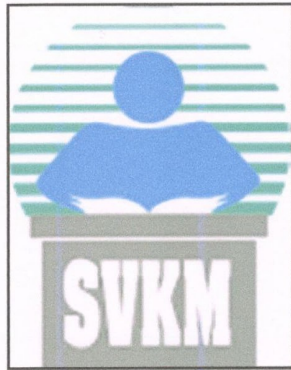


ENVIRONMENTAL AUDIT REPORT

of

SHRI VILE PARLE KELAVANI MANDAL'S,
INSTITUTE OF PHARMACY, DHULE



Year: 2021-22

Prepared by

ENGRESS SERVICES

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



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.

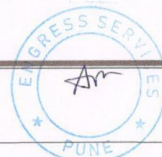
Name and Address of the firm : M/s Engress Services
Yashshree, 26, Nirmal Bag Society,
Near Muktangam English School,
Parvati, Pune – 411 009.

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)



ENGRESS SERVICES

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

Ref: ES/DYPP/21-22/03

Date: 12/5/2022

CERTIFICATE

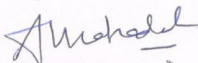
This is to certify that we have conducted Environmental Audit at Shri Vile Parle Kelavani Mandal's Institute of Pharmacy, Dhule in the Year 2021-22.

The Institute has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Installation of 72 kWp Capacity Roof Top Solar PV Plant
- Segregation of Waste at Source
- Provision of Sanitary Waste Incinerator, for disposal of Sanitary Waste
- Installation of Sewage Treatment Plant, for treatment of Waste Liquid
- Installation of Rain Water Management Project
- Internal Tree Plantation
- Creation of Awareness by Display of Posters on importance of Plastic Free Campus.
- Tree Plantation Drive in the Institute Campus

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

For Engress Services,



A Y Mehendale,
Certified Energy Auditor,
EA-8192



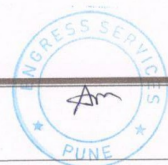
INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	8
1	Introduction	9
2	Study of Resource Consumption & CO ₂ Emission	11
3	Study of CO ₂ Emission Reduction	13
4	Study of Indoor Air Quality	14
5	Study of Waste Management	16
6	Study of Rain Water Management	18
7	Study of Environment Friendly Practices	19
	Annexure	
I	Various Indoor Air Quality and Water Standards	21

ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of, Shri Vile Parle Kelavani Mandal's Institute of Pharmacy, Dhule 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. **Shri Vile Parle Kelavani Mandal's Institute of Pharmacy, Dhule** consumes Energy in the form of **Electrical Energy and LPG**; used for various gadgets, office & other facilities.

2. Pollution caused due to Institute Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity & LPG Consumption.
- **Solid Waste:** Bio degradable Waste, Garden Waste, Recyclable Waste and Human Waste.
- **Liquid Waste:** Human liquid Waste.

3. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Value	Energy Purchased, kWh	LPG Consumed, Kg	CO ₂ Emissions, MT
1	Total	44348	114	40
2	Maximum	6220	13	5.63
3	Minimum	1185	4	1.09
4	Average	3695.66	9.50	3.35

4. Projects implemented for Environmental Conservation:

- Installation of 72 kWp Roof Top Solar PV Plant.
- Implementation of Sewage Treatment Plant
- Implementation of Rain Water Management Project

5. Usage of Renewable Energy & Reduction in CO₂ Emission:

- The Institute has installed a Roof Top Solar PV Plant of Capacity **72 kWp**.
- The Energy Generated by Roof Top Solar PV Plant in 21-22 is **86400 kWh**.
- The Annual Reduction in CO₂ Emission in 21-22 is **78 MT**.

6. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	98	72	74
2	Minimum	89	51	60

7. Waste Management:

7.1 Segregation of Waste at Source:

The waste is segregated at source. There are separate bins for collection at various points and the Waste is handed over to Municipal Corporation for further action.

7.2 Liquid Waste Management:

The Institute has installed Sewage Treatment Plant. The treated water is used for flushing purpose.

7.3 Sanitary Waste Management:

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

7.4 Laboratory Liquid Waste Management:

The Chemical Laboratory Liquid Waste is very negligible.

8. Rain Water Management:

The Institute has installed Rain Water Management Project, wherein the Rain Water from terrace is collected and is used to increase the underground water table.

9. Environmental Friendly Initiatives:

- Internal Tree Plantation and Medicinal Garden
- Creation of Awareness by Display of Posters on Plastic Ban.
- Tree Plantation in the Campus

10. Assumptions:

- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere
- 1 Kg of LPG releases 2.68 Kg of CO₂ into atmosphere
- Average Energy generated by 1 kWp Solar PV Plant : 4 kWh/Day
- Annual Solar Energy Generation Days: 300 Nos

11. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar Energy Generation: www.solarrooftop.gov.in
- For AQI & Water Quality Standards: www.cpcb.com

ABBREVIATIONS

Kg	: Kilo Gram
SVKM	: Shri Vile Parle Kelavani Mandal
MT	: Metric Ton
kWh	: kilo-Watt Hour
KLPD	: Kilo Litres per Day
LED	: Light Emitting Diode
AQI	: Air Quality Index
PM-2.5	: Particulate Matter of Size 2.5 Micron
PM-10	: Particulate Matter of Size 10 Micron
CPCB	: Central Pollution Control Board



CHAPTER-I INTRODUCTION

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

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

1.1.2. Environmental Audit: Definition:

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

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

1.1.3. 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. To study Resource Consumption & CO₂ Emissions
2. To Study CO₂ Emission Reduction
3. To study Indoor Air Quality Parameters
4. To Study Waste Management
5. To Study Rain Water Management
6. To Study Environment Friendly Initiatives

1.3 General Details of Institute: Table No: 4

No	Head	Particulars
1	Name of the Institution	Shri Vile Parle Kelavani Mandal's Institute of Pharmacy
2	Address	Mumbai Agra Highway, Dhule-424001
3	Year of Establishment	2017
4	Affiliation	Dr. Babasaheb Ambedkar Technological University, Lonere

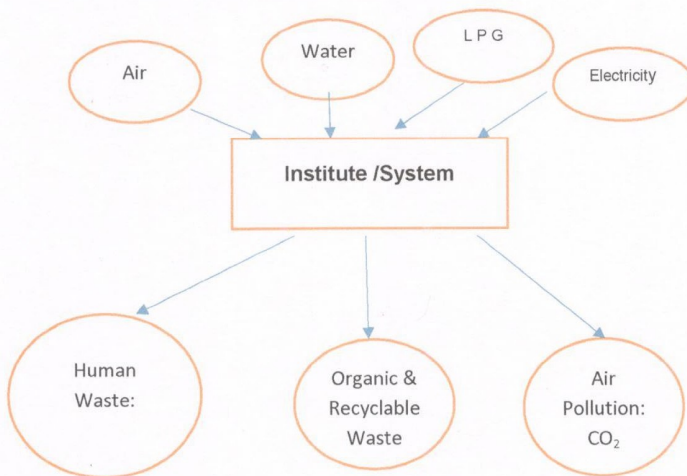
CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

The Institute consumes following Natural/derived Resources:

1. Air
2. Water
3. Electrical Energy
4. Liquefied Petroleum Gas

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

Chart No 1: Representation of Institute as System:



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

- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere
- 1 Kg of LPG releases 2.68 Kg of CO₂ into atmosphere.

Table No 5: Study of Consumption of Energy & CO₂ Emissions: 21-22:

No	Month	Energy Purchased, kWh	LPG Consumed, Kg	CO2 Emissions, MT
1	Feb-21	4755	12	4.31
2	Mar-21	5849	9	5.29
3	Apr-21	4440	10	4.02
4	May-21	4196	11	3.81
5	Jun-21	5002	12	4.53

6	Jul-21	6220	13	5.63
7	Aug-21	5253	4	4.74
8	Sep-21	2525	6	2.29
9	Oct-21	1345	8	1.23
10	Nov-21	1323	10	1.22
11	Dec-21	2255	10	2.06
12	Jan-22	1185	9	1.09
13	Total	44348	114	40
14	Maximum	6220	13	5.63
15	Minimum	1185	4	1.09
16	Average	3695.66	9.50	3.35

Chart No 2: Study of CO₂ Emission:

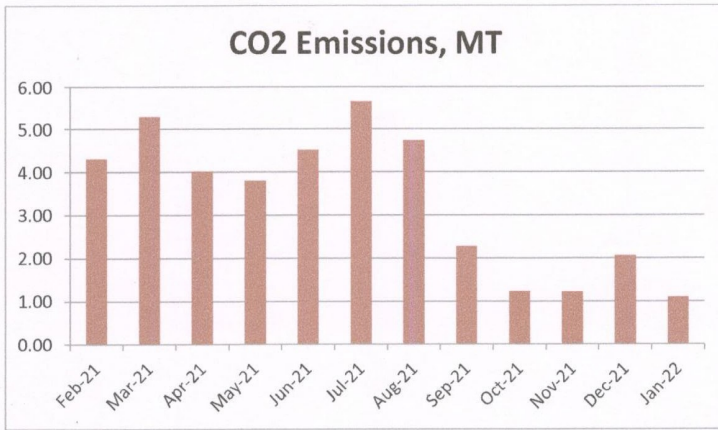


Table No 6: Various Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	LPG Consumed, Kg	CO ₂ Emissions, MT
1	Total	44348	114	40
2	Maximum	6220	13	5.63
3	Minimum	1185	4	1.09
4	Average	3695.66	9.50	3.35

CHAPTER IV STUDY OF CO₂ EMISSION REDUCTION

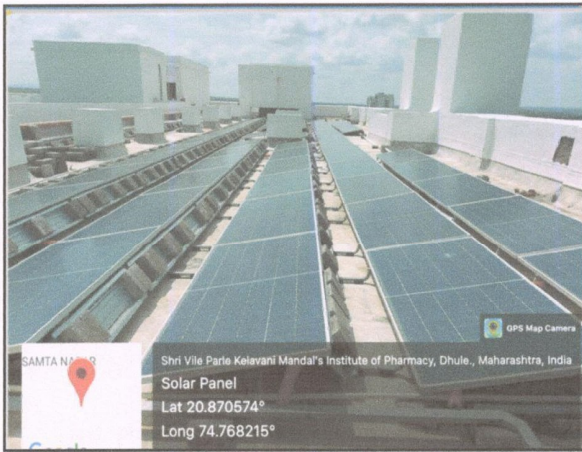
The Institute has installed Roof Top Solar PV Plant of Capacity **72 kWp**.

In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof Top Solar PV Plant.

Table No 7: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	72	kWp
2	Energy Generated in per kWp	4	kWh
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 21-22 = 1*2*3	86400	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg of CO ₂
6	Qty of CO ₂ Saved by Solar PV Plant = (4)*(5) /1000	78	MT of CO ₂

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.

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.'

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. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects. The measurement of the AQI requires an air monitor and an air pollutant concentration over a specified averaging period.

We present herewith following important Parameters.

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

Table No 8: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
1	Office	93	55	68
2	Principal Cabin	89	59	60
3	Pharmacology Lab	98	58	74

4	Library	90	51	63
5	Pharmaceutical Chemistry Lab	95	72	69
6	Computer Lab	96	70	69
7	Class Room-1	95	69	72
8	Class Room-2	94	68	71
	Maximum	98	72	74
	Minimum	89	51	60

CHAPTER V STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The waste is segregated at source. There are separate bins for collection at various points and the Waste is handed over to Municipal Corporation for further action.

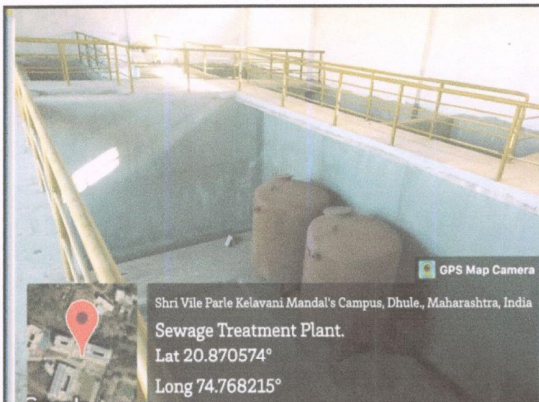
Photograph of Waste Disposal:



5.2 Liquid Waste Management:

The Institute has installed Sewage Treatment Plant. The treated water is used for flushing purpose.

Photograph of Sewage Treatment Plant:



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 Laboratory Liquid Waste Management:

The Chemical Laboratory Liquid Waste is very negligible.

CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

The Institute has installed Rain Water Management Project, wherein the Rain Water from terrace is collected and is used to increase the underground water table.

Photograph of Rain Water Collecting Pipe:

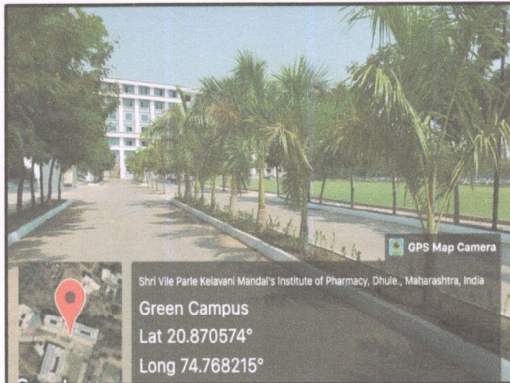


CHAPTER-VII STUDY OF ENVIRONMENTAL FRIENDLY PRACTICES

7.1 Internal Tree Plantation:

The Institute has well maintained Medicinal Plant Garden.

Photograph of Internal Tree Plantation in the campus:



7.2 Creation of Awareness on Plastic Ban by Display of Posters:

The Institute has displayed Poster emphasizing Plastic Free Campus

Photograph of Poster on Plastic Free Campus:



7.3 Tree Plantation Event:

The Institute arranged Tree Plantation Drive in the Institute campus on 13/09/2021.

Photograph of Tree Plantation Event:



ANNEXURE-I: INDOOR AIR QUALITY & WATER 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 Water Quality Standards:

No	Designated Best Use	Criteria
1	Drinking Water Source without conventional Treatment but after disinfection	pH between 6.5 to 8.5 Dissolved Oxygen 6 mg/l or more
2	Drinking water source after conventional treatment and disinfection	pH between 6 to 9 Dissolved Oxygen 4 mg/l or more
3	Outdoor Bathing (Organized)	pH between 6.5 to 8.5 Dissolved Oxygen 5 mg/l or more
4	Controlled Waste Disposal	pH between 6 to 8.5