ENVIRONMENTAL AUDIT REPORT

of

Maharashtra State Institute of Hotel Management & Catering Technology,

(UG & PG –Degree Programme)

412-C, K M Munshi Marg, Shivajinagar, Pune 411 016

M.S.I.H.M.C.T.R.S.

ज्ञानं परमं बलम्

Year: 2019-20

Prepared by

ENRICH CONSULTANTS

Yashashree, 26, Nirmal Bag Society

Near Muktangan English School, Parvati, Pune 411009

Phone: 09890444795 Email: enrichcons@gmail.com

ENRICH CONSULTANTS * PUNE *

REGISTRATION CERTIFICATES

National Productivity Council

(National Certifying Agency)

PROVISIONAL CERTIFICATE

Achyut Yashavant Mehendale

Yashavant

Controller of Examination

BEE ENERGY AUDITOR CERTIFICATE

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency

CERTIFICATE OF REGISTRATION

FOR CLASS 'A'

Name and Address of the firm	:	Enrich Consultants
Registration Category	:	Empanelled Consultant for Energy Conservation Programme
Registration Number	:	[illegible]

- This empanelment is valid till 31st March 2021 from the date of registration to carry out energy audits under the Energy Conservation Programme.

General Manager (EC)

MEDA EMPANELMENT CERTIFICATE

ENRICH CONSULTANTS

Yashashree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/MSIHMCT/19-20/03

Date: 14/8/2020

CERTIFICATE

This is to certify that we have conducted an Environmental Audit at Maharashtra State Institute of Hotel Management & Catering Technology, (UG & PG –Degree Programme) 412-C, K M Munshi Marg, Shivajinagar, Pune 411 016, in the Year 2019-20.

The Institute has adopted following Eco Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Installation of Solar Thermal Water Heating System
- Segregation of Waste at source
- Vermi Composting Bed for conversion of organic Waste
- Implementation of Rain Water Management Project
- Internal Tree Plantation

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Enrich Consultants,

ENRICH CONSULTANTS PUNE

A Y Mehendale,
Certified Energy Auditor
EA-8192

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ACKNOWLEDGEMENT

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EXECUTIVE SUMMARY

1. Maharashtra State Institute of Hotel Management & Catering Technology, (UG & PG –Degree Programme) 412-C, K M Munshi Marg, Shivajinagar, Pune 411 016 consumes Energy in the form of Electrical Energy & LPG; used for various Equipment.

2. Pollution caused due to Institute Activities:

- Air pollution: Mainly CO_2 on account of Electricity Consumption
- Solid Waste: Bio degradable Garden Waste, Recyclable Waste and Human Waste
- Liquid Waste: Human liquid waste

3. Present Energy, LPG Consumption & CO_2 Emissions:

No	Parameter /Value	Energy Purchased, kWh	LPG Consumed, Kg	CO_2 Emissions, MT
1	Total	50310	456	46.50
2	Maximum	6962	76	6.47
3	Minimum	2676	19	2.46
4	Average	4192.50	38.00	3.88

4. Measures adopted for Environmental Conservation:

- Usage of Energy efficient LED fittings
- Installation of Solar Thermal Water Heating System

5. Usage of Renewable Energy:

- The Institute has installed Solar Thermal Water Heating System

6. Waste Management:

6.1 Segregation of Waste at Source:

The waste is segregated at the source. There are Waste Collection Bins at various locations.

6.2 Organic Waste Management:

The Institute has installed a Vermi Composting Pit for conversion of Organic Waste.

7. Rain Water Management:

The Rain Water from the Terrace is collected through pipes and is used for recharging the ground water.

8. Environment Friendly Initiatives:

- Internal Tree Plantation

9. Assumptions:

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO_2 into atmosphere
2. 1 Kg of LPG releases 2.68 Kg of CO_2 into atmosphere

10. Reference:

- For CO_2 Emission computation: www.tatapower.com

ABBREVIATIONS

kWh	:	kilo-Watt Hour
Qty	:	Quantity
MT	:	Metric Ton
CO_2	:	Carbon Di Oxide
LPD	:	Liters per Day

CHAPTER-I
INTRODUCTION

1.1. Important Definitions:

1.1.1Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

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

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

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

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

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

1989	Hazardous Waste (Management and Handling) Rules
1989	Manufacture, Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Rules
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules
2011	E-waste (Management and Handling) Rules

2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

1.1.6 National Environmental Plans & Policy Documents: Table No-3:

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

1. Study of present Resource Consumption & CO_2 Emissions
2. Study of Usage of Renewable Energy
3. Study of Waste Management
4. Study of Rain Water Harvesting
5. Study of Environmental Friendly Initiatives.

1.3 General Details of Institute: Table No: 4:

No	Head	Particulars
1	Name	Maharashtra State Institute of Hotel Management & Catering Technology (UG & PG –Degree Programme)
2	Address	412-C, K M Munshi Marg, Shivajinagar, Pune 411 016
3	Affiliation	Savitribai Phule Pune University

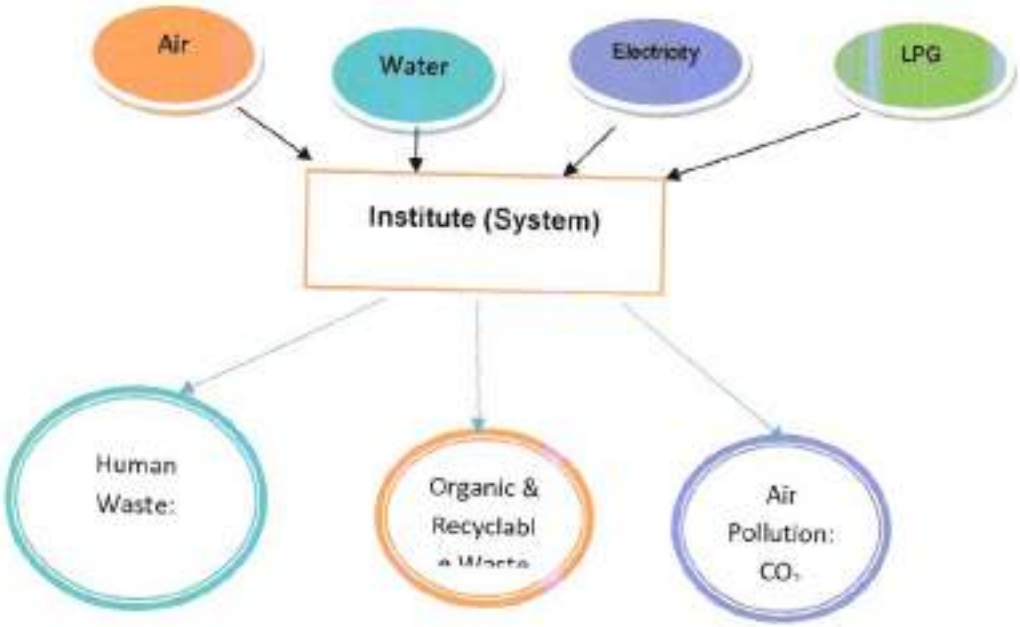
CHAPTER-II
STUDY OF RESOURCE CONSUMPTION & CO_2 EMISSION

The Institute consumes following Natural/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:



A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Here we compute the emissions of Carbon-Di-Oxide, by usage of Electrical Energy. The basis of Calculation for CO_2 emissions due to Electrical Energy & LPG is:

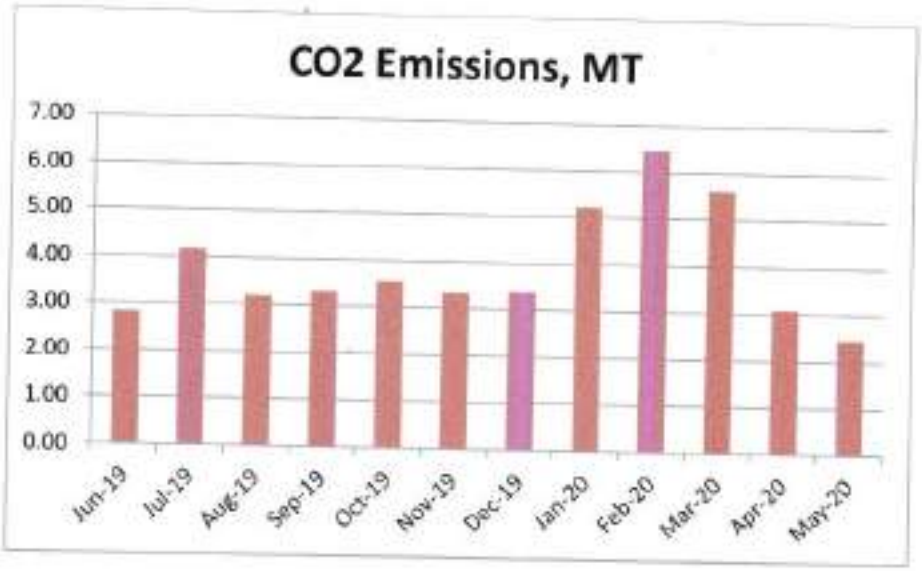
- **1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere
- **1 Kg** of LPG releases 2.68 Kg **of CO_2** into atmosphere

Table No 5: Study of Energy, LPG Consumption & CO_2 Emission: 2019-20:

No	Month	Energy Consumed, kWh	LPG Consumed, Kg	CO_2 Emissions, MT
1	Jun-19	3013	38	2.81
2	Jul-19	4410	76	4.17
3	Aug-19	3483	19	3.19
4	Sep-19	3555	38	3.30
5	Oct-19	3697	76	3.53

6	Nov-19	3631	19	3.32
7	Dec-19	3631	38	3.37
8	Jan-20	5714	19	5.19
9	Feb-20	6962	76	6.47
10	Mar-20	6163	19	5.60
11	Apr-20	3375	19	3.09
12	May-20	2676	19	2.46
13	Total	50310	456	46.50
14	Max	6962	76	6.47
15	Min	2676	19	2.46
16	Average	4192.50	38.00	3.88

Chart No 2: Representation of Month wise CO_2 emissions:



CHAPTER-III
STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed Solar Thermal Water Heating System. The Hot Water is used in the Kitchen.

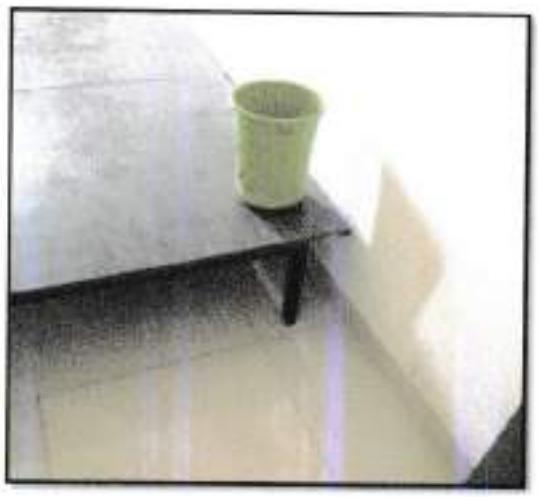
Photograph of Solar Thermal Water Heating System:

CHAPTER IV
STUDY OF WASTE MANAGEMENT

4.1 Segregation of Waste at Source:

The Institute has good housekeeping practices. The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

Photograph of Waste Collection Bin:



4.2 Organic Waste Management:

The Institute has installed a Vermi Composting Pit for conversion of Organic Waste.

Photograph of Vermi Composting Pit:

CHAPTER-VII
STUDY OF RAIN WATER MANAGEMENT

The Rain Water from the Terrace is collected through pipes and is used for recharging the ground water.

Photograph of Rain Water Carrying Pipe:

CHAPTER-VIII
STUDY OF ENVIRONMENT FRIENDLY PRACTICES

8.1Tree Plantation in the Campus:

The Institute has landscaped Lawn and well maintained Tree Plantation in the campus.

Photograph of Tree Plantation:

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FOR CLASS 'A'

Name and Address of the firm: M/s Enrich Consultants

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

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- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Installation of Solar Thermal Water Heating System
- Segregation of Waste at source
- Vermi Composting Bed for conversion of organic Waste
- Disposal of Sanitary Waste through an NGO
- Implementation of Rain Water Management Project
- Internal Tree Plantation
- Creation of awareness on Importance of 3R's Reduce, Reuse & Recycle 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.

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ENRICH CONSULTANTS PUNE

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- Air pollution: Mainly CO_2 on account of Electricity Consumption
- Solid Waste: Bio degradable Garden Waste, Recyclable Waste and Human Waste
- Liquid Waste: Human liquid waste

3. Present Energy, LPG Consumption & CO_2 Emissions:

No	Parameter /Value	Energy Purchased, kWh	LPG Consumed, Kg	CO_2 Emissions, MT
1	Total	58325	665	54.27
2	Maximum	6425	114	6.04
3	Minimum	2970	9	2.77
4	Average	4860.42	55.42	4.52

4. Measures adopted for Environmental Conservation:

- Usage of Energy efficient LED fittings
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5. Usage of Renewable Energy:

- The Institute has installed Solar Thermal Water Heating System

6. Indoor Air Quality:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	130	74	91
2	Minimum	110	59	72

7. Waste Management:

7.1 Segregation of Waste at Source:

The waste is segregated at the source. There are Waste Collection Bins at various locations, to collect the Waste.

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The Institute has installed a Vermi Composting Pit for conversion of Organic Waste.

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CO_2	:	Carbon Di Oxide
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PM2.5	:	Particulate Matter of Size 2.5 microns
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CPCB	:	Central Pollution Control Board

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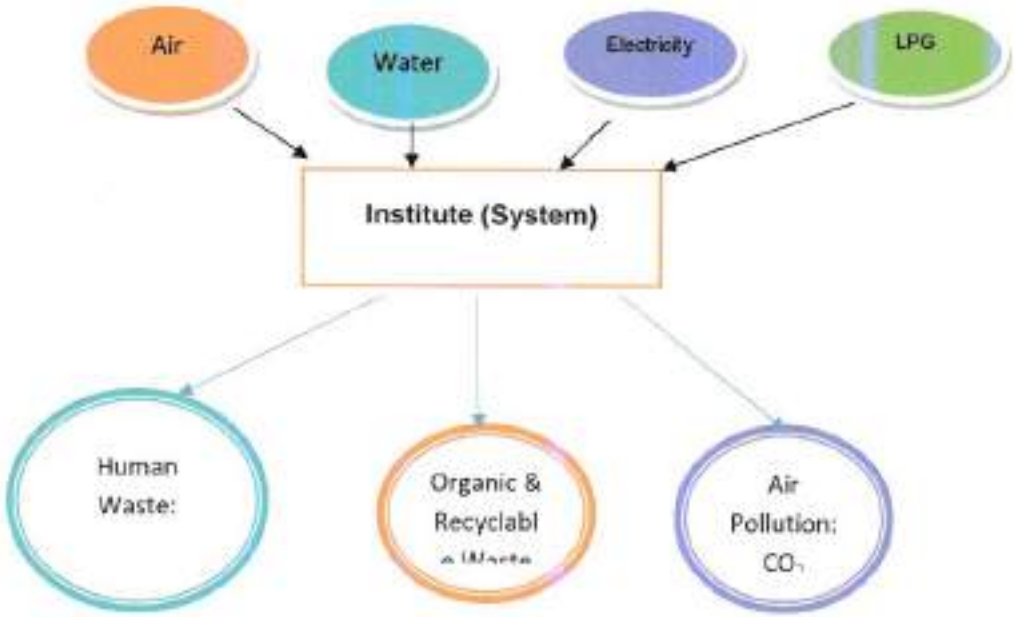

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3	Aug-20	3789	9	3.43
4	Sep-20	6163	57	5.70
5	Oct-20	6425	95	6.01

6	Nov-20	5471	95	5.18
7	Dec-20	5267	76	4.94
8	Jan-21	5679	38	5.21
9	Feb-21	2970	114	2.98
10	Mar-21	6206	103	5.86
11	Apr-21	4806	19	4.38
12	May-21	4496	39	4.15
13	Total	58325	665	54.27
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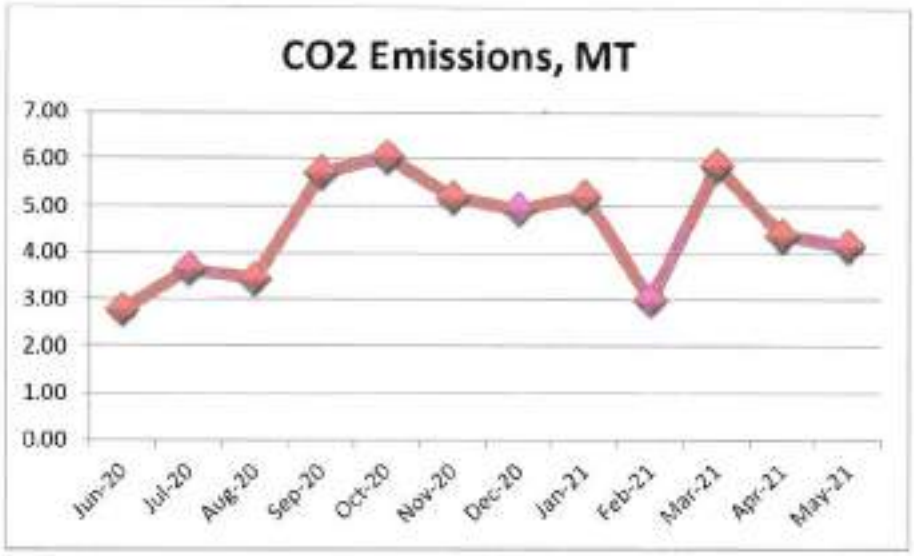


CHAPTER-III
STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed Solar Thermal Water Heating System. The Hot Water is used in the Kitchen.

Photograph of Solar Thermal Water Heating System:

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 liveability.

Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981.

Air quality is a measure of the suitability of air for breathing by people, plants and animals.
According to Section 2(b) of Air (Prevention and control of pollution) Act, 1981 '**air pollution**' has been defined as '**the presence in the atmosphere of any air pollutant.**'

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 10 micron

Table No 6: Indoor Air Quality Parameters:

No	Location	AQI	PM2.5	PM10
1	Zaffran Training Restaurant	123	68	80
2	Guest Room	130	69	80
3	Admin Office	130	69	85
4	Kitchen	110	67	82
5	House Keeping Lab	113	68	80
6	Computer Lab	126	73	82
7	Pantry	130	74	85
8	Tutorial Room-II	116	59	72
9	Classroom-603	130	66	91
10	Faculty Room	113	61	79
	Maximum	**130**	**74**	**91**
	Minimum	**110**	**59**	**72**

CHAPTER V
STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The Institute has good housekeeping practices. The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

Photograph of Waste Collection Bin:

5.2 Organic Waste Management:

The Institute has installed a Vermi Composting Pit for conversion of Organic Waste.

Photograph of Vermi Composting Pit:

5.3 Sanitary Waste Management:

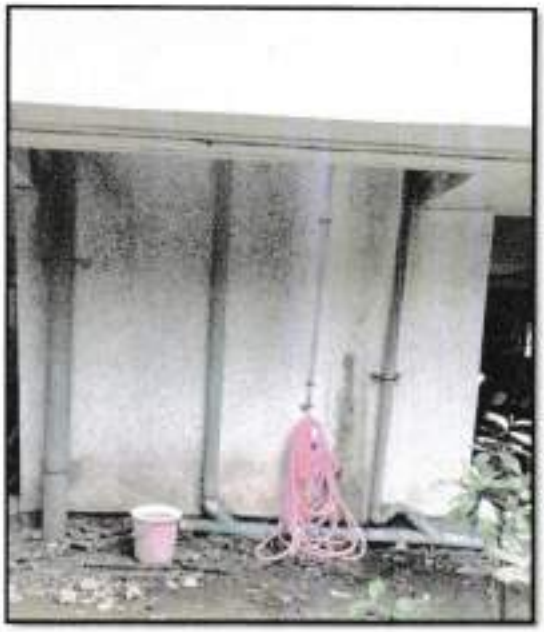
The Institute has a tie up with NG Enterprises who provides feminine hygiene care unit in the washroom for disposal of sanitary napkins

Photograph of Sanitary Napkin Disposal Unit:

CHAPTER-VII
STUDY OF RAIN WATER MANAGEMENT

The Rain Water from the Terrace is collected through pipes and is used for recharging the ground water.

Photograph of Rain Water Carrying Pipe:



CHAPTER-VIII
STUDY OF ENVIRONMENT FRIENDLY PRACTICES

8.1Tree Plantation in the Campus:
The Institute has landscaped Lawn and well maintained Tree Plantation in the campus.
Photograph of Tree Plantation:

8.2 Creation of Awareness on 3 R's Reduce, Reuse & Recycle:
The Institute has displayed Posters on **3 R's Reduce, Reuse & Recycle.**
Photograph of Poster on importance 3 R's Reduce, Reuse & Recycle:

ANNEXURE-I:
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 +

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Year: 2021-22

Prepared by

ENGRESS SERVICES

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ENGRESS SERVICES PUNE

REGISTRATION CERTIFICATES

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency

(Government of Maharashtra Institution)
Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,
Aundh, Pune, Maharashtra 411067
Ph No: 020-35000450
Email: mea@mahaurja.com, Web: www.mahaurja.com

I.C.N:2022-23/CR-43/1709 — 10th May, 2022

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

We hereby certify that, the firm having following particulars is registered with *MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)* under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : M/s Engress Services
Vaibhavee, 2/6, Nirmal Bag Society,
Near Muktangan English School,
Parvati, Pune - 411 009.

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

Registration Number : *MEDA/ECN/2022-23/Class A/EA-32.*

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **09th May, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme.
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (T.C.)

MEDA EMPANELMENT CERTIFICATE

ASSOCHAM

GEM Certificate

ASSOCHAM hereby certifies that

Mr. A Y Mehendale

has successfully passed the

Green and Eco-friendly Movement Certified Professional Test (GEM CP)

with

"Excellent Performance"

on

06 June, 2022

He/she is now eligible to execute the GEM Sustainability Certification Projects.
ASSOCHAM feels proud to award the GEM Certified Professional title to him/her.

Pankaj R. Dharkar
Chairman, GEM

GEM CP 22/755

Deepak Sood
Secretary General, ASSOCHAM

ASSOCHAM GEM CP CERTIFICATE

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com

Ref: ES/MSIHMCT/21-22/03

Date: 15/7/2022

CERTIFICATE

This is to certify that we have conducted an Environmental Audit at Maharashtra State Institute of Hotel Management & Catering Technology, (UG & PG –Degree Programme) 412-C, K M Munshi Marg, Shivajinagar, Pune 411 016, in the Year 2021-22.

The Institute has adopted following Eco Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Installation of Solar Thermal Water Heating System
- Segregation of Waste at source
- Vermi Composting Bed for conversion of organic Waste
- Disposal of Sanitary Waste through an NGO
- Implementation of Rain Water Management Project
- Internal Tree Plantation
- Creation of awareness on Importance of Cleanliness 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,

ENGRESS SERVICES PUNE

A Y Mehendale,
Certified Energy Auditor, EA-8192
ASSOCHAM GEM Certified Professional: GEM: 22/788

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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Maharashtra State Institute of Hotel Management & Catering Technology, (UG & PG – Degree Programme) 412-C, K M Munshi Marg, Shivajinagar, Pune 411 016, for awarding us the assignment of Environmental Audit of their Campus for the Year: 2021-22.

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

EXECUTIVE SUMMARY

1. Maharashtra State Institute of Hotel Management & Catering Technology, (UG & PG –Degree Programme) 412-C, K M Munshi Marg, Shivajinagar, Pune 411 016 consumes Energy in the form of Electrical Energy & LPG; used for various Equipment.

2. Pollution caused due to Institute Activities:

- Air pollution: Mainly CO_2 on account of Electricity Consumption
- Solid Waste: Bio degradable Garden Waste, Recyclable Waste and Human Waste
- Liquid Waste: Human liquid waste

3. Present Energy, LPG Consumption & CO_2 Emissions:

No	Parameter /Value	Energy Purchased, kWh	LPG Consumed, Kg	CO_2 Emissions, MT
1	Total	82865	190	75.09
2	Maximum	10434	38	9.44
3	Minimum	4321	9	3.91
4	Average	6905.42	15.83	6.26

4. Measures adopted for Environmental Conservation:

- Usage of Energy efficient LED fittings
- Maximum Usage of Day Lighting
- Installation of Solar Thermal Water Heating System

5. Usage of Renewable Energy:

- The Institute has installed Solar Thermal Water Heating System

6. Indoor Air Quality:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	95	57	73
2	Minimum	90	54	67

7. Indoor Comfort Condition Parameters:

No	Parameter/Value	Temperature, ^0C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	31.1	39	314	45.6
2	Minimum	30.8	38	136	36.9

8. Waste Management:

8.1 Segregation of Waste at Source:

The waste is segregated at the source. There are Waste Collection Bins at various locations, to collect the Waste.

8.2 Organic Waste Management:

The Institute has installed a Vermi Composting Pit for conversion of Organic Waste.

8.3 Sanitary Waste Management:

The Institute has a tie up with an NGO, for disposal of Sanitary Waste.

9. Rain Water Management:

The Rain Water from the Terrace is collected through pipes and is used for recharging the ground water.

10. Environment Friendly Initiatives:

- Internal Tree Plantation
- Creation of Awareness on Importance of Cleanliness by display of Posters

11. Assumptions:

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO_2 into atmosphere
2. 1 Kg of LPG releases 2.68 Kg of CO_2 into atmosphere

12. References:

- For CO_2 Emission computation: www.tatapower.com
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI Quality Standards: www.cpcb.com

ABBREVIATIONS

kWh	:	kilo-Watt Hour
Qty	:	Quantity
MT	:	Metric Ton
CO_2	:	Carbon Di Oxide
LPD	:	Liters per Day
AQI	:	Air Quality Index
PM2.5	:	Particulate Matter of Size 2.5 microns
PM 10	:	Particulate Matter of Size 10 microns
CPCB	:	Central Pollution Control Board
ISHARE	:	The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

CHAPTER-I
INTRODUCTION

1.1. Important Definitions:

1.1.1Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

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

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

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

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

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

1989	Hazardous Waste (Management and Handling) Rules
1989	Manufacture, Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Rules
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules
2011	E-waste (Management and Handling) Rules

2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

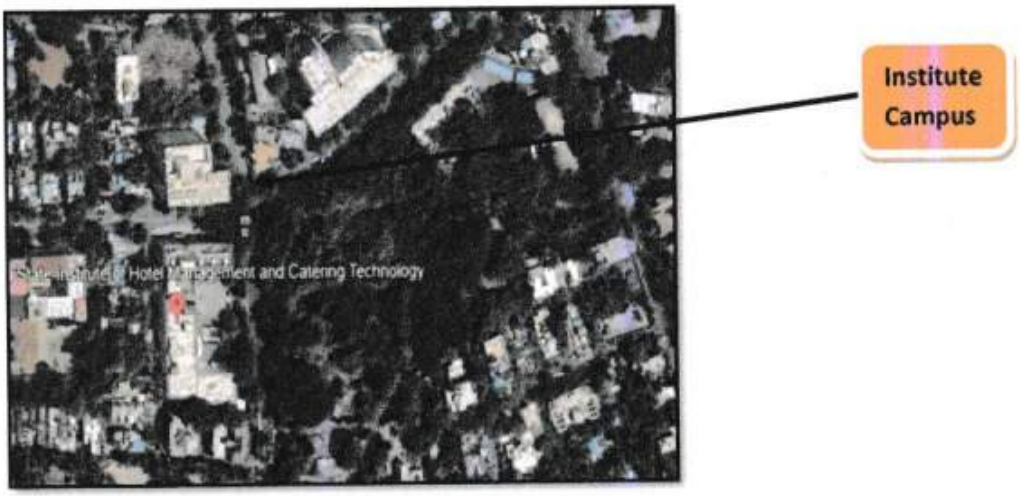
1.1.6 National Environmental Plans & Policy Documents: Table No-3:

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

1. Study of present Resource Consumption & CO_2 Emissions
2. Study of Usage of Renewable Energy
3. Study of Indoor Air Quality
4. Study of Indoor Comfort Conditions
5. Study of Waste Management
6. Study of Rain Water Harvesting
7. Study of Environmental Friendly Initiatives.

1.3 Google Earth Location Image:



1.4 General Details of Institute: Table No: 4:

No	Head	Particulars
1	Name	Maharashtra State Institute of Hotel Management & Catering Technology (UG & PG –Degree Programme)
2	Address	412-C, K M Munshi Marg, Shivajinagar, Pune 411 016
3	Affiliation	Savitribai Phule Pune University

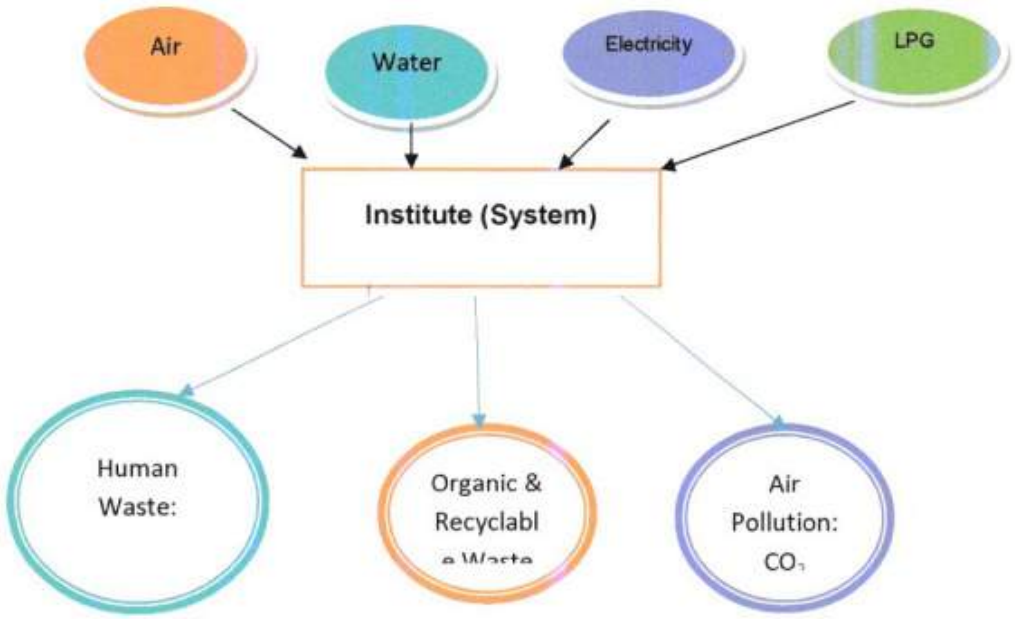
CHAPTER-II
STUDY OF RESOURCE CONSUMPTION & CO_2 EMISSION

The Institute consumes following Natural/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:



A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Here we compute the emissions of Carbon-Di-Oxide, by usage of Electrical Energy. The basis of Calculation for CO_2 emissions due to Electrical Energy & LPG is:

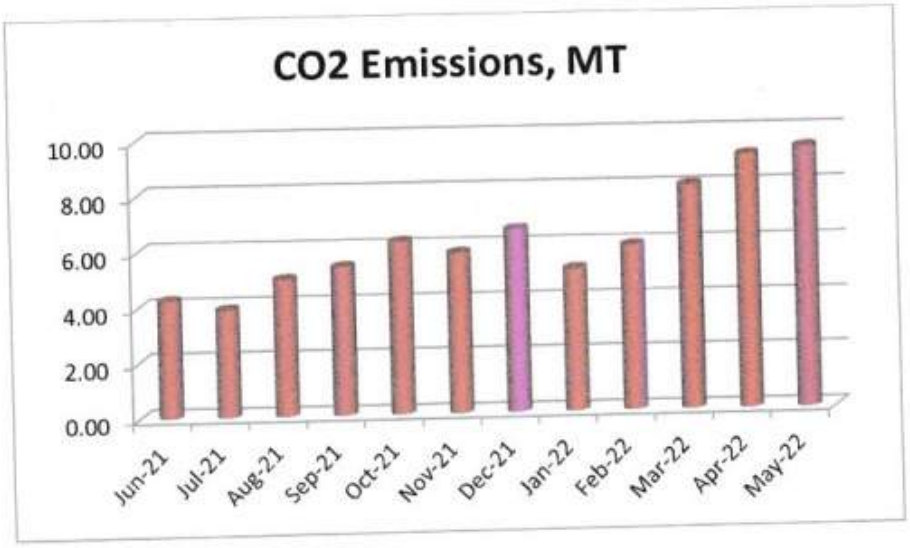
- **1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere
- **1 Kg** of LPG releases 2.68 Kg **of CO_2** into atmosphere

Table No 5: Study of Energy, LPG Consumption & CO_2 Emission: 2021-22:

No	Month	Energy Consumed, kWh	LPG Consumed, Kg	CO_2 Emissions, MT
1	Jun-21	4720	9	4.27
2	Jul-21	4321	9	3.91
3	Aug-21	5467	19	4.97
4	Sep-21	5945	9	5.37
5	Oct-21	6924	10	6.26

6	Nov-21	6392	19	5.80
7	Dec-21	7350	10	6.64
8	Jan-22	5670	19	5.15
9	Feb-22	6610	10	5.98
10	Mar-22	8948	19	8.10
11	Apr-22	10084	38	9.18
12	May-22	10434	19	9.44
13	Total	82865	190	75.09
14	Maximum	10434	38	9.44
15	Minimum	4321	9	3.91
16	Average	6905.42	15.83	6.26

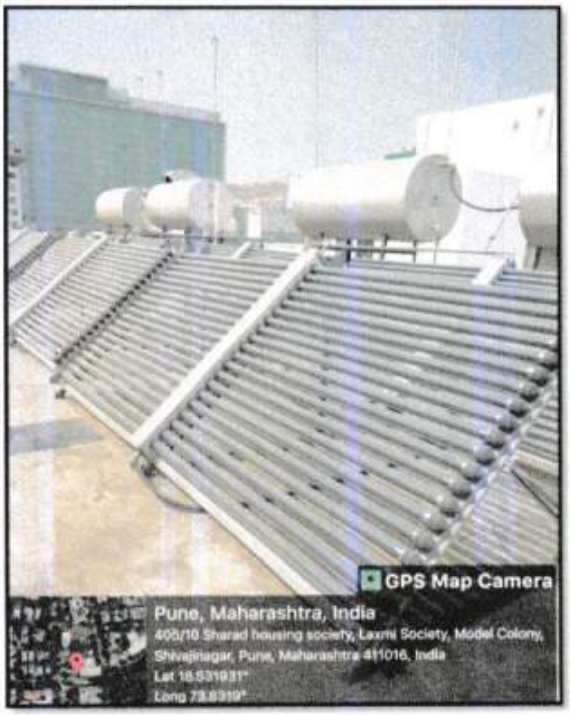
Chart No 2: Representation of Month wise CO_2 emissions:



CHAPTER-III
STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed Solar Thermal Water Heating System. The Hot Water is used in the Kitchen.

Photograph of Solar Thermal Water Heating System:



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 liveability.

Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981.

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

According to Section 2(b) of Air (Prevention and control of pollution) Act, 1981 '**air pollution**' has been defined as '**the presence in the atmosphere of any air pollutant**.'

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 10 micron

Table No 6: Indoor Air Quality Parameters:

No	Location	AQI	PM2.5	PM10
1	Library	90	54	67
2	Tutorial Room-I	93	56	70
3	Baking & Confectionary	95	57	73
4	Girls Common Room	93	56	70
5	Classroom-601	93	55	68
6	Classroom-602	90	54	69
7	Front Office Lab	91	55	67
8	Advance Training Kitchen-II	90	54	68
	Maximum	**95**	**57**	**73**
	Minimum	**90**	**54**	**67**

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 7: Study of Indoor Comfort Parameters:

No	Location	Temperature, ^0C	Humidity, %	Lux Level	Noise Level, dB
1	Library	31	39	145	45.6
2	Tutorial Room-I	30.9	38	136	45
3	Baking & Confectionary	30.9	38	174	36.9
4	Girls Common Room	31.1	38	163	44
1	Classroom-601	30.8	39	314	44.2
2	Classroom-602	30.9	39	164	45
1	Front Office Lab	30.9	39	164	41.3
2	Advance Training Kitchen-II	31	39	198	43.6
	Maximum	**31.1**	**39**	**314**	**45.6**
	Minimum	**30.8**	**38**	**136**	**36.9**

CHAPTER VI
STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The Institute has good housekeeping practices. The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

Photograph of Waste Collection Bin:

6.2 Organic Waste Management:

The Institute has installed a Vermi Composting Pit for conversion of Organic Waste.

Photograph of Vermi Composting Pit:

ENGRESS SERVICES PUNE

6.3 Sanitary Waste Management:

The Institute has a tie up with NG Enterprises who provides feminine hygiene care unit in the washroom for disposal of sanitary napkins

Photograph of Sanitary Napkin Disposal Unit:

CHAPTER-VII
STUDY OF RAIN WATER MANAGEMENT

The Rain Water from the Terrace is collected through pipes and is used for recharging the ground water.

Photograph of Rain Water Carrying Pipe:

CHAPTER-VIII
STUDY OF ENVIRONMENT FRIENDLY PRACTICES

8.1Tree Plantation in the Campus:

The Institute has landscaped Lawn and well maintained Tree Plantation in the campus.

Photograph of Tree Plantation:

8.2 Creation of Awareness on Cleanliness:

The Institute has displayed Posters on Importance of Cleanliness.

Photograph of Poster on importance of Cleanliness:

ANNEXURE-I:
AIR QUALITY, NOISE & INDOOR COMFORT PARAMETER 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 33^0C
2	Humidity	Less Than 70%

ENVIRONMENTAL AUDIT REPORT

of

Maharashtra State Institute of Hotel Management & Catering Technology,

(UG & PG –Degree Programme)

412-C, K M Munshi Marg, Shivajinagar, Pune 411 016

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

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School,
Parvati, Pune 411 009 Tel: 09890444795 Email: 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/MSIHMCT/22-23/03 **Date: 6/7/2023**

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- Creation of awareness on Energy 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,

ENGRESS SERVICES * PUNE *

A Y Mehendale,
B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192
ASSOCHAM GEM Certified Professional: GEM: 22/768

REGISTRATION CERTIFICATES


Maharashtra Energy Development Agency

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

MEDA REGISTRATION CERTIFICATE

ASSOCHAM GEM CP CERTIFICATE


Certificate of Registration

ENGRESS SERVICES

ISO 9001:2015

IAF

Director

ISO: 9001-2015 CERTIFICATE


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2. Pollution due to Institute Activities:

- Air pollution: Mainly CO_2 on account of Electricity Consumption
- Solid Waste: Bio degradable Garden Waste, Paper & Plastic Waste
- Liquid Waste: Human liquid waste

3. Present Energy Consumption & CO_2 Emission:

No	Particulars	Value	Unit
1	Total Connected Load	93.69	kW
2	Annual Energy Consumed	99292	kWh
3	Annual LPG Consumed	1615	Kg

4. Renewable Energy & Reduction in CO_2 Emissions:

- The Institute has installed Solar Thermal Water Heating System

5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	80	48	57
2	Minimum	70	39	49

6. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	28.1	81	126	45
2	Minimum	27.9	80	102	41.9

7. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Installed a Vermi Composting Bed
3	Sanitary Waste	Tie up with NGO for Disposal of Sanitary Waste

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The Rain Water from the Terrace is collected through pipes and is used for recharging the ground water.

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_2 into atmosphere
2. 1 Kg of LPG releases 2.68 Kg of CO_2 into atmosphere

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ABBREVIATIONS

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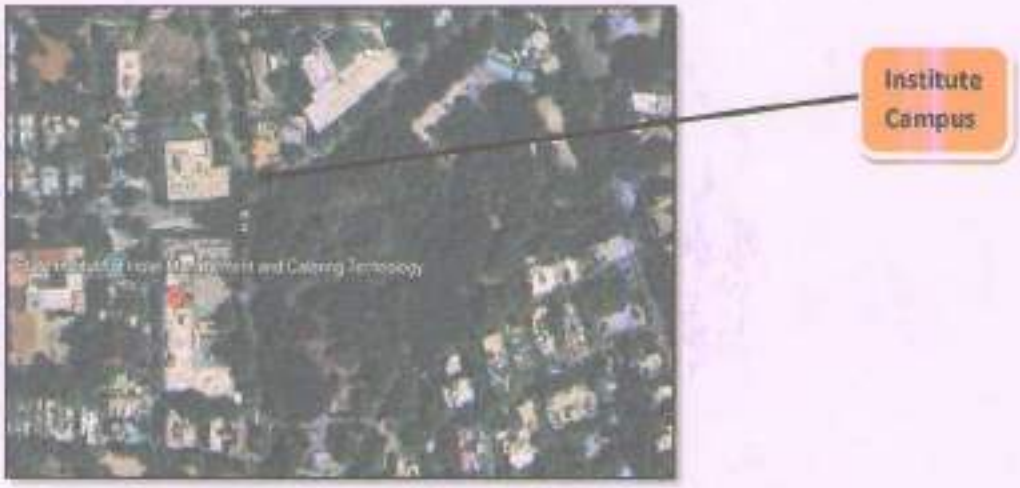
1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.4 Audit Procedural Steps:

1.5 Institute Location Image:

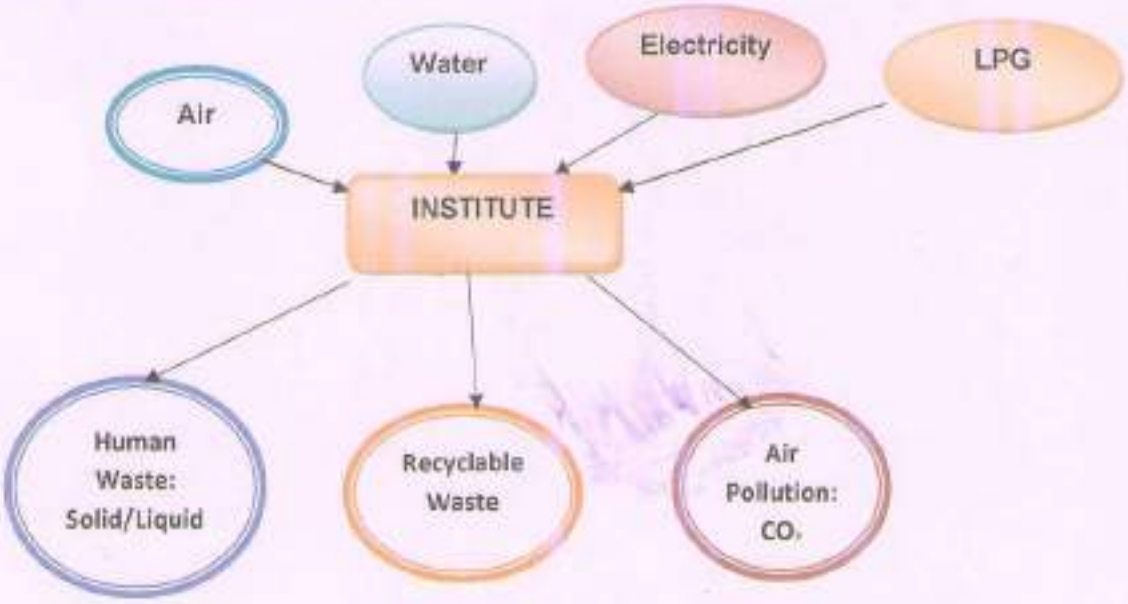


CHAPTER-II
STUDY OF RESOURCE CONSUMPTION & CO_2 EMISSION

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_2 on account of consumption of Electrical Energy. The basis of Calculation for CO_2 emissions due to Electrical Energy is as under.

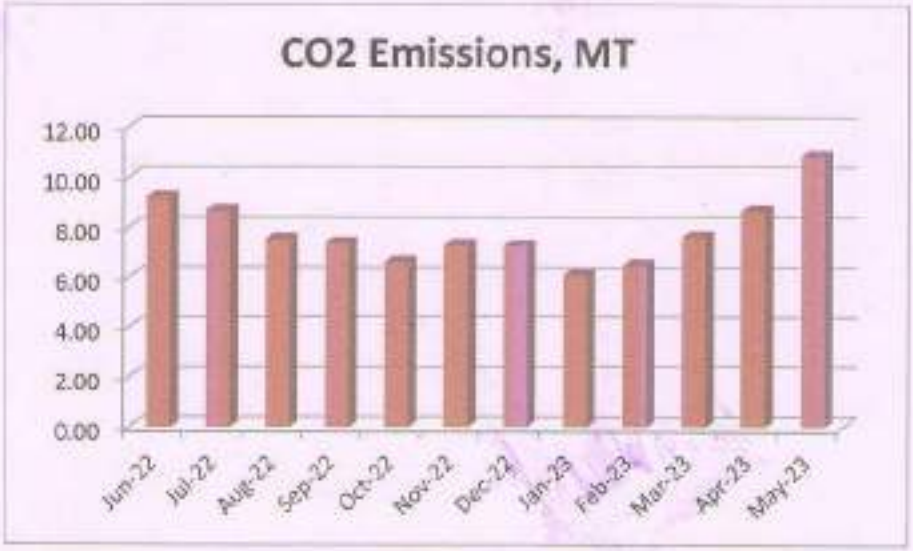
- **1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere
- **2 Kg of LPG** releases **2.68 Kg of CO_2** into atmosphere

Table No 1: Study of Energy, LPG Consumption & CO_2 Emission: 2022-23:

No	Month	Energy Consumed, kWh	LPG Consumed, Kg	CO_2 Emissions, MT
1	Jun-22	9950	100	9.22
2	Jul-22	9071	190	8.67
3	Aug-22	8061	100	7.52
4	Sep-22	7589	200	7.37
5	Oct-22	7063	100	6.62
6	Nov-22	7544	190	7.30
7	Dec-22	7798	90	7.26
8	Jan-23	6472	100	6.09

9	Feb-23 *	6639	190	6.48
10	Mar-23	8221	80	7.61
11	Apr-23	9377	85	8.67
12	May-23	11507	190	10.87
13	Total	99292	1615	93.69
14	Max	11507	200	10.87
15	Min	6472	80	6.09
16	Average	8274.33	134.58	7.81

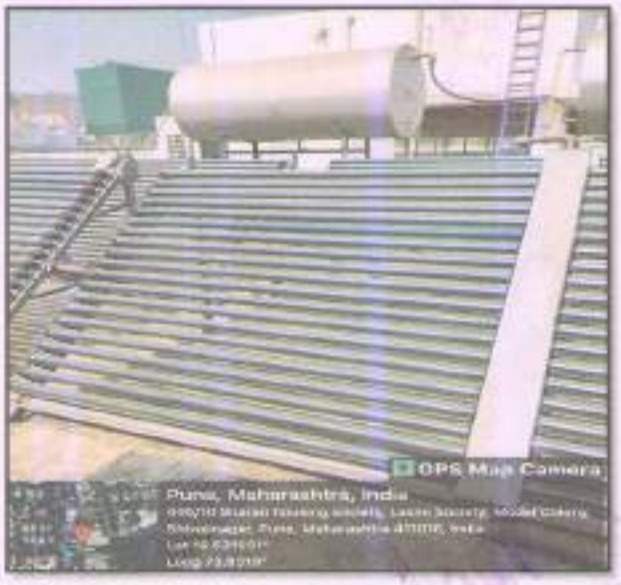
Chart No 2: Representation of Month wise CO_2 emissions:



CHAPTER-III
STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed Solar Thermal Water Heating System. The Hot Water is used in the Kitchen.

Photograph of Solar Thermal Water Heating System:



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 liveability.

Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981.

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

According to Section 2(b) of Air (Prevention and control of pollution) Act, 1981 '**air pollution**' has been defined as '**the presence in the atmosphere of any air pollutant.**'

4.2 Air Quality Index:

An **Air Quality Index (AQI)** is a number used by govemment 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 10 micron

Table No 2: Indoor Air Quality Parameters:

No	Location	AQI	PM2.5	PM10
1	Conference Room	75	46	56
2	Hotel Room	74	45	52
3	Principal Cabin	70	39	49
4	R & D Kitchen	80	48	57
5	House Keeping Lab	71	43	52
6	Exam Cell	78	48	56
7	Maximum	**80**	**48**	**57**
8	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 3: Study of Indoor Comfort Parameters:

No	Location	Temperature, ^0C	Humidity, %	Lux Level	Noise Level, dB
1	Conference Room	27.9	81	123	45
2	Hotel Room	27.9	80	119	44.2
3	Principal Cabin	28	81	106	41.9
4	R & D Kitchen	28	81	115	42.6
1	House Keeping Lab	28.1	80	126	44
2	Exam Cell	28	80	102	44.3
1	Maximum	**28.1**	**81**	**126**	**45**
2	Minimum	**27.9**	**80**	**102**	**41.9**

CHAPTER VI
STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The Institute has good housekeeping practices. The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

Photograph of Waste Collection Bin:

6.2 Organic Waste Management:

The Institute has installed a Vermi Composting Pit for conversion of Organic Waste.

Photograph of Vermi Composting Pit:

6.3 Sanitary Waste Management:

The Institute has a tie up with NG Enterprises who provides feminine hygiene care unit in the washroom for disposal of sanitary napkins

Photograph of Sanitary Napkin Disposal Unit:

CHAPTER-VII
STUDY OF RAIN WATER MANAGEMENT

The Rain Water from the Terrace is collected through pipes and is used for recharging the ground water.

Photograph of Rain Water Carrying Pipe:

Rain Water Carrying Pipe

Water Storage/Recharge Point

CHAPTER-VIII
STUDY OF ECO FRIENDLY PRACTICES

8.1Tree Plantation in the Campus:

The Institute has landscaped Lawn and well maintained Tree Plantation in the campus.

Photograph of Tree Plantation:

8.2 Creation of Awareness on Energy Conservation:

The Institute has displayed Posters on Importance of Energy Conservation.

Photograph of Poster on Energy Conservation:

ANNEXURE-I:
AIR QUALITY, NOISE & INDOOR COMFORT PARAMETER 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%