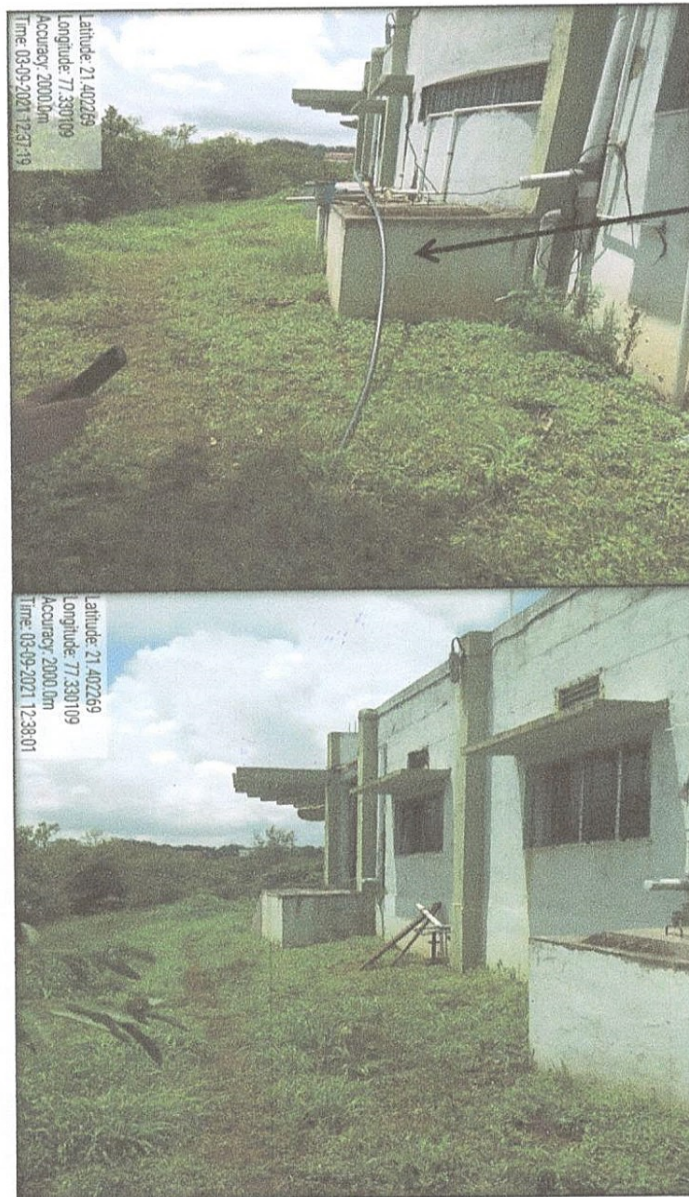
### 5.4 E-Waste Management:

It is recommended to handover the E Waste through Authorized E-Waste collecting agency.

## CHAPTER-VI STUDY OF RAIN WATER HARVESTING

The College has installed Rain Water Harvesting Project, wherein the Rain Water falling on the terrace is collected and is stored in a separate Water Storage Tank. The Water is further used for domestic purpose.

### Photograph of Rain Water Storage Tank Facility:



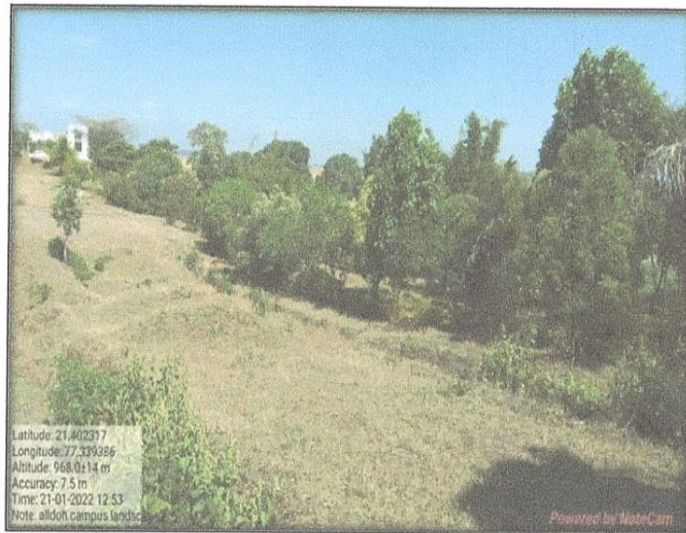
Water  
Storage  
Tank

## CHAPTER-VII STUDY OF GREEN & SUSTAINABLE PRACTICES

### 7.1 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

#### Photograph of Tree plantation:



### 7.2 Creation of Awareness on Plastic Free Campus:

The College is creating awareness on Plastic Ban by Display of Posters.

#### Photograph of Poster on Plastic Ban:



### 7.3 Cleanliness Drive:

The College arranged Cleanliness Drive in the Campus under National Service Scheme.

#### Photograph of Cleanliness Drive:



### 7.4 Tree Plantation Drive:

The College arranged Tree Plantation Drive in the Campus under National Service Scheme.

#### Photograph of Cleanliness Drive:



**ANNEXURE-I:  
RECOMMENDED NOISE & INDOOR COMFORT STANDARDS:**

**1. Recommended Noise Level Standards:**

No	Location	Noise Level dB
1	Auditoriums	20-25
2	Outdoor Playground	55
3	Occupied Class Room	40-45
4	Un occupied Class Room	35
5	Apartment, Homes	35-40
6	Offices	45-50
7	Libraries	35-40
8	Restaurants	50-55

**2. Thermal Comfort Conditions: For Non-conditioned Buildings:**

No	Parameter	Value
1	Temperature	Less Than 33 <sup>0</sup> C
2	Humidity	Less Than 70%

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



Year: 2021-22

Prepared by

**Engress Services**

Yashashree, 26, Nirmal Bag Society,  
Near Muktangan English School, Parvati, Pune 411009  
Phone: 09890444795, Email: [engress123@gmail.com](mailto:engress123@gmail.com)



MAHARASHTRA ENERGY DEVELOPMENT AGENCY



**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/2022-23/CR-43/1709

10<sup>th</sup> May, 2022

**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 Engress Services  
Yashshree, 26, Nirmal Bag Society,  
Near Muktangan English School,  
Parvati, Pune – 411 009.

**Registration Category** : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

**Registration Number** : *MEDA/ECN/2022-23/Class A/EA-32.*

- 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 **09<sup>th</sup> May, 2024** 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)



# Engress Services

Yashashree, 26, Nirmal Bag Society,  
Near Mukangan English School, Parvati, Pune 411 009  
Tel: 09890444795 Email: [engress123@gmail.com](mailto:engress123@gmail.com)

Ref: ES/SSPMAASCCC/21-22/01

Date: 13/5/2022

## 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 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 the Management, involvement of Faculty Members and students in the process of making the campus Energy Efficient.

**For Engress Services,**

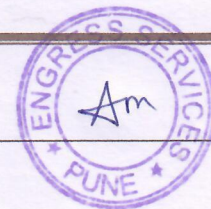


**A Y Mehendale,**  
Certified Energy Auditor  
EA-8192



## INDEX

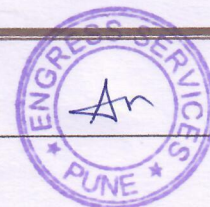
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5	Study of Usage of Alternate Energy	14
6	Study of usage of LED Lighting	15



## **ACKNOWLEDGEMENT**

We Engress Services, 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: 2021-22.

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	4412	3.97
2	Maximum	759	0.68
3	Minimum	180	0.16
4	Average	401	0.36

### 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:

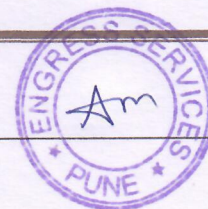
1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere
2. As the Hostel facility is closed, we consider Electrical Energy consumption of only Main College building.

### 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:



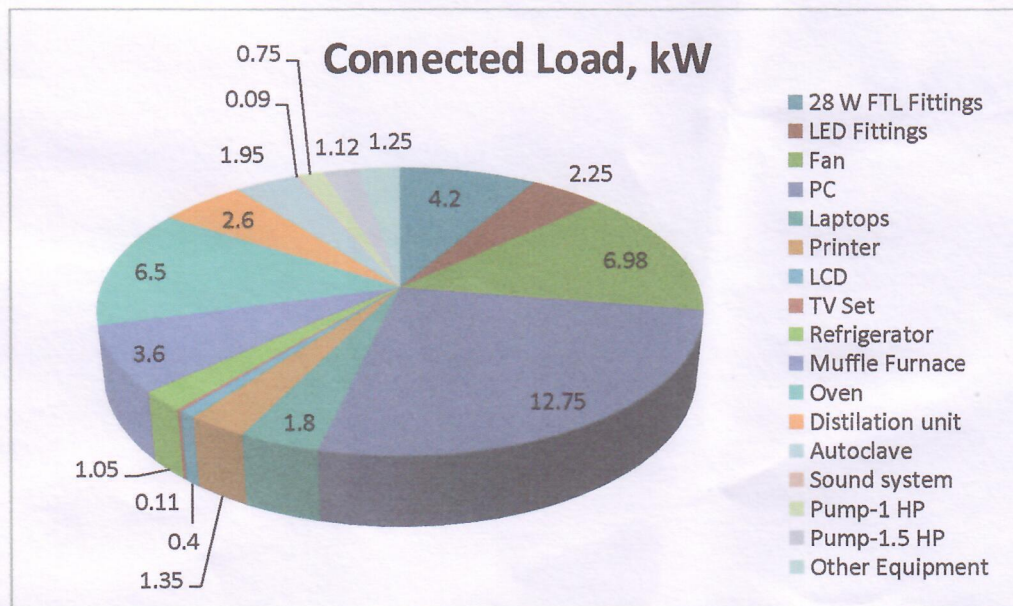
## CHAPTER-II STUDY OF CONNECTED LOAD

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:**



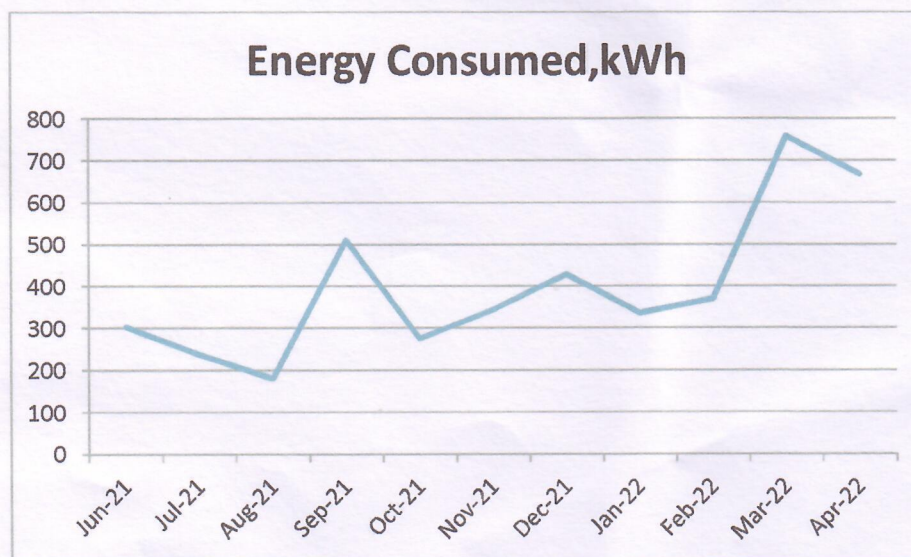
### CHAPTER-III STUDY OF ELECTRICAL ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Bills. As the Hostel facility is closed, we consider the consumption of only College premises.

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

No	Month	Energy Consumed, kWh
1	Jun-21	303
2	Jul-21	237
3	Aug-21	180
4	Sep-21	511
5	Oct-21	275
6	Nov-21	344
7	Dec-21	429
8	Jan-22	336
9	Feb-22	370
10	Mar-22	759
11	Apr-22	668
12	Total	4412
13	Maximum	759
14	Minimum	180
15	Average	401

**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	4412
2	Maximum	759
3	Minimum	180
4	Average	401



## 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:

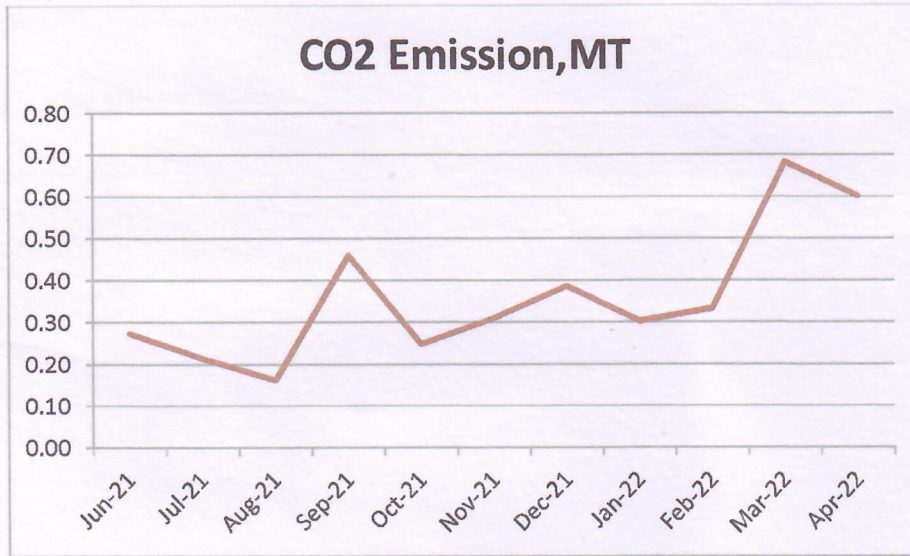
The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere

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 Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Jun-21	303	0.27
2	Jul-21	237	0.21
3	Aug-21	180	0.16
4	Sep-21	511	0.46
5	Oct-21	275	0.25
6	Nov-21	344	0.31
7	Dec-21	429	0.39
8	Jan-22	336	0.30
9	Feb-22	370	0.33
10	Mar-22	759	0.68
11	Apr-22	668	0.60
12	Total	4412	3.97
13	Maximum	759	0.68
14	Minimum	180	0.16
15	Average	401	0.36

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



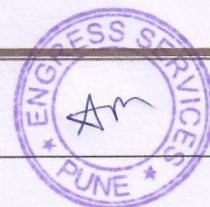
**Table No 6: Key observations:**

No	Parameter	Energy consumed, kWh	CO2 Emissions, MT
1	Total	4412	3.97
2	Maximum	759	0.68
3	Minimum	180	0.16
4	Average	401	0.36

## **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	%

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



Year: 2020-21

Prepared by

**Enrich Consultants**

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



**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)



# 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/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



## INDEX

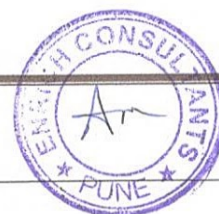
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5	Study of Usage of Alternate Energy	14
6	Study of usage of LED Lighting	15



## **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

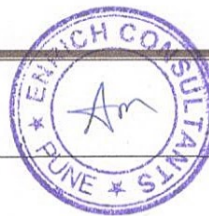
### 7. Reference:

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:



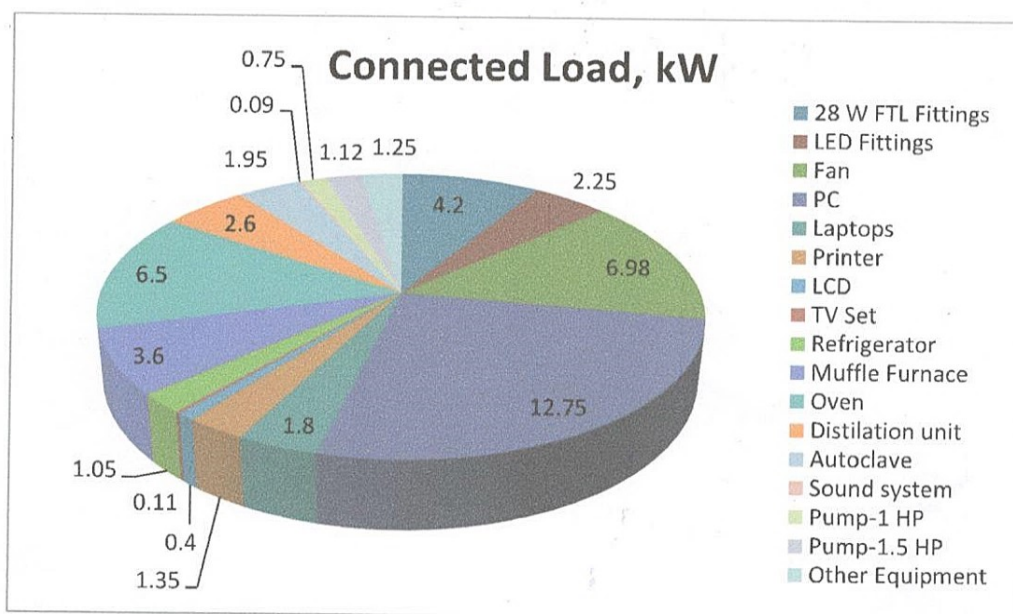
## CHAPTER-II STUDY OF CONNECTED LOAD

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:**



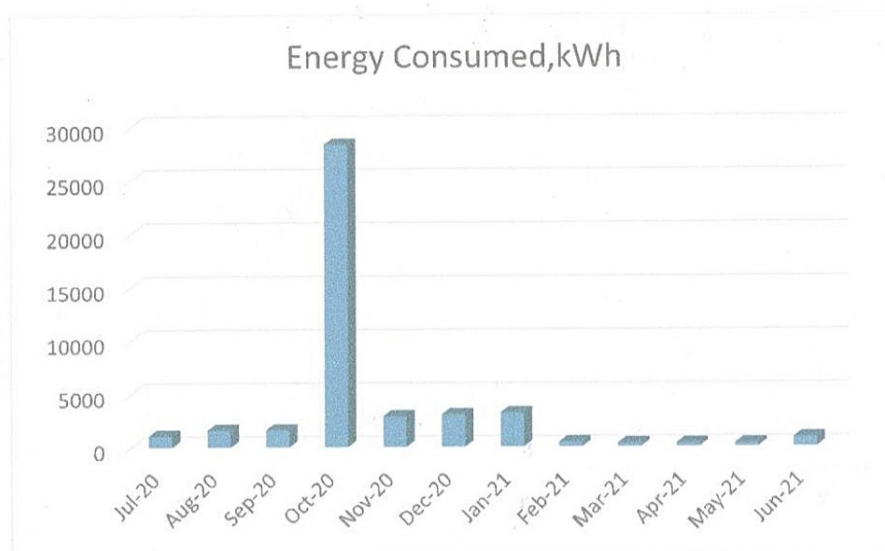
### CHAPTER-III STUDY OF ELECTRICAL ENERGY CONSUMPTION

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

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

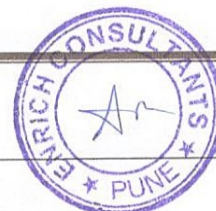
No	Month	Energy Purchased-Meter-1, kWh	Energy Purchased-Meter-2, kWh	Total Energy Consumed, kWh
1	Jul-20	1000	58	1058
2	Aug-20	1000	576	1576
3	Sep-20	1000	576	1576
4	Oct-20	22824	5475	28299
5	Nov-20	2636	223	2859
6	Dec-20	2636	378	3014
7	Jan-21	2636	535	3171
8	Feb-21	79	349	428
9	Mar-21	19	294	313
10	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
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## 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.

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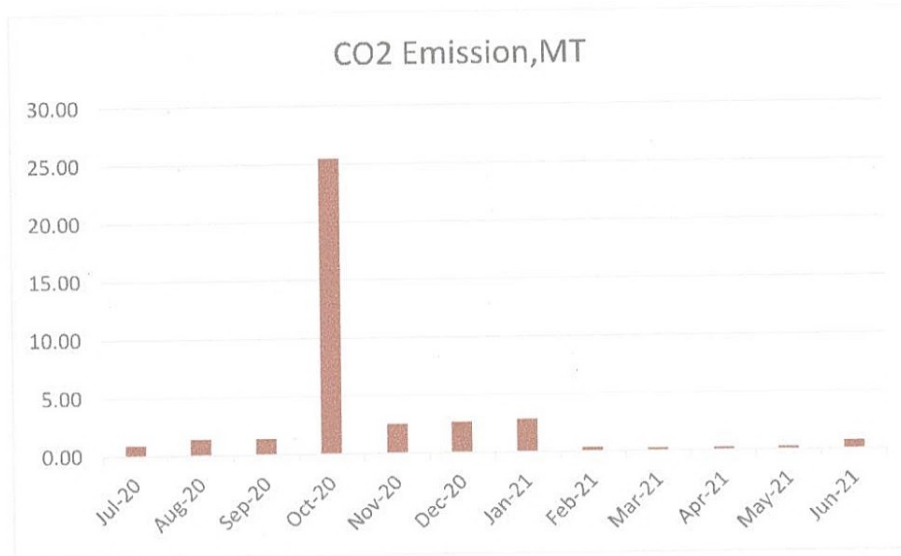
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**Table No 5: Month wise CO<sub>2</sub> Emissions:**

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
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7	Jan-21	2636	535	3171	2.85
8	Feb-21	79	349	428	0.39
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**Chart No 3: Representation of Month wise CO<sub>2</sub> emissions:**



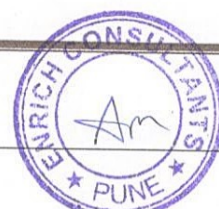
**Table No 6: Key observations:**

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## **CHAPTER-V**

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

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## 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.

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7	Total Lighting Load= 3+6	4.2	kW
8	Total LED Lighting Load= 6	2.25	kW
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