GREEN AUDIT REPORT

of

Progressive Education Society's

MODERN COLLEGE OF COMMERCE & COMPUTER STUDIES,

Yamunanagar, Nigdi, Pune 411 044

Year: 2020-21

Prepared by

ENRICH CONSULTANTS

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

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

An ISO 9001 : 2000 Reg. no. : RQ 91 / 2462

Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary, Aundh, Pune, Maharashtra 411067

Ph No: 020-35000450

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

ECN/2021-22/CR-14/1577

22nd April, 2021

CERTIFICATE OF REGISTRATION

FOR CLASS 'A'

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

Name and Address of the firm : **M/s Enrich Consultants**
Yashashree, Plot No. 26, Nirmal Bag Society,
Near Muktangan English School, Parvati,
Pune - 411009.

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

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

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **21st April, 2023** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

ENRICH CONSULTANTS PUNE

Enrich Consultants

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

Ref: ES/ MCCCS /20-21/02

Date: 15/7/2021

CERTIFICATE

This is to certify that we have conducted Green Audit at Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044 in the year 2021-22.

The College has adopted following Energy Efficient and Green practices:

- Usage of Energy Efficient LED Lighting
- Usage of BEE STAR Rated equipment
- Segregation of Waste at source
- Installation of Rain Water Management Project
- Maintenance of good Internal Road
- Tree Plantation in the Campus
- Provision of Ramp for Divyangajan
- Creation of Awareness on Water Conservation by Display of Posters

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

For Enrich Consultants,

A Y Mehendale,
Certified Energy Auditor,
EA-8192

ENRICH CONSULTANTS PUNE

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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044, for awarding us the assignment of Green Audit of their Nigdi campus for the Year: 2020-21.

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

EXECUTIVE SUMMARY

1. Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044, consumes Energy in the form of **Electrical Energy;** used for various equipment.

2. Present Level of Energy Consumption & CO_2 Emission:

No	Parameter/ Value	Energy consumed, kWh	CO_2 emissions, MT
1	Total	7180	6.46
2	Maximum	852	0.77
3	Minimum	140	0.13
4	Average	598.33	0.54

3. Measures Adopted for Energy Conservation:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated ACs

4. Usage of Renewable Energy:

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

5. Waste Management:

5.1 Segregation of Waste at Source:

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

5.2 Organic Waste Management:

It is recommended to install a Bio Composting Bed, for conversion of Leafy Waste.

5.3 E-Waste Management:

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

6. Rain Water Management:

The College has installed Rain Water Management project, wherein the rain water falling on the terrace is collected through pipe and is used for increasing the underground water table

7. Green & Sustainable Practices:

- Maintenance of Good internal road
- Internal Tree Plantation
- Provision of Ramp for Divyangajan
- Awareness creation on Water Conservation by display of Posters

8. Assumption:

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

9. Reference:

- For CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

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

CHAPTER-I
INTRODUCTION

1.1 Objectives:

1. To study present Energy Consumption
2. To study the present CO_2 emissions
3. To study usage of Renewable Energy
4. To study Waste Management
5. To study rain water Management
6. To study Green & Sustainable Practices

1.2 Table No-1: General Details of College:

No	Head	Particulars
1	Name	Progressive Education Society's Modern College of Commerce & Computer Studies
2	Address	Yamunanagar, Nigdi, Pune 411 044
3	Affiliation	Savitribai Phule Pune University

CHAPTER-II
STUDY OF ELECTRICAL ENERGY CONSUMPTION

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

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

No	Month	Energy Consumed, kWh
1	Apr-20	140
2	May-20	140
3	Jun-20	140
4	Jul-20	760
5	Aug-20	680
6	Sep-20	600
7	Oct-20	760
8	Nov-20	798
9	Dec-20	852
10	Jan-21	820
11	Feb-21	798
12	Mar-21	692
13	Total	7180
14	Maximum	852
15	Minimum	140
16	Average	598.33

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

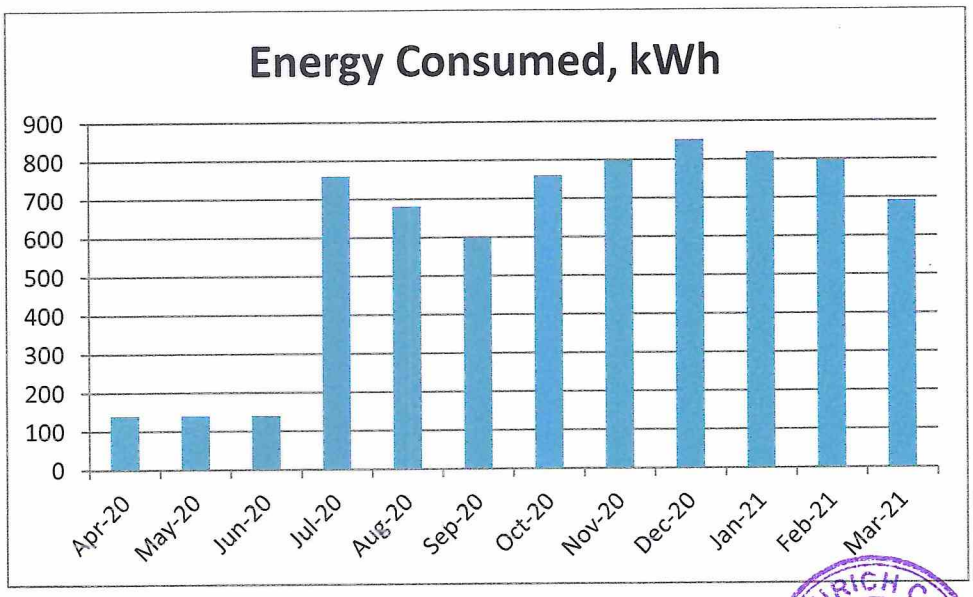


Table No 3: Important parameters:

No	Parameter	Energy consumed, kWh
1	Total	7180
2	Maximum	852
3	Minimum	140
4	Average	598.33

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 CO_2 Emissions:

The basis of Calculation for CO_2 emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

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

Table No 4: Month wise CO_2 Emissions:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-20	140	0.13
2	May-20	140	0.13
3	Jun-20	140	0.13
4	Jul-20	760	0.68
5	Aug-20	680	0.61
6	Sep-20	600	0.54
7	Oct-20	760	0.68
8	Nov-20	798	0.72
9	Dec-20	852	0.77
10	Jan-21	820	0.74
11	Feb-21	798	0.72
12	Mar-21	692	0.62
13	Total	7180	6.46
14	Maximum	852	0.77
15	Minimum	140	0.13
16	Average	598.33	0.54

Chart No 2: Representation of Month wise CO_2 Emissions:

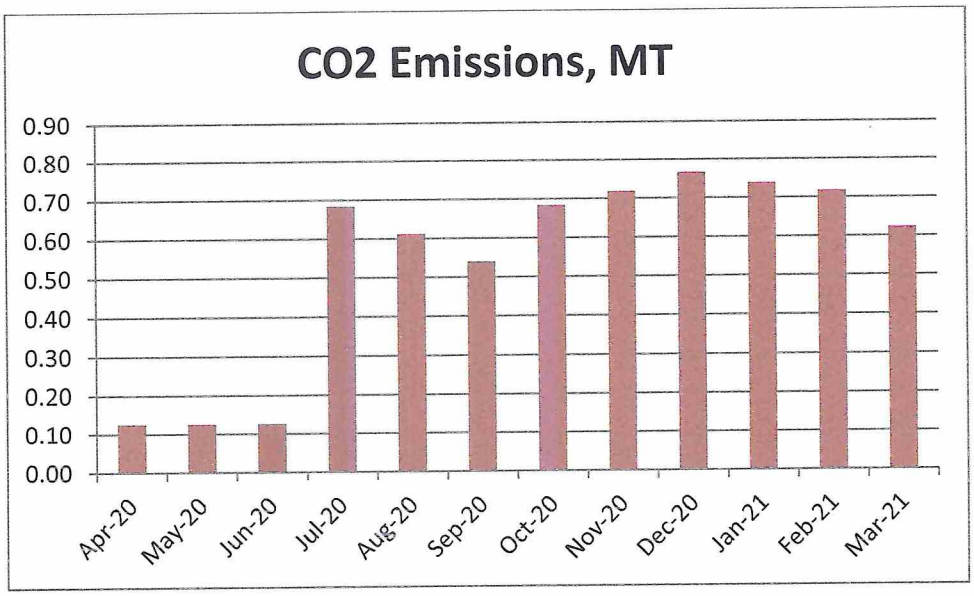


Table No 5: Key observations:

No	Parameter	Energy consumed, kWh	CO2 emissions, MT
1	Total	7180	6.46
2	Maximum	852	0.77
3	Minimum	140	0.13
4	Average	598.33	0.54

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 kept at various locations.

Photograph of Waste Collection Bin:

5.2 Organic Waste Management:

It is recommended to install a Bio Composting Bed, for conversion of Leafy Waste.

5.3 E-Waste Management:

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

CHAPTER-VI
STUDY OF RAIN WATER MANAGEMENT

The College has installed Rain Water Management project, wherein the rain water falling on the terrace is collected through pipe and is used for increasing the underground water table.

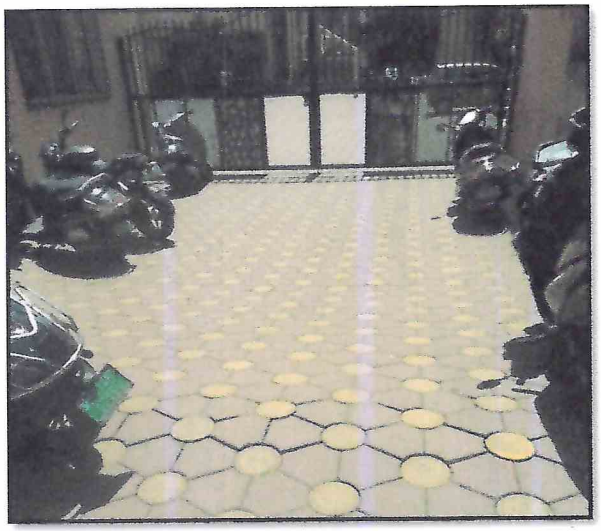
Photograph of Rain Water Carrying Pipe:

CHAPTER-VII
STUDY OF GREEN & SUATAINABLE PRACTICES

7.1 Pedestrian Friendly Road:

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

Photograph of Internal Road:



7.2 Tree Plantation:

The College has well maintained internal Tree Plantation.

Photograph of Internal Plantation:

7.3 Provision of Ramp for Divyangajan:

The College has made a provision of Ramp for Divyangajan.

Photograph of Ramp:

7.4 Creation of Awareness on Water Conservation:

The College has displayed Posters emphasizing the Importance of Energy Conservation.

Photograph of Poster on Water Conservation:

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General Manager (EC)

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Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: enrichcons@gmail.com

Ref: ES/ MCCCS /20-21/03

Date: 15/7/2021

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044 in the year 2020-21.

The College has adopted following Environmental Friendly Practices:

- Usage of Energy Efficient LED Lighting
- Usage of BEE STAR Rated equipment
- Segregation of Waste at source
- Installation of Rain Water Management Project
- Tree Plantation in the Campus
- Creation of Awareness on Water Conservation by Display of Posters

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

For Enrich Consultants,

Mehendale

A Y Mehendale,
Certified Energy Auditor,
EA-8192

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

EXECUTIVE SUMMARY

1. Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044, consumes Energy in the form of **Electrical Energy;** used for various equipment.

2. Pollution due to College Activities:

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

3. Present Energy Consumption & CO_2 Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO_2 Emissions, MT
1	Total	7180	6.46
2	Maximum	852	0.77
3	Minimum	140	0.13
4	Average	598.33	0.54

4. Various initiatives taken for Energy Conservation:

- Usage of Energy Efficient LED Lighting
- 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	123	67	86
2	Minimum	100	60	76

7. Waste Management:

7.1 Segregation of Waste at Source:

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

7.2 Organic Waste Management:

It is recommended to install a Bio Composting Bed, for conversion of Leafy Waste.

7.3 E-Waste Management:

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

8. Rain Water Management:

The College has installed Rain Water Management project, wherein the rain water falling on the terrace is collected through pipe and is used for increasing the underground water table.

9. Eco Friendly Initiatives:

- Internal Tree Plantation
- Creation of Awareness on Water Conservation, by Display of Posters

10. Assumption:

1. 1 Unit of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

11. References:

- For CO_2 Emissions: www.tatapower.com
- For AQI &Water Quality Standards: www.cpcb.com

ABBREVIATIONS

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
PES	:	Progressive Education Society
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
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

1.1Important 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 present usage of resources & CO_2 Emission
2. To Study Usage of Renewable Energy
3. To study Indoor Air Quality
4. To study Waste Management practices
5. To study Rain Water Management
6. To study Environment Friendly Initiatives

1.3 Table No 4: General Details of College:

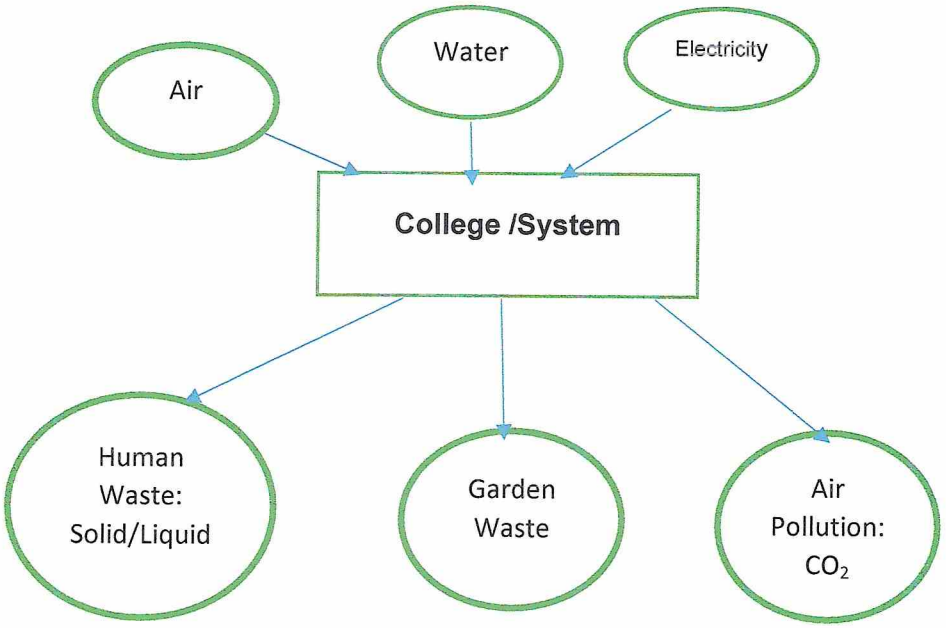
No	Head	Particulars
1	Name	Progressive Education Society's Modern College of Commerce & Computer Studies
2	Address	Yamunanagar, Nigdi, Pune 411 044
3	Affiliation	Savitribai Phule Pune University

CHAPTER-II
STUDY OF RESOURCE CONSUMPTION & CO_2 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



Now we compute the Generation of CO_2 on account of consumption of Electrical Energy. The basis of Calculation for CO_2 emissions due to Electrical Energy is as under

- 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Table No 5: Study of Consumption of Electrical Energy & CO_2 Emissions: 20-21:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-20	140	0.13
2	May-20	140	0.13
3	Jun-20	140	0.13
4	Jul-20	760	0.68
5	Aug-20	680	0.61
6	Sep-20	600	0.54
7	Oct-20	760	0.68
8	Nov-20	798	0.72
9	Dec-20	852	0.77

10	Jan-21	820	0.74
11	Feb-21	798	0.72
12	Mar-21	692	0.62
13	Total	7180	6.46
14	Maximum	852	0.77
15	Minimum	140	0.13
16	Average	598.33	0.54

Chart No 2: To study the variation of Month wise CO_2 Emission:

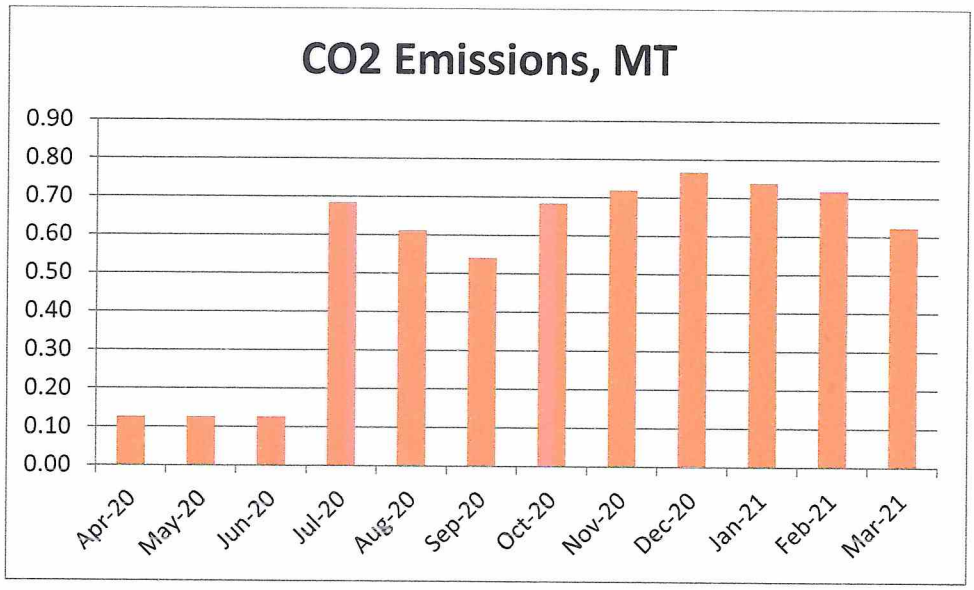


Table No 6: Important parameters:

No	Parameter	Energy consumed, kWh	CO2 emissions, MT
1	Total	7180	6.46
2	Maximum	852	0.77
3	Minimum	140	0.13
4	Average	598.33	0.54

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 micron
3. PM-10- Particulate Matter of Size 10micron

Table No 7: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
1	Account Section	103	61	81
2	Class Room- Ground Floor	100	60	76
3	Boys Common Room	100	61	78

4	Research Centre	106	62	82
5	IQAC Room	110	64	81
6	Library	113	64	85
7	Seminar Hall	112	64	84
8	Computer Lab	123	67	86
	Maximum	**123**	**67**	**86**
	Minimum	**100**	**60**	**76**

CHAPTER V
STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

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

Photograph of Waste Collection Bin:

5.2 Organic Waste Management:

It is recommended to install a Bio Composting Bed, for conversion of Leafy Waste.

5.3 E-Waste Management:

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

CHAPTER-VI
STUDY OF RAIN WATER MANAGEMENT

The College has installed Rain Water Management project, wherein the rain water falling on the terrace is collected through pipe and is used for increasing the underground water table.

Photograph of Rain Water Carrying Pipe:

CHAPTER-VII
STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

7.1 Internal Tree Plantation:

The College has well maintained Internal Tree Plantation.

Photograph of Internal Tree Plantation:

7.2 Creation of Awareness about Water Conservation:

The College has displayed Posters emphasizing the Importance of Water Conservation.

Photograph of Poster on Water Conservation:

ANNEXURE-I:
VARIOUS AIR QUALITY STANDARDS:

1. Category Wise Air Quality Index Values & Concentration of PM 2.5 & PM10:

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

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- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

ENRICH CONSULTANTS ★ PUNE ★

Enrich Consultants

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

Ref: ES/MCCCS/20-21/01

Date: 15/7/2021

CERTIFICATE

This is to certify that we have conducted Energy Audit at Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044 in the year 2020-21.

The College has adopted following Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment

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

For Enrich Consultants,

ENRICH CONSULTANTS ★ PUNE ★

A Y Mehendale,
Certified Energy Auditor
EA-8192

INDEX

ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044, for awarding us the assignment of Energy Audit of their Nigdi campus for the Year: 2020-21

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

EXECUTIVE SUMMARY

1. Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044, consumes Energy in the form of **Electrical Energy;** used for various equipment.

2. Present Level of Energy Consumption & CO_2 Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO_2 emissions, MT
1	Total	7180	6.46
2	Maximum	852	0.77
3	Minimum	140	0.13
4	Average	598.33	0.54

3. Measures Adopted for Energy Conservation:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment

4. Usage of Alternate Energy:

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

5. Usage of LED Lighting:

- The LED Lighting Load of the College is **4.136 kW**
- The Total Lighting Load of the College is **4.296 kW**
- The % of Usage of LEDs to Total Lighting Load is **96.28 %**

6. Assumption:

1. 1 Unit of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

7. Reference:

1. For CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

AC	:	Air conditioner
PES	:	Progressive Education Society
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
PC	:	Personal Computer
MT	:	Metric Ton

CHAPTER-I
INTRODUCTION

1.1 Objectives:

1. To study Connected Load
2. To study present Energy Consumption
3. To Study the present CO_2 emissions
4. To study Usage of Renewable Energy
5. To study Usage of LED Lighting

1.2 Table No-1: General Details of College:

No	Head	Particulars
1	Name	Progressive Education Society's Modern College of Commerce & Computer Studies
2	Address	Yamunanagar, Nigdi, Pune 411 044
3	Affiliation	Savitribai Phule Pune University

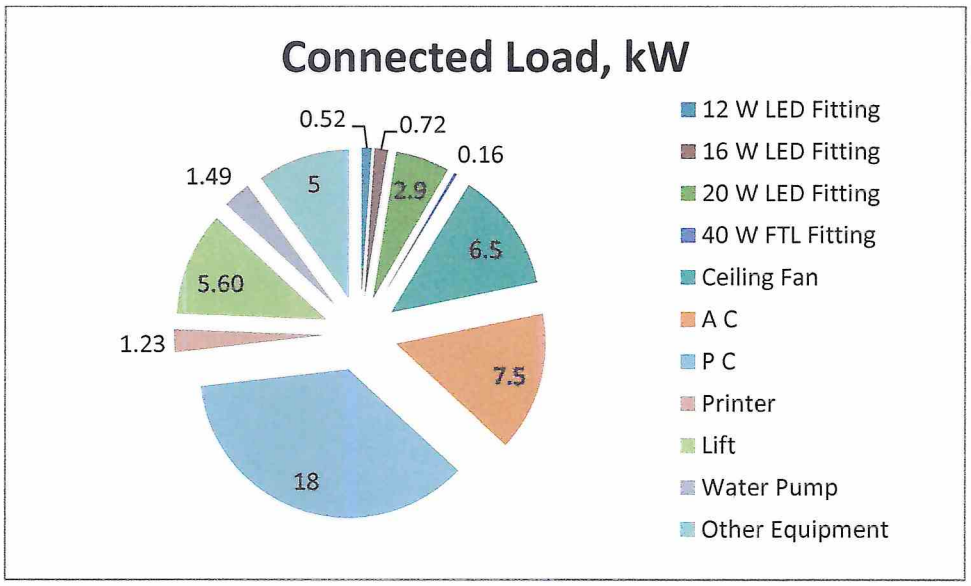
CHAPTER-II
STUDY OF CONNECTED LOAD

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	12 W LED Fitting	43	12	0.52
2	16 W LED Fitting	45	16	0.72
3	20 W LED Fitting	145	20	2.9
4	40 W FTL Fitting	4	40	0.16
5	Ceiling Fan	100	65	6.5
6	A C	4	1875	7.5
7	P C	120	150	18
8	Printer	7	175	1.23
9	Lift	1	5595	5.60
10	Water Pump	1	1492	1.49
11	Other Equipment	20	250	5
12	**Total**			**49.61**

Chart No-1: Details of Connected Load:



CHAPTER-III
STUDY OF ELECTRICAL ENERGY CONSUMPTION

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

Table No 3: Electrical Energy Consumption Analysis- 2020-21:

No	Month	Energy Consumed, kWh
1	Apr-20	140
2	May-20	140
3	Jun-20	140
4	Jul-20	760
5	Aug-20	680
6	Sep-20	600
7	Oct-20	760
8	Nov-20	798
9	Dec-20	852
10	Jan-21	820
11	Feb-21	798
12	Mar-21	692
13	Total	7180
14	Maximum	852
15	Minimum	140
16	Average	598.33

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

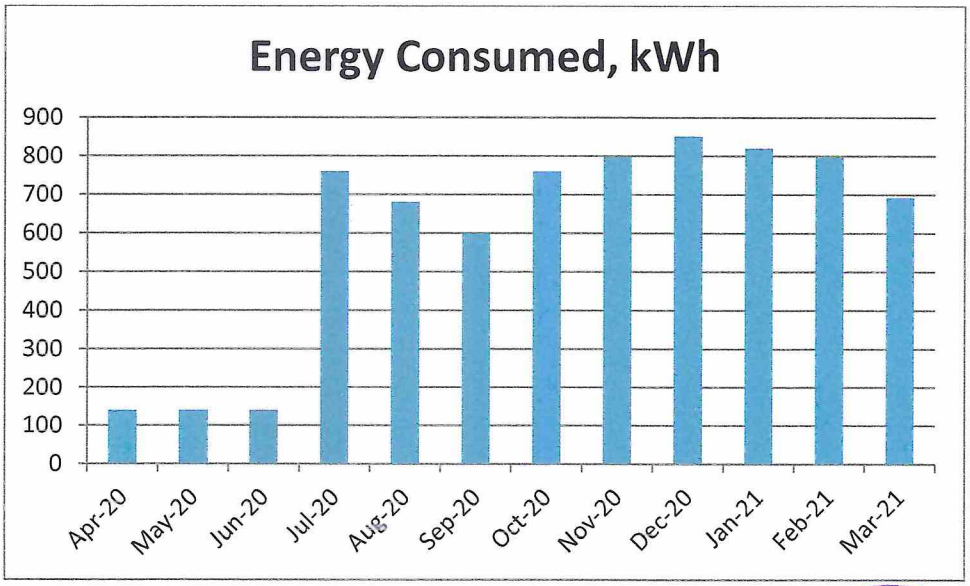


Table No 4: Important parameters:

No	Parameter	Energy consumed, kWh
1	Total	7180
2	Maximum	852
3	Minimum	140
4	Average	598.33

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 CO_2 Emissions:

The basis of Calculation for CO_2 emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

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

Table No 5: Month wise CO_2 Emissions:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-20	140	0.13
2	May-20	140	0.13
3	Jun-20	140	0.13
4	Jul-20	760	0.68
5	Aug-20	680	0.61
6	Sep-20	600	0.54
7	Oct-20	760	0.68
8	Nov-20	798	0.72
9	Dec-20	852	0.77
10	Jan-21	820	0.74
11	Feb-21	798	0.72
12	Mar-21	692	0.62
13	Total	7180	6.46
14	Maximum	852	0.77
15	Minimum	140	0.13
16	Average	598.33	0.54

Chart No-3: Representation of Month wise CO_2 emissions:

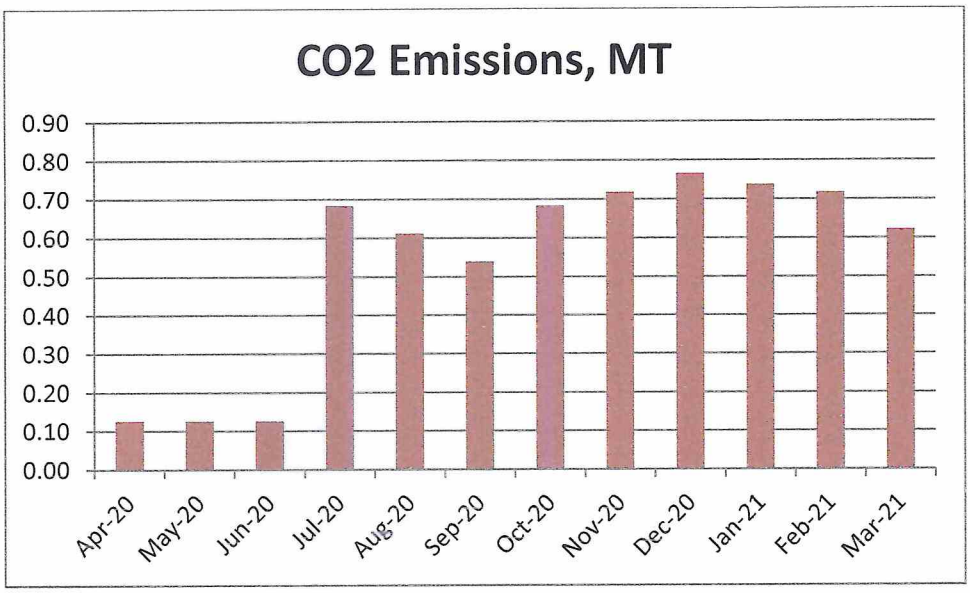


Table No 6: Key observations:

No	Parameter	Energy consumed, kWh	CO_2 emissions, MT
1	Total	7180	6.46
2	Maximum	852	0.77
3	Minimum	140	0.13
4	Average	598.33	0.54

CHAPTER-V
STUDY OF USAGE OF ALTERNATE ENERGY

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

CHAPTER-VI
STUDY OF USAGE OF LED LIGHTING

In this Chapter, we study the Lighting System in the College.

We compute the usage of LED lights to the Total Lighting Load.

Table No 7: Study of Lighting Load:

No	Particulars	Value	Unit
1	No of 12 W LED Fittings	43	Nos
2	Load of 12 W LED Fitting	12	W/Unit
3	Total Load of 12 W LED fittings	**0.516**	kW
4	No of 16 W LED Fittings	45	Nos
5	Load of 16 W LED Fitting	16	W/Unit
6	Total Load of 16 W LED fittings	**0.72**	kW
7	No of 20 W LED Fittings	145	Nos
8	Load of 20 W LED Fitting	20	W/Unit
9	Total Load of 20 W LED fittings	**2.9**	kW
10	No of 40 W FTL Fittings	4	Nos
11	Load of 40 W FTL Fitting	40	W/Unit
12	Total Load of 40 W FTL fittings	**0.16**	kW
13	Total LED Lighting Load= 3+6+9	**4.136**	kW
14	Total Lighting Load= 3+6+9+12	**4.296**	kW
15	% of LED to Total Lighting Load= 13*100/14	**96.28**	%

GREEN AUDIT REPORT

of

Progressive Education Society's

MODERN COLLEGE OF COMMERCE & COMPUTER STUDIES,

Yamunanagar, Nigdi, Pune 411 044

Year: 2021-22

Prepared by

ENGRESS SERVICES

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

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

ECN/2021-22/CR-43/441 — 8th February, 2022

CERTIFICATE OF REGISTRATION
FOR CLASS 'B'

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

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

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

Registration Number : *MEDA/ECN/2021-22/Class B/EA-07.*

- 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 **7th February, 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.

08/02/22
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/ MCCCS /21-22/02 Date: 11/8/2022

CERTIFICATE

This is to certify that we have conducted Green Audit at Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044 in the year 2021-22.

The College has adopted following Energy Efficient and Green practices:

- Usage of Energy Efficient LED Lighting
- Usage of BEE STAR Rated equipment
- Segregation of Waste at source
- Installation of Rain Water Management Project
- Maintenance of good Internal Roads
- Maintenance of Garden in the Campus
- Provision of Ramp for Divyangajan
- Creation of Awareness on Energy Conservation by Display of Posters

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

For Engress Services,

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

ENGRESS SERVICES PUNE

INDEX

ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044, for awarding us the assignment of Green Audit of their Nigdi campus for the Year: 2021-22.

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

EXECUTIVE SUMMARY

1. Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044, consumes Energy in the form of **Electrical Energy;** used for various equipment.

2. Present Level of Energy Consumption & CO_2 Emission:

No	Parameter/ Value	Energy consumed, kWh	CO_2 emissions, MT
1	Total	8495	7.65
2	Maximum	1096	0.99
3	Minimum	338.4	0.30
4	Average	707.93	0.64

3. Measures Adopted for Energy Conservation:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated ACs

4. Usage of Renewable Energy:

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

5. Waste Management:

5.1 Segregation of Waste at Source:

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

5.2 Organic Waste Management:

It is recommended to install a Bio Composting Bed, for conversion of Leafy Waste.

5.3 Sanitary Waste Management:

It is recommended to install a Sanitary Waste Incinerator, to dispose of the Sanitary Waste.

5.4 E-Waste Management:

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

6. Rain Water Management:

The College has installed Rain Water Management project, wherein the rain water falling on the terrace is collected through pipe and is used for increasing the underground water table

7. Green & Sustainable Practices:

- Maintenance of Good internal road

- Internal Tree Plantation
- Provision of Ramp for Divyangajan
- Awareness creation on Energy Conservation by display of Posters

8. Assumption:

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

9. Reference:

- For CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

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

CHAPTER-I
INTRODUCTION

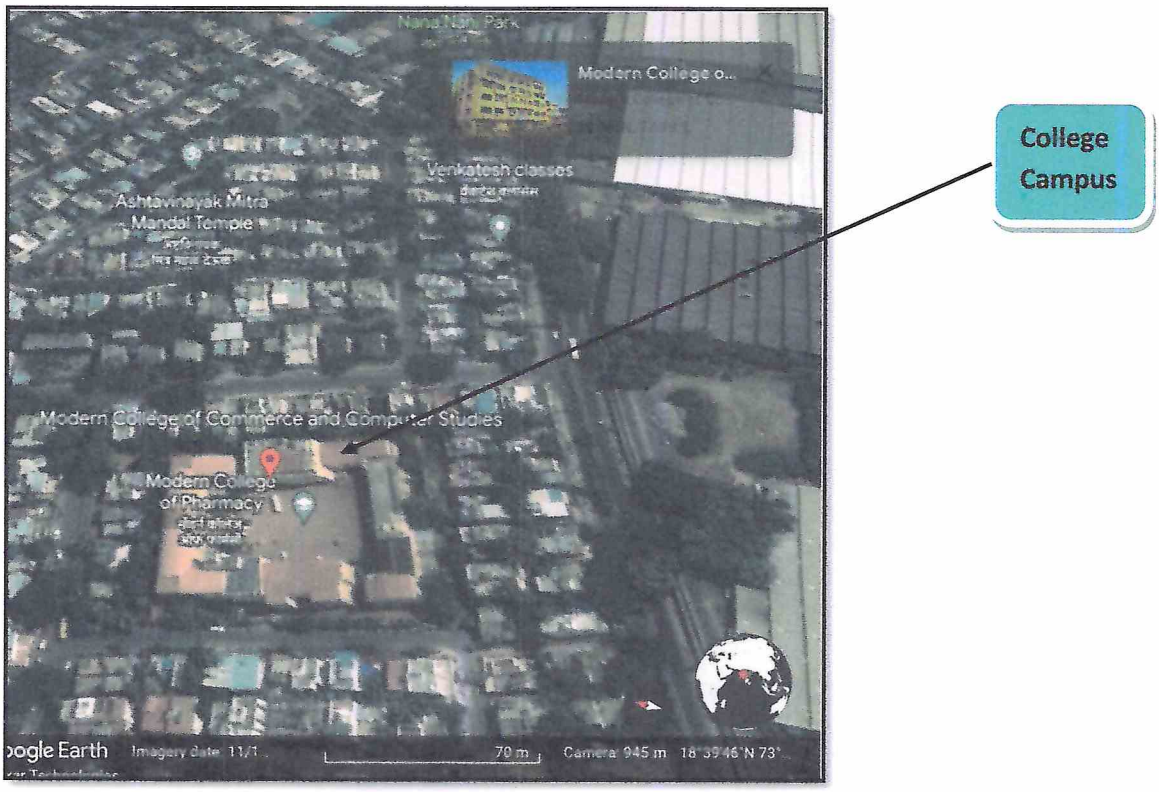
1.1 Objectives:

1. To study present Energy Consumption
2. To study the present CO_2 emissions
3. To study usage of Renewable Energy
4. To study Waste Management
5. To study rain water Management
6. To study Green & Sustainable Practices

1.2 Table No-1: General Details of College:

No	Head	Particulars
1	Name	Progressive Education Society's Modern College of Commerce & Computer Studies
2	Address	Yamunanagar, Nigdi, Pune 411 044
3	Affiliation	Savitribai Phule Pune University

1.3 Google Earth Image:



CHAPTER-II
STUDY OF ELECTRICAL ENERGY CONSUMPTION

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

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

No	Month	Energy Consumed, kWh
1	Apr-21	338
2	May-21	438
3	Jun-21	993
4	Jul-21	704
5	Aug-21	1096
6	Sep-21	1094
7	Oct-21	546
8	Nov-21	410
9	Dec-21	908
10	Jan-22	860
11	Feb-22	438
12	Mar-22	670
13	Total	8495
14	Maximum	1096
15	Minimum	338.4
16	Average	707.93

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

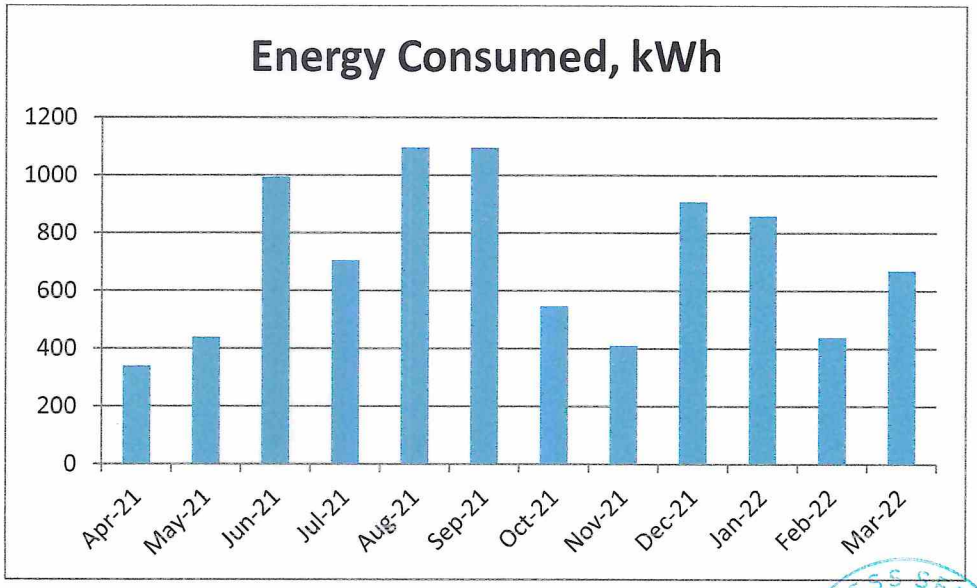


Table No 3: Important parameters:

No	Parameter	Energy consumed, kWh
1	Total	8495
2	Maximum	1096
3	Minimum	338.4
4	Average	707.93

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 CO_2 Emissions:

The basis of Calculation for CO_2 emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

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

Table No 4: Month wise CO_2 Emissions:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-21	338	0.30
2	May-21	438	0.39
3	Jun-21	993	0.89
4	Jul-21	704	0.63
5	Aug-21	1096	0.99
6	Sep-21	1094	0.98
7	Oct-21	546	0.49
8	Nov-21	410	0.37
9	Dec-21	908	0.82
10	Jan-22	860	0.77
11	Feb-22	438	0.39
12	Mar-22	670	0.60
13	Total	8495	7.65
14	Maximum	1096	0.99
15	Minimum	338.4	0.30
16	Average	707.93	0.64

Chart No 2: Representation of Month wise CO_2 Emissions:

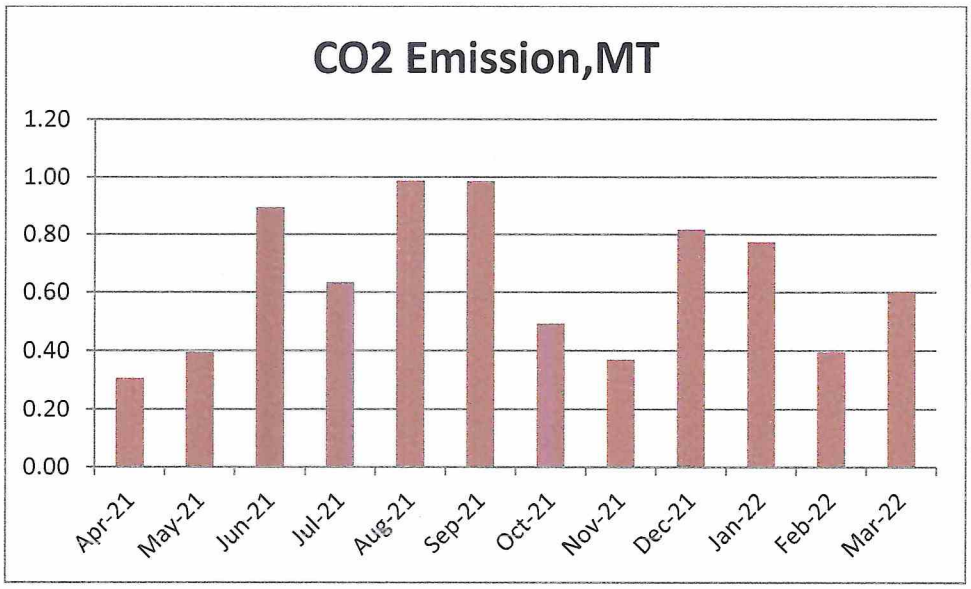


Table No 5: Key observations:

No	Parameter	Energy consumed, kWh	CO2 emissions, MT
1	Total	8495	7.65
2	Maximum	1096	0.99
3	Minimum	338.4	0.30
4	Average	707.93	0.64

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 kept at various locations.

Photograph of Waste Collection Bins:

5.2 Organic Waste Management:

It is recommended to install a Bio Composting Bed, for conversion of Leafy Waste.

5.3 Sanitary Waste Management:

It is recommended to install a Sanitary Waste Incinerator, to dispose of the Sanitary Waste.

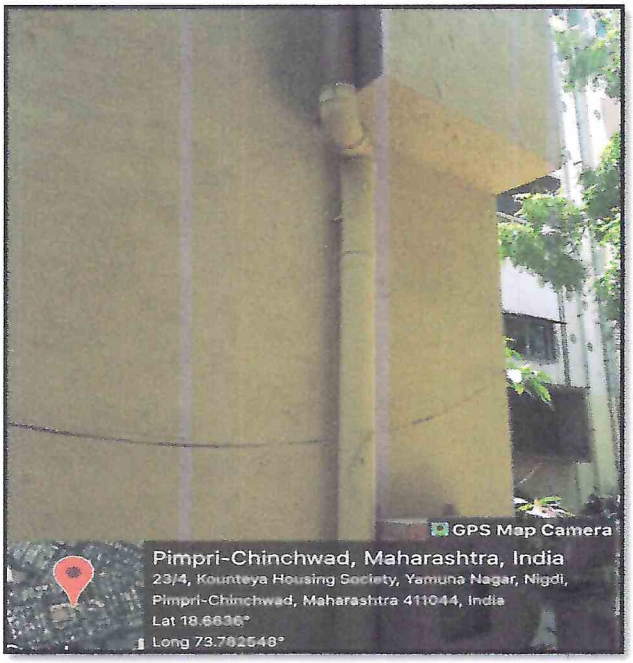
5.4 E-Waste Management:

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

CHAPTER-VI
STUDY OF RAIN WATER MANAGEMENT

The College has installed Rain Water Management project, wherein the rain water falling on the terrace is collected through pipe and is used for increasing the underground water table.

Photograph of Rain Water Carrying Pipe:



CHAPTER-VII
STUDY OF GREEN & SUATAINABLE PRACTICES

7.1 Pedestrian Friendly Road:

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

Photograph of Internal Road:

7.2 Tree Plantation:

The College has well maintained internal Tree Plantation.

Photograph of Internal Plantation:

7.3 Provision of Ramp for Divyangajan:

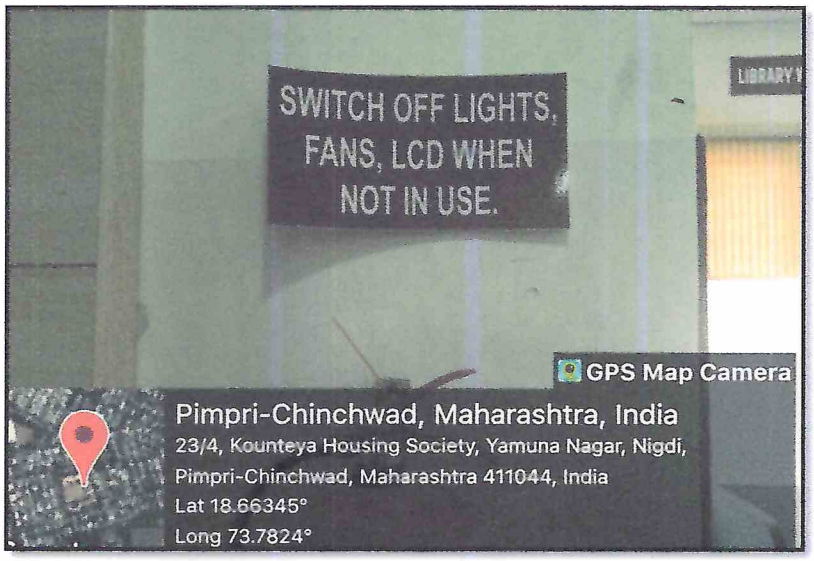
The College has made a provision of Ramp for Divyangajan.

Photograph of Ramp:

7.4 Creation of Awareness on Energy Conservation:

The College has displayed Posters emphasizing the Importance of Energy Conservation.

Photograph of Poster on Energy Conservation:



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

1. List of Trees:

No	Common Name Of Tree	Qty
1	Palm	130
2	Audumbar	2
3	Ficus	10
4	Pimple	1
5	Palas	1
6	Ashoka	2
7	Sonchampa	2
8	Charismas	3
9	Mango	1
10	Chikoo	1
11	Rubber	1
12	Umbrella Palm	5
13	Ticoma	2
14	Papaya	1
15	Shevri	1
16	Tagar	1
17	Ixora	4
18	Kadunim	3
19	**Total**	**171**

2. List of Ornamental Plants:

No	Common Name
1	Coleus
2	Drecena
3	Song Of India
4	Hibiscus
5	Gokarna
6	Cactus
7	Tulsi
8	Rose
9	Jai

ENVIRONMENTALAUDIT REPORT

of

Progressive Education Society's
MODERN COLLEGE OF COMMERCE & COMPUTER STUDIES,

Yamunanagar, Nigdi, Pune 411 044

Year: 2021-22

Prepared by

ENGRESS SERVICES

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

ENGRESS SERVICES PUNE

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/2021-22/CR-43/441 — 8th February, 2022

CERTIFICATE OF REGISTRATION
FOR CLASS 'B'

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

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

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

Registration Number : *MEDA/ECN/2021-22/Class B/EA-07.*

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- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

08/02/22
General Manager (EC)

ASSOCHAM

GEM Certificate

ASSOCHAM hereby certifies that

Mr. A Y Mehendale

has successfully passed the
Green and Eco-friendly Movement Certified Professional Test (GEM CP)
with
"Excellent Performance"
on
06 June, 2022

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

Pankaj R. Dharkar
Chairman, GEM

GEM CP 22/788

Deepak Sood
Secretary General, ASSOCHAM

ENGRESS SERVICES PUNE

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

Ref: ES/ MCCCS /21-22/03 Date: 11/8/2022

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044 in the year 2021-22.

The College has adopted following Environmental Friendly Practices:

- Usage of Energy Efficient LED Lighting
- Usage of BEE STAR Rated equipment
- Segregation of Waste at source
- Installation of Rain Water Management Project
- Tree Plantation in the Campus
- Creation of Awareness on Energy Conservation by Display of Posters

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

For Engress Services,

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

ENGRESS SERVICES PUNE

INDEX

ACKNOWLEDGEMENT

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

EXECUTIVE SUMMARY

1. Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044, consumes Energy in the form of **Electrical Energy;** used for various equipment.

2. Pollution due to College Activities:

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

3. Present Energy Consumption & CO_2 Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO_2 Emissions, MT
1	Total	8495	7.65
2	Maximum	1096	0.99
3	Minimum	338.4	0.30
4	Average	707.93	0.64

4. Various initiatives taken for Energy Conservation:

- Usage of Energy Efficient LED Lighting
- 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	36	22	28
2	Minimum	20	13	16

7. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, ^0C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	27.6	48	145	42
2	Minimum	26.9	46.9	105	39

8. Waste Management:

8.1 Segregation of Waste at Source:

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

8.2 Organic Waste Management:

It is recommended to install a Bio Composting Bed, for conversion of Leafy Waste.

8.3 Sanitary Waste Management:

It is recommended to install a Sanitary Waste Incinerator, to dispose of the Sanitary Waste.

8.4 E-Waste Management:

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

9. Rain Water Management:

The College has installed Rain Water Management project, wherein the rain water falling on the terrace is collected through pipe and is used for increasing the underground water table

10. Eco Friendly Initiatives:

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

11. Assumption:

1. 1 Unit of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

12. References:

- For CO_2 Emissions: www.tatapower.com
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI &Water Quality Standards: www.cpcb.com

ABBREVIATIONS

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
PES	:	Progressive Education Society
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
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

1.1Important 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

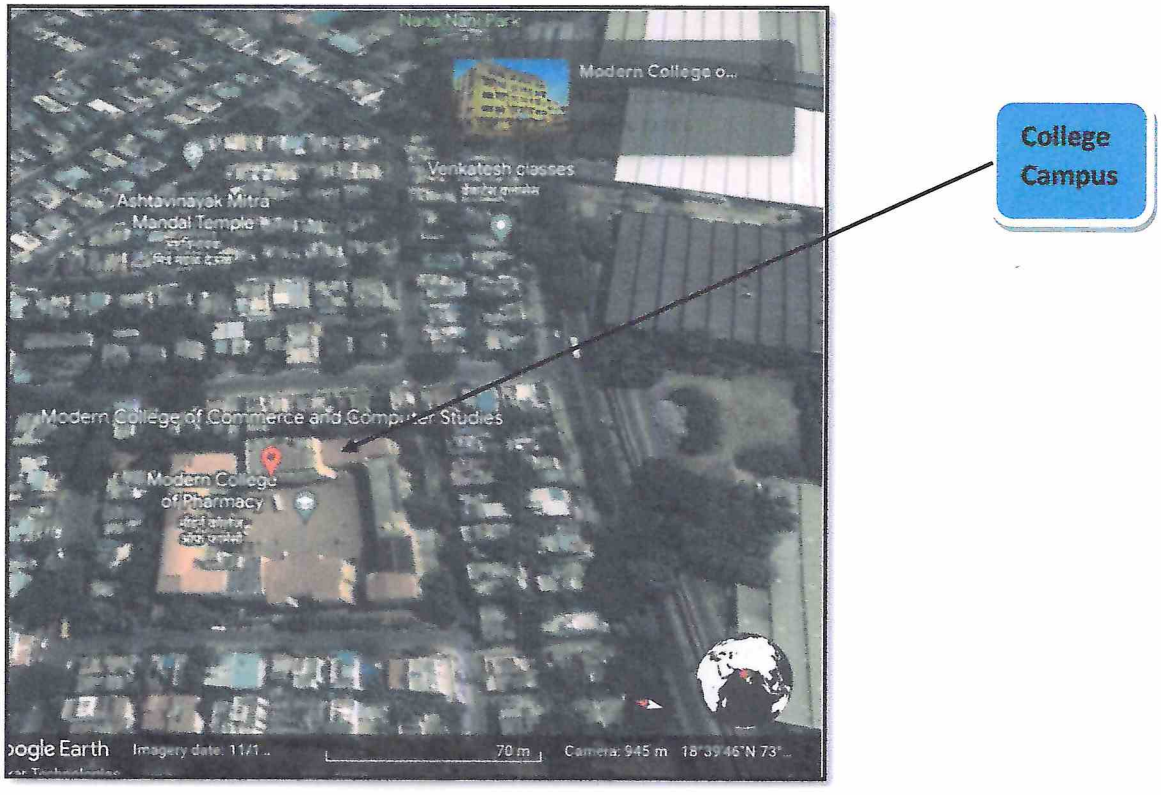
1.1.6 National Environmental Plans & Policy Documents: Table No-3:

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 present usage of resources & CO_2 Emission
2. To Study Usage of Renewable Energy
3. To study Indoor Air Quality
4. To study Indoor Comfort Condition Parameters
5. To study Waste Management practices
6. To study Rain Water Management
7. To study Environment Friendly Initiatives

1.3 Google Earth Image:



1.4 Table No 4: General Details of College:

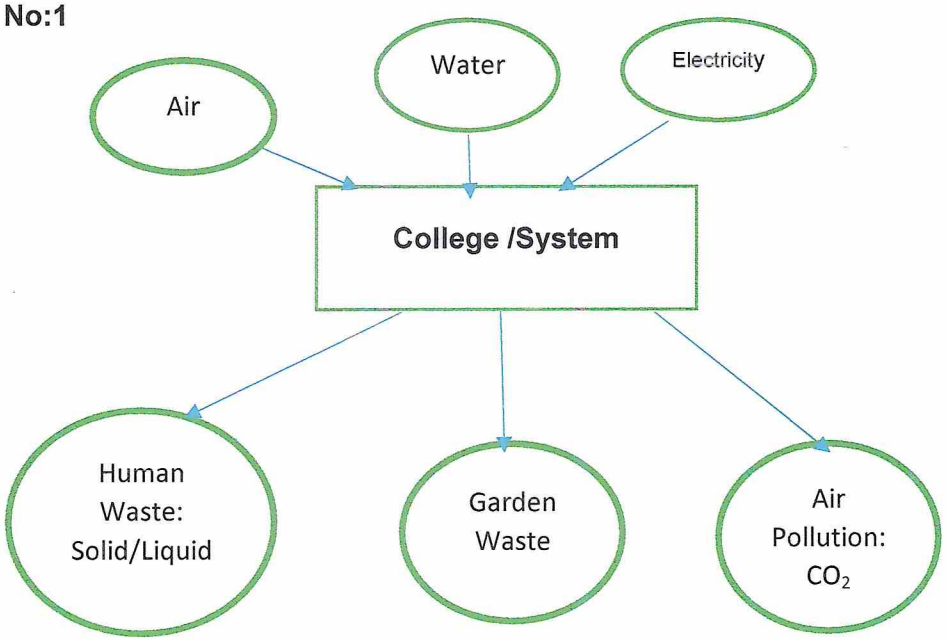
No	Head	Particulars
1	Name	Progressive Education Society's Modern College of Commerce & Computer Studies
2	Address	Yamunanagar, Nigdi, Pune 411 044
3	Affiliation	Savitribai Phule Pune University

CHAPTER-II
STUDY OF RESOURCE CONSUMPTION & CO_2 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



Now we compute the Generation of CO_2 on account of consumption of Electrical Energy. The basis of Calculation for CO_2 emissions due to Electrical Energy is as under

- 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Table No 5: Study of Consumption of Electrical Energy & CO_2 Emissions: 21-22:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-21	338	0.30
2	May-21	438	0.39
3	Jun-21	993	0.89
4	Jul-21	704	0.63
5	Aug-21	1096	0.99
6	Sep-21	1094	0.98
7	Oct-21	546	0.49
8	Nov-21	410	0.37
9	Dec-21	908	0.82

10	Jan-22	860	0.77
11	Feb-22	438	0.39
12	Mar-22	670	0.60
13	Total	8495	7.65
14	Maximum	1096	0.99
15	Minimum	338.4	0.30
16	Average	707.93	0.64

Chart No 2: To study the variation of Month wise CO_2 Emission:

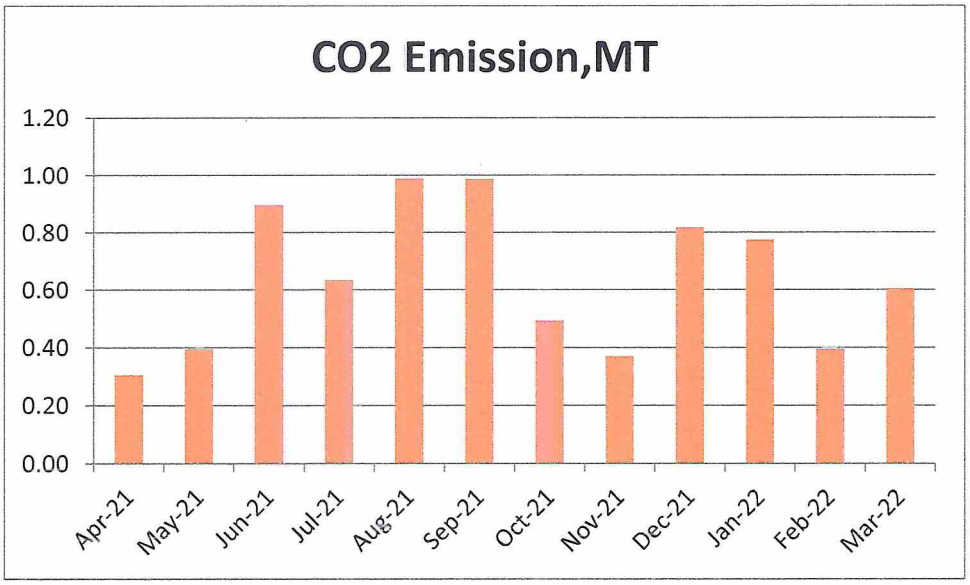


Table No 6: Important parameters:

No	Parameter	Energy consumed, kWh	CO2 emissions, MT
1	Total	8495	7.65
2	Maximum	1096	0.99
3	Minimum	338.4	0.30
4	Average	707.93	0.64

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 micron
3. PM-10- Particulate Matter of Size 10micron

Table No 7: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
1	Office	33	13	21
2	Vice Principal Sir Cabin	25	15	16
3	Class Room	31	18	20

4	Research Centre	36	22	28
5	Computer Lab	20	15	19
6	Class Room	26	16	16
7	Seminar Hall	27	16	21
8	Examination Room	31	18	28
	Maximum	**36**	**22**	**28**
	Minimum	**20**	**13**	**16**

CHAPTER V
STUDY OF INDOOR COMFORT CONDITION PARAMETERS

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

The Parameters include:

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

Table No 8: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, OC	Humidity, %	Lux Level	Noise Level, dB
1	Office	27	47	120	40
2	Vice Principal Sir Cabin	27.1	46.9	129	41
3	Class Room	27	47	145	42
4	Research Centre	26.9	47.1	129	40
5	Computer Lab	27.2	46.9	131	39
6	Class Room	27.3	47	130	41
7	Seminar Hall	27.5	47.1	145	40
8	Examination Room	27.6	48	105	39
	Maximum	**27.6**	**48**	**145**	**42**
	Minimum	**26.9**	**46.9**	**105**	**39**

CHAPTER VI
STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

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

Photograph of Waste Collection Bins:

6.2 Organic Waste Management:

It is recommended to install a Bio Composting Bed, for conversion of Leafy Waste.

6.3 Sanitary Waste Management:

It is recommended to install a Sanitary Waste Incinerator, to dispose of the Sanitary Waste.

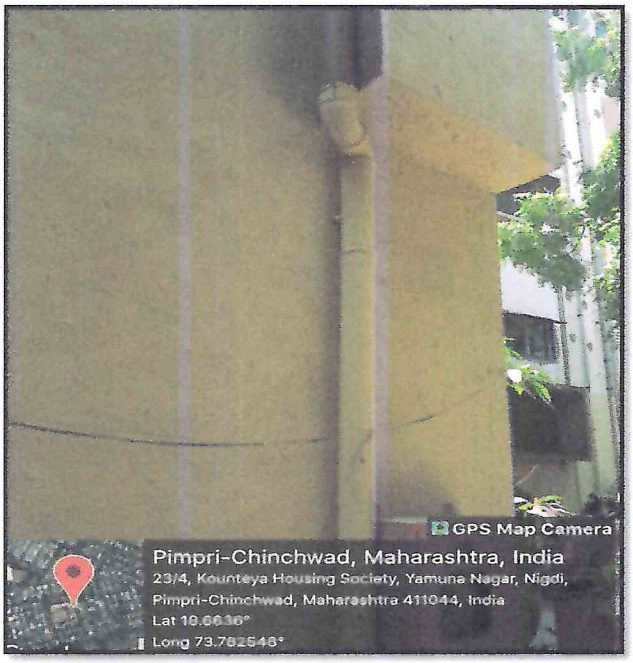
6.4 E-Waste Management:

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

CHAPTER-VII
STUDY OF RAIN WATER MANAGEMENT

The College has installed Rain Water Management project, wherein the rain water falling on the terrace is collected through pipe and is used for increasing the underground water table.

Photograph of Rain Water Carrying Pipe:

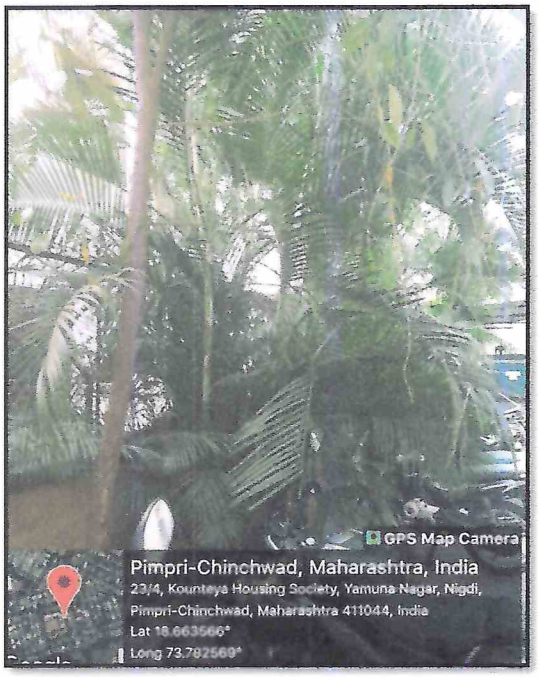


CHAPTER-VIII
STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The College has well maintained Internal Tree Plantation.

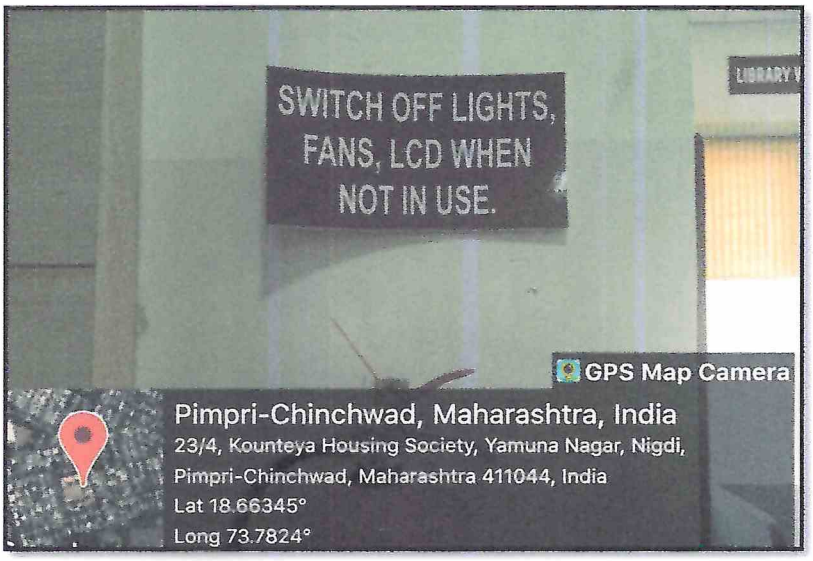
Photograph of Internal Tree Plantation:



8.2 Creation of Awareness about Energy Conservation:

The College has displayed Posters emphasizing the Importance of Energy Conservation.

Photograph of Poster on Energy Conservation:



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 33^0C
2	Humidity	Less Than 70%

ENERGY AUDIT REPORT

of

Progressive Education Society's

MODERN COLLEGE OF COMMERCE & COMPUTER STUDIES,

Yamunanagar, Nigdi, Pune 411 044

Year: 2021-22

Prepared by

ENGRESS SERVICES

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

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

ECN/2022-23/CR-43/1709 — 10th May, 2022

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

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

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

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

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

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

General Manager (EC)

ENGRESS SERVICES PUNE

ENGRESS SERVICES

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

Ref: ES/MCCCS/21-22/01 Date: 11/8/2022

CERTIFICATE

This is to certify that we have conducted Energy Audit at Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044 in the year 2021-22.

The College has adopted following Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment

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

For Engress Services,

ENGRESS SERVICES PUNE

A Y Mehendale,
Certified Energy Auditor
EA-8192

INDEX

ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044, for awarding us the assignment of Energy Audit of their Nigdi campus for the Year: 2021-22.

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

EXECUTIVE SUMMARY

1. Progressive Education Society's Modern College of Commerce & Computer Studies, Yamunanagar, Nigdi, Pune 411 044, consumes Energy in the form of **Electrical Energy;** used for various equipment.

2. Present Level of Energy Consumption & CO_2 Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO_2 emissions, MT
1	Total	8495	7.65
2	Maximum	1096	0.99
3	Minimum	338.4	0.30
4	Average	707.93	0.64

3. Measures Adopted for Energy Conservation:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment

4. Usage of Alternate Energy:

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

5. Usage of LED Lighting:

- The LED Lighting Load of the College is **4.252 kW**
- The Total Lighting Load of the College is **4.252 kW**
- The % of Usage of LEDs to Total Lighting Load is **100 %**

6. Assumption:

1. 1 Unit of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

7. Reference:

1. For CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

AC	:	Air conditioner
PES	:	Progressive Education Society
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
PC	:	Personal Computer
MT	:	Metric Ton

CHAPTER-I
INTRODUCTION

1.1 Objectives:

1. To study Connected Load
2. To study present Energy Consumption
3. To Study the present CO_2 emissions
4. To study Usage of Renewable Energy
5. To study Usage of LED Lighting

1.2 Table No-1: General Details of College:

No	Head	Particulars
1	Name	Progressive Education Society's Modern College of Commerce & Computer Studies
2	Address	Yamunanagar, Nigdi, Pune 411 044
3	Affiliation	Savitribai Phule Pune University

1.3 Google Earth Image:

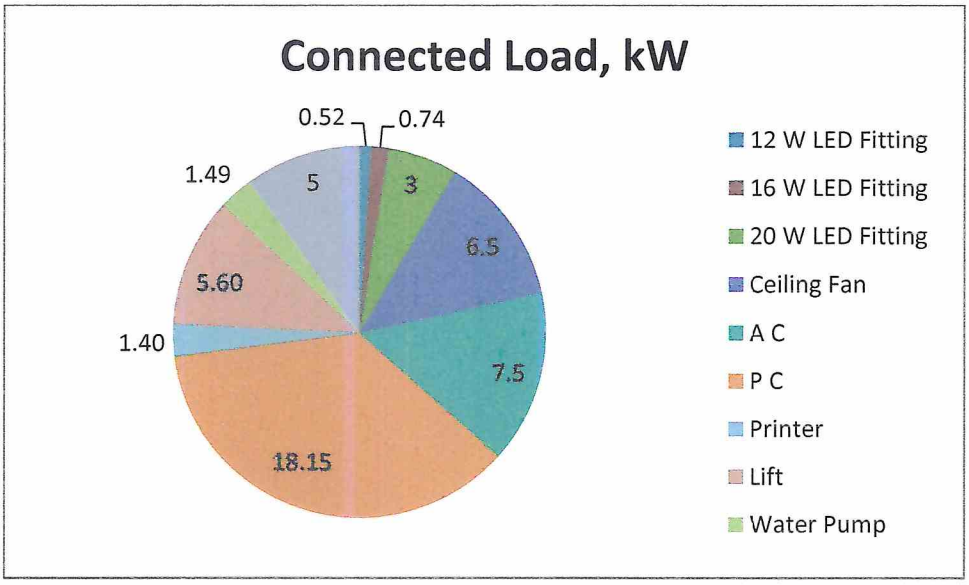
CHAPTER-II
STUDY OF CONNECTED LOAD

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	12 W LED Fitting	43	12	0.52
2	16 W LED Fitting	46	16	0.74
3	20 W LED Fitting	150	20	3
4	Ceiling Fan	100	65	6.5
5	A C	4	1875	7.5
6	P C	121	150	18.15
7	Printer	8	175	1.40
8	Lift	1	5595	5.60
9	Water Pump	1	1492	1.49
10	Other Equipment	20	250	5
11	**Total**			**40.21**

Chart No-1: Details of Connected Load:



CHAPTER-III
STUDY OF ELECTRICAL ENERGY CONSUMPTION

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

Table No 3: Electrical Energy Consumption Analysis- 2021-22:

No	Month	Energy Consumed, kWh
1	Apr-21	338
2	May-21	438
3	Jun-21	993
4	Jul-21	704
5	Aug-21	1096
6	Sep-21	1094
7	Oct-21	546
8	Nov-21	410
9	Dec-21	908
10	Jan-22	860
11	Feb-22	438
12	Mar-22	670
13	Total	8495
14	Maximum	1096
15	Minimum	338.4
16	Average	707.93

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

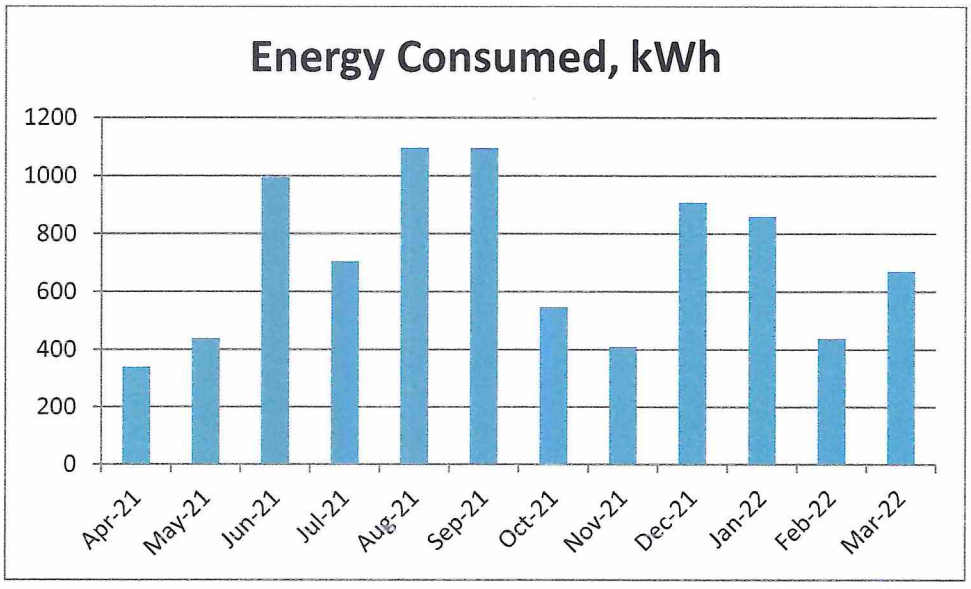


Table No 4: Important parameters:

No	Parameter	Energy consumed, kWh
1	Total	8495
2	Maximum	1096
3	Minimum	338.4
4	Average	707.93

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 CO_2 Emissions:

The basis of Calculation for CO_2 emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

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

Table No 5: Month wise CO_2 Emissions:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-21	338	0.30
2	May-21	438	0.39
3	Jun-21	993	0.89
4	Jul-21	704	0.63
5	Aug-21	1096	0.99
6	Sep-21	1094	0.98
7	Oct-21	546	0.49
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12	Mar-22	670	0.60
13	Total	8495	7.65
14	Maximum	1096	0.99
15	Minimum	338.4	0.30
16	Average	707.93	0.64

Chart No-3: Representation of Month wise CO_2 emissions:

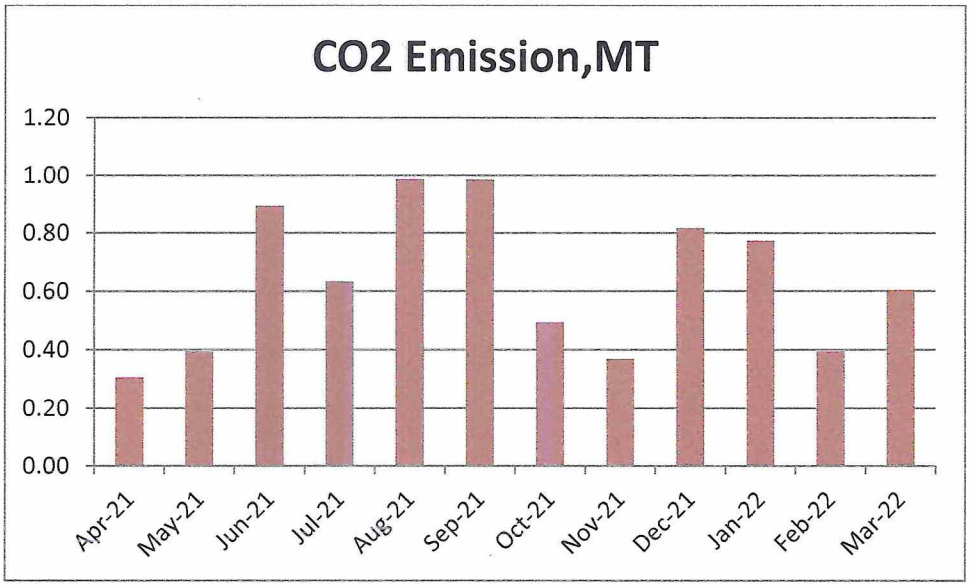

Table No 6: Key observations:

No	Parameter	Energy consumed, kWh	CO2 emissions, MT
1	Total	8495	7.65
2	Maximum	1096	0.99
3	Minimum	338.4	0.30
4	Average	707.93	0.64

CHAPTER-V
STUDY OF USAGE OF ALTERNATE ENERGY

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

CHAPTER-VI
STUDY OF USAGE OF LED LIGHTING

In this Chapter, we study the Lighting System in the College.

We compute the usage of LED lights to the Total Lighting Load.

Table No 7: Study of Lighting Load:

No	Particulars	Value	Unit
1	No of 12 W LED Fittings	43	Nos
2	Load of 12 W LED Fitting	12	W/Unit
3	Total Load of 12 W LED fittings	**0.516**	kW
4	No of 16 W LED Fittings	46	Nos
5	Load of 16 W LED Fitting	16	W/Unit
6	Total Load of 16 W LED fittings	**0.736**	kW
7	No of 20 W LED Fittings	150	Nos
8	Load of 20 W LED Fitting	20	W/Unit
9	Total Load of 20 W LED fittings	**3**	kW
10	Total LED Lighting Load = 3+6+9	**4.252**	kW
11	Total Lighting Load = 3+6+9	**4.252**	kW
12	% of LED to Total Lighting Load= **10*100/11**	**100**	%