



## Key Indicator - 7.1 Institutional Values and Social Responsibilities

7.1.3 Quality audits on environment and energy regularly undertaken by the Institution. The institutional environment and energy initiatives are confirmed through the following.

1. Green audit / Environment audit
2. Energy audit
3. Clean and green campus initiatives
4. Beyond the campus environmental promotion activities

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# Environment Audit Certificates and Reports



LOKMANYA TILAK JANKALYAN SHIKSHAN SANSTHA'S

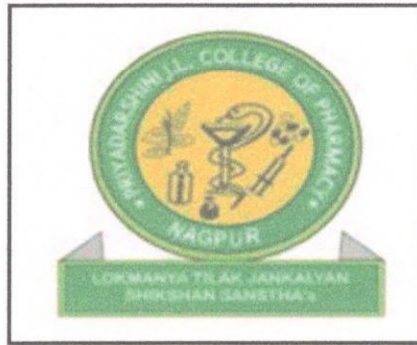
**PRIYADARSHINI J. L. COLLEGE OF PHARMACY**

# ENVIRONMENTAL AUDIT REPORT

of

Lokmanya Tilak Jankalyan Shikshan Sanstha's,  
**PRIYADARSHINI J. L. COLLEGE OF PHARMACY (DEGREE),**

MIDC Hingna Road, Nagpur



Year: 2021-22

Prepared by:

**ENGRESS SERVICES**

Yashashree, 26, Nirmal Bag Society,  
Near Mukhtangan English School, Parvati, Pune 411009

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







## ENGRESS SERVICES

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

Ref: EC/JLCOP/21-22/02

Date: 14/6/2022

### ENVIRONMENTAL AUDIT CERTIFICATE

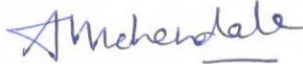
This is to certify that we have conducted Environmental Audit at Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini J. L. College of Pharmacy (Degree), MIDC Hingna, Nagpur in the Year 21-22.

The College has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 33 kWp
- Segregation of Waste at source
- Provision of Bio Composting Pit for conversion of organic Waste
- Provision of Incinerator for Animal Waste
- Implementation of Rain Water management Project
- Tree Plantation in the campus

We appreciate the support of Management, involvement of faculty members and students in the process of making the Campus Energy Efficient & Environment Friendly

For Engress Services,



**A Y Mehendale,**

Certified Energy Auditor, EA-8192

ASSOCHAM GEM Certified Professional: GEM: 22/788



## INDEX

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## **ACKNOWLEDGEMENT**

We Engress Services, Pune, express our sincere gratitude to the management of Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini J. L. College of Pharmacy (Degree), MIDC Hingna, Nagpur, for awarding us the assignment of Environmental Audit of their Campus for the Year: 21-22.

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



## EXECUTIVE SUMMARY

1. Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini J. L. College of Pharmacy (Degree), MIDC Hingna, Nagpur consumes Energy in the form of **Electrical Energy & LPG**; used for various Equipment.

### 2. Pollution due to Institute 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 Electrical Energy, LPG Purchase & CO<sub>2</sub> Emission:

No	Parameter/ Value	Energy Purchased, kWh	LPG Consumed, Kg	CO <sub>2</sub> Emissions, MT
1	Total	2290	228	2.672
2	Maximum	321	38	0.316
3	Minimum	126	9	0.143
4	Average	190.83	19.00	0.22

### 4. Initiatives Environmental Conservation:

- Usage of Energy Efficient LED fittings
- Implementation of **33 kWp** Roof Top Solar PV Plant
- Segregation of Waste at source
- Implementation of Rain Water Management Project

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

- The College installed Roof Top Solar PV Plant of Capacity **33 kWp**
- Energy generated n 21-22 **39600 kWh**
- Reduction in CO<sub>2</sub> Emissions in 21-22 is **35.64 MT**

### 6. Indoor Air Quality:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	<b>57</b>	<b>32</b>	<b>38</b>
2	Minimum	<b>45</b>	<b>24</b>	<b>27</b>

### 7. Indoor Comfort Condition Parameters:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	<b>27</b>	<b>60.1</b>	<b>145</b>	<b>49</b>
2	Minimum	<b>26.5</b>	<b>59</b>	<b>121</b>	<b>39</b>



## 8. Waste Management:

### 8.1 Segregation of Waste at source:

The Waste is segregated at source. Waste Bins are kept at various points

### 8.2 Bio Composting Pit:

For conversion of Organic Waste, a Bio Composting Pit is provided

### 8.3 Provision of Incinerator:

For disposal of animal Waste Incinerator is provided

### 8.4 Hazardous Chemical Storage & Fumes' Management:

The Hazardous Chemicals are kept away from Students in a Fumigation Chamber.

### 8.5 E Waste Management:

The E Waste is disposed of through M/s. Suritex Pvt. Ltd.

## 9. Rain Water management:

The Rain water falling on the terrace is used to increase the underground water table.

## 10. Eco Friendly Initiatives:

- Tree Plantation in the campus

## 11. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere
2. **1 Kg** of LPG releases **2.68 Kg of CO<sub>2</sub>** into atmosphere
3. Energy generated by Solar PV plant: **4 kWp/Day/kWp**
4. Annual Energy Generation Days: **300 Nos**

## 12. References:

- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)
- For Solar Energy Generation: [www.solarrooftop.gov.in](http://www.solarrooftop.gov.in)
- For AQI Parameters: [www.cpcb.com](http://www.cpcb.com)
- For Indoor Comfort Parameters: [www.isharae.com](http://www.isharae.com)



## **ABBREVIATIONS**

LTJSSS	:	Lokmanya Tilak Jankalyan Shikshan Sanstha
LED	:	Light Emitting Diode
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
FTL	:	Fluorescent Tube Light
Kg	:	Kilo Gram
kWh	:	kilo-Watt Hour
CO <sub>2</sub>	:	Carbon Di Oxide
MT	:	Metric Ton
AQI	:	Air Quality Index
CPCB	:	Central pollution Control Board
ISHRAE	:	The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

## 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.	Information Technology Vision 2030 (The Energy Research Institute)
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 Resource Consumption & CO<sub>2</sub> Emissions
2. To Study Usage of renewable Energy
3. To study Indoor air Quality
4. To study Indoor Comfort Condition Parameters
5. To Study of Waste Management
6. To Study of Rain Water Management
7. To Study of Environment Friendly Initiatives

**1.2 Table No 4: General Details of the College:**

No	Head	Particulars
1	Name of Institution	Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini J. L. College of Pharmacy (Degree),
2	Address	MIDC Hingna, Nagpur
3	Establishment	1997



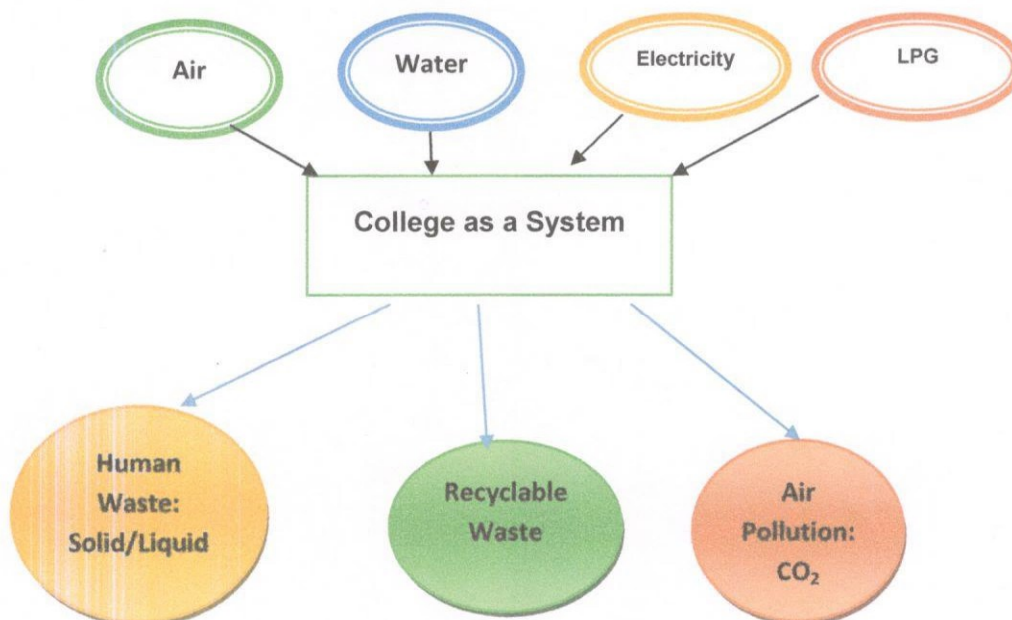
## CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO<sub>2</sub> EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy & LPG

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

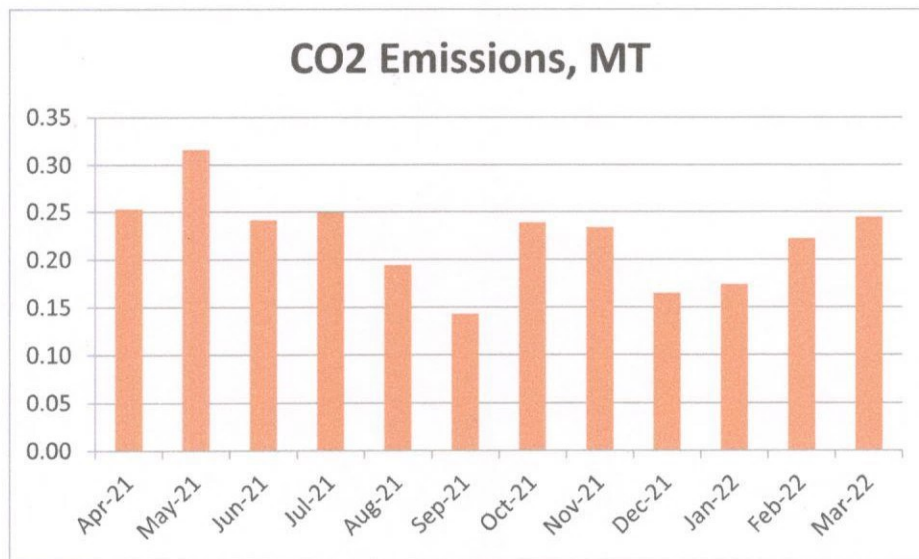
**Table No 5: Study of Energy, LPG Consumption & CO<sub>2</sub> Emissions: 21-22:**

No	Month	Energy Purchased, kWh	LPG Consumed, Kg	CO <sub>2</sub> Emissions, MT
1	Apr-21	254	9	0.25
2	May-21	321	10	0.32
3	Jun-21	241	9	0.24
4	Jul-21	247	10	0.25
5	Aug-21	189	9	0.19
6	Sep-21	129	10	0.14
7	Oct-21	152	38	0.24



8	Nov-21	146	38	0.23
9	Dec-21	126	19	0.16
10	Jan-22	137	19	0.17
11	Feb-22	133	38	0.22
12	Mar-22	215	19	0.24
13	Total	2290	228	2.672
14	Maximum	321	38	0.316
15	Minimum	126	9	0.143
16	Average	190.83	19.00	0.22

**Chart No 2: Variation in Monthly CO<sub>2</sub> Emission:**



**Table No 6: Variation in Important Parameters:**

No	Parameter/ Variation	Energy Purchased, kWh	LPG Consumed, Kg	CO <sub>2</sub> Emissions, MT
1	Total	2290	228	2.672
2	Maximum	321	38	0.316
3	Minimum	126	9	0.143
4	Average	190.83	19.00	0.22





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

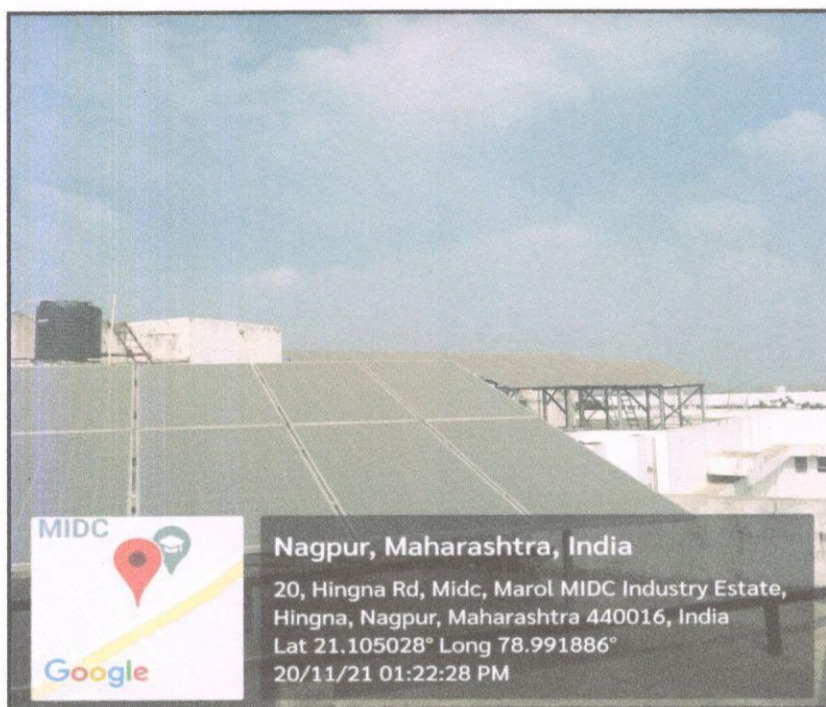
The College has installed Roof Top Solar PV Plant of Capacity **33 kWp**.

In the following Table, we present the Reduction in CO<sub>2</sub> Emissions due to Solar Energy.

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

No	Particulars	Value	Unit
1	Capacity of Roof Top Solar PV Plant	33	kWp
2	Energy generated in 21-22	39600	kWh
3	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO <sub>2</sub>
4	Reduction in CO <sub>2</sub> Emission in 21-22 = $2*3/1000$	35.64	MT

**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.**

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.

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 10micron

**Table No 8: Indoor Air Quality Parameters:**

No	Location	AQI	PM-2.5	PM-10
1	Admin Section	51	32	38
2	Lab-1	50	30	37
3	Lab-2	45	24	27
4	Class Room-2	57	32	36
5	Library	51	31	33
	Maximum	<b>57</b>	<b>32</b>	<b>38</b>
	Minimum	<b>45</b>	<b>24</b>	<b>27</b>



## 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 9: Study of Indoor Comfort Condition Parameters:**

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Admin Section	26.5	60	145	41
2	Lab-1	26.7	59	140	39
3	Lab-2	26.6	59.6	139	47
4	Class Room-2	26.8	60.1	129	49
5	Library	27	60	121	47
	Maximum	<b>27</b>	<b>60.1</b>	<b>145</b>	<b>49</b>
	Minimum	<b>26.5</b>	<b>59</b>	<b>121</b>	<b>39</b>



## CHAPTER VI STUDY OF WASTE MANAGEMENT

### 6.1 Segregation of Waste at source:

The Waste is segregated at source. Waste Bins are kept at various points

Photograph of Waste Bin:



### 6.2 Bio Composting Pit:

For conversion of Organic Waste, a Bio Composting Pit is provided

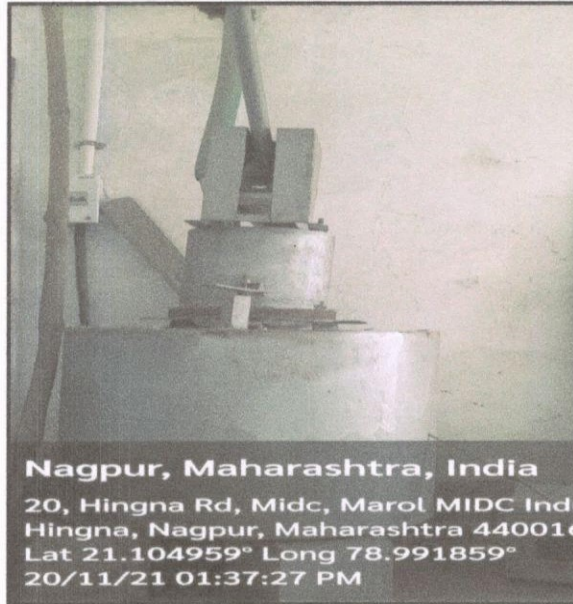
Photograph of Bio Composting Pit:



**6.3 Provision of Incinerator:**

For disposal of animal Waste Incinerator is provided

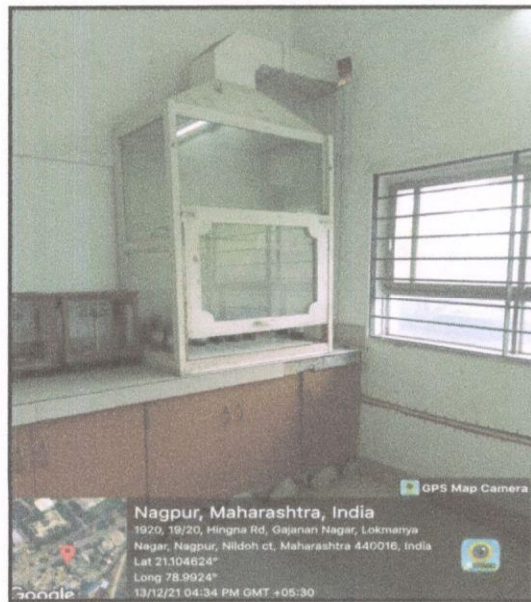
**Photograph of Incinerator:**



**6.4 Hazardous Chemical Storage & Fumes' Management:**

The Hazardous Chemicals are kept away from Students in a Fumigation Chamber.

**Photograph of Fumigation Chamber:**



**6.5 E Waste Management:**

The E Waste is disposed of through M/s. Suritex Pvt. Ltd.



## CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

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

**Photograph of Rain Water Pipe Section:**



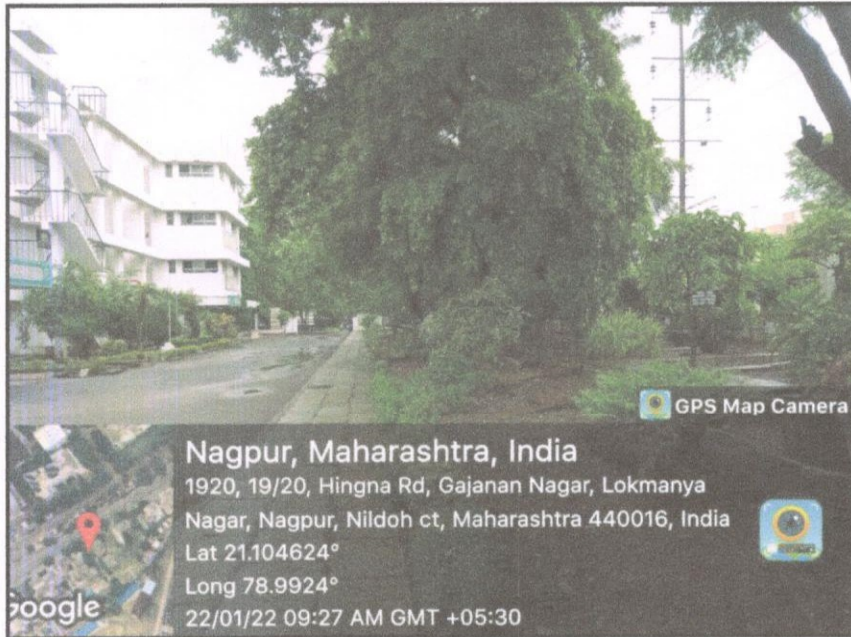
Rain Water  
Carrying Pipe

## CHAPTER-VIII STUDY OF ECO FRIENDLY INITIATIVES

### 7.1 Tree Plantation:

The College has done Tree Plantation in the campus.

#### Photograph of Tree Plantation:



## VARIOUS AIR QUALITY, NOISE & INDOOR COMFORT STANDARDS:

### 1. Category Wise Air Quality Index Values & Concentration of PM-2.5 & PM-10:

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°C
2	Humidity	Less Than 70%



# ENVIRONMENTAL AUDIT REPORT

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Prepared by:

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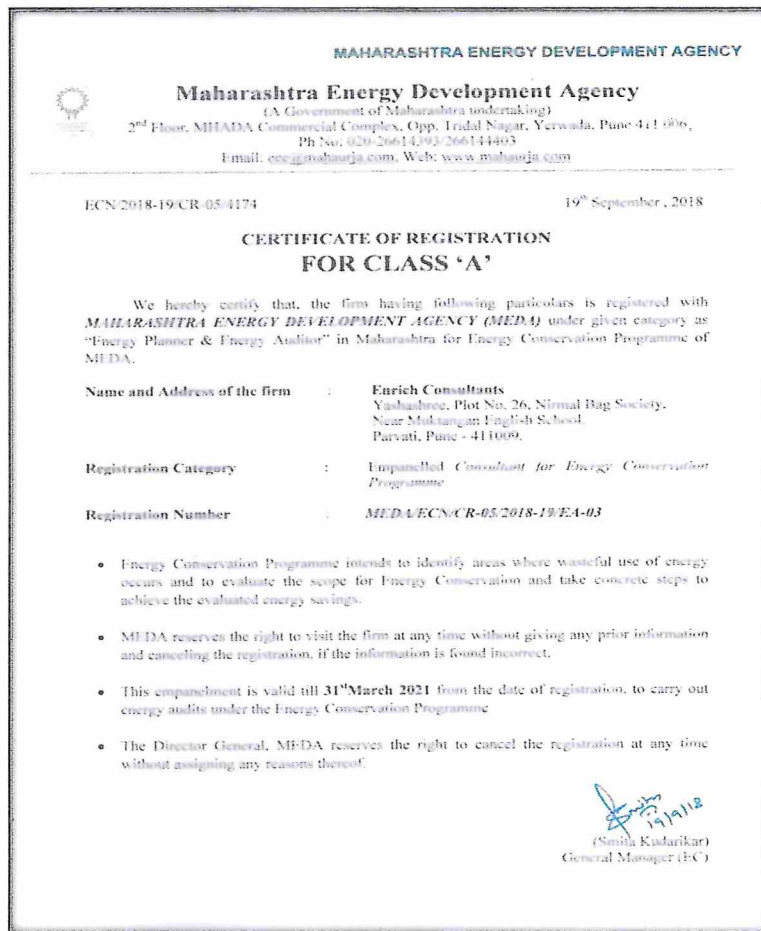
Email: [enrichcons@gmail.com](mailto:enrichcons@gmail.com)



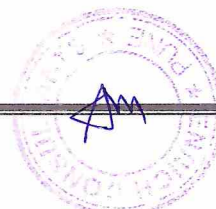
### REGISTRATION CERTIFICATES



### BEE AUDITOR CERTIFICATE



### MEDA REGIATRATION CERTIFICATE





## Enrich Consultants

Yashashree, 26, Nirmal Bag Society,  
Near Mukhtangan English School, Parvati, Pune 411 009  
Email: [enrichcons@gmail.com](mailto:enrichcons@gmail.com)

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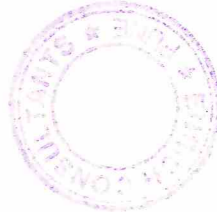
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For Enrich Consultants,



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B E- Mechanical, M Tech, Energy  
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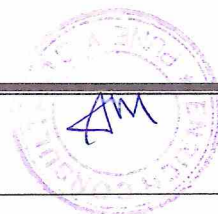
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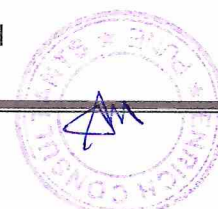
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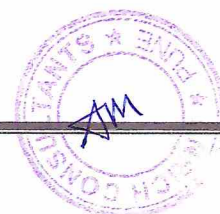
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### 11. References:

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- For Solar Energy Generation: [www.solarrooftop.gov.in](http://www.solarrooftop.gov.in)

## **ABBREVIATIONS**

LTJSSS	:	Lokmanya Tilak Jankalyan Shikshan Sanstha
LED	:	Light Emitting Diode
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
FTL	:	Fluorescent Tube Light
Kg	:	Kilo Gram
kWh	:	kilo-Watt Hour
CO <sub>2</sub>	:	Carbon Di Oxide
MT	:	Metric Ton
AQI	:	Air Quality Index
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"*

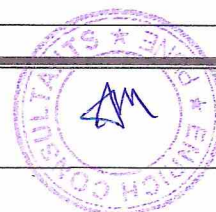
**1.1.3. Environmental Pollutant:** means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

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#### 1.1.5. Some Important Environmental Rules in India: Table No-2:

1989	Hazardous Waste (Management and Handling) Rules
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### 1.1.6 National Environmental Plans & Policy Documents: Table No-3:

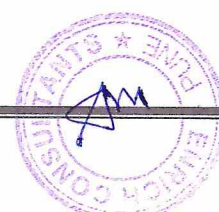
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### 1.2 Objectives:

1. To study Resource Consumption & CO<sub>2</sub> Emissions
2. To Study Usage of renewable Energy
3. To study Indoor air Quality
4. To Study of Waste Management
5. To Study of Rain Water Management
6. To Study of Environment Friendly Initiatives

### 1.2 Table No 4: General Details of the College:

No	Head	Particulars
1	Name of Institution	Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini J. L. College of Pharmacy (Degree),
2	Address	MIDC Hingna, Nagpur
3	Establishment	1997





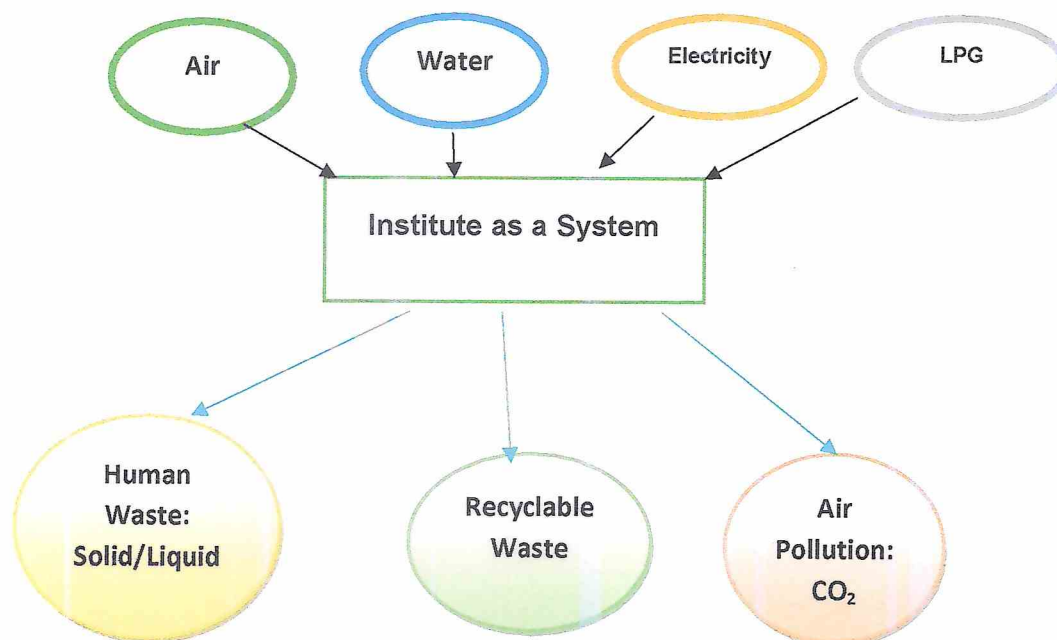
## CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO<sub>2</sub> EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy & LPG

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

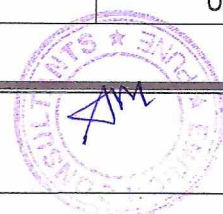


Now we compute the Generation of CO<sub>2</sub> on account of consumption of Electrical Energy. The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy is as under

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

Table No 5: Study of Energy, LPG Consumption & CO<sub>2</sub> Emissions: 20-21:

No	Month	Energy Purchased, kWh	LPG Consumed, Kg	CO <sub>2</sub> Emissions, MT
1	Apr-20	1068	2	0.97
2	May-20	1068	2	0.97
3	Jun-20	702	9	0.66
4	Jul-20	129	10	0.14
5	Aug-20	127	8	0.14
6	Sep-20	129	9	0.14
7	Oct-20	125	10	0.14



8	Nov-20	134	9	0.14
9	Dec-20	137	9	0.15
10	Jan-21	130	9	0.14
11	Feb-21	122	9	0.13
12	Mar-21	184	9	0.19
13	Total	4055	95	3.904
14	Maximum	1068	10	0.967
15	Minimum	122	2	0.134
16	Average	337.92	7.92	0.33

Chart No 2: Variation in Monthly CO<sub>2</sub> Emission:

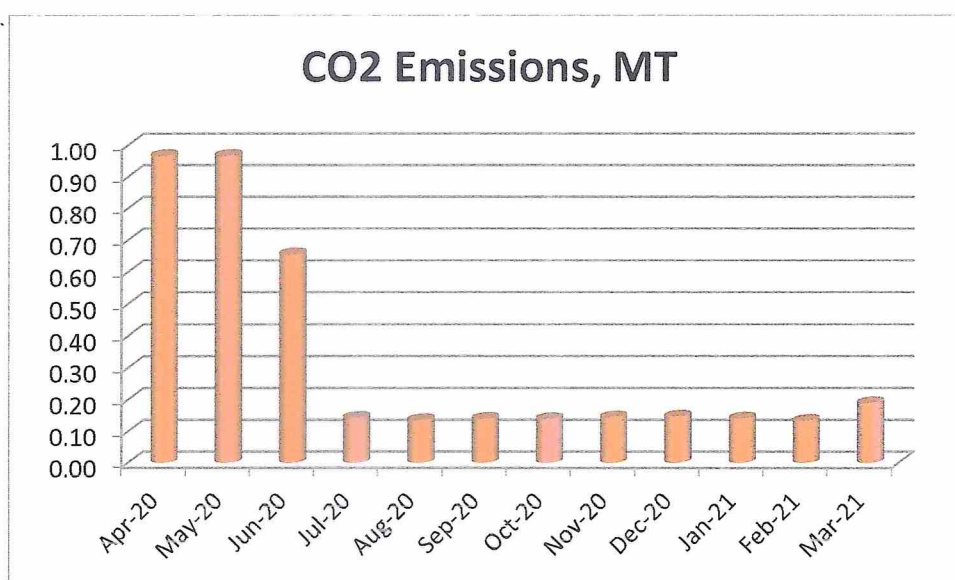
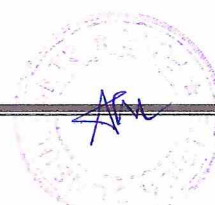


Table No 6: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	LPG Consumed, Kg	CO <sub>2</sub> Emissions, MT
1	Total	4055	95	3.904
2	Maximum	1068	10	0.967
3	Minimum	122	2	0.134
4	Average	337.92	7.92	0.33



### **CHAPTER-III**

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

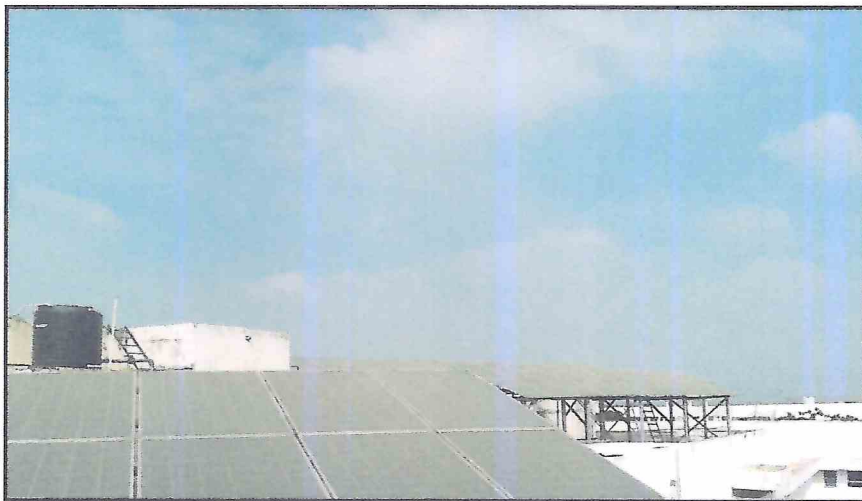
The College has installed Roof Top Solar PV Plant of Capacity 33 kWp.

In the following Table, we present the Reduction in CO<sub>2</sub> Emissions due to Solar Energy.

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

No	Particulars	Value	Unit
1	Capacity of Roof Top Solar PV Plant	33	kWp
2	Energy generated in 20-21	39600	kWh
3	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO <sub>2</sub>
4	Reduction in CO <sub>2</sub> Emission in 20-21 = $2*3/1000$	35.64	MT

**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.**

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.

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 10micron

**Table No 8: Indoor Air Quality Parameters:**

No	Location	AQI	PM-2.5	PM-10
1	Principal Cabin	96	58	73
2	Admin Section	101	61	75
3	Laboratory	98	58	74
4	Class Room-1	102	61	80
5	Library	103	61	75
	Maximum	103	61	80
	Minimum	96	58	73

## CHAPTER V STUDY OF WASTE MANAGEMENT

### 5.1 Segregation of Waste at source:

The Waste is segregated at source. Waste Bins are kept at various points

Photograph of Waste Bin:



### 5.2 Bio Composting Pit:

For conversion of Organic Waste, a Bio Composting Pit is provided

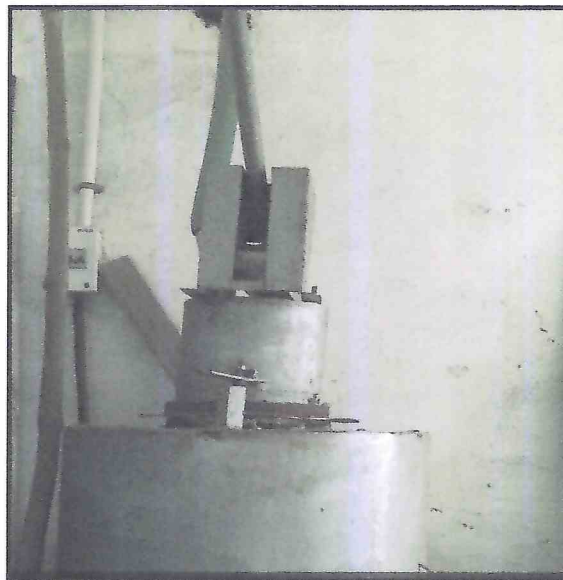
Photograph of Bio Composting Pit:



**5.3 Provision of Incinerator:**

For disposal of animal Waste Incinerator is provided

**Photograph of Incinerator:**



**5.4 Hazardous Chemical Storage & Fumes' Management:**

The Hazardous Chemicals are kept away from Students in a Fumigation Chamber.

**Photograph of Fumigation Chamber:**



**5.5 E Waste Management:**

The E Waste is disposed of through M/s. Suritex Pvt. Ltd.



## **CHAPTER-VI**

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

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

**Photograph of Rain Water Pipe Section:**



## **CHAPTER-VII**

### **STUDY OF ECO FRIENDLY INITIATIVES**

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

The College has done Tree Plantation in the campus.

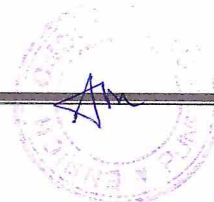
**Photograph of Tree Plantation:**



**ANNEXURE:**  
**INDOOR AIR QUALITY 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 +





# ENVIRONMENTAL AUDIT REPORT

of

Lokmanya Tilak Jankalyan Shikshan Sanstha's,  
**PRIYADARSHINI J. L. COLLEGE OF PHARMACY (DEGREE),**  
MIDC Hingna Road, Nagpur

Year: 2019-20

Prepared by:

**ENRICH CONSULTANTS**

Yashashree, 26, Nirmal Bag Society,  
Near Mukhtangan English School, Parvati, Pune 411009

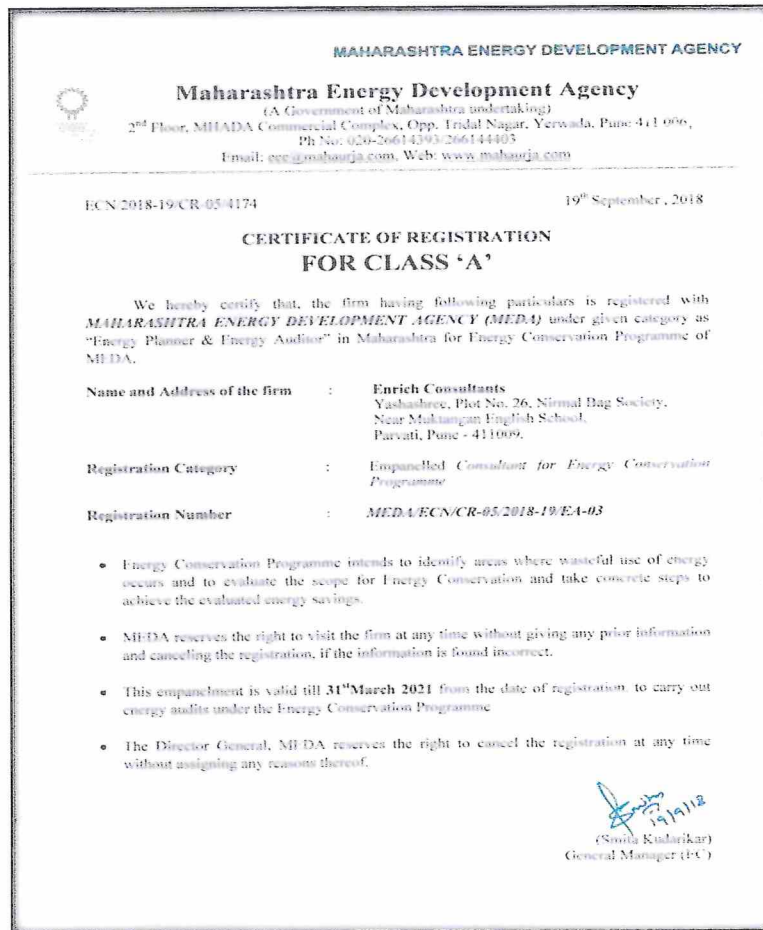
Email: [enrichcons@gmail.com](mailto:enrichcons@gmail.com)



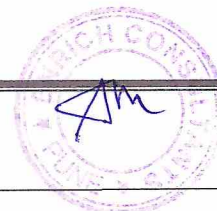
### REGISTRATION CERTIFICATES



### BEE AUDITOR CERTIFICATE



### MEDA REGIATRATION CERTIFICATE



## Enrich Consultants

Yashashree, 26, Nirmal Bag Society,  
Near Mukhtangan English School, Parvati, Pune 411 009  
Email: [enrichcons@gmail.com](mailto:enrichcons@gmail.com)

Ref: EC/JLCOP/19-20/02

Date: 10/7/2020

### ENVIRONMENTAL AUDIT CERTIFICATE

This is to certify that we have conducted Environmental Audit at Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini J. L. College of Pharmacy (Degree), MIDC Hingna, Nagpur in the Year 19-20.

The College has adopted following Eco Friendly Practices:

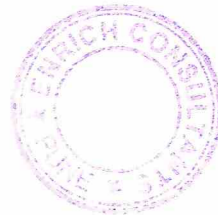
- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 33 kWp
- Segregation of Waste at source
- Provision of Bio Composting Pit for conversion of organic Waste
- Provision of Incinerator for Animal Waste
- Implementation of Rain Water management Project
- Tree Plantation in the campus

We appreciate the support of Management, involvement of faculty members and students in the process of making the Campus Energy Efficient & Eco Friendly

For Enrich Consultants,



A Y Mehendale,  
B E- Mechanical, M Tech, Energy  
Certified Energy Auditor, EA-8192





## INDEX

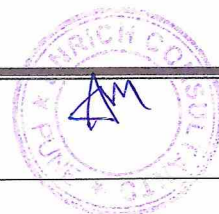
Sr. No	Particulars	Page No
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3	Study of Usage of Renewable Energy	13
4	Study of Waste Management	14
5	Study of Rain Water Management	16
6	Study of Eco Friendly Initiatives	17



## **ACKNOWLEDGEMENT**

We Engress Services, Pune, express our sincere gratitude to the management of Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini J. L. College of Pharmacy (Degree), MIDC Hingna, Nagpur, for awarding us the assignment of Environmental Audit of their Campus for the Year: 19-20.

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



## EXECUTIVE SUMMARY

1. Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini J. L. College of Pharmacy (Degree), MIDC Hingna, Nagpur consumes Energy in the form of Electrical Energy & LPG; used for various Equipment.

### 2. Present Electrical Energy, LPG Purchase & CO<sub>2</sub> Emission:

No	Parameter/ Value	Energy Purchased, kWh	LPG Consumed, Kg	CO <sub>2</sub> Emissions, MT
1	Total	43837	380	40.472
2	Maximum	6642	76	6.080
3	Minimum	2371	9	2.338
4	Average	3653.08	31.67	3.37

### 3. Initiatives Environmental Conservation:

- Usage of Energy Efficient LED fittings
- Implementation of 33 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Implementation of Rain Water Management Project

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

- The College installed Roof Top Solar PV Plant of Capacity **33 kWp**
- Energy Generated by Solar PV Plant in 19-20 is **13200 kWh**
- Reduction in CO<sub>2</sub> Emissions in 19-20 is **11.88 MT**

### 5. Waste Management:

#### 5.1 Segregation of Waste at source:

The Waste is segregated at source. Waste Bins are kept at various points

#### 5.2 Bio Composting Pit:

For conversion of Organic Waste, a Bio Composting Pit is provided

#### 5.3 Provision of Incinerator:

For disposal of animal Waste Incinerator is provided

#### 5.4 E Waste Management:

The E Waste is disposed of through M/s. Suritex Pvt. Ltd.

### 6. Rain Water management:

The Rain water falling on the terrace is used to increase the underground water table.



### 7. Eco Friendly Initiatives:

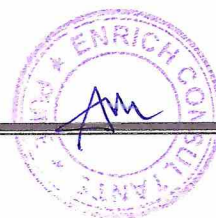
- Tree Plantation in the campus

### 8. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere
2. **1 Kg** of LPG releases **2.68 Kg of CO<sub>2</sub>** into atmosphere
3. Energy generated by Solar PV plant: **4 kWp/Day/kWp**
4. Annual Energy Generation Days in 19-20: **100 Nos**

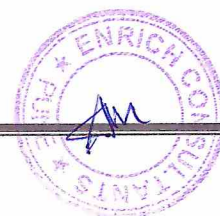
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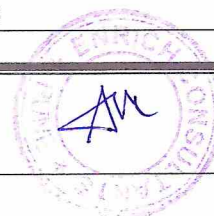
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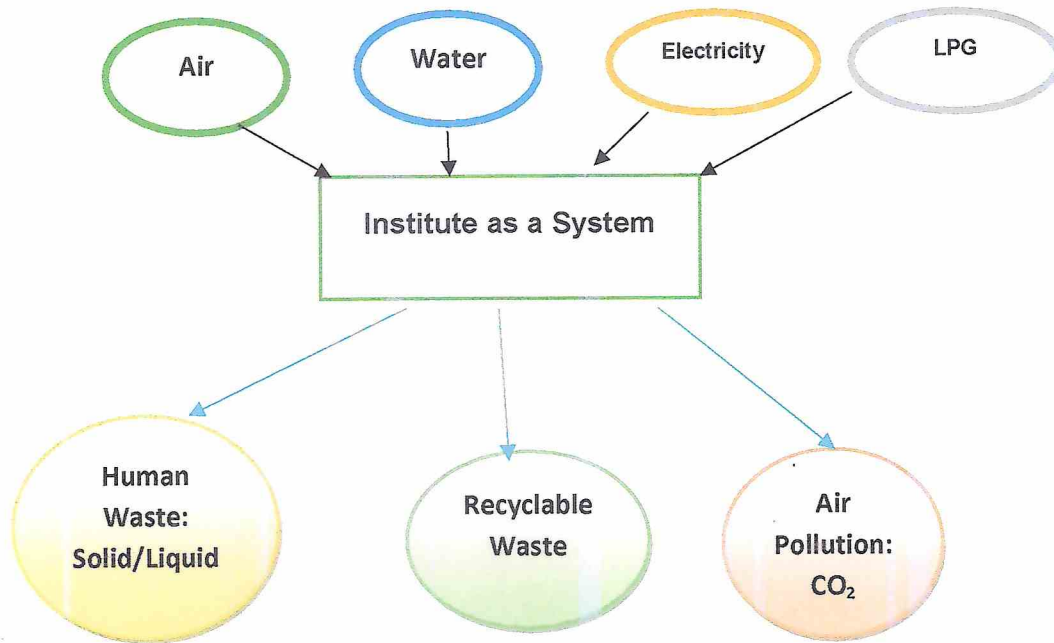
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## CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO<sub>2</sub> EMISSION

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3. Electrical Energy & LPG

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 5: Study of Energy, LPG Consumption & CO<sub>2</sub> Emissions: 19-20:**

No	Month	Energy Purchased, kWh	LPG Consumed, Kg	CO <sub>2</sub> Emissions, MT
1	Apr-19	254	19	0.28
2	May-19	5226	38	4.81
3	Jun-19	4962	38	4.57
4	Jul-19	3935	10	3.57
5	Aug-19	3384	9	3.07
6	Sep-19	3302	10	3.00
7	Oct-19	2327	38	2.20

8	Nov-19	0	38	0.10
9	Dec-19	0	19	0.05
10	Jan-20	561	19	0.56
11	Feb-20	315	38	0.39
12	Mar-20	315	9	0.31
13	Total	24581	285	22.887
14	Maximum	5226	38	4.805
15	Minimum	0	9	0.051
16	Average	2048.42	23.75	1.91

Chart No 2: Variation in Monthly CO<sub>2</sub> Emission:

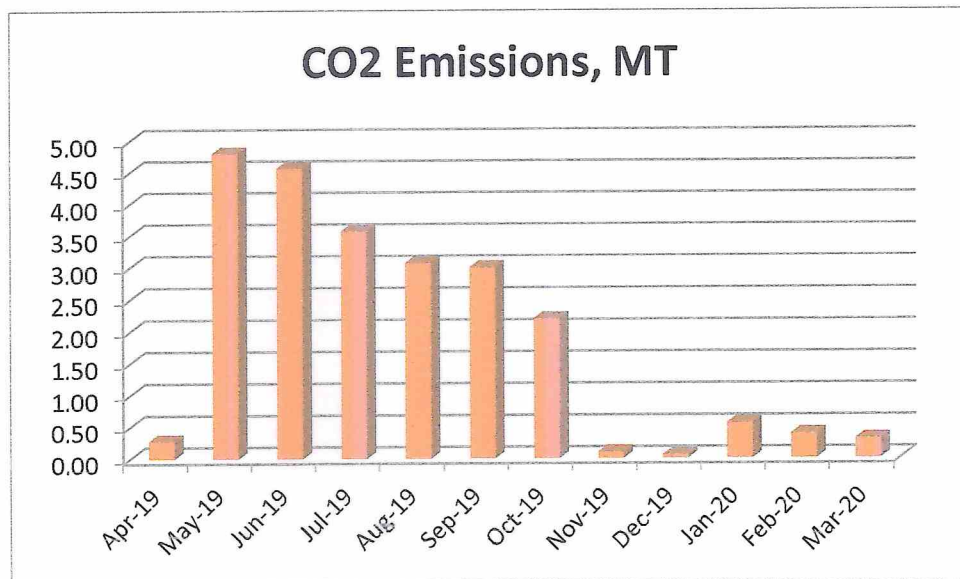


Table No 6: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	LPG Consumed, Kg	CO <sub>2</sub> Emissions, MT
1	Total	24581	285	22.887
2	Maximum	5226	38	4.805
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### CHAPTER-III STUDY OF USAGE OF RENEWABLE ENERGY

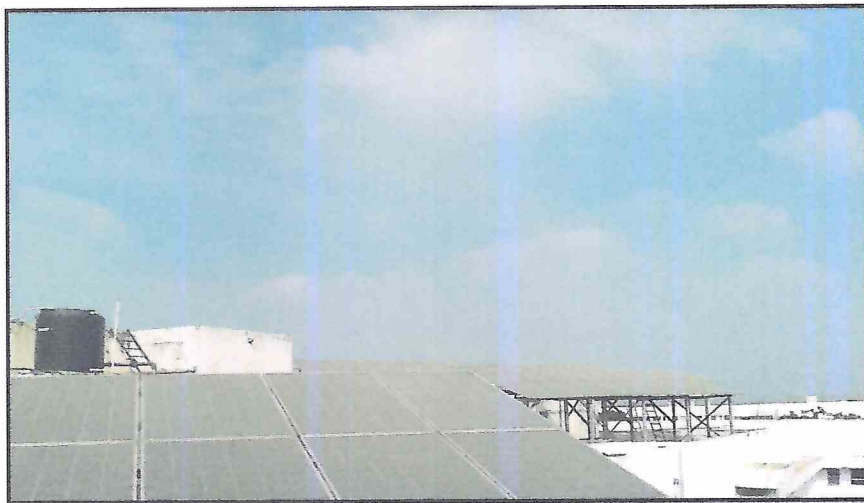
The College has installed Roof Top Solar PV Plant of Capacity 33 kWp.

In the following Table, we present the Reduction in CO<sub>2</sub> Emissions due to Solar Energy.

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

No	Particulars	Value	Unit
1	Capacity of Roof Top Solar PV Plant	33	kWp
2	Energy generated in 19-20	13200	38
3	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO <sub>2</sub>
4	Reduction in CO <sub>2</sub> Emission in 19-20 = $2*3/1000$	11.88	MT

**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 kept at various points

**Photograph of Waste Bin:**



#### **4.2 Bio Composting Pit:**

For conversion of Organic Waste, a Bio Composting Pit is provided

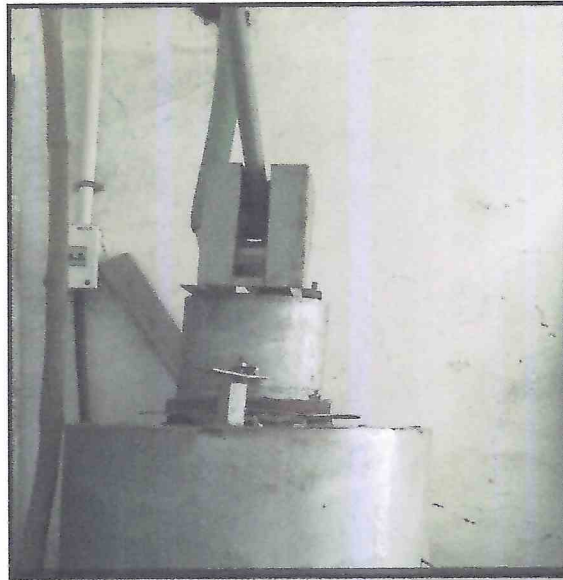
**Photograph of Bio Composting Pit:**



**4.3 Provision of Incinerator:**

For disposal of animal Waste Incinerator is provided

**Photograph of Incinerator:**



**4.4 E Waste Management:**

The E Waste is disposed of through M/s. Suritex Pvt. Ltd.



## **CHAPTER-V**

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

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

**Photograph of Rain Water Pipe Section:**



## **CHAPTER-VI**

### **STUDY OF ECO FRIENDLY INITIATIVES**

#### **6.1 Tree Plantation:**

The College has done Tree Plantation in the campus.

Photograph of Tree Plantation:

