

# **ENVIRONMENTAL AUDIT REPORT**

## **SAMARTH RURAL EDUCATION INSTITUTE'S, SAMARTH COLLEGE OF COMPUTER SCIENCE,**

A/P Belhe, Tal: Junnar, Dist: Pune 412 410



**Year: 2023-24**

Prepared by:

### **ENGRESS SERVICES**

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

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## **ACKNOWLEDGEMENT**

We at Engress Services, Pune, express our sincere gratitude to the management of Samarth Rural Education Institute's Samarth College of Computer Science, A/P Belhe, Tal: Junnar, Dist: Pune, for awarding us the assignment of Environmental Audit of their Campus for the Year: 2023-24.

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

## EXECUTIVE SUMMARY

**1. Samarth College of Computer Science, A/P Belhe, Tal; Junnar, Dist: Pune** consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, 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
- **Liquid Waste:** Human liquid waste

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

No	Particulars	Value	Unit
1	Annual Energy Consumed	28530	kWh
2	Annual CO <sub>2</sub> Emissions	26.53	MT

### 4. Usage of Renewable Energy:

- Installation of Solar Thermal Water Heating System at Hostel Block.

### 5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	90	54	69
2	Minimum	82	50	62

### 6. Indoor Lux & Noise Level Parameters:

No	Parameter/Value	Lux Level	Noise Level, dB
1	Maximum	236	48
2	Minimum	226	45.9

### 7. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Food Waste	Provision of Bio Gas Plant
3	E Waste	Recommended to dispose of through Authorized Agency

### 8. Rain Water Management:

The rain water falling on the terrace is collected and is used to crease the Underground Water Table.

### 9. Environment Friendly Initiatives:

- Tree Plantation in the campus.
- Creation of awareness on Energy Conservation Display of Posters

### 10. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.93 Kg of CO<sub>2</sub>** into atmosphere
2. Energy Consumption is computed based on Load Utilization Factor

### 11. References:

- For CO<sub>2</sub> Emissions: [www.ccd.gujarat.gov.in](http://www.ccd.gujarat.gov.in)
- For Various Indoor Air Parameters: [www.ishrae.com](http://www.ishrae.com)
- For AQI Quality Standards: [www.cpcb.com](http://www.cpcb.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. 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:

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

### 1.3 Key Study Points:

No	Particulars
1	Study of Present Resource Consumption & CO <sub>2</sub> Emission
2	Study of Usage of Renewable Energy
3	Study of Indoor Air Quality
4	Study of Indoor Lux & Noise Level
5	Study of Water Management
6	Study of Waste Management Practices
7	Study of Environment Friendly Practices

### 1.4 College Location Image:



College  
Campus



## CHAPTER-II

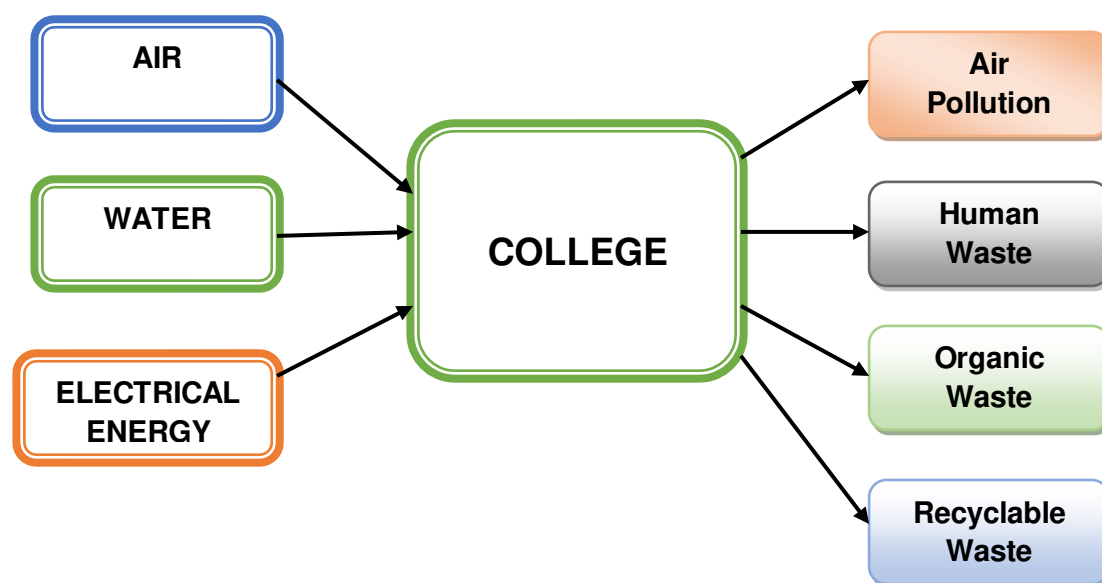
### STUDY OF RESOURCE CONSUMPTION & CO<sub>2</sub> EMISSION

The College 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.

**Chart No 1: Representation of Resource Requirement & Waste of a College:**



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 is as under.

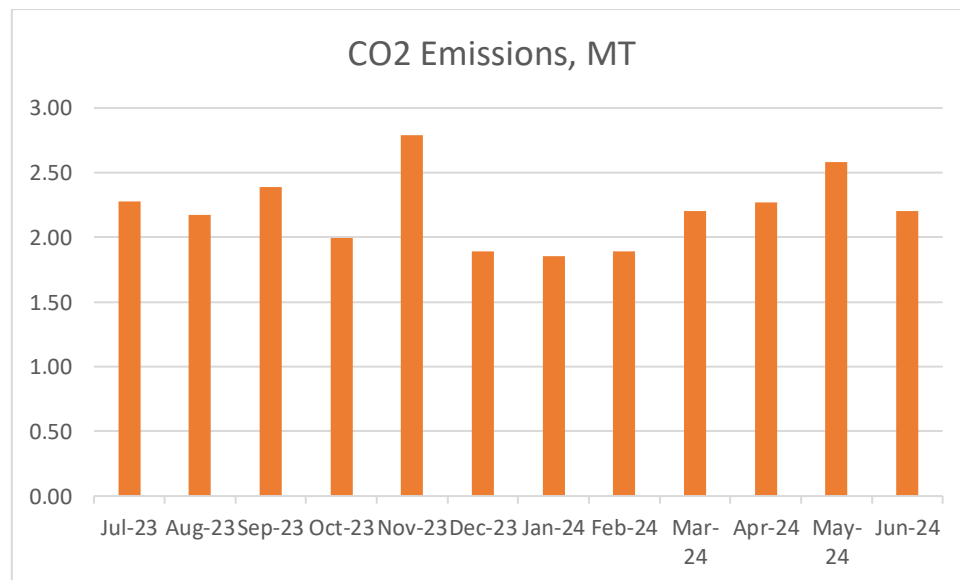
- **1 kWh** of Electrical Energy releases **0.93 Kg of CO<sub>2</sub>** into atmosphere

**Table No 1: Study of Purchase of Energy & CO<sub>2</sub> Emissions: 23-24:**

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Jul-23	2450	2.28
2	Aug-23	2336	2.17
3	Sep-23	2569	2.39
4	Oct-23	2145	1.99
5	Nov-23	2998	2.79
6	Dec-23	2036	1.89

7	Jan-24	1998	1.86
8	Feb-24	2036	1.89
9	Mar-24	2369	2.20
10	Apr-24	2445	2.27
11	May-24	2780	2.59
12	Jun-24	2368	2.20
13	Total	28530	26.53
14	Maximum	2998	2.79
15	Minimum	1998	1.86
16	Average	2377.5	2.21

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



### **CHAPTER III**

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

The College has installed Solar Thermal Water Heating System.

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

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



## CHAPTER IV

### STUDY OF INDOOR AIR QUALITY

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

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

**3. Air Quality Index: Air Quality Index (AQI)** is a number used by government agencies to measure the **Air Pollution** levels and communicate it to the population.

In this Chapter, we present three important Parameters: **AQI**- Air Quality Index, **PM-2.5**- Particulate Matter of Size 2.5 micron and **PM-10**- Particulate Matter of Size 10 micron

**Table No 2: Indoor Air Quality Parameters:**

No	Location	AQI	PM2.5	PM10
1	Principal Sir Cabin	83	51	63
2	Class Room	82	50	62
3	Computer Lab	90	55	69
4	Library	86	54	64
5	Faculty Room	85	53	63
	Maximum	<b>90</b>	<b>54</b>	<b>69</b>
	Minimum	<b>82</b>	<b>50</b>	<b>62</b>

**Table No 3: Air Quality Index Values & Concentration of PM 2.5 & PM10: (By CPCB):**

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 +

#### Conclusion:

From the above measured values, we conclude that the observed values of AQI, PM-2.5 & PM-10 are in the **Satisfactory Range**, as per the guidelines given by Central Pollution Control Board.

## CHAPTER V

### STUDY OF LUX & NOISE PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit. The Parameters include: **Lux Level and Noise Level.**

**Table No 4: Study of Indoor Lux & Noise Parameters:**

No	Location	Lux Level	Noise Level, dB
1	Principal Sir Cabin	236	48
2	Class Room	229	47
3	Computer Lab	231	45.9
4	Library	227	46.5
5	Faculty Room	226	46
	Maximum	<b>236</b>	<b>48</b>
	Minimum	<b>226</b>	<b>45.9</b>

**Recommended Lux & Noise Level: As per BEE & ISHRAE Guidelines:**

A) Noise Level Reference:		
No	Location	Noise Level Range, dB
1	Offices	45-50
2	Occupied Class Room	40-45
3	Libraries	35-40
B) Reference Lux Level, Lumens:		
1	For Class Rooms	<b>200 Plus</b>
2	For Reading Rooms	<b>200 Plus</b>

#### Conclusion:

From the above measured values, we conclude that:

- The Noise Level is within the prescribed Limit
- The Lux Level at various locations is Okay

## CHAPTER VI STUDY OF RAIN WATER MANAGEMENT

The College has installed the Rainwater Management project, the rain water falling on the terrace is used to increase the Underground Water Table.

### Photograph of Rain water Collecting Pipe:




Rain Water  
Collecting pipe

## CHAPTER-VII

### STUDY OF WASTE MANAGEMENT

In this Chapter, we present the Waste Management Practices, followed by the College.

#### Details of Waste Management Practices:


No	Head	Observation	Photograph
1	Solid Waste	Segregation of Waste at Source: Provision of Waste Collection Bins	<p><b>Waste Collection Bin</b></p> 
2	Food Waste	The Food Waste is converted in to Bio gas in a Bio Gas Plant.	<p><b>Bio Gas Plant:</b></p> 
3	E Waste	Recommended to dispose of through Authorized Agency.	

## CHAPTER-VIII

### STUDY OF ECO-FRIENDLY PRACTICES

In this Chapter, we present the Eco-Friendly Practices, followed by the College.

#### Details of Eco-Friendly Practices:

No	Head	Observation	Photograph
1	<b>Tree Plantation</b>	Internal Tree Plantation in the Campus	<p><b>Internal Tree Plantation:</b></p> 
2	<b>Creation of Awareness among Stake Holders</b>	Display of Poster on Energy Conservation	<p><b>Poster on Energy Conservation:</b></p> 