



**Shri Gajanan Maharaj Shikshan Prasarak Mandal's,  
SHARADCHANDRA PAWAR ARTS AND COMMERCE COLLEGE,  
Alandi Devachi (Dudulgaon), Tal. Khed, Dist.Pune 412105.**

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# **ENERGY AUDIT REPORT**

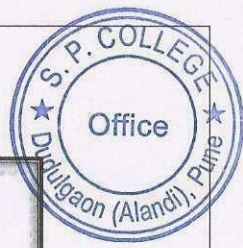
**Year: 2020-21**

Prepared by

## **Enrich Consultants**

Yashashree, 26, Nirmal Bag Society,  
Near Muktang 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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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.

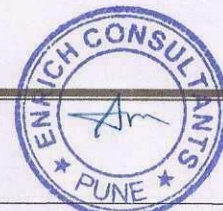
**Name and Address of the firm** : **M/s Enrich Consultants**  
Yashashree, Plot No. 26, Nirmal Bag Society,  
Near Mukangan English School, Parvati,  
Pune - 411009.

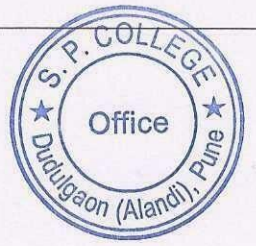
**Registration Category** : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

**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 Mukangan English School, Parvati, Pune 411 009  
Tel: 09890444795 Email: [enrichcons@gmail.com](mailto:enrichcons@gmail.com)

Ref: EC/SGMSPMSPACC/20-21/01

Date: 2/7/2021

## CERTIFICATE

This is to certify that we have conducted Energy Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College, Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune-412105 in the 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 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

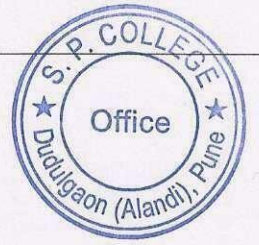




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## **ACKNOWLEDGEMENT**

We Enrich Consultants, Pune, express our sincere gratitude to the management of Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College, Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune-412105, for awarding us the assignment of Energy Audit of their Dudulgaon campus for the Year: 20-21.

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





## EXECUTIVE SUMMARY

1. **Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College, Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune 412105** consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

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

No	Parameter	Energy Consumed, kWh	CO <sub>2</sub> emissions, MT
1	Total	13376	12.04
2	Maximum	3992	3.59
3	Minimum	560	0.50
4	Average	1114.67	1.00

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

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

### 4. Usage of Alternate Energy Source:

- The College has yet to install Roof Top Solar PV Plant.
- The % of Annual Power requirement met by Alternate Energy is nil

### 5. Usage of LED Lighting to Total Lighting Load:

- The LED Lighting Load is **1.872 kW**.
- The Total Lighting Load is **1.872 kW**.
- The percentage of LED Lighting Total Lighting load works out to be **100 %**

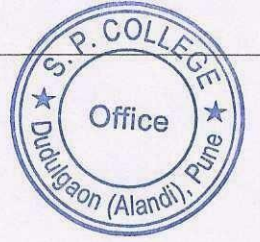
### 6. Assumption:

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

### 7. Reference:

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

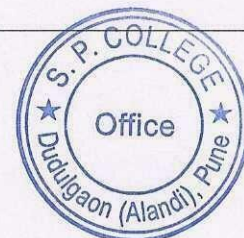




## ABBREVIATIONS

AC	:	Air conditioner
SGMSPM	:	Shri Gajanan Maharaj Shikshan Prasarak Mandal
BEE	:	Bureau of Energy Efficiency
CFL	:	Compact Fluorescent Lamp
FTL	:	Fluorescent Tube Light
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
PC	:	Personal Computer
MT	:	Metric Ton
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited





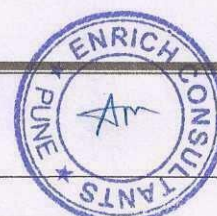
## CHAPTER-I INTRODUCTION

### 1.1 Objectives:

1. To study Connected Load and Present Energy Consumption
2. To Study CO<sub>2</sub> emissions
3. To study Scope for usage of Alternate / Renewable Energy
4. To study usage of LED Lighting

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

No	Head	Particulars
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College
2	Address	Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune 412 105
3	Year of Establishment	2002
3	Affiliation	Savitribai Phule Pune University







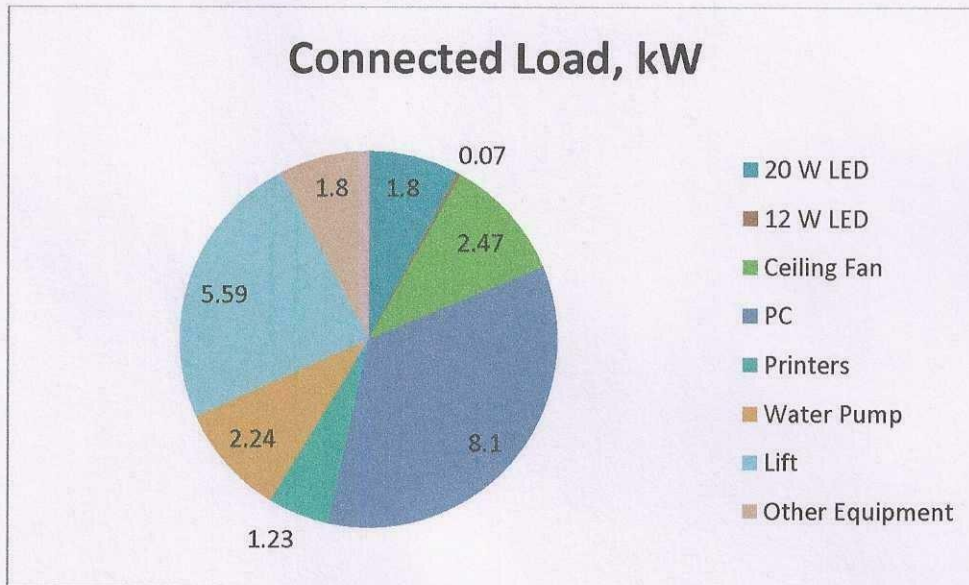
## CHAPTER-II STUDY OF CONNECTED LOAD

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

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

No	Equipment	Qty	Load, W/unit	Load, kW
1	20 W LED	90	20	1.8
2	12 W LED	6	12	0.07
3	Ceiling Fan	38	65	2.47
4	PC	54	150	8.1
5	Printers	7	175	1.23
6	Water Pump	1	2238	2.24
7	Lift	1	5595	5.60
8	Other Equipment	9	200	1.8
9	<b>Total</b>			<b>23</b>

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



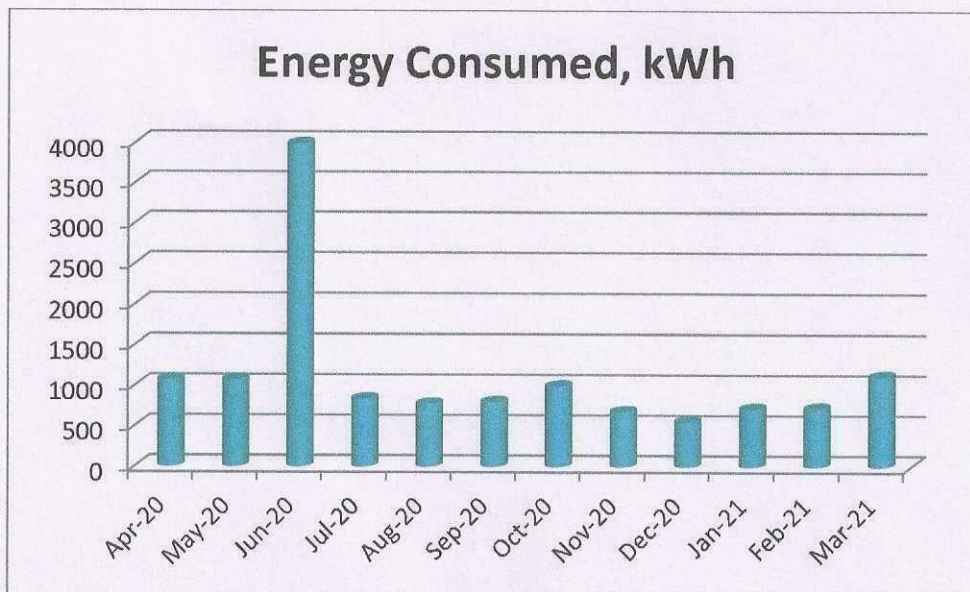


### CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Energy Consumed  
Table No 3: Electrical Energy Consumed: 20-21:

No	Month	Energy Consumed, kWh
1	Apr-20	1076
2	May-20	1076
3	Jun-20	3992
4	Jul-20	840
5	Aug-20	779
6	Sep-20	802
7	Oct-20	999
8	Nov-20	682
9	Dec-20	560
10	Jan-21	721
11	Feb-21	725
12	Mar-21	1124
13	Total	13376
14	Maximum	3992
15	Minimum	560
16	Average	1114.67

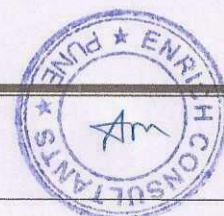
Chart No 2: To study the variation of Month wise Energy Consumed, kWh:





**Table No 4: Important parameters:**

No	Parameter	Energy Consumed, kWh
1	Total	13376
2	Maximum	3992
3	Minimum	560
4	Average	1114.67





## CHAPTER-IV 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:

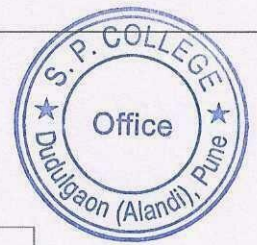
The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere

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

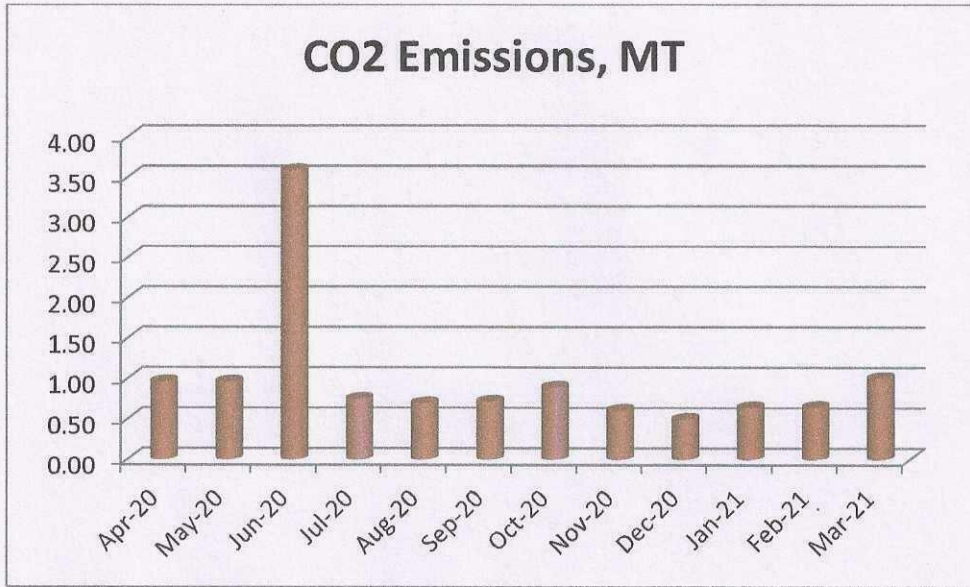
**Table No 5: Month wise CO<sub>2</sub> Emissions:**

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Apr-20	1076	0.97
2	May-20	1076	0.97
3	Jun-20	3992	3.59
4	Jul-20	840	0.76
5	Aug-20	779	0.70
6	Sep-20	802	0.72
7	Oct-20	999	0.90
8	Nov-20	682	0.61
9	Dec-20	560	0.50
10	Jan-21	721	0.65
11	Feb-21	725	0.65
12	Mar-21	1124	1.01
13	Total	13376	12.04
14	Maximum	3992	3.59
15	Minimum	560	0.50
16	Average	1114.67	1.00





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



**Table No 6: Key observations:**

No	Parameter	Energy consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Total	13376	12.04
2	Maximum	3992	3.59
3	Minimum	560	0.50
4	Average	1114.67	1.00





## **CHAPTER-V**

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

- The College has yet to install Roof top Solar PV Plant.
- As on Date the percentage of Annual Power requirement by Alternate Energy is nil.





## CHAPTER-VI STUDY OF USAGE OF LED LIGHTS

In the following Table, we present the percentage of usage of LED lights to Total Lighting Load.

**Table No 7: Study of % LED Lighting Load to Total Lighting Load:**

No	Particulars	Value	Unit
1	Qty of 20 W LED Fittings	90	Nos
2	Load per Unit of 20 W LED Fitting	20	W/Unit
3	Total Load of 20 W LED Fittings	1.8	kW
4	Qty of 12 W LED Fittings	6	Nos
5	Load per Unit of 12 W LED Fitting	12	W/Unit
6	Total Load of 12 W LED Fittings	0.072	kW
7	Total LED Lighting Load=3+6	1.872	kW
8	Total Lighting Load=3+6	1.872	kW
9	% of Total Lighting Load met by LEDs= $7 \times 100 / 8$	100	%



*Liborat*

PRINCIPAL

Sharadchandra Pawar Arts & Commerce College  
Dudulgaon (Alandi), Pune





Shri Gajanan Maharaj Shikshan Prasarak Mandal's,  
SHARADCHANDRA PAWAR ARTS AND COMMERCE COLLEGE,  
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## GREEN AUDIT REPORT

Year: 2020-21

Prepared by

**Enrich Consultants**

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Near Muktangan English School, Parvati, Pune 411009  
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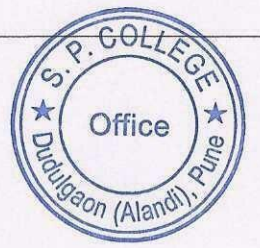
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General Manager (EC)





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Date: 2/7/2021

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The College has adopted following Green Practices:

- Usage of Energy Efficient LED Fittings
- Segregation of Waste at source
- Installation of Rain Water Management Project
- Maintenance of Good Internal Roads
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of awareness on Plastic Free Campus 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 Enrich Consultants,

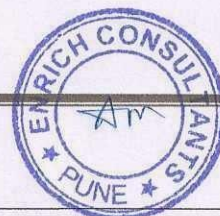
A Y Mehendale,  
Certified Energy Auditor, EA-8192

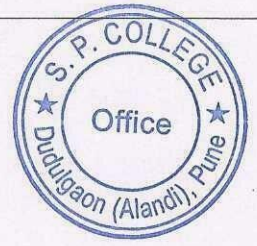




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6	Study of Rain Water Harvesting	16
7	Study of Green & Sustainable Practices	17



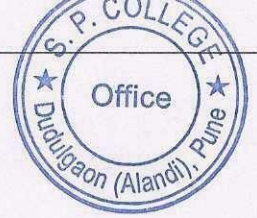


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## EXECUTIVE SUMMARY

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No	Parameter	Energy Consumed, kWh	CO <sub>2</sub> emissions, MT
1	Total	13376	12.04
2	Maximum	3992	3.59
3	Minimum	560	0.50
4	Average	1114.67	1.00

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

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

### 4. Usage of Renewable Energy Source:

- The College has yet to install Roof Top Solar PV Plant.

### 5. Waste Management:

#### 5.1 Segregation of Waste at Source:

The Waste is segregated at source and the recyclable waste like Paper waste, Plastic Waste is handed over to authorized agency.

#### 5.2 Organic Waste Management:

It is recommended to compost the organic waste like leafy and canteen waste.

### 6. Rain Water Management:

The College has installed Rainwater Management Project. The rain water falling on the terrace is collected through pipes and is used to increase the underground water table.

### 7. Green & Sustainable Practices:

- Good Internal Road
- Internal Tree Plantation
- Provision of Ramp for Divyangajan
- Creation of Awareness on Plastic Free Campus by Display of Posters



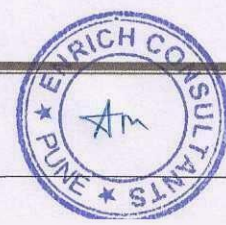


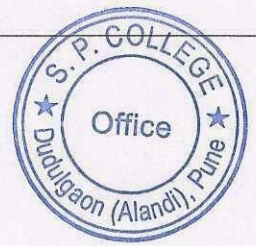
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- 1 kWh (Unit) of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere

**9. Reference:**

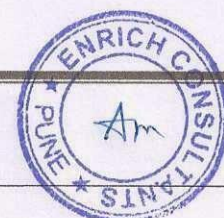
- For CO<sub>2</sub> calculations: [www.tatapower.com](http://www.tatapower.com)

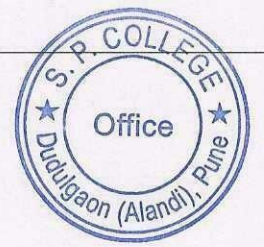




## ABBREVIATIONS

SGMSPM : Shri Gajanan Maharaj Shikshan Prasarak Mandal  
LED : Light Emitting Diode  
kWh : kilo-Watt Hour  
Qty : Quantity  
kW : Kilo Watt  
MT : Metric Ton





## 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. To study Waste Management practices
5. To study Green & Sustainable Practices

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

No	Head	Particulars
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College
2	Address	Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune 412 105
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3	Affiliation	Savitribai Phule Pune University







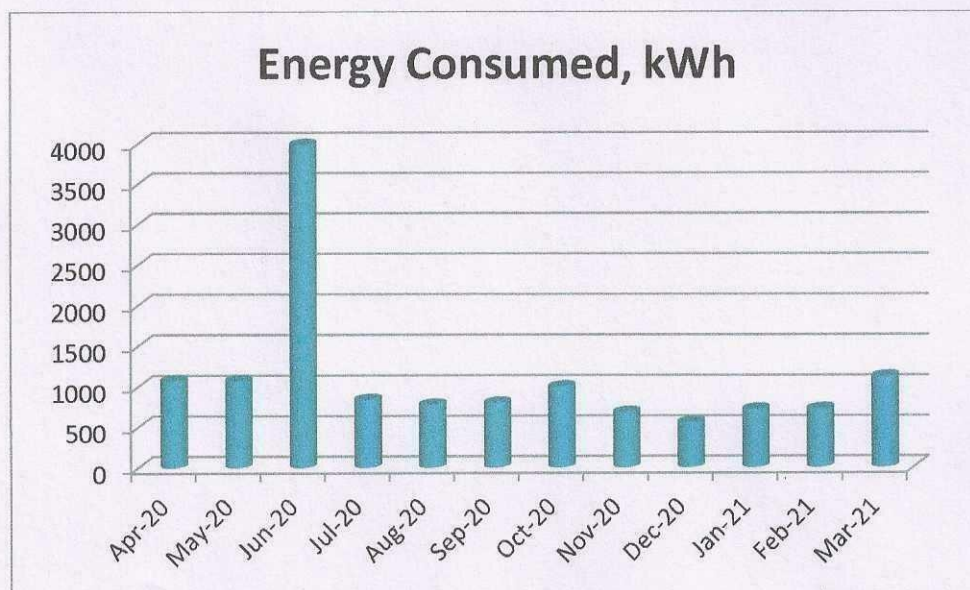
## CHAPTER-II

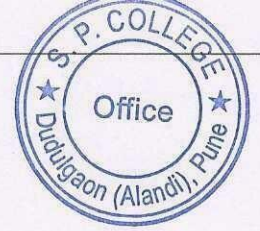
### STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Energy Consumption  
**Table No 2: Electrical Energy Purchase Analysis- 20-21:**

No	Month	Energy Consumed, kWh
1	Apr-20	1076
2	May-20	1076
3	Jun-20	3992
4	Jul-20	840
5	Aug-20	779
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7	Oct-20	999
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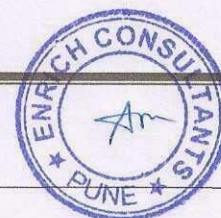
**Chart No 1: To study the variation of Month wise Energy Consumed, kWh:**

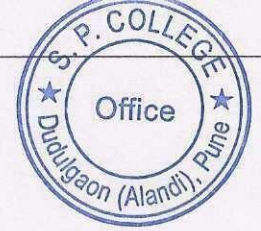




**Table No 3: Important parameters:**

No	Parameter	Energy consumed, kWh
1	Total	13376
2	Maximum	3992
3	Minimum	560
4	Average	1114.67





## CHAPTER-III

### 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:

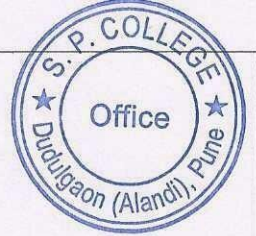
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Based on the above Data we compute the CO<sub>2</sub> emissions which are being released in to the atmosphere by the College due to its Day to Day operations

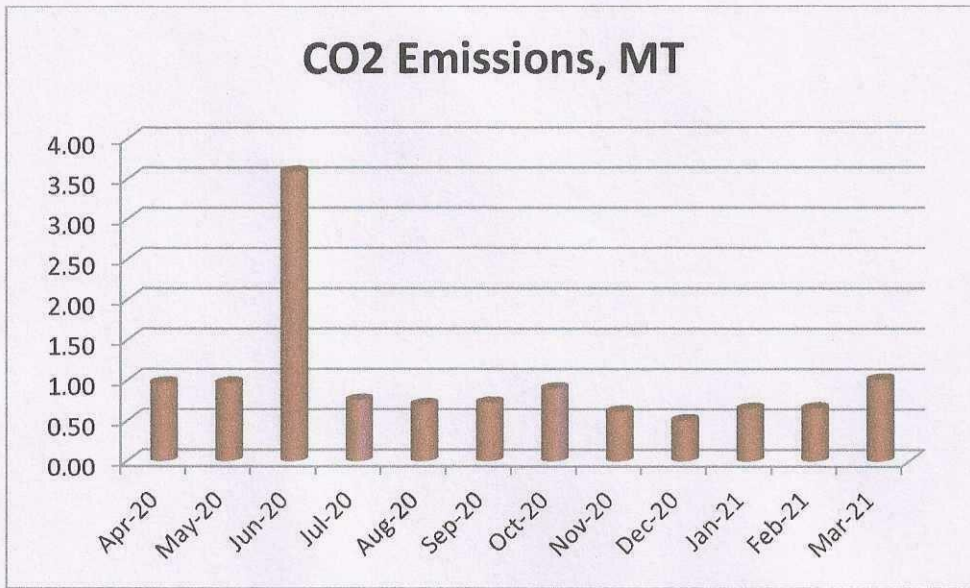
**Table No 4: Month wise CO<sub>2</sub> Emissions:**

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Apr-20	1076	0.97
2	May-20	1076	0.97
3	Jun-20	3992	3.59
4	Jul-20	840	0.76
5	Aug-20	779	0.70
6	Sep-20	802	0.72
7	Oct-20	999	0.90
8	Nov-20	682	0.61
9	Dec-20	560	0.50
10	Jan-21	721	0.65
11	Feb-21	725	0.65
12	Mar-21	1124	1.01
13	Total	13376	12.04
14	Maximum	3992	3.59
15	Minimum	560	0.50
16	Average	1114.67	1.00



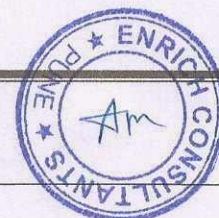


**Chart No 2: Representation of Month wise CO<sub>2</sub> emissions:**



**Table No 5: Key observations:**

No	Parameter	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Total	13376	12.04
2	Maximum	3992	3.59
3	Minimum	560	0.50
4	Average	1114.67	1.00





## **CHAPTER-IV**

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

The College has yet to install Roof top Solar PV Plant.





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

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

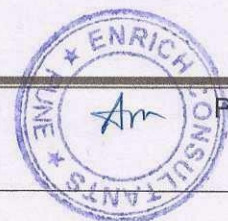
The Waste is segregated at source. Waste bins are located at various locations

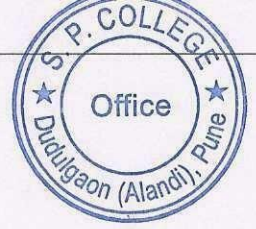
**Photograph of Waste Collection Bin:**



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

It is recommended to compost the organic waste like leafy and canteen waste.



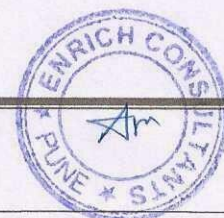
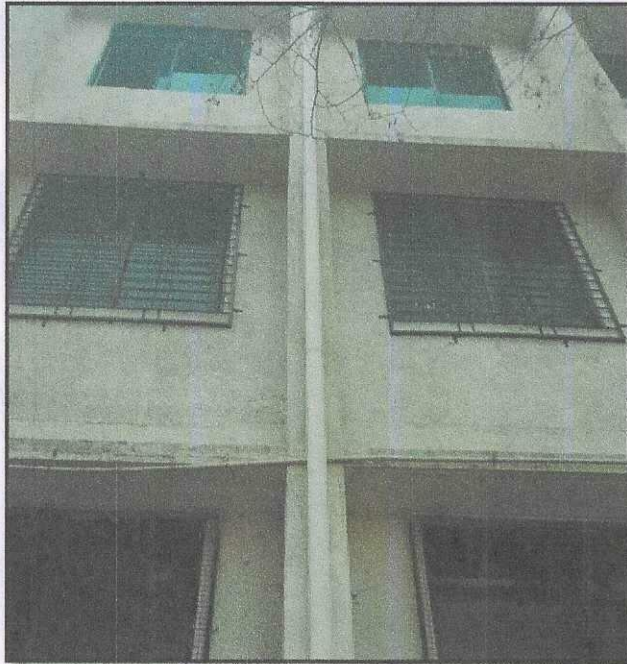


## **CHAPTER-VI**

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

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

**Photograph of Rain Water Carrying Pipe:**





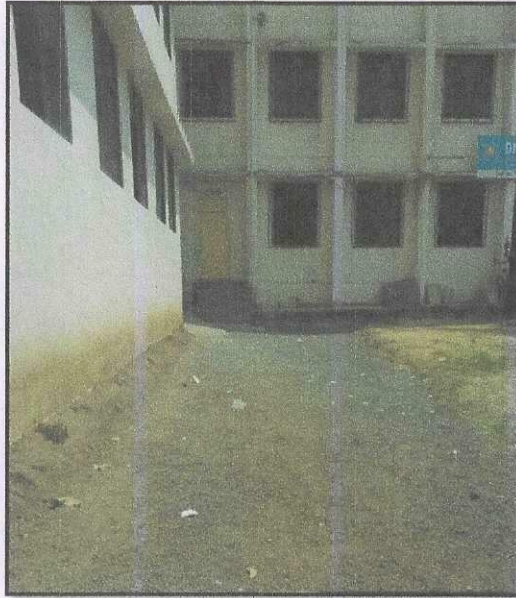
## **CHAPTER-VII**

### **STUDY OF GREEN & SUSTAINABLE PRACTICES**

#### **7.1 Pedestrian Friendly Roads:**

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

**Photograph of Road within campus:**



#### **7.2 Internal Tree Plantation:**

The College has well maintained Tree Plantation.

**Photograph of Tree Plantation:**





**7.3 Provision of Ramp for Divyangajan:**

The College has made provision of Ramp for the Divyangajan.

**Photograph of Ramp for Divyangajan:**



**7.4 Creation of Awareness by Display of Posters:**

The College has displayed posters on Plastic Free Campus.

**Photograph of Poster Display Board on Plastic Free Campus:**



*H. H. Hazrat*  
PRINCIPAL  
Sharadchandra Pawar Arts & Commerce College  
Dudulgaon (Alandi), Pune





Shri Gajanan Maharaj Shikshan Prasarak Mandal's,  
SHARADCHANDRA PAWAR ARTS AND COMMERCE COLLEGE,  
Alandi Devachi (Dudulgaon), Tal: Khed, Dist. Pune 412105.

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# ENVIRONMETAL AUDIT REPORT

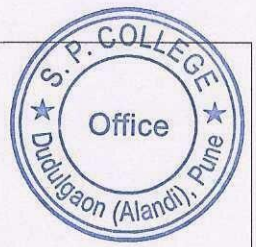
Year: 2020-21

Prepared by

**Enrich Consultants**

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





**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.

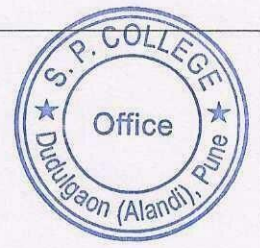
**Registration Category** : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

**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 Mukangan English School, Parvati, Pune 411 009  
Tel: 09890444795 Email: [enrichcons@gmail.com](mailto:enrichcons@gmail.com)

Ref: EC/ SGMSPMSPACC /20-21/03

Date: 2/7/2021

## CERTIFICATE

This is to certify that we have conducted Environmental Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College, Alandi Devachi (Dudulgaon), Tal: Khed, Dist. Pune-412105 in the year 2020-21.

The College has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Segregation of Waste at source
- Installation of Rain Water Management Project
- Tree Plantation in the campus
- Creation of awareness on Plastic Free Campus 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 Enrich Consultants,

A Y Mehendale,  
Certified Energy Auditor, EA-8192



**INDEX**

Sr. No	Particulars	Page No
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I	Various Indoor Air Quality & Water Standards	19

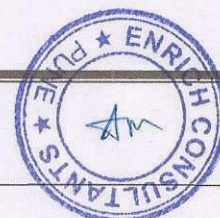


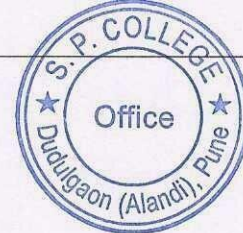


## **ACKNOWLEDGEMENT**

We Enrich Consultants, Pune, express our sincere gratitude to the management of Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College, Alandi Devachi (Dudulgaon), Tal: Khed, Dist. Pune-412105, for awarding us the assignment of Environmental Audit of their Dudulgaon campus for the Year: 20-21.

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





## EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College, Alandi Devachi (Dudulgaon), Tal: Khed, Dist. Pune 412105 consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

### 2. Pollution due to Day to Day Activities:

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

### 3. Energy Purchased & CO<sub>2</sub> Emission:

No	Parameter	Energy Consumed, kWh	CO <sub>2</sub> emissions, MT
1	Total	13376	12.04
2	Maximum	3992	3.59
3	Minimum	560	0.50
4	Average	1114.67	1.00

### 4. Various Measures Adopted for Environmental Conservation:

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

### 5. Usage of Renewable Energy:

- The College is in process of installation of **2.5 kWp** Roof Top Solar PV Plant.

### 6. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	100	60	76
2	Minimum	89	53	69

### 7. Waste Management:

#### 7.1 Segregation of Waste at Source:

The Waste is segregated at source and the recyclable waste like Paper waste, Plastic Waste is handed over to authorized agency.

#### 7.2 Organic Waste Management:





It is recommended to compost the organic waste like leafy and canteen waste.

#### 8. Rain Water Management:

The College has installed Rainwater Management Project. The rain water falling on the terrace is collected through pipes and is used to increase the underground water table.

#### 9. Eco Friendly Practices:

- Internal Tree Plantation
- Creation of Awareness on Plastic Free Campus by Display of Posters

#### 11. Assumption:

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

#### 12. References:

1. For CO<sub>2</sub> calculations: [www.tatapower.com](http://www.tatapower.com)
2. For AQI & Water Quality Standards: [www.cpcb.com](http://www.cpcb.com)







## ABBREVIATIONS

SGMSPM	:	Shri Gajanan Maharaj Shikshan Prasarak Mandal
AQI	:	Air Quality Index
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
MT	:	Metric Ton
CO <sub>2</sub>	:	Carbon Di Oxide
ISHRAE	:	The Indian Society of Heating, Refrigerating & Air conditioning Engineers
CPCB	:	Central Pollution Control Board





## 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"*

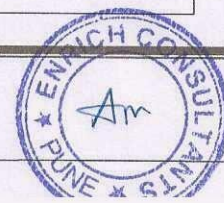
**1.1.3. Environmental Pollutant:** means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

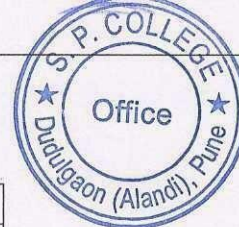
#### 1.1.4. Relevant Environmental Laws in India: Table No-1:

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:

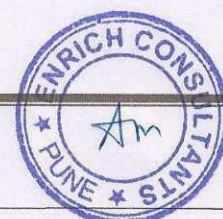
1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research College)
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)

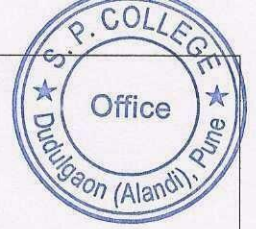
### 1.2 Objectives:

1. To study Recourse Consumption and CO<sub>2</sub> Emission
2. To Study CO<sub>2</sub> Emission Reduction
3. To Study Indoor Air Quality
4. To Study Waste Management Practices
5. To Study Rain Water Harvesting
6. To study Environment Friendly Practices

### 1.3 Table No-4: General Details of College:

No	Head	Particulars
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College
2	Address	Alandi Devachi (Dudulgaon), Tal: Khed, Dist. Pune 412 105
3	Year of Establishment	2002
3	Affiliation	Savitribai Phule Pune University





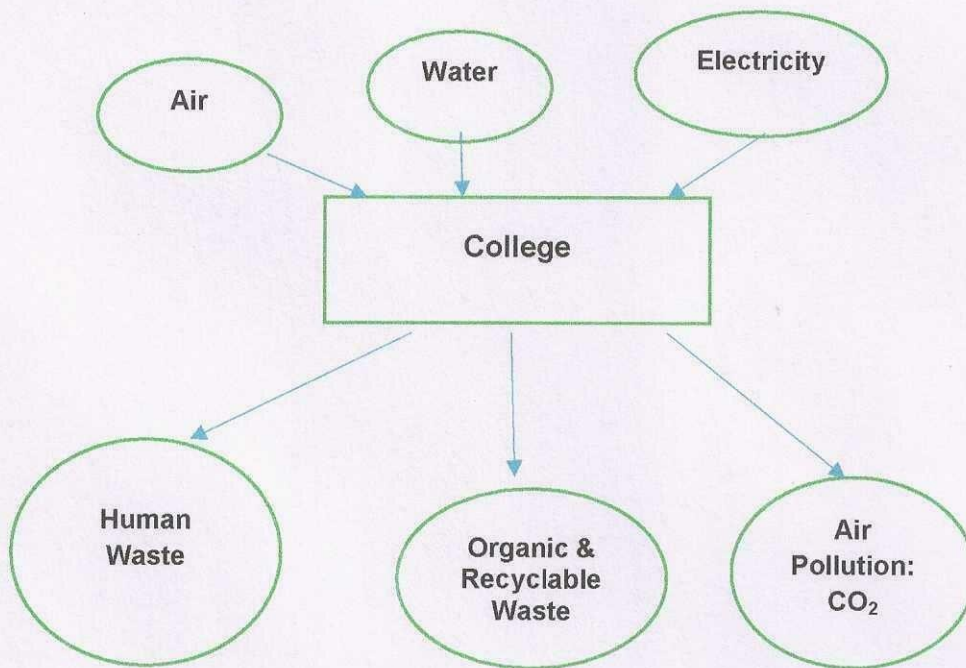
## CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO<sub>2</sub> EMISSION

The College consumes following Natural/derived Resources:

1. Air
2. Water
3. Electrical Energy

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

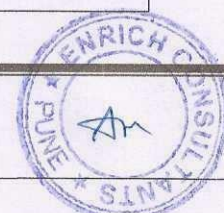
**Chart No: 1: Representation of College as System:**



We compute the Generation of CO<sub>2</sub> on account of consumption of Electrical Energy as under. 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.

**Table No 5: Electrical Energy Usage & CO<sub>2</sub> Emission: 20-21:**

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Apr-20	1076	0.97
2	May-20	1076	0.97
3	Jun-20	3992	3.59
4	Jul-20	840	0.76
5	Aug-20	779	0.70





6	Sep-20	802	0.72
7	Oct-20	999	0.90
8	Nov-20	682	0.61
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12	Mar-21	1124	1.01
13	Total	13376	12.04
14	Maximum	3992	3.59
15	Minimum	560	0.50
16	Average	1114.67	1.00

Chart No 2: To study CO<sub>2</sub> Emission:

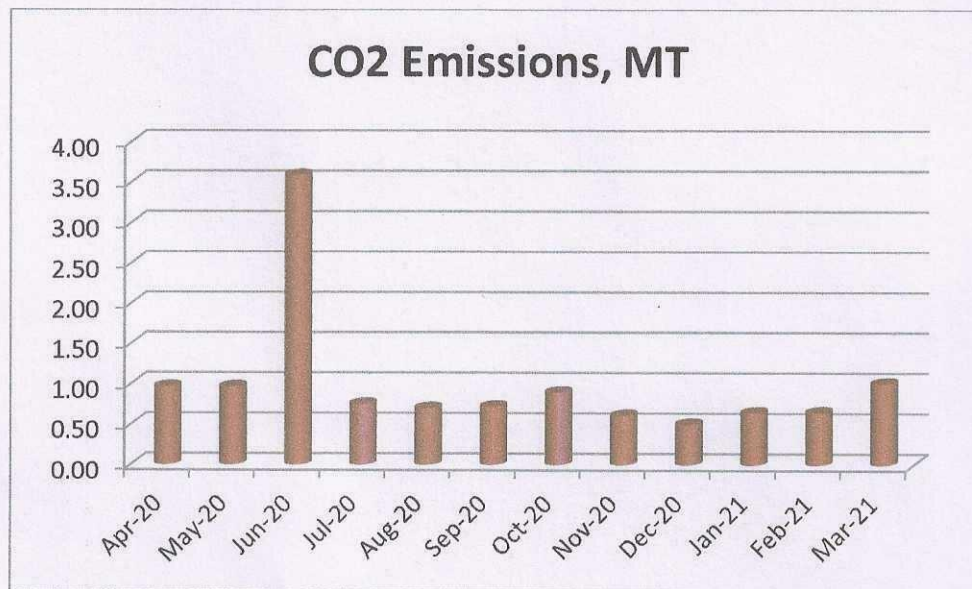


Table No 6: Important parameters:

No	Parameter	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Total	13376	12.04
2	Maximum	3992	3.59
3	Minimum	560	0.50
4	Average	1114.67	1.00





### **CHAPTER-III**

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

The College has yet to install Roof top Solar PV Plant.





## 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**.

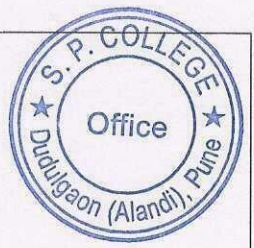
We present herewith following important Parameters.

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

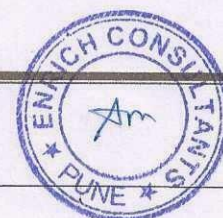
**Table No 7: Indoor Air Quality Parameters:**

No	Location	AQI	PM-2.5	PM-10
	<b>Ground Floor</b>			
1	Office	96	58	76
2	Class Room-1	100	60	75

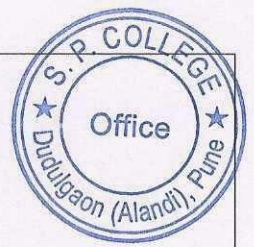




	<b>First Floor</b>			
4	Principal Cabin	91	55	69
5	BBA Department	95	57	72
	<b>Second Floor</b>			
7	Library	90	54	71
	<b>Third Floor</b>			
9	Class Rooms	89	53	70
	<b>Fourth Floor</b>			
10	Class Rooms	97	58	74
	Maximum	100	60	76
	Minimum	89	53	69







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

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

The Waste is segregated at source. Waste bins are located at various locations

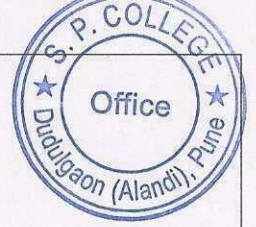
**Photograph of Waste Collection Bin:**



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

It is recommended to compost the organic waste like leafy and canteen waste.



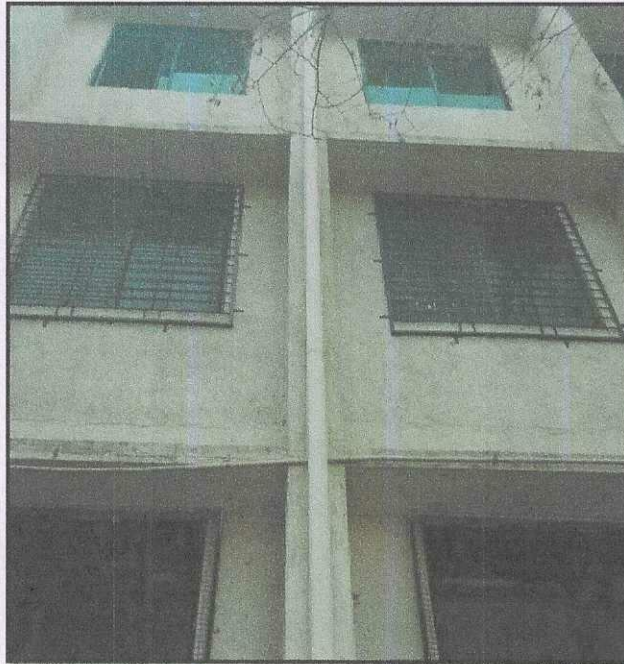


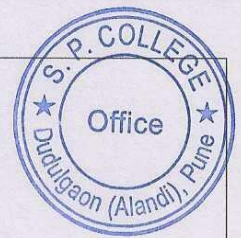
## **CHAPTER-VI**

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

The College has implemented the Rain Water Harvesting Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used to increase the underground water table.

**Photograph of Rain Water Carrying Pipe:**





## **CHAPTER VII**

### **STUDY OF ENVIRONMENT FRIENDLY INITIATIVES**

#### **7.1 Internal Tree Plantation:**

The College has well maintained Tree plantation.

**Photograph of Tree Plantation:**



#### **7.2 Creation of Awareness by Display of Posters:**

The College has displayed posters on Plastic Free Campus.

**Photograph of Poster Display Board on Plastic Free Campus:**



**ANNEXURE-I:  
VARIOUS AIR QUALITY, WATER QUALITY, 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



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