



Dr. D. Y. Patil Pratishthan's

Dr. D. Y. PATIL COLLEGE OF PHARMACY

Dr. D. Y. Patil Educational Complex, Sector - 29, Pradhikaran, Akurdi, Pune 411 044.

Tel. : 020-27656141, Tel. Fax : 020-27656141

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Approved by : All India Council for Technical Education, New Delhi

Pharmacy Council of India, New Delhi. Recognized by : Government of Maharashtra

Affiliated to Savitribai Phule Pune University, Pune

Dr. Sanjay D. Patil
President

Padmashree Dr. D. Y. Patil
Founder

Shri. Satej D. Patil
Vce-President & Chairman

Dr. N. S. Vyawahare
Principal

**Ref. No. : DYPCOP/
Date :**

7.1.6

7.1.6 - Quality audits on environment and energy are regularly undertaken by the institution

7.1.6.1 Reports on environment and energy audits submitted by the auditing agency

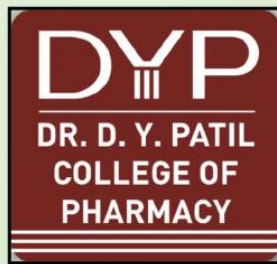
SUMMARY

Sr. No.	Quality audits
Institutional environment and energy initiatives	
1	Green audit
2	Energy audit
3	Environment audit

1. Green Audit:

GREEN AUDIT REPORT

Dr. D. Y. Patil Pratishthan's,
DR. D. Y. PATIL COLLEGE OF PHARMACY
Pradhikaran, Akurdi, Pune



Year: 2023-24

Prepared by:

ENGRESS SERVICES

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



[BACK TO SUMMARY](#)

Registration Certificates: UDYAM, MEDA, ASSOCHAM GEM-CP, ISO: 9001 & 14001:

UDYAM REGISTRATION CERTIFICATE

UDYAM REGISTRATION NUMBER: UDYAM-MH-26-0135636

NAME OF ENTERPRISE: ENGRESS SERVICES

S.No.	Classification Year	Enterprise Type	Classification Date
1	2023-24	Micro	03/02/2024
2	2022-23	Micro	26/06/2022
3	2021-22	Micro	27/07/2021

MAJOR ACTIVITY: SERVICES

SOCIAL CATEGORY OF ENTREPRENEUR: GENERAL

NAME OF UNIT(S): Engress Services

OFFICIAL ADDRESS OF ENTERPRISE:

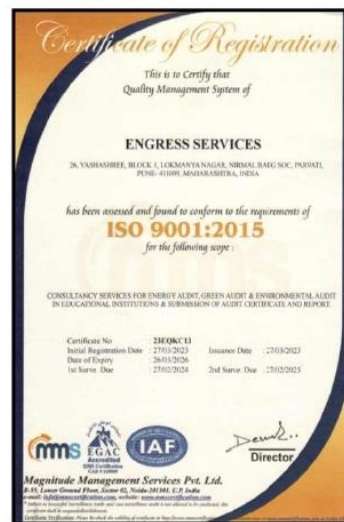
Flat/Door/Block No.	26	Name of Premises/Building	Yashbree
Village/Town	Pune	Block	1
Road/Street/Lane No.	Lokmanya Nagar, Nirmal Bag Society	City	Pune
State	MAHARASHTRA	District	PUNE, Pin-411009
Mobile	870447244	Email:	engrsv123@gmail.com

DATE OF INCORPORATION / REGISTRATION OF ENTERPRISE: 13/04/2021

DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS: 13/04/2021

S.No.	NIC 2 Digit	NC 4 Digit	NIC 5 Digit	Activity
1	79	Activities of head office; management consultancy activities	7920 Management consultancy activities	Services

DATE OF UDYAM REGISTRATION: 27/07/2021



Maharashtra Energy Development Agency

ECN/2022-23/CR-431/709 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.

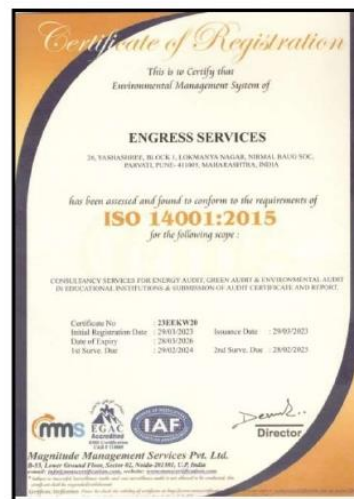
Name and Address of the firm: M/S Engress Services, Yashbree, 26, Nirmal Bag Society, Near Mukteshwar English School, Pune, Pin-411009.

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

Registration Number: MEDA/ECN/2022-23/Class A/E/A-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 endorsement 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 (E.C)



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ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of Dr. D. Y. Patil Pratishthan's Dr. D. Y. Patil College of Pharmacy, Akurdi, Pune, for awarding us the assignment of Green Audit of Akurdi campus for the Academic Year: 2023-24.

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

EXECUTIVE SUMMARY

1. Dr. D Y Patil Pratishthan's Dr. D. Y. Patil College of Pharmacy, Akurdi, Pune consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

2. Present Energy Consumption & CO₂ Emission:

No	Particulars	Value	Unit
1	Total Energy Purchased	122911	kWh
2	Total LPG Consumed	209	Kg
3	Annual CO ₂ Emissions	114.92	MT

3. Usage of Renewable Energy & Reduction in CO₂ Emissions:

- The Institute has installed Roof Top Solar PV Plant of Capacity **15.36 kWp**.
- The Energy generated by Solar PV Plant in 23-24 is **18432 kWh**.
- Reduction in CO₂ Emissions in 23-24 is **17.14 MT**

4. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Provision of Bio composting Bed
3	Liquid Waste	Provision of Sewage Treatment Plant
4	Chemical Storage & Fumes'	Provision of Fuming Chamber
5	Chemical Lab Liquid Waste	Recommended to dispose of properly
6	Bio Medical Waste	MoU with M/s PASSSCO, for disposal
7	Sanitary Waste	Recommended to provide Sanitary Waste Incinerator
8	E Waste	Recommended to dispose of through Authorized Agency

5. Rain Water Management:

The College has installed the Rainwater Management project; the rain water falling on the terrace is collected through pipes and is used for increasing the Underground Water Table as well as recharging the bore well.

6. Green & Sustainable Practices:

- Maintenance of good Internal Road
- Internal Tree Plantation
- Provision of Ramp for Divyangajan
- Creation of awareness on Water Conservation Display of Posters

7. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.93 Kg of CO₂** into atmosphere
2. **1 Kg** of LPG releases **2.94 Kg of CO₂** into atmosphere
3. **1 kWp** Solar PV system generates **4 kWh** of Electrical Energy per Day
4. Annual Solar Energy Generation Days: **300 Nos**
5. Electrical Energy Consumption is computed based on Load Utilization Factor
6. CO₂ Emissions are computed based on Electrical Energy Purchased

8. References:

- For CO₂ Emissions: www.ccd.gujarat.gov.in
- For Solar PV Energy Generation: www.rooftopsolar.gov.in

ABBREVIATIONS

BEE	Bureau of Energy Efficiency
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO ₂	Carbon Di Oxide
Qty	Quantity

CHAPTER-I INTRODUCTION

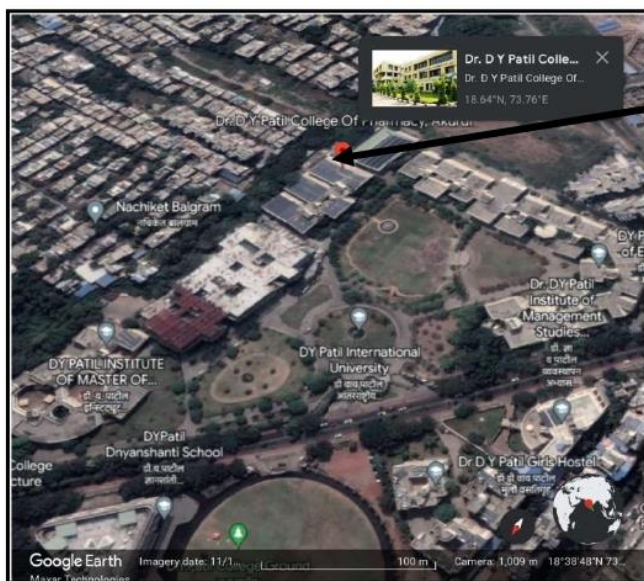
1.1 Introduction:

A Green Audit is conducted at Dr. D. Y. Patil Pratishthan's, Dr. D. Y. Patil College of Pharmacy, Akurdi, Pune.

1.2 Key Study Points:

No	Particulars
1	Study of Present Energy Consumption & CO ₂ Emission
2	Study of Usage of Renewable Energy
3	Study of Waste Management Practices
4	Study of Rain Water Management
5	Study of Green & Sustainable Initiatives

1.3 College Location Image:



College
Campus

CHAPTER-II

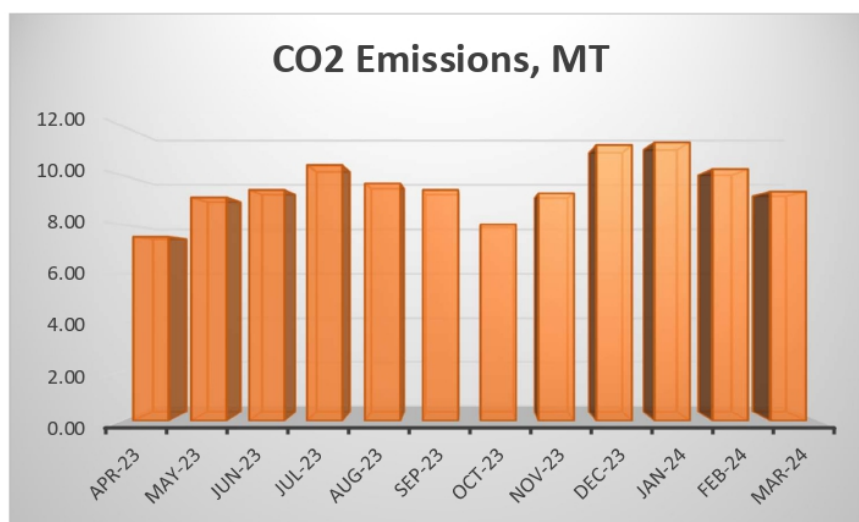
STUDY OF ENERGY CONSUMPTION & CO₂ EMISSION

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. **Basis for computation of CO₂ Emissions: 1 kWh of Electrical Energy releases 0.93 Kg of CO₂ and 1 Kg of LPG releases 2.94 Kg of CO₂ into atmosphere**

Table No 1: Month wise Energy, LPG Consumption & CO₂ Emissions:

No	Month	Energy Purchased, kWh	LPG Consumed, Kg	CO ₂ Emissions, MT
1	Apr-23	8036	9	7.50
2	May-23	9735	15	9.10
3	Jun-23	10069	15	9.41
4	Jul-23	11136	16	10.40
5	Aug-23	10336	20	9.67
6	Sep-23	9997	38	9.41
7	Oct-23	8550	20	8.01
8	Nov-23	9906	19	9.27
9	Dec-23	12034	10	11.22
10	Jan-24	12138	17	11.34
11	Feb-24	10987	11	10.25
12	Mar-24	9987	19	9.34
13	Total	122911	209	114.92
14	Maximum	12138	38	11.34
15	Minimum	8036	9	7.50
16	Average	10242.58	17.42	9.58

Chart No 1: Month wise CO₂ Emissions:



CHAPTER III

STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed Roof Top Solar PV Plant of Capacity **15.36 kWp**
In the following Table, we present the reduction in CO₂ emissions due to Solar Energy:

Table No 2: Computation of Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	15.36	kWp
2	Energy Generated in the Year: 23-24	18432	kWh
3	1 kWh of Electrical Energy saves	0.93	Kg/kWh
4	Qty of CO₂ Saved by Solar PV Plant =(2)*(3) /1000	17.14	MT of CO₂



Photograph of Roof Top Solar PV Plant:





CHAPTER IV STUDY OF WASTE MANAGEMENT

In this Chapter, we present the Waste Management Practices, followed by the Institute.

Details of Waste Management Practices:

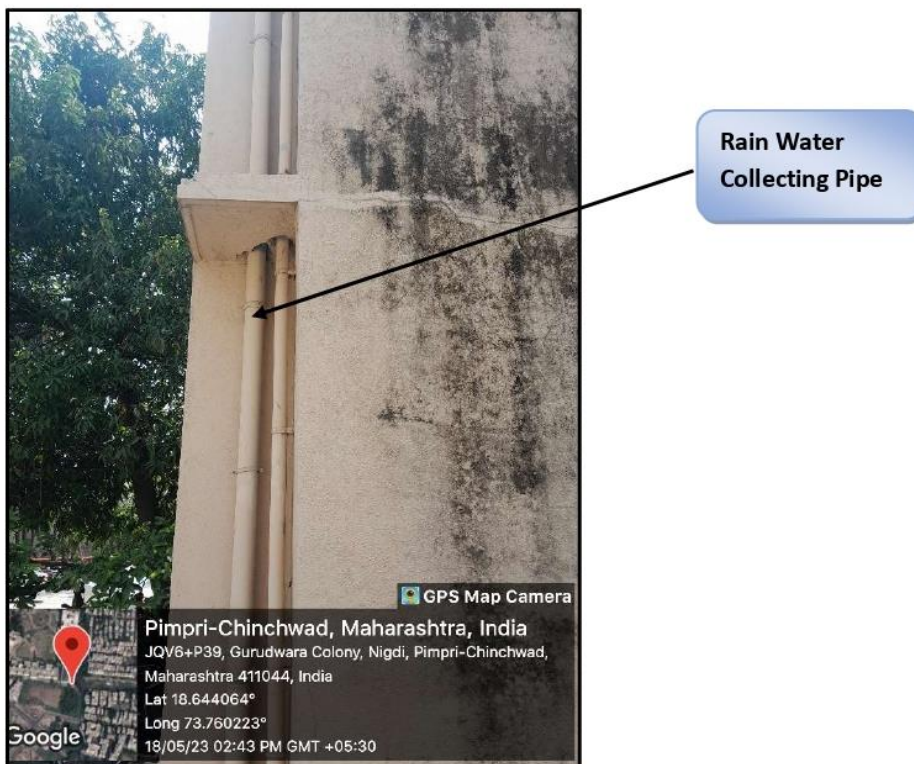
No	Head	Observation	Photograph
1	Solid Waste	Segregation of Waste at Source: Provision of Waste Collection Bins	<p>Waste Collection Bin</p> 
2	Organic Waste	Arrangement of Bio Composting Bed, to convert the Leafy Waste into Bio Compost.	<p>Bio Composting Bed:</p> 

3	Liquid Waste	Installed Sewage Treatment Plant. The treated Water is used for gardening purpose.	<p style="text-align: center;">Sewage Treatment Plant:</p> 
4	Hazardous Chemicals & Fumes' Management	Hazardous chemicals are kept away from the reach of students. Fire extinguishers are available in all labs	<p style="text-align: center;">Fuming Chamber:</p> 
5	Chemical Laboratory Liquid Waste	Recommended to dispose of the Chemical Lab Liquid Waste in a proper manner.	
6	Bio Medical Waste	The institute has tie-up with the PASCO for the management of hazardous biomedical waste and disposal of the same	
7	Sanitary Waste	Recommended to dispose of the Sanitary Waste in a Sanitary Waste incinerator.	
8	E Waste	Recommended to dispose of the E Waste through Authorized Agency.	

CHAPTER-V STUDY OF RAIN WATER MANAGEMENT


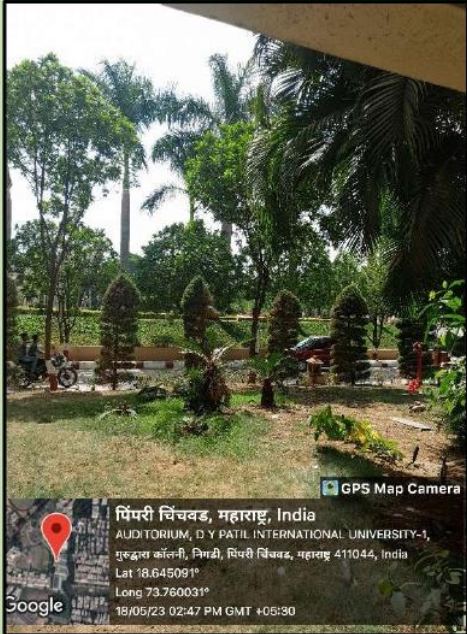
The College has installed the Rainwater Management project; the rain water falling on the terrace is collected through pipes and is used for increasing the Underground Water Table as well as recharging the bore well.



Photograph of Rain Water Collecting Pipe:



CHAPTER-VI STUDY OF GREEN & SUSTAINABLE PRACTICES

In this Chapter, we present the Green & Sustainable Practices followed by the Institute.
Green & Sustainable Practices:

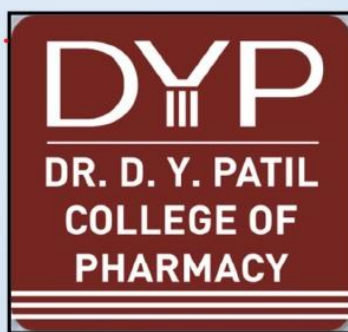
No	Head	Observation	Photograph
1	Easy Movement of Stake Holders	Provision of Good Internal Road within the Campus	<p>Internal Road:</p> 
2	Tree Plantation	Internal Tree Plantation in the Campus	<p>Internal Tree Plantation:</p> 

<p>3</p>	<p>Facilities for Divyangajan</p>	<p>Provision of Ramp for Divyangajan</p>	<p>Ramp for Divyangajan:</p> 
<p>4</p>	<p>Creation of Awareness among Stake Holders</p>	<p>Display of Poster on Water Conservation</p>	<p>Poster on Water Conservation:</p> 

2. Energy Audit:

ENERGY AUDIT REPORT

Dr. D. Y. Patil Pratishthan's,
DR. D. Y. PATIL COLLEGE OF PHARMACY,
Pradhikaran, Akurdi, Pune



Year: 2023-24

Prepared by:

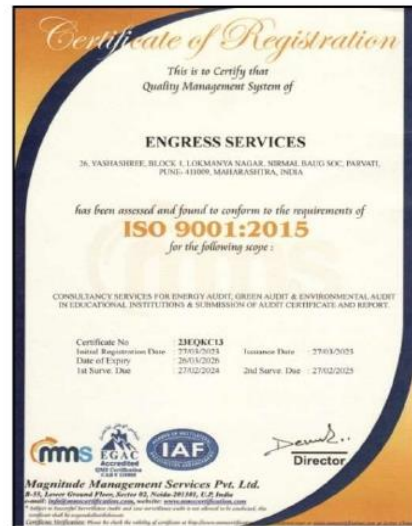
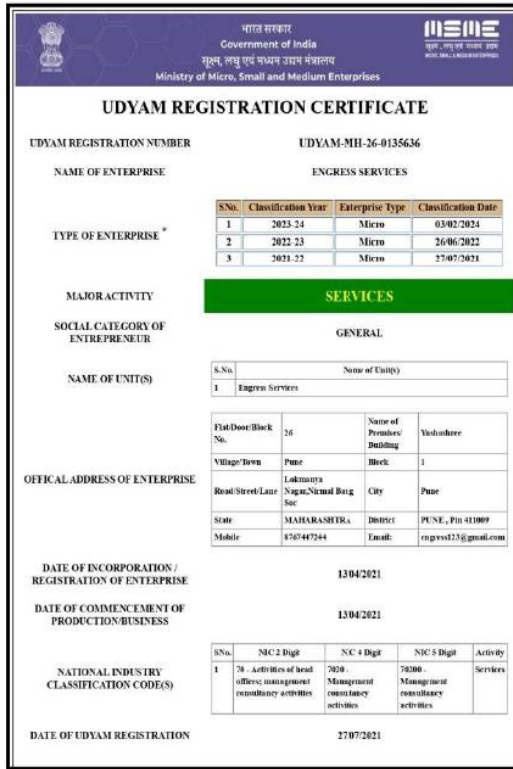
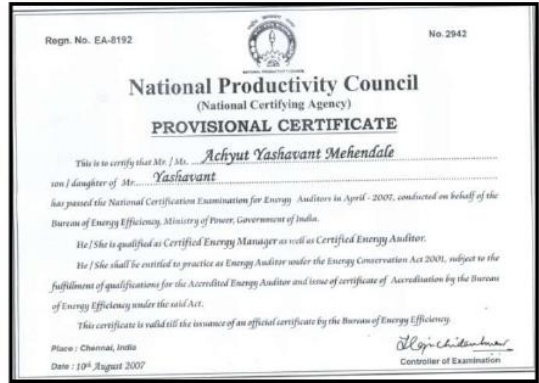
ENGRESS SERVICES

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Near Muktangnan English School, Parvati, Pune 411009
Phone: 09890444795 Email: engress123@gmail.com



[BACK TO SUMMARY](#)

REGISTRATION CERTIFICATES: BEE, UDYAM, MEDA, ISO-9001 & 14001:



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4	Study of Per capita Energy Consumption	10
5	Study of Lighting	12
6	Study of Renewable Energy & Energy Efficiency	14

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

EXECUTIVE SUMMARY

1. Dr. D. Y. Patil Pratishthan's Dr. D. Y. Patil College of Pharmacy, Akurdi, Pune consumes Energy in the form of **Electrical Energy & LPG**; used for college activities.

2. Present Connected Load & Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	147.7	kW
2	Annual Energy Purchased	122911	kWh
3	Annual LPG Consumption	209	Kg

3. Per Capita Energy Consumption:

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	122911	kWh
2	Annual Energy Generated	18432	kWh
3	Annual Energy Consumed=1+2	141343	kWh
4	No of students studying in the College	621	Nos
5	Per Capita Energy Consumption = (4) / (5)	227.61	kWh/Annum

4. Study of % Usage of LED Lighting:

No	Particulars	Value	Unit
1	Lighting Power density	4.8	W/m ²
2	% of Usage of LED Lighting to Total Lighting Load	33	%

5. Renewable Energy & Energy Efficiency Projects:

- Installation of **15.36 kWp** Roof Top Solar PV Plant
- Usage of Energy efficient LED fittings
- Usage of BEE STAR Rated Equipment

6. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.93 Kg** of **CO₂** into atmosphere
2. **1 Kg** of LPG releases **2.94 Kg** of **CO₂** into atmosphere
3. **1 kWp** Solar PV system generates **4 kWh** of Electrical Energy per Day
4. Annual Solar Energy Generation Days: **300 Nos**
5. Electrical Energy Consumption is computed based on Load Utilization Factor
6. CO₂ Emissions are computed based on Electrical Energy Purchased

7. References:

- Audit Methodology: www.mahaurja.com
- Energy Conservation Building Code: ECBC-2017: www.beeindia.gov.in
- For CO₂ Emissions: www.ccd.gujarat.gov.in
- For Solar PV Energy Generation: www.rooftopsolar.gov.in

ABBREVIATIONS

LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
IQAC	: Internal Quality Assurance Cell
BEE	: Bureau of Energy Efficiency
FTL	: Fluorescent Tube Light
CFL	: Compact Fluorescent Light
PV	: Photo Voltaic .
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton

CHAPTER-I INTRODUCTION

1.1 Introduction:

An Energy Audit is conducted at Dr. D. Y. Patil Pratishthan's, Dr. D.Y. Patil College of Pharmacy, Akurdi, Pune.

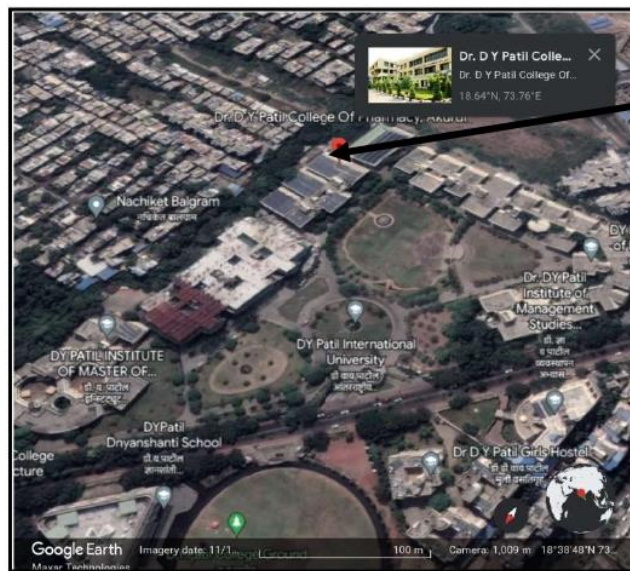
The guidelines followed for conducting the Energy Audit are:

- BEE India's Energy Conservation Building Code: ECBC-2017
- Maharashtra Energy Development Agency (www.mahaurja.com)
- Tata Power: www.tatapower.com

1.2 Key Study Points:

No	Particulars
1	Study of Present Connected Load
2	Study of Present Energy Consumption
3	Study of Per Capita Energy Consumption
4	Study of Lighting
5	Study of Energy Efficiency & Renewable Energy

1.3 College Location Image:



College
Campus

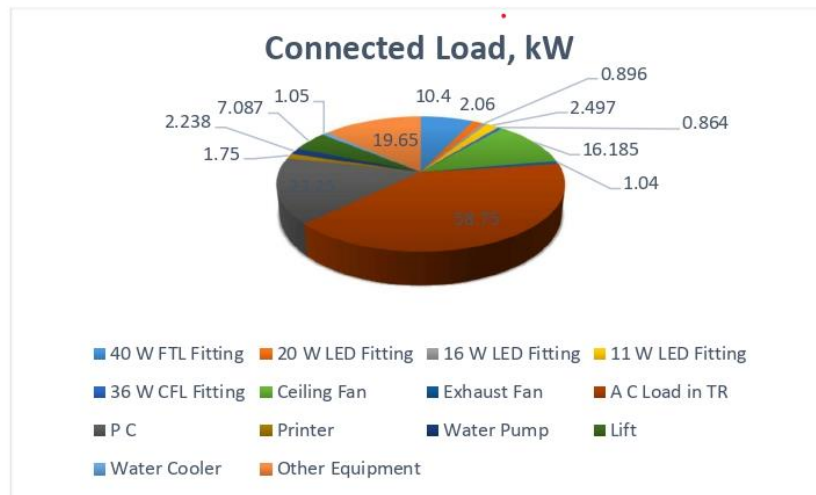
CHAPTER-II STUDY OF CONNECTED LOAD

The major contributors to the connected load of the College include:

Table No 1: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	40 W FTL Fitting	260	40	10.4
2	20 W LED Fitting	103	20	2.06
3	16 W LED Fitting	56	16	0.896
4	11 W LED Fitting	227	11	2.497
5	36 W CFL Fitting	24	36	0.864
6	Ceiling Fan	249	65	16.185
7	Exhaust Fan	20	52	1.04
8	A C Load in TR	47	1250	58.75
9	P C	155	150	23.25
10	Printer	10	175	1.75
11	Water Pump	1	2238	2.238
12	Lift	1	7087	7.087
13	Water Cooler	3	350	1.05
14	Other Equipment	131	150	19.65
15	Total			147.7

Chart No 1: Study of Connected Load:



CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electrical Energy Consumption.

Table No 2: Study of Electrical Energy & LPG Consumption: 2023-24:

No	Month	Energy Purchased, kWh	LPG Consumed, Kg	CO ₂ Emissions, MT
1	Apr-23	8036	9	7.50
2	May-23	9735	15	9.10
3	Jun-23	10069	15	9.41
4	Jul-23	11136	16	10.40
5	Aug-23	10336	20	9.67
6	Sep-23	9997	38	9.41
7	Oct-23	8550	20	8.01
8	Nov-23	9906	19	9.27
9	Dec-23	12034	10	11.22
10	Jan-24	12138	17	11.34
11	Feb-24	10987	11	10.25
12	Mar-24	9987	19	9.34
13	Total	122911	209	114.92
14	Maximum	12138	38	11.34
15	Minimum	8036	9	7.50
16	Average	10242.58	17.42	9.58

Chart No 2: To study the variation of Monthly Electrical Energy Consumption:

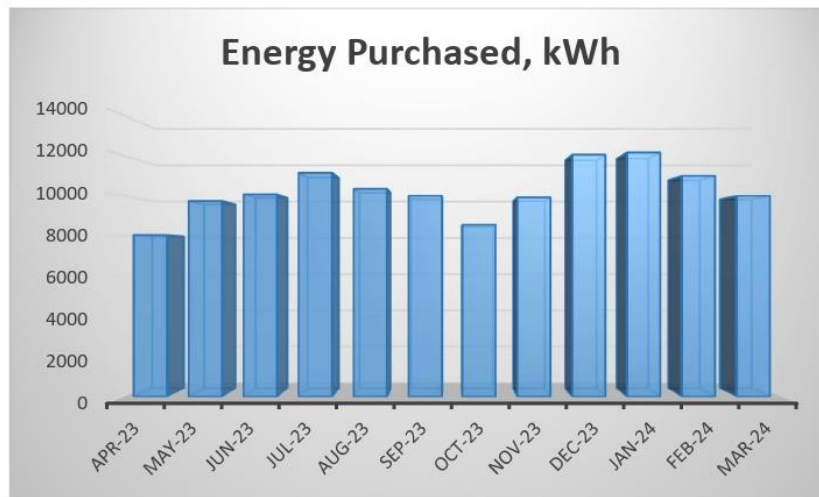
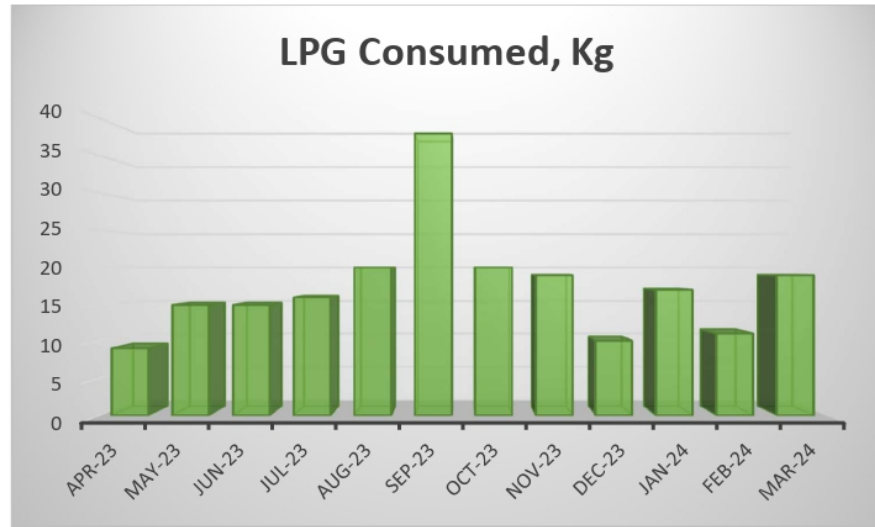


Chart No 3: Variation in Monthly LPG Consumption:



CHAPTER-IV

STUDY OF PER CAPITA ENERGY CONSUMPTION

Per Capita Energy Consumption Index: Per Capita Energy Consumption Index of an educational College/College is its Annual Energy Consumption in Kilo Watt Hours per student studying in the College/College.

It is determined by:

$$\text{Per Capita Energy Consumption Index} = \frac{\text{Annual Energy Consumption in kWh}}{\text{(Total No of students studying)}}$$

Table No 3: Computation of Per Capita Energy Consumption Index:

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	122911	kWh
2	Energy Generated by Solar PV Plant	18432	kWh
3	Total Energy Consumed= 1+2	141343	kWh
4	No of students studying in the College	621	Nos
5	Per Capita Energy Consumption = (4) / (5)	227.61	kWh/Annum

CHAPTER-V

STUDY OF LIGHTING

Terminology:

1. Lumen is a unit of light flow or luminous flux. The lumen rating of a lamp is a measure of the total light output of the lamp. The most common measurement of light output (or luminous flux) is the lumen. Light sources are labeled with an output rating in lumens.

2. Lux is the metric unit of measure for illuminance of a surface. One lux is equal to one lumen per square meter.

3. Circuit Watts is the total power drawn by lamps and ballasts in a lighting circuit under assessment.

4. Installed Load Efficacy is the average maintained illuminance provided on a horizontal working plane per circuit watt with general lighting of an interior. Unit: lux per watt per square metre (lux/W/m²)

5. Lamp Circuit Efficacy is the amount of light (lumens) emitted by a lamp for each watt of power consumed by the lamp circuit, i.e. including control gear losses. This is a more meaningful measure for those lamps that require control gear. Unit: lumens per circuit watt (lm/W)

6. Lighting Power Density: It is defined as Total Lighting Load in a room divided by the Area of that Room in square meters.

In this Chapter we compute the Lighting Power density and the percentage usage of LED Lighting to total Lighting Load of the College.

Table No 4: Computation of Lighting Power Density:

No	Particulars	Value	Unit
1	No of 40 W LED Tube Lights in PG Lab-II	9	Nos
2	Demand of 20 W LED Tube Light	40	W/Unit
3	Total Lighting Load in the Class Room= (1) * (2)	360	kW
4	Area of Class Room	75	m ²
5	Lighting Power Density = (3)/ (4)	4.8	W/m ²

Now, we compute the usage of LED Lighting to Total Lighting Load, as under.

Table No 5: Percentage Usage of LED Lighting to Annual Lighting Load:

No	Particulars	Value	Unit
1	No of 40 W FTL Fittings	260	Nos
2	Demand of 40 W FTL Fitting	40	W/Unit
3	Total Electrical Load of 40 W FTL Fittings	10.4	kW
4	No of 20 W LED Tube Lights	103	Nos
5	Demand of 20 W LED Tube Light	20	W/Unit
6	Total Electrical Load of 20 W LED Fittings	2.06	kW
7	No of 16 W Panel LED Fittings	56	Nos
8	Demand of 16 W Panel LED Fittings	16	W/Unit
9	Total Electrical Load of 16 W Panel LED Fittings	0.90	kW
10	No of 11 W LED Fittings	227	Nos
11	Demand of 11 W LED Fittings	11	W/Unit
12	Total Electrical Load of 11 W LED Fittings	2.497	kW
13	No of PL Type 36 W CFL Fittings	24	Nos
14	Demand of PL Type 36 W CFL Fittings	36	W/Unit
15	Total Electrical Load of PL Type 36 W CFL Fittings	0.864	kW
16	Total LED Lighting Load= 6+9+12	5.45	kW
17	Total Lighting Load=3+6+9+12+15	16.717	kW
18	Annual Lighting Requirement met by LED= $16 \times 100 / 17$	33	%

CHAPTER-VI STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

6.1 Usage of Renewable Energy:

The College has installed:

- Roof Top Solar PV Plant of Capacity **15.36 kWp**

Photograph of Roof Top Solar PV Plant:



6.2 Energy Efficiency Measures adopted:

- The College has Energy Efficient LED Fittings.
- Usage of BEE STAR Rated Equipment

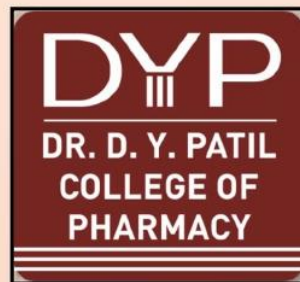
Photographs of STAR Rated AC & LED Fitting:



3. Environment Audit:

ENVIRONMENTAL AUDIT REPORT

Dr. D. Y. Patil Pratishthan's,
DR. D. Y. PATIL COLLEGE OF PHARMACY
Pradhikaran, Akurdi, Pune



Year: 2023-24

Prepared by:

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society
Near Muktangan English School, Parvati, Pune 411009
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[BACK TO SUMMARY](#)

Registration Certificates: UDYAM, MEDA, ASSOCHAM GEM-CP, ISO: 9001 & 14001:

UDYAM REGISTRATION CERTIFICATE

UDYAM REGISTRATION NUMBER: UDYAM-MH-26-0135636

NAME OF ENTERPRISE: ENGRESS SERVICES

S.No.	Classification Year	Enterprise Type	Classification Date
1	2023-24	Micro	03/02/2024
2	2022-23	Micro	26/06/2022
3	2021-22	Micro	27/07/2021

MAJOR ACTIVITY: SERVICES

SOCIAL CATEGORY OF ENTREPRENEUR: GENERAL

NAME OF UNIT(S): None of Units

S.No.	Name of Unit
1	Engress Services

Flat/Door/Block No.	Name of Premises/Building	Village/Town
26	Lokmanya	Pune

Head Street Lane	City	State
Nagan,Nirmal Bag Soc	Pune	MAHARASHTRA

DATE OF INCORPORATION / REGISTRATION OF ENTERPRISE: 13/04/2021

DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS: 13/04/2021

S.No.	NIC 2 Digit	NIC 4 Digit	NIC 5 Digit	Activity
1	78	7824	78200	Services

DATE OF UDYAM REGISTRATION: 27/07/2021



Maharashtra Energy Development Agency

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.

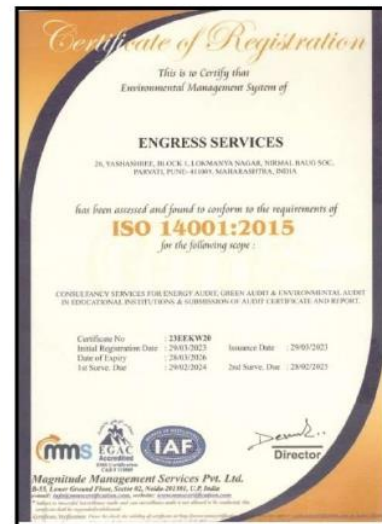
Name and Address of the firm : M/s Engress Services
Yaashree, 26, Nirmal Bag Society,
Near Milkamang English School,
Parvaty, Pune - 411 009.

Registration Category : Empowered 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 empowerment 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)



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ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of Dr. D. Y. Patil Pratishthan's Dr. D. Y. Patil College of Pharmacy, Akurdi, Pune, for awarding us the assignment of Environmental Audit of Akurdi campus for the Year: 2023-24.

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

EXECUTIVE SUMMARY

1. Dr. D. Y. Patil Pratishthan's Dr. D. Y. Patil College of Pharmacy, Akurdi, Pune consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

2. Pollution due to College Activities:

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

3. Present Energy Consumption & CO₂ Emission:

No	Particulars	Value	Unit
1	Total Energy Purchased	122911	kWh
2	Total LPG Consumed	209	Kg
3	Annual CO ₂ Emissions	114.92	MT

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

No	Particulars	Value	Unit
1	Installed Solar PV Plant Capacity	15.36	kWp
2	Energy Generated by Solar PV Plant in 23-24	18432	kWh
3	Reduction in Annual CO ₂ Emissions	17.14	MT

5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	65	39	48
2	Minimum	55	32	39

6. Indoor Lux & Noise Level Parameters:

No	Parameter/Value	Lux Level	Noise Level, dB
1	Maximum	236	49.3
2	Minimum	216	45

7. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Provision of Bio composting Bed
3	Liquid Waste	Provision of Sewage Treatment Plant

4	Chemical Storage & Fumes'	Provision of Fuming Chamber
5	Chemical Lab Liquid Waste	Recommended to dispose of properly
6	Bio Medical Waste	MoU with M/s PASSSCO, for disposal
7	Sanitary Waste	Recommended to provide Sanitary Waste Incinerator
8	E Waste	Recommended to dispose of through Authorized Agency

8. Rain Water Management:

The College has installed the Rainwater Management project; the rain water falling on the terrace is collected through pipes and is used for increasing the Underground Water Table as well as recharging the bore well.

9. Environment Friendly Initiatives:

- Tree Plantation in the campus.
- Creation of awareness on Water Conservation Display of Posters

10. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.93 Kg of CO₂** into atmosphere
2. **1 Kg** of LPG releases **2.94 Kg of CO₂** into atmosphere
3. **1 kWp** Solar PV system generates **4 kWh** of Electrical Energy per Day
4. Annual Solar Energy Generation Days: **300 Nos**
5. Electrical Energy Consumption is computed based on Load Utilization Factor
6. CO₂ Emissions are computed based on Electrical Energy Purchased

11. References:

- For CO₂ Emissions: www.ccd.gujarat.gov.in
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI Quality Standards: www.cpcb.com
- For Solar PV Energy Generation: www.rooftopsolar.gov.in

ABBREVIATIONS

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
LPD	:	Liters per Day
LED	:	Light Emitting Diode
AQI	:	Air Quality Index
PM-2.5	:	Particulate Matter of Size 2.5 Micron
PM-10	:	Particulate Matter of Size 10 Micron
CPCB	:	Central Pollution Control Board
ISHRAE	:	The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

CHAPTER-I INTRODUCTION

1. Important Definitions:

1.1.1 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

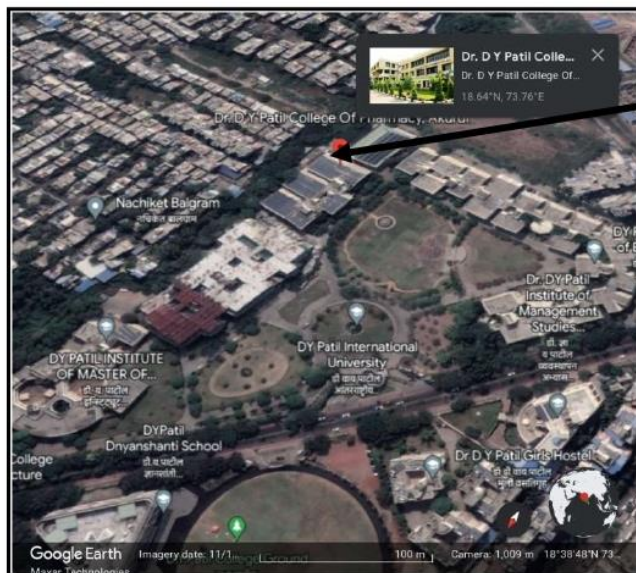
1.1.2 Environmental Audit: Definition:

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 Key Study Points:

No	Particulars
1	Study of Present Resource Consumption & CO ₂ Emission
2	Study of Usage of Renewable Energy
3	Study of Indoor Air Quality
4	Study of Indoor Lux & Noise Level
5	Study of Water Management
6	Study of Waste Management Practices
7	Study of Environment Friendly Practices

1.4 College Location Image:



College Campus

CHAPTER-II

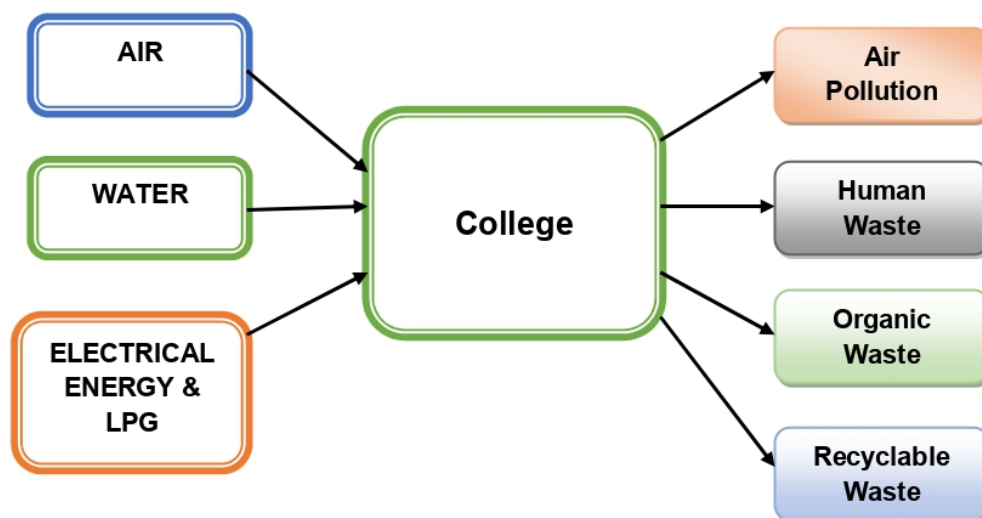
STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

The College consumes following basic/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 Resource Requirement & Waste of a College:



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

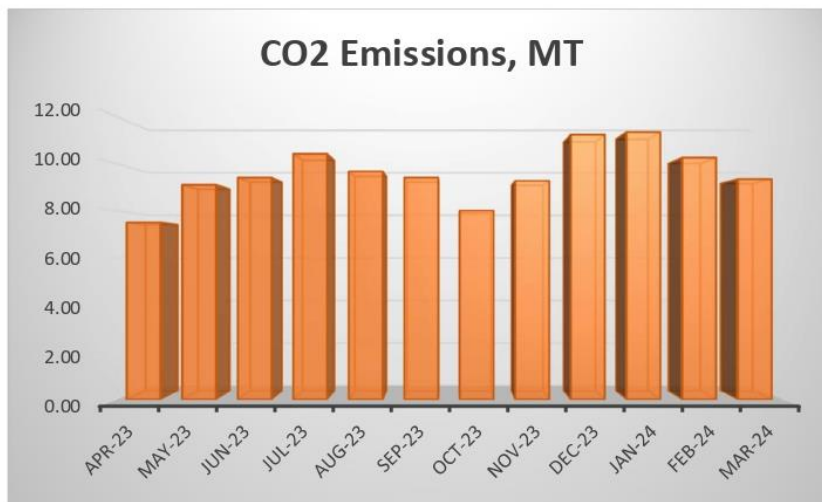
- 1 kWh of Electrical Energy releases 0.93 Kg of CO₂ into atmosphere
- 1 Kg of LPG releases 2.94 Kg of CO₂ into atmosphere

Table No 1: Study of Purchase of Energy, LPG & CO₂ Emissions: 23-24:

No	Month	Energy Purchased, kWh	LPG Consumed, Kg	CO ₂ Emissions, MT
1	Apr-23	8036	9	7.50
2	May-23	9735	15	9.10
3	Jun-23	10069	15	9.41
4	Jul-23	11136	16	10.40
5	Aug-23	10336	20	9.67

6	Sep-23	9997	38	9.41
7	Oct-23	8550	20	8.01
8	Nov-23	9906	19	9.27
9	Dec-23	12034	10	11.22
10	Jan-24	12138	17	11.34
11	Feb-24	10987	11	10.25
12	Mar-24	9987	19	9.34
13	Total	122911	209	114.92
14	Maximum	12138	38	11.34
15	Minimum	8036	9	7.50
16	Average	10242.58	17.42	9.58

Chart No 2: Month wise CO₂ Emissions:



CHAPTER III STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity **15.36 kWp**
In the following Table, we present the reduction in CO₂ emissions due to Solar Energy:

Table No 2: Computation of Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	15.36	kWp
2	Energy Generated in the Year: 23-24	18432	kWh
3	1 kWh of Electrical Energy saves	0.93	Kg/kWh
4	Qty of CO ₂ Saved by Solar PV Plant $= (2) * (3) / 1000$	17.14	MT of CO ₂

Photograph of Roof Top Solar PV Plant:



CHAPTER IV STUDY OF INDOOR AIR QUALITY

1. Air: The common name given to the atmospheric gases used in breathing and photosynthesis.

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

3. Air Quality Index: Air Quality Index (AQI) is a number used by government agencies to measure the **Air Pollution** levels and communicate it to the population.

In this Chapter, we present three important Parameters: **AQI**- Air Quality Index, **PM-2.5**- Particulate Matter of Size 2.5 micron and **PM-10**- Particulate Matter of Size 10 micron

Table No 3: Indoor Air Quality Parameters:

No	Location	AQI	PM2.5	PM10
1	Training & placement Cell	57	34	40
2	Staff Room	65	39	48
3	Pharmaceutics Lab	56	35	42
4	Seminar Hall	55	32	39
5	HOD cabin	64	38	47
	Maximum	65	39	48
	Minimum	55	32	39

Table No 4: Air Quality Index Values & Concentration of PM 2.5 & PM10: (By CPCB):

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 +

Conclusion:

From the above measured values, we conclude that the observed values of AQI, PM-2.5 & PM-10 are in the **Satisfactory Range**, as per the guidelines given by Central Pollution Control Board.

CHAPTER V STUDY OF LUX & NOISE PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit. The Parameters include: **Lux Level and Noise Level.**

Table No 5: Study of Indoor Lux Level and Noise Level Parameters:

No	Location	Lux Level	Noise Level, dB
1	Training & placement Cell	226	45
2	Staff Room	234	49
3	Pharmaceutics Lab	216	48.7
4	Seminar Hall	229	49.3
5	HOD cabin	236	46
	Maximum	236	49.3
	Minimum	216	45

Recommended Lux & Noise Level: As per BEE & ISHRAE Guidelines:

A) Noise Level Reference:		
No	Location	Noise Level Range, dB
1	Offices	45-50
2	Occupied Class Room	40-45
3	Libraries	35-40
B) Reference Lux Level, Lumens:		
1	For Class Rooms	200 Plus
2	For Reading Rooms	200 Plus

Conclusion:

From the above measured values, we conclude that:

- The Noise Level is within the prescribed Limit
- The Lux Level at various locations is Okay

CHAPTER VI STUDY OF RAIN WATER MANAGEMENT

The College has installed the Rainwater Management project; the rain water falling on the terrace is collected through pipes and is used for increasing the Underground Water Table as well as recharging the bore well.

Photograph of Rain Water Collecting Pipe:





Rain Water
Collecting Pipe

CHAPTER-VII STUDY OF WASTE MANAGEMENT

In this Chapter, we present the Waste Management Practices, followed by the College.

Details of Waste Management Practices:


No	Head	Observation	Photograph
1	Solid Waste	Segregation of Waste at Source: Provision of Waste Collection Bins	<p>Waste Collection Bin</p>  <p>GPS Map Camera Pimpri-Chinchwad, Maharashtra, India 133/1/7, Bharalmata Society Ln, Shri Sai Society, Gurudwara Colony, Nigdi, Pimpri-Chinchwad, Maharashtra 411044, India Lat 18.644823° Long 73.760425° 18/05/23 02:34 PM GMT +05:30</p>
2	Organic Waste	Arrangement of Bio Composting Bed, to convert the Leafy Waste into Bio Compost.	<p>Bio Composting Bed:</p>  <p>GPS Map Camera Pimpri-Chinchwad, Maharashtra, India 7/49, Gurudwara Colony, Nigdi, Pimpri-Chinchwad, Maharashtra 411044, India Lat 18.648015° Long 73.760825° 18/05/23 03:15 PM GMT +05:30</p>

3	Liquid Waste	Installed Sewage Treatment Plant. The treated Water is used for gardening purpose.	<p>Sewage Treatment Plant:</p> 
4	Hazardous Chemicals and Fumes' Management	Hazardous chemicals are kept away from the reach of students. Fire extinguishers are available in all labs	<p>Fuming Chamber:</p> 
5	Chemical Laboratory Liquid Waste	Recommended to dispose of the Chemical Lab Liquid Waste in a proper manner.	
6	Bio Medical Waste	The College has tie-up with the PASCO for the management of hazardous biomedical waste and disposal of the same	
7	Sanitary Waste	Recommended to dispose of the Sanitary Waste in a Sanitary Waste incinerator.	
8	E Waste	Recommended to dispose of the E Waste through Authorized Agency.	

CHAPTER-VIII STUDY OF ECO-FRIENDLY PRACTICES

In this Chapter, we present the Eco-Friendly Practices, followed by the College.

Details of Eco-Friendly Practices:

No	Head	Observation	Photograph
1	Tree Plantation	Tree Plantation in the Campus	<p>Internal Tree Plantation:</p> 
2	Creation of Awareness among Stake Holders	Display of Poster on Water Conservation	<p>Poster on Water Conservation:</p> 