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:

Index

Sr. No.	Year	Content
1.	**2022-23**	Green audit / Environment audit
2.	**2021-22**	Green audit / Environment audit
3.	**2020-21**	Green audit / Environment audit
4.	**2018-19**	Green audit / Environment audit

PRATIBHA INSTITUTE OF BUSINESS MANAGEMENT * CHINCHWAD, PUNE 411019.

GREEN AUDIT REPORT

of

Kamala Education Society's,

PRATIBHA INSTITUTE OF BUSINESS MANAGEMENT

Off Mumbai Pune Road, Chinchwad, Pune 411 019

KAMALA
Education Society

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
PUNE

ENGRESS SERVICES

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

GREEN AUDIT CERTIFICATE

Certificate No: ES/KESPIBM/22-23/02 **Date: 20/6/2023**

This is to certify that we have conducted Green Audit at Kamala Educational Society's, Pratibha Institute of Business Management, Chinchwad, Pune in the year 2022-23.

The Institute has adopted following Green & Sustainable Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of 20 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Bio Composting Pit for Conversion of Leafy Waste
- Installation of Rain Water Harvesting Project
- Internal Tree Plantation
- Good Internal Roads
- 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.

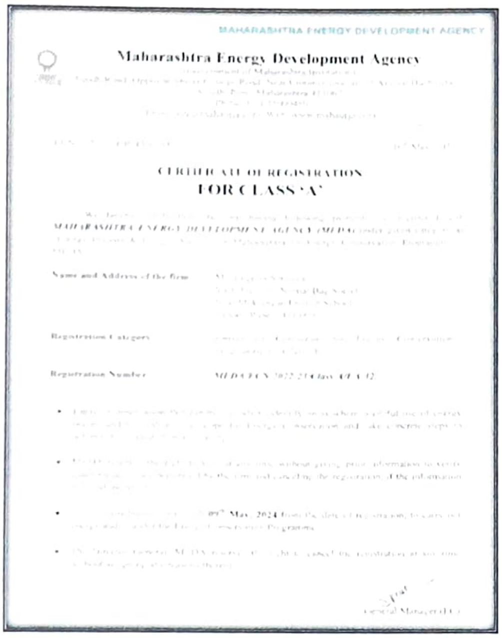
For Engress Services,

A Mehendale

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

ENGRESS SERVICES PUNE

REGISTRATION CERTIFICATES


MAHARASHTRA ENERGY DEVELOPMENT AGENCY

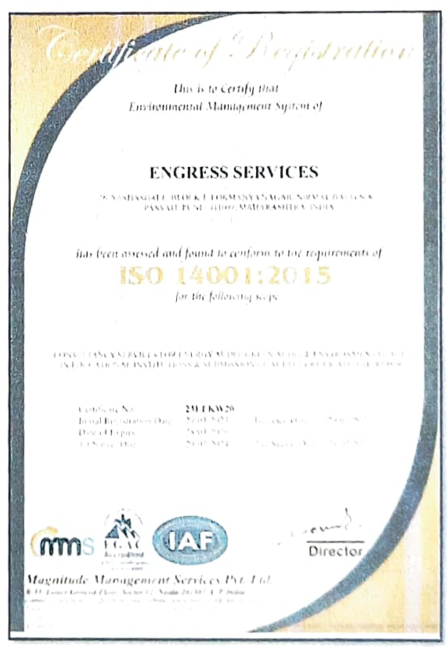
Maharashtra Energy Development Agency

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

MEDA Registration Certificate

ASSOCHAM GEM CP Certificate

ISO: 9001-2015 Certificate



ISO: 14001-2015 Certificate

INDEX

ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune for awarding us the assignment of Green Audit of their campus for the Year: 2022-23.

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

EXECUTIVE SUMMARY

1. Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune consumes Energy in the form of Electrical Energy; used for various gadgets, Office & other facilities.

2. Present Energy Consumption & CO_2 Emission:

No	Particulars	Value	Unit
1	Annual Energy Purchased	**30752**	kWh
2	Annual CO_2 Emissions	**27.68**	MT

3. Usage of Renewable Energy & CO_2 Emission Reduction:

- The Institute has installed Roof Top Solar PV Plant of Capacity 20 kWp.
- Energy Generated by Solar PV Plant in 22-23 is 24000 kWh
- Annual Reduction in CO_2 Emissions in 22-23 is 21.6 MT.

4. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Provision of Bio Composting Unit
3	Sanitary waste	Provision of Sanitary Waste Incinerator
4	E Waste	Disposed of through Authorized Agency

5. Rain Water Harvesting:

The Institute has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

6. Green & Sustainable Practices:

- Well maintained internal road & Tree Plantation
- Awareness Creation on Energy Conservation by Display of posters

7. Assumptions:

1. Energy Consumption in computed on the basis of Load Utilization Factor
2. 1 kWh of Electrical Energy releases 0.9 Kg of CO_2 into atmosphere
3. 1 kWp Solar PV system generates 4 kWh of Electrical Energy per Day
4. Annual Solar Energy Generation Days: 300 Nos

8. References:

1. For CO_2 Emissions: www.tatapower.com
2. For Solar PV Energy Generation: www.solarrofftop.gov.in

ABBREVIATIONS

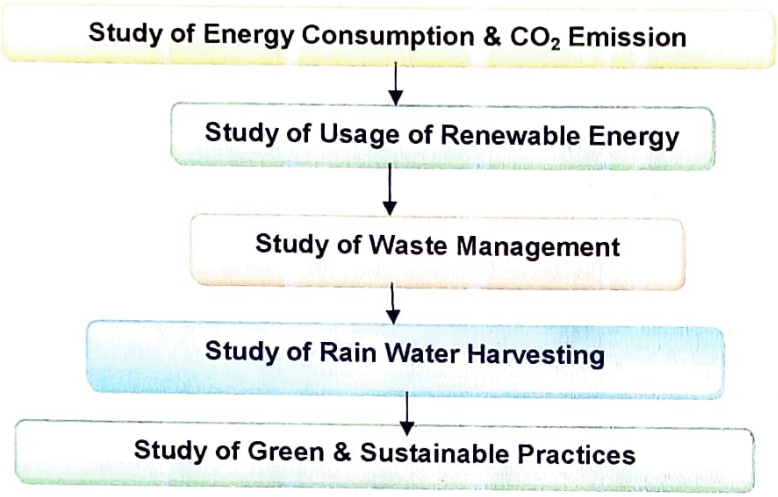
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
MT	:	Metric Ton

CHAPTER-I
INTRODUCTION

11.1 Introduction:

A Green Audit is conducted at Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune.

1.2 Audit Procedural Steps:



1.3 Institute Location Image:

CHAPTER-II
STUDY OF ENERGY CONSUMPTION & CO_2 EMISSION

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the Institute for performing its day to day activities

The Institute uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO_2 Emissions:

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

Based on the above Data we compute the CO_2 emissions which are being released in to the atmosphere by the Institute due to its Day to Day operations

Table No 1: Month wise CO_2 Emissions:

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Jun-22	2785	2.51
2	Jul-22	2693	2.42
3	Aug-22	2596	2.34
4	Sep-22	2660	2.39
5	Oct-22	2512	2.26
6	Nov-22	2618	2.36
7	Dec-22	2196	1.98
8	Jan-23	2236	2.01
9	Feb-23	2698	2.43
10	Mar-23	2436	2.19
11	Apr-23	2559	2.30
12	May-23	2763	2.49
13	Total	30752	27.68
14	Maximum	2785	2.51
15	Minimum	2196	1.98
16	Average	2562.67	2.31

Chart No 1: To study the variation of Month wise Energy Purchased, kWh:

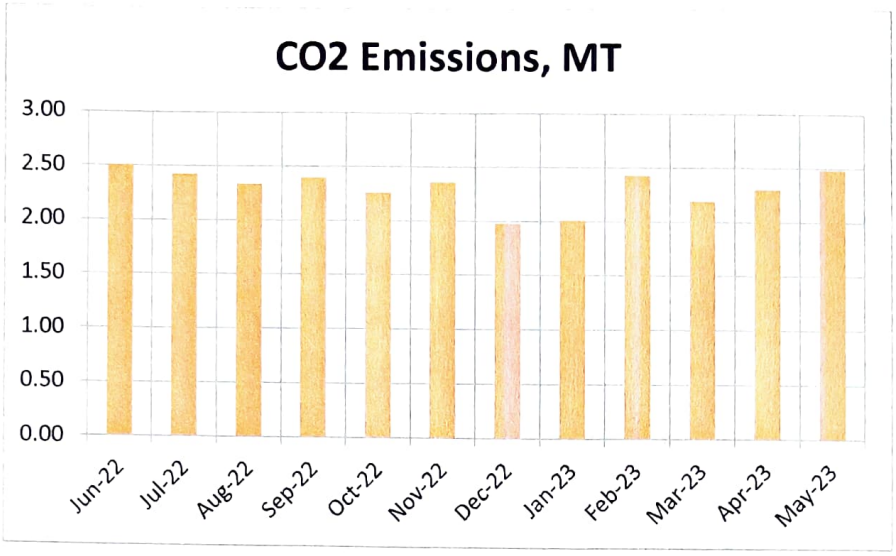


Table No 2: Key Parameters:

No	Parameter	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	30752	27.68
2	Maximum	2785	2.51
3	Minimum	2196	1.98
4	Average	2562.67	2.31

CHAPTER-III
STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed **20 kWp** Roof Top Solar PV Plant. In the following Table, we present the Annual Reduction in CO_2 Emissions due to usage of Renewable Energy.

Table No 3: Calculation of Reduction in CO_2 Emissions:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	**20**	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated = **1*2*3**	**24000**	kWh
5	1 kWh of Energy is equivalent to	**0.9**	Kg of CO_2
6	Reduction in Annual CO_2 Emissions= **(4) * (5)/1000**	**21.6**	**MT**

Photograph of Roof Top Solar PV Plant:

CHAPTER IV
STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source

The Waste is segregated at source. Waste Collection Bins are placed at various locations.

Photograph of Waste Collection Bin:

5.2 Organic Waste Management:

A Bio Composting Pit is used to convert the Leafy Waste into Bio Compost.

Photograph of Bio Composting Arrangement:

5.3 Sanitary Waste Management:

The Institute has installed Sanitary Waste Incinerator, to dispose of the Sanitary Waste.

Photograph of Sanitary Waste Incinerator:

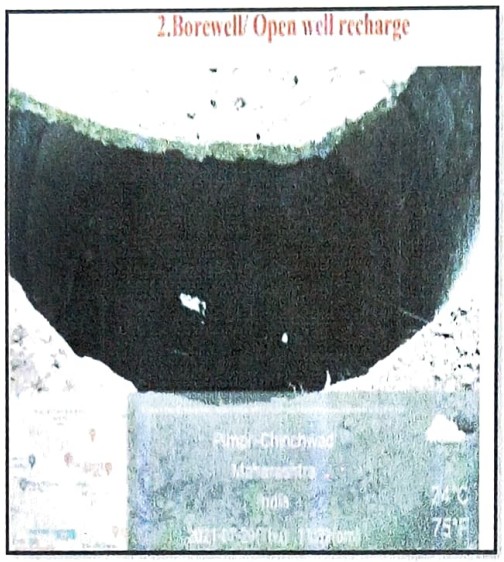
5.4 E Waste Management:

The E Waste is disposed of through Authorized Agency.

CHAPTER-V
STUDY OF RAIN WATER MANAGEMENT

The Institute has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

Photograph of Bore well Recharge Point:



CHAPTER-VI
STUDY OF GREEN & SUSTAINABLE PRACTICES

6.1 Pedestrian Friendly Internal Road:

The Institute has well maintained internal road to facilitate the easy movement of the students within the campus.

Photograph of Internal Road:

6.2 Internal Tree Plantation:

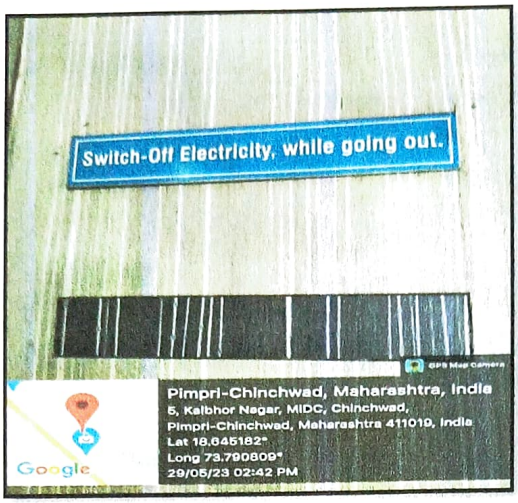
The Institute has well maintained tree plantation in the campus.

Photograph of Tree Plantation in the campus:

6.3 Creation of Awareness about Energy Conservation:

The Institute has displayed Posters on Importance of Energy Conservation.

Photograph of Posters on Energy Conservation:



ANNEXURE-I
DETAILS OF TREES AND PLANTS IN THE CAMPUS:

List of Trees & Plants in the Campus:

No	Name of Tree/Plant
1	Cycus
2	Adulsa
3	Bottle Brush
4	Green Champa
5	Ashwagandha
6	Dikemali
7	Bel
8	Tulsi
9	Shevga
10	Seeta Ashok
11	Tuti
12	Apta
13	Bibba
14	Tamhan
15	Sonchampa
16	Kanher
17	Amla
18	Behda
19	Arjun
20	Mahogany
21	Ritha
22	Rose
23	Shikekai
24	Mehendi
25	Bramhi
26	Gulvel
27	Jasmine
28	Jai
29	Shatavari
30	Gingko
31	Tirphal
32	Nagkeshar
33	Bhringaraj
34	Putrajeevi
35	Madhumalti

	Indoor Plants
No	Name of Tree/Plant
1	Peace Lily
2	Aloevera
3	Drecena
4	Fern
5	Chinese Evergreen
6	Flemingo
7	Arica Palm
8	Money Plant
9	Heart Leaf
10	Azalia
11	Green Spider
12	Weeping Fig
13	Croton
14	Fig Plant
15	Dumb cane
16	Snake plant

ENVIRONMENTAL AUDIT REPORT

of

Kamala Education Society's,

PRATIBHA INSTITUTE OF BUSINESS MANAGEMENT

Off Mumbai Pune Road, Chinchwad, Pune 411 019

KAMALA
Education Society

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
PUNE

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/KESPIBM/22-23/03 **Date: 20/6/2023**

This is to certify that we have conducted Environmental Audit at Kamala Educational Society's, Pratibha Institute of Business Management, Chinchwad, Pune in the year 2022-23.

The Institute has adopted Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of 20 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Bio Composting Pit for Conversion of Leafy Waste
- Provision of Sanitary Waste Incinerator
- Installation of Rain Water Harvesting Project
- Internal Tree Plantation
- Creation of awareness on Energy Conservation by Display of Posters

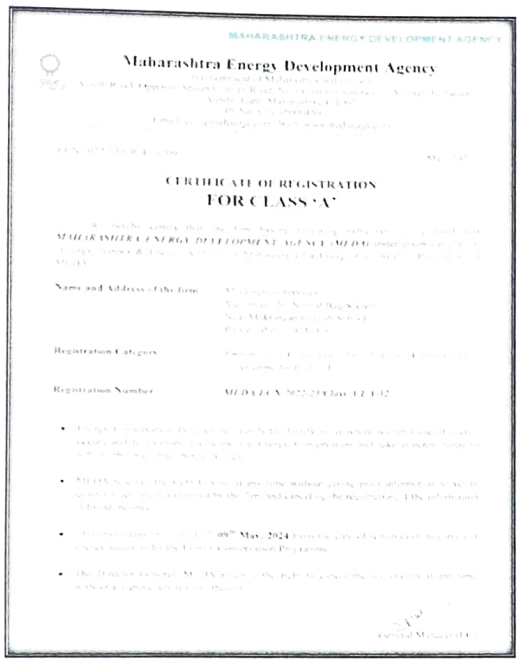
We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation& making the campus Energy Efficient, Green and Environment Friendly.

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: 22/788

REGISTRATION CERTIFICATES



Maharashtra Energy Development Agency

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

MEDA Registration Certificate

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

Pankaj R. Dharkar
Chairman GEM

GEM CP 22/768

Deepak Sood
Secretary General, ASSOCHAM

ASSOCHAM GEM CP Certificate

Certificate of Registration

This is to Certify that
Quality Management System of

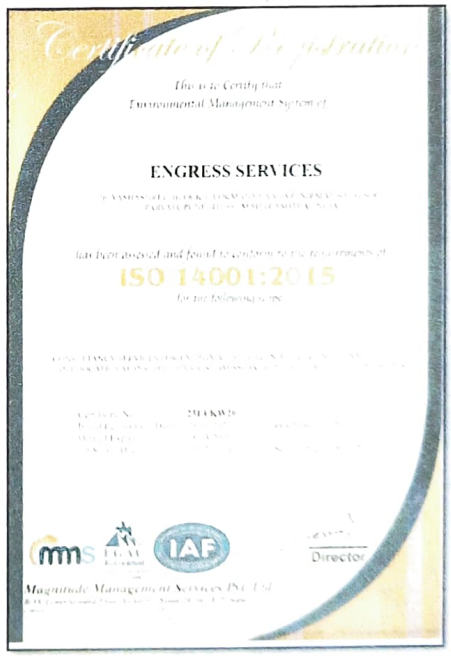
ENGRESS SERVICES

has been assessed and found to conform to the requirements of
ISO 9001:2015
for the following scope

Director

Magnitude Management Services Pvt. Ltd.

ISO: 9001-2015 Certificate



Certificate of Registration

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ENGRESS SERVICES

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for the following scope

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ENGRESS SERVICES PUNE

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

EXECUTIVE SUMMARY

1. Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune consumes Energy in the form of Electrical Energy; 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 & Laboratory Liquid waste

3. Present Energy Consumption & CO_2 Emission:

No	Particulars	Value	Unit
1	Annual Energy Purchased	**54752**	kWh
2	Annual CO_2 Emissions	**27.68**	MT

4. Various projects implemented for Environmental Conservation:

- Usage of Energy Efficient BEE STAR Rated Equipment
- Installation of 20 kWp Roof Top Solar PV Plant
- Installation of Rain Water Harvesting Project

5. Usage of Renewable Energy & CO_2 Emission Reduction:

- The Institute has installed Roof Top Solar PV Plant of Capacity 10 kWp.
- Energy Generated by Solar PV Plant in 22-23 is 12000 kWh
- Annual Reduction in CO_2 Emissions in 22-23 is 10.8 MT.

6. Indoor Air Quality:

No	Parameter/Value	AQI	PM2.5	PM10
1	Maximum	**97**	**58**	**74**
2	Minimum	**93**	**57**	**72**

7. Indoor Comfort Condition Parameters:

No	Parameter/Value	Temperature, ^0C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	**29.2**	**52**	**142**	**45**
2	Minimum	**28.9**	**50**	**102**	**41.9**

8. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Provision of Bio Composting Unit
3	Sanitary waste	Provision of Sanitary Waste Incinerator
4	E Waste	Disposed of through Authorized Agency

9. Rain Water Harvesting:

The Institute has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

10. Environment Friendly Initiatives:

- Internal tree Plantation.
- Creation of Awareness on Energy Conservation by Display of Posters

11. Assumptions:

1. Energy Consumption in computed on the basis of Load Utilization Factor
2. 1 kWh of Electrical Energy releases 0.9 Kg of CO_2 into atmosphere
3. 1 kWp Solar PV system generates 4 kWh of Electrical Energy per Day
4. Annual Solar Energy Generation Days: 300 Nos

12. References:

- For CO_2 Emission computation: www.tatapower.com
- For Solar PV Energy Generation: www.solarrooftop.gov.in
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI Standards: www.cpcb.com

ABBREVIATIONS

kWh	:	kilo-Watt Hour
Qty	:	Quantity
MT	:	Metric Ton
CO_2	:	Carbon Di Oxide
kWp	:	Kilo Watt Peak
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. Important Definitions:

1.1. Environment: Definition as per environment Protection Act: 1986

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

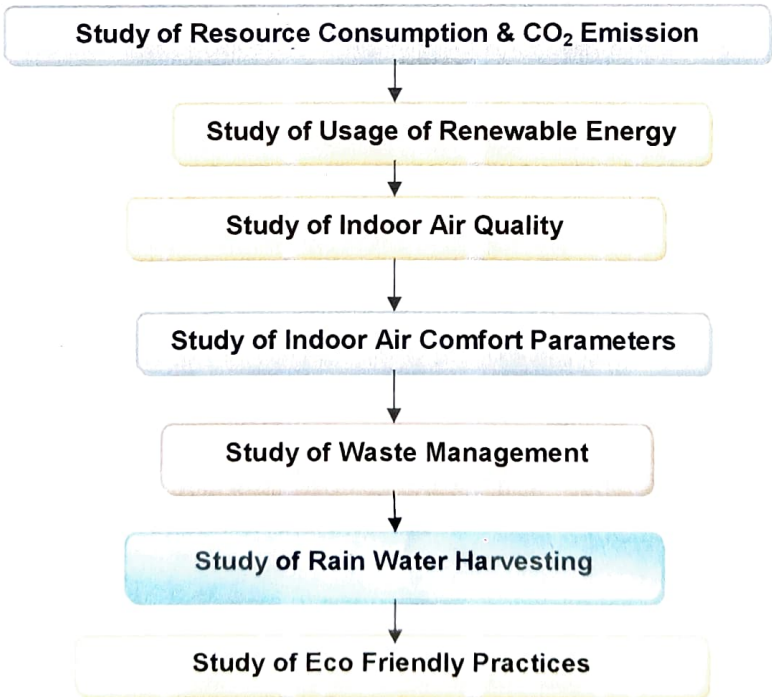
1.2. Environmental Audit: Definition:

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

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

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

1.4 Audit Procedural Steps:



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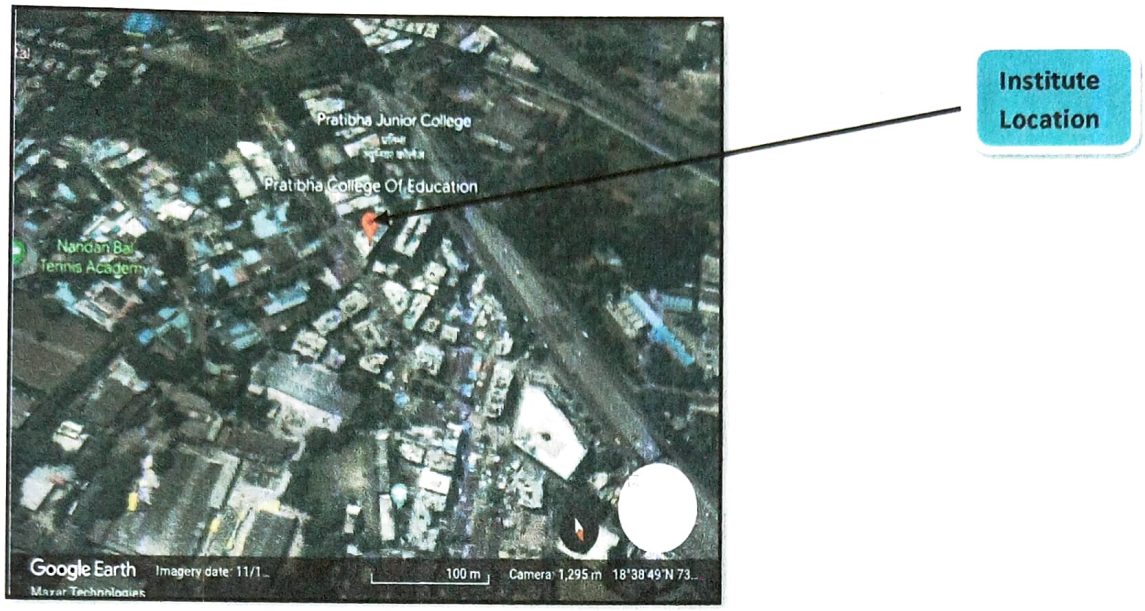
1.5 Institute Location Image:



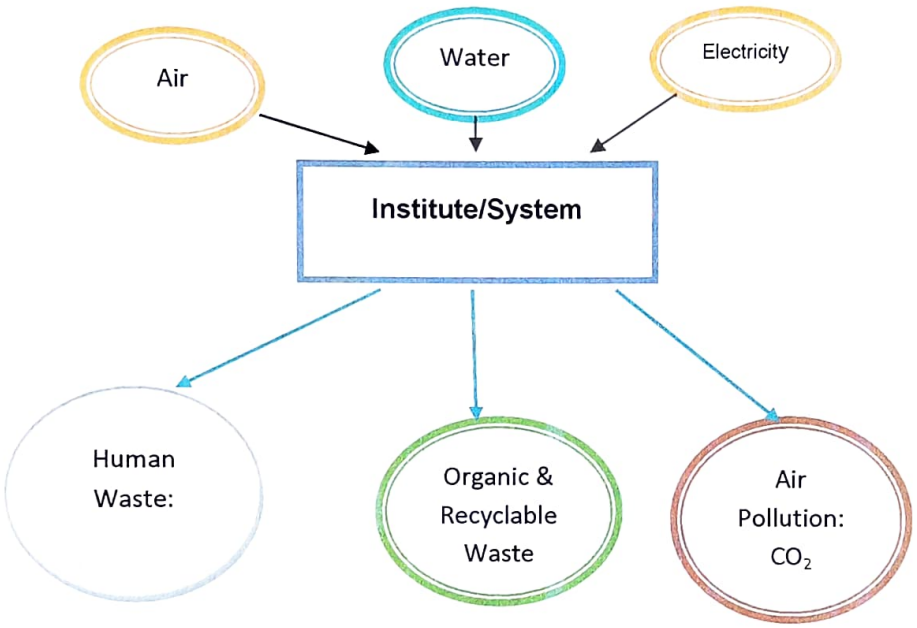
CHAPTER-II
STUDY OF RESOURCE CONSUMPTION & CO_2 EMISSION

The Institute consumes following Natural/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:



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 the various forms of Energy used by the Institute for performing its day to day activities
The basis of Calculation for CO_2 emissions due to Electrical Energy is:

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

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

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Jun-22	2785	2.51
2	Jul-22	2693	2.42
3	Aug-22	2596	2.34
4	Sep-22	2660	2.39
5	Oct-22	2512	2.26

ENGRESS SERVICES PUNE

6	Nov-22	2618	2.36
7	Dec-22	2196	1.98
8	Jan-23	2236	2.01
9	Feb-23	2698	2.43
10	Mar-23	2436	2.19
11	Apr-23	2559	2.30
12	May-23	2763	2.49
13	Total	30752	27.68
14	Maximum	2785	2.51
15	Minimum	2196	1.98
16	Average	2562.67	2.31

Chart No 2: Representation of Month wise CO_2 emissions:

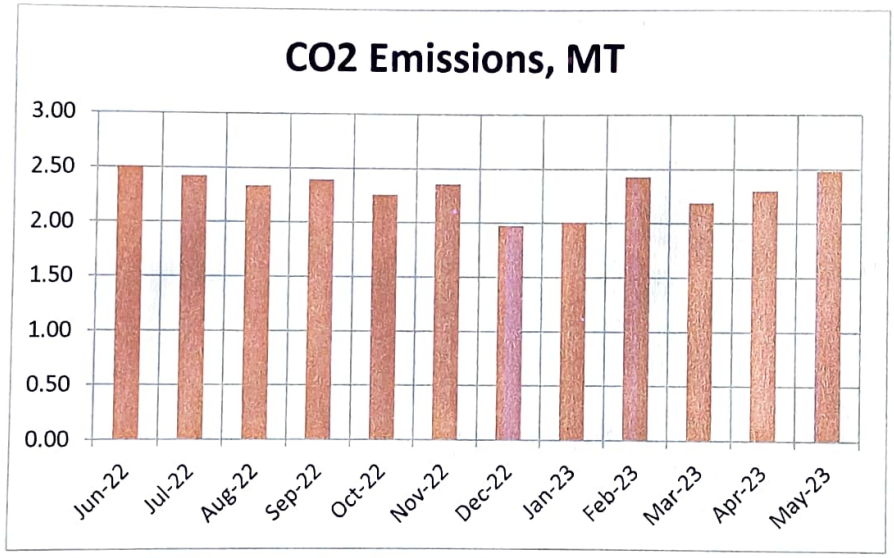


Table No 2: Key Parameters:

No	Value	Energy Purchased, kWh	CO_2 emissions, MT
1	Total	30752	27.68
2	Maximum	2785	2.51
3	Minimum	2196	1.98
4	Average	2562.67	2.31

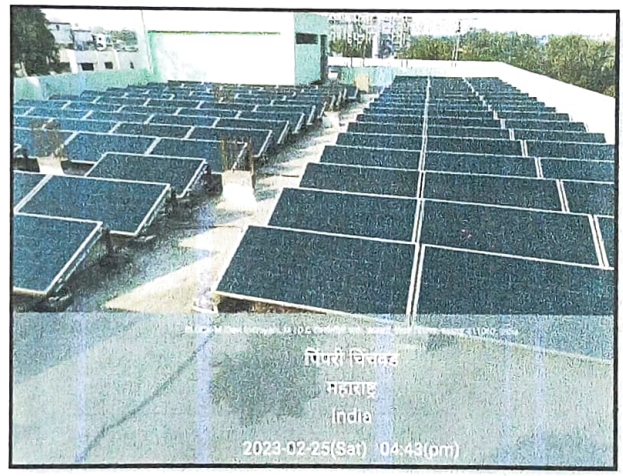
CHAPTER-III
STUDY OF CO_2 USAGE OF RENEWABLE ENERGY

The Institute has installed **20 kWp** Roof Top Solar PV Plant. In the following Table, we present the Annual Reduction in CO_2 Emissions due to usage of Renewable Energy.

Table No 3: Calculation of Reduction in CO_2 Emissions:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	20	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	**24000**	kWh
5	1 kWh of Energy is equivalent to	**0.9**	Kg of CO_2
6	Reduction in Annual CO_2 Emissions= **(4) * (5)/1000**	**21.6**	**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 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.

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
3. PM 2.5- Particulate Matter of Size 2.5

Table No 4: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
1	Office	95	57	73
2	Library	93	57	74
3	Classroom	96	57	73
4	Tutorial Room	95	57	72
5	IQAC Room	96	57	73
6	Ladies Common Room	97	58	73
	Maximum	**97**	**58**	**74**
	Minimum	**93**	**57**	**72**

CHAPTER V
STUDY OF INDOOR COMFORT CONDITION PARAMETERS

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

The Parameters include:

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

Table No 5: Study of Indoor Comfort Parameters:

No	Location	Temperature, ^0C	Humidity, %	Lux Level	Noise Level, dB
1	Office	28.9	52	102	41.9
2	Library	29.1	51	113	45
3	Classroom	29.2	52	142	42.6
4	Tutorial Room	28.9	52	109	44.8
5	IQAC Room	28.9	50	119	45
6	Ladies Common Room	29	52	123	44.7
	Maximum	**29.2**	**52**	**142**	**45**
	Minimum	**28.9**	**50**	**102**	**41.9**

CHAPTER VI
STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source

The Waste is segregated at source. Waste Collection Bins are placed at various locations.

Photograph of Waste Collection Bin:

6.2 Organic Waste Management:

A Bio Composting Pit is used to convert the Leafy Waste into Bio Compost.

Photograph of Bio Composting Arrangement:

6.3 Sanitary Waste Management:

The Institute has installed Sanitary Waste Incinerator, to dispose of the Sanitary Waste.

Photograph of Sanitary Waste Incinerator:

6.4 E Waste Management:

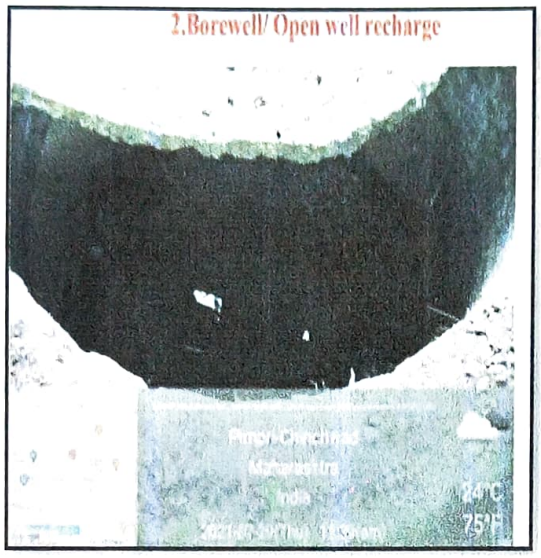
The E Waste is disposed of through Authorized Agency.

CHAPTER-VII
STUDY OF RAIN WATER MANAGEMENT

The Institute has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

.

Photograph of Bore well Recharge Point:

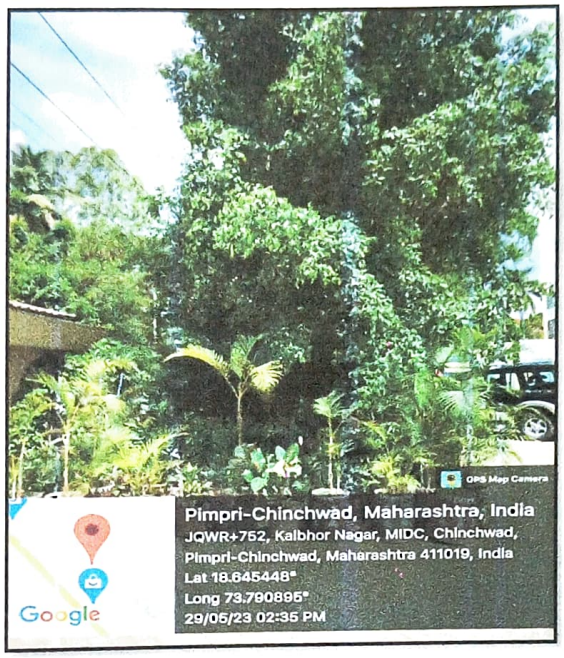


CHAPTER-VIII
STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The Institute has well maintained tree plantation in the campus.

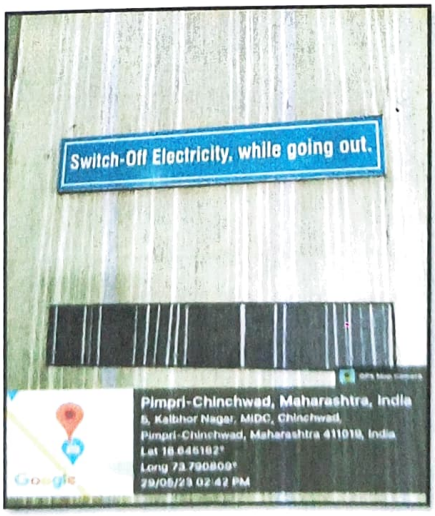
Photograph of Tree Plantation in the campus:



8.2 Creation of Awareness about Energy Conservation:

The Institute has displayed Posters on Importance of Energy Conservation.

Photograph of Posters on Energy Conservation:



ANNEXURE: I
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 33^0C
2	Humidity	Less Than 70%

GREEN AUDIT REPORT

of

Kamala Education Society's,

PRATIBHA INSTITUTE OF BUSINESS MANAGEMENT

Off Mumbai Pune Road, Chinchwad, Pune 411 019

KAMALA
Education Society

Year: 2021-22

Prepared by

ENGRESS SERVICES

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

ENGRESS SERVICES

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: eee@mahaurja.com, Web: www.mahaurja.com

ECN/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
Yashshree, 26, 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 (EC)

MEDA REGISTRATION 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 22/788

Deepak Sood
Secretary General, ASSOCHAM

ASSOCHAM GEM CP CERTIFICATE

ENGRESS SERVICES PUNE

ENGRESS SERVICES

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

Ref: ES/ PIBM/21-22/02

Date: 15/6/2022

CERTIFICATE

This is to certify that we have conducted Green Audit at Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune in the year 2021-22.

The Institute has adopted Energy Efficient & Green Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of 20 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Bio Composting Pit for Conversion of Leafy Waste
- Provision of Sanitary Waste Incinerator
- Installation of Rain Water Harvesting Project
- Internal Tree Plantation
- Good Internal Road
- 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,

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

ENGRESS SERVICES PUNE

INDEX

ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune for awarding us the assignment of Green Audit of their campus for the Year: 2021-22.

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

EXECUTIVE SUMMARY

1. Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune consumes Energy in the form of Electrical Energy; used for various gadgets, Office & other facilities.

2. Present Energy Consumption& CO_2 Emission:

No	Parameter /Value	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	29716	26.74
2	Maximum	3036	2.73
3	Minimum	2113	1.90
4	Average	2476.33	2.23

3. Various Majors Adopted for Energy Conservation:

- Usage of Energy Efficient LED Fittings
- Usage of Energy efficient STAR Rated Equipment
- Installation of 20 kWp Roof Top Solar PV Plant

4. Usage of Renewable Energy:

- The Institute has installed 20 Roof Top Solar PV Plant.
- The Energy generated by Solar PV Plant in the Year: 21-22 is 24000 kWh.
- The reduction in CO_2 Emissions due to Solar PV Plant in 21-22 is 21.6 MT.

5. Waste Management:

5.1 Segregation of Waste at Source:

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

5.2 Organic Waste Management:

The Institute has a Bio Composting Arrangement for conversion of Leafy Waste into Bio Compost.

5.3 Sanitary Waste Management:

Institute has a provision of sanitary waste incinerator.

5.4 E-Waste Management:

The E Waste is disposed of through Authorized Agency.

6. Rain Water Management:

The Institute has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

7. Green & Sustainable Practices:

- Well maintained internal road
- Well maintained Garden.
- Provision of Ramp for Divyangajan
- Creation of Awareness in respect of Resource Conservation by displaying posters

8. Assumptions:

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO_2 into atmosphere
2. 1 kWp Solar PV system generates 4 kWh of Electrical Energy per Day
3. Annual Solar Energy Generation Days: 300 Nos

9. References:

1. For CO_2 Emissions: www.tatapower.com
2. For Solar PV Energy Generation: www.solarrofftop.gov.in

ABBREVIATIONS

LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
MT	:	Metric Ton
LPD	:	Liters Per Day

CHAPTER-I
INTRODUCTION

1.1 Objectives:

1. To study present level of Energy Consumption
2. To Study the present CO_2 emissions
3. To study Scope for usage of Renewable Energy
4. To study Waste Management:
5. To study Rain Water Management
6. To study Green & Sustainable Practices.

1.2 Table No 1: General Details of Institute:

No	Head	Particulars
1	Name	Kamala Education Society's Pratibha Institute of Business Management
2	Address	Off Mumbai Pune Road, Chinchwad, Pune-411019
3	Year of Establishment	2008

CHAPTER-II
STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Energy Consumption

Table No 2: Electrical Energy Consumption Analysis- 2021-22:

No	Month	Energy Purchased, kWh
1	Jun-21	2136
2	Jul-21	2236
3	Aug-21	2363
4	Sep-21	2113
5	Oct-21	2236
6	Nov-21	2301
7	Dec-21	2436
8	Jan-22	2536
9	Feb-22	2664
10	Mar-22	2763
11	Apr-22	2896
12	May-22	3036
13	Total	29716
14	Maximum	3036
15	Minimum	2113
16	Average	2476.33

Chart No 1: To study the variation of Month wise Energy Consumption, kWh:

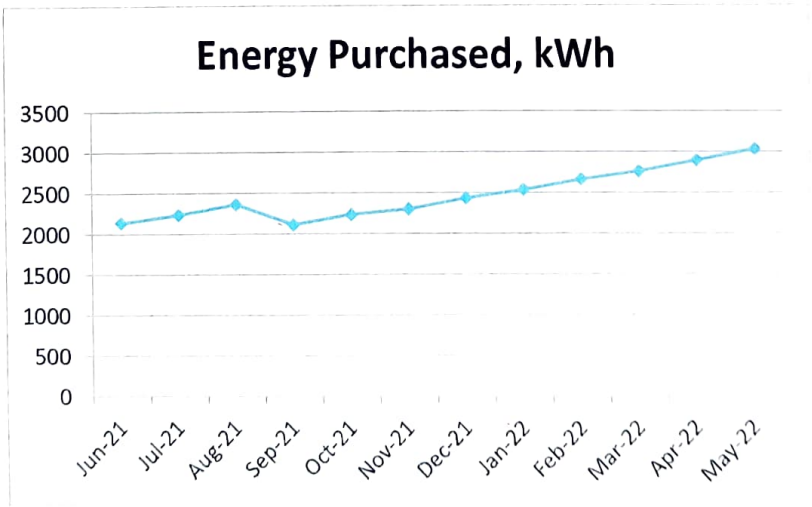


Table No 3: Key Parameters:

No	Parameter	Energy Purchased, kWh
1	Total	29716
2	Maximum	3036
3	Minimum	2113
4	Average	2476.33

CHAPTER-III
STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the Institute for performing its day to day activities

The Institute uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO_2 Emissions:

The basis of Calculation for CO_2 emissions due to Electrical Energy is:

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

Based on the above Data we compute the CO_2 emissions which are being released in to the atmosphere by the Institute due to its Day to Day operations

Table No 4: Month wise CO_2 Emissions:

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Jun-21	2136	1.92
2	Jul-21	2236	2.01
3	Aug-21	2363	2.13
4	Sep-21	2113	1.90
5	Oct-21	2236	2.01
6	Nov-21	2301	2.07
7	Dec-21	2436	2.19
8	Jan-22	2536	2.28
9	Feb-22	2664	2.40
10	Mar-22	2763	2.49
11	Apr-22	2896	2.61
12	May-22	3036	2.73
13	Total	29716	26.74
14	Maximum	3036	2.73
15	Minimum	2113	1.90
16	Average	2476.33	2.23

Chart No 2: Representation of Month wise CO_2 emissions:

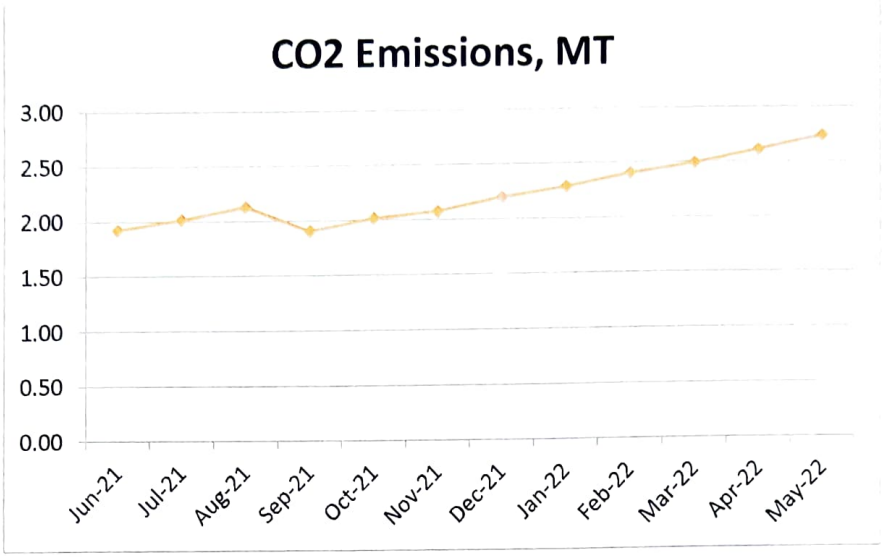


Table No 5: Key Parameters:

No	Value	Energy Purchased, kWh	CO_2 emissions, MT
1	Total	29716	26.74
2	Maximum	3036	2.73
3	Minimum	2113	1.90
4	Average	2476.33	2.23

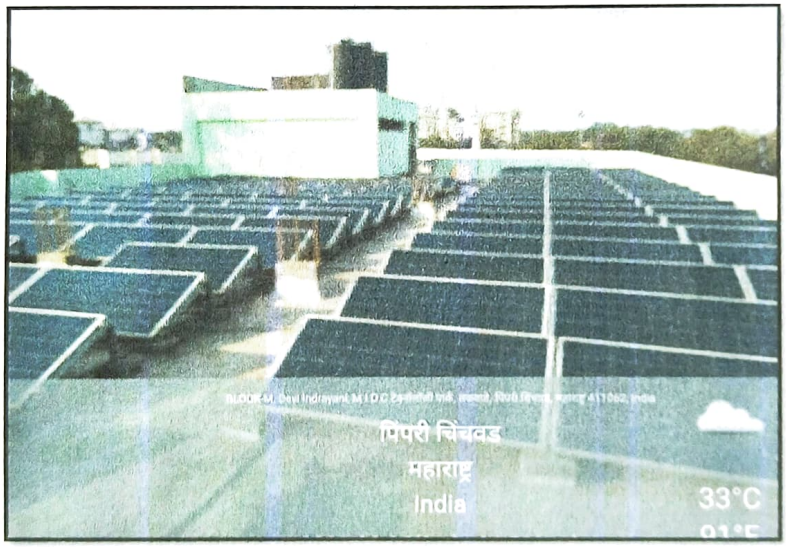
CHAPTER-IV
STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed a Roof Top Solar PV Plant of capacity **20 kWp.** In the following Table we present the Annual Reduction in CO_2 Emissions due to Solar PV Plant.

Table No 6: Computation of Annual Reduction in CO_2 Emissions:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	20	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated = 1*2*3	**12000**	kWh
5	1 kWh of Electrical Energy emits	**0.9**	Kg of CO_2
6	Annual Reduction in CO2 Emissions = (4) * (5) /1000	**21.6**	MT

Photograph of Roof Top Solar PV Plant:



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 a Bio Composting Arrangement for conversion of Leafy Waste in to Bio compost.

Photograph of Bio Composting Arrangement:

5.3 Sanitary Waste Management:

The Institute has installed Sanitary Waste Incinerator, to dispose of the Sanitary Waste.

Photograph of Sanitary Waste Incinerator:

5.4 E Waste Management:

The E Waste is disposed of through Authorized Agency.

CHAPTER-VI
STUDY OF RAIN WATER MANAGEMENT

The Institute has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

Photograph of Rain Water Carrying Pipe:

CHAPTER-VII
STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Internal Road:

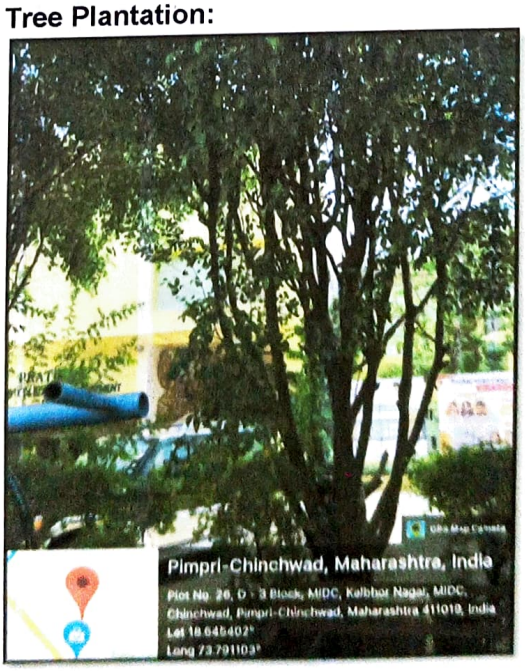
The Institute has well maintained internal road to facilitate the easy movement of the students within the campus.

Photograph of Internal Road:

7.2 Tree Plantation:

The Institute has well maintained Tree Plantation in the campus.

Photograph of Internal Tree Plantation:



7.3 Creation of Awareness about Resource Conservation:

The Institute has displayed Posters on Importance of Energy Conservation, appealing the stake holders to conserve the various Resources

Photograph of Posters on importance of Energy & Water Conservation:

ENVIRONMENTAL AUDIT REPORT

of

Kamala Education Society's,

PRATIBHA INSTITUTE OF BUSINESS MANAGEMENT

Off Mumbai Pune Road, Chinchwad, Pune 411 019

KAMALA
Education Society

Year: 2021-22

Prepared by

ENGRESS SERVICES

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

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 Husbandry,
Aundh, Pune, Maharashtra 411067
Ph No: 020-35000450
Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/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
Yashshree, 26, 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.*

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- 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 (EC)

MEDA REGISTRATION CERTIFICATE

ASSOCHAM GEM CP CERTIFICATE

ENGRESS SERVICES PUNE

ENGRESS SERVICES

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

Ref: ES/PIBM/21-22/03

Date: 15/6/2022

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Kamala Educational Society's, Pratibha Institute of Business Management, Chinchwad, Pune in the year 2021-22.

The Institute has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of 20 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Bio Composting Pit for Conversion of Leafy Waste
- Provision of Sanitary Waste Incinerator.
- Installation of Rain Water Harvesting Project
- Internal Tree Plantation
- 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 Energy Efficient, Green and environment Friendly.

For Engress Services,

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

ENGRESS SERVICES PUNE

INDEX

ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune for awarding us the assignment of Environmental Audit of their campus for the Year: 2021-22.

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

EXECUTIVE SUMMARY

1. Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune consumes Energy in the form of Electrical Energy; 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 Consumption & CO_2 Emissions:

No	Parameter/Value	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	29716	26.74
2	Maximum	3036	2.73
3	Minimum	2113	1.90
4	Average	2476.33	2.23

4. Projects implemented for Environmental Conservation:

- Installation of 20 kWp Roof Top Solar PV Plant
- In campus Tree Plantation
- Installation of Sewage Treatment Plant

5. Usage of Renewable Energy& CO_2 Emission Reduction:

- The Institute has installed 20 Roof Top Solar PV Plant.
- The Energy generated by Solar PV Plant in the Year: 21-22 is 24000 kWh.
- The reduction in CO_2 Emissions due to Solar PV Plant in 21-22 is 21.6 MT.

6. Indoor Air Quality:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	121	68	81
2	Minimum	106	62	79

7. Indoor Comfort Condition Parameters:

No	Parameter/Value	Temperature, ^0C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	26.5	60	147	45
2	Minimum	26.3	59	117	42

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 a Bio Composting Arrangement for conversion of Leafy Waste into Bio Compost.

8.3 Sanitary Waste Management:

Institute has a provision of sanitary waste incinerator.

8.4 E-Waste Management:

The E Waste is disposed of through Authorized Agency.

9. Rain Water Management:

The Institute has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

10. Environment Friendly Initiatives:

- Tree Plantation and Well maintained Garden.
- Creation of Awareness in respect of Resource Conservation by displaying posters

11. Notes & Assumptions:

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO_2 into atmosphere
2. 1 kWp Solar PV system generates 4 kWh of Electrical Energy per Day
3. Annual Solar Energy Generation Days: 300 Nos

12. References:

- For CO_2 Emission computation: www.tatapower.com
- For Solar PV Energy Generation: www.solarrooftop.gov.in
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI &Water Quality Standards: www.cpcb.com

ABBREVIATIONS

kWh	:	kilo-Watt Hour
MCA	:	Master in Computer Applications
Qty	:	Quantity
MT	:	Metric Ton
CO_2	:	Carbon Di Oxide
kWp	:	Kilo Watt Peak
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

ENGRESS SERVICES PUNE

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 Institute as System
2. Study of present Resource Consumption & CO_2 Emissions
3. Study of CO_2 emission Reduction
4. Study of Indoor Air Quality
5. Study of Indoor Comfort Conditions
6. Study of Waste Management
7. Study of Rain Water Management
8. Study of Environmental Friendly Initiatives

1.3 General Details of Institute: Table No: 4:

No	Head	Particulars
1	Name	Kamala Education Society's Pratibha Institute of Business Management
2	Address	Off Mumbai Pune Road, Chinchwad, Pune-411019
3	Year of Establishment	2009

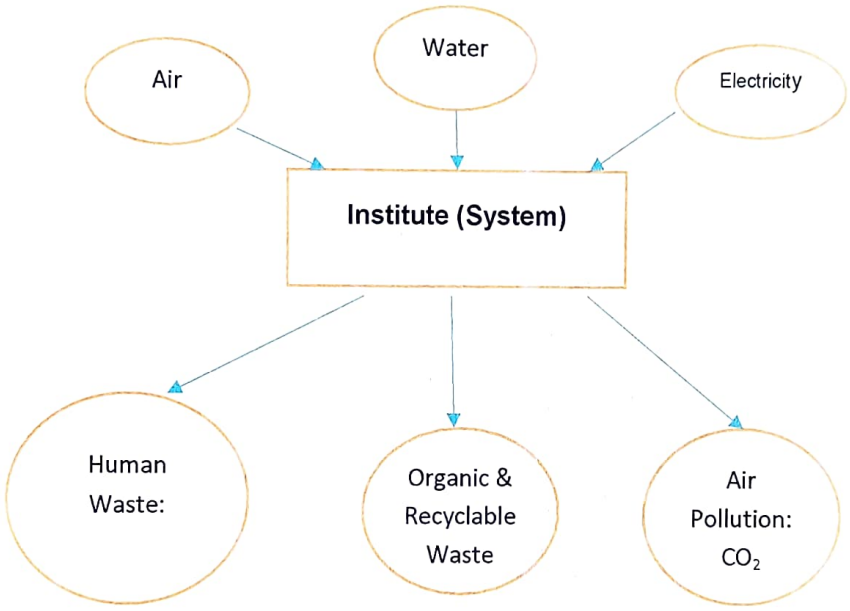
CHAPTER-II
STUDY OFRESOURCECONSUMPTION & CO_2 EMISSION

The Institute consumes following Natural/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:



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 the various forms of Energy used by the Institute for performing its day to day activities
The basis of Calculation for CO_2 emissions due to Electrical Energy is:

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

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

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Jun-21	2136	1.92
2	Jul-21	2236	2.01
3	Aug-21	2363	2.13
4	Sep-21	2113	1.90

ENGRESS SERVICES PUNE

5	Oct-21	2236	2.01
6	Nov-21	2301	2.07
7	Dec-21	2436	2.19
8	Jan-22	2536	2.28
9	Feb-22	2664	2.40
10	Mar-22	2763	2.49
11	Apr-22	2896	2.61
12	May-22	3036	2.73
13	Total	29716	26.74
14	Maximum	3036	2.73
15	Minimum	2113	1.90
16	Average	2476.33	2.23

Chart No 2: Representation of Month wise CO_2 emissions:

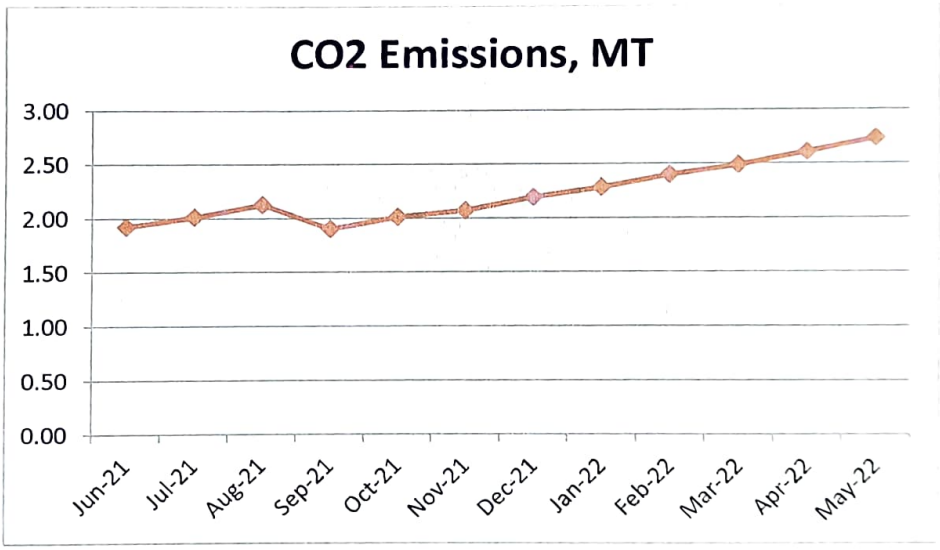


Table No 6: Key Parameters:

No	Value	Energy Purchased, kWh	CO_2 emissions, MT
1	Total	29716	26.74
2	Maximum	3036	2.73
3	Minimum	2113	1.90
4	Average	2476.33	2.23

CHAPTER-III
STUDY OF CO_2 EMISSION REDUCTION

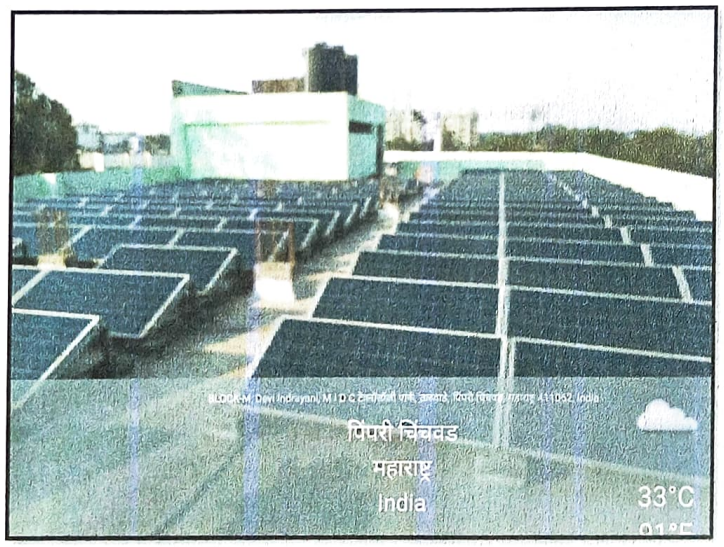
The Institute has installed a Roof Top Solar PV Plant of capacity **20 kWp.**

In the following Table we present the Annual Reduction in CO_2 Emissions due to Solar PV Plant.

Table No 7: Computation of Annual Reduction in CO_2 Emissions:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	20	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	**24000**	kWh
5	1 kWh of Electrical Energy emits	**0.9**	Kg of CO_2
6	Annual Reduction in CO2 Emissions = (4) * (5) /1000	**21.6**	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 litres** 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.

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
3. PM 2.5- Particulate Matter of Size 2.5

Table No 8: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
1	Central Store	113	61	81
2	Canteen	120	66	81
3	HOD Cabin	110	63	80
4	Faculty Cabin	106	62	79
5	Classroom	114	64	79
6	Computer Lab	121	68	81
	Maximum	**121**	**68**	**81**
	Minimum	**106**	**62**	**79**

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 Parameters:

No	Location	Temperature, ^0C	Humidity, %	Lux Level	Noise Level, dB
1	Central Store	26.3	60	123	45
2	Canteen	26.3	60	119	42
3	HOD Cabin	26.4	59	123	43
4	Faculty Cabin	26.4	59	147	45
5	Classroom	26.5	60	123	44
6	Computer Lab	26.5	60	117	44.3
	Maximum	**26.5**	**60**	**147**	**45**
	Minimum	**26.3**	**59**	**117**	**42**

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 a Bio Composting Arrangement for conversion of Leafy Waste in to Bio compost.

Photograph of Bio Composting Arrangement:

6.3 Sanitary Waste Management:

The Institute has installed Sanitary Waste Incinerator, to dispose of the Sanitary Waste.

Photograph of Sanitary Waste Incinerator:

6.4 E Waste Management:

The E Waste is disposed of through Authorized Agency.

CHAPTER-VII
STUDY OF RAIN WATER MANAGEMENT

The Institute has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

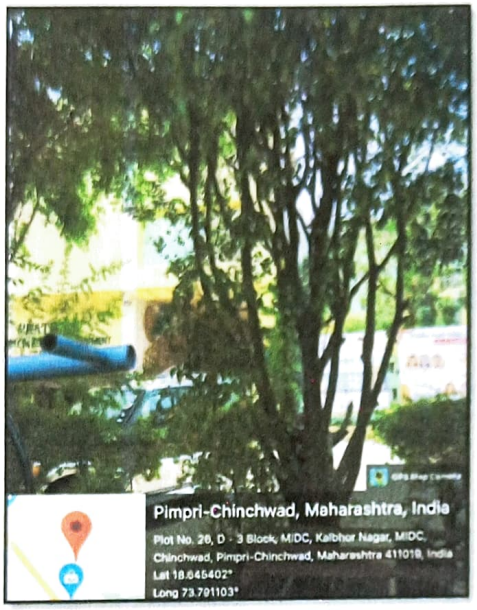
Photograph of Rain Water Carrying Pipe:

CHAPTER-VIII
STUDY OF ENVIRONMENT FRIENDLY PRACTICES

8.1Tree Plantation in the Campus:

The Institute has well maintained Tree Plantation in the campus

Photograph of Tree Plantation:



7.2Creation of Awareness about Resource Conservation:

The Institute has displayed Posters on Importance of Energy Conservation, appealing the stake holders to switch of the Equipment.

Photograph of Posters on importance of Energy & Water Conservation:

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

ENGRESS SERVICES PUNE

GREEN AUDIT REPORT

of

Kamala Education Society's,

PRATIBHA INSTITUTE OF BUSINESS MANAGEMENT

Off Mumbai Pune Road, Chinchwad, Pune 411 019

Year: 2020-21

Prepared by

ENRICH CONSULTANTS

Yashashree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: enrichcons@gmail.com

REGISTRATION CERTIFICATES

Regn. No. EA-8192 No. 2942

National Productivity Council
(National Certifying Agency)

PROVISIONAL CERTIFICATE

This is to certify that Mr. / Ms. Achyut Yashavant Mehendale
son / daughter of Mr. Yashavant
has passed the National Certification Examination for Energy Auditors in April - 2007, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India.

He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for the Accredited Energy Auditor and issue of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.

Place : Chennai, India
Date : 10th August 2007

Controller of Examination

Auditor Certificate

MAHARASHTRA ENERGY DEVELOPMENT AGENCY
An ISO 9001 : 2000 Reg. no. : RQ 91 / 2462

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: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2021-22/CR-14/1577 22nd April, 2021

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 Enrich Consultants**
Yashashree, Plot No. 26, Nirmal Bag Society,
Near Muktangan English School, Parvati,
Pune - 411009.

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

Registration Number : ***MEDA/ECN/2021-22/Class A/EA-03***

- 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 **21st April, 2023** 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 (EC)

MEDA Registration Certificate

ENRICH CONSULTANTS

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

Ref: EC/PIBM/20-21/02

Date: 27/7/2021

CERTIFICATE

This is to certify that we have conducted Green Audit at Kamala Educational Society's, Pratibha Institute of Business Management, Chinchwad, Pune in the year 2020-21.

The College has adopted following Green Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of 20 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Bio Composting Bed for Conversion of Leafy Waste
- Provision of Sanitary Waste Incinerator, for Disposal of Sanitary Waste
- Installation of Rain Water Management Project
- Internal Tree Plantation
- Good Internal Road
- Creation of awareness on Water 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 Enrich Consultants,

A Y Mehendale,
Certified Energy Auditor,
EA-8192

ENRICH CONSULTANTS ★ PUNE ★

INDEX

ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune for awarding us the assignment of Green Audit of their campus for the Year: 2020-21.

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

EXECUTIVE SUMMARY

1. Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune consumes Energy in the form of **Electrical Energy;** used for various gadgets, Office & other facilities.

2. Present Energy Consumption & CO_2 Emission:

No	Parameter /Value	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	18224	16.40
2	Maximum	3036	2.73
3	Minimum	989	0.89
4	Average	1518.67	1.37

3. Various Majors Adopted for Energy Conservation:

- Usage of Energy Efficient LED Fittings
- Usage of Energy efficient STAR Rated Equipment
- Installation of **20 kWp** Roof Top Solar PV Plant

4. Usage of Renewable Energy:

- The College has installed **20 kWp** Roof Top Solar PV Plant.
- The Energy generated by Solar PV Plant in the Year: 20-21 is **24000 kWh**.
- The reduction in CO_2 Emissions due to Solar PV Plant in 20-21 is **21.6 MT.**

5. Waste Management:

5.1 Segregation of Waste at Source:

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

5.2 Organic Waste Management:

The College has a Bio Composting Arrangement for conversion of Leafy Waste into Bio Compost.

6. Rain Water Management:

The College has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

7. Green & Sustainable Practices:

- Well maintained internal road
- Well maintained Garden.

- Creation of Awareness in respect of Water Conservation by displaying posters

8. Assumptions:

1. Energy Consumption is computed based on Load Utilization Factor.
2. **1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere
3. **1 kWp** Solar PV system generates **4 kWh** of Electrical Energy per Day
4. Annual Solar Energy Generation Days: **300 Nos**

9. References:

1. For CO_2 Emissions: www.tatapower.com
2. For Solar PV Energy Generation: www.solarrofftop.gov.in

ABBREVIATIONS

LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
MT	:	Metric Ton

CHAPTER-I
INTRODUCTION

1.1 Objectives:

1. To study present level of Energy Consumption
2. To Study the present CO_2 emissions
3. To study Scope for usage of Renewable Energy
4. To study Waste Management:
5. To study Rain Water Management
6. To study Green & Sustainable Practices.

1.2 Table No 1: General Details of College:

No	Head	Particulars
1	Name	Kamala Education Society's Pratibha Institute of Business Management
2	Address	Off Mumbai Pune Road, Chinchwad, Pune-411019
3	Year of Establishment	2008

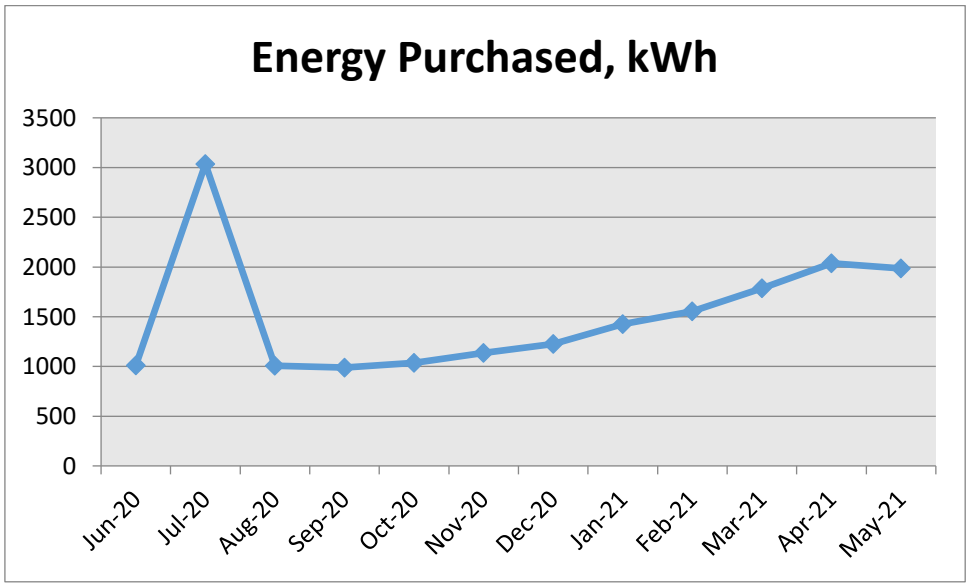
CHAPTER-II
STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Energy Consumption

Table No 2: Electrical Energy Consumption Analysis- 2020-21:

No	Month	Energy Purchased, kWh
1	Jun-20	1012
2	Jul-20	3036
3	Aug-20	1006
4	Sep-20	989
5	Oct-20	1036
6	Nov-20	1136
7	Dec-20	1225
8	Jan-21	1425
9	Feb-21	1553
10	Mar-21	1785
11	Apr-21	2036
12	May-21	1985
13	Total	18224
14	Maximum	3036
15	Minimum	989
16	Average	1518.67

Chart No 1: To study the variation of Month wise Energy Consumption, kWh:



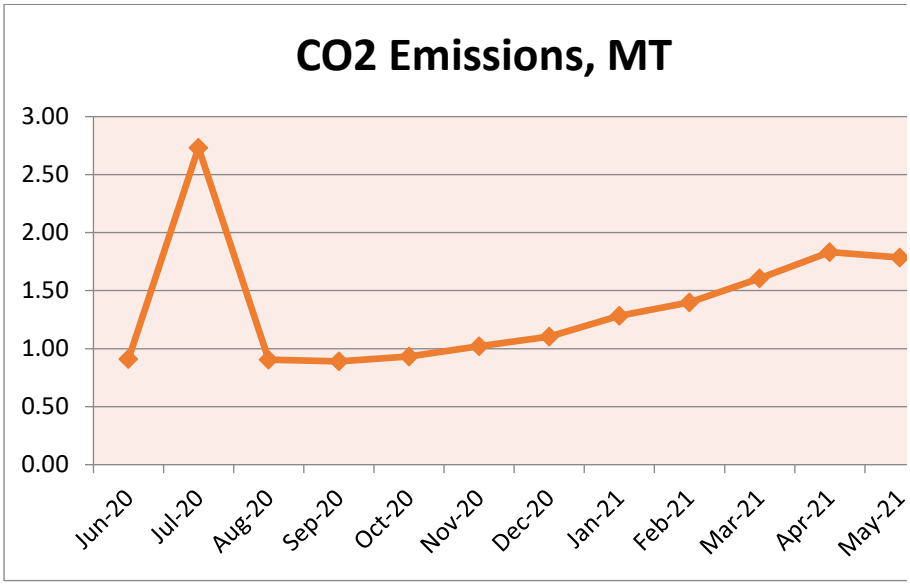
CHAPTER-III
STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. **Basis for computation of CO_2 Emissions: 1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Table No 3: Month wise CO_2 Emissions:

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Jun-20	1012	0.91
2	Jul-20	3036	2.73
3	Aug-20	1006	0.91
4	Sep-20	989	0.89
5	Oct-20	1036	0.93
6	Nov-20	1136	1.02
7	Dec-20	1225	1.10
8	Jan-21	1425	1.28
9	Feb-21	1553	1.40
10	Mar-21	1785	1.61
11	Apr-21	2036	1.83
12	May-21	1985	1.79
13	Total	18224	16.40
14	Maximum	3036	2.73
15	Minimum	989	0.89
16	Average	1518.67	1.37

Chart No 2: Representation of Month wise CO_2 emissions:



CHAPTER-IV
STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed a Roof Top Solar PV Plant of capacity **20 kWp.** In the following Table we present the Annual Reduction in CO_2 Emissions due to Solar PV Plant.

Table No 5: Computation of Annual Reduction in CO_2 Emissions:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	20	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	**24000**	kWh
5	1 kWh of Electrical Energy emits	**0.9**	Kg of CO_2
6	Annual Reduction in CO2 Emissions = (4) * (5) /1000	**21.6**	MT

Photograph of Roof Top Solar PV Plant:

CHAPTER V
STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source

The Waste is segregated at source. Waste Collection Bins are placed at various locations.

Photograph of Waste Collection Bin:

5.2 Organic Waste Management:

A Bio Composting Bed is used to convert the Leafy Waste into Bio Compost.

Photograph of Bio Composting Arrangement:

5.3 Sanitary Waste Management:

The Institute has installed Sanitary Waste Incinerator, to dispose of the Sanitary Waste.

Photograph of Sanitary Waste Incinerator:

CHAPTER-VI
STUDY OF RAIN WATER MANAGEMENT

The College has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

Photograph of Rain Water Carrying Pipe Section:

CHAPTER-VII
STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Internal Road:

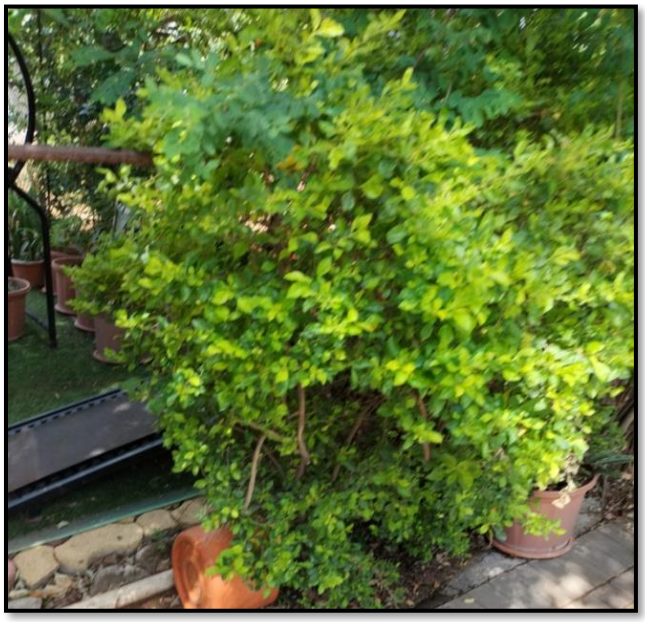
The College has well maintained internal roads to facilitate the easy movement of the students within the campus.

Photograph of Internal Road:

7.2 Tree Plantation:

The College has well maintained lawn and Tree Plantation in the campus.

Photograph of Internal Tree Plantation:



7.3 Creation of Awareness about Water Conservation:

The College has displayed Posters on Importance of Water Conservation, appealing the stake holders to conserve the various Resources

Photograph of Posters on importance of Water Conservation:

ENVIRONMENTAL AUDIT REPORT

of

Kamala Education Society's,

PRATIBHA INSTITUTE OF BUSINESS MANAGEMENT

Off Mumbai Pune Road, Chinchwad, Pune 411 019

Year: 2020-21

Prepared by

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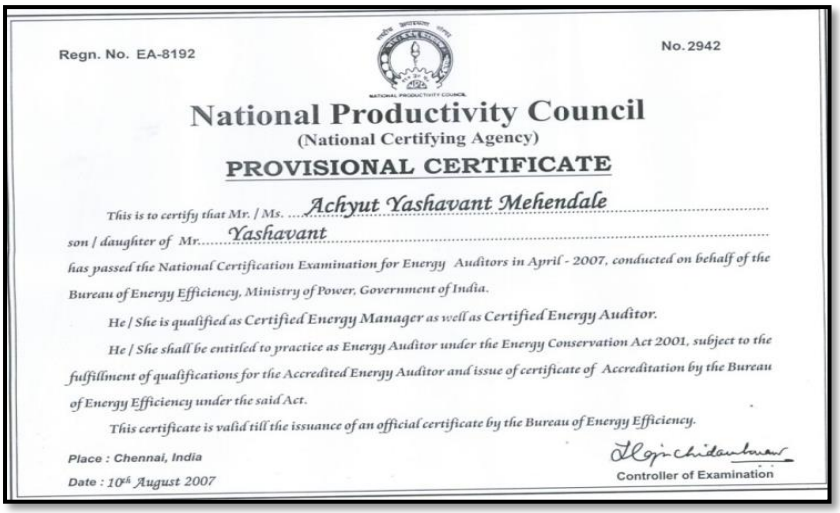

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Controller of Examination

Auditor Certificate

MAHARASHTRA ENERGY DEVELOPMENT AGENCY
An ISO 9001 : 2000 Reg. no. : RQ 91 / 2462

Maharashtra Energy Development Agency
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ECN/2021-22/CR-14/1577 22nd April, 2021

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General Manager (EC)

MEDA Registration Certificate

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Ref: EC/ PIBM /20-21/03 Date: 27/7/2021

CERTIFICATE

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The College has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
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- Bio Composting Pit for Conversion of Leafy Waste
- Provision of Sanitary Waste Incinerator, for Disposal of Sanitary Waste
- Installation of Rain Water Management Project
- Internal Tree Plantation
- Creation of awareness on Water 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 Environment Friendly.

For Enrich Consultants,

A Y Mehendale

A Y Mehendale,
Certified Energy Auditor,
EA-8192

ENRICH CONSULTANTS PUNE

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

.

EXECUTIVE SUMMARY

1. Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune consumes Energy in the form of **Electrical Energy;** used for various equipment.

2. Pollution caused due to College Activities:

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

3. Present Energy Consumption & CO_2 Emissions:

No	Parameter/Value	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	18224	16.40
2	Maximum	3036	2.73
3	Minimum	989	0.89
4	Average	1518.67	1.37

4. Projects implemented for Environmental Conservation:

- Installation of **20 kWp** Roof Top Solar PV Plant
- In campus Tree Plantation

5. Usage of Renewable Energy & CO_2 Emission Reduction:

- The College has installed **20 kWp** Roof Top Solar PV Plant.
- The Energy generated by Solar PV Plant in the Year: 20-21 is **24000 kWh**.
- The reduction in CO_2 Emissions due to Solar PV Plant in 20-21 is **21.6 MT.**

6. Indoor Air Quality:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	**81**	**49**	**63**
2	Minimum	**70**	**43**	**54**

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.

7.2 Organic Waste Management:

The College has a Bio Composting Bed Arrangement for conversion of Leafy Waste into Bio

Compost.

8. Rain Water Management:

The College has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

9. Environment Friendly Initiatives:

- Tree Plantation and Well maintained Garden.
- Creation of Awareness in respect of Water Conservation by displaying posters

10. Assumptions:

1. Energy Consumption is computed based on Load Utilization Factor.
2. **1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere
3. **1 kWp** Solar PV system generates **4 kWh** of Electrical Energy per Day
4. Annual Solar Energy Generation Days: **300 Nos**

11. References:

- For CO_2 Emission computation: www.tatapower.com
- For Solar PV Energy Generation: www.solarrooftop.gov.in
- For AQI Standards: www.cpcb.com

ABBREVIATIONS

kWh	:	kilo-Watt Hour
Qty	:	Quantity
MT	:	Metric Ton
CO_2	:	Carbon Di Oxide
kWp	:	Kilo Watt Peak
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

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 College)
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 College as System
2. Study of present Resource Consumption & CO_2 Emissions
3. Study of Usage of Renewable Energy
4. Study of Indoor Air Quality
5. Study of Waste Management
6. Study of Rain Water Management
7. Study of Environmental Friendly Initiatives

1.3 General Details of College: Table No: 4:

No	Head	Particulars
1	Name	Kamala Education Society's Pratibha Institute of Business Management
2	Address	Off Mumbai Pune Road, Chinchwad, Pune 411 019
3	Year of Establishment	2009

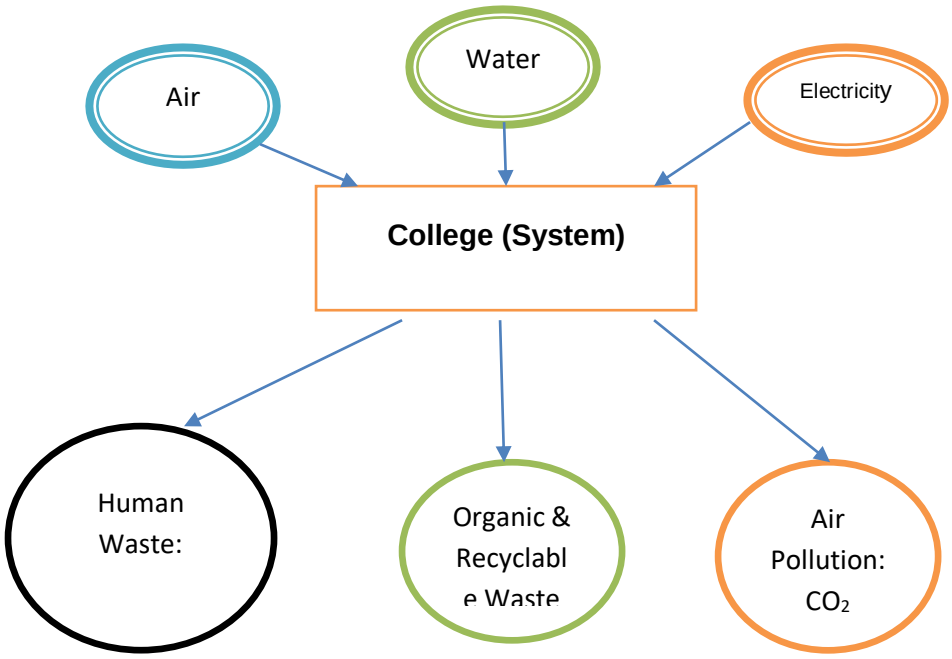
CHAPTER-II
STUDY OF RESOURCE CONSUMPTION & CO_2 EMISSION

The College consumes following Natural/derived Resources:

1. Air
2. Water
3. Electrical Energy

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

Chart No 1: Representation of College 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 the various forms of Energy used by the College for performing its day to day activities

The basis of Calculation for CO_2 emissions due to Electrical Energy is:

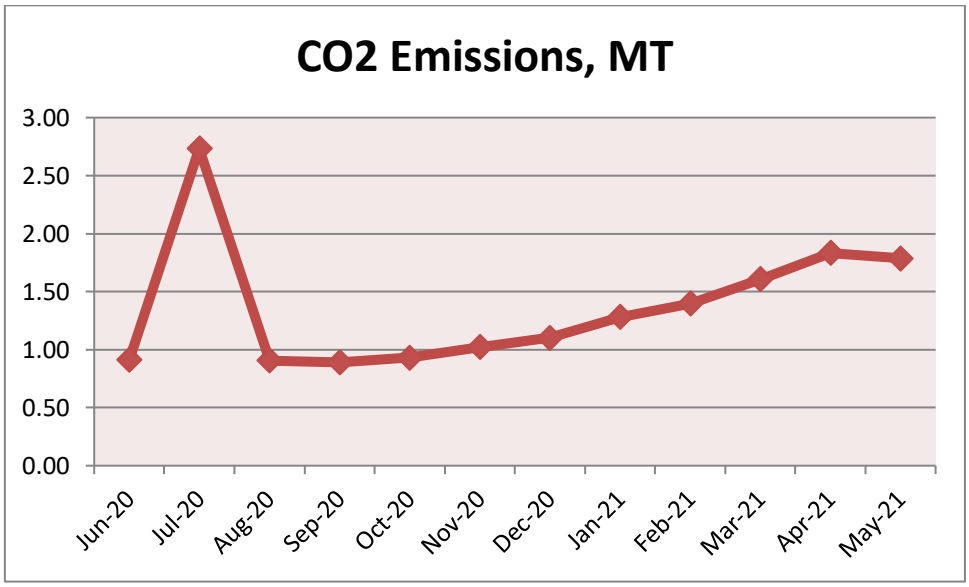
1 kWh of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Table No 5: Study of Energy Consumption & CO_2 Emission: 2020-21:

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Jun-20	1012	0.91
2	Jul-20	3036	2.73
3	Aug-20	1006	0.91
4	Sep-20	989	0.89
5	Oct-20	1036	0.93

6	Nov-20	1136	1.02
7	Dec-20	1225	1.10
8	Jan-21	1425	1.28
9	Feb-21	1553	1.40
10	Mar-21	1785	1.61
11	Apr-21	2036	1.83
12	May-21	1985	1.79
13	Total	18224	16.40
14	Maximum	3036	2.73
15	Minimum	989	0.89
16	Average	1518.67	1.37

Chart No 2: Representation of Month wise CO_2 emissions:



CHAPTER-III
STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed a Roof Top Solar PV Plant of capacity **20 kWp.**

In the following Table we present the Annual Reduction in CO_2 Emissions due to Solar PV Plant.

Table No 6: Computation of Annual Reduction in CO_2 Emissions:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	20	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	**24000**	kWh
5	1 kWh of Electrical Energy emits	**0.9**	Kg of CO_2
6	Annual Reduction in CO2 Emissions = (4) * (5) /1000	**21.6**	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 an average, a person inhales about **14,000 litres** 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.

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 10 Micron

Table No 7: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
1	Library	70	43	54
2	Classroom	76	46	57
3	Office	73	45	57
4	Staff Room	81	49	63
5	Pantry	77	45	54
6	Corridor	80	48	62
	Maximum	**81**	**49**	**63**
	Minimum	**70**	**43**	**54**

CHAPTER V
STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source

The Waste is segregated at source. Waste Collection Bins are placed at various locations.

Photograph of Waste Collection Bin:

5.2 Organic Waste Management:

A Bio Composting Bed is used to convert the Leafy Waste into Bio Compost.

Photograph of Bio Composting Arrangement:

5.3 Sanitary Waste Management:

The Institute has installed Sanitary Waste Incinerator, to dispose of the Sanitary Waste.

Photograph of Sanitary Waste Incinerator:

CHAPTER-VI
STUDY OF RAIN WATER MANAGEMENT

The College has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

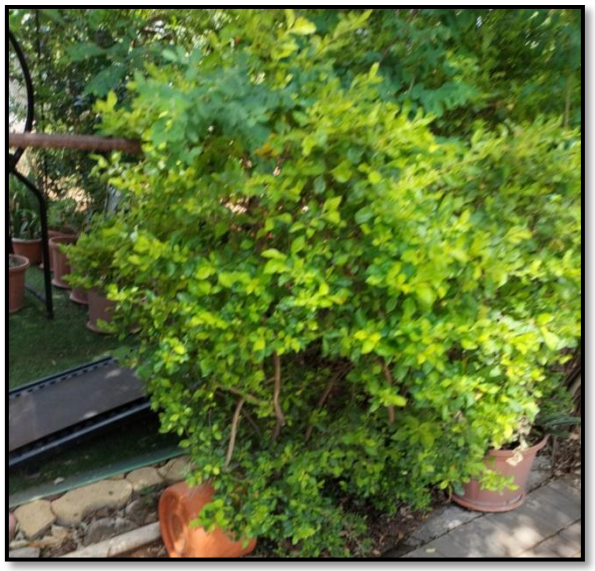
Photograph of Rain Water Carrying Unit:

CHAPTER-VII
STUDY OF ENVIRONMENT FRIENDLY PRACTICES

7.1 Tree Plantation in the Campus:

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

Photograph of Tree Plantation:



7.2 Creation of Awareness about Water Conservation:

The College has displayed Posters on Importance of Water Conservation, appealing the stake holders to conserve the various Resources

Photograph of Posters on importance of Water Conservation:

ANNEXURE-I:
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 +

GREEN AUDIT REPORT

of

Kamala Education Society's,

PRATIBHA INSTITUTE OF BUSINESS MANAGEMENT

Off Mumbai Pune Road, Chinchwad, Pune 411 019

Year: 2018-19

Prepared by

ENRICH CONSULTANTS

Yashashree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: enrichcons@gmail.com

REGISTRATION CERTIFICATES

Regn. No. EA-8192 No. 2942

National Productivity Council
(National Certifying Agency)

PROVISIONAL CERTIFICATE

This is to certify that Mr. / Ms. Achyut Yashavant Mehendale
son / daughter of Mr. Yashavant
has passed the National Certification Examination for Energy Auditors in April - 2007, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India.

He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for the Accredited Energy Auditor and issue of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.

Place : Chennai, India
Date : 10th August 2007

Controller of Examination

Auditor Certificate

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
(A Government of Maharashtra undertaking)
2nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,
Ph No: 020-26614393/266144403
Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2018-19/CR-05/4174 19th September , 2018

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 : **Enrich Consultants**
Yashashree, Plot No. 26, Nirmal Bag Society,
Near Muktangan English School,
Parvati, Pune - 411009.

Registration Category : Empanelled *Consultant for Energy Conservation Programme*

Registration Number : ***MEDA/ECN/CR-05/2018-19/EA-03***

- 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 the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **31st March 2021** 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.

19/9/18
(Smita Kudarikar)
General Manager (EC)

MEDA Registration Certificate

Enrich Consultants

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

Ref: EC/ PIBM/18-19/02 Date: 22/7/2019

CERTIFICATE

This is to certify that we have conducted Green Audit at Kamala Educational Society's, Pratibha Institute of Business Management, Chinchwad, Pune in the year 2018-19.

The Institute has adopted following Green Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of 20 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Bio Composting Bed for Conversion of Leafy Waste
- Implementation of Rain Water Management Project
- Internal Tree Plantation
- Good Internal Road

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,

A Y Mehendale,
Certified Energy Auditor,
EA-8192

ENRICH CONSULTANTS ★ PUNE ★

INDEX

ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune for awarding us the assignment of Green Audit of their campus for the Year: 2018-19.

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

EXECUTIVE SUMMARY

1. Kamala Education Society's, Pratibha Institute of Business Management, Chinchwad, Pune consumes Energy in the form of **Electrical Energy;** used for various gadgets, Office & other facilities.

2. Present Energy Consumption & CO_2 Emission:

No	Parameter /Value	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	31367	25.09
2	Maximum	3015	2.41
3	Minimum	1990	1.59
4	Average	2613.92	2.09

3. Usage of Renewable Energy:

- The Institute has installed **20 kWp** Roof Top Solar PV Plant.
- The Energy generated by Solar PV Plant in the Year: 18-19 is **24000 kWh**.
- The reduction in CO_2 Emissions due to Solar PV Plant in 18-19 is **21.6 MT.**

4. Waste Management:

4.1 Segregation of Waste at Source:

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

5.2 Organic Waste Management:

The Institute has a Bio Composting Arrangement for conversion of Leafy Waste into Bio Compost.

6. Rain Water Management:

The Rain Water falling on the terrace is used to recharge the bore well

7. Green Practices:

- Well maintained internal road
- Well maintained Garden.

8. Assumptions:

1. Energy Consumption is computed based on Load Utilization Factor.
2. **1 kWh** of Electrical Energy releases **0.8 Kg of CO_2** into atmosphere
3. Average Energy generated by **1 kWp** Roof Top Solar PV System: **4 kWh**
4. Annual Solar Energy Generation Days: **300 Nos**

9. Reference:

1. For Solar PV Energy Generation: www.solarrofftop.gov.in

ABBREVIATIONS

LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
MT	:	Metric Ton

CHAPTER-I
INTRODUCTION

1.1 Objectives:

1. To study present level of Energy Consumption
2. To Study the present CO_2 emissions
3. To study Scope for usage of Renewable Energy
4. To study Waste Management:
5. To study Rain Water Management
6. To study Green & Sustainable Practices.

1.2 Table No 1: General Details of Institute:

No	Head	Particulars
1	Name	Kamala Education Society's Pratibha Institute of Business Management
2	Address	Off Mumbai Pune Road, Chinchwad, Pune-411019
3	Year of Establishment	2008

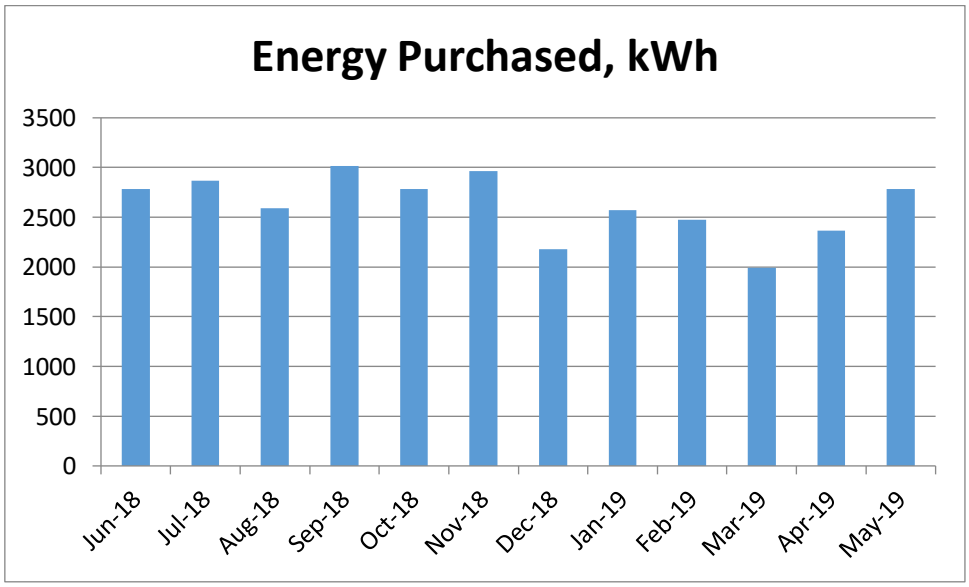
CHAPTER-II
STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Energy Consumption

Table No 2: Electrical Energy Consumption Analysis- 2018-19:

No	Month	Energy Purchased, kWh
1	Jun-18	2785
2	Jul-18	2865
3	Aug-18	2589
4	Sep-18	3015
5	Oct-18	2784
6	Nov-18	2965
7	Dec-18	2178
8	Jan-19	2569
9	Feb-19	2478
10	Mar-19	1990
11	Apr-19	2368
12	May-19	2781
13	Total	31367
14	Maximum	3015
15	Minimum	1990
16	Average	2613.92

Chart No 1: To study the variation of Month wise Energy Consumption, kWh:



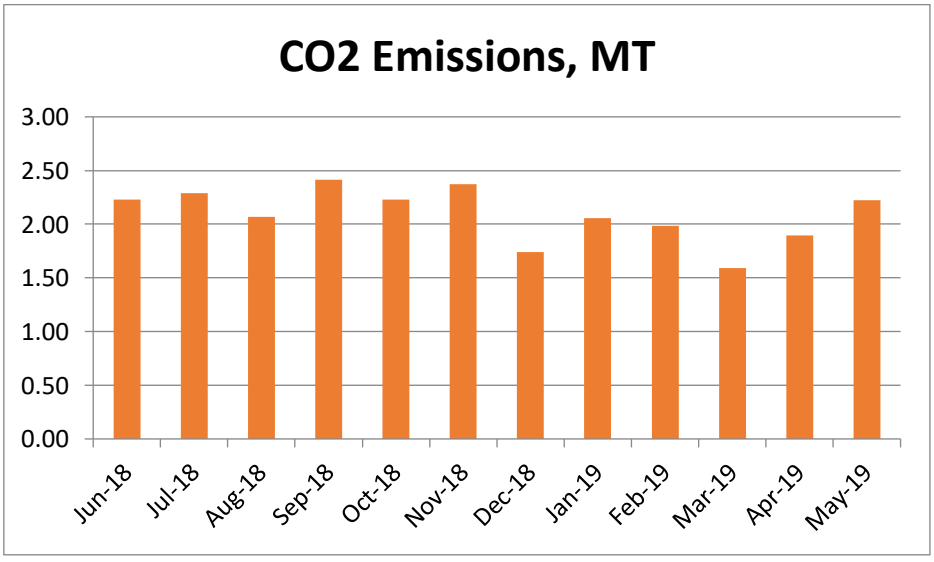
CHAPTER-III
STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. **Basis for computation of CO_2 Emissions:**
1 kWh of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Table No 3: Month wise CO_2 Emissions:

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Jun-18	2785	2.23
2	Jul-18	2865	2.29
3	Aug-18	2589	2.07
4	Sep-18	3015	2.41
5	Oct-18	2784	2.23
6	Nov-18	2965	2.37
7	Dec-18	2178	1.74
8	Jan-19	2569	2.06
9	Feb-19	2478	1.98
10	Mar-19	1990	1.59
11	Apr-19	2368	1.89
12	May-19	2781	2.22
13	Total	31367	25.09
14	Maximum	3015	2.41
15	Minimum	1990	1.59
16	Average	2613.92	2.09

Chart No 2: Representation of Month wise CO_2 Emissions:



CHAPTER-IV
STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed a Roof Top Solar PV Plant of capacity **20 kWp.** In the following Table we present the Annual Reduction in CO_2 Emissions due to Solar PV Plant.

Table No 5: Computation of Annual Reduction in CO_2 Emissions:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	20	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	**24000**	kWh
5	1 kWh of Electrical Energy emits	**0.9**	Kg of CO_2
6	Annual Reduction in CO2 Emissions = (4) * (5) /1000	**21.6**	MT

Photograph of Roof Top Solar PV Plant:

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 a Bio Composting Arrangement for conversion of Leafy Waste in to Bio compost.

Photograph of Bio Composting Arrangement:

CHAPTER-VI
STUDY OF RAIN WATER MANAGEMENT

The Institute has installed Rain Water Management Project; The Rain Water falling on the terrace and slopes is channelized through a pipe and used to recharge the bore well.

Photograph of Rain Water Collecting Pipe:

CHAPTER-VII
STUDY OF GREEN PRACTICES

7.1 Pedestrian Friendly Internal Road:

The Institute has well maintained internal roads to facilitate the easy movement of the students within the campus.

Photograph of Internal Road & Tree Plantation:

7.2 Tree Plantation:

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

Photograph of Internal Tree Plantation:

SACHIN BORGAVE

Digitally signed by SACHIN BORGAVE
DN: cn=SACHIN BORGAVE, c=IN, o=KAMALAEDUCATIONSOCIETYS PRATIBHAINSTITUTE OFBUSINESS MANAGEMENT, ou=DIRECTOR, email=sachinborgave@gmail.com
Date: 2024.09.30 17:31:06 +05'30'