

ENVIRONMENTAL AUDIT REPORT

of

AJEENKYA D Y PATIL UNIVERSITY,

Charholi Budruk, Via Lohegaon, Pune 412 105



Year: 2022-23

Prepared by

ENGRESS SERVICES

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REGISTRATION CERTIFICATES



MEDA REGISTRATION CERTIFICATE

ASSOCHAM GEM CP CERTIFICATE



ISO: 9001-2015 CERTIFICATE

ISO: 14001-2015 CERTIFICATE

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We at Engress Services, Pune, express our sincere gratitude to the management of Ajeenkya D Y Patil University, Charholi Budruk Pune 412 105 for awarding us the assignment of Environmental Audit of their Charholi campus for the Academic Year: 2022-23.

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

EXECUTIVE SUMMARY

1. Ajeenkya D Y Patil University, Charholi Budruk, Pune 412 105 consumes Energy in the form of **Electrical Energy** used for various gadgets, Office & other facilities.

2. Pollution due to University Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste, Paper & Plastic Waste
- **Liquid Waste:** Human liquid waste

3. Present Energy Consumption & CO₂ Emission:

No	Particulars	Value	Unit
1	Annual Energy Purchased	548048	kWh
2	Annual CO ₂ Emissions	493.24	MT

4. Renewable Energy & Reduction in CO₂ Emissions:

- The University has installed Roof Top Solar PV Plant of Capacity **800 kWp**.
- The Energy generated by Solar PV Plant in 2022-23 is **960000 kWh**.
- Reduction in CO₂ Emissions in 2022-23 is **864 MT**

5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	76	46	57
2	Minimum	70	39	49

6. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	28.2	82	130	45.9
2	Minimum	27.8	80	103	40

7. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Provision of Bio Composting Pit
3	Food Waste	Provision of Bio gas Unit
4	Liquid Waste	Installed Sewage Treatment Plant
5	E Waste	Disposed of through Authorized Agency

8. Rain Water Management:

The Rain water falling on the terrace is used to increase the Underground Water Table.

9. Environment Friendly Initiatives:

- Tree Plantation in the campus.
- Creation of awareness on Water Conservation Display of Posters
- Provision of E Vehicles by Shride Vehicles Pvt Ltd.

10. Assumptions:

1. Energy consumption is computed based on Load Utilization Factor
2. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
3. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
4. Annual Solar Energy Generation Days: **300 Nos**

11. References:

- For CO₂ Emissions: www.tatapower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI Quality Standards: 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. 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 complied with and adequate care has been taken towards environmental protection and preservation

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

1.3. 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 University Location Image:



University
Campus

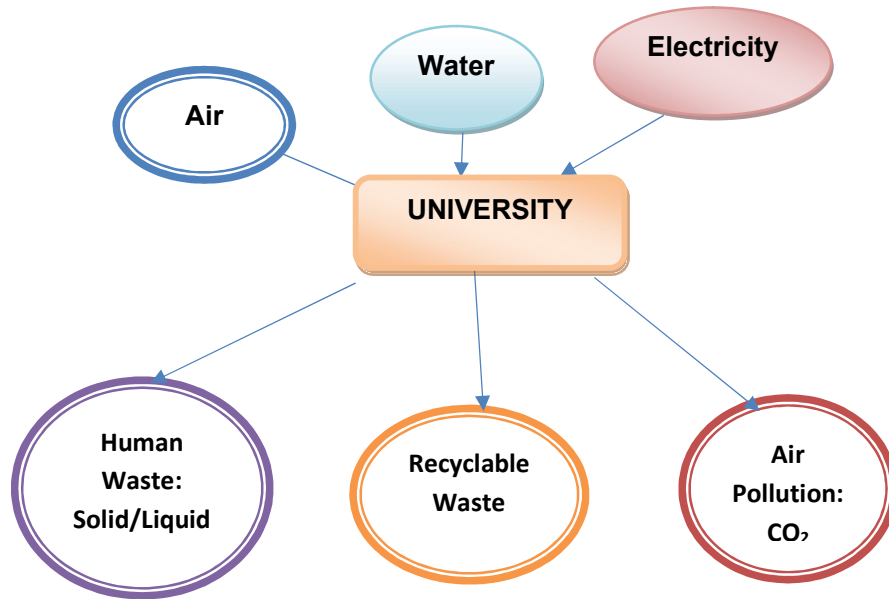
CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

The University consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

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

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



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy. The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

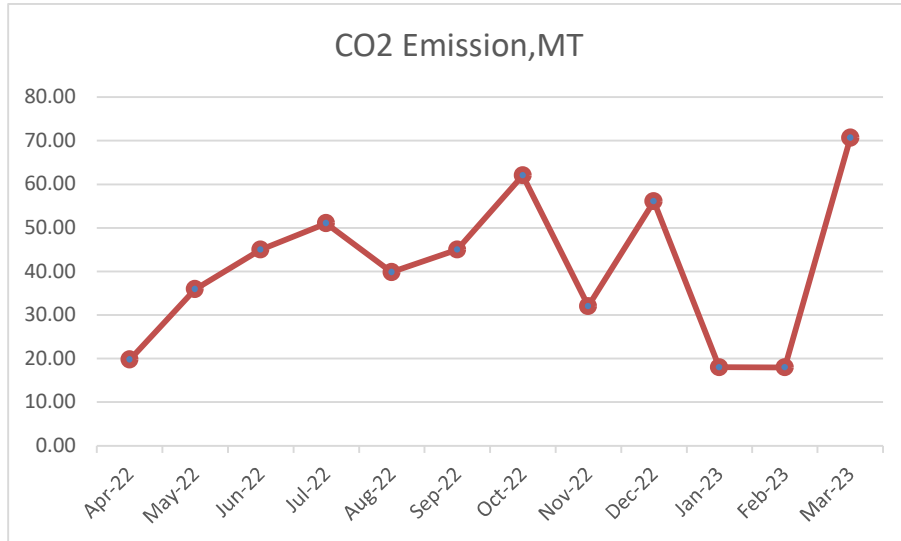
- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

Table No 1: Study of Purchase of Energy & CO₂ Emissions: 22-23:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-22	21985	19.79
2	May-22	39905	35.91
3	Jun-22	49985	44.99
4	Jul-22	56697	51.03
5	Aug-22	44252	39.83

6	Sep-22	49987	44.99
7	Oct-22	68874	61.99
8	Nov-22	35569	32.01
9	Dec-22	62287	56.06
10	Jan-23	20015	18.01
11	Feb-23	19987	17.99
12	Mar-23	78505	70.65
13	Total	548048	493.24
14	Maximum	78505	70.65
15	Minimum	19987	17.99
16	Average	45670.67	41.10

Chart No 2: Month wise CO₂ Emissions:



CHAPTER-III

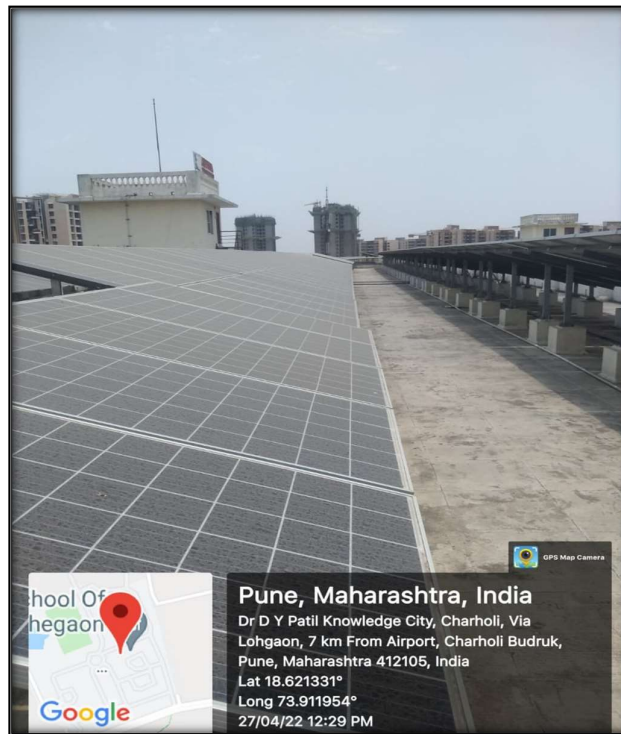
STUDY OF USAGE OF RENEWABLE ENERGY

The University has installed Roof Top Solar PV Plant of Capacity **800 kWp**.
In the following Table, we compute Reduction in CO₂ Emissions due to Solar PV Plant

Table No 2: Computation of Reduction in CO₂ Emissions due to Solar PV Plant:

No	Particulars	Value	Unit
1	Solar PV Plant Capacity	800	kWp
2	Average Energy generated per kWp	4	kWh/kWp
3	Annual working days	300	Nos
4	Annual Energy generated = (2) * (3) * (4)	960000	kWh/Annum
5	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO ₂
6	Annual Reduction in CO₂ Emissions = 4 * 5 /1000	864	MT

Photograph of Roof Top Solar PV Plant:



CHAPTER-IV

STUDY OF INDOOR AIR QUALITY PARAMETERS

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 3: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
1	Office	75	46	56
2	Classroom-1	74	45	52
3	Computer Lab	70	39	49
4	Classroom-2	71	43	52
5	School of Law	76	46	57
	Maximum	76	46	57
	Minimum	70	39	49

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 4: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Office	27.8	81	130	45.9
2	Classroom-1	27.9	80	119	44.2
3	Computer Lab	28	82	106	40
4	Classroom-2	28.2	81	103	42.6
5	School of Law	28.1	80	126	44
	Maximum	28.2	82	130	45.9
	Minimum	27.8	80	103	40

CHAPTER-VI STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The waste is segregated at source. Separate Dry and Wet waste collection bins are provided at key locations in the campus.

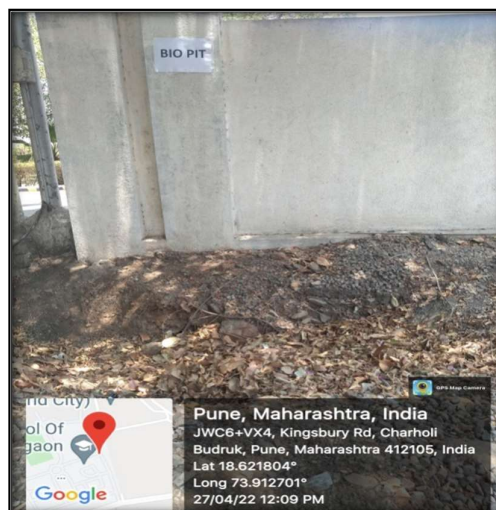
Photograph of Waste Collection Bins:



6.2 Organic Waste Management:

The organic waste generated is composted in a Bio Composting Pit and the compost produced is used for own garden.

Photograph of Vermi Composting Unit:



6.3 Food Waste Management:

The University has installed Bio Gas Plant for conversion of Food Waste

Photograph of Bio Gas Plant:



6.4 Liquid Waste Management:

The University has a Sewage Treatment Plant of Capacity **300 KLPD**, to treat the Liquid Waste. The treated water is used for gardening purpose.

Photograph of Sewage Treatment Plant:



6.5 E Waste Management:

The E Waste is disposed of through Authorized Agency.

CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

The University is installing the project of Rain water Management project. The Rain Water from the terrace is taken through pipes, filtered and further used for increasing the underground water table.

Photograph of Rain Water Collecting Pipe and Sand Filter Unit:



Rain Water
Collecting Pipe with
Sand Filter Unit

CHAPTER-VIII

STUDY OF ECO-FRIENDLY INITIATIVES

8.1 Plantation in the Campus:

The University has well maintained Garden, inside the campus.

Photograph of Internal Tree Plantation:



8.2 Creation of Awareness by Display of Posters:

At prominent location, Posters are displayed for creation of awareness on Resource Conservation.

Photograph of Poster on Water 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 ⁰ C
2	Humidity	Less Than 70%