

# GREEN AUDIT REPORT

of

**MARATHWADA MITRA MANDAL'S, COLLEGE OF COMMERCE**

202/A, MMCC Complex, Deccan Gymkhana, Pune 411 004



**Year: 2022-23**

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)



# ENGRESS SERVICES

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Parvati, Pune 411 009 Tel: 09890444795 Email: [engress123@gmail.com](mailto:engress123@gmail.com)  
MEDA Registration No: ECN/2022-23/CR-43/1709  
ISO: 9001-2015 Certified (Cert No: 23EQKC13),  
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

## GREEN AUDIT CERTIFICATE

**Certificate No: ES/MMCC/22-23/02**

**Date: 24/8/2023**

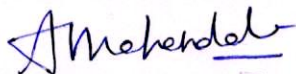
This is to certify that we have conducted Green Audit at Marathwada Mitra Mandal's College of Commerce Pune, in the Academic year 2022-23.

The College has adopted following Green & Sustainable Practices:

- Usage of Energy Efficient LED Light Fitting
- Maximum Usage of Day Lighting
- Installation of Solar Thermal Water Heating System of Capacity 1500 LPD
- Provision of Separate bins for Dry & Wet Waste
- Installation of Bio Composting Unit for conversion of Organic Waste
- Provision of Sanitary Waste Incinerator
- Implementation of Rain Water Management Project.
- Maintenance of good Internal Road
- Tree Plantation in the campus
- Provision of Ramp & Wheel Chair for Divyangajan
- Provision of Braille language signage and dedicated foot ways for Divyangajan
- Creation of Awareness on Reducing Carbon Footprints by Display of Posters

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,**

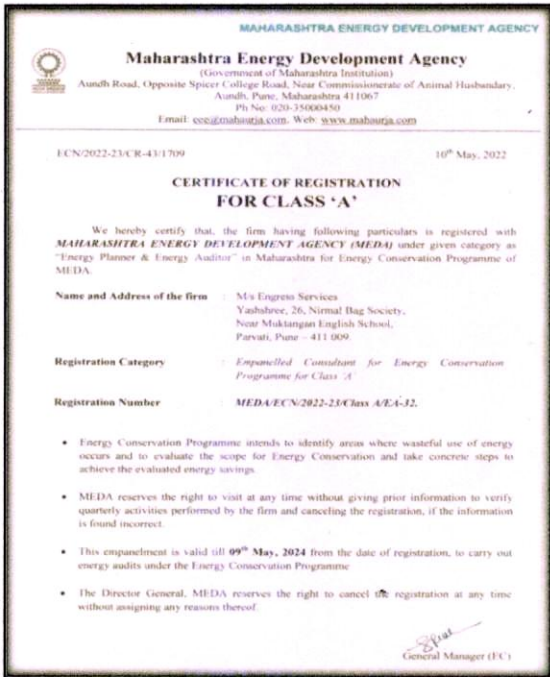


**A Y Mehendale,**

B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192  
ASSOCHAM GEM Certified Professional: GEM: 22/788



## REGISTRATION CERTIFICATES



**MEDA Registration Certificate**



**ASSOCHAM GEM CP Certificate**



**ISO: 9001-2015 Certificate**



**ISO: 14001-2015 Certificate**



## INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	7
1	Introduction	8
2	Study of Energy Consumption & CO <sub>2</sub> Emission	9
3	Study of Usage of Renewable Energy	10
4	Study of Waste Management	11
5	Study of Rain water Management	13
6	Study of Green & Sustainable Practices	14
	<b>Annexure</b>	
I	List of Trees & Plants	17

## **ACKNOWLEDGEMENT**

We Engress Services, Pune, express our sincere gratitude to the management of Marathwada Mitra Mandal's College of Commerce Pune, for awarding us the assignment of Green Audit of their Campus for the Academic Year: 22-23.

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



## EXECUTIVE SUMMARY

1. **Marathwada Mitra Mandal's College of Commerce, Pune** consumes Energy in the form of **Electrical Energy** which is used for various Office Equipment and other facilities.

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

No	Particulars	Value	Unit
1	Annual Energy Consumption	25657	kWh
2	Annual CO <sub>2</sub> Emissions	23.09	MT

### 3. Renewable Energy & Energy Efficiency Projects:

- Usage of Energy Efficient LED fittings
- Solar Thermal Water Heating System at Hostel Block

### 4. Waste Management Initiatives:

No	Head	Particulars
1	Solid Waste Management	Segregation of waste at source.
2	Organic Waste	Arrangement of Bio Composting unit.
3	Sanitary Waste	Provision of Sanitary Waste Incinerator
4	E Waste Management	Disposed through authorized agency.

### 5. Rain Water Management:

The College has installed Rain Water Management Project and the rain water falling on the terrace is channelized to increase the underground water table.

### 6. Green & Sustainable Practices:

- Maintenance of good Internal Road
- Maintenance of Internal Garden
- Provision of Ramp & Wheel Chair for Divyangajan
- Creation of Awareness on Reducing Carbon Footprints by Display of Posters

### 7. Assumption:

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

### 8. Reference:

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

## ABBREVIATIONS

BEE	Bureau of Energy Efficiency
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO <sub>2</sub>	Carbon Di Oxide
Qty	Quantity

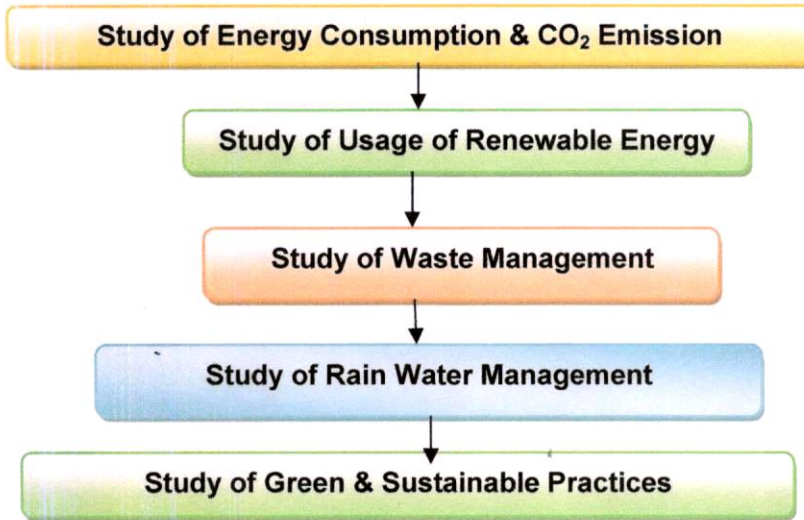


# CHAPTER-I INTRODUCTION

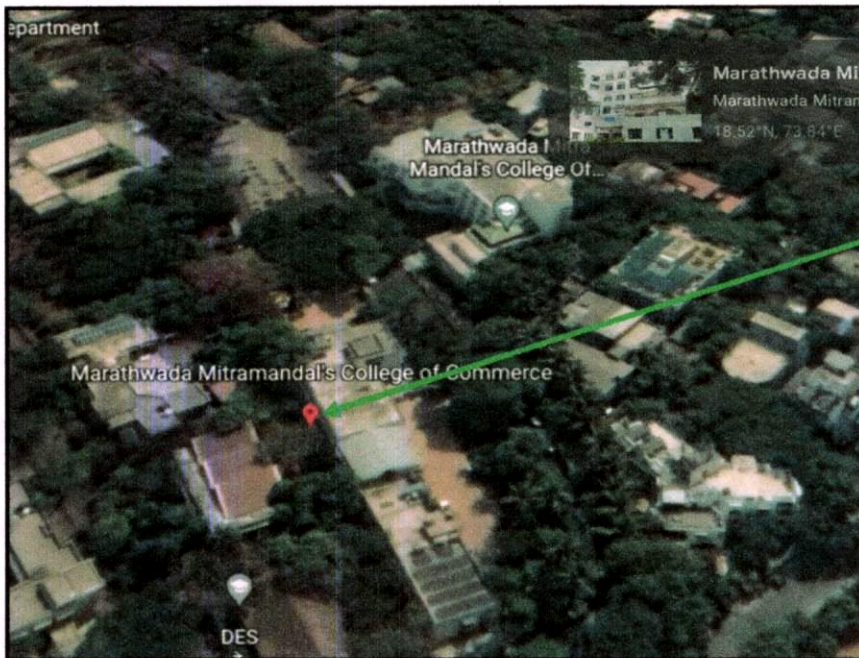
## 1.1 Introduction:

A Green Audit is conducted at Marathwada Mitra Mandal's College of Commerce Pune,

## 1.2 Audit Procedural Steps:



## 1.3 Google Earth Image:



College Campus



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

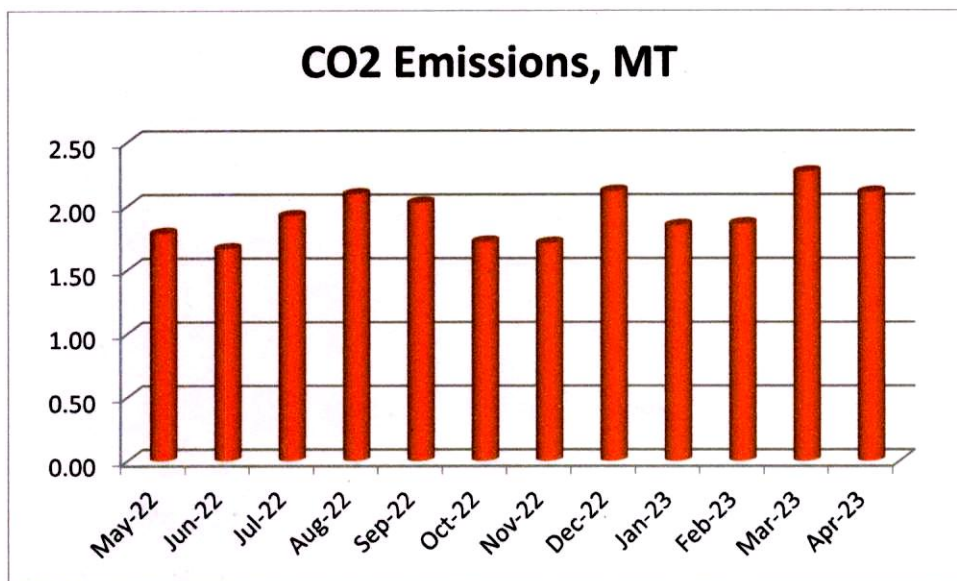
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. The College uses Electrical Energy for various Electrical gadgets.

**Basis for computation of CO<sub>2</sub> Emissions: 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere**

**Table No 1: Month wise CO<sub>2</sub> Emissions:**

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	May-22	1982	1.78
2	Jun-22	1846	1.66
3	Jul-22	2134	1.92
4	Aug-22	2323	2.09
5	Sep-22	2248	2.02
6	Oct-22	1907	1.72
7	Nov-22	1896	1.71
8	Dec-22	2349	2.11
9	Jan-23	2051	1.85
10	Feb-23	2066	1.86
11	Mar-23	2516	2.26
12	Apr-23	2339	2.11
13	Total	25657	23.09
14	Maximum	2516	2.26
15	Minimum	1846	1.66
16	Average	2138.08	1.92

**Chart No 1: Month wise CO<sub>2</sub> Emissions:**



### **CHAPTER III**

## **STUDY OF USAGE OF RENEWABLE ENERGY**

The College has Solar Thermal Water Heating System of Capacity 1500 LPD.

The College has yet to install Roof Top Solar PV Plant

**Photograph of Solar Thermal Water Heating System:**



## CHAPTER IV STUDY OF WASTE MANAGEMENT

### 4.1 Segregation of Waste at Source:

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

#### Photograph of Waste Collection Bins:



### 4.2 Organic Waste Management:

The College has installed a Bio Composting Unit and the organic Waste is converted in to Bio compost, which is further used in the own garden as well as sold outside.

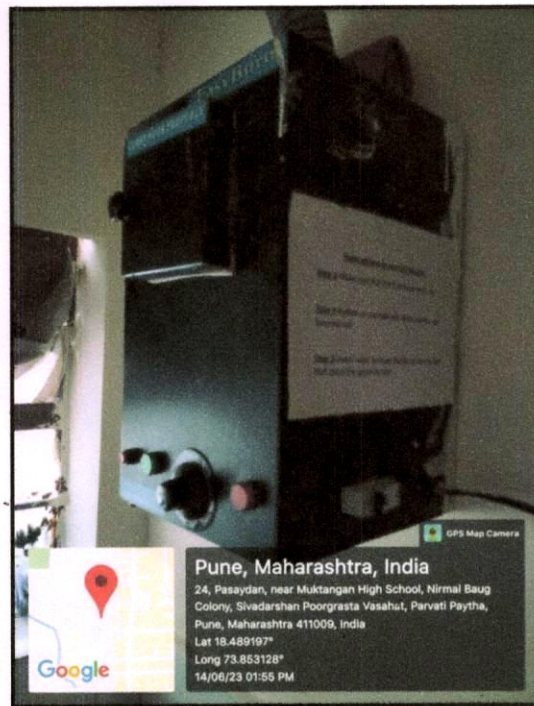
#### Photograph of Bio Composting Unit:



#### 4.3 Sanitary Waste Management:

The College has installed Sanitary Waste Incinerator, to dispose of the Sanitary Waste.

#### Photograph of Sanitary Waste Incinerator:



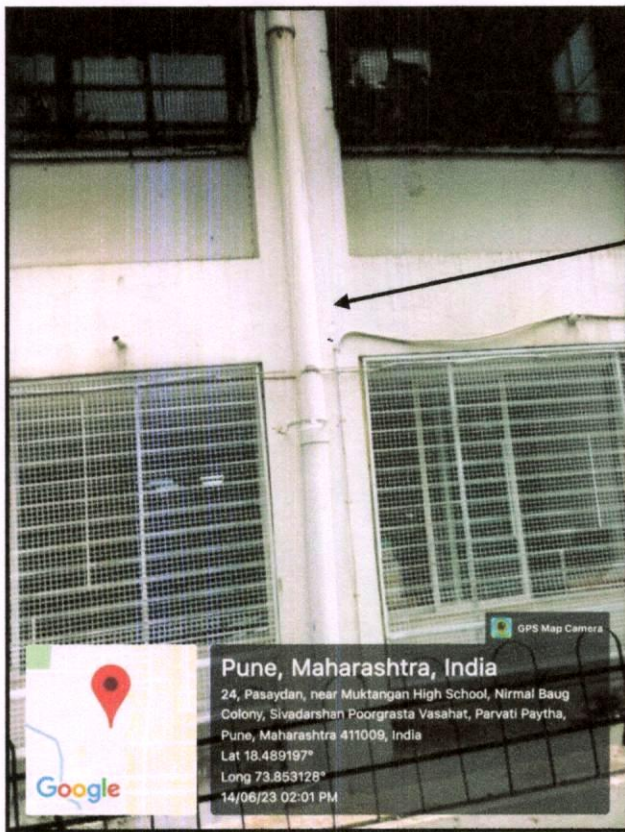
#### 4.4 E Waste Management:

The E-Waste is disposed of through Authorized Agency.

## CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

The College has installed Rain Water Management Project and the rain water falling on the terrace is used to increase the underground water table.

**Photograph of Rain Water Management Pipe:**



**Rain Water  
Collection Pipe**

## CHAPTER VI STUDY OF GREEN & SUSTAINABLE PRACTICES

### 6.1 Pedestrian Friendly Road:

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

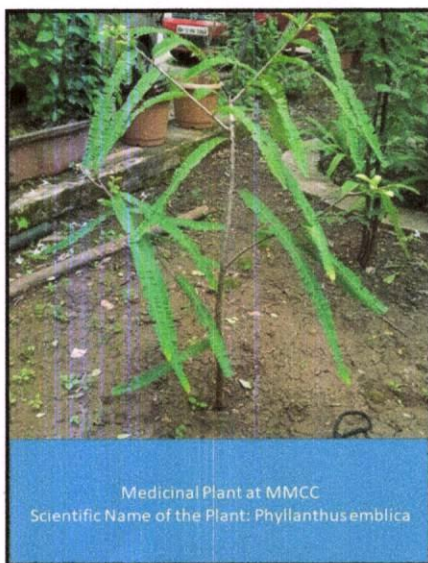
#### Photograph of Internal Road:



### 6.2 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

#### Photograph of Medicinal plant, Tree with Bird Nest:

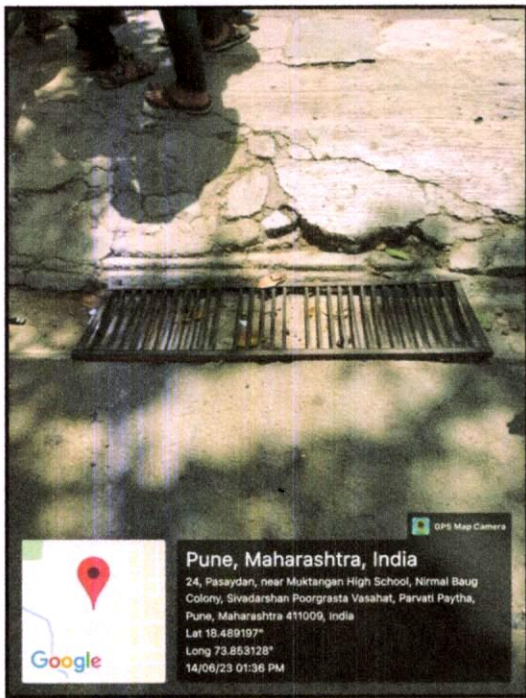


Bird  
Nest

### 6.3 Provision of Ramp:

For easy movement of Divyangajan, the College has made provision of Ramp & wheel Chair in the campus.

#### Photograph of Ramp & Wheel Chair:



### 6.4 Creation of Awareness on Reducing Carbon Footprint by Display of Posters:

The College has displayed posters emphasizing on importance of reducing carbon footprint.

#### Photograph of Poster on Reducing Carbon Footprint:



**6.5 Braille Signage Board & Dedicated Footway:**

The College has Braille language signage and dedicated foot ways for Divyangjan.

**Photographs of Braille Signage Board & Footway:**





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

No	Common Name	Qty
1	Mango	6
2	Silver Oak	4
3	Pichkari	6
4	Coconut	17
5	Jamun	1
6	Ashok	56
7	Guava	6
8	Almond	4
9	Morpankhi	6
10	Lemon	2
11	Phycus	8
12	Areca Palm	101
13	Christmas Tree	9
14	Sonchampa	5
15	Chikoo	2
16	Rubber	1
17	Shevari	10
18	Kaduneem	1
19	Apta	1
20	<b>Total</b>	<b>246</b>



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**COLLEGE OF COMMERCE**

202/A, MMCC Complex, Deccan Gymkhana, Pune 411 004

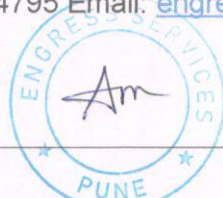


Year: 2021-22

Prepared by:

**Engress Services**

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Near Mukhtangan 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

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Tel: 09890444795 Email: [engress123@gmail.com](mailto:engress123@gmail.com)

Ref: ES/MMCC/21-22/02

Date: 25/5/2022

## CERTIFICATE

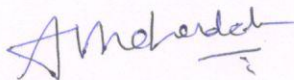
This is to certify that we have conducted Green Audit at Marathwada Mitra Mandal's College of Commerce Pune, in the Academic year 2021-22.

The College has adopted following Green Initiatives:

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- Maximum Usage of Day Lighting
- Installation of Solar Thermal Water Heating System of Capacity 1500 LPD
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- Provision of Ramp for Divyangajan
- Provision of Sanitary Waste Incinerator
- Creation of Awareness on Resource Conservation by Display of Posters
- Cleanliness Drive and Participation in Swatch Bharat Abhiyan

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

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	8
1	Introduction	9
2	Study of Present Energy Consumption	10
3	Study of Carbon Foot printing	12
4	Study of Usage of Renewable Energy	14
5	Study of Waste Management	15
6	Study of Rain water Management	16
7	Study of Green & Sustainable Practices	17
	<b>Annexure</b>	
I	Details of Trees & Plants in the Campus	21

## **ACKNOWLEDGEMENT**

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



## EXECUTIVE SUMMARY

1. Marathwada Mitra Mandal's College of Commerce, Pune consumes Energy in the form of Electrical Energy used for various Electrical Equipment, office & other facilities.

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

No	Parameter/ Value	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Total	18436	16.59
2	Maximum	2308	2.08
3	Minimum	1023	0.92
4	Average	1536.33	1.38

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

- Usage of Energy Efficient BEE STAR Rated Equipment
- Usage of Energy Efficient LED Lighting
- Maximum Usage of Day Lighting
- Installation of 1500 LPD Solar Water Heating System

### 4. Usage of Renewable Energy & CO<sub>2</sub> Emission Reduction:

The College has Solar Thermal Water Heating System of Capacity 1500 LPD. The College has not installed Roof Top Solar PV Plant, as on Date.

### 5.1 Segregation of Waste at Source:

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

### 5.2 Organic Waste Management:

The College has installed a Bio Composting Unit and the organic Waste is converted in to Bio compost, which is further used in the own garden as well as sold outside.

### 5.3 E Waste Management:

The E-Waste is disposed of through Authorized E-Waste collecting agency.

### 6. Rain Water Management:

The College has installed Rain Water Management Project and the rain water falling on the terrace is channelized to increase the underground water table.

### 7. Green & Sustainable Initiatives:

- Maintenance of good Internal Road
- Maintenance of Internal Garden

- Provision of Ramp for Divyangajan
- Provision of Sanitary Waste Incinerator
- Creation of Awareness on Resource Conservation by Display of Posters
- Cleanliness Drive and Participation in Swatcch Bharat Abhiyan

#### 8. Notes & Assumptions:

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

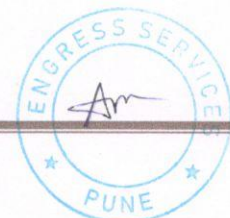
#### 9. Reference:

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



## ABBREVIATIONS

BEE	Bureau of Energy Efficiency
kWh	Kilo Watt Hour
LPD	Liters Per Day
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 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 Table No 1: General Details of College:

No	Head	Particulars
1	Name of Institution	Marathwada Mitra Mandal's College of Commerce
2	Address	202/A ,Deccan Gymkhana,Pune-411004
3	Year of Establishment	1986
4	Affiliation	Savitribai Phule Pune University

### 1.3 Google Earth Image:



College Campus

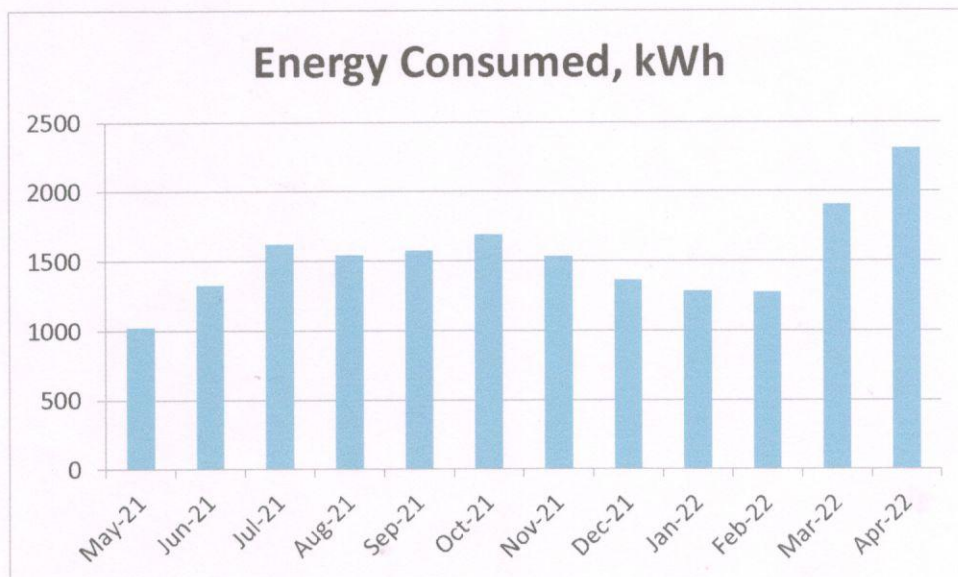
## CHAPTER-II STUDY OF PRESENT ENERGY CONSUMPTION

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

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

No	Month	Energy Consumed, kWh
1	May-21	1023
2	Jun-21	1324
3	Jul-21	1618
4	Aug-21	1541
5	Sep-21	1572
6	Oct-21	1689
7	Nov-21	1534
8	Dec-21	1363
9	Jan-22	1285
10	Feb-22	1273
11	Mar-22	1906
12	Apr-22	2308
13	Total	18436
14	Maximum	2308
15	Minimum	1023
16	Average	1536.33

Chart No 1: Variation in Monthly Energy Consumption:



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

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	18436
2	Maximum	2308
3	Minimum	1023
4	Average	1536.33

### 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 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	May-21	1023	0.92
2	Jun-21	1324	1.19
3	Jul-21	1618	1.46
4	Aug-21	1541	1.39
5	Sep-21	1572	1.41
6	Oct-21	1689	1.52
7	Nov-21	1534	1.38
8	Dec-21	1363	1.23
9	Jan-22	1285	1.16
10	Feb-22	1273	1.15
11	Mar-22	1906	1.72
12	Apr-22	2308	2.08
13	Total	18436	16.59
14	Maximum	2308	2.08
15	Minimum	1023	0.92
16	Average	1536.33	1.38

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

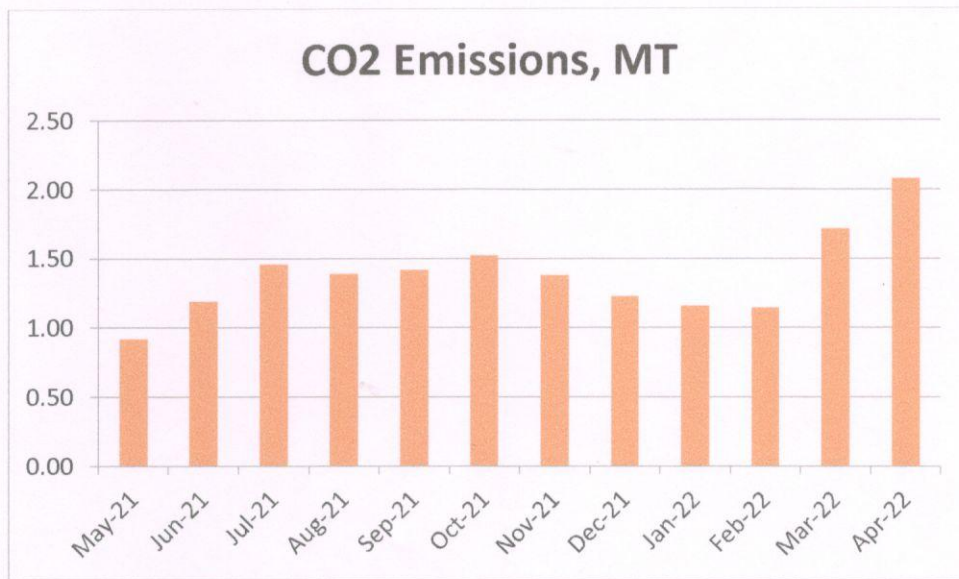


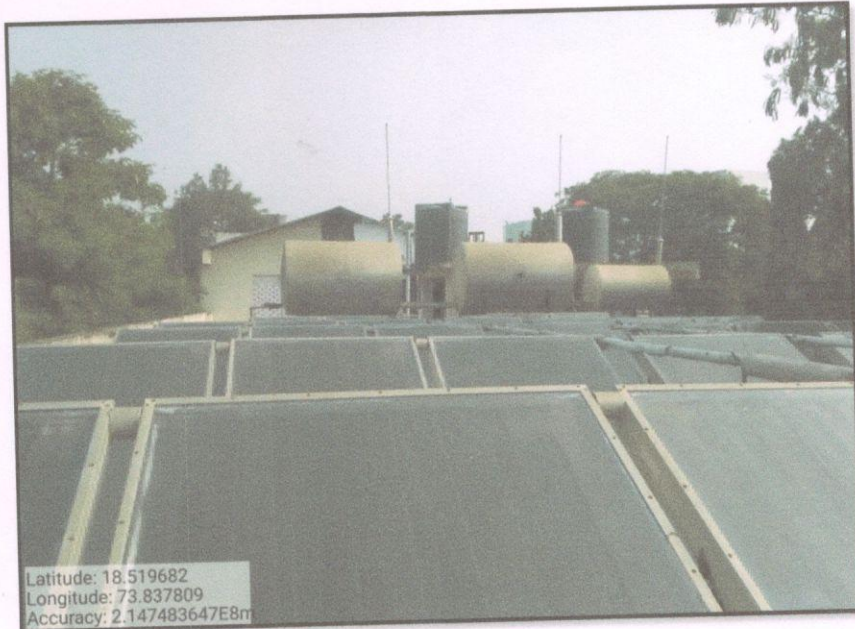
Table No 5: Variation in Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	18436	16.59
2	Maximum	2308	2.08
3	Minimum	1023	0.92
4	Average	1536.33	1.38

## CHAPTER IV STUDY OF USAGE OF RENEWABLE ENERGY

The College has Solar Thermal Water Heating System of Capacity 1500 LPD. The College has not installed Roof Top Solar PV Plant, as on Date.

Photograph of Solar Thermal Water Heating System:

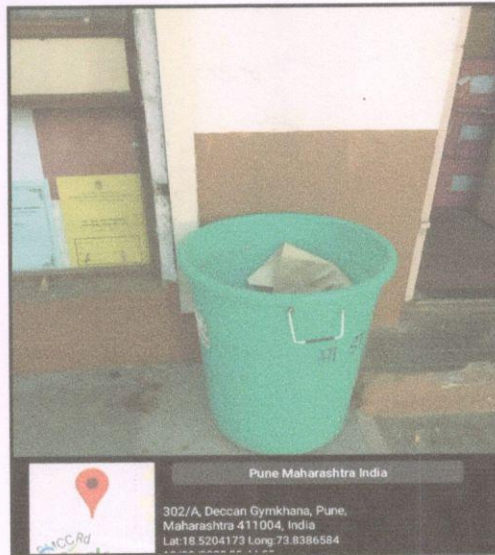


## CHAPTER V STUDY OF WASTE MANAGEMENT

### 5.1 Segregation of Waste at Source:

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

Photograph of Waste Collection Bins:



### 5.1.2 Organic Waste Management:

The College has installed a Bio Composting Unit and the organic Waste is converted in to Bio compost, which is further used in the own garden as well as sold outside.

Photograph of Bio Composting Unit:



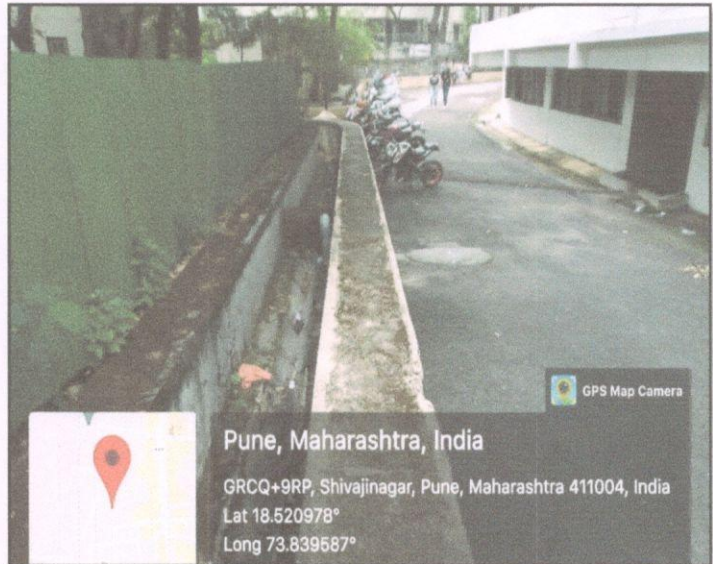
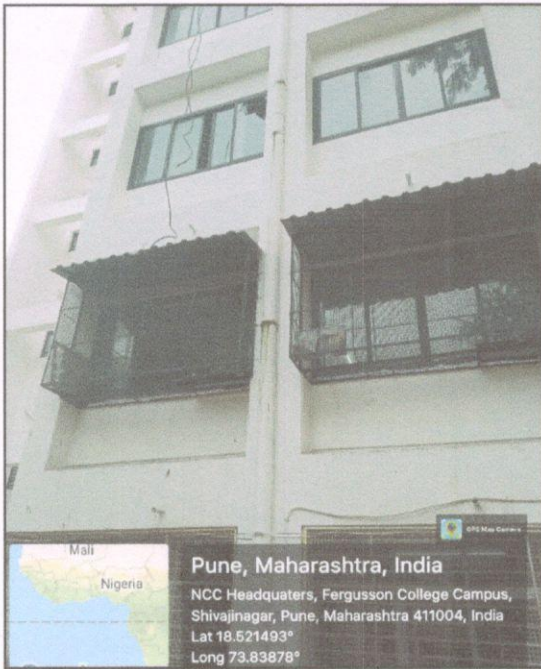
5.3 E Waste Management: The E-Waste is disposed of through Authorized Agency.



## CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

The College has installed Rain Water Management Project and the rain water falling on the terrace is used to increase the underground water table.

Photograph of Rain water Carrying Pipe and Channel Section:



## 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.

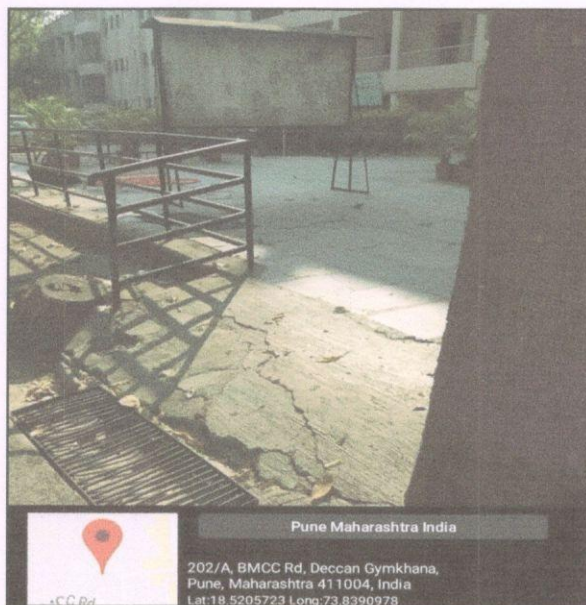
#### Photograph of Tree plantation:



### 7.3 Provision of Ramp:

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

#### Photograph of Ramp:



### 7.4 Sanitary Waste Incinerator:

The College has installed Sanitary Waste Incinerator, for disposal of Sanitary Waste

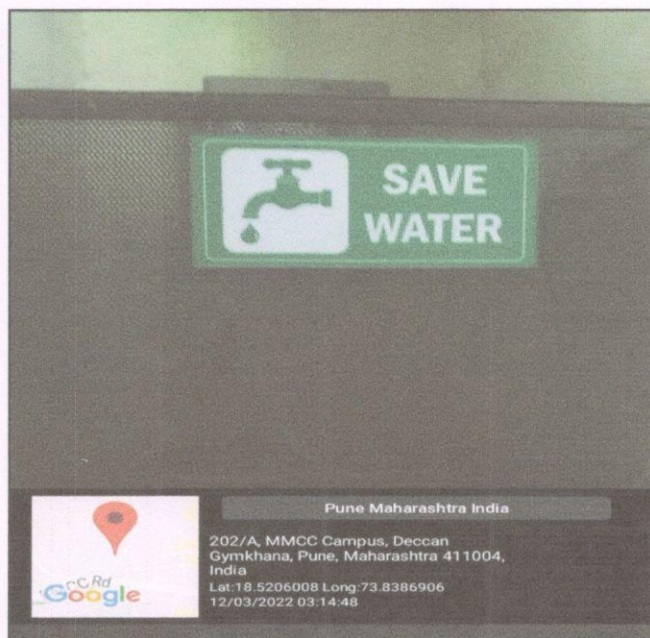
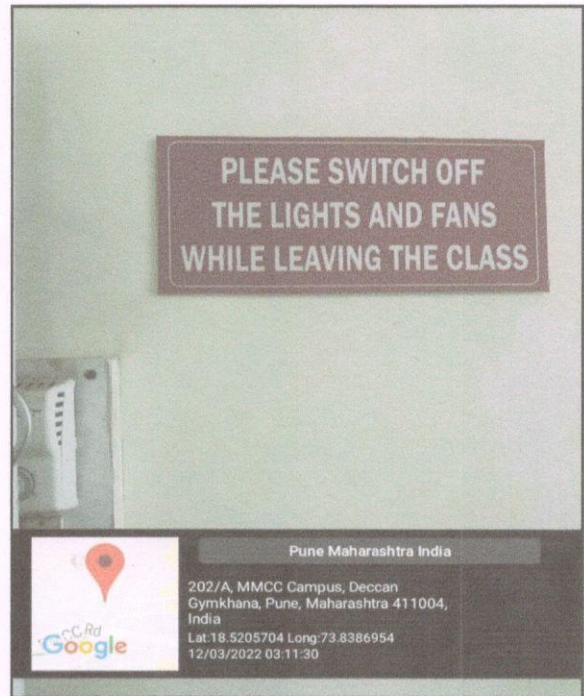
#### Photograph of Sanitary Waste Incinerator:



### 7.5 Creation of Awareness on Resource Conservation by Display of Posters:

The College has displayed posters emphasizing on importance of Resource Conservation.

Photograph of Poster on Resource Conservation:



**7.6 Cleanliness Drive & Participation in Swatcch Bharat Abhiyan:**

The College arranged Cleanliness Drive under the NSS Initiative at S M Joshi Bridge in Pune. Also the College participated in Swatcch Bharat Abhiyan.

**Photographs of Tree Plantation Drive & Swatcch Bharat Abhiyan:**



**ANNEXURE-1:**  
**DETAILS OF TREES& PLANTS:**

No	Common Name	Qty
1	Mango	6
2	Silver Oak	4
3	Pichkari	6
4	Coconut	17
5	Jamun	1
6	Ashok	56
7	Guava	6
8	Almond	4
9	Morpankhi	6
10	Lemon	2
11	Phycus	8
12	Areca Palm	101
13	Christmas Tree	9
14	Sonchampa	5
15	Chikoo	2
16	Rubber	1
17	Shevari	10
18	Kaduneem	1
19	Apta	1
20	<b>Total</b>	<b>246</b>

**ANNEXURE-2:**  
**LIST OF PLANTS:**

No	Common Name
1	Hibiscus
2	Rose
3	Cactus
4	Insulin
5	Hemelia
6	Croton
7	Drecena
8	Mogra
9	White Champa
10	Raktaparni
11	Ribbbin Grass
12	Coopia
13	Kardal
14	Lucky Bamboo
15	Money plant
16	Alamanda
17	Madhumalti
18	Jai
19	Jui
20	Shevga
21	Sadafuli
22	Jatropha
23	Touch me not
24	Syngonia
25	Strawbery
26	Song Of India
27	Duranta
28	Alu
29	Bottle brush

# GREEN AUDIT REPORT

of

## Marathwada Mitra Mandal's, College of Commerce

202/A, MMCC Complex, Deccan Gymkhana, Pune 411 004



Year: 2019-20

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**



**Maharashtra Energy Development Agency**

(A Government of Maharashtra undertaking)

2<sup>nd</sup> Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,

Ph No: 020-26614393/266144403

Email: [eee@mahaurja.com](mailto:eee@mahaurja.com), Web: [www.mahaurja.com](http://www.mahaurja.com)

ECN/2018-19/CR-05/4174

19<sup>th</sup> September, 2018

**CERTIFICATE OF REGISTRATION  
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

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

**Registration Category** : Empanelled *Consultant for Energy Conservation Programme*

**Registration Number** : **MEDA/ECN/CR-05/2018-19/EA-03**

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **31<sup>st</sup> March 2021** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

  
(Smita Kudarikar)  
General Manager (EC)



## 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/MMCC/19-20/02

Date: 20/8/2020

### CERTIFICATE

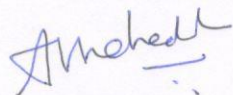
This is to certify that we have conducted Green Audit at Marathwada Mitra Mandal's College of Commerce Pune, in the Academic year 2019-20.

The College has adopted following Green Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Maximum Usage of Day Lighting
- Installation of Solar Thermal Water Heating System of Capacity 1500 LPD
- Provision of Separate bins for Dry & Wet Waste
- Installation of Bio Composting Unit for conversion of Organic Waste
- Implementation of Rain Water Harvesting Project for recharging the bore well.
- Maintenance of good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Provision of Sanitary Waste Incinerator
- Creation of Awareness on Resource Conservation by Display of Posters
- Tree Plantation Drive under NSS Initiative

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



## INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	8
1	Introduction	9
2	Study of Present Energy Consumption	10
3	Study of Carbon Foot printing	12
4	Study of Usage of Renewable Energy	14
5	Study of Waste Management	15
6	Study of Rain water Management	16
7	Study of Green & Sustainable Practices	17
	<b>Annexure</b>	
I	Details of Trees & Plants in the Campus	21

## ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Marathwada Mitra Mandal's College of Commerce Pune, for awarding us the assignment of Green Audit of their Campus for the Academic Year: 19-20.

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



## EXECUTIVE SUMMARY

1. Marathwada Mitra Mandal's College of Commerce, Pune consumes Energy in the form of Electrical Energy used for various Electrical Equipment, office & other facilities.

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

No	Parameter/ Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Total	22696	20.43
2	Maximum	2228	2.01
3	Minimum	1375	1.2375
4	Average	1891.33	1.70

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

- Usage of Energy Efficient BEE STAR Rated Equipment
- Usage of Energy Efficient LED Lighting
- Maximum Usage of Day Lighting
- Installation of 1500 LPD Solar Water Heating System

### 4. Usage of Renewable Energy & CO<sub>2</sub> Emission Reduction:

- The College has installed Solar Water Heating Plant of Capacity 1500 LPD.
- Equivalent Electrical Energy saved by Solar Thermal System in 19-20 is 12329 kWh
- The reduction in Annual CO<sub>2</sub> Emissions in 19-20 is 11 MT.

#### 5.1 Waste Management:

##### 5.1 Segregation of Waste at Source:

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

##### 5.2 Organic Waste Management:

The College has installed a Bio Composting Unit and the organic Waste is converted in to Bio compost, which is further used in the own garden as well as sold outside.

##### 5.3 E-Waste Management:

The E-Waste is disposed of through Authorized E-Waste collecting agency.

#### 6. Rain Water Management:

The College has installed Rain Water Harvesting Project and the rain water falling on the terrace is used to recharge the bore well.

### 7. Green & Sustainable Initiatives

- Maintenance of good Internal Road
- Maintenance of Internal Garden
- Provision of Ramp for Divyangajan
- Provision of Sanitary Waste Incinerator
- Creation of Awareness on Resource Conservation by Display of Posters
- Tree Plantation Drive under NSS Initiative

### 8. Notes & Assumptions:

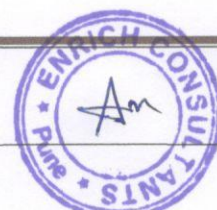
1. 1 kWh of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere

### 9. References:

- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)
- For Electrical Energy saved by Solar Thermal System: [www.mahaurja.com](http://www.mahaurja.com)

## ABBREVIATIONS

BEE	Bureau of Energy Efficiency
kWh	Kilo Watt Hour
LPD	Liters Per Day
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 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	Marathwada Mitra Mandal's College of Commerce
2	Address	202/A ,Deccan Gymkhana,Pune-411004
3	Year of Establishment	1986
4	Affiliation	Savitribai Phule Pune University



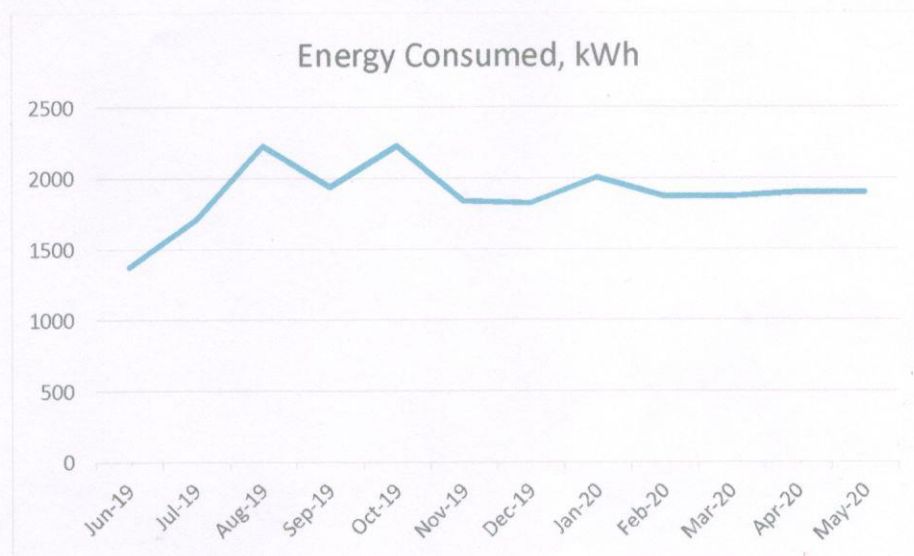
## CHAPTER-II STUDY OF PRESENT ENERGY CONSUMPTION

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

**Table No 2: Electrical Bill Analysis- 2019-20:**

No	Month	Energy Purchased, kWh
1	Jun-19	1375
2	Jul-19	1710
3	Aug-19	2226
4	Sep-19	1940
5	Oct-19	2228
6	Nov-19	1840
7	Dec-19	1825
8	Jan-20	2006
9	Feb-20	1872
10	Mar-20	1872
11	Apr-20	1901
12	May-20	1901
13	Total	22696
14	Maximum	2228
15	Minimum	1375
16	Average	1891.33

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



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

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	22696
2	Maximum	2228
3	Minimum	1375
4	Average	1891.33



### CHAPTER III STUDY OF CARBON FOOT PRINTING

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 as under

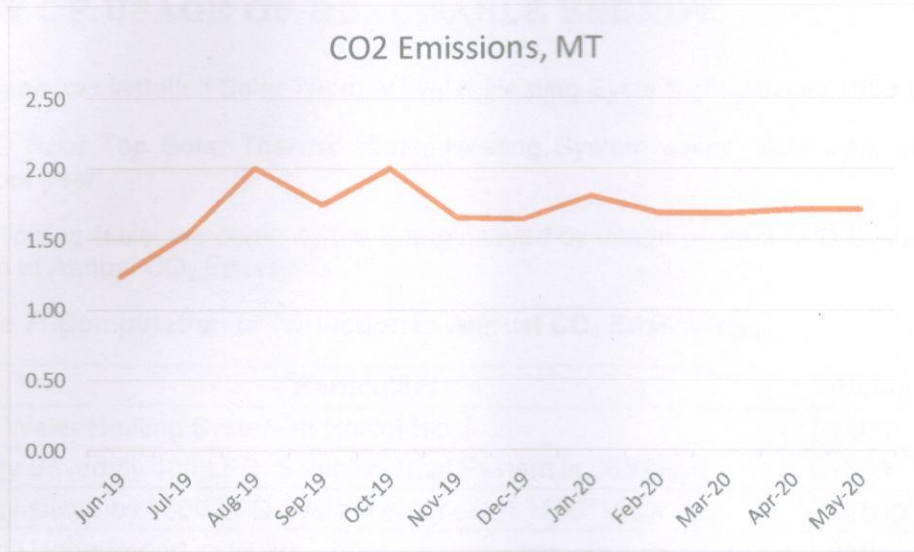
- 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere

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, kWh	CO <sub>2</sub> Emission, MT
1	Jun-19	1375	1.24
2	Jul-19	1710	1.54
3	Aug-19	2226	2.00
4	Sep-19	1940	1.75
5	Oct-19	2228	2.01
6	Nov-19	1840	1.66
7	Dec-19	1825	1.64
8	Jan-20	2006	1.81
9	Feb-20	1872	1.68
10	Mar-20	1872	1.68
11	Apr-20	1901	1.71
12	May-20	1901	1.71
13	Total	22696	20.43
14	Maximum	2228	2.01
15	Minimum	1375	1.2375
16	Average	1891.33	1.70

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



**Table No 5: Variation in Important Parameters:**

No	Parameter/ Value	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	22696	20.43
2	Maximum	2228	2.01
3	Minimum	1375	1.2375
4	Average	1891.33	1.70

## CHAPTER IV STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Solar Thermal Water Heating System of Capacity **1500 LPD**.

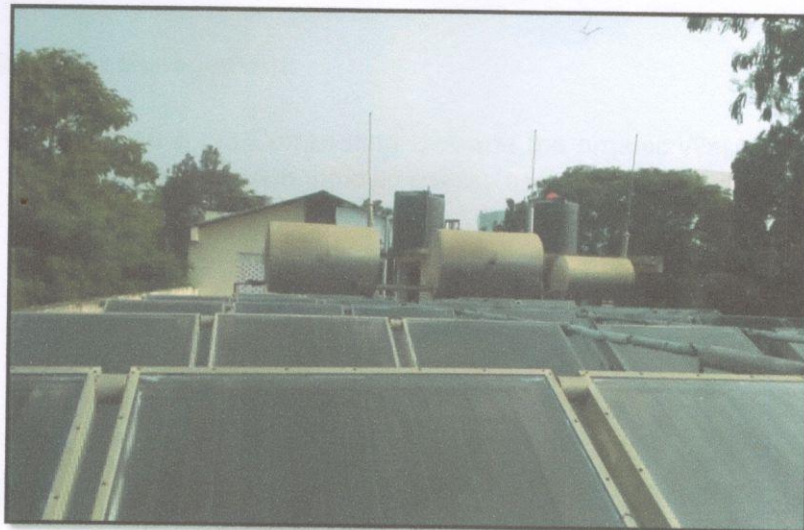
100 LPD Roof Top Solar Thermal Water Heating System saves 1500 kWh of Electrical Energy per year.

In the following table, we compute the Energy saved by usage of 1500 LPD System and the reduction in Annual CO<sub>2</sub> Emissions.

**Table No 7: Computation of Reduction in Annual CO<sub>2</sub> Emissions:**

No	Particulars	Value	Unit
1	Solar Water Heating System at Hostel Block	1500	LPD
2	Energy Saved by 100 LPD Solar Thermal System in 365 Days	1500	kWh
3	Energy saved by 1500 LPD System in 1 Year = $1500 \times 1500 / 100$	22500	kWh
4	Actual Usage Period in 19-20	200	Nos
5	Energy saved in 200 Days of operation in 19-20 = $200 \times 22500 / 365$	<b>12329</b>	kWh
6	1 kWh of Electrical Energy is equal to	<b>0.9</b>	Kg of CO <sub>2</sub>
7	Annual reduction in CO <sub>2</sub> Emissions in 19-20 = $(5) \times (6) / 1000$	<b>11</b>	MT of CO <sub>2</sub>

**Photograph of Solar Thermal Water Heating System:**



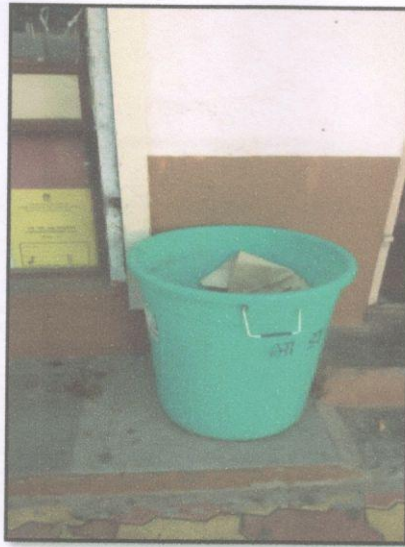
## **CHAPTER V STUDY OF WASTE MANAGEMENT**

### **5.1 Solid Waste Management:**

#### **5.1.1 Segregation of Waste at Source:**

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

#### **Photograph of Waste Collection Bins:**



#### **5.1.2 Organic Waste Management:**

The College has installed a Bio Composting Unit and the organic Waste is converted in to Bio compost, which is further used in the own garden as well as sold outside.

#### **Photograph of Bio Composting Unit:**



**5.2 E-Waste Management:** The E-Waste is disposed of through Authorized Agency.

# ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society,  
Near Muktang English School, Parvati, Pune 411 009  
Phone: 09890444795 Email:engress123@gmail.com

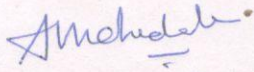
## INVOICE

<b>To</b> The Principal, Marathwada Mitra Mandal's, College of Commerce, 202/A, Deccan Gymkhana, Pune 411 004	Invoice No: 2021-22/58 Date: 25/3/2022
--	---

Work Order No	MMM/MMCC/VO/221-22/1325, dated:12/3/222
Our PAN No	AMOPM6853B

No	Particulars	Charges per Unit, Rs.	Quantity Nos.	Amount in Rs.
1	Consultancy Service Charges for Energy, Green & Environmental Audit of MMCC Campus for two Academic Years: 19-20 and 20-21	6000.00	02	12000.00
2	<b>Total Amount</b>			<b>12000.00</b>
3	<b>Amount in Words: Rupees Twelve Thousand only.</b>			

For Engress Services,



Authorized Signatory



Bank Details:

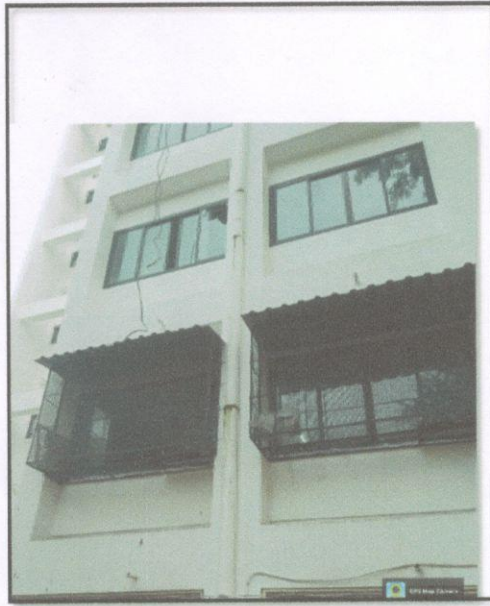
Name of Account	Engress Services
Bank	SVC Co-Operative Bank Ltd
Branch	Sahakarnagar Branch, Pune
Current Account	112904180000319
IFSC Code	SVCB0000129

## **CHAPTER-VI**

### **STUDY OF RAIN WATER MANAGEMENT**

The College has installed Rain Water Harvesting Project and the rain water falling on the terrace is used to recharge the bore well.

**Photograph of Rain water Carrying Pipe and Channel Section:**





## **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.

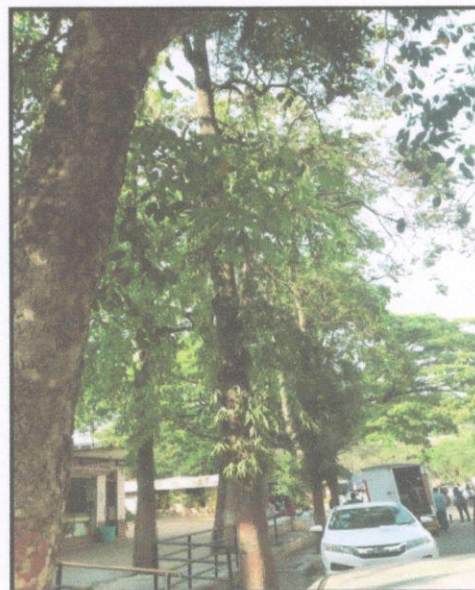
#### **Photograph of Internal Road:**



#### **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.

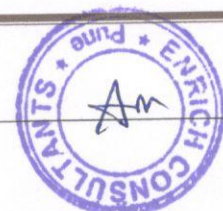
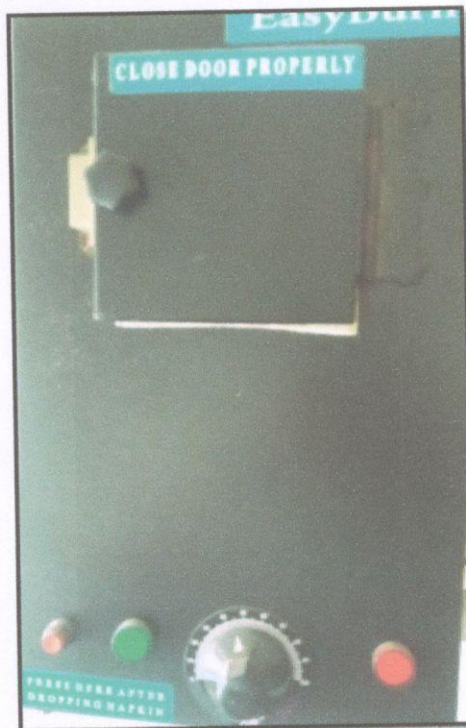
Photograph of Ramp:



### 7.4 Sanitary Waste Incinerator:

The College has installed Sanitary Waste Incinerator, for disposal of Sanitary Waste

Photograph of Sanitary Waste Incinerator:



**7.5 Creation of Awareness on Resource Conservation by Display of Posters:**

The College has displayed posters emphasizing on importance of Resource Conservation.

**Photograph of Poster on Resource Conservation:**



**7.6 Tree Plantation Drive:**

The College arranged Tree Plantation Drive under the NSS Initiative.

**Photographs of Tree Plantation Drive:**



**ANNEXURE-1:  
DETAILS OF TREES & PLANTS:**

No	Common Name	Qty
1	Mango	6
2	Silver Oak	4
3	Pichkari	6
4	Coconut	17
5	Jamun	1
6	Ashok	56
7	Guava	6
8	Almond	4
9	Morpankhi	6
10	Lemon	2
11	Phycus	8
12	Areca Palm	101
13	Christmas Tree	9
14	Sonchampa	5
15	Chikoo	2
16	Rubber	1
17	Shevari	10
18	Kaduneem	1
19	Apta	1
20	<b>Total</b>	<b>246</b>