

**ENVIRONMENTAL AUDIT REPORT**  
of  
**ASM'S COLLEGE OF COMMERCE, SCIENCE &  
INFORMATION TECHNOLOGY,**

Pimpri, Pune 411 018



Year: 2022-23

Prepared by

**ENGRESS SERVICES**

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



## ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Mukhtangan English School,  
Parvati, Pune 411 009 Tel: 09890444795 Email: [engress123@gmail.com](mailto:engress123@gmail.com)  
MEDA Registration No: ECN/2022-23/CR-43/1709  
ISO: 9001-2015 Certified (Cert No: 23EQKC13),  
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

## ENVIRONMENTAL AUDIT CERTIFICATE

Certificate No: ES/ASMCSIT /22-23/03

Date: 12/7/2023

This is to certify that we have conducted Environmental Audit at ASM's College of Commerce, Science & Information Technology, Pimpri, Pune 411 018 in the year 2022-23.

The College has adopted Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- The College has installed 2.18 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Installation of Sanitary Waste Incinerator, for disposal of Sanitary Waste
- Installation of Rain Water Management Project
- Tree Plantation in the campus
- Creation of awareness on Resource Conservation 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,

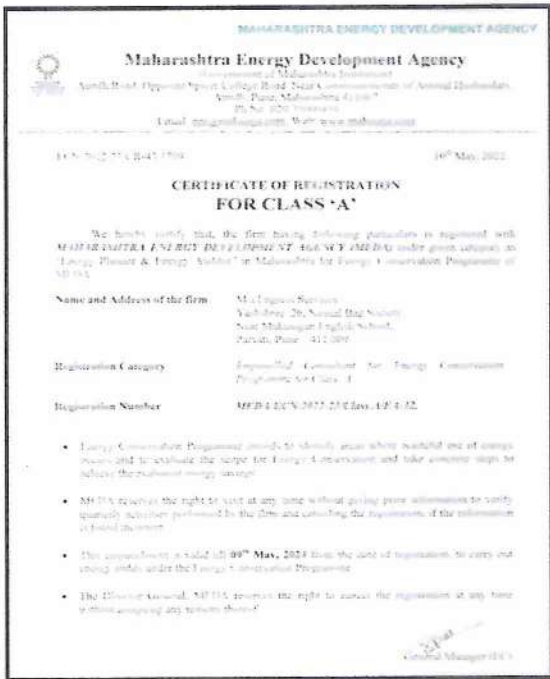


A Y Mehendale,

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	8
1	Introduction	9
2	Study of Resource Consumption & CO <sub>2</sub> Emission	11
3	Study of Usage of Renewable Energy	13
4	Study of Indoor Air Quality	14
5	Study of Indoor Comfort Condition Parameters	15
6	Study of Waste Management	16
7	Study of Rain water Management	18
8	Study of Eco Friendly Initiatives	19
	<b>Annexure</b>	
I	Indoor Air Quality, Noise, & Indoor Comfort Standards	20

## **ACKNOWLEDGEMENT**

We at Engress Services, Pune, express our sincere gratitude to the management of ASM's College of Commerce, Science & Information Technology, Pimpri, Pune 411 018, for awarding us the assignment of Environmental Audit of their Pimpri campus for the Year: 2022-23

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



## EXECUTIVE SUMMARY

1. ASM's College of Commerce, Science & Information Technology, Pimpri, Pune consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

### 2. Pollution due to Institute Activities:

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

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

No	Particulars	Value	Unit
1	Annual Energy Purchased	41020	kWh
2	Annual CO <sub>2</sub> Emissions	36.92	MT

### 4. Renewable Energy & Reduction in CO<sub>2</sub> Emissions:

- The College has installed Roof Top Solar PV Plant of Capacity **2.180 kWp**.
- The Energy generated by Solar PV Plant in 2022-23 is **784.8 kWh**.
- Reduction in CO<sub>2</sub> Emissions in 2022-23 is **0.706 MT**

### 5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	70	43	54
2	Minimum	60	37	47

### 6. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	23.5	93	140	45.8
2	Minimum	23.3	91	102	40

### 7. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Arrangement of Bio Composting Bed
3	Sanitary Waste	Installed Sanitary Waste Incinerator
4	E Waste Management	Disposed of through Authorized Agency

### 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. 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 **0.9 Kg of CO<sub>2</sub>** into atmosphere
2. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
3. Annual Solar Energy generation Days: **90Nos**

### 11. References:

- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)
- For Solar PV Energy generation: [www.solarrooftop.gov.in](http://www.solarrooftop.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**

ASM	: Audyogik Shikshan 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
LPD	: Liters Per Day
NSS	: National Service Scheme
PM	: Particulate Matter



## CHAPTER-I INTRODUCTION

### 1. Important Definitions:

#### 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

#### 1.2. 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"*

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

#### 1.4 Audit Procedural Steps:



### 1.5 Institute Location Image:



**Institute  
Campus**

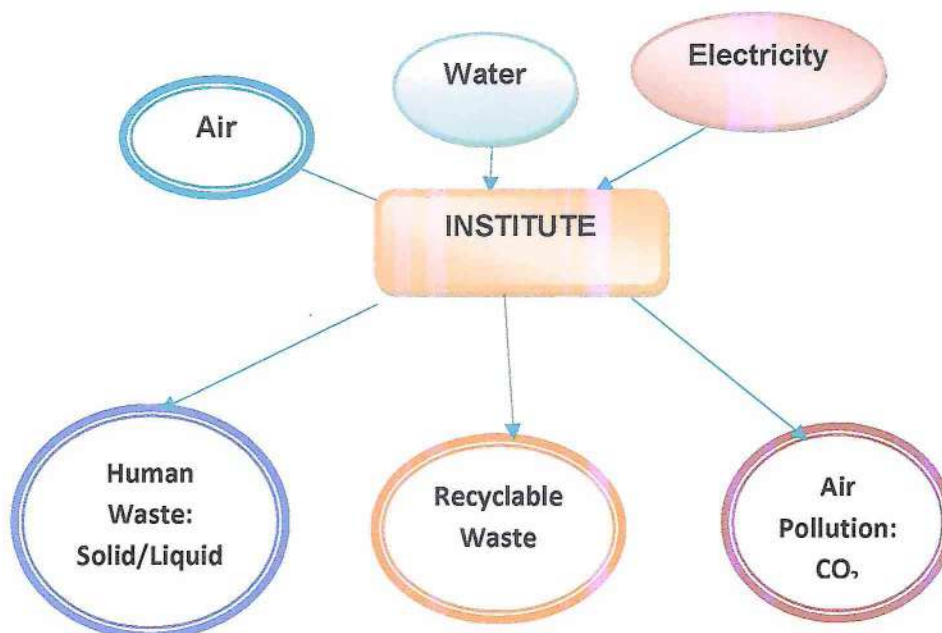
## CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO<sub>2</sub> EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

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

**Chart No 1: Representation of Institute as System & Study of Resources & Waste**



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 0.9 Kg of CO<sub>2</sub> into atmosphere

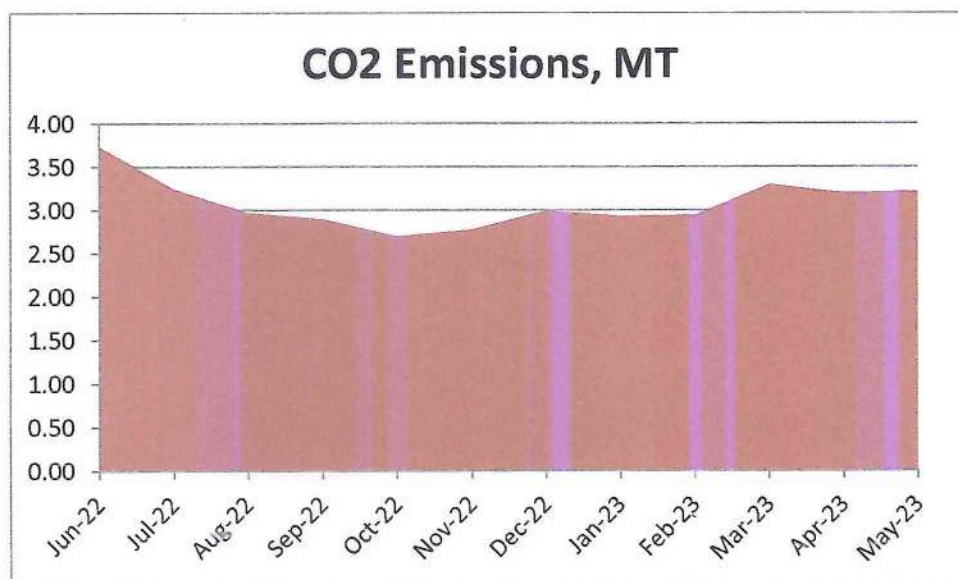
**Table No 1: Study of Purchase of Energy & CO<sub>2</sub> Emissions: 22-23:**

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Jun-22	4150	3.74
2	Jul-22	3604	3.24
3	Aug-22	3304	2.97
4	Sep-22	3221	2.90
5	Oct-22	2998	2.70



6	Nov-22	3087	2.78
7	Dec-22	3329	3.00
8	Jan-23	3256	2.93
9	Feb-23	3273	2.95
10	Mar-23	3663	3.30
11	Apr-23	3555	3.20
12	May-23	3581	3.22
13	Total	41020	36.92
14	Maximum	4150	3.74
15	Minimum	2998	2.70
16	Average	3418	3.08

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





### CHAPTER-III STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity 2.180 kWp  
In the following Table, we present the reduction in CO<sub>2</sub> emissions due to Solar Energy:

**Table No 3: Computation of Reduction in CO<sub>2</sub> Emissions:**

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	2.180	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	90	Nos
4	Energy Generated in the Year: 2022-23	784.8	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO <sub>2</sub> Saved by Solar PV Plant $= (4) * (5) / 1000$	0.706	MT of CO <sub>2</sub>

**Photograph of 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.

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

### 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.

We present herewith following important Parameters.

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

**Table No 4: Indoor Air Quality Parameters:**

No	Location	AQI	PM-2.5	PM-10
1	Principal Cabin	66	40	51
2	Office	62	38	48
3	Staff Room	60	37	47
4	Classroom	65	40	48
5	Lab	70	43	54
	Maximum	70	43	54
	Minimum	60	37	47

## **CHAPTER-V**

### **STUDY OF INDOOR COMFORT CONDITION PARAMETERS**

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

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

**Table No 5: Study of Indoor Comfort Condition Parameters:**

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Principal Cabin	23.4	93	112	45.2
2	Office	23.5	92	140	45.8
3	Staff Room	23.3	92	126	41
4	Classroom	23.3	91	102	40
5	Lab	23.5	93	118	42.6
	Maximum	<b>23.5</b>	<b>93</b>	<b>140</b>	<b>45.8</b>
	Minimum	<b>23.3</b>	<b>91</b>	<b>102</b>	<b>40</b>

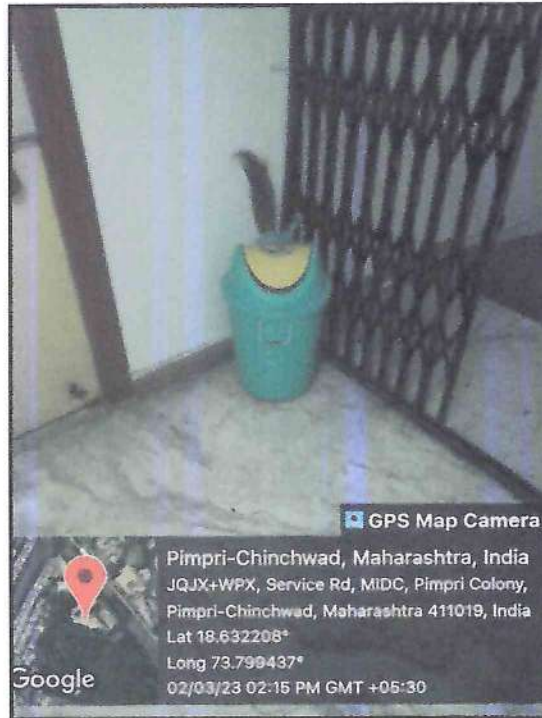


## CHAPTER-VI STUDY OF WASTE MANAGEMENT

### 6.1 Segregation of Waste at Source:

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

Photograph of Separate Waste Collection Bin:



### 6.2 Sanitary Waste Management:

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

Photograph of Sanitary Waste Incinerator:





### 6.3 Organic Waste Management:

The College has installed Bio Composting Pit to compost the organic waste like leafy and canteen waste.

#### Photograph of Bio Composting Bed:



### 6.4 E-Waste Management:

It is disposed of the through Authorized Agency.

## CHAPTER-VII

### 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 & Sand Filter:



Rain Water Pipe & Sand Filter

## CHAPTER VIII STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

### 8.1 Internal Tree Plantation:

The College has well maintained Tree plantation.

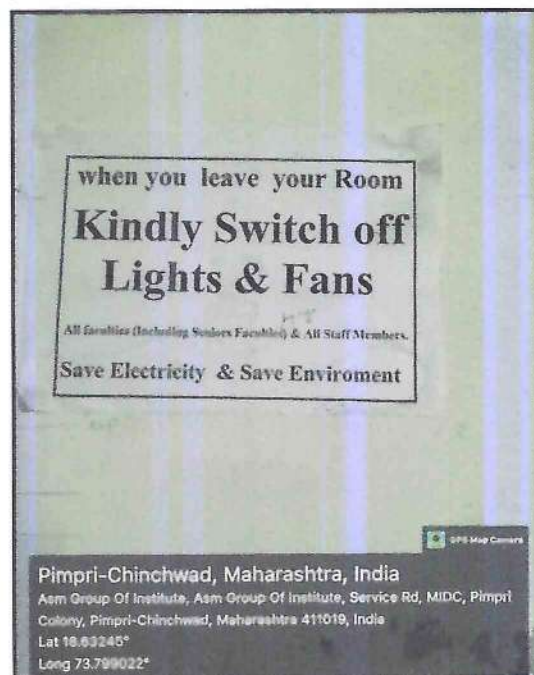
Photograph of Tree Plantation:



### 8.2 Creation of Awareness by Display of Posters:

The College has displayed posters on resource conservation.

Photograph of Poster Display Board on Resource Conservation:





## **ANNEXURE-I: VARIOUS AIR QUALITY, NOISE & 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 Noise Level Standards:**

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

### **3. Thermal Comfort Conditions: For Non-conditioned Buildings:**

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



**GREEN AUDIT REPORT**  
of  
**ASM'S COLLEGE OF COMMERCE, SCIENCE &  
INFORMATION TECHNOLOGY,**  
Pimpri, Pune 411 018



Year: 2022-23

Prepared by

**ENGRESS SERVICES**

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



# ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School,  
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/ASMCSIT /22-23/02

Date: 12/7/2023

This is to certify that we have conducted Green Audit at ASM's College of Commerce, Science & Information Technology, Pimpri, Pune 411 018 in the year 2022-23.

The College has adopted Green Practices:

- Usage of Energy Efficient LED Fittings
- The College has installed 2.18 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Installation of Sanitary Waste Incinerator, for disposal of Sanitary Waste
- 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 Resource Conservation 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,

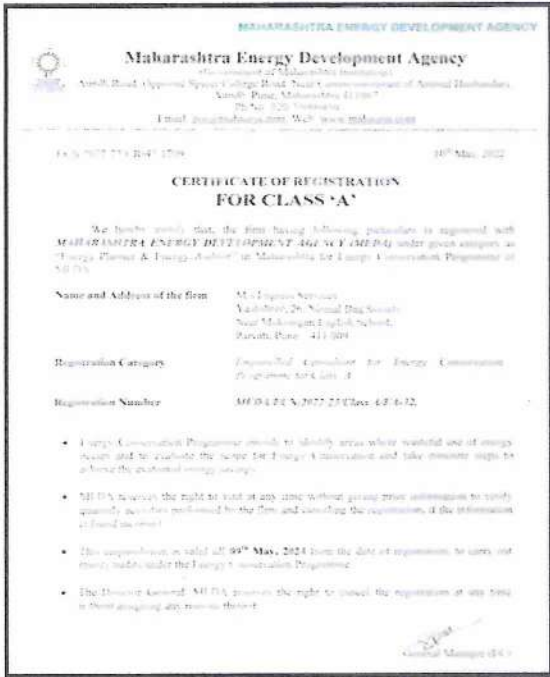


A Y Mehendale,

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

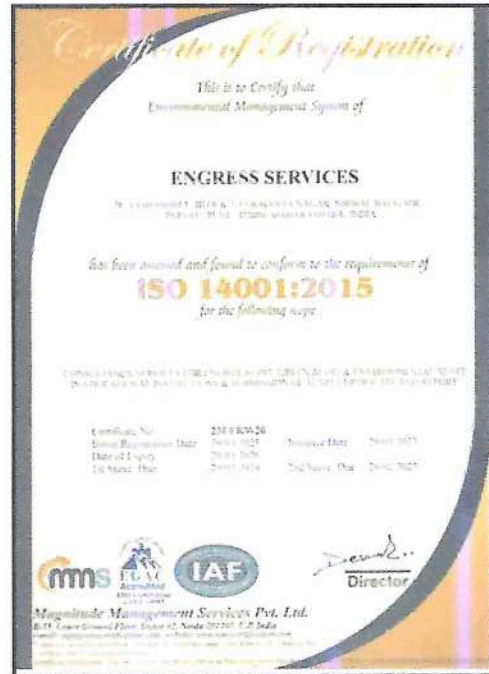
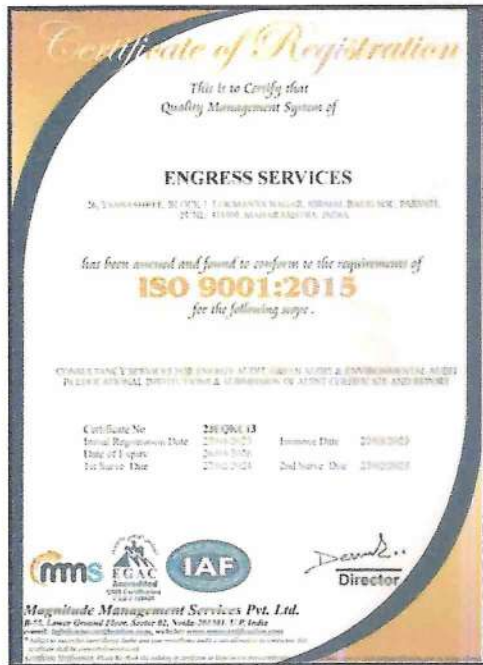


REGISTRATION CERTIFICATES



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	16

## **ACKNOWLEDGEMENT**

We at Engress Services, Pune, express our sincere gratitude to the management of ASM's College of Commerce, Science & Information Technology, Pimpri, Pune 411 018, for awarding us the assignment of Green Audit of their Pimpri campus for the Year: 2022-23

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



## EXECUTIVE SUMMARY

1. **ASM's College of Commerce, Science & Information Technology, Pimpri, Pune** consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

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

No	Particulars	Value	Unit
1	Annual Energy Purchased	41020	kWh
2	Annual CO <sub>2</sub> Emissions	36.92	MT

### 3. Renewable Energy & Reduction in CO<sub>2</sub> Emissions:

- The College has installed Roof Top Solar PV Plant of Capacity **2.180 kWp**.
- The Energy generated by Solar PV Plant in 2022-23 is **784.8 kWh**.
- Reduction in CO<sub>2</sub> Emissions in 2022-23 is **0.706 MT**

### 4. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Arrangement of Bio Composting Bed
3	Sanitary Waste	Installed Sanitary Waste Incinerator
4	E Waste Management	Disposed of through Authorized Agency

### 5. 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.

### 6. Green & Sustainable Practices:

- Maintenance of good Internal Road
- Tree Plantation in the campus.
- Provision of Ramp for Divyangajan
- Creation of awareness on Energy Conservation Display of Posters

### 7. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere
2. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
3. Annual Solar Energy generation Days: **300 Nos**

### 8. References:

- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)
- For Solar PV Energy generation: [www.solarrooftop.gov.in](http://www.solarrooftop.gov.in)



## ABBREVIATIONS

ASM	:	Audyogik Shikshan Mandal
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
MT	:	Metric Ton
CO <sub>2</sub>	:	Carbon Di Oxide

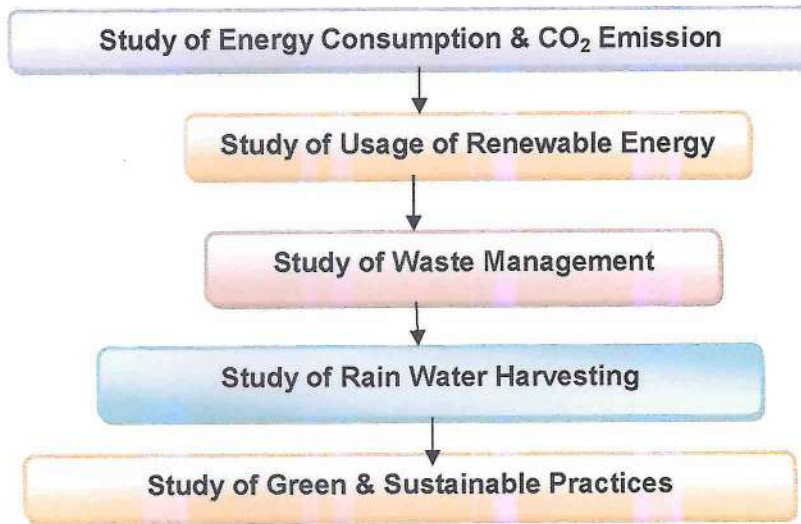


## CHAPTER-I INTRODUCTION

### 1.1 Introduction:

A Green Audit is conducted at ASM's College of Commerce, Science & Information Technology, Pimpri, Pune

### 1.2 Audit Procedural Steps:



### 1.3 Institute Location Image:



Institute  
Campus

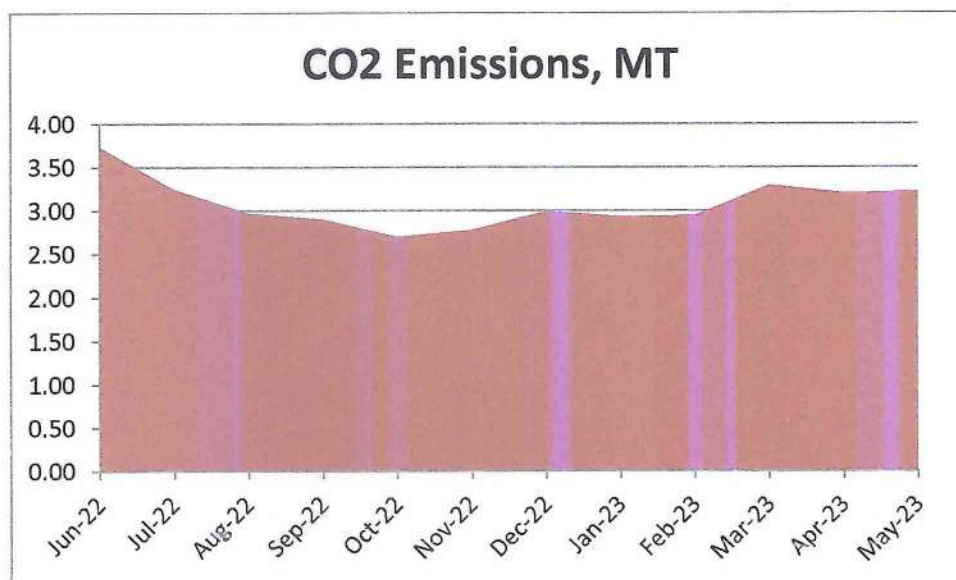
## CHAPTER-II STUDY OF ENERGY CONSUMPTION & CO<sub>2</sub> EMISSION

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. **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 Energy Consumption & CO<sub>2</sub> Emissions:**

No	Month	Energy Purchased, kWh	CO2 Emissions, MT
1	Jun-22	4150	3.74
2	Jul-22	3604	3.24
3	Aug-22	3304	2.97
4	Sep-22	3221	2.90
5	Oct-22	2998	2.70
6	Nov-22	3087	2.78
7	Dec-22	3329	3.00
8	Jan-23	3256	2.93
9	Feb-23	3273	2.95
10	Mar-23	3663	3.30
11	Apr-23	3555	3.20
12	May-23	3581	3.22
13	Total	41020	36.92
14	Maximum	4150	3.74
15	Minimum	2998	2.70
16	Average	3418	3.08

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





### CHAPTER-III STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity 2.180 kWp  
In the following Table, we present the reduction in CO<sub>2</sub> emissions due to Solar Energy:

**Table No 3: Computation of Reduction in CO<sub>2</sub> Emissions:**

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	2.180	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	90	Nos
4	Energy Generated in the Year: 2022-23	784.8	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO <sub>2</sub> Saved by Solar PV Plant = (4)*(5) /1000	0.706	MT of CO <sub>2</sub>

**Photograph of Roof Top Solar PV Plant:**



## CHAPTER-IV STUDY OF WASTE MANAGEMENT

### 4.1 Segregation of Waste at Source:

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

Photograph of Separate Waste Collection Bin:



### 4.2 Sanitary Waste Management:

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

Photograph of Sanitary Waste Incinerator:



#### 4.3 Organic Waste Management:

The College has installed Bio Composting Pit to compost the organic waste like leafy and canteen waste.

#### Photograph of Bio Composting Bed:



#### 4.4 E-Waste Management:

It is disposed of the through Authorized Agency.



## CHAPTER-V 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 & Sand Filter:



Rain Water Pipe & Sand Filter

## CHAPTER-VI STUDY OF GREEN & SUSTAINABLE PRACTICES

### 6.1 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:



### 6.2 Internal Tree Plantation:

The College has well maintained Tree Plantation.

Photograph of Tree Plantation:



### 6.3 Provision of Ramp for Divyangajan:

The College has made provision of Ramp for the Divyangajan.

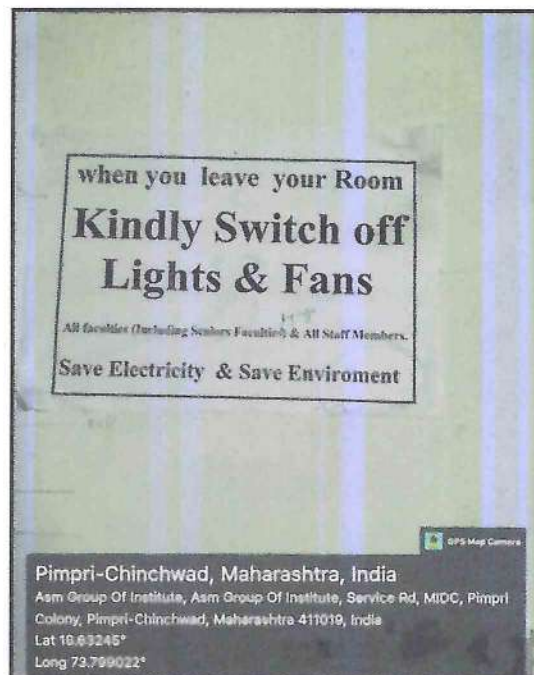
Photograph of Ramp for Divyangajan:



### 6.4 Creation of Awareness by Display of Posters:

The College has displayed posters on conservation of Resource.

Photograph of Poster Display Board on Resource Conservation:





## **ANNEXURE**

### **LIST OF TREES & PLANTS IN THE CAMPUS**

#### **1. List of Trees:**

<b>No</b>	<b>Common Name of Tree</b>
1	Coconut
2	Mango
3	Kaduneem
4	Cluster Fig
5	Peepal
6	Vad
7	Ashoka
8	Sonchampa
9	Almond
10	Wild tamarind
11	Flame tree
12	English Tamarind
13	Charismas Tree
14	Coconut Palm
15	Palm
16	Custard apple
17	Sweet Lime
18	Nagchampa

#### **2. List of Plants:**

<b>No</b>	<b>Common Name of Plant</b>
1	Adulsa
2	Hibiscus
3	Duranta
4	Moses
5	Kardal
6	Drecena
7	Exora
8	Rhoeo
9	Croton

**ENERGY AUDIT REPORT**  
of  
**ASM'S COLLEGE OF COMMERCE, SCIENCE &  
INFORMATION TECHNOLOGY,**

Pimpri, Pune 411 018



Year: 2022-23

Prepared by

**ENGRESS SERVICES**

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



## ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, 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)

## ENERGY AUDIT CERTIFICATE

Certificate No: ES/ASMCSIT /22-23/01

Date: 12/7/2023

This is to certify that we have conducted Energy Audit at ASM's College of Commerce, Science & Information Technology, Pimpri, Pune 411 018 in the year 2022-23.

The College has adopted Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- The College has installed 2.18 kWp Roof Top Solar PV Plant

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

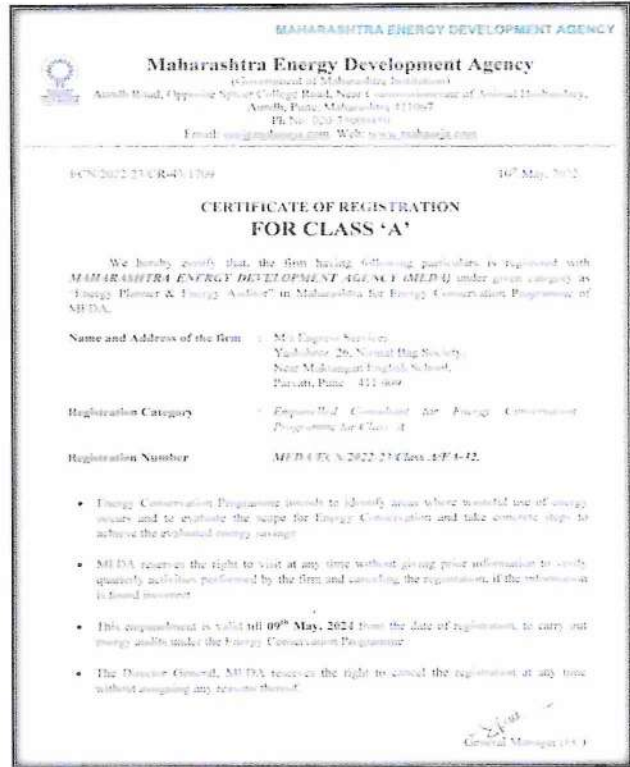




**REGISTRATION CERTIFICATES**



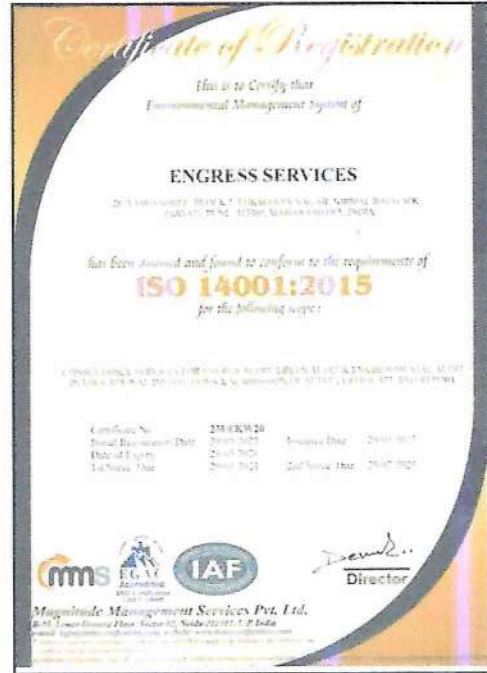
**AUDITOR CERTIFICATE**



**MEDA Registration Certificate**



**ISO: 9001-2015 Certificate**



**ISO: 14001-2015 Certificate**



## INDEX

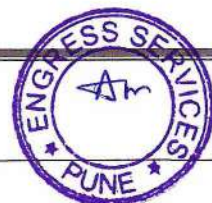
Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	7
1	Introduction	8
2	Study of Connected Load	9
3	Study of Present Energy Consumption	10
4	Study of Energy Performance Index	11
5	Study of Lighting	12
6	Study of Renewable Energy & Energy Efficiency	14



## **ACKNOWLEDGEMENT**

We Engress Services, Pune, express our sincere gratitude to the management of ASM's College of Commerce, Science & Information Technology, Pimpri, Pune 411 018, for awarding us the assignment of Energy Audit of their Pimpri campus for the Year: 2022-23.

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





## EXECUTIVE SUMMARY

1. ASM's College of Commerce, Science & Information Technology, Pimpri, Pune consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

### 2. Present Connected Load & Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	58	kW
2	Annual Energy Purchased	41020	kWh

### 3. Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	41020	kWh
2	Annual Energy Generated	784.8	kWh
3	Annual Energy Consumed=1+2	41804.8	kWh
4	Total Built up area of Institute	10615.82	m <sup>2</sup>
5	Energy Performance Index =(3) / (4)	3.94	kWh/m <sup>2</sup>

### 4. Study of % Usage of LED Lighting:

No	Particulars	Value	Unit
	% of Usage of LED Lighting to Total Lighting Load	18.67	%

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

- Usage of Energy Efficient LED fittings
- Installation of **2.18 kWp** Roof Top Solar PV Plant

### 6. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg** of CO<sub>2</sub> into atmosphere
2. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
3. Annual Solar Energy generation Days: **90 Nos**

### 7. References:

- Audit Methodology: [www.mahaurja.com](http://www.mahaurja.com)
- Energy Conservation Building Code: ECBC-2017: [www.beeindia.gov.in](http://www.beeindia.gov.in)
- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)
- For Solar PV Energy generation: [www.solarrooftop.gov.in](http://www.solarrooftop.gov.in)

## ABBREVIATIONS

AC	: Air conditioner
ASM	: Audyogik Shikshan 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

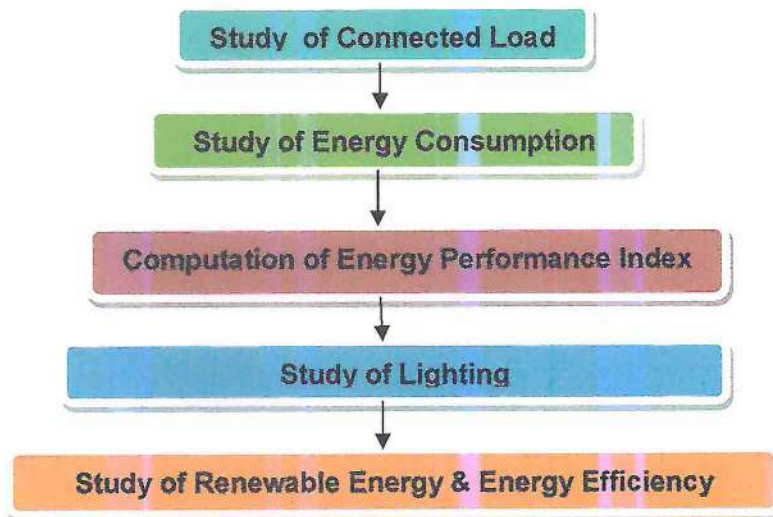
### 1.1 Introduction:

An Energy Audit is conducted at ASM's College of Commerce, Science & Information Technology, Pimpri, Pune

The guidelines followed for conducting the Energy Audit are:

- BEE India's Energy Conservation Building Code: ECBC-2017
- Maharashtra Energy Development Agency ([www.mahaurja.com](http://www.mahaurja.com))
- Tata Power: [www.tatapower.com](http://www.tatapower.com)

### 1.2 Audit Procedural Steps:



### 1.3 Institute Location Image:



Institute  
Campus



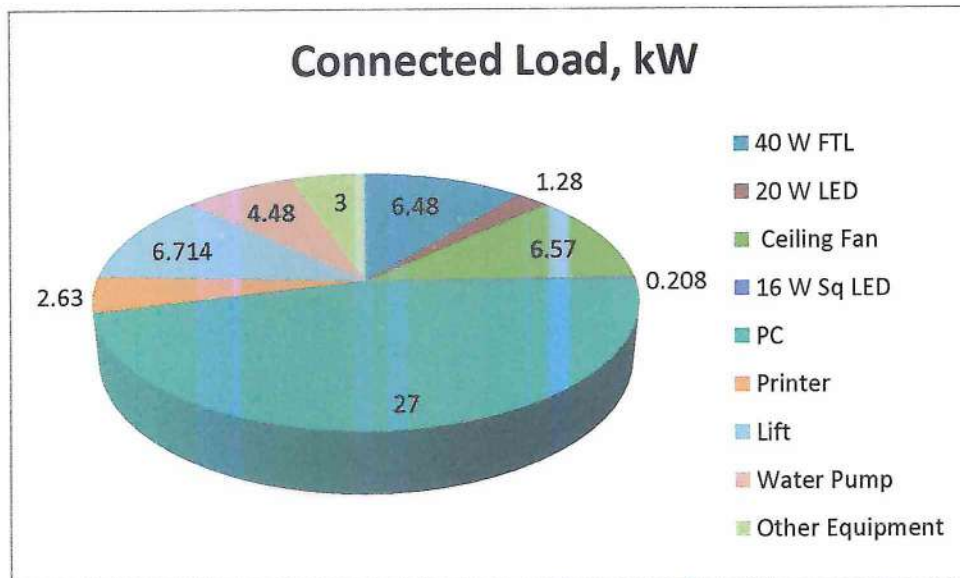
## CHAPTER-II STUDY OF CONNECTED LOAD

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	40 W FTL	162	40	6.48
2	20 W LED	64	20	1.28
3	Ceiling Fan	101	65	6.57
4	16 W Sq LED	13	16	0.208
5	PC	180	150	27
6	Printer	15	175	2.63
7	Lift	1	6714	6.714
8	Water Pump	2	2238	4.48
9	Other Equipment	12	250	3
	<b>Total</b>			<b>58</b>

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



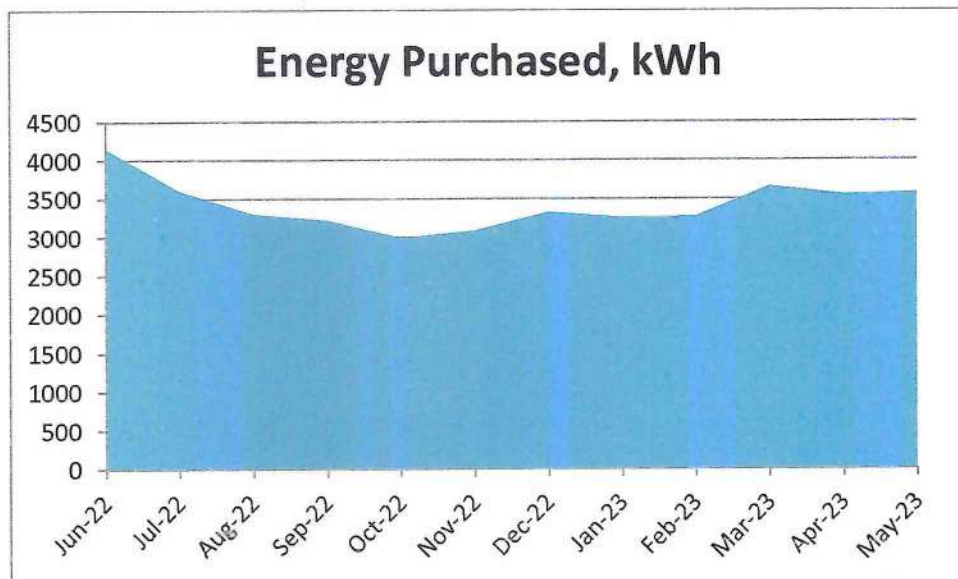
### CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electrical Energy Consumption.

Table No 2: Electrical Energy Purchase Analysis- 2022-23:

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Jun-22	4150	3.74
2	Jul-22	3604	3.24
3	Aug-22	3304	2.97
4	Sep-22	3221	2.90
5	Oct-22	2998	2.70
6	Nov-22	3087	2.78
7	Dec-22	3329	3.00
8	Jan-23	3256	2.93
9	Feb-23	3273	2.95
10	Mar-23	3663	3.30
11	Apr-23	3555	3.20
12	May-23	3581	3.22
13	Total	41020	36.92
14	Maximum	4150	3.74
15	Minimum	2998	2.70
16	Average	3418	3.08

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



## CHAPTER-IV STUDY OF ENERGY PERFORMANCE INDEX

**Energy Performance Index:** Energy Performance Index of a Building is its Annual Energy Consumption in Kilo Watt Hours per square meter of the Building

It is determined by:

$$\text{EPI} = \frac{\text{(Annual Energy Consumption in kWh)}}{\text{(Total Built-up area in m}^2\text{)}}$$

Now we compute the EPI for the Institute as under:

**Table No 3: Computation of Energy Performance Index:**

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	41020	kWh
2	Energy Generated by Solar PV Plant	784.8	kWh
3	Total Energy Consumed= 1+2	41804.8	kWh
4	Total Built up area of Institute	10615.82	m <sup>2</sup>
5	Energy Performance Index =(3) / (4)	3.94	kWh/m <sup>2</sup>



## CHAPTER V STUDY OF LIGHTING

### Terminology:

1. **Lumen** is a unit of light flow or luminous flux. The lumen rating of a lamp is a measure of the total light output of the lamp. The most common measurement of light output (or luminous flux) is the lumen. Light sources are labeled with an output rating in lumens.

2. **Lux** is the metric unit of measure for illuminance of a surface. One lux is equal to one lumen per square meter.

3. **Circuit Watts** is the total power drawn by lamps and ballasts in a lighting circuit under assessment.

4. **Installed Load Efficacy** is the average maintained illuminance provided on a horizontal working plane per circuit watt with general lighting of an interior. Unit: lux per watt per square metre (lux/W/m<sup>2</sup>)

5. **Lamp Circuit Efficacy** is the amount of light (lumens) emitted by a lamp for each watt of power consumed by the lamp circuit, i.e. including control gear losses. This is a more meaningful measure for those lamps that require control gear. Unit: lumens per circuit watt (lm/W)

6. **Installed Power Density.** The installed power density per 100 lux is the power needed per square metre of floor area to achieve 100 lux of average maintained illuminance on a horizontal working plane with general lighting of an interior. Unit: watts per square metre per 100 lux (W/m<sup>2</sup>/100 lux) 100 Installed power density (W/m<sup>2</sup>/100 lux)

7. **Lighting Power Density:** It is defined as Total Lighting Load in a room divided by the Area of that Room in square meters.

In this Chapter we compute the percentage usage of LED Lighting to total Lighting Load of the Institute.

**Table No 4: Percentage Usage of LED Lighting to Total Lighting Load:**

No	Particulars	Value	Unit
1	Qty of 40 W FTL Fittings	162	Nos
2	Load/Unit of 40 W FTL Fitting	40	W/Unit
3	Total Load of 40 W FTL fittings	<b>6.48</b>	kW
4	Qty of 16 W LED fittings	13	Nos
5	Load/Unit of 16 W LED fitting	16	W/Unit

6	Total Load of 16 W LED fittings	0.208	kW
7	Qty of 20 W LED fitting	64	Nos
8	Load/Unit of 20 W LED fitting	20	W/Unit
9	Total Load of 20 W LED fittings	1.28	kW
10	Total LED Lighting Load=6+9	1.49	kW
11	Total Lighting Load=3+6+9	7.97	kW
12	% of LED to Total Lighting Load = $10 \times 100 / 11$	18.67	%



## CHAPTER-VI STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

### 6.1 Usage of Renewable Energy:

The Institute has installed:

- Roof Top Solar PV Plant of Capacity 2.180 kWp

Photograph of Roof Top Solar PV Plant:



### 6.2 Energy Efficiency Measures adopted:

- The Institute has Energy Efficient LED Fittings.
- Usage of BEE STAR Rated Equipment

Photographs of STAR Rated AC & LED Lighting:

