



Shri Gajanan Maharaj Shikshan Prasarak Mandal's,
SHARADCHANDRA PAWAR ARTS AND COMMERCE COLLEGE,
Alandi Devachi (Dudulgaon), Tal. Khed, Dist.Pune 412105.



ENVIRONMENTAL AUDIT REPORT

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,
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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 Muktagan 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)





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Tel: 09890444795 Email: engress123@gmail.com

Ref: ES/ SGMSPMSPACC/21-22/03

Date: 20/6/2022

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College, Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune-412105 in the year 2021-22.

The College has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Maximum Usage of Day Lighting
- Segregation of Waste at source
- In process construction of Bio Composting Pit
- Installation of Rain Water Management Project
- Tree Plantation in the campus
- Creation of awareness on Resource Conservation by Display of Posters
- Conducting Tree Plantation & Cleanliness Drive

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,

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Certified Energy Auditor, EA-8192

ASSOCHAM GEM Certified Professional: GEM: 22/788

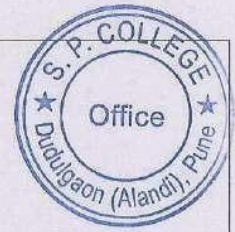




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ACKNOWLEDGEMENT

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





EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College, Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune 412105 consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

2. Pollution due to Day to Day Activities:

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

3. Energy Purchased & CO₂ Emission:

No	Parameter	Energy Consumed, kWh	CO ₂ emissions, MT
1	Total	13340	12.01
2	Maximum	2308	2.08
3	Minimum	802	0.72
4	Average	1111.67	1.00

4. Various Measures Adopted for Environmental Conservation:

- Usage of Energy Efficient LED fittings
- Maximum Usage of Day Lighting

5. Usage of Renewable Energy:

- The College has yet to install Roof Top Solar PV Plant.

6. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	80	48	61
2	Minimum	71	43	52

7. Indoor Comfort Condition Parameters:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	32.1	46	169	45
2	Minimum	31.8	45	136	41.7





8. Waste Management:

8.1 Segregation of Waste at Source:

The Waste is segregated at source and the recyclable waste like Paper waste, Plastic Waste is handed over to authorized agency.

8.2 Organic Waste Management:

The College is constructing facility for composting the Organic Waste into Bio Compost.

8.3 E Waste Management:

It is recommended to dispose of E Waste through Authorized Agency.

9. Rain Water Management:

The College has installed Rainwater Management Project. The rain water falling on the terrace is collected through pipes and is used to increase the underground water table.

10. Eco Friendly Practices:

- Internal Tree Plantation
- Creation of Awareness on Resource Conservation by Display of Posters
- Conducting Tree Plantation & Cleanliness Drive

11. Assumption:

- 1 kWh (Unit) of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

12. References:

1. For CO₂ calculations: www.tatapower.com
2. For Various Indoor Air Parameters: www.ishrae.com
3. For AQI & Water Quality Standards: www.cpcb.com





ABBREVIATIONS

SGMSPM	:	Shri Gajanan Maharaj Shikshan Prasarak Mandal
AQI	:	Air Quality Index
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
MT	:	Metric Ton
CO ₂	:	Carbon Di Oxide
ISHRAE	:	The Indian Society of Heating, Refrigerating & Air conditioning Engineers
CPCB	:	Central Pollution Control Board
PM	:	Particulate Matter





CHAPTER-I INTRODUCTION

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

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

1.1.2. Environmental Audit: Definition:

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

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

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

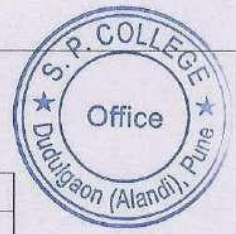
1.1.4. Relevant Environmental Laws in India: Table No-1:

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

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

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





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

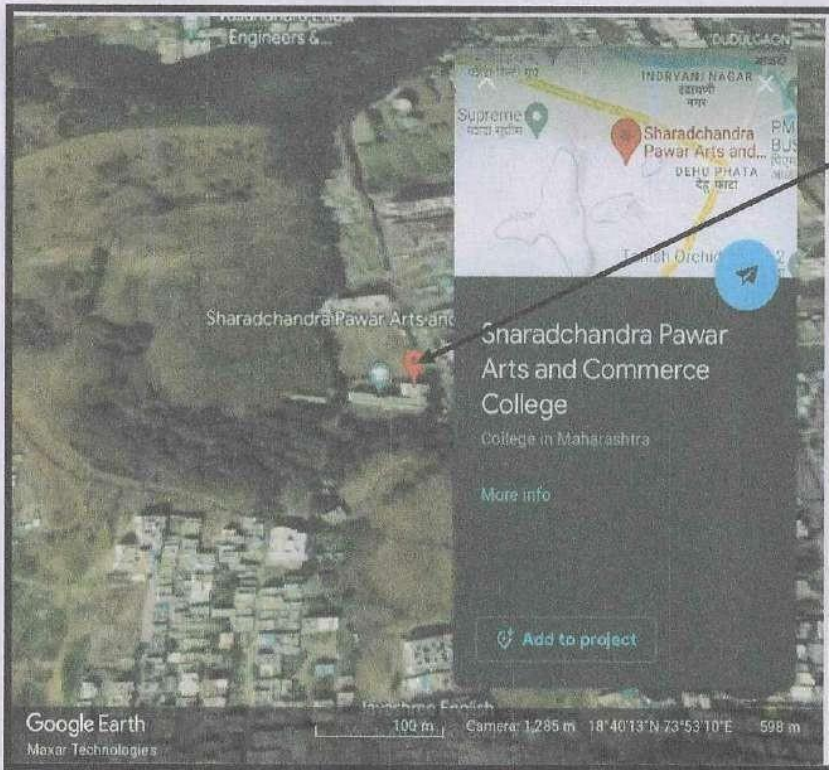
1.1.6 National Environmental Plans & Policy Documents: Table No-3:

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

1. To study Recourse Consumption and CO₂ Emission
2. To Study CO₂ Emission Reduction
3. To Study Indoor Air Quality
4. To study Indoor Comfort Parameters
5. To Study Waste Management Practices
6. To Study Rain Water Harvesting
7. To study Environment Friendly Practices

1.3 Google Earth Image:



**College
Campus**





1.4 Table No 4: General Details of College:

No	Head	Particulars
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College
2	Address	Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune 412 105
3	Year of Establishment	2002
3	Affiliation	Savitribai Phule Pune University





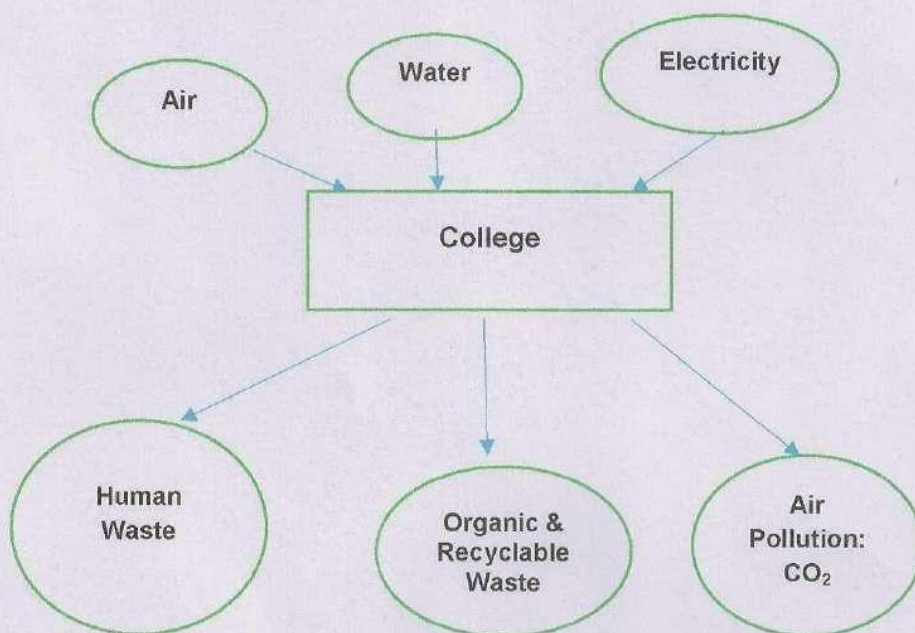
CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

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:

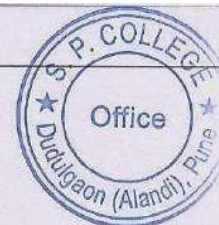


We compute the Generation of CO₂ on account of consumption of Electrical Energy as under. The basis of Calculation for CO₂ emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere.

Table No 5: Electrical Energy Usage & CO₂ Emission: 21-22:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Apr-21	978	0.88
2	May-21	874	0.79
3	Jun-21	870	0.78
4	Jul-21	965	0.87
5	Aug-21	880	0.79





6	Sep-21	802	0.72
7	Oct-21	917	0.83
8	Nov-21	1166	1.05
9	Dec-21	1218	1.10
10	Jan-22	1065	0.96
11	Feb-22	1297	1.17
12	Mar-22	2308	2.08
13	Total	13340	12.01
14	Maximum	2308	2.08
15	Minimum	802	0.72
16	Average	1111.67	1.00

Chart No 2: To study CO₂ Emission:

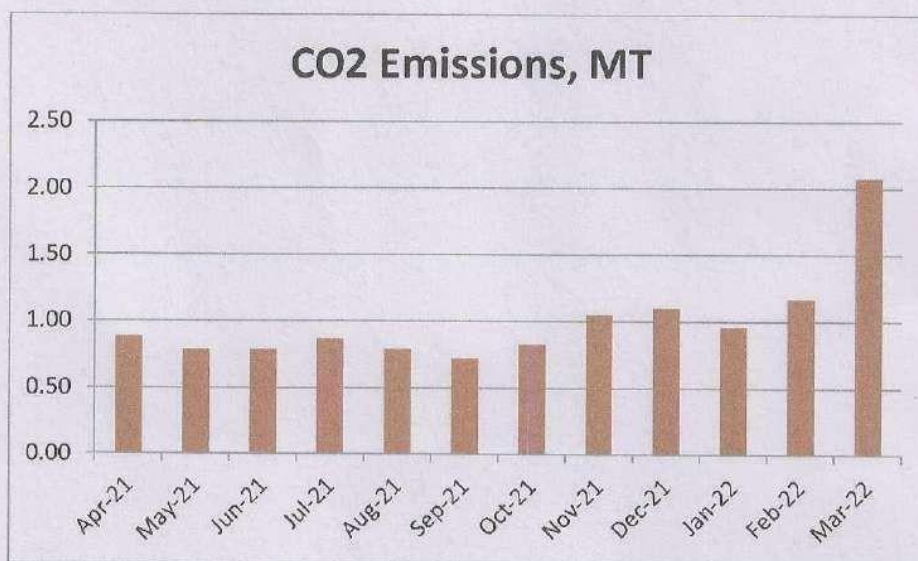
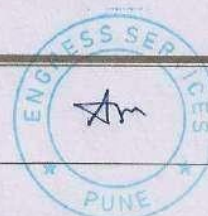
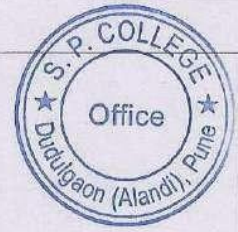


Table No 6: Important parameters:

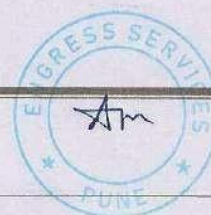
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2	Maximum	2308	2.08
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4	Average	1111.67	1.00





CHAPTER-III
STUDY OF USAGE OF RENEWABLE ENERGY

The College has yet to install Roof top Solar PV Plant.





CHAPTER-IV STUDY OF INDOOR AIR QUALITY

4.1 Importance of Air Quality:

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

By volume, Dry Air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.039% carbon dioxide, and small amounts of other gases.

On average, a person inhales about **14,000 liters** of air every day. Therefore, poor air quality may affect the quality of life now and for future generations by affecting the health, the environment, the economy and the city's livability.

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
3. PM 2.5- Particulate Matter of Size 2.5

Table No 7: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
	Ground Floor			
1	Office	75	46	56
2	Class Room-1	80	48	58





3	Class Room-2			
	First Floor			
4	Principal Cabin	71	43	52
5	BBA Department	76	46	56
6	Class Room	73	45	56
	Second Floor			
7	Library	75	45	61
8	Class Room	80	48	61
	Third Floor			
9	Class Room	74	45	56
	Fourth Floor			
10	Class Room	72	43	54
	Maximum	80	48	61
	Minimum	71	43	52





CHAPTER-V

STUDY OF INDOOR AIR 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 8: Study of Indoor Comfort Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
	Ground Floor				
1	Office	32.1	46	145	45
2	Class Room-1	32	46	165	44.6
3	Class Room-2	32	45	147	44.2
	First Floor				
4	Principal Office	28.7	38.9	145	39
5	BBA Department	31.9	45	154	43.5
6	Class Rooms- 5 Nos	31.9	46	136	41.9
	Second Floor				
7	Library	31.8	46	147	41.7
8	Class Room	31.9	46	136	42.9
	Third Floor				
9	Class Room	31.8	46	159	43.6
10	Class Room	31.8	45	162	42.1
11	Class Room	31.8	45	162	42.1
	Maximum	32.1	46	169	45
	Minimum	31.8	45	136	41.7





CHAPTER-VI STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The Waste is segregated at source. Waste bins are located at various locations

Photograph of Waste Collection Bin:



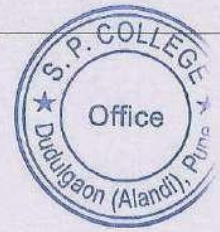
6.2 Organic Waste Management:

The College is constructing facility for composting the Organic Waste into Bio Compost.

6.3 E Waste Management:

It is recommended to dispose of E Waste through Authorized Agency.

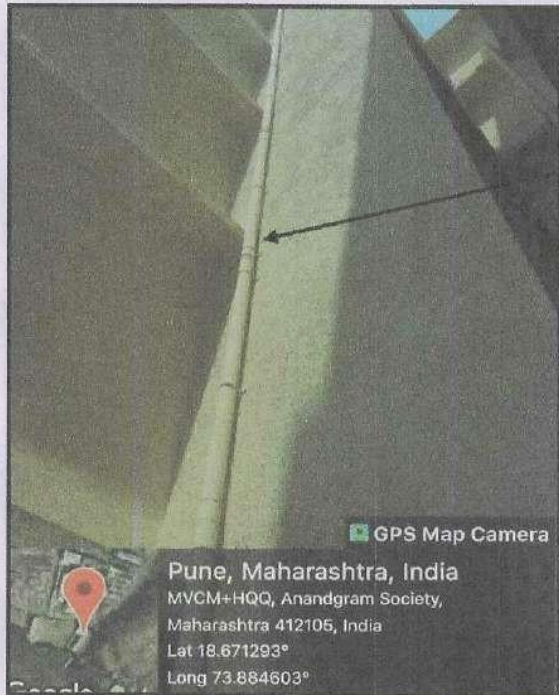




CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

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

Photograph of Rain Water Carrying Pipe:



Rain Water Pipe





CHAPTER VIII STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The College has well maintained Tree plantation.

Photograph of Tree Plantation:



8.2 Creation of Awareness by Display of Posters:

The College has displayed posters on resource conservation.

Photograph of Poster Display Board on Resource Conservation:





8.3 Tree Plantation & Cleanliness Drive:

The College arranged Tree Plantation & Cleanliness Drive in the College Campus.

Photograph of Tree Plantation & Cleanliness Drive:





ANNEXURE-I: VARIOUS AIR QUALITY, WATER 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 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



3. 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

4. Thermal Comfort Conditions: For Non-conditioned Buildings:

No	Parameter	Value
1	Temperature	Less Than 33 ⁰ C
2	Humidity	Less Than 70%



H. D. Thozat

PRINCIPAL

Sharadchandra Pawar Arts & Commerce College
Dudulgaon (Alandi), Pune





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GREEN AUDIT REPORT

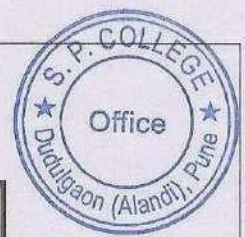
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- Provision of Ramp for Divyangajan
- Creation of awareness on Resource Conservation by Display of Posters
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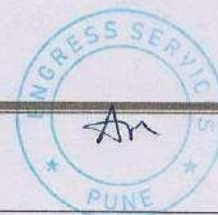
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7. Green & Sustainable Practices:

- Good Internal Road
- Internal Tree Plantation





- Provision of Ramp for Divyangajan
- Creation of Awareness on Resource Conservation by Display of Posters
- Tree Plantation & Cleanliness Drive

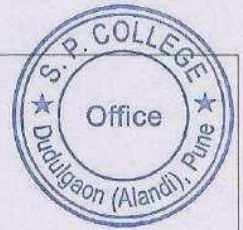
8. Assumption:

- 1 kWh (Unit) of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

9. Reference:

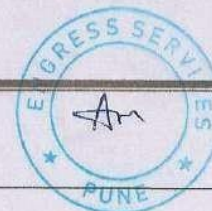
- For CO₂ calculations: www.tatapower.com





ABBREVIATIONS

SGMSPM	:	Shri Gajanan Maharaj Shikshan Prasarak Mandal
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
MT	:	Metric Ton





CHAPTER-I INTRODUCTION

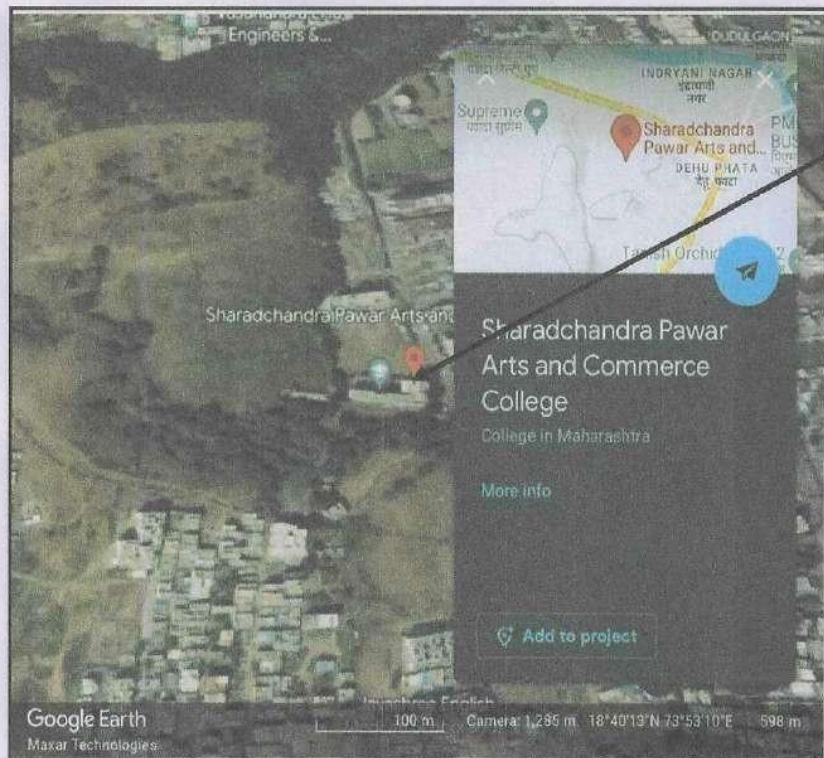
1.1 Objectives:

1. To study present Energy Consumption
2. To Study the present CO₂ emissions
3. To study Usage of Renewable Energy
4. To study Waste Management practices
5. To study Green & Sustainable Practices

1.2 Table No-1: General Details of College:

No	Head	Particulars
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College
2	Address	Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune 412 105
3	Year of Establishment	2002
3	Affiliation	Savitribai Phule Pune University

1.3 Google Earth Image:



College
Campus





CHAPTER-II
STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Energy Consumption
Table No 2: Electrical Energy Purchase Analysis- 21-22:

No	Month	Energy Consumed, kWh
1	Apr-21	978
2	May-21	874
3	Jun-21	870
4	Jul-21	965
5	Aug-21	880
6	Sep-21	802
7	Oct-21	917
8	Nov-21	1166
9	Dec-21	1218
10	Jan-22	1065
11	Feb-22	1297
12	Mar-22	2308
13	Total	13340
14	Maximum	2308
15	Minimum	802
16	Average	1111.67

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

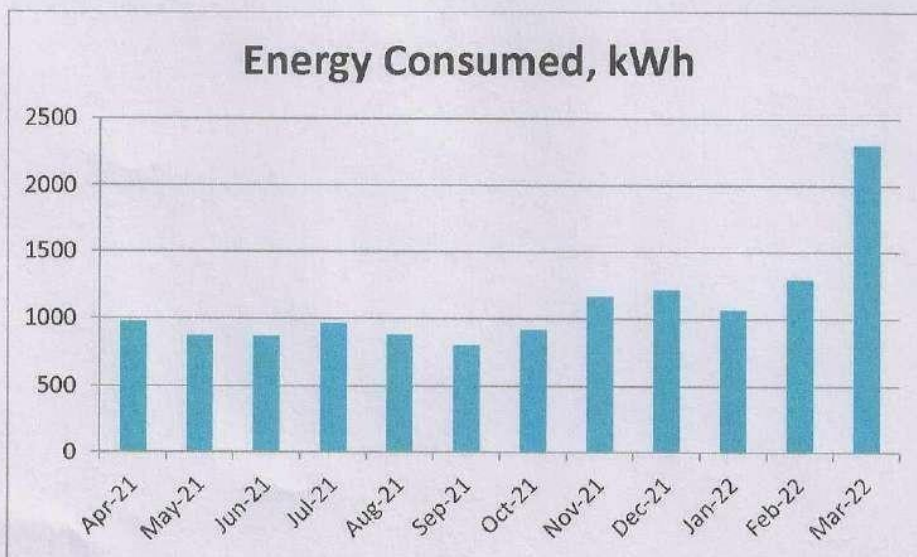




Table No 3: Important parameters:

No	Parameter	Energy consumed, kWh
1	Total	13340
2	Maximum	2308
3	Minimum	802
4	Average	1111.67





CHAPTER-III 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 College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere.

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 4: Month wise CO₂ Emissions:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Apr-21	978	0.88
2	May-21	874	0.79
3	Jun-21	870	0.78
4	Jul-21	965	0.87
5	Aug-21	880	0.79
6	Sep-21	802	0.72
7	Oct-21	917	0.83
8	Nov-21	1166	1.05
9	Dec-21	1218	1.10
10	Jan-22	1065	0.96
11	Feb-22	1297	1.17
12	Mar-22	2308	2.08
13	Total	13340	12.01
14	Maximum	2308	2.08
15	Minimum	802	0.72
16	Average	1111.67	1.00





Chart No 2: Representation of Month wise CO₂ emissions:

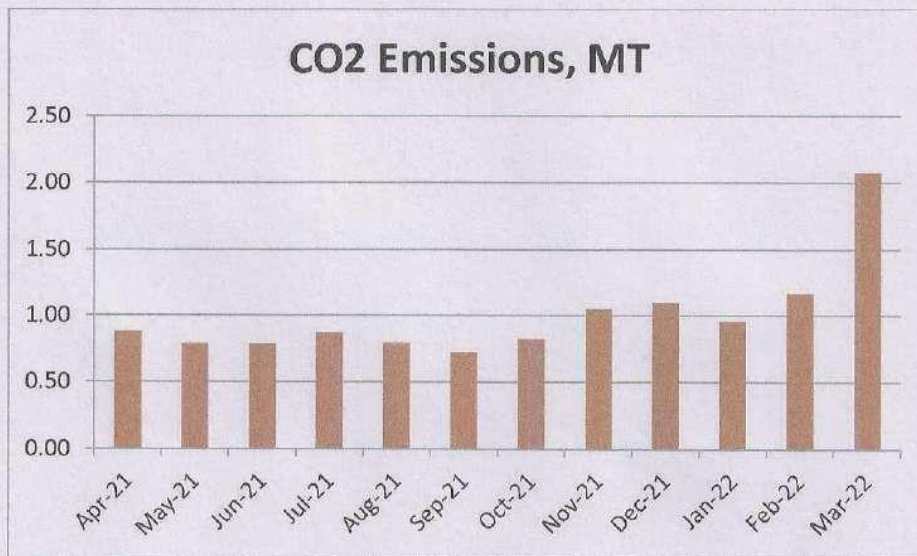


Table No 5: Key observations:

No	Parameter	Energy consumed, kWh	CO ₂ Emissions, MT
1	Total	13340	12.01
2	Maximum	2308	2.08
3	Minimum	802	0.72
4	Average	1111.67	1.00





CHAPTER-IV
STUDY OF USAGE OF RENEWABLE ENERGY

The College has yet to install 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 bins are located at various locations

Photograph of Waste Collection Bin:



5.2 Organic Waste Management:

The College is constructing facility for composting the Organic Waste into Bio Compost.

5.3 E Waste Management:

It is recommended to dispose of E Waste through Authorized Agency.

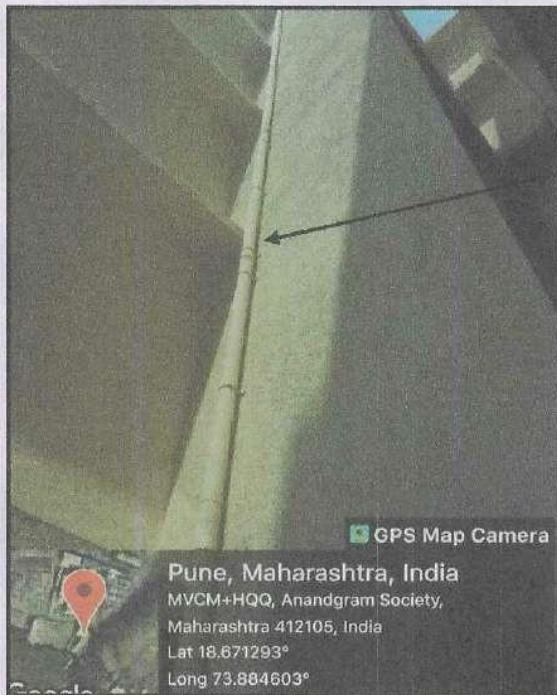




CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

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

Photograph of Rain Water Carrying Pipe:



Rain Water Pipe





CHAPTER-VII STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Roads:

The College has well maintained pedestrian road as to facilitate the easy movement of the students within the campus.

Photograph of Road within campus:



7.2 Internal Tree Plantation:

The College has well maintained Tree Plantation.

Photograph of Tree Plantation:





7.3 Provision of Ramp for Divyangajan:

The College has made provision of Ramp for the Divyangajan.

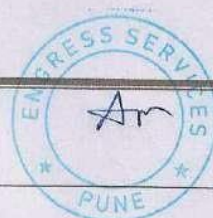
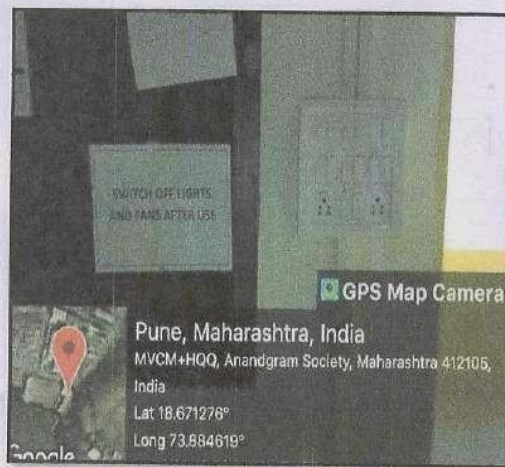
Photograph of Ramp for Divyangajan:



7.4 Creation of Awareness by Display of Posters:

The College has displayed posters on conservation of Resource.

Photograph of Poster Display Board on Resource Conservation:





7.5 Tree Plantation & Cleanliness Drive:

The College arranged Tree Plantation & Cleanliness Drive in the College Campus.

Photograph of Tree Plantation & Cleanliness Drive:





ANNEXURE LIST OF TREES & PLANTS IN THE CAMPUS

1. List of Trees:

No	Name of Tree
1	Mango
2	Kaduneem
3	Palm
4	Sonchampa
5	Champa
6	Indian almond
7	Gulmohor
8	Subabhul
9	Ficus
10	Black Walnut
11	Vad
12	Peepal
13	Tamrind
14	Silver Oak
15	Eranda
16	Chikoo
17	Seetafal
18	Shevga
19	Jamun
20	Bor
21	Sweetlime
22	Bamboo
23	Saptaparni





2. List of Plants:

No	Name of Plant
1	Aster
2	Jasmine
3	Rose
4	Adulsa
5	Cactus
6	Jatropha
7	Tomato
8	Croton
9	Duranta
10	Hibiscus
11	Curry leaves



H. Thozar
PRINCIPAL

Sharadchandra Pawar Arts & Commerce College
Dudulgaon (Alandi), Pune





Shri Gajanan Maharaj Shikshan Prasarak Mandal's,
SHARADCHANDRA PAWAR ARTS AND COMMERCE COLLEGE,
Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune 412105.



ENERGY AUDIT REPORT

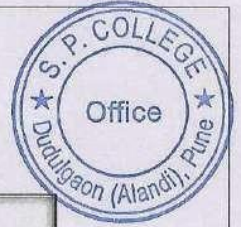
Year: 2021-22

Prepared by

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society
Near Mukhtangan 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 Mukhtangan English School, Parvati, Pune 411 009
Tel: 020-24220747 Email: engress123@gmail.com

Ref: ES/SGMSPMSPACC /21-22/01

Date: 20/6/2022

CERTIFICATE

This is to certify that we have conducted Energy Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College, Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune-412105 in the year 2021-22.

The College has adopted following Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting

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

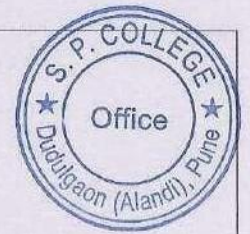




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III	Abbreviations	7
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2	Study of Connected Load	9
3	Study of Electrical Energy Consumption	10
4	Carbon Foot printing	12
5	Study of Usage of Alternate Energy	14
6	Study of Usage of LED Lights	15



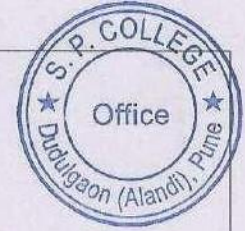


ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College, Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune-412105, for awarding us the assignment of Energy Audit of their Dudulgaon campus for the Year: 21-22.

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





EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College, Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune 412105 consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

2. Energy Consumed & CO₂ Emission:

No	Parameter	Energy Consumed, kWh	CO ₂ emissions, MT
1	Total	13340	12.01
2	Maximum	2308	2.08
3	Minimum	802	0.72
4	Average	1111.67	1.00

3. Various Measures Adopted for Energy Conservation:

- Usage of Energy Efficient LED fittings
- Maximum Usage of Day Lighting

4. Usage of Alternate Energy Source:

- The College has yet to install Roof Top Solar PV Plant.
- The % of Annual Power requirement met by Alternate Energy is nil

5. Usage of LED Lighting to Total Lighting Load:

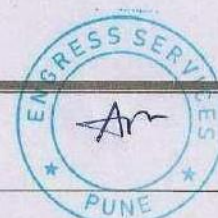
- The LED Lighting Load is **2.032 kW**.
- The Total Lighting Load is **2.032 kW**.
- The percentage of LED Lighting Total Lighting load works out to be **100 %**

6. Assumption:

- 1 kWh (Unit) of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

7. Reference:

- For CO₂ Emission Calculations: www.tatapower.com





ABBREVIATIONS

AC	: Air conditioner
SGMSPM	: Shri Gajanan Maharaj Shikshan Prasarak Mandal
BEE	: Bureau of Energy Efficiency
CFL	: Compact Fluorescent Lamp
FTL	: Fluorescent Tube Light
LED	: Light Emitting Diode
kWh	: kilo-Watt Hour
Qty	: Quantity
W	: Watt
kW	: Kilo Watt
PC	: Personal Computer
MT	: Metric Ton
MSEDCL	: Maharashtra State Electricity Distribution Company Limited





CHAPTER-I INTRODUCTION

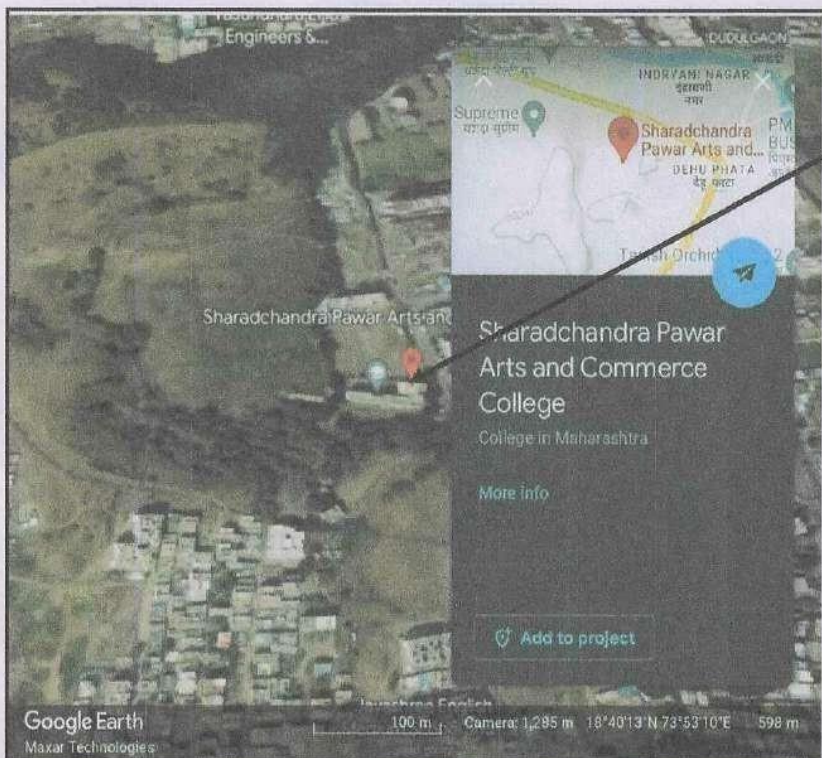
1.1 Objectives:

1. To study Connected Load
2. Study of Present Energy Consumption
3. Study of CO₂ emissions
4. Study of usage of Alternate / Renewable Energy
5. Study of usage of LED Lighting

1.2 Table No-1: General Details of College:

No	Head	Particulars
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Sharadchandra Pawar Arts and Commerce College
2	Address	Alandi Devachi (Dudulgaon), Tal. Khed, Dist. Pune 412 105
3	Year of Establishment	2002
3	Affiliation	Savitribai Phule Pune University

1.3 Google Earth Image:



College
Campus





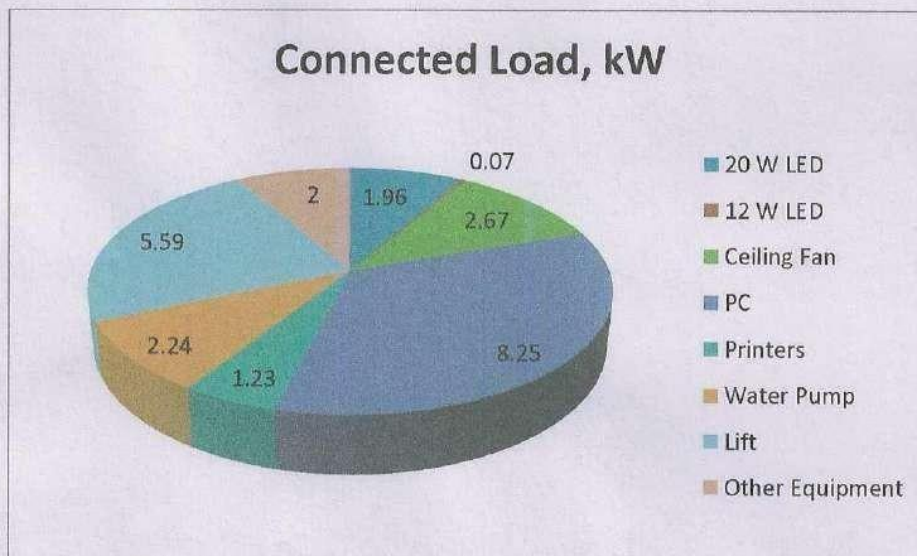
CHAPTER-II STUDY OF CONNECTED LOAD

In this chapter, we present the details of various Electrical loads as under

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/unit	Load, kW
1	20 W LED	98	20	1.96
2	12 W LED	6	12	0.07
3	Ceiling Fan	41	65	2.67
4	PC	55	150	8.25
5	Printers	7	175	1.23
6	Water Pump	1	2238	2.24
7	Lift	1	5595	5.60
8	Other Equipment	10	200	2
9	Total			24

Chart No 1: Details of Connected Load:



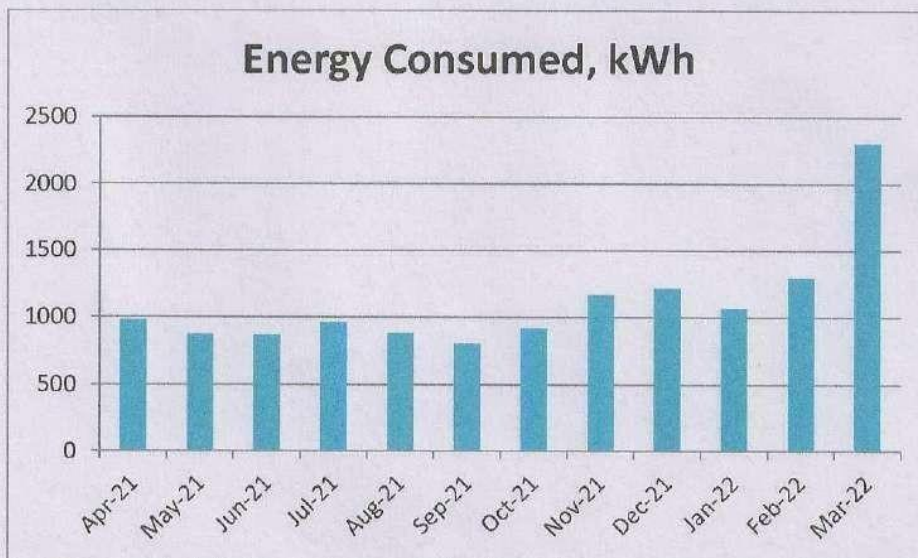
CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Energy Consumed

Table No 3: Electrical Energy Consumed: 21-22:

No	Month	Energy Consumed, kWh
1	Apr-21	978
2	May-21	874
3	Jun-21	870
4	Jul-21	965
5	Aug-21	880
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8	Nov-21	1166
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11	Feb-22	1297
12	Mar-22	2308
13	Total	13340
14	Maximum	2308
15	Minimum	802
16	Average	1111.67

Chart No 2: To study the variation of Month wise Energy Consumed, kWh:



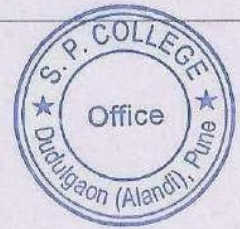
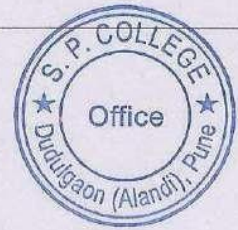


Table No 4: Important parameters:

No	Parameter	Energy Consumed, kWh
1	Total	13340
2	Maximum	2308
3	Minimum	802
4	Average	1111.67





CHAPTER-IV CARBON FOOT PRINTING

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 College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 5: Month wise CO₂ Emissions:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Apr-21	978	0.88
2	May-21	874	0.79
3	Jun-21	870	0.78
4	Jul-21	965	0.87
5	Aug-21	880	0.79
6	Sep-21	802	0.72
7	Oct-21	917	0.83
8	Nov-21	1166	1.05
9	Dec-21	1218	1.10
10	Jan-22	1065	0.96
11	Feb-22	1297	1.17
12	Mar-22	2308	2.08
13	Total	13340	12.01
14	Maximum	2308	2.08
15	Minimum	802	0.72
16	Average	1111.67	1.00



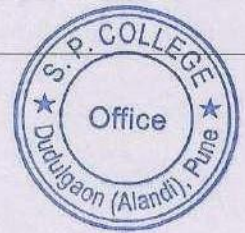


Chart No 3: Representation of Month wise CO₂ Emissions:

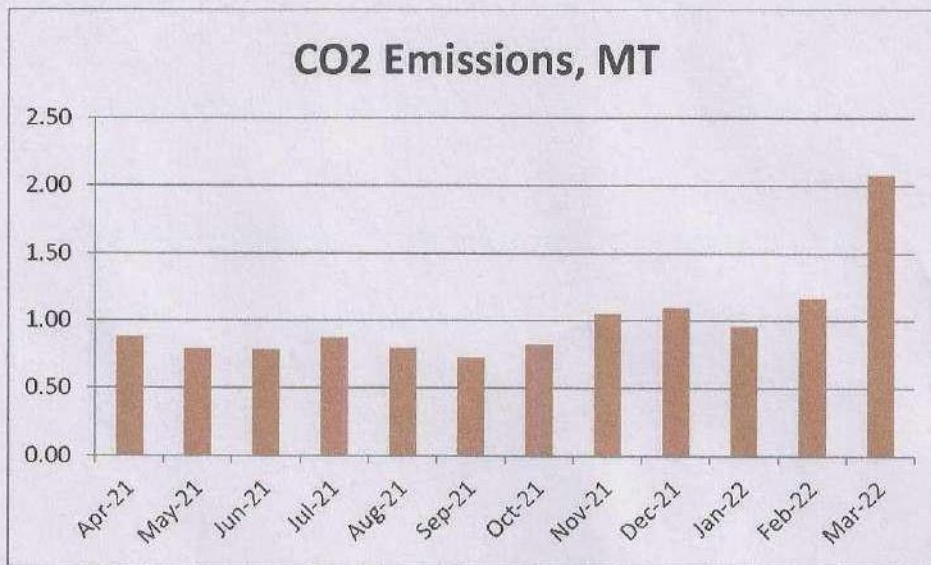
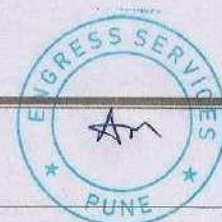
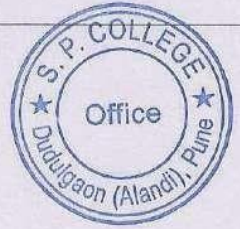


Table No 6: Key observations:

No	Parameter	Energy consumed, kWh	CO ₂ Emissions, MT
1	Total	13340	12.01
2	Maximum	2308	2.08
3	Minimum	802	0.72
4	Average	1111.67	1.00





CHAPTER-V

STUDY OF USAGE OF ALTERNATE ENERGY

The College has yet to install Roof top Solar PV Plant.

As on Date the percentage of Annual Power requirement by Alternate Energy is nil.



CHAPTER-VI STUDY OF USAGE OF LED LIGHTS

In the following Table, we present the percentage of usage of LED lights to Total Lighting Load.

Table No 7: Study of % LED Lighting Load to Total Lighting Load:

No	Particulars	Value	Unit
1	Qty of 20 W LED Fittings	98	Nos
2	Load per Unit of 20 W LED Fitting	20	W/Unit
3	Total Load of 20 W LED Fittings	1.96	kW
4	Qty of 12 W LED Fittings	6	Nos
5	Load per Unit of 12 W LED Fitting	12	W/Unit
6	Total Load of 12 W LED Fittings	0.072	kW
7	Total LED Lighting Load=3+6	2.032	kW
8	Total Lighting Load=3+6	2.032	kW
9	% of Total Lighting Load met by LEDs= $7*100/8$	100	%



H. B. Borat
PRINCIPAL

Sharadchandra Pawar Arts & Commerce College
Dudulgaon (Alandi), Pune



