

ENERGY AUDIT REPORT
of
PUNE VIDYARTHI GRIHA'S,
College of Engineering and Technology & G K Pate (Wani)
Institute of Management,
Vidyanagari, Parvati, Pune 411 009

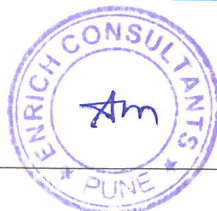


Year: 2019-20

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,
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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.

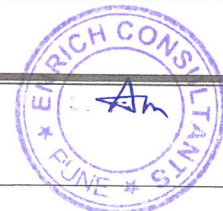
Name and Address of the firm : **Enrich Consultants**
Yashashree, Plot No. 26, Nirmal Bag Society,
Near Muktangan English School,
Parvati, Pune - 411009.

Registration Category : *Empanelled Consultant for Energy Conservation Programme*

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

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- This empanelment is valid till **31st March 2021** 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.


(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: EC/PVGCOETGKPOIM/19-20/01

Date: 10/8/2020

CERTIFICATE


This is to certify that we have conducted Energy Audit at Pune Vidyarthi Griha's College of Engineering and Technology & G K Pate(Wani) Institute of Management, Vidyanagari, Parvati, Pune 411 009 in the Academic year 2019-20.

The College has adopted following Energy Efficient practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Maximum usage of Day Lighting
- Installation of **7.4 kWp** Roof Top Solar PV Plant

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



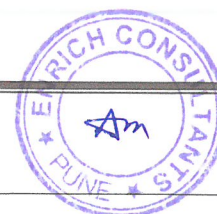
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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Pune Vidyarthi Griha's College of Engineering and Technology & G K Pate(Wani) Institute of Management, Vidyanagari, Parvati, Pune 411 009, for awarding us the assignment of Energy Audit of their Campus for the Year: 2019-20.

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



EXECUTIVE SUMMARY

1. Pune Vidyarthi Griha's College of Engineering & Technology & G K Pate (Wani) Institute of Management, Vidyanagari, Parvati, Pune uses 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 Purchased, kWh	CO ₂ Emissions, MT
1	Total	127563	102.05
2	Maximum	14179	11.34
3	Minimum	3745	3.00
4	Average	10630.25	8.50

3. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment
- Maximum Usage of Day Lighting
- Installation of **7.4 kWp** Roof Top Solar PV Plant.

4. Usage of Alternate Energy:

- The College has installed Roof Top Solar PV Plant of Capacity **7.4 kWp**.
- The Energy purchased from MSEDCL is **127563 kWh**
- The Energy Generated by Roof Top Solar PV Plant is **8880 kWh**
- The percent of usage of Alternate Energy to Annual Energy Demand is **6.51 %**

5. Usage of LED Lighting:

- The Total Lighting Load of the College is **35.51 kW**.
- The LED Lighting Load is **9.91 kW**.
- The percentage of Annual LED Lighting to Annual Lighting Demand is **27.91 %**.

6. Recommendations:

- Replacement of old lighting by LED Lighting, as per the budget availability
- Increase in Roof Top Solar PV Plant Capacity, as per the budget availability

7. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Annual Solar Energy Generation Days: **300 Nos**

8. Reference:

- For Solar PV Energy Generation: www.solarrooftop.gov.in

ABBREVIATIONS

LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
PVG	: Pune Vidyarthi Griha
COET	: College of Engineering and Technology
IOM	: Institute of Management
BEE	: Bureau of Energy Efficiency
FTL	: Fluorescent Tube Light
PV	: Photo Voltaic
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton

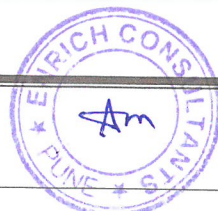
CHAPTER-I INTRODUCTION

1.1 Objectives:

1. To study present Energy Consumption
2. To Study the present CO₂ emissions
3. To study usage of Alternate Energy
4. To study usage of LED Lighting

1.2 Table No 1: General Details of the College:

No	Head	Particulars
1	Name of Institution	Pune Vidyarthi Griha's College of Engineering & Technology & G K Pate (Wani) Institute of Management
2	Address	Vidyanagari, Pune 411 009
3	Year of Establishment	1985



CHAPTER-II

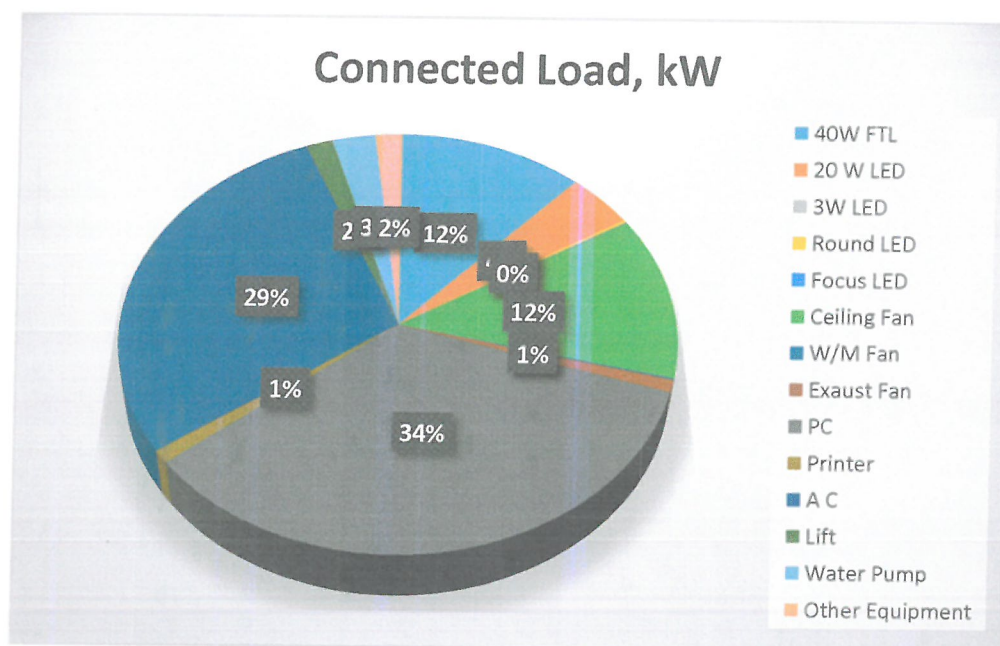
STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	40W FTL	640	40	25.6
2	20 W LED	467	20	9.34
3	3W LED	10	3	0.03
4	Round LED	27	16	0.43
5	Focus LED	10	11	0.11
6	Ceiling Fan	425	65	27.625
7	W/M Fan	5	52	0.26
8	Exhaust Fan	40	52	2.08
9	PC	499	150	74.85
10	Printer	12	175	2.1
11	A C	35	1800	63
12	Lift	1	3730	3.73
13	Water Pump	1	5968	5.97
14	Other Equipment	25	150	3.75
15	Total			219

Chart No 1: Study of Connected Load:



CHAPTER-III

STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 3: Electrical Bill Analysis- 2019-20:

No	Month	Energy Consumed, kWh
1	Jul-19	12875
2	Aug-19	13125
3	Sep-19	14179
4	Oct-19	13568
5	Nov-19	12125
6	Dec-19	13127
7	Jan-20	13125
8	Feb-20	12375
9	Mar-20	10190
10	Apr-20	4890
11	May-20	3745
12	Jun-20	4239
13	Total	127563
14	Maximum	14179
15	Minimum	3745
16	Average	10630.25

Chart No 2: Variation in Monthly Energy Consumption:

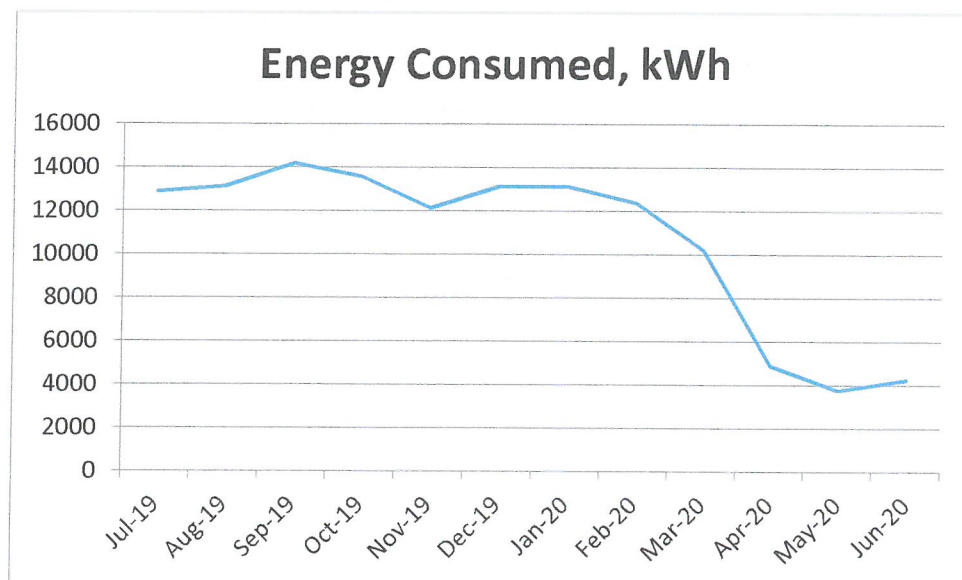


Table No 4: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	127563
2	Maximum	14179
3	Minimum	3745
4	Average	10630.25

CHAPTER-IV

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:

- 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	Jul-19	12875	10.30
2	Aug-19	13125	10.50
3	Sep-19	14179	11.34
4	Oct-19	13568	10.85
5	Nov-19	12125	9.70
6	Dec-19	13127	10.50
7	Jan-20	13125	10.50
8	Feb-20	12375	9.90
9	Mar-20	10190	8.15
10	Apr-20	4890	3.91
11	May-20	3745	3.00
12	Jun-20	4239	3.39
13	Total	127563	102.05
14	Maximum	14179	11.34
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Chart No 3: Month wise CO₂ Emissions:

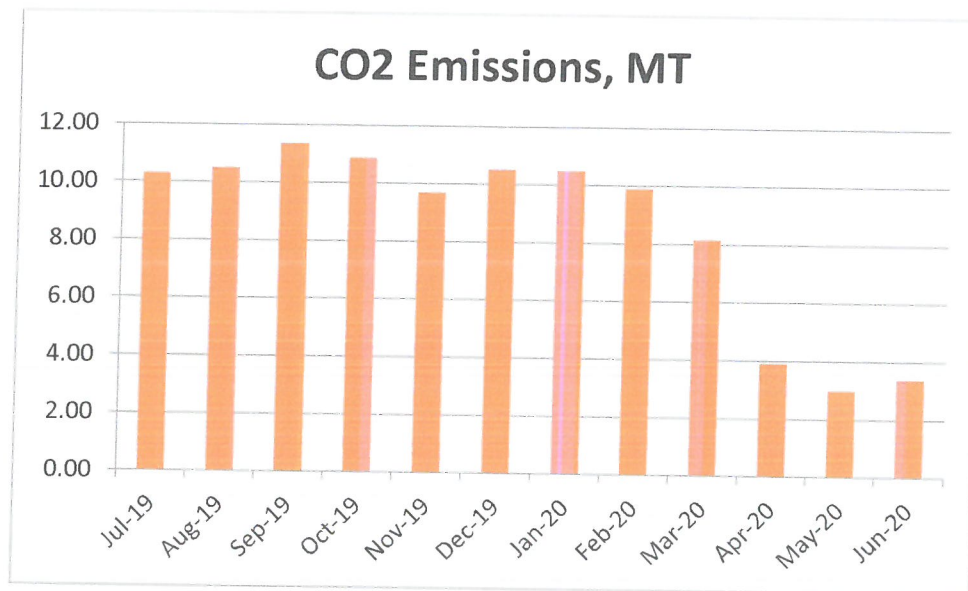


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	127563	102.05
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CHAPTER-V

STUDY OF USAGE OF ALTERNATE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity 7.4 kWp

We now calculate the percentage of usage of Alternate Energy to Annual Energy Demand.

Table No 7: % Usage of Alternate Energy to Annual Energy Demand:

No	Particulars	Value	Unit
1	Energy Purchased from MSEDCL	127563	kWh
2	Installed Roof Top Solar PV Plant Capacity	7.4	kWp
3	Average Daily Energy Generated	4	kWh/kWp
4	Annual Generation Days	300	Nos
5	Annual Solar Energy Generated	8880	kWh
6	Total Energy Demand = (1) + (5)	136443	kWh
7	% of Usage of Alternate Energy to Total Annual Energy Demand= (5)*100/ (6)	6.51	%

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 8: Percentage of Usage of LED Lighting to Annual Lighting Load

No	Particulars	Value	Unit
1	No of 40 W FTL fittings	640	Nos
2	No of 20 W LED fitting	467	Nos
3	No of 3 W LED Fittings	10	Nos
4	No of 16 W LED Down Lighter	27	Nos
5	No of 11 W Focus LEDs	10	Nos
6	Load/Unit of 40 W FTL fitting	40	W/Unit
7	Load/Unit of 20 W LED fitting	20	W/Unit
8	Load/Unit of 3 W LED fitting	3	W/Unit
9	Load/Unit of 16 W LED fitting	16	W/Unit
10	Load/Unit of 11 W LED fitting	11	W/Unit
11	Demand of 40 W FTL fittings	25.6	kW
12	Demand of 20 W LED fitting	9.34	kW
13	Demand of 3 W LED fitting	0.03	kW
14	Demand of 16 W LED fitting	0.432	kW
15	Demand of 11 W LED fitting	0.11	kW
16	Total Lighting Load=11+12+13+14+15	35.51	kW
16	Total LED Lighting Load=12+13+14+15	9.91	kW
19	% of usage of LED lights to Total Lighting Demand = (16)*100/(15)	27.91	%

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Year: 2019-20

Prepared by:

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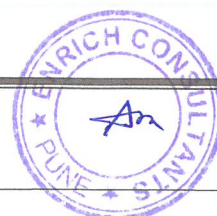
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Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/PVGCOETGKPOIM/19-20/02

Date: 10/8/2020

CERTIFICATE


This is to certify that we have conducted Green Audit at Pune Vidyarthi Griha's College of Engineering and Technology & G K Pate(Wani) Institute of Management, Vidyanagari, Parvati, Pune 411 009 in the Academic year 2019-20.

The College has adopted following Green Initiatives:

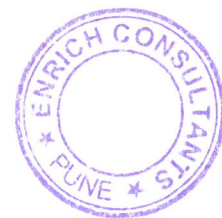
- Usage of Energy Efficient LED Light Fitting
- Installation of **7.4 kWp** Roof Top Solar PV Plant
- Maximum Usage of Day Lighting
- Segregation of Waste at source by provision of Bins
- Implementation of Bio Composting Unit
- Maintenance of good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Provision of Sanitary Waste Incinerator
- Creation of Awareness about Resource 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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2. Present Energy Consumption & CO₂ Emissions:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	127563	102.05
2	Maximum	14179	11.34
3	Minimum	3745	3.00
4	Average	10630.25	8.50

3. Various initiatives taken for Energy Conservation:

- Usage of Energy Efficient BEE STAR Rated Equipment
- Usage of Energy Efficient LED Lighting
- Maximum Usage of Day Lighting
- Installation of 7.4 kWp Roof Top Solar PV Plant
- Modifications in the Chiller System at the Auditorium

4. Usage of Renewable Energy:

- The College has installed Roof Top Solar PV Plant of Capacity 7.4 kWp.
- The Energy Generated by Roof Top Solar PV Plant is 8880 kWh
- The reduction in CO₂ Emissions is 7.104 MT

5. Waste Management:

5.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source by making provision of different waste collection bins. The Plastic Waste is handed over to Authorized Plastic Recyclers.

5.2 Organic Waste Management:

The College has installed Bio Composting unit to convert the Organic Waste into Bio compost. The same is used into own garden.

5.3 E-Waste Management:

The E-Waste is disposed of through Authorized E-Waste collecting agency.

6. Water Conservation:

It is recommended to make proper channels to collect the rain water and store the same in the open well which is in operation as on today,

The College is also planning to make one open well alive, which is not in use, at present.

7. Green & Sustainable Initiatives

- Maintenance of good Internal Road
- Maintenance of Internal Garden
- Provision of Ramp for Divyangajan
- Provision of Sanitary Waste Incinerator
- Display of Posters on Resource Conservation

8. Notes & Assumptions:

- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere
- Annual Solar Energy Generation Days: 300 Nos

9. Reference:

- For Solar PV Energy Generation: www.solarrooftop.gov.in

ABBREVIATIONS

BEE	Bureau of Energy Efficiency
PVG	Pune Vidyarthi Griha
COET	College of Engineering & Technology
IOM	Institute of Management
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO ₂	Carbon Di Oxide
Qty	Quantity

CHAPTER-I INTRODUCTION

1.1 Objectives:

1. To study present Energy Consumption
2. To Study CO₂ emissions
3. To study usage of Renewable Energy
4. Study of Waste Management
5. Study of Water Conservation
6. Study of Green & Sustainable Practices

1.2 General Details of College: Table No 1:

No	Head	Particulars
1	Name of Institution	Pune Vidyarthi Griha's College of Engineering & Technology & G K Pate (Wani) Institute of Management
2	Address	Vidyanagari, Pune 411 009
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CHAPTER-II

STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 2: Electrical Bill Analysis- 2019-20:

No	Month	Energy Consumed, kWh
1	Jul-19	12875
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Chart No 1: Variation in Monthly Energy Consumption:

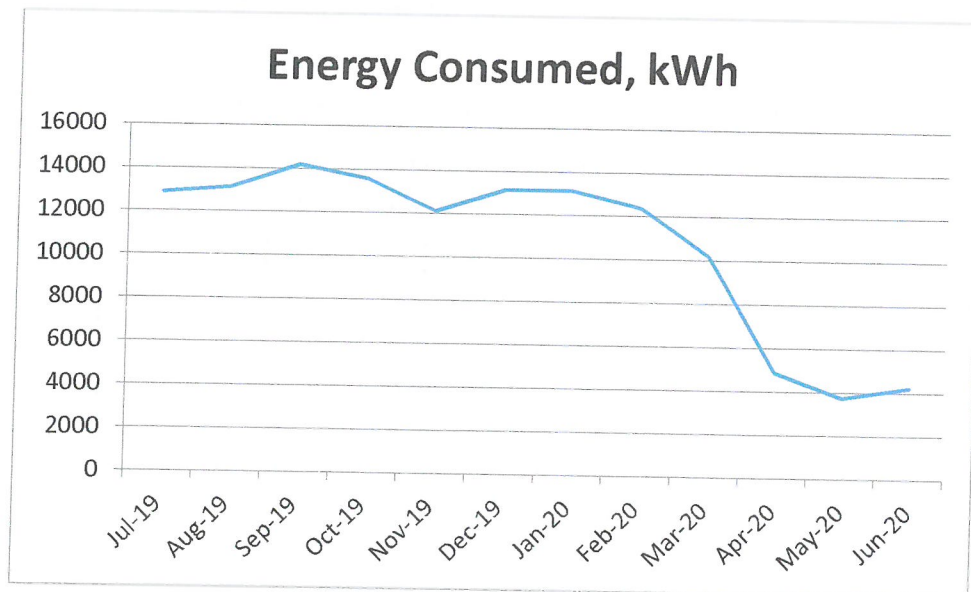


Table No 3: Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh
1	Total	127563
2	Maximum	14179
3	Minimum	3745
4	Average	10630.25

CHAPTER III

STUDY OF 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 is as under

- 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 4: Month wise CO₂ Emissions:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Jul-19	12875	10.30
2	Aug-19	13125	10.50
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9	Mar-20	10190	8.15
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12	Jun-20	4239	3.39
13	Total	127563	102.05
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16	Average	10630.25	8.50

Chart No 2: Month wise CO₂ Emissions:

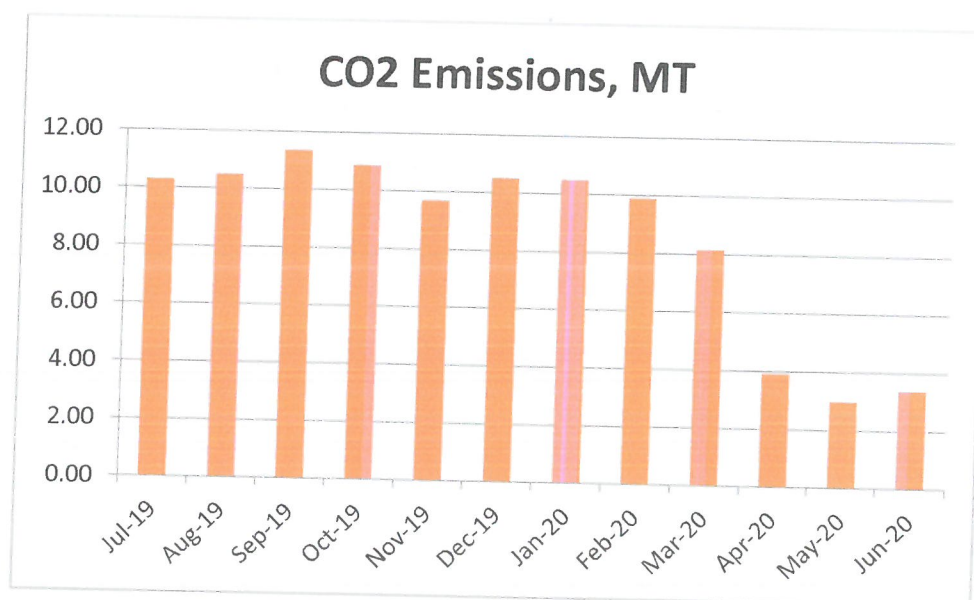


Table No 5: Variation in Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh	CO2 Emissions, MT
1	Total	127563	102.05
2	Maximum	14179	11.34
3	Minimum	3745	3.00
4	Average	10630.25	8.50

CHAPTER IV

STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity 7.4 kWp
We now calculate the reduction in CO₂ Emission due to Solar PV Plant.

Table No 6: Computation of Reduction in CO₂ Emission:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	7.4	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	8880	kWh
5	1 kWh of Electrical Energy is equivalent to	0.8	Kg of CO ₂
6	Annual Reduction in CO ₂ Emission = (4) * (5) /1000	7.104	MT

CHAPTER V

STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at source:

The recyclable waste, like paper, plastic waste is segregated at source by making provision of different waste collection bins. The Plastic Waste is handed over to Authorized Plastic Recyclers.

Photograph of Waste Collection Bins:



5.2 Organic Waste Management:

The recyclable waste, like paper waste is handed over to authorized waste collecting agent for further recycling.

5.3 E-Waste Management: The E-Waste is disposed of through Authorized Agency.

CHAPTER-VI

STUDY OF WATER CONSERVATION

It is recommended to make proper channels to collect the rain water and store the same in the open well which is in operation as on date.

The College is also planning to make one open well alive, which is not in use, at present.

CHAPTER-VII

STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Roads:

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

Photograph of Internal Road:



7.2 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

Photograph of Internal Lawn and Tree plantation:



7.3 Provision of Ramp:

For easy movement of Divyangajan, the College has made provision of Ramp at the main entrance.

Photograph of Ramp:



7.4 Provision of Sanitary Waste Incinerator:

The College has made provision of Sanitary Waste Incinerator for disposal of Sanitary Waste.

Photograph of Sanitary Waste Incinerator:



7.5 Creation of Awareness about Resource Conservation:

The College has displayed posters emphasizing on importance of Resource Conservation.

Photograph of Poster on Energy Conservation:



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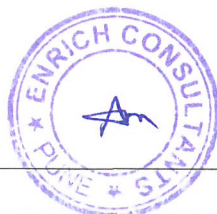


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MAHARASHTRA ENERGY DEVELOPMENT AGENCY



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.

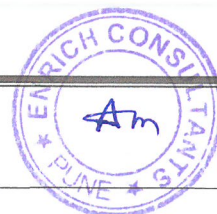
Registration Category : *Empanelled Consultant for Energy Conservation Programme*

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

- 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 the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **31st March 2021** 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.


19/9/18

(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: EC/PVGCOS /19-20/03

Date: 10/8/2020

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Pune Vidyarthi Griha's College of Engineering and Technology & G K Pate(Wani) Institute of Management, Vidyanagari, Parvati, Pune 411 009 in the Academic year 2019-20.

The College has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Light Fitting
- Maximum Usage of Day Lighting
- Installation of 7.4 kWp Roof Top Solar PV Plant
- Provision of Separate bins for Dry & Wet Waste
- Provision of Bio Composting Pit for conversion of Organic Waste
- Tree Plantation in the campus
- Provision of Sanitary Waste Incinerator
- Creation of awareness about Resource Conservation by displaying 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



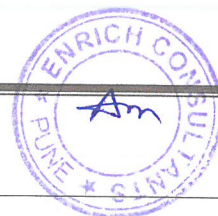
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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Pune Vidyarthi Griha's College of Engineering and Technology & G K Pate (Wani) Institute of Management, Vidyanagari, Parvati, Pune 411 009, for awarding us the assignment of Environmental Audit of their Campus for the Year: 2019-20.

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



EXECUTIVE SUMMARY

1. Pune Vidyarthi Griha's College of Engineering & Technology & G K Pate (Wani) Institute of Management, Vidyanagari, Parvati, Pune uses Energy in the form of Electrical Energy used for various Electrical Equipment, office & other facilities.

2. Various Pollution due to Institute Activities:

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

3. Present Energy Consumption & CO₂ Emissions:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	127563	102.05
2	Maximum	14179	11.34
3	Minimum	3745	3.00
4	Average	10630.25	8.50

4. Various initiatives taken for Energy Conservation:

- Usage of Energy Efficient BEE STAR Rated Equipment
- Usage of Energy Efficient LED Lighting
- Maximum Usage of Day Lighting
- Installation of **7.4 kWp** Roof Top Solar PV Plant

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

- The College has installed Roof Top Solar PV Plant of Capacity **7.4 kWp**.
- The Energy Generated by Roof Top Solar PV Plant is **8880 kWh**
- The reduction in CO₂ Emissions is **7.104 MT**

6. Waste Management:

6.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source by making provision of different waste collection bins. The Plastic Waste is handed over to Authorized Plastic Recyclers.

6.2 Organic Waste Management:

The College has installed Bio Composting unit to convert the Organic Waste into Bio compost. The same is used into own garden.

6.3 E-Waste Management:

The E-Waste is disposed of through Authorized E-Waste collecting agency.

7. Water Conservation:

It is recommended to make proper channels to collect the rain water and store the same in the open well which is in operation as on today,

The College is also planning to make one open well alive, which is not in use, at present.

8. Environment Friendly Initiatives

- Maintenance of Internal Garden
- Provision of Sanitary Waste Incinerator
- Creation of awareness by display of Posters on Resource Conservation

9. Notes & Assumptions Notes & Assumptions:

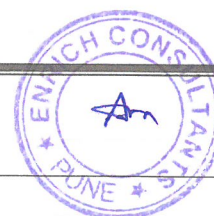
- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere
- Annual Solar Energy Generation Days: 300 Nos

10. Reference:

- For Roof Top Solar Energy generation: www.solarrooftop.gov.in

ABBREVIATIONS

Kg	:	Kilo Gram
PVG	:	Pune Vidyarthi Griha
MSEDCL	:	Maharashtra State Distribution Company Limited
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
LPD	:	Liters per Day
LED	:	Light Emitting Diode



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 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 Resource Consumption & CO₂ Emissions
2. To Study CO₂ Emission Reduction
3. To study Indoor Air Quality Parameters
4. To study Indoor Comfort Condition Parameters
5. To Study Waste Management
6. To Study Rain Water Harvesting
7. To Study Environmental Friendly Initiatives

1.3 General Details of Institute: Table No 4:

No	Head	Particulars
1	Name of Institution	Pune Vidyarthi Griha's College of Engineering & Technology & G K Pate (Wani) Institute of Management
2	Address	Vidyanagari, Pune 411 009
3	Year of Establishment	1985

CHAPTER-II

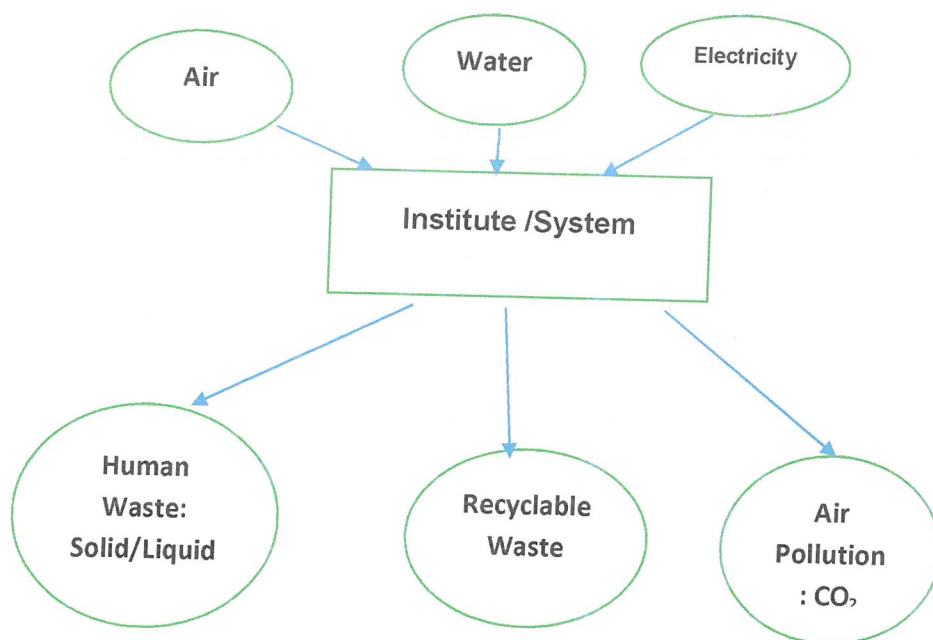
STUDY OF CONSUMPTION OF REOURCES & CO₂ EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

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

Chart No 1: Representation of Institute as System & Study of Resources & Waste



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy.

The basis of Calculation for CO₂ emissions due to Electrical Energy is as under

- 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Table No 5: Study of Consumption of Electrical Energy & CO₂ Emissions: 19-20:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Jul-19	12875	10.30
2	Aug-19	13125	10.50
3	Sep-19	14179	11.34
4	Oct-19	13568	10.85
5	Nov-19	12125	9.70
6	Dec-19	13127	10.50

7	Jan-20	13125	10.50
8	Feb-20	12375	9.90
9	Mar-20	10190	8.15
10	Apr-20	4890	3.91
11	May-20	3745	3.00
12	Jun-20	4239	3.39
13	Total	127563	102.05
14	Maximum	14179	11.34
15	Minimum	3745	3.00
16	Average	10630.25	8.50

Chart No 2: Month wise CO₂ Emissions:

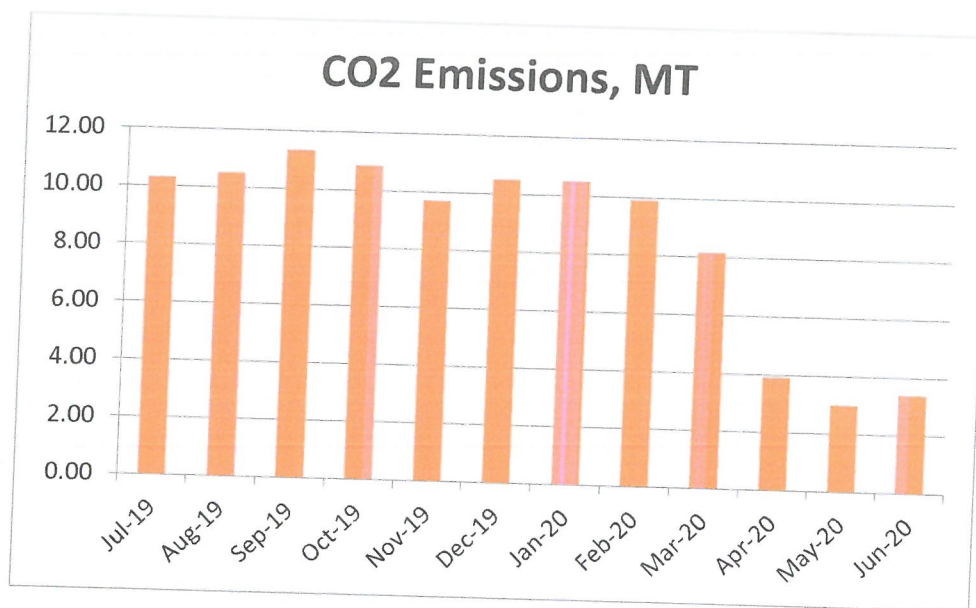


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	127563	102.05
2	Maximum	14179	11.34
3	Minimum	3745	3.00
4	Average	10630.25	8.50

CHAPTER III

STUDY OF CO₂ EMISSION REDUCTION

The College has installed Roof Top Solar PV Plant of Capacity **7.4 kWp**

We now calculate the reduction in CO₂ Emission due to Solar PV Plant.

Table No 7: Computation of Reduction in CO₂ Emission:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	7.4	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	8880	kWh
5	1 kWh of Electrical Energy is equivalent to	0.8	Kg of CO ₂
6	Annual Reduction in CO₂ Emission = (4) * (5) /1000	7.104	MT

CHAPTER IV STUDY OF WASTE MANAGEMENT

4.1 Segregation of Waste at source:

The recyclable waste, like paper, plastic waste is segregated at source by making provision of different waste collection bins. The Plastic Waste is handed over to Authorized Plastic Recyclers.

Photograph of Waste Collection Bins:



4.2 Organic Waste Management:

The recyclable waste, like paper waste is handed over to authorized waste collecting agent for further recycling.

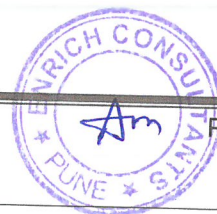
4.3 E-Waste Management: The E-Waste is disposed of through Authorized Agency.

CHAPTER-V

STUDY OF WATER CONSERVATION

It is recommended to make proper channels to collect the rain water and store the same in the open well which is in operation as on date.

The College is also planning to make one open well alive, which is not in use, at present.



CHAPTER-VI

STUDY OF ECO FRIENDLY PRACTICES

6.1 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

Photograph of Internal Lawn and Tree plantation:



6.2 Provision of Sanitary Waste Incinerator:

The College has made provision of Sanitary Waste Incinerator for disposal of Sanitary Waste.

Photograph of Sanitary Waste Incinerator:



6.3 Creation of Awareness about Resource Conservation:

The College has displayed posters emphasizing on importance of Resource Conservation.

Photograph of Poster on Energy Conservation:

