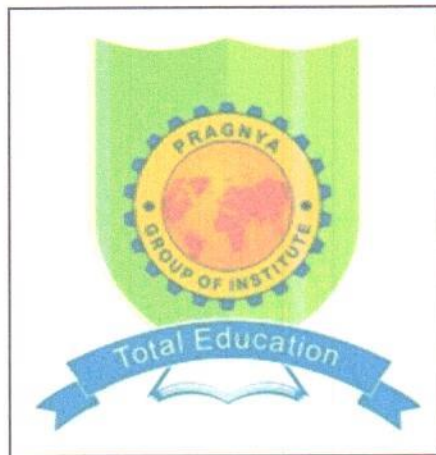


ENERGY AUDIT REPORT
of
Pragnya Education Trust's,
PRAGNYA COLLEGE OF MANAGEMENT & COMPUTER STUDIES,
S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308



Year: 2019-20

Prepared by:

Enrich Consultants

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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(A Government of Maharashtra undertaking)

2nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,

Ph No: 020-26614393/266144403

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

ECN/2018-19/CR-05/4174

19th September, 2018

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

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

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

Registration Category : Empanelled *Consultant for Energy Conservation Programme*

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

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- MEDA reserves the right to visit the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
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(Smita Kudarikar)
General Manager (EC)



Enrich Consultants

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

Ref: ES/PETPCOMCS/19-20/01

Date: 17/7/2020

CERTIFICATE

This is to certify that we have conducted Energy Audit at Pragnya Education Trust's Pragnya College of Management & Computer Studies, S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308 in the Year 2019-20.

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 making the Campus Energy Efficient.

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



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5	Study of Usage of Alternate Energy	14
6	Study of LED Lighting	15

ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management Pragnya Education Trust's Pragnya College of Management & Computer Studies, S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308, for awarding us the assignment of Energy Audit of their Handewadi Campus for the Year: 19-20.

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



EXECUTIVE SUMMARY

1. Pragnya Education Trust's Pragnya College of Management & Computer Studies, S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	1375	1.24
2	Maximum	129	0.12
3	Minimum	69	0.06
4	Average	114.58	0.10

3. Energy Conservation projects installed:

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

4. Usage of Alternate Energy:

- The College has yet to install Roof Top Solar PV Plant.
- As on today, the % of Usage of Alternate Energy to Total Energy Demand is Nil

5. Usage of LED Lighting:

- The Total Lighting Load of the College is **2.55 kW**.
- The Total LED Lighting Load of the College is **1.15 kW**.
- The percentage of LED Lighting to Total Lighting Load is **45 %**.

6. Assumption:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

7. Reference:

- For CO₂ Emissions: www.tatapower.com

ABBREVIATIONS

LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
BEE	: Bureau of Energy Efficiency
FTL	: Fluorescent Tube Light
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
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 CO₂ emissions
4. To study usage of Alternate Energy
5. To study usage of LED Lighting

1.2 Table No 1: General Details of the College:

No	Head	Particulars
1	Name of Institution	Pragnya Education Trust's Pragnya College of Management & Computer Studies
2	Address	S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308
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CHAPTER-II

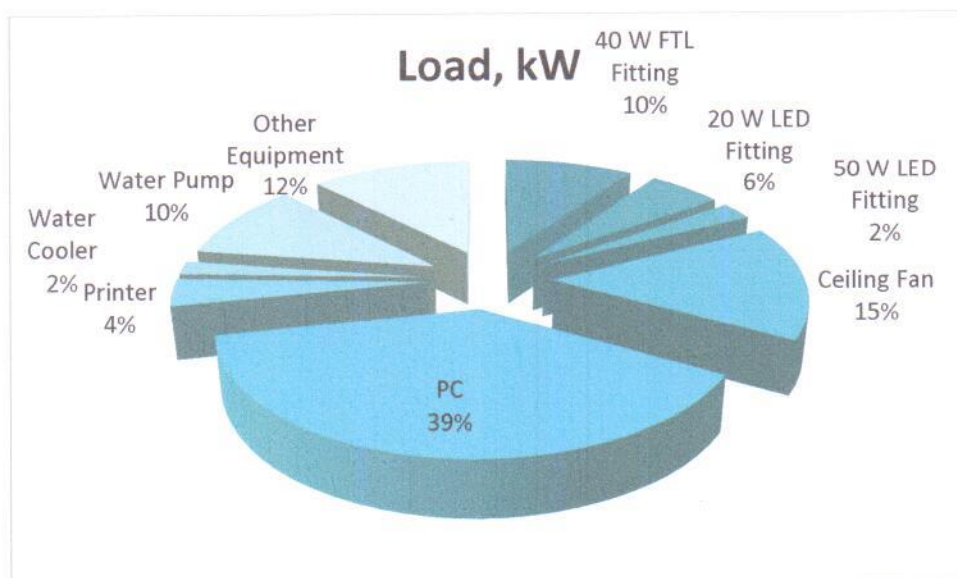
STUDY OF CONNECTED LOAD

The major contributors to the connected load of the College are as under.

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	40 W FTL Fitting	35	40	1.4
2	20 W LED Fitting	40	20	0.8
3	50 W LED Fitting	7	50	0.35
4	Ceiling Fan	34	65	2.21
5	PC	37	150	5.55
6	Printer	3	175	0.53
7	Water Cooler	1	250	0.25
8	Water Pump	1	1492	1.49
9	Other Equipment	10	175	1.75
10	Total			14

Chart No 1: Study of Connected Load:



CHAPTER-III

STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 3: Electrical Energy Consumption Analysis- 2019-20:

No	Month	Energy Consumed, kWh
1	Apr-19	125
2	May-19	129
3	Jun-19	121
4	Jul-19	118
5	Aug-19	119
6	Sep-19	115
7	Oct-19	112
8	Nov-19	124
9	Dec-19	129
10	Jan-20	115
11	Feb-20	99
12	Mar-20	69
13	Total	1375
14	Maximum	129
15	Minimum	69
16	Average	114.58

Chart No 2: Variation in Monthly Energy Consumption:

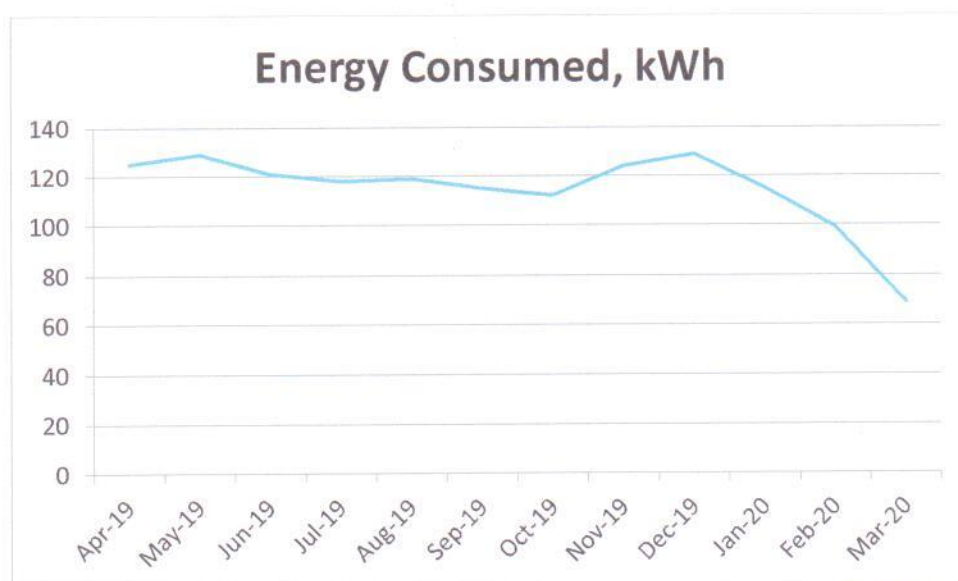


Table No 4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh
1	Total	1375
2	Maximum	129
3	Minimum	69
4	Average	114.58



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 taking into account the usage of the Electrical Energy.

Basis for computation of CO₂ Emissions:

- 1 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-19	125	0.11
2	May-19	129	0.12
3	Jun-19	121	0.11
4	Jul-19	118	0.11
5	Aug-19	119	0.11
6	Sep-19	115	0.10
7	Oct-19	112	0.10
8	Nov-19	124	0.11
9	Dec-19	129	0.12
10	Jan-20	115	0.10
11	Feb-20	99	0.09
12	Mar-20	69	0.06
13	Total	1375	1.24
14	Maximum	129	0.12
15	Minimum	69	0.06
16	Average	114.58	0.10

Chart No 3: Month wise CO₂ Emissions:

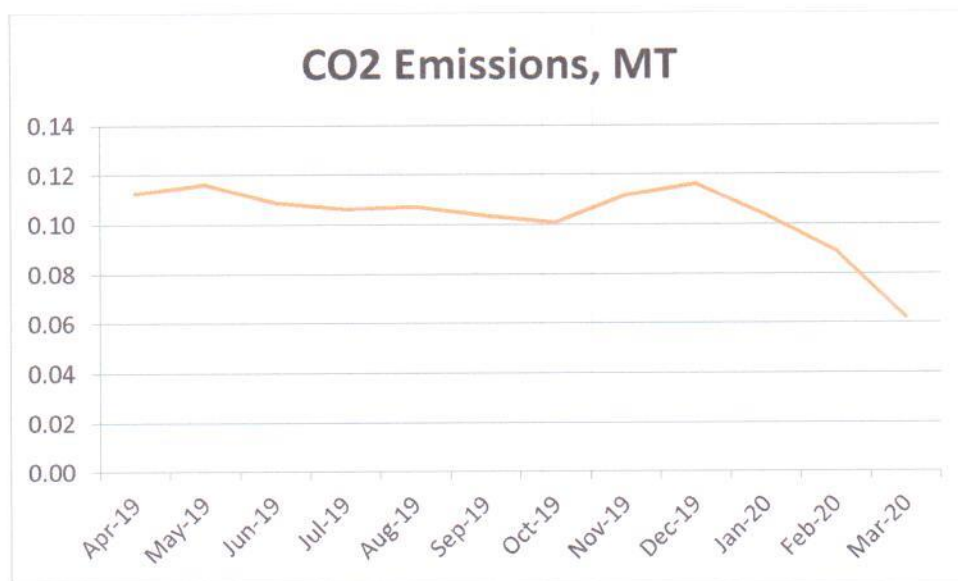


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	1375	1.24
2	Maximum	129	0.12
3	Minimum	69	0.06
4	Average	114.58	0.10

CHAPTER-V

STUDY OF USAGE OF ALTERNATE ENERGY

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

As on today, the % of Usage of Alternate Energy to Total Energy Demand is Nil

CHAPTER VI

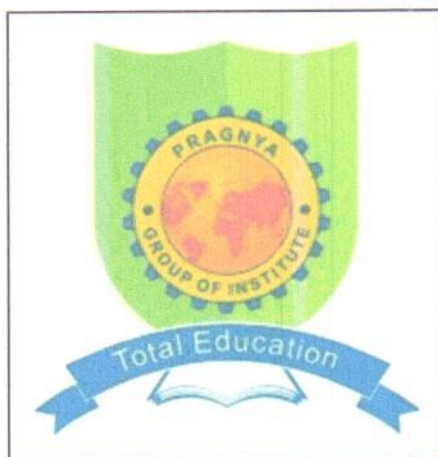
STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LED Lighting to Annual Lighting power requirement.

Table No 7: Percentage of Usage of LED Lighting to Annual Lighting Load:

No	Particulars	Value	Unit
1	No of 40 W LED Fittings	35	Nos
2	Load of 40 W LED Fitting	40	W/unit
3	Total Load of 40 W LED Fittings	1.4	kW
4	No of 20 W LED Fittings	40	Nos
5	Load of 20 W LED Fitting	20	W/unit
6	Total Load of 20 W LED Fittings	0.8	kW
7	No of 50 W LED Fittings	7	Nos
8	Load of 50 W LED Fitting	50	W/unit
9	Total Load of 50 W LED Fittings	0.35	kW
10	Total LED Lighting Load= 6+9	1.15	kW
11	Total Lighting Load=3+6+9	2.55	kW
12	% of LEDs to Total Lighting Load= $10 \times 100 / 11$	45	%

GREEN AUDIT REPORT
of
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PRAGNYA COLLEGE OF MANAGEMENT & COMPUTER STUDIES,
S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308



Year: 2019-20

Prepared by

Enrich Consultants

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19/9/18

(Smita Kudarikar)
General Manager (EC)



Enrich Consultants

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

Ref: EC/ PETPCOMCS /19-20/02

Date: 17/7/2020

CERTIFICATE

This is to certify that we have conducted Green Audit at Pragnya Education Trust's Pragnya College of Management & Computer Studies, S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308 in the Year 2019-20.

The College has adopted following Green practices:

- Maximum Usage of Day Lighting
- Usage of Energy Efficient LED Fittings
- Segregation of Waste at source
- Maintenance of good internal road
- Tree Plantation in the campus
- Creation of awareness on Water Conservation by Display of Poster

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



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6	Study of Rain Water Management	15
7	Study of Green & Sustainable Practices	16

ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of Pragnya Education Trust's Pragnya College of Management & Computer Studies, S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308, for awarding us the assignment of Green Audit of their Handewadi Campus for the Year: 19-20.

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



EXECUTIVE SUMMARY

1. Pragnya Education Trust's Pragnya College of Management & Computer Studies, S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308 consumes Energy in the form of Electrical Energy; used for various gadgets, Office & other facilities.

2. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	1375	1.24
2	Maximum	129	0.12
3	Minimum	69	0.06
4	Average	114.58	0.10

3. Waste Management:

3.1 Segregation of Waste at Source:

The Dry and Wet waste is segregated at the source and is handed over to Authorized Agency for further action.

4. Rain Water Management:

The College has yet to implement the Rain Water management Project.

5. Green & Sustainable Practices:

- Good internal road for easy movement of commuters
- Internal tree plantation in the campus
- Creation of Awareness by Display of Posters on Water Conservation

6. Assumption:

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

7. Reference:

- For CO₂ Emission Computation: www.tatapower.com

ABBREVIATIONS

LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
MT	:	Metric Ton
CO ₂	:	Carbon Di Oxide



CHAPTER-I

INTRODUCTION

1.1 Objectives:

1. To study present Energy Consumption
2. To compute CO₂ emissions
3. To Study Usage of Renewable Energy
4. To Study Waste Management Practices
5. To Study Rain Water Harvesting
6. To Study Green & Sustainable Initiatives

1.2 Table No 1: General Details of College:

No	Head	Particulars
1	Name of Institution	Pragnya Education Trust's Pragnya College of Management & Computer Studies
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3	Affiliation	Savitribai Phule Pune University

CHAPTER-II

STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Bills
Table No 2: Electrical Energy Consumption Analysis- 2019-20:

No	Month	Energy Consumed, kWh
1	Apr-19	125
2	May-19	129
3	Jun-19	121
4	Jul-19	118
5	Aug-19	119
6	Sep-19	115
7	Oct-19	112
8	Nov-19	124
9	Dec-19	129
10	Jan-20	115
11	Feb-20	99
12	Mar-20	69
13	Total	1375
14	Maximum	129
15	Minimum	69
16	Average	114.58

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

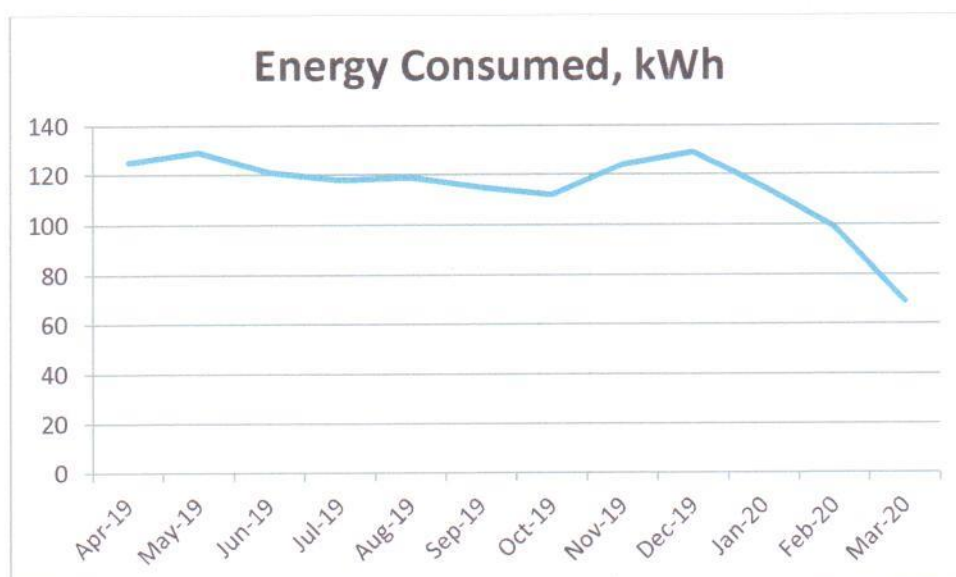


Table No 3: Various Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh
1	Total	1375
2	Maximum	129
3	Minimum	69
4	Average	114.58

CHAPTER III

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:

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

Table No 4: Month wise CO₂ Emissions:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Apr-19	125	0.11
2	May-19	129	0.12
3	Jun-19	121	0.11
4	Jul-19	118	0.11
5	Aug-19	119	0.11
6	Sep-19	115	0.10
7	Oct-19	112	0.10
8	Nov-19	124	0.11
9	Dec-19	129	0.12
10	Jan-20	115	0.10
11	Feb-20	99	0.09
12	Mar-20	69	0.06
13	Total	1375	1.24
14	Maximum	129	0.12
15	Minimum	69	0.06
16	Average	114.58	0.10

Chart No 2: Representation of Month wise CO₂ Emissions:

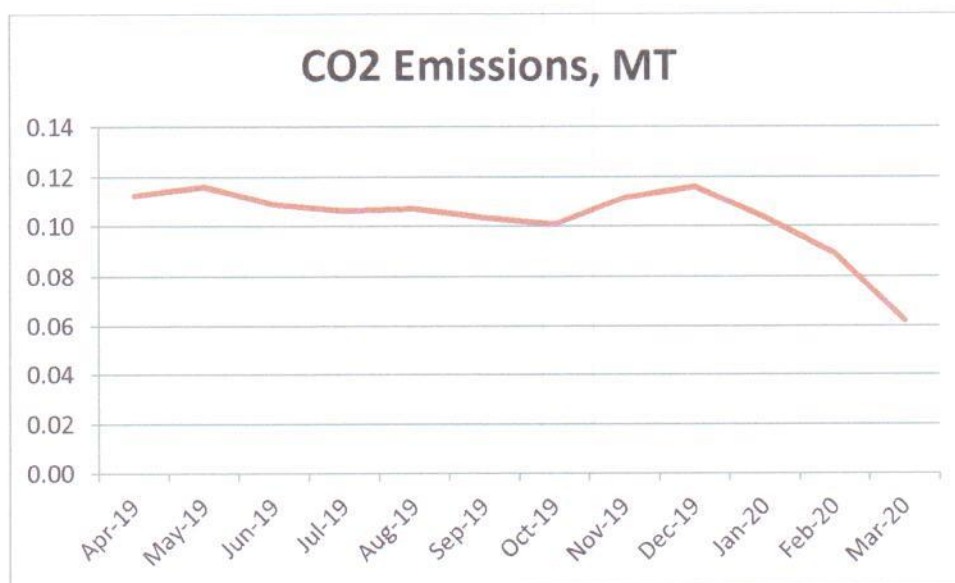


Table No 5: Various Important Parameters:

No	Parameter/ Value	Energy consumed, kWh	CO ₂ Emissions, MT
1	Total	1375	1.24
2	Maximum	129	0.12
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4	Average	114.58	0.10

CHAPTER IV

STUDY OF USAGE OF RENEWABLE ENERGY

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



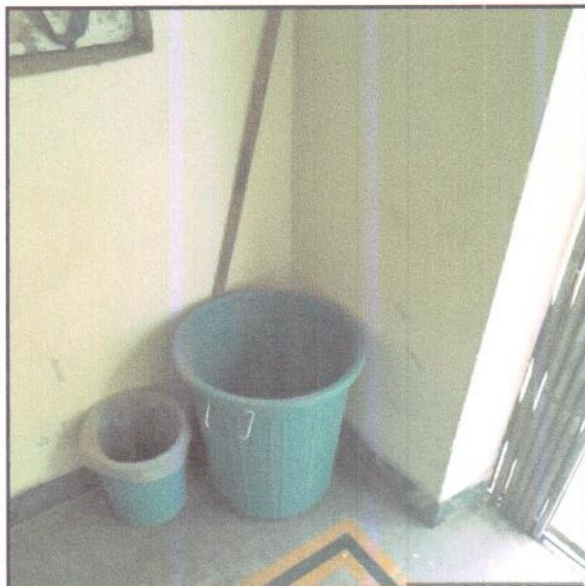
CHAPTER V

STUDY OF WASTE MANAGEMENT

5.1 Solid Waste Management:

The Waste is segregated at source and is handed over to Agency for further action.

Photograph of Waste Collection Bin:



CHAPTER VI

STUDY OF RAIN WATER MANAGEMENT

The College has yet to implement the Rain Water management Project.



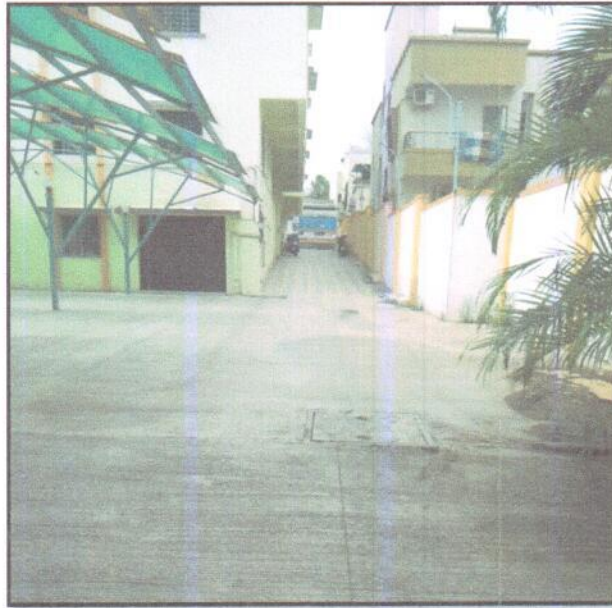
CHAPTER VII

STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Road:

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

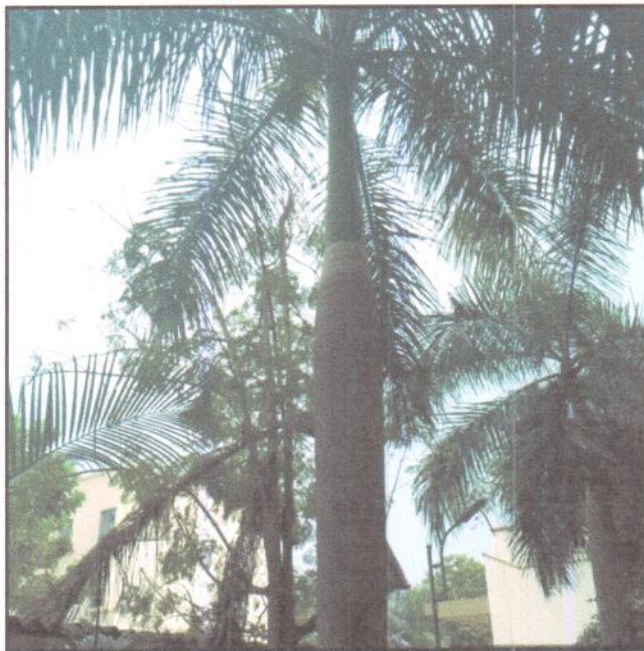
Photograph of Internal Road inside the College Campus:



7.2 Internal Tree Plantation:

The College has well maintained Tree Plantation in the campus.

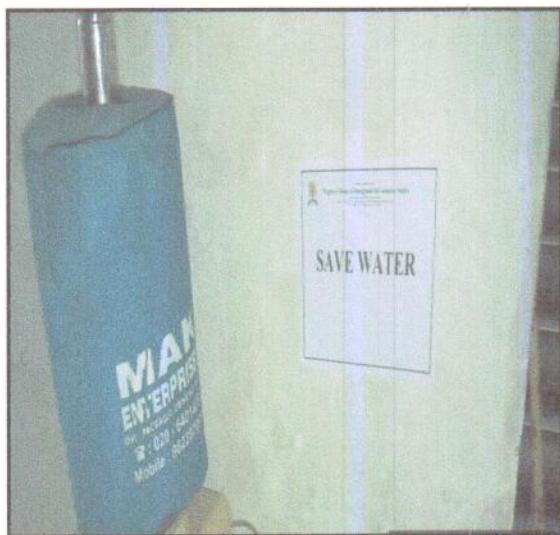
Photograph of Tree Plantation Campus:



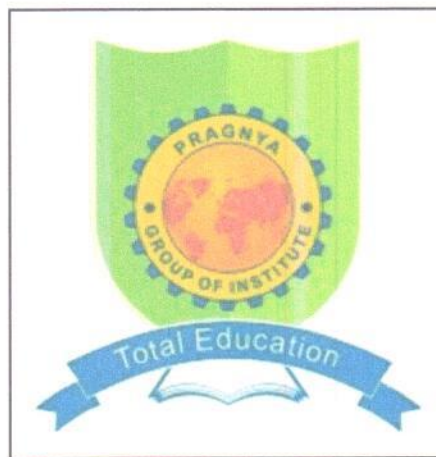
7.3 Creation of Awareness about Water Conservation:

In order to create awareness about Water Conservation, the College has displayed poster at the Water cooler.

Photograph of Poster on Water Conservation:



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Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/ PETPCOMCS /19-20/03

Date: 17/7/2020

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Pragnya Education Trust's Pragnya College of Management & Computer Studies, S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308 in the Year 2019-20.

The College has adopted Environment Friendly practices:

- Maximum Usage of Day Lighting
- Usage of Energy Efficient LED Fittings
- Segregation of Waste at source
- Tree Plantation in the campus
- Creation of Awareness about 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



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6	Study of Environment Friendly Initiatives	15



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1. Pragnya Education Trust's Pragnya College of Management & Computer Studies, S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308 consumes Energy in the form of Electrical Energy used for various gadgets, Office & other facilities.

2. Pollution caused due to College 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. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	1375	1.24
2	Maximum	129	0.12
3	Minimum	69	0.06
4	Average	114.58	0.10

4. Usage of Renewable Energy:

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

5. Waste Management:

5.1 Segregation of Waste at Source:

The Dry and Wet waste is segregated at the source and is handed over to Authorized Agency for further action.

6. Rain Water Management:

The College has yet to implement the Rain Water management Project.

7. Eco Friendly Initiatives:

- Internal tree plantation in the campus
- Creation of Awareness by Display of Posters on Resource Conservation

8. Assumption:

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

9. Reference:

1. For Various Indoor Air Parameters: www.ishrae.com

ABBREVIATIONS

LED	: Light Emitting Diode
kWh	: kilo-Watt Hour
MT	: Metric Ton
CO ₂	: Carbon Di Oxide



CHAPTER-I

INTRODUCTION

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

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

1.1.2. Environmental Audit: Definition:

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

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

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

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

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

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 (Sitting 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 Table No-3: National Environmental Plans & Policy Documents:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research Institute)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency)
10.	The Road to Copenhagen; India's Position on Climate Change Issues (MoEF)

1.2 Objectives:

1. To study Consumption of Resources and CO₂ Emission
2. To Study usage of Renewable Energy
3. To Study Waste Management Practices
4. To Study Rain Water Management
5. To study Eco Friendly Initiatives

1.3 Table No 4: General Details of College:

No	Head	Particulars
1	Name of Institution	Pragnya Education Trust's Pragnya College of Management & Computer Studies
2	Address	S. No. 26/1/1, Handewadi Chowk, Hadapsar, Pune 412 308
3	Affiliation	Savitribai Phule Pune University

CHAPTER-II

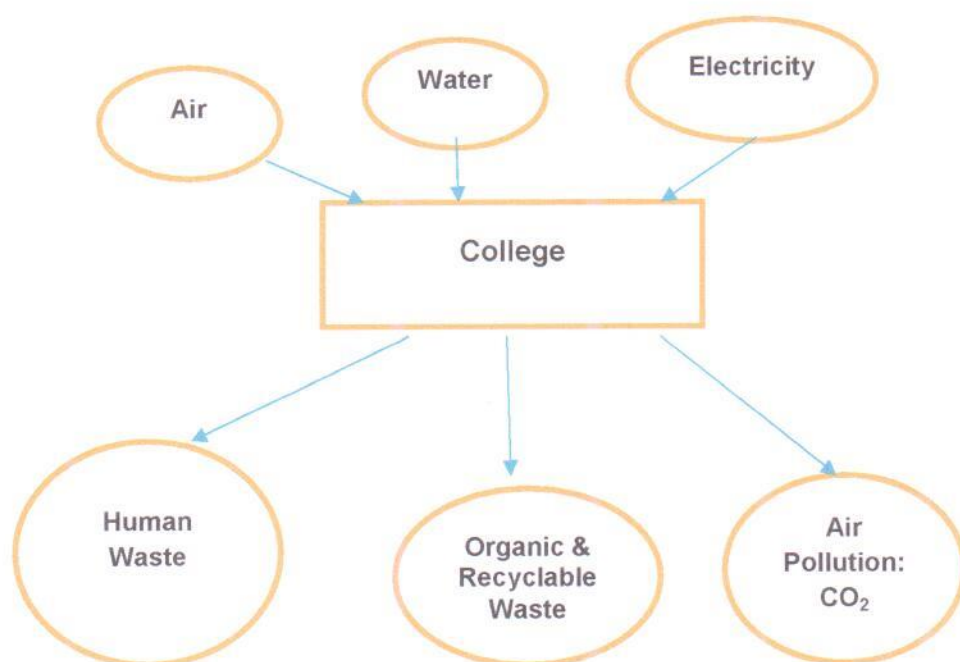
STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

2.1 The Institute consumes following Natural/derived Resources:

1. Air
2. Water
3. Electrical Energy

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

2.2 Chart No: 1: Representation of College as System:



We compute the Generation of CO₂ on account of consumption of Electrical Energy as under.

Table No 5: To study Energy Consumption and CO₂ Emission: 19-20:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Apr-19	125	0.11
2	May-19	129	0.12
3	Jun-19	121	0.11
4	Jul-19	118	0.11
5	Aug-19	119	0.11
6	Sep-19	115	0.10
7	Oct-19	112	0.10

8	Nov-19	124	0.11
9	Dec-19	129	0.12
10	Jan-20	115	0.10
11	Feb-20	99	0.09
12	Mar-20	69	0.06
13	Total	1375	1.24
14	Maximum	129	0.12
15	Minimum	69	0.06
16	Average	114.58	0.10

Chart No 2: To study the variation in CO₂ Emissions, MT:

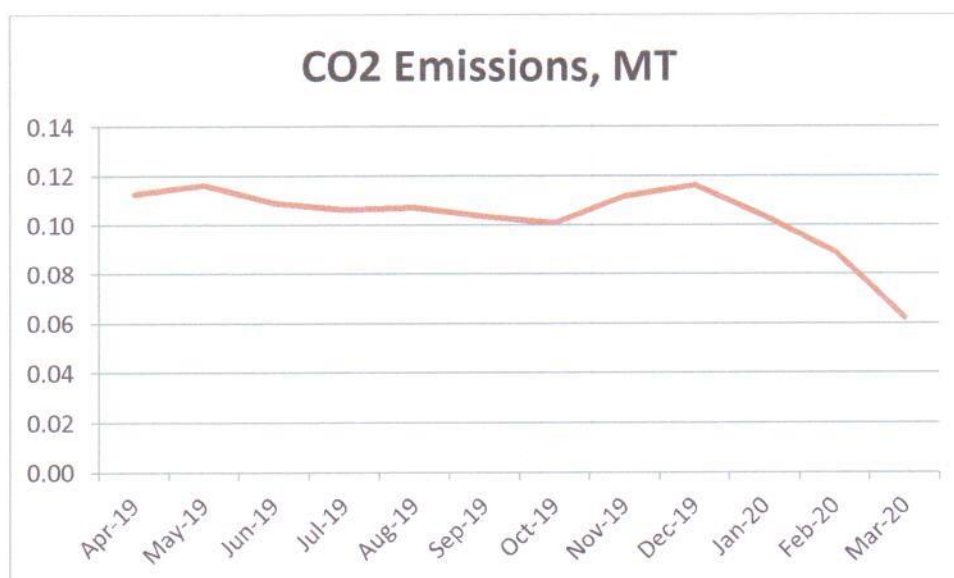


Table No 6: Various Important Parameters:

No	Parameter/ Value	Energy consumed, kWh	CO ₂ Emissions, MT
1	Total	1375	1.24
2	Maximum	129	0.12
3	Minimum	69	0.06
4	Average	114.58	0.10

CHAPTER III

STUDY OF USAGE OF RENEWABLE ENERGY

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



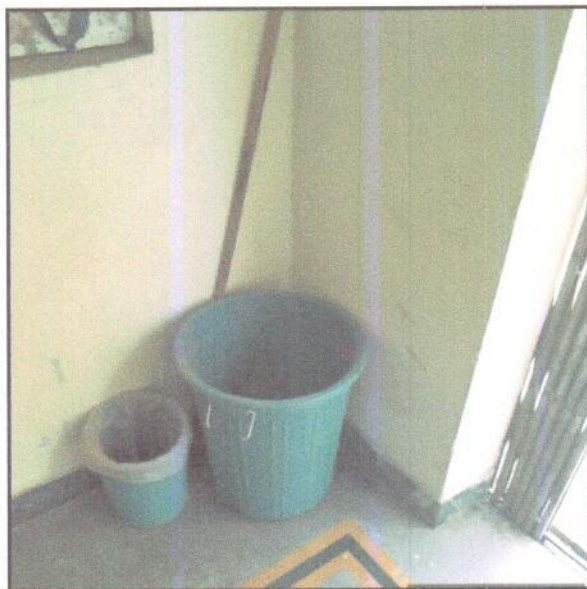
CHAPTER IV

STUDY OF WASTE MANAGEMENT

4.1 Solid Waste Management:

The Waste is segregated at source and is handed over to Agency for further action.

Photograph of Waste Collection Bin:



CHAPTER V

STUDY OF RAIN WATER MANAGEMENT

The College has yet to implement the Rain Water management Project.



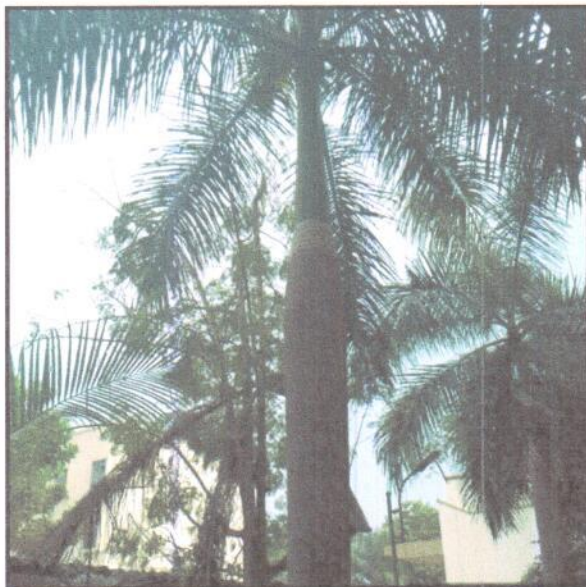
CHAPTER VI

STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The College has well maintained Tree Plantation in the campus.

Photograph of Tree Plantation Campus:



7.3 Creation of Awareness about Water Conservation:

In order to create awareness about Water Conservation, the College has displayed poster at the Water cooler.

Photograph of Poster on Water Conservation:

