



# Certificate

**HYM International Certifications Pvt. Ltd.**

Certified that the Environmental Management System of

**Dr.B.R. AMBEDKAR OPEN UNIVERSITY**

Prof.G. Ram Reddy Marg, Road No:46, Jubilee Hills, Hyderabad - 500 033,  
Telangana State, India

has been assessed and found to be in accordance with the requirements of the environmental standards

## ISO 14001 : 2015

for the following scope of certification

### IMPLEMENTATION OF GREENERY AND ENVIRONMENTAL PROMOTION ACTIVITIES

Further information about the scope of this certificate and applicability of ISO 14001 : 2015 requirements may be obtained by consulting the organization.

Issue Date : 17/10/2022

1st Surveillance 16/10/2023

Renewal Date : 16/10/2025

2nd Surveillance 16/10/2024



Authorised Signature

Certificate No : **E91864140193**

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**NOTE: This Certificate is Valid From 17/10/2022 to 16/10/2023**

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## ISO 50001 : 2018

for the following scope of certification

### IMPLEMENTATION OF ENERGY SAVING PRACTICES

Further information about the scope of this certificate and applicability of ISO 50001 : 2018 requirements may be obtained by consulting the organization.

Issue Date : 17/10/2022

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Renewal Date : 16/10/2025

2nd Surveillance 16/10/2024



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Certificate No : **En9186414092**

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Phone: 098661 92420/ 90326 92420 Email: hym@hymcertifications.com

Date: 15/10/2022

**CERTIFICATE**

This is to certify that we have conducted **Energy Audit** at Dr. B.R Ambedkar Open University, G Ram Reddy Marg, Masthan Nagar, CBI Colony, Jubilee Hills, Hyderabad, Telangana 500033 in the year 2021-22.


The University has already adopted **Energy Efficient** Practices Like:

- Usage of Energy Efficient LED Fittings
- Maximum Usage of Day Lighting
- Maintenance of Power Factor Close to Utility
- Installation of **2500 LPD** Solar Thermal Water Heating System.

We appreciate the support of Management and involvement of faculty and staff members in the process of making the campus Energy Efficient.

For HYM International Certifications Pvt Ltd,

Authorized Signatory

  
Authorized Signatory  
Director, CIQA  
Dr. B.R. Ambedkar Open University  
Hyderabad - 500033

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Phone: 098661 92420/ 90326 92420 Email: hym@hymcertifications.com

Ref:EC/BRAOU/21-22/02\*\*\*\*\*

Date:10/6/2021

**CERTIFICATE**

This is to certify that we have conducted **Green Audit** at Dr. B.R Ambedkar Open University,,G Ram Reddy Marg, Masthan Nagar, CBI Colony, Jubilee Hills, Hyderabad, Telangana 500033 in the year 2021-22.

The University has already adopted following **Green practices**:

- Usage of Energy Efficient LED Fittings
- Maximum Usage of Day Lighting in the campus
- Installation of **13625 LPD** Solar Thermal Water Heating System.
- Construction of Farmpond
- Rain Water Harvesting Project for making use of rain water falling on terrace
- Segregation of Recyclable Waste at source

We appreciate the support of Management and involvement of faculty members and staff members in the process of making the campus Energy Efficient and Green.

For HYM International Certifications Pvt Ltd,

Certified Energy Auditor  
EA-8192

  
Authorized Signatory  
Director, CIQA  
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Ref: EC/BRAOU/21-22/02\*\*\*\*\*

Date: 10/6/2021

**CERTIFICATE**

This is to certify that we have conducted **Green Audit** at Dr. B.R Ambedkar Open University, G Ram Reddy Marg, Masthan Nagar, CBI Colony, Jubilee Hills, Hyderabad, Telangana 500033 in the year 2021-22.

The University has already adopted following **Green practices**:

- Usage of Energy Efficient LED Fittings
- Maximum Usage of Day Lighting in the campus
- Installation of 2500LPD Solar Thermal Water Heating System at guest house.
- Construction of Internal Bund of Capacity **1.4 Million Liters**
- Segregation of Recyclable Waste at source
- Plantation in the Campus

We appreciate the support of Management and involvement of faculty members and staff members in the process of making the campus Energy Efficient and Green.

For HYM International Certifications Pvt Ltd,

  
Authorized Signatory  
Director, CIQA  
Dr. B.R. Ambedkar Open University  
Hyderabad - 500033



# ENERGY AUDIT REPORT

Of

Dr. B.R AMBEDKAR OPEN UNIVERSITY

G Ram Reddy Marg, Masthan Nagar,

CBI Colony, Jubilee Hills, Hyderabad,

Telangana 500033



Year: 2021-22


Prepared by:

**HYM International Certifications Pvt Ltd**

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The University has already adopted **Energy Efficient** Practices Like:

- Usage of Energy Efficient LED Fittings
- Maximum Usage of Day Lighting
- Maintenance of Power Factor Close to Utility
- Installation of **2500 LPD** Solar Thermal Water Heating System.

We appreciate the support of Management and involvement of faculty and staff members in the process of making the campus Energy Efficient.

For HYM International Certifications Pvt Ltd,

Authorized Signatory

  
Authorized Signatory  
Director, CIOA  
Dr. B.R. Ambedkar Open University  
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## INDEX

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## ACKNOWLEDGEMENT

We at HYM International Certifications Pvt. Ltd, Hyderabad, express our sincere gratitude to the management of **Dr B.R Ambedkar Open University, Hyderabad 500033** was awarding us the assignment of Energy Audit of Dr. B.R Ambedkar Open University, Campus for the year 2021-22.

We are thankful to:

- Prof. K. Seetharama Rao, Vice chancellor
- Dr. A. V. N. Reddy, Registrar
- Prof. P. Madhusudhan Reddy , NAAC Coordinator
- Smt. K. Leela Laxma Reddy, President, Council for Green revolution

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

  
Authorized Signatory  
Director, CIQA  
Dr. B.R. Ambedkar Open University  
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## EXECUTIVE SUMMARY

After the field study & analysis, we present here with important observations made during the assignment of Energy Audit.

**1. Dr. B.R Ambedkar Open University, Hyderabad Energy in three forms namely: Electrical Energy, Diesel and LPG**

**2. Present Energy Consumption:**

| Parameter /value | Electrical Energy Consumed, kWh | LPG consumed, KG | Diesel consumed, Liters | CO <sub>2</sub> Emissions, MT |
|------------------|---------------------------------|------------------|-------------------------|-------------------------------|
| Total            | 390094                          | 348              | 1779                    | 357.23                        |
| Maximum          | 42199                           | 43.5             | 300                     | 38.25                         |
| Minimum          | 25106                           | 14.5             | 0                       | 23.54                         |
| Average          | 32508                           | 29               | 148.25                  | 29.76                         |

**3. Energy Conservation Projects already installed:**

- Usage of Energy Efficient LED fittings
- Usage of Maximum Day Lighting
- Maintenance of Good Power Factor close to Utility
- Installation of **2500 LPD** Solar Thermal Water Heating System

**4. Usage of Alternate /Renewable Energy:**


- The University has installed a **2500 LPD Solar Thermal Water Heating System**. The Percentage of usage of Renewable Energy to Annual Energy Demand is **11.35%**.

**5. Usage of LED Lighting:**

The total Annual Lighting Consumption a **2500 LPD** of the University is **110149 Kwh**. The annual LED Lighting Consumption is **76549 kW**. The percentage of annual LED Lighting Usage to Annual Lighting Power requirement is **69.50%**.

**6. Recommendations:**

- It is recommended to Install Roof Top Solar PV Plant
- It is recommended to Replace 50 No's W LED Fittings by 72 W LED Fittings
- Take advantage of Day light
- Get into the Habit of Turning lights off when you leave a room
- Fit External Lights with a Motion Sensor

  
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### 7. Assumptions:

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere
2. 1 Kg of LPG releases 2.93 Kg of CO<sub>2</sub> into atmosphere
3. 1 Liter of Diesel emits 2.68 Kg CO<sub>2</sub> into atmosphere.
4. Daily working hours-7 to 12 Nos.
5. Annual working Days-250 to 365 Nos.
6. Load Factor for use of Solar Thermal Water Heating System: 50%

### 8. References:

- For calculation of CO<sub>2</sub> Emissions: \*\*\*\*\*
- For Energy Saved by Solar Thermal Plant: \*\*\*\*\*

  
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## ABBREVIATIONS

|                 |                         |
|-----------------|-------------------------|
| KWh             | Kilo Watt Hour          |
| kWp             | Kilo Watt Peak          |
| Kg              | Kilogram                |
| MT              | Metric Ton              |
| CO <sub>2</sub> | Carbon Di Oxide         |
| LPD             | Liters per Day          |
| LPG             | Liquefied Petroleum Gas |
| FTL             | Fluorescent Tube Light  |
| Qty             | Quantity                |
| LED             | Light Emitting Diode    |

  
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## CHAPTER-I

### INTRODUCTION

#### 1.1 Objectives:

1. To study Connected Load
2. To study present level of Energy Consumption
3. To study the present CO<sub>2</sub> emissions
4. To Assess the Various Equipment/Facilities from Energy Efficient Aspects
5. To study usage of Renewable Energy
6. To study various measures to reduce the Energy Consumption

#### 1.2 Table No 1: General Details of the University:

| No | Head                      | Particulars   |
|----|---------------------------|---|
| 1  | Name of Institution       | Dr. B.R. Ambedkar Open University   |
| 2  | Address                   | G Ram Reddy Marg, Masthan Nagar, CBI Colony, Jubilee Hills, Hyderabad, Telangana 500033 |
| 3  | Year of Establishment     | 1982  |
| 4  | Academic Programs Offered | 200 Plus  |

  
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## CHAPTER-II STUDY OF CONNECTED LOAD

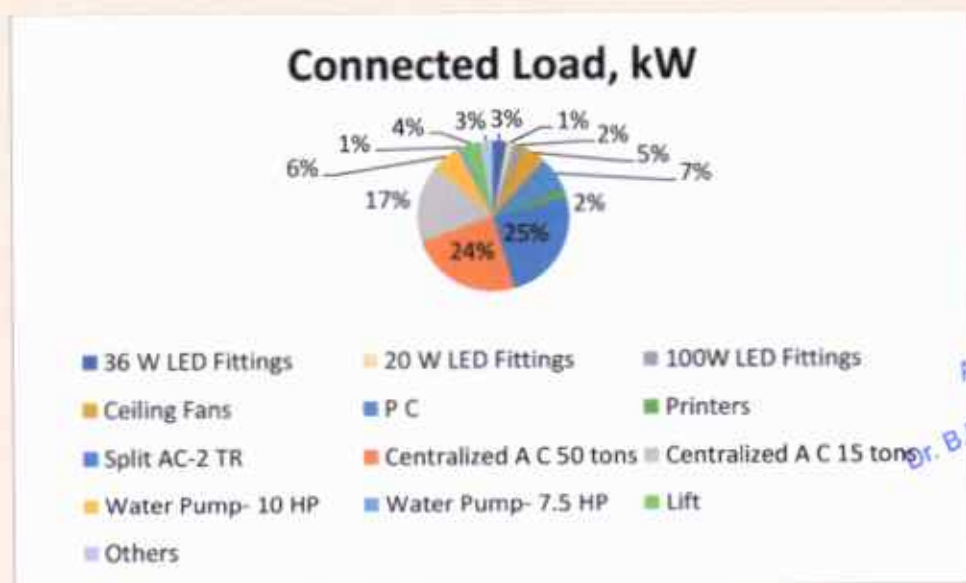
The Major contributors to the connected load of the University as under:

**Table No 2: Equipment wise Connected Load:**

| No | Equipment               | Qty  | Load, W/ Unit | Load, kW |
|----|-------------------------|------|---------------|----------|
| 1  | 20 W LED Fittings       | 1500 | 20            | 8        |
| 2  | 36 W LED Fittings       | 100  | 28            | 16.8     |
| 3  | 100W LED Fittings       | 50   | 72            | 13.90    |
| 4  | Ceiling Fans            | 800  | 65            | 26.65    |
| 5  | P C                     | 220  | 135           | 41.85    |
| 6  | Printers                | 52   | 150           | 9        |
| 7  | Split AC-2 TR           | 70   | 2750          | 137.5    |
| 8  | Centralized A C 50 tons | 2    | 26856         | 134.3    |
| 9  | Centralized A C 15 tons | 1    | 16250         | 93.75    |
| 10 | Water Pump- 10 HP       | 3    | 5595          | 33.57    |
| 11 | Water Pump- 7.5 HP      | 1    | 2238          | 6.71     |
| 12 | Lift                    | 4    | 6714          | 20.14    |
| 13 | Others                  | 60   | 150           | 15       |

We present the above Data in a PIE Chart as under:

**Chart No 1: Connected Load:**



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### CHAPTER-III

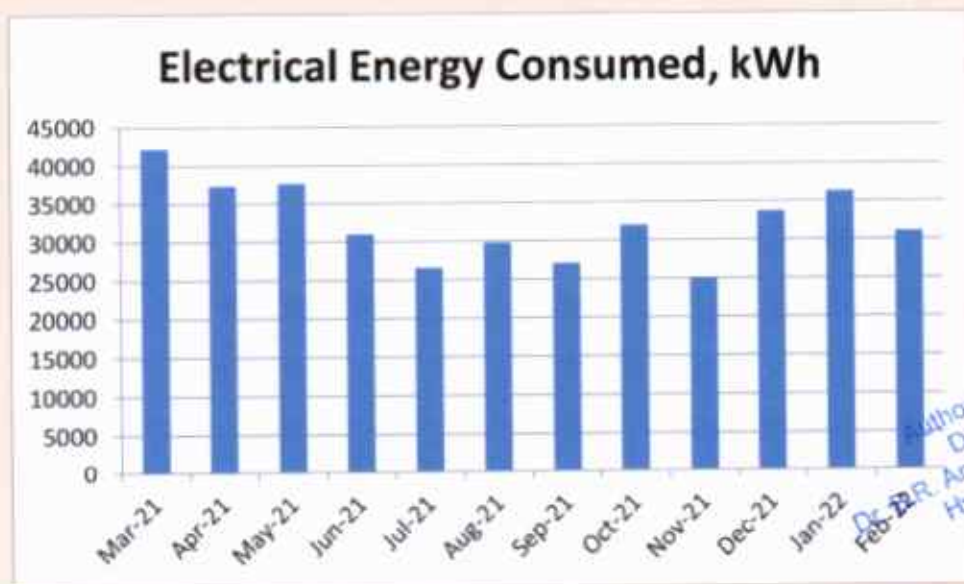
### STUDY OF PRESENT ENERGY CONSUMPTION

In this Chapter, We present the analysis of last year Energy Consumption

**3.1 Table No 3: Study of Electrical Energy, LPG and Diesel Consumption: 2021-22**

| No | Month   | Electrical Energy Consumed, kWh | LPG Consumed, Kg | Diesel Consumed, Liters |
|----|---------|---------------------------------|------------------|-------------------------|
| 1  | Mar-21  | 42199                           | 43.5             | 50                      |
| 2  | Apr-21  | 37387                           | 29               | 120                     |
| 3  | May-21  | 37640                           | 29               | 300                     |
| 4  | Jun-21  | 31023                           | 29               | 25                      |
| 5  | Jul-21  | 26607                           | 43.5             | 32                      |
| 6  | Aug-21  | 29825                           | 14.5             | 300                     |
| 7  | Sep-21  | 27109                           | 29               | 52                      |
| 8  | Oct-21  | 32004                           | 14.5             | 300                     |
| 9  | Nov-21  | 25106                           | 29               | 300                     |
| 10 | Dec-21  | 33776                           | 29               | 0                       |
| 11 | Jan-22  | 36319                           | 14.5             | 300                     |
| 12 | Feb-22  | 31099                           | 43.5             | 0                       |
| 13 | Total   | 390094                          | 348              | 1779                    |
| 14 | Maximum | 42199                           | 43.5             | 300                     |
| 15 | Minimum | 25106                           | 14.5             | 0                       |
| 16 | Average | 32508                           | 29               | 148.25                  |

**3.2 To Study the Variation of Monthly Electrical Energy Consumption: Chart No: 2**

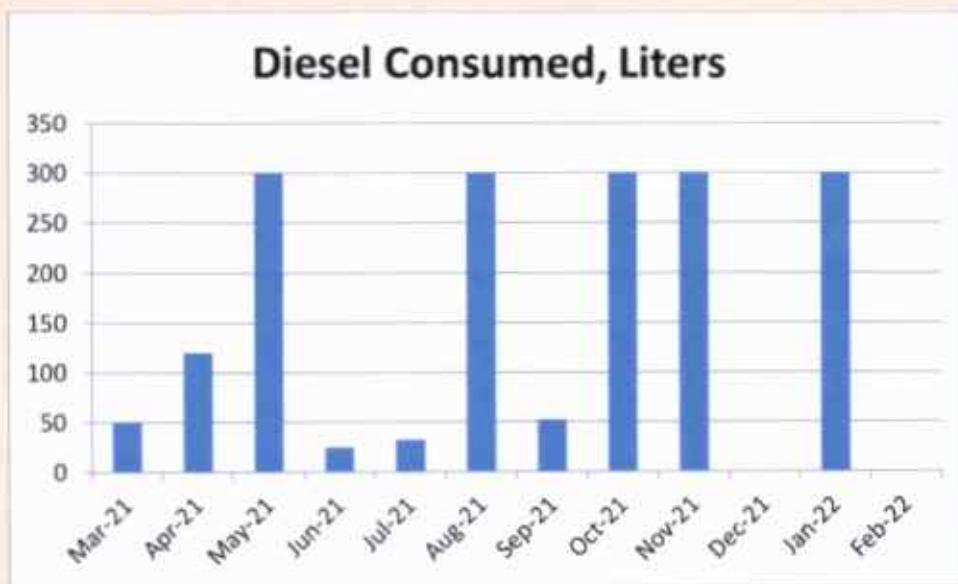


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3.3 Study of Month wise LPG Consumption: Chart No: 3



3.4 Study of Month wise Diesel Consumption: Chart No: 4



From the above analysis, we present following important parameters:

Table No 4: Variation in Important Parameters:

| No | Parameter/ Value | Electrical Energy Consumed, kWh | LPG Consumed, Kg | Diesel Consumed, Liters |
|----|------------------|---------------------------------|------------------|-------------------------|
| 1  | Total            | 390094                          | 348              | 1779                    |
| 2  | Maximum          | 42199                           | 43.5             | 300                     |
| 3  | Minimum          | 25106                           | 14.5             | 0                       |
| 4  | Average          | 32508                           | 29               | 148.25                  |

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**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 University for performing its day to day activities

The University uses three forms of Energy namely: Electrical Energy for various Electrical gadgets, LPG and Diesel.

**Basis for computation of CO<sub>2</sub> Emissions:**

The basis of Calculation for CO<sub>2</sub> emissions due to LPG & Electrical Energy are as under

- 1 Unit (kWh) of Electrical Energy releases **0.9Kg of CO<sub>2</sub>** into atmosphere.
- 1 Kg of LPG releases **2.93 Kg** of CO<sub>2</sub> into atmosphere.
- 1 Liter of Diesel released **2.68 Kg** of CO<sub>2</sub> into atmosphere.

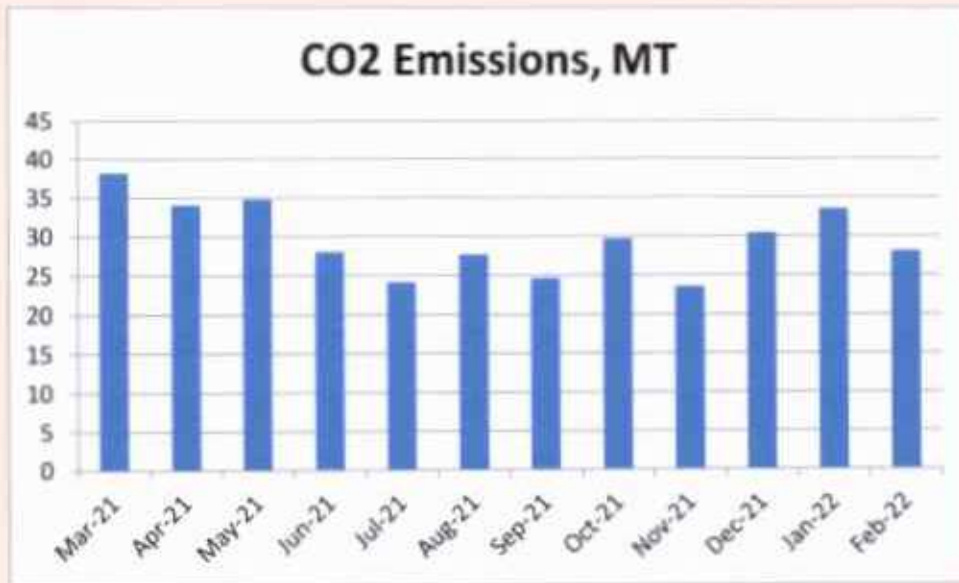
Based on the above Data we compute the CO<sub>2</sub> emissions which are being released in to the atmosphere by the University due to its Day to Day operations.

**Table No 5: Month wise Energy Consumption & CO<sub>2</sub> Emissions**

| No | Month   | Electrical Energy Consumption, kWh | LPG Consumed, Kg | Diesel Consumed, Liters | CO <sub>2</sub> Emissions, MT |
|----|---------|------------------------------------|------------------|-------------------------|-------------------------------|
| 1  | Mar-21  | 42199                              | 43.5             | 50                      | 38.25                         |
| 2  | Apr-21  | 37387                              | 29               | 120                     | 34.08                         |
| 3  | May-21  | 37640                              | 29               | 300                     | 34.82                         |
| 4  | Jun-21  | 31023                              | 29               | 25                      | 28.08                         |
| 5  | Jul-21  | 26607                              | 43.5             | 32                      | 24.17                         |
| 6  | Aug-21  | 29825                              | 14.5             | 300                     | 27.75                         |
| 7  | Sep-21  | 27109                              | 29               | 52                      | 24.63                         |
| 8  | Oct-21  | 32004                              | 14.5             | 300                     | 29.71                         |
| 9  | Nov-21  | 25106                              | 29               | 300                     | 23.54                         |
| 10 | Dec-21  | 33776                              | 29               | 0                       | 30.48                         |
| 11 | Jan-22  | 36319                              | 14.5             | 300                     | 30.59                         |
| 12 | Feb-22  | 31099                              | 43.5             | 0                       | 28.12                         |
| 13 | Total   | 390094                             | 348              | 1779                    | 357.23                        |
| 14 | Maximum | 42199                              | 43.5             | 300                     | 38.25                         |
| 15 | Minimum | 25106                              | 14.5             | 0                       | 23.54                         |
| 16 | Average | 32508                              | 29               | 148.25                  | 29.76                         |



Representation of Month wise CO<sub>2</sub> Emissions: Chart No: 5



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## CHAPTER-V

### STUDY OF USAGE OF ALTERNATE ENERGY

The University has installed Solar Thermal Water Heating System. The details of Installation are as under.

**Table No 6: Details of Solar Thermal Water Heating System**

| No | Location            | Capacity in LPD |
|----|---------------------|-----------------|
| 1  | Gust house Building | 2500            |
|    | <b>Total</b>        | <b>2500</b>     |

**Table No 7: Percentage of usage of Alternative Energy:**

| No | Particulars   | Value  | Unit |
|----|---|--------|------|
| 1  | Energy Purchased from TSSPDCL in the Year:2021-22                       | 452682 | kWh  |
| 2  | Capacity of Solar Thermal Water Heating System                          | 2500   | LPD  |
| 3  | Electrical Energy Saved by 100LPD Solar Thermal System per Annum        | 1500   | kWh  |
| 4  | For Calculations, we assume the Annual Energy saved in the year:2021-22 | 750    | kWh  |
| 5  | Annual Equivalent Energy Saved by Solar Thermal System                  | 56677  | kWh  |
| 6  | Total Annual Electrical Energy Requirement $=(1)+(5)$                   | 509359 | kWh  |
| 7  | Percent of Alternate Energy to Annual Energy Requirement $=(6)*100/(7)$ | 11.25  | %    |

**Photograph of Solar Thermal Water Heating System: at Yash Inn Facility**



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**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, as under.

**Table No 8: Computation of Percent Usage of LED Lighting to Annual Lighting Load:**

| No | Particulars   | Value  | Unit   |
|----|---|--------|--------|
| 1  | No of 20 W LED Fittings                                       | 1500   | Nos    |
| 2  | Load/ Unit of 20 W LED Fittings                               | 20     | W/Unit |
| 3  | Total Load of 1500 Nos, 20 W LED Fittings                     | 8      | kW     |
| 4  | Daily Working Hours   | 8      | Nos    |
| 5  | Annual Working Days   | 250    | Nos    |
| 6  | Annual Lighting Consumption of 20 W LED Fittings = $3*4*5$    | 16000  | kWh    |
| 7  | No of 36 W LED Fittings                                       | 100    | Nos    |
| 8  | Load/ Unit of 36 W LED Fittings                               | 28     | W/Unit |
| 9  | Total Load of 100 Nos, 36 W LED Fittings                      | 16.8   | kW     |
| 10 | Daily Working Hours   | 8      | Nos    |
| 11 | Annual Working Days   | 250    | Nos    |
| 12 | Annual Lighting Consumption of 36 W LED Fittings = $9*10*11$  | 33600  | kWh    |
| 13 | No of 100 W LED Fittings                                      | 50     | Nos    |
| 14 | Load/ Unit of 100 W LED Fittings                              | 72     | W/Unit |
| 15 | Total Load of 50 Nos, 100 W LED Fittings                      | 13.90  | kW     |
| 16 | Daily Working Hours   | 12     | Nos    |
| 17 | Annual Working Days   | 365    | Nos    |
| 18 | Annual Lighting Consumption of 20 W LED Fittings = $15*16*17$ | 60882  | kWh    |
| 19 | Total Annual Lighting Load = $6+12+18$                        | 110482 | kWh    |
| 20 | Annual LED Lighting Load = $12+18$                            | 94482  | kWh    |
| 21 | % of Annual LED Lighting to Total Lighting Load = $20*100/19$ | 85.51  | %      |

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## CHAPTER-VII RECOMMENDATIONS

It is recommended to:

1. Install Roof Top Solar PV Plant
2. Replace 50 No's W LED Fittings by 72 W LED Fittings
3. Take advantage of Day light
4. Get into the Habit of Turning lights off when you leave a room
5. Fit External Lights with a Motion Sensor

  
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# ENVIRONMENTAL AUDIT REPORT

of

Dr. B.R AMBEDKAR OPEN UNIVERSITY

G Ram Reddy Marg, Masthan Nagar,

CBI Colony, Jubilee Hills, Hyderabad,

Telangana 500033



Year: 2021-22

*M. S. S. S.*  
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Prepared by:

**HYM International Certifications Pvt Ltd**

P.No. 163A, Flat No. 201,

Addagutta Society, Kukatpally, Hyderabad- 500 077.

Phone: 098661 92420/ 90326 92420 Email: [hym@hymcertifications.com](mailto:hym@hymcertifications.com)



# Certificate

**HYM International Certifications Pvt. Ltd.**

Certified that the Environmental Management System of

**Dr.B.R. AMBEDKAR OPEN UNIVERSITY**

Prof.G. Ram Reddy Marg, Road No:46, Jubilee Hills, Hyderabad - 500 033,  
Telangana State, India

has been assessed and found to be in accordance with the requirements of the environmental standards

## ISO 14001 : 2015

for the following scope of certification

### IMPLEMENTATION OF GREENERY AND ENVIRONMENTAL PROMOTION ACTIVITIES

Further information about the scope of this certificate and applicability of ISO 14001 : 2015 requirements may be obtained by consulting the organization.

Issue Date : 17/10/2022

1st Surveillance 16/10/2023

Renewal Date : 16/10/2025

2nd Surveillance 16/10/2024



Authorised Signature

Certificate No : **E91864140193**

**HYM International Certifications Pvt. Ltd**

**NOTE: This Certificate is Valid From 17/10/2022 to 16/10/2023**

This is an accredited certificate authorized for issue by Accreditation Service for Certifying Bodies (Europe) Limited who have assessed M/s.HYM International Certifications Pvt. Ltd. against defined criteria and in cognizance of ISO 17021:2015 "Conformity Assessment - Requirements for bodies providing audit and Certification of management Systems".

[www.hymcertifications.com](http://www.hymcertifications.com) on for checking the validation of the Certification

Regd. Office : Plot No. 265/C, Addagutta Society, Opp. JNTU, Kukatpally, Hyderabad - 500 072, Telangana State, India.  
E-mail: [siva@hymcertifications.com](mailto:siva@hymcertifications.com), Website: [www.hymcertifications.com](http://www.hymcertifications.com)

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Addagutta Society, Kukatpally, Hyderabad- 500 077

Phone: 098661 92420/ 90326 92420 Email: hym@hymcertifications.com

Ref: EC/BRAOU/21-22/02\*\*\*\*\*

Date: 10/6/2021

**CERTIFICATE**

This is to certify that we have conducted **Green Audit** at Dr. B.R Ambedkar Open University, G Ram Reddy Marg, Masthan Nagar, CBI Colony, Jubilee Hills, Hyderabad, Telangana 500033 in the year 2021-22.

The University has already adopted following **Green practices**:

- Usage of Energy Efficient LED Fittings
- Maximum Usage of Day Lighting in the campus
- Installation of 2500LPD Solar Thermal Water Heating System at guest house.
- Construction of Internal Bund of Capacity **1.4 Million Liters**
- Segregation of Recyclable Waste at source
- Plantation in the Campus

We appreciate the support of Management and involvement of faculty members and staff members in the process of making the campus Energy Efficient and Green.

For HYM International Certifications Pvt Ltd,

  
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Director, CIQA  
Dr. B.R. Ambedkar Open University  
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## ABBREVIATIONS

|                 |                         |
|-----------------|-------------------------|
| KWh             | Kilo Watt Hour          |
| kWp             | Kilo Watt Peak          |
| Kg              | Kilogram                |
| MT              | Metric Ton              |
| CO <sub>2</sub> | Carbon Di Oxide         |
| LPD             | Liters per Day          |
| LPG             | Liquefied Petroleum Gas |
| LED             | Light Emitting Diode    |
| Qty             | Quantity                |
| M               | Meters                  |
| L               | Length                  |
| B               | Breadth                 |
| H               | Height                  |

  
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## 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 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                        |

  
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**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 (Prac8cos and Procedure) Rules      |
| 2011 | Plastic Waste Management and Handling) Rules                |

**1.1.6 National Environmental Plane & Policy Documents: Table No-3:**

|    |   |
|----|---|
| 1. | National Forest Policy, 1988  |
| 2. | National Water Policy, 2002   |
| 3. | National EnvironmentPolicy or NEP (2006)  |
| 4. | National Conservation Strategy and Policy Statement on Environment and development,1982 |
| 5. | Policy Statement for Abatement of Pollution (teen)                                      |
| 6. | National Acton Plan on Climate Change   |
| 7. | Vision Statement on Environment and Human Health  |
| 8. | Technology Vision 2030 (The Energy Research University)                                 |
| 9. | Addressing Energy security and Climate Change (MoEF and Bureau of Energy Efficiency     |
| 10 | The Road to Copenhagen; India'sPosition on climate Change IssuesMoEF                    |

**1.2 Audit Methodology:**

1. Study of University as System
2. Study of present Energy Consumption
3. Study of CO<sub>2</sub>emissions& Mitigation
4. Study of Waste Generation & Management
5. Study of Rain WaterHarvesting

**1.2 Table No 4: General Details of the University:**

| No | Head                      | Particulars   |
|----|---------------------------|---|
| 1  | Name of Institution       | Dr. B.R. Ambedkar Open University   |
| 2  | Address                   | G Ram Reddy Marg, Masthan Nagar, CBI Colony, Jubilee Hills, Hyderabad, Telangana 500033 |
| 3  | Year of Establishment     | 1982  |
| 4  | Academic Programs Offered | 200 Plus  |

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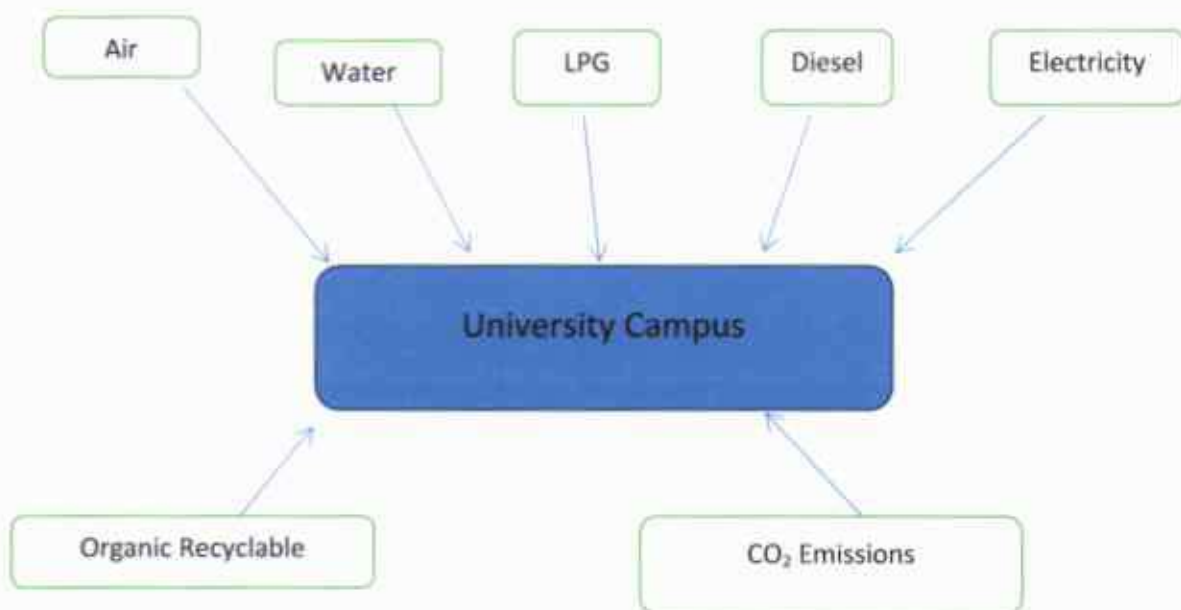
## CHAPTER-II

### STUDY OF CONSUMPTION OF VARIOUS RESOURCES

2.1 The University consumes following Natural/ derived Resources:

1. Air
2. Water
3. Electrical Energy
4. Liquefied Petroleum Gas
5. Diesel

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



Now we present the analysis of last year Energy Consumption

2.1 Table No 5: Study of Electrical Energy, LPG and Diesel Consumption: 2021-22

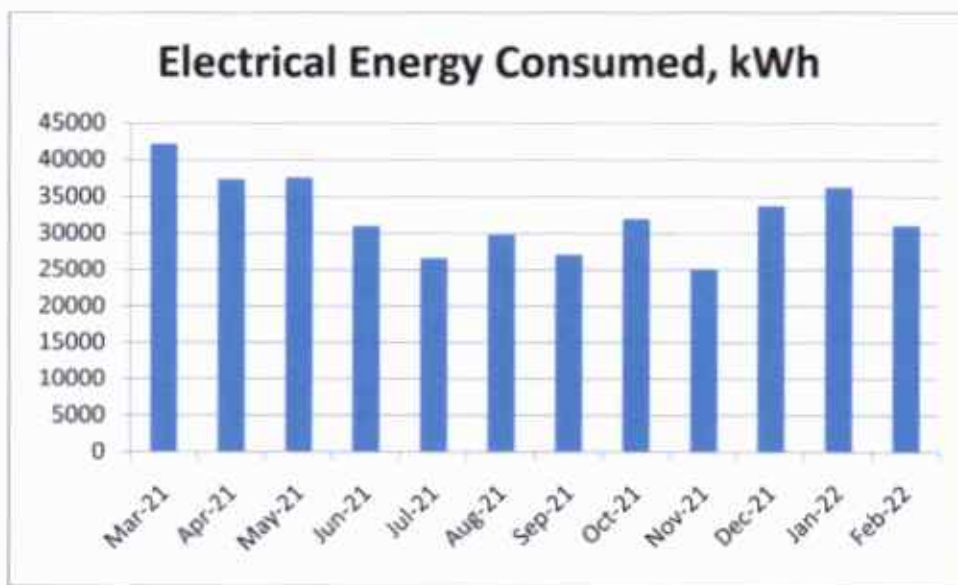
| No | Month  | Electrical Energy Consumed, kWh | LPG Consumed, Kg | Diesel Consumed, Liters |
|----|--------|---------------------------------|------------------|-------------------------|
| 1  | Mar-21 | 42199                           | 43.5             | 50                      |
| 2  | Apr-21 | 37387                           | 29               | 120                     |
| 3  | May-21 | 37640                           | 29               | 300                     |
| 4  | Jun-21 | 31023                           | 29               | 25                      |
| 5  | Jul-21 | 26607                           | 43.5             | 32                      |
| 6  | Aug-21 | 29825                           | 14.5             | 300                     |
| 7  | Sep-21 | 27109                           | 29               | 52                      |
| 8  | Oct-21 | 32004                           | 14.5             | 300                     |

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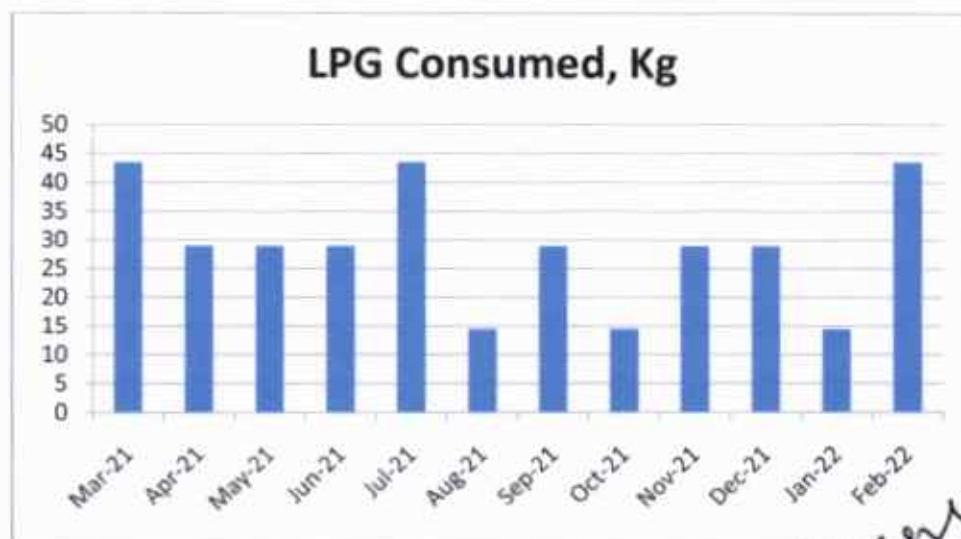


|    |         |        |      |        |
|----|---------|--------|------|--------|
| 9  | Nov-21  | 25106  | 29   | 300    |
| 10 | Dec-21  | 33776  | 29   | 0      |
| 11 | Jan-22  | 36319  | 14.5 | 300    |
| 12 | Feb-22  | 31099  | 43.5 | 0      |
| 13 | Total   | 390094 | 348  | 1779   |
| 14 | Maximum | 42199  | 43.5 | 300    |
| 15 | Minimum | 25106  | 14.5 | 0      |
| 16 | Average | 32508  | 29   | 148.25 |

2.2 To Study the Variation of Monthly Electrical Energy Consumption: Chart No: 2

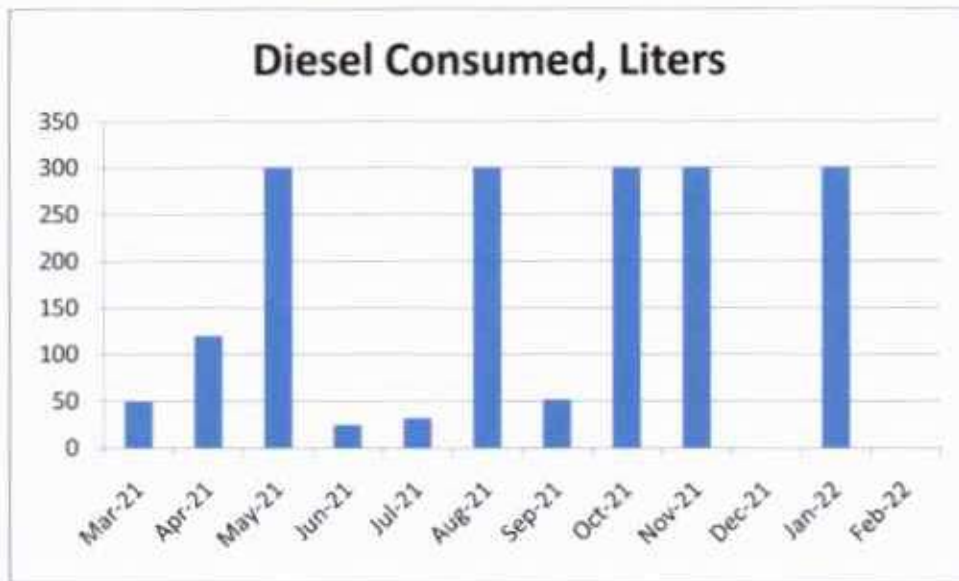


2.3 Study of Month wise LPG Consumption: Chart No: 3



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2.3 Study of Month wise Diesel Consumption: Chart No: 4



From the above analysis, we present following important parameters:

Table No 6: Variation in Important Parameters:

| No | Parameter/<br>Value | Electrical Energy<br>Consumed, kWh | LPG<br>Consumed, Kg | Diesel<br>Consumed, Liters |
|----|---------------------|------------------------------------|---------------------|----------------------------|
| 1  | Total               | 390094                             | 348                 | 1779                       |
| 2  | Maximum             | 42199                              | 43.5                | 300                        |
| 3  | Minimum             | 25106                              | 14.5                | 0                          |
| 4  | Average             | 32508                              | 29                  | 148.25                     |

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## CHAPTER-III

### STUDY OF CO<sub>2</sub> EMISSIONS

#### 3.1 Air Pollution:

The University uses three forms of Energies, namely. Electrical Energy used for day to day operations, LPG and Diesel. The major pollutant on account of above Energy forms is the Carbon Dioxide. **A Carbon Foot print** is defined as the Total Green house Gas emissions, emitted due to various activities.

#### Basis for computation of CO<sub>2</sub> Emissions:

The basis of Calculation for CO<sub>2</sub> emissions due to LPG & Electrical Energy are as under

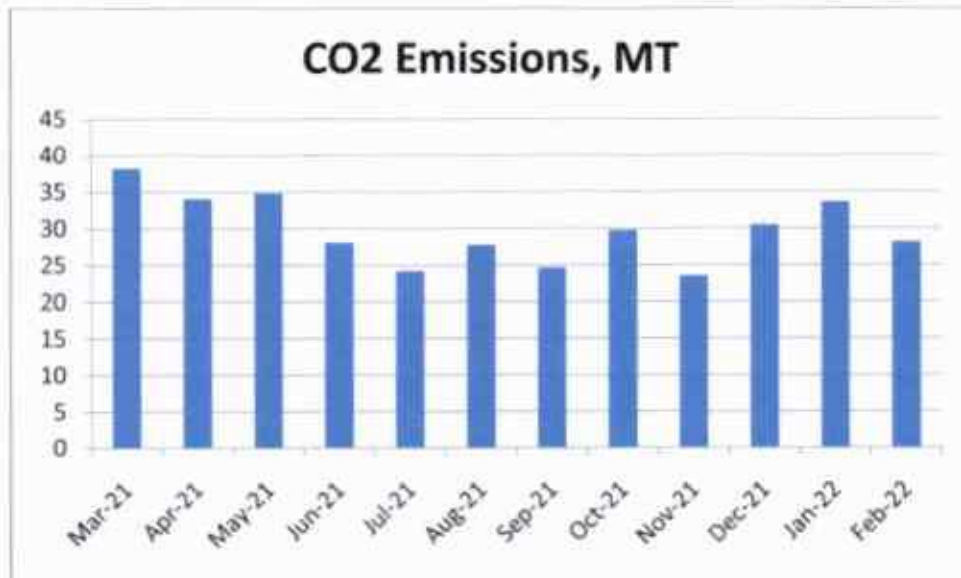
- 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** in to atmosphere.
- 1 Kg of LPG releases **2.93 Kg of CO<sub>2</sub>** in to atmosphere.
- 1 Liter of Diesel released **2.88 Kg of CO<sub>2</sub>** in to atmosphere.

Based on the above Data we compute the CO<sub>2</sub> emissions which are being released in to the atmosphere by the University due to its Day to Day operations.

**Table No 7: Month wise CO<sub>2</sub> Emissions**

| No | Month   | Electrical Energy Consumption, kWh | LPG Consumed, Kg | Diesel Consumed, Liters | CO <sub>2</sub> Emissions, MT |
|----|---------|------------------------------------|------------------|-------------------------|-------------------------------|
| 1  | Mar-21  | 42199                              | 43.5             | 50                      | 38.25                         |
| 2  | Apr-21  | 37387                              | 29               | 120                     | 34.08                         |
| 3  | May-21  | 37640                              | 29               | 300                     | 34.82                         |
| 4  | Jun-21  | 31023                              | 29               | 25                      | 28.08                         |
| 5  | Jul-21  | 26607                              | 43.5             | 32                      | 24.17                         |
| 6  | Aug-21  | 29825                              | 14.5             | 300                     | 27.75                         |
| 7  | Sep-21  | 27109                              | 29               | 52                      | 24.63                         |
| 8  | Oct-21  | 32004                              | 14.5             | 300                     | 29.71                         |
| 9  | Nov-21  | 25106                              | 29               | 300                     | 23.54                         |
| 10 | Dec-21  | 33776                              | 29               | 0                       | 30.48                         |
| 11 | Jan-22  | 36319                              | 14.5             | 300                     | 33.59                         |
| 12 | Feb-22  | 31099                              | 43.5             | 0                       | 28.12                         |
| 13 | Total   | 390094                             | 348              | 1779                    | 357.23                        |
| 14 | Maximum | 42199                              | 43.5             | 300                     | 38.25                         |
| 15 | Minimum | 25106                              | 14.5             | 0                       | 23.54                         |
| 16 | Average | 32508                              | 29               | 148.25                  | 29.76                         |

Representation of Month wise CO<sub>2</sub> Emissions: Chart No: 5



Study of Important Parameters: Table No 8:

| No | Parameter/<br>Value | Electrical Energy<br>Consumed, kWh | LPG<br>Consumed, Kg | Diesel<br>Consumed, Liters | CO <sub>2</sub><br>Emissions, MT |
|----|---------------------|------------------------------------|---------------------|----------------------------|----------------------------------|
| 1  | Total               | 390094                             | 348                 | 1779                       | 357.23                           |
| 2  | Maximum             | 42199                              | 43.5                | 300                        | 38.25                            |
| 3  | Minimum             | 25106                              | 14.5                | 0                          | 23.54                            |
| 4  | Average             | 32508                              | 29                  | 148.25                     | 29.76                            |

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## CHAPTER-IV STUDY OF CO<sub>2</sub> MITIGATION

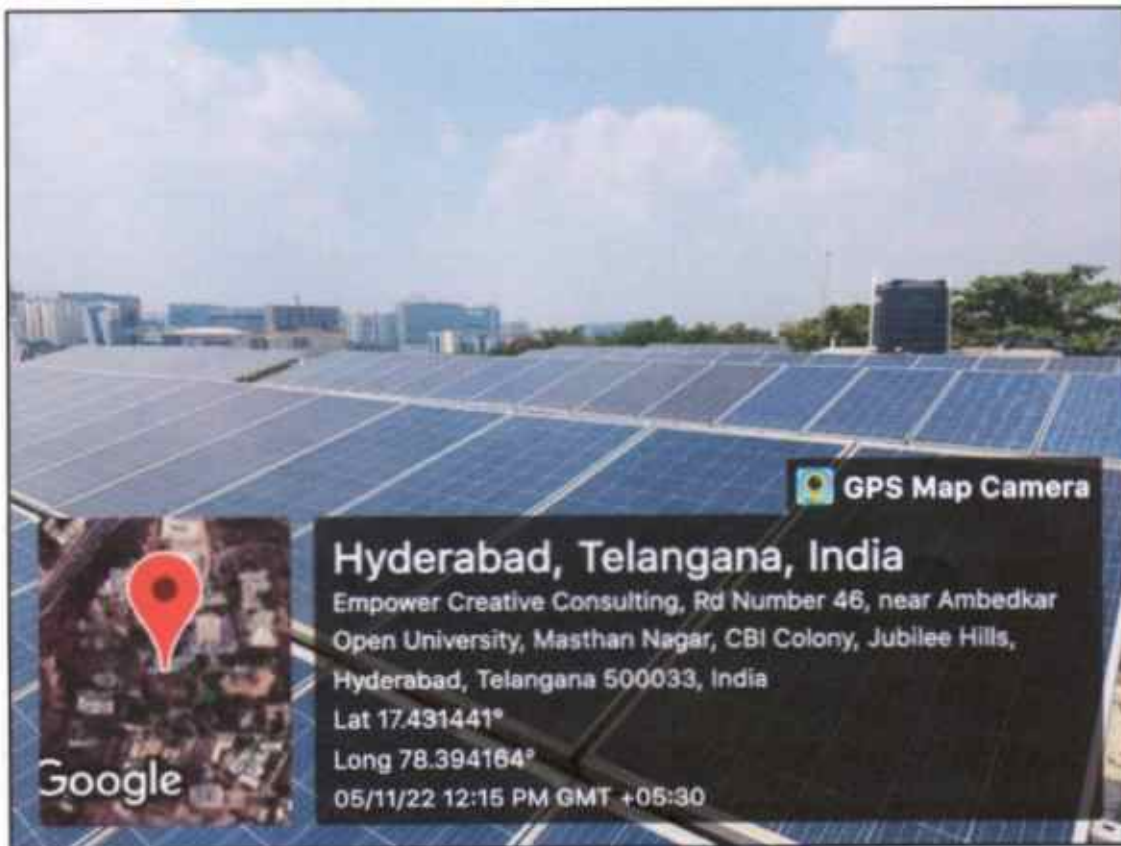
4.1 There are two ways by which the University is reducing the CO<sub>2</sub> emissions, namely:

1. The Usage of Renewable Energy, by installation of 2500 LPD Solar Thermal Water Heating System
2. Usage of 180 No's 20 W Energy Efficient LED Lighting.

### 4.2 Table No 9: Details of Solar Thermal Water Heating System

| No | Location            | Capacity in LPD |
|----|---------------------|-----------------|
| 1  | Gust house Building | 2500            |
|    | <b>Total</b>        | <b>2500</b>     |

### 4.3 Photograph of Solar Thermal Water Heating System: at Gust house building



**4.4 Computation of Reduction in CO<sub>2</sub> Emission: Table No 10:**

| S No      | Particulars  | Value        | Unit                  |
|-----------|--|--------------|-----------------------|
| 1         | Capacity of Solar Thermal Water Heating System   | 2500         | LPD                   |
| 2         | Electrical Energy Saved by 100LPD Solar Thermal System per Annum                                 | 1500         | kWh                   |
| 3         | For Calculations, we assume the Annual Energy saved in the year:2021-22                          | 750          | kWh                   |
| 4         | Annual Equivalent Energy Saved by Solar Thermal System   | <b>56677</b> | kWh                   |
| 5         | 1 kWh of Electrical Energy emits   | 0.9          | Kg of CO <sub>2</sub> |
| 6         | Reduction in CO <sub>2</sub> Emission by Solar Thermal Water Heating System                      | <b>2.77</b>  | MT/Annum              |
| 7         | Energy Saved by Replacing 600 no's 28WT- 5 Fittings by 20 W LEDs per Day (for 10 hour Operation) | <b>32</b>    | kWh                   |
| 8         | Annual Energy Saved (for 250 Days per annum)   | <b>3200</b>  | kWh                   |
| 9         | Annual Reduction in CO <sub>2</sub> Emission by LED Lighting                                     | <b>6.2</b>   | MT                    |
|           |  |              |                       |
| <b>10</b> | <b>Total Annual CO<sub>2</sub> Emission =(6)+(9)</b>   | <b>8.97</b>  | <b>MT</b>             |

  
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## CHAPTER-V

### STUDY OF WASTE MANAGEMENT

#### 5.1 Solid Waste Management

##### 5.1.1 Recyclable Solid Waste Management

The recyclable waste, namely paper waste is segregated at the source of the generation. There are about 80plus bins for collection of waste placed at all strategic locations. This waste material is further given to Authorized Vender for further disposal & recycling.

#### Photograph of Waste Collection Bin:



##### 5.1.2 Vermicomposting:

The University has almost 6 acres plantation. The University has installed a Vermi-Composting Plant and almost 100 MT of Vermi Compost is produced in this plant.

#### Photograph of Vermicomposting:



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## 5.2 E-Waste management:

The E Waste Includes: PCs, Printers, Pen drives, CDs etc.

For E-Waste management, the University follows the Methodology, as per the Government

Regulations & it is disposed of by calling the tenders, as per the Regulations.

  
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## CHAPTER-VI

### STUDY OF RAIN WATER HARVESTING

The University has already implemented the Rain Water Harvesting Project by two ways.

Namely: Farm Pond and collecting the rain water from terrace

#### 6.1 Construction of Water Ponds

The Dimensions of the Bund area: L=350m\*B=15m\*H=5m

The total 3 Water Storage Capacity is about **1.4 Million Liters.**

The ponds wasconstructed with cost of **Rs.1.5Lakhs**

The water from these ponds is used for watering the plants and for the domestic use. Only Drinking water is purchased from the HMWSSB.

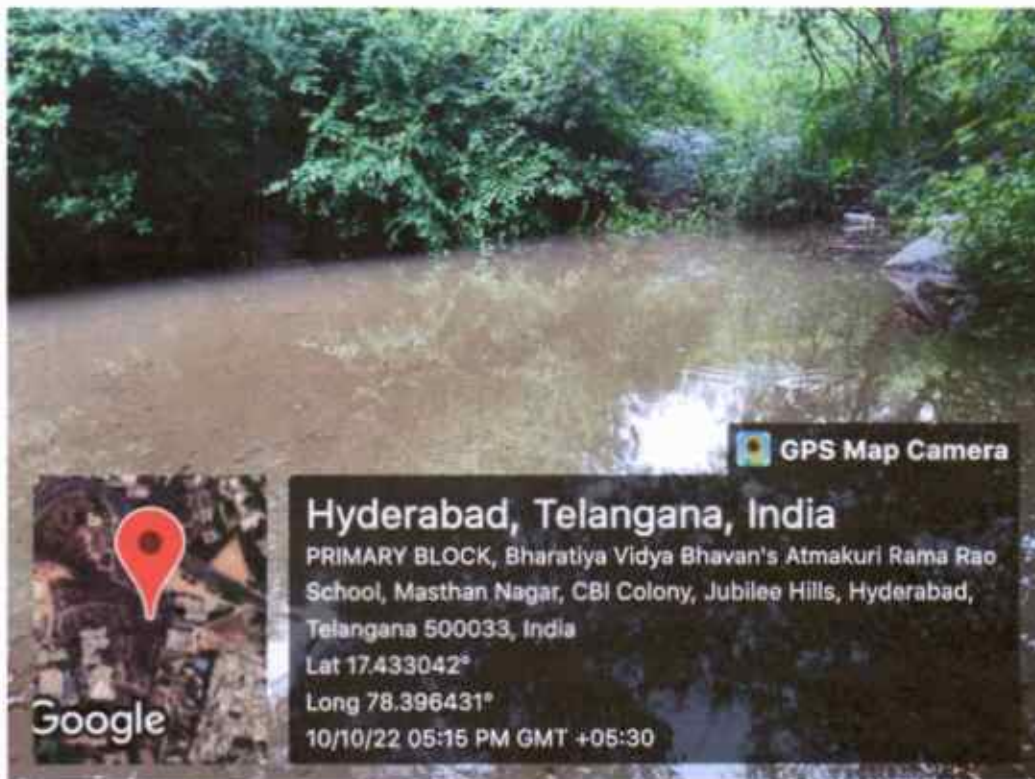
#### Photograph of Constructed water ponds:



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**Photograph of natural water ponds:**



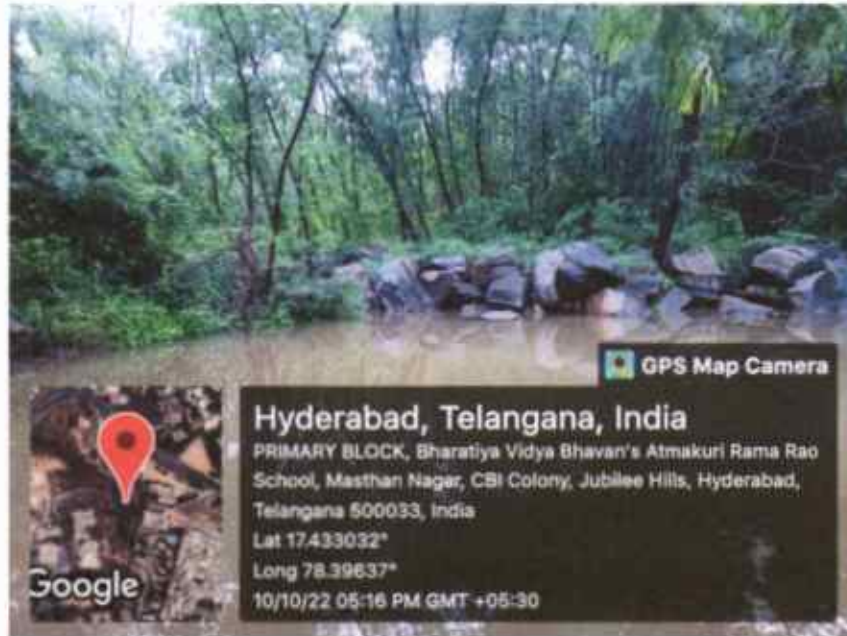
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### 6.2 Farm Pond:

The University has a farm pond which can store approximately 1.4 million liters of Water. This Farm Pond has helped the nearby farmers, as the underground water level has increased substantially due to this farm pond.

#### Photograph of Farm Pond:



### 6.3 Rain Water Harvesting from Terrace at Main Building:

The University has laid pipes to collect the Rain Water collected on the terrace of the University buildings. Separate water channels are built to further store this collected Water to ponds

#### Photograph of Rain Water Collecting Pipe from Terrace:



#### 6.4 Rain Water Harvesting from Terrace at Library Building:

The University has laid pipes to collect the Rain Water collected on the terrace of the Library building. This water is stored and in turn used for maintaining Lawn within the premises.

Photograph of Drinking water is purchased from the HMWSSB.



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## CHAPTER-VII

### STUDY OF ENVIRONMENTALLY FRIENDLY PRACTICES

#### 7.1 Smoke Free Campus:

The entire campus is smoke free at common places boards are displayed appealing to keep the campus Smoke Free.

Photograph of Smoke Free Campus display board: Need the photo:



#### 7.2 Plastic Free Campus:

The University is taking strict measures to keep the campus Plastic Free. At prominent places, boards are displayed to keep the campus Plastic Free.

Photograph of Display board displaying Plastic Free campus at the main entrance:



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### 7.3 Paperless Office:

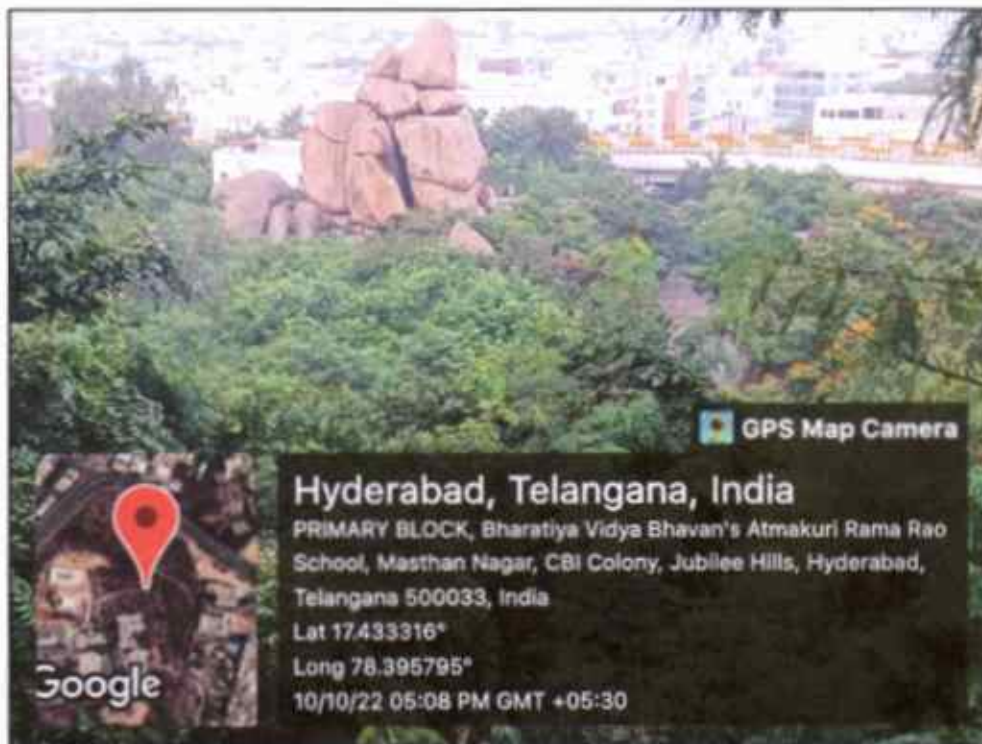
The University is taking various measures to make the Day-to-day operations Paper less. There about Thirteen sections/operations wherein software based solutions are adopted are:

- E-Books Down load
- BRAOU Regional Centers
- Finance
- Admission
- Results
- Migration
- Grievances
- Scanned copy of Marks list to name a few
- Revaluation of Answer Book
- E-Tenders

### 7.4 Green Cover in the Campus:

Out of a total area of 22 Acres, almost 54 Acres of Land is under, while 3 Acres under the plantation. More than 90% of total area is Green

#### Photograph of Green Cover in the Campus:



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### 7.5 Participation SWACHH BHARATH ABHIYAN:

The University is an active participant in the Government of India's most prestigious project of SWACHH BHARATH ABHIYAN.

The important highlights under this Program are.

- The campus is **SWACHHA** from inside: Has adequate number of Toilets, The Hostel facilities are cleanly maintained, The Water supply is sufficient & the cooking equipment are modern & efficient
- There are ample numbers of Garbage Bins and the collection of garbage is on Daily basis.
- The Garden Waste is composted by **Vermi-Composting** route
- Swachhta Lectures are held annually
- To promote the **Swachh Bharat Abhiyan** the University has adopted plantation program varies areas within the campus area

  
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## CHAPTER-VIII

### STUDY OF ECO FRIENDLY & SUSTAINABLE INITIATIVES

In this Chapter, we discuss the various Eco Friendly and Sustainable Initiatives undertaken by the University.

#### 8.1 Participation in Unnat Bharat Abhiyan:

Under this Program, the following activities are taken in the university campus:  
Disseminating the information on:

- Need & Importance of Personal Hygiene & Sanitation
- Hygiene of Water resources

#### 8.2 Participation of Affiliated Colleges in National Service Scheme (NSS) Program:

Under the University there are about 50 Plus Learning centers. From these affiliated centers, about 1200 plus students are involved in the National Service Scheme (NSS) program.

The major activities under this Program are:

- Tree Plantation Campaign
- Water conservation

**Photograph of Tree Plantation Campaign:**



*Dr. B.R. Ambedkar*  
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Director, CIQA  
Dr. B.R. Ambedkar Open University  
Hyderabad - 500033



## CHAPTER-IX RECOMMENDATIONS

It is recommended to:

1. Install Roof Top Solar PV Plant
2. Replace 600 No's T-5 Fittings by 20 W LED Fittings
3. To set target of reduction in use of paper by about 5 % on year-to-year basis.

  
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**ANNEXURE-I**

**LIST OF PLANTED TREES**

| S No | Name of the Plant    | No of plants |
|------|----------------------|--------------|
| 1    | Spanish Cherry       | 27           |
| 2    | Indian elm           | 46           |
| 3    | African tulip tree   | 18           |
| 4    | Neem Tree            | 32           |
| 5    | Peltophorum          | 87           |
| 6    | Rain Tree            | 9            |
| 7    | Portia Tree          | 1            |
| 8    | Yellow Trumpet Tree  | 6            |
| 9    | Eucalyptus           | 64           |
| 10   | Wild date palm       | 1            |
| 11   | Royal Palm           | 22           |
| 12   | Indian Cork wood     | 26           |
| 13   | Trumpet bush tree    | 11           |
| 14   | Pongam tree          | 9            |
| 15   | Teak                 | 42           |
| 16   | Cucumber Tree        | 2            |
| 17   | Pink Trumpet Tree    | 7            |
| 18   | Peepal               | 5            |
| 19   | Lebbek Tree          | 9            |
| 20   | Indian Black Berry   | 4            |
| 21   | Indian almond Tree   | 17           |
| 22   | Silver Oak           | 12           |
| 23   | Ashoka               | 32           |
| 24   | Palmyra alstonia     | 24           |
| 25   | Mahua Butter Tree    | 5            |
| 26   | Leguminosae          | 27           |
| 27   | Wild Indian Almond   | 7            |
| 28   | Tamarind             | 6            |
| 29   | Mango                | 27           |
| 30   | Indian Sissoo        | 13           |
| 31   | Bamboo               | 22           |
| 32   | Manila Tamarind Tree | 8            |
| 33   | Common Fig           | 2            |
| 34   | Ficusbenjamina       | 2            |
| 35   | Banyan Tree          | 2            |
| 36   | Temple Tree          | 16           |
| 37   | Illintha             | 32           |
| 38   | Subhabul             | 1080         |
| 39   | Jujubi               | 6            |
| 40   | Pala Kodesha         | 7            |
| 41   | Thunki               | 11           |
| 42   | Kanchanam            | 6            |
| 43   | NarInghi             | 21           |
| 44   | NallaThumma          | 2            |

*Mrunal*  
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# GREEN AUDIT REPORT

Of

Dr. B.R AMBEDKAR OPEN UNIVERSITY

G Ram Reddy Marg, Masthan Nagar,

CBI Colony, Jubilee Hills, Hyderabad,

Telangana 500033



Year: 2021-22

Prepared by:

**HYM International Certifications Pvt Ltd**

P.No. 163A, Flat No. 201,

Addagutta Society, Kukatpally, Hyderabad- 500 077.

Phone: 098661 92420/ 90326 92420 Email: [hym@hymcertifications.com](mailto:hym@hymcertifications.com)

*Menthy*  
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Director, CIQA  
Dr. B.R. Ambedkar Open University  
Hyderabad - 500033





# Certificate

**HYM International Certifications Pvt. Ltd.**

Certified that the Environmental Management System of

**Dr.B.R. AMBEDKAR OPEN UNIVERSITY**

Prof.G. Ram Reddy Marg, Road No:46, Jubilee Hills, Hyderabad - 500 033,  
Telangana State, India

has been assessed and found to be in accordance with the requirements of the environmental standards

## ISO 14001 : 2015

for the following scope of certification

### IMPLEMENTATION OF GREENERY AND ENVIRONMENTAL PROMOTION ACTIVITIES

Further information about the scope of this certificate and applicability of ISO 14001 : 2015 requirements may be obtained by consulting the organization.

Issue Date : 17/10/2022

1st Surveillance 16/10/2023

Renewal Date : 16/10/2025

2nd Surveillance 16/10/2024



Authorised Signature

Certificate No : **E91864140193**

**HYM International Certifications Pvt. Ltd**

**NOTE: This Certificate is Valid From 17/10/2022 to 16/10/2023**

This is an accredited certificate authorized for issue by Accreditation Service for Certifying Bodies [Europe] Limited who have assessed M/s.HYM International Certifications Pvt. Ltd. against defined criteria and in cognizance of ISO 17021:2015 "Conformity Assessment - Requirements for bodies providing audit and Certification of management Systems".

[www.hymcertifications.com](http://www.hymcertifications.com) on for checking the validation of the Certification

Regd. Office : Plot No. 265/C, Addagutta Society, Opp. JNTU, Kukatpally, Hyderabad - 500 072, Telangana State, India.  
E-mail: [siva@hymcertifications.com](mailto:siva@hymcertifications.com), Website: [www.hymcertifications.com](http://www.hymcertifications.com)

*Menthi*  
Authorized Signatory  
Director, CIOA  
Dr. B.R. Ambedkar Open University  
Hyderabad - 500023

**HYM International Certifications Pvt Ltd**

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Addagutta Society, Kukatpally, Hyderabad- 500 077.

Phone: 098661 92420/ 90326 92420 Email: hym@hymcertifications.com

Ref:EC/BRAOU/21-22/02\*\*\*\*\*

Date:10/6/2021

**CERTIFICATE**

This is to certify that we have conducted **Green Audit** at Dr. B.R Ambedkar Open University,, G Ram Reddy Marg, Masthan Nagar, CBI Colony, Jubilee Hills, Hyderabad, Telangana 500033 in the year 2021-22.

The University has already adopted following **Green practices**:

- Usage of Energy Efficient LED Fittings
- Maximum Usage of Day Lighting in the campus
- Installation of **13625 LPD** Solar Thermal Water Heating System.
- Construction of Farmpond
- Rain Water Harvesting Project for making use of rain water falling on terrace
- Segregation of Recyclable Waste at source

We appreciate the support of Management and involvement of faculty members and staff members in the process of making the campus Energy Efficient and Green.

For HYM International Certifications Pvt Ltd,

Certified Energy Auditor  
EA-8192

  
Authorized Signatory  
Director, CIQA  
Dr. B.R. Ambedkar Open University  
Hyderabad - 500033

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## ACKNOWLEDGEMENT

We HYM International Certifications Pvt Ltd,Hyderabad, express our sincere gratitude to the management of **Dr B.R Ambedkar Open University; Hyderabad** was awarding us the assignment of Green Audit of Dr. B.R Ambedkar Open University, Campus for the year 2021-22.

We are thankful to:

- Prof. K. Seetharama Rao, Vice chancellor
- Dr. A. V. N. Reddy, Registrar
- Prof. P. Madhusudhan Reddy, NAAC Coordinator
- Smt. K. Leela Laxma Reddy, President, Council for Green revolution

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

  
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Dr. B.R. Ambedkar Open University  
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## EXECUTIVE SUMMARY

After the field study & analysis, we present here with important observations made during the assignment of green audit.

1. Dr BR Ambedkar Open University, Hyderabad Energy in three forms namely: Electrical energy, diesel and LPG

2. Present Energy Consumption:

| Parameter /value | Electrical Energy Consumed, kWh | LPG consumed, KG | Diesel consumed, Liters | CO <sub>2</sub> Emissions, MT |
|------------------|---------------------------------|------------------|-------------------------|-------------------------------|
| Total            | 390094                          | 348              | 1779                    | 357.23                        |
| Maximum          | 42199                           | 43.5             | 300                     | 38.25                         |
| Minimum          | 25106                           | 14.5             | 0                       | 23.54                         |
| Average          | 32508                           | 29               | 148.25                  | 29.76                         |

3. Energy Conservation Projects already installed:

- Usage of Energy Efficient LED fittings
- Usage of Maximum Day Lighting
- Installation of **2500 LPD** Solar Thermal Water Heating System

4. Usage of Renewable Energy:

- The University has installed a **2500 LPD** Solar Thermal Water Heating System.
- The Percentage of usage of Renewable Energy to Annual Energy Demand is **17.29%**.
- The reduction in CO<sub>2</sub> emissions due to Solar Thermal Water Heating System is **32.37 MT/Annum**.

5. Waste Management:

5.1 Solar Waste Management:

- **Segregation of waste at source & Recycling:** The recyclable waste, like paper, board etc. is segregated at source. There are separate bins for collection at various points and is disposed of for further for recycling.
- **Vermi-Composting :** The University has vermi -Composting facility & about **36.5 MT** of Vermi compost is produced in a year

5.2 E - Waste Management:

- For E - Waste Management, the University follows the Methodology, as per the Government Regulations & it is disposed of by calling the tenders

5.3 Liquid Waste Management:

- It is recommended to go for a Sewage Treatment Plant, for recycling of the liquid waste

*Provenly*  
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## 6. Rain Water Harvesting:

The University has already installed Rain Water Harvesting Project in three ways:

- Constructing a two bund sof storage capacity **1.2 Million Liters**
- Farm Pond
- Proper channelizing the rain water falling on the terrace of main building & Library

## 7. Green Innovative Practices:

- **Smoke Free & Plastic Free Campus:** At various locations in the University campus boards are displayed, for making the Campus Smoke and Plastic Free.
- **Paperless Office:** The University has adopted a Software based system with respect to almost thirteen types of various operations involved on Day-to-Day basis
- **Green Cover in the Campus:**Out of total area of **22 acres**, almost**52 acres**of area is under Green Cover. The percentage of Green Cover is more than **90%**.

## 8. Eco Friendly & sustainable Initiatives:

- **Participation in Unnat Bharat Abhiyan:** The University is actively participating in the Unnat Bharat Abhiyan and community development activities are undertaken under this.
- **Participation In National service Scheme:** About 1200 plus students from affiliated Learning centers have carried out many activities like Tree Plantation, Water Conservation, Road construction in the adopted villages.

## 9. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>**into atmosphere
2. **1 Kg of LPG** releases**2.93 Kg of CO<sub>2</sub>**into atmosphere
3. **1 Liter of Diesel**emits**2.68 Kg CO<sub>2</sub>**into atmosphere.
4. Daily working hours-**7 to 12 Nos.**
5. Annual working Days-**250 to 385 Nos.**
6. Load Factor for use of Solar Thermal Water Heating System:**50%**

## 10. Recommendations:

1. Install Roof Top Solar PV Plant
2. Replace 600 No's T-5 Fittings by 20 W LED Fittings
3. To sat target of reduction in use of paper by about 5 % on year-to-year basis.
4. To install a Bio Sewage Treatment Plant.

## 11. References:

- For calculation of CO2 Emissions:\*\*\*\*\*
- For Energy Saved by Solar Thermal Plant:\*\*\*\*\*

  
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## ABBREVIATIONS

|                 |                         |
|-----------------|-------------------------|
| KWh             | Kilo Watt Hour          |
| kWp             | Kilo Watt Peak          |
| Kg              | Kilogram                |
| MT              | Metric Ton              |
| CO <sub>2</sub> | Carbon Di Oxide         |
| LPD             | Liters per Day          |
| LPG             | Liquefied Petroleum Gas |
| LED             | Light Emitting Diode    |
| Qty             | Quantity                |
| M               | Meters                  |
| L               | Length                  |
| B               | Breadth                 |
| H               | Height                  |

  
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## CHAPTER-I

### INTRODUCTION

#### 1.1 Objectives:

1. To study present level of Energy Consumption
2. To study the present CO2 emissions
3. To study usage of Renewable Energy
4. To study Waste Management: Solid, Liquid and e-waste.
5. To study Rain Water harvesting
6. To study Green and Innovative practices.

#### 1.1 TableNo1:GeneralDetailsoftheUniversity:

| No | Head                      | Particulars   |
|----|---------------------------|---|
| 1  | Name of Institution       | Dr. B.R. Ambedkar Open University   |
| 2  | Address                   | G Ram Reddy Marg, Masthan Nagar, CBI Colony, Jubilee Hills, Hyderabad, Telangana 500033 |
| 3  | Year of Establishment     | 1982  |
| 4  | Academic Programs Offered | 200 Plus  |

  
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## CHAPTER-II

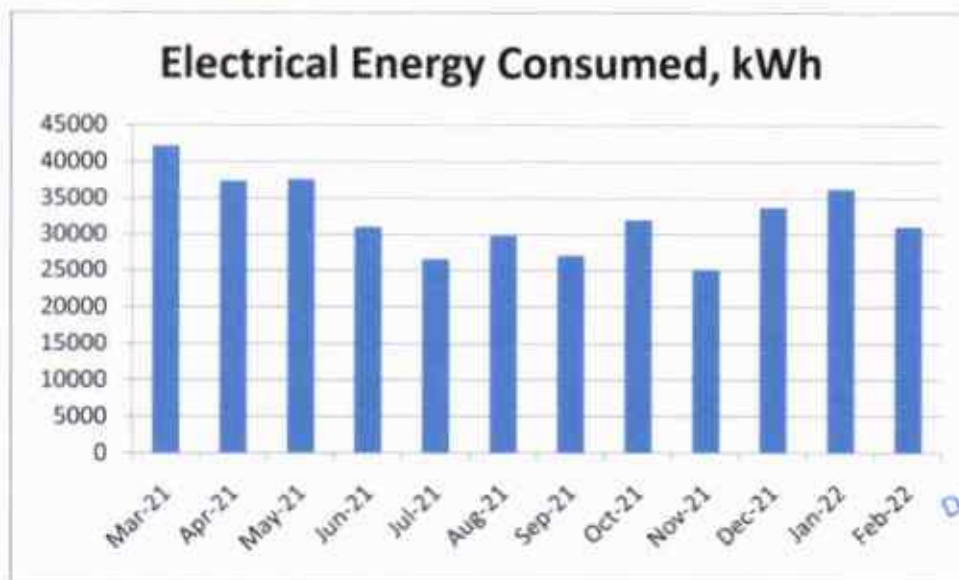
### STUDY OF PRESENT ENERGY CONSUMPTION

In this Chapter, We present the analysis of last year Energy Consumption

**2.1 Table No 2: Study of Electrical Energy, LPG and Diesel Consumption: 2021-22**

| No | Month   | Electrical Energy Consumed, kWh | LPG Consumed, Kg | Diesel Consumed, Liters |
|----|---------|---------------------------------|------------------|-------------------------|
| 1  | Mar-21  | 42199                           | 43.5             | 50                      |
| 2  | Apr-21  | 37387                           | 29               | 120                     |
| 3  | May-21  | 37640                           | 29               | 300                     |
| 4  | Jun-21  | 31023                           | 29               | 25                      |
| 5  | Jul-21  | 26607                           | 43.5             | 32                      |
| 6  | Aug-21  | 29825                           | 14.5             | 300                     |
| 7  | Sep-21  | 27109                           | 29               | 52                      |
| 8  | Oct-21  | 32004                           | 14.5             | 300                     |
| 9  | Nov-21  | 25106                           | 29               | 300                     |
| 10 | Dec-21  | 33776                           | 29               | 0                       |
| 11 | Jan-22  | 36319                           | 14.5             | 300                     |
| 12 | Feb-22  | 31099                           | 43.5             | 0                       |
| 13 | Total   | 390094                          | 348              | 1779                    |
| 14 | Maximum | 42199                           | 43.5             | 300                     |
| 15 | Minimum | 25106                           | 14.5             | 0                       |
| 16 | Average | 32508                           | 29               | 148.25                  |

**2.2 To Study the Variation of Monthly Electrical Energy Consumption: Chart No: 1**

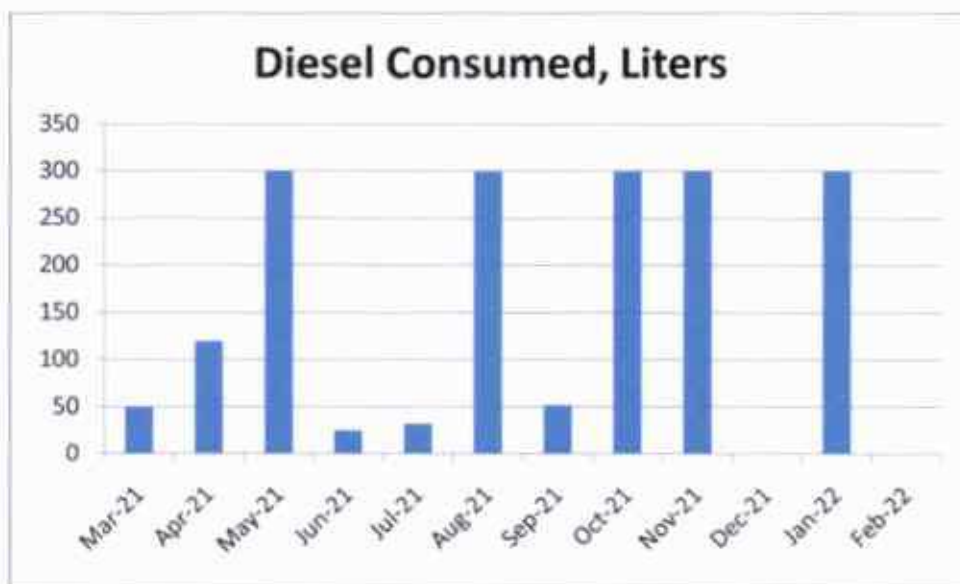


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2.3 Study of Month wise LPG Consumption: Chart No: 2



2.3 Study of Month wise Diesel Consumption: Chart No: 3



From the above analysis, we present following important parameters:

Table No 3: Variation in Important Parameters:

| No | Parameter/ Value | Electrical Energy Consumed, kWh | LPG Consumed, Kg | Diesel Consumed, Liters |
|----|------------------|---------------------------------|------------------|-------------------------|
| 1  | Total            | 390094                          | 348              | 1779                    |
| 2  | Maximum          | 42199                           | 43.5             | 300                     |
| 3  | Minimum          | 25106                           | 14.5             | 0                       |
| 4  | Average          | 32508                           | 29               | 148.25                  |

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## 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 University for performing its day to day activities

The University uses three forms of Energy namely: Electrical Energy for various Electrical gadgets, LPG and Diesel.

**Basis for computation of CO<sub>2</sub> Emissions:**

The basis of Calculation for CO<sub>2</sub> emissions due to LPG & Electrical Energy are as under

- 1 Unit (kWh) of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere.
- 1 Kg of LPG releases 2.93 Kg of CO<sub>2</sub> into atmosphere.
- 1 Liter of Diesel releases 2.88 Kg of CO<sub>2</sub> into atmosphere.

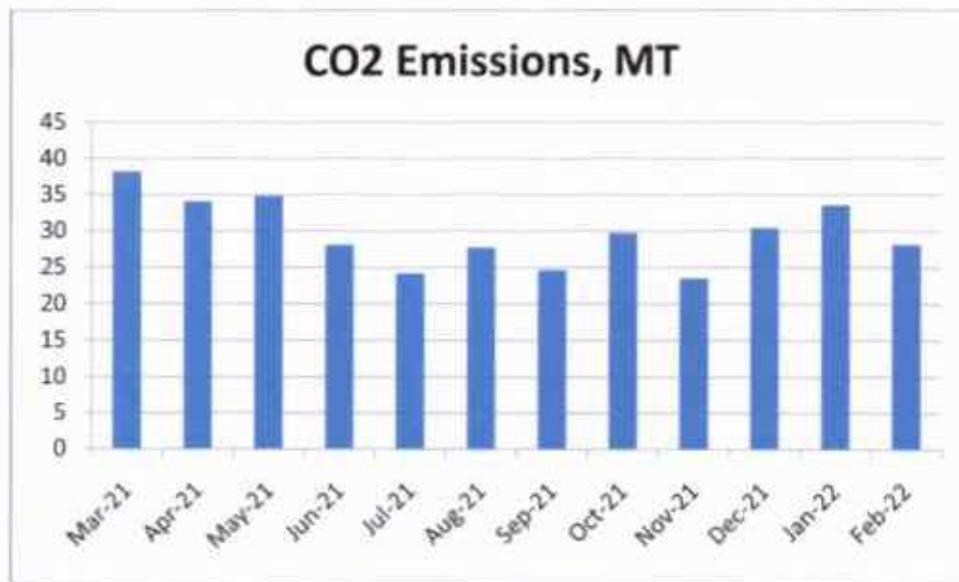
Based on the above Data we compute the CO<sub>2</sub> emissions which are being released in to the atmosphere by the University due to its Day to Day operations.

**Table No 4: Month wise Energy Consumption & CO<sub>2</sub> Emissions**

| No | Month   | Electrical Energy Consumption, kWh | LPG Consumed, Kg | Diesel Consumed, Liters | CO <sub>2</sub> Emissions, MT |
|----|---------|------------------------------------|------------------|-------------------------|-------------------------------|
| 1  | Mar-21  | 42199                              | 43.5             | 50                      | 38.25                         |
| 2  | Apr-21  | 37387                              | 29               | 120                     | 34.08                         |
| 3  | May-21  | 37640                              | 29               | 300                     | 34.82                         |
| 4  | Jun-21  | 31023                              | 29               | 25                      | 28.08                         |
| 5  | Jul-21  | 26607                              | 43.5             | 32                      | 24.17                         |
| 6  | Aug-21  | 29825                              | 14.5             | 300                     | 27.75                         |
| 7  | Sep-21  | 27109                              | 29               | 52                      | 24.63                         |
| 8  | Oct-21  | 32004                              | 14.5             | 300                     | 29.71                         |
| 9  | Nov-21  | 25106                              | 29               | 300                     | 23.54                         |
| 10 | Dec-21  | 33776                              | 29               | 0                       | 30.48                         |
| 11 | Jan-22  | 36319                              | 14.5             | 300                     | 33.59                         |
| 12 | Feb-22  | 31099                              | 43.5             | 0                       | 28.12                         |
| 13 | Total   | 390094                             | 448              | 1779                    | 357.23                        |
| 14 | Maximum | 42199                              | 43.5             | 300                     | 38.25                         |
| 15 | Minimum | 25106                              | 14.5             | 0                       | 23.54                         |
| 16 | Average | 32508                              | 29               | 148.25                  | 29.76                         |



Representation of Month wise CO<sub>2</sub> Emissions: Chart No: 4



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## CHAPTER-IV

### STUDY OF RENEWABLE ENERGY INITIATIVES

The University has installed Solar Thermal Water Heating System. The details of Installation are as under.

**Table No 5: Details of Solar Thermal Water Heating System**

| No | Location            | Capacity in LPD |
|----|---------------------|-----------------|
| 1  | Gust house Building | 2500            |
|    | <b>Total</b>        | <b>2500</b>     |

**Table No 6: Percentage of usage of Alternative Energy:**

| No | Particulars   | Value         | Unit |
|----|---|---------------|------|
| 1  | Energy Purchased from TSSPDCL in the Year:2021-22                       | <b>452682</b> | kWh  |
| 2  | Capacity of Solar Thermal Water Heating System                          | 2500          | LPD  |
| 3  | Electrical Energy Saved by 100LPD Solar Thermal System per Annum        | 1500          | kWh  |
| 4  | For Calculations, we assume the Annual Energy saved in the year:2021-22 | 750           | kWh  |
| 5  | Annual Equivalent Energy Saved by Solar Thermal System                  | <b>56677</b>  | kWh  |
| 6  | Total Annual Electrical Energy Requirement =(1)+(5)                     | <b>509359</b> | kWh  |
| 7  | Percent of Alternate Energy to Annual Energy Requirement= $(6)*100/(7)$ | <b>11.25</b>  | %    |

#### Photograph of Solar Thermal Water Heating System: at Yash Inn Facility



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4.4 Computation of Reduction in CO2 Emission: Table No 7

| S No | Particulars   | Value        | Unit                  |
|------|---|--------------|-----------------------|
| 1    | Capacity of Solar Thermal Water Heating System                              | 2500         | LPD                   |
| 2    | Electrical Energy Saved by 100LPD Solar Thermal System per Annum            | 1500         | kWh                   |
| 3    | For Calculations, we assume the Annual Energy saved in the year:2020-21     | 750          | kWh                   |
| 4    | Annual Equivalent Energy Saved by Solar Thermal System                      | <b>56677</b> | kWh                   |
| 5    | 1 kWh of Electrical Energy emits  | 0.9          | Kg of CO <sub>2</sub> |
| 6    | Reduction in CO <sub>2</sub> Emission by Solar Thermal Water Heating System | <b>2.77</b>  | MT/Annum              |

  
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## CHAPTER-V

### STUDY OF WASTE MANAGEMENT

#### 5.1 Solid Waste Management

##### 5.1.1 Recyclable Solid Waste Management

The recyclable waste, namely paper waste is segregated at the source of the generation. There are about 80plus bins for collection of waste placed at all strategic locations. This waste material is further given to Authorized Vender for further disposal & recycling.

#### Photograph of Waste Collection Bin:



##### 5.1.2 Vermicomposting:

The University has almost 6 acres plantation. The University has installed a Vermi-Composting Plant and almost 100 MT of Vermi Compost is produced in this plant.

#### Photograph of Vermicomposting:



*Pooni*  
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Director, CIQA  
Dr. B.R. Ambedkar Open University  
Hyderabad - 500033



## 5.2 E-Waste management:

The E Waste Includes: PCs, Printers, Pen drives, CDs etc.

For E-Waste management, the University follows the Methodology, as per the Government

Regulations & it is disposed of by calling the tenders, as per the Regulations.

  
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Dr. B.R. Ambedkar Open University  
Hyderabad - 500033

## CHAPTER-VI

### STUDY OF RAIN WATER HARVESTING

The University has already implemented the Rain Water Harvesting Project by two ways.

Namely: Farm Pond and collecting the rain water from terrace

#### 6.1 Construction of Water Ponds

The Dimensions of the Bund area: L=350m\*B=15m\*H=5m

The total 3 Water Storage Capacity is about **1.4 Million Liters.**

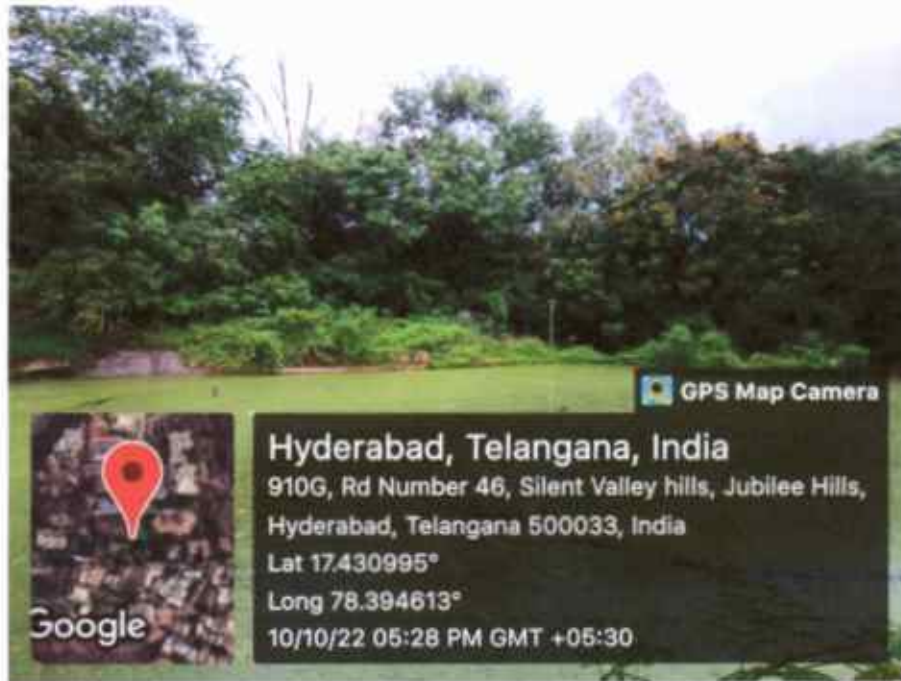
The ponds was constructed with cost of **Rs.1.5Lakhs**

The water from these ponds is used for watering the plants and for the domestic use. Only Drinking water is purchased from the HMWSSB.

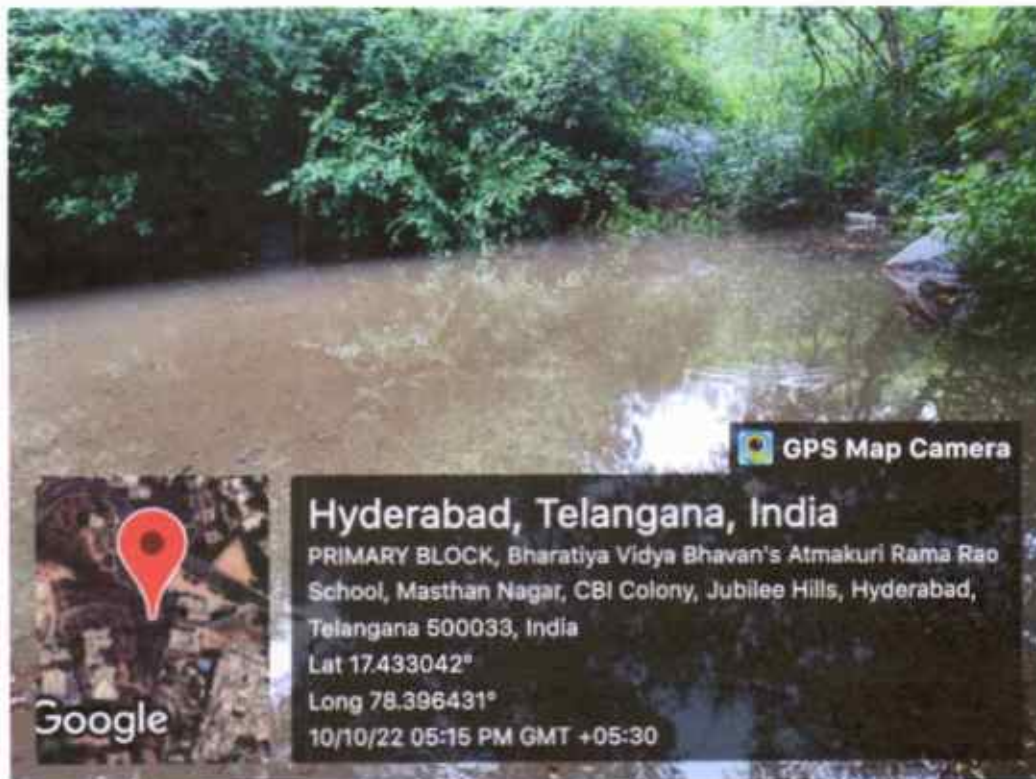
#### Photograph of Constructed water ponds :



*Dr. B.R. Ambedkar*  
Authorized Signatory  
Director, CIQA  
Dr. B.R. Ambedkar Open University  
Hyderabad - 500033



Photograph of natural water ponds :



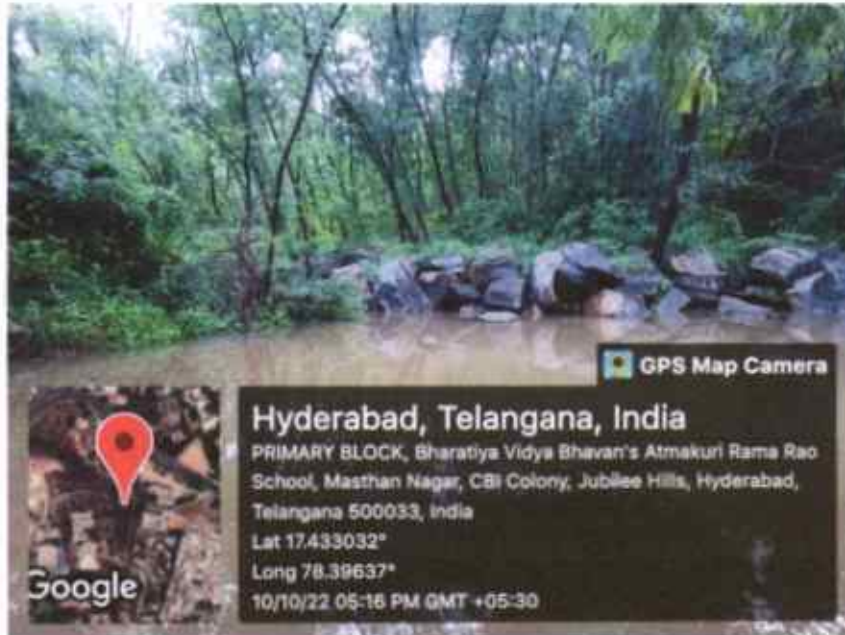
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Dr. B.R. Ambedkar Open University  
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### 6.2 Farm Pond:

The University has a farm pond which can store approximately 1.4 million liters of Water. This Farm Pond has helped the nearby farmers, as the underground water level has increased substantially due to this farm pond.

#### Photograph of Farm Pond:



### 6.3 Rain Water Harvesting from Terrace at Main Building:

The University has laid pipes to collect the Rain Water collected on the terrace of the University buildings. Separate water channels are built to further store this collected Water to ponds.

#### Photograph of Rain Water Collecting Pipe from Terrace:



*Preethi*  
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Dr. B.R. Ambedkar Open University  
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#### 6.4 Rain Water Harvesting from Terrace at Library Building:

The University has laid pipes to collect the Rain Water collected on the terrace of the Library building. This water is stored and in turn used for maintaining Lawn within the premises.

Photograph of Drinking water is purchased from the HMWSSB.



*[Handwritten Signature]*  
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Dr. B.R. Ambedkar Open University  
Hyderabad - 500033

## CHAPTER-VII

### STUDY OF GREEN AND INNOVATIVE PRACTICES

#### 7.1 Smoke Free Campus:

The entire campus is smoke free at common places boards are displayed appealing to keep the campus Smoke Free.

**Photograph of Smoke Free Campus display board: Need the photo:**



#### 7.2 Plastic Free Campus:

The University is taking strict measures to keep the campus Plastic Free. At prominent places, boards are displayed to keep the campus Plastic Free.

**Photograph of Display board displaying Plastic Free campus at the main entrance:**



*[Handwritten Signature]*  
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### 7.3 Pedestrian Friendly Roads:

The University has well maintained roads as to facilitate the easy movement of the commuters within the campus.

#### Photograph of Internal Roads in the campus:



### 7.4 Paperless Office:

The University is taking various measures to make the Day-to-day operations Paper less. There about Thirteen sections/operations wherein software based solutions are adopted are:

- E-Books Down load
- BRAOU Regional Centers
- Finance
- Admission
- Results
- Migration
- Grievances
- Scanned copy of Marks list to name a few
- Revaluation of Answer Book
- E-Tenders

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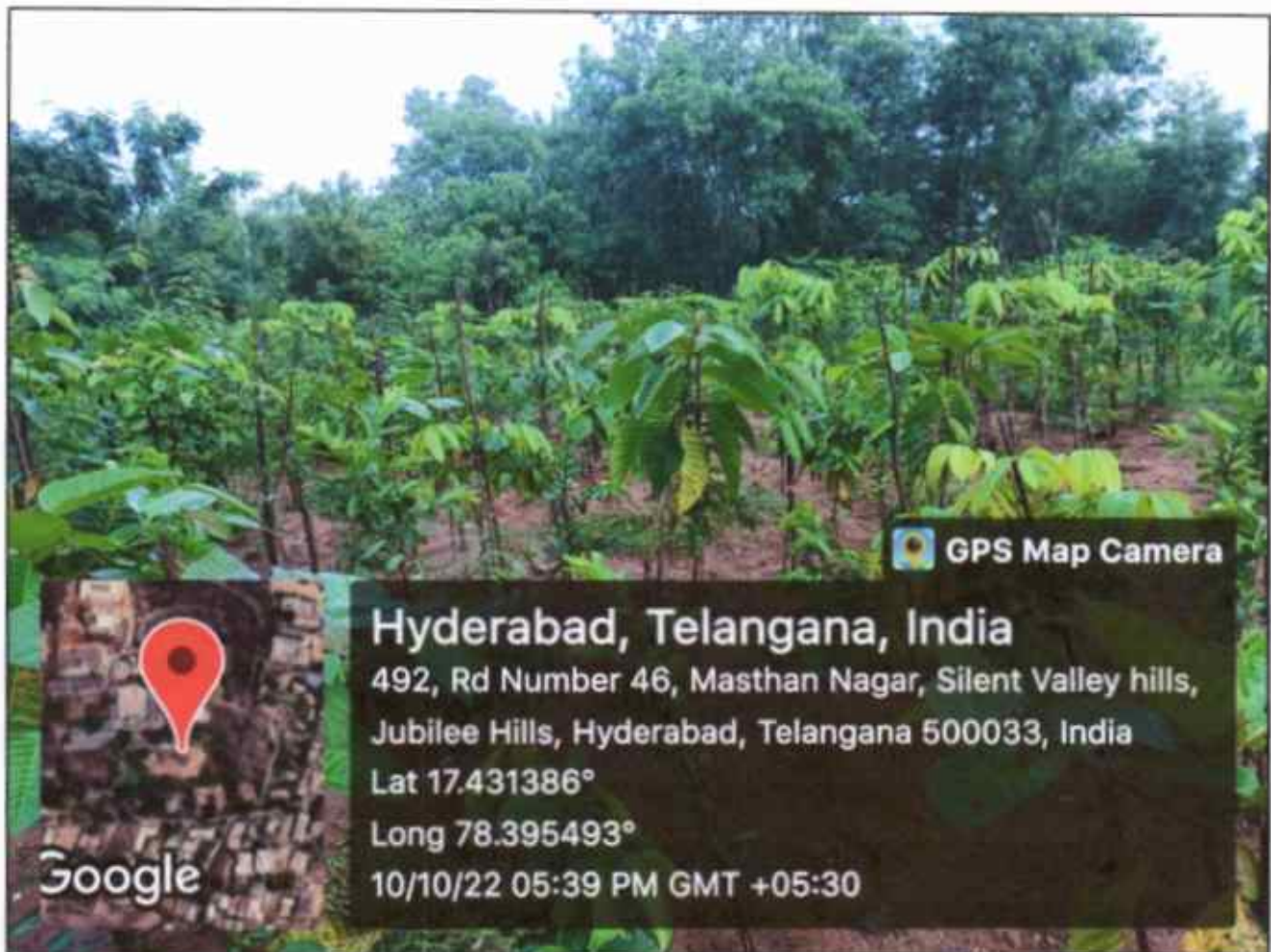


## 7.5 Plantation in the Campus:

### 7.5.1 Miyawaki and Medicinal Garden:

The Council for Green Revolution, United Way of Hyderabad and H&R Block India Pvt Ltd organization are implemented Plantation programs in the campus. They were planted miyawaki and herbal gardens in the university High density plantation micro irrigation system low cost technologies etc

#### Photograph of Plantation in the campus:



### 7.5.2 Landscaping of the Campus:

A **landscape** is the visible features of an area of land, its landforms, and how they integrate with natural or man-made features. The character of a **landscape** helps define the self-image of the people who inhabit it and a sense of place that differentiates one region from other regions.

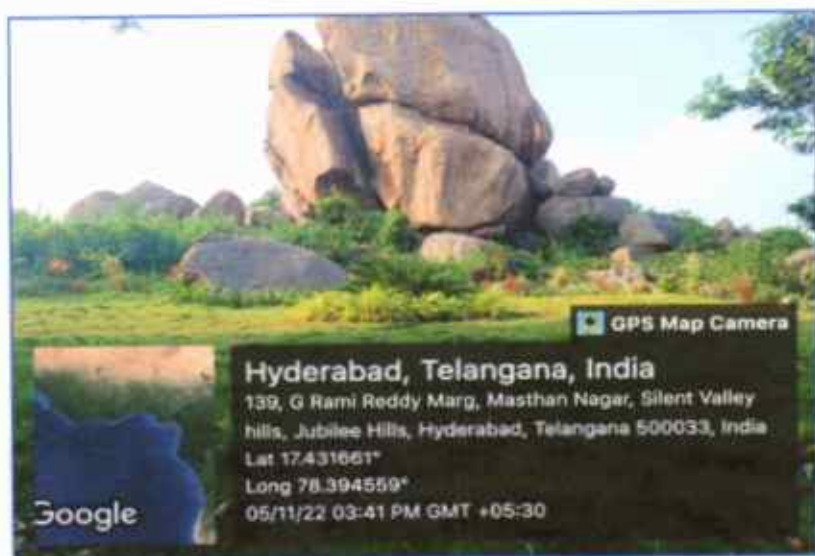
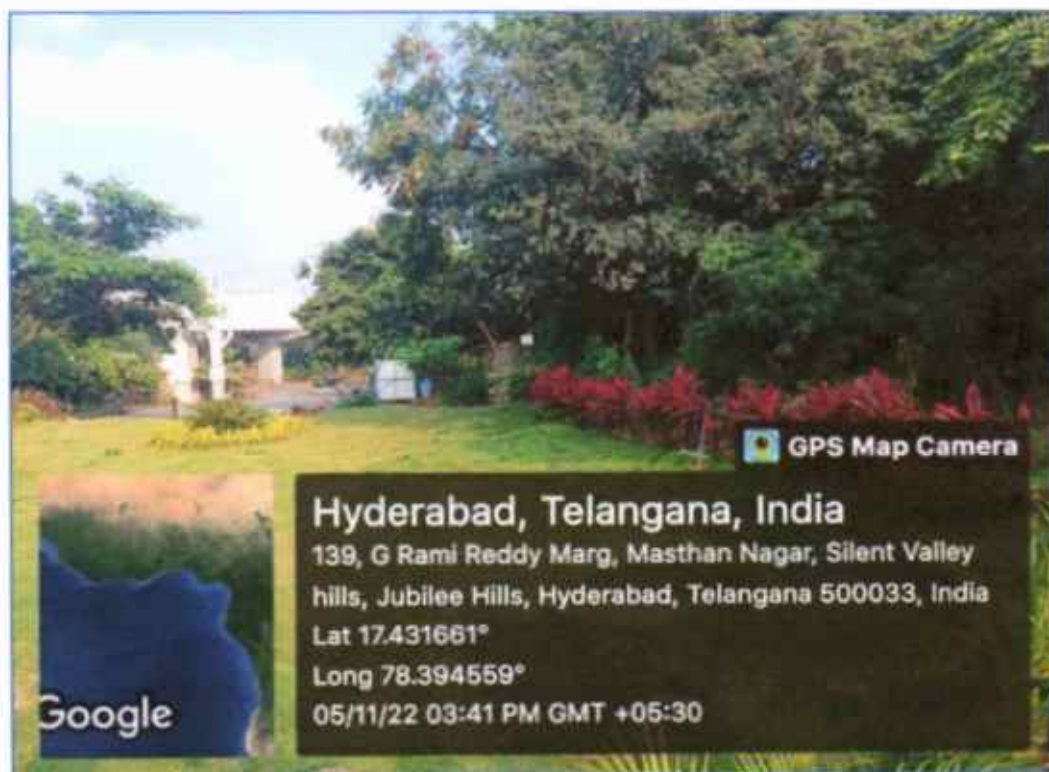
A comprehensive, sustainable **landscape** design typically addresses a series of **goals**: protecting the site and surrounding land and ecosystems — soil, water, and wildlife; reducing water use; limiting pesticide



use; using plants and materials from local sources; minimizing mowing requirements; ensuring the health. The principles are the fundamental concepts of composition-proportion, order, **repetition**, and unity—that serve as guidelines to arrange or organize the features to create an aesthetically pleasing or beautiful landscape.

The University campus is spread over 150 Acres of land and is located near Gangapur Dam. Since 1989 beautification of university campus is on till date. The Landscaping is approximately done on 20 Acres of total land.

**Photograph of Landscaped Garden in the campus:**

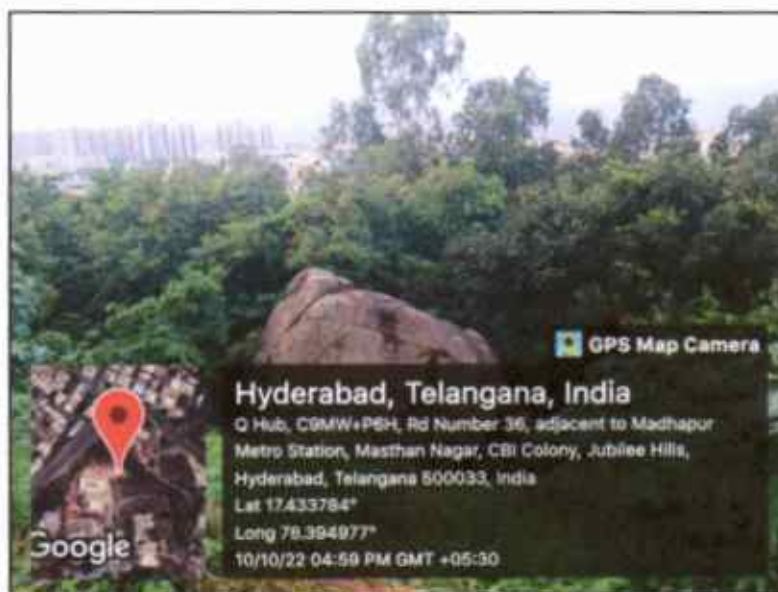


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### 7.5.3 Maintenance of Natural Forest Area:

In 1991 for development of green campus initially various forestry species plants were planted on an area of **22 acres**. Regular watering and fertilizers were applied to the plants. Wall fencing is done for the total area to protect the plantation from stray animals and also from cutting the trees for firewood by humans, at actual now total plantation has survived and fully grown. There is an increase 25 percent of plant population which ere naturally germinated and survived.

#### Photograph of Natural within the campus:



### 7.5.4 Planting of Ornamental Plants:

For beatification of our university campus we have taken initiative in which the University planted many species of ornamental plants at various sites in the campus.

#### Photograph of Ornamental Plantation:



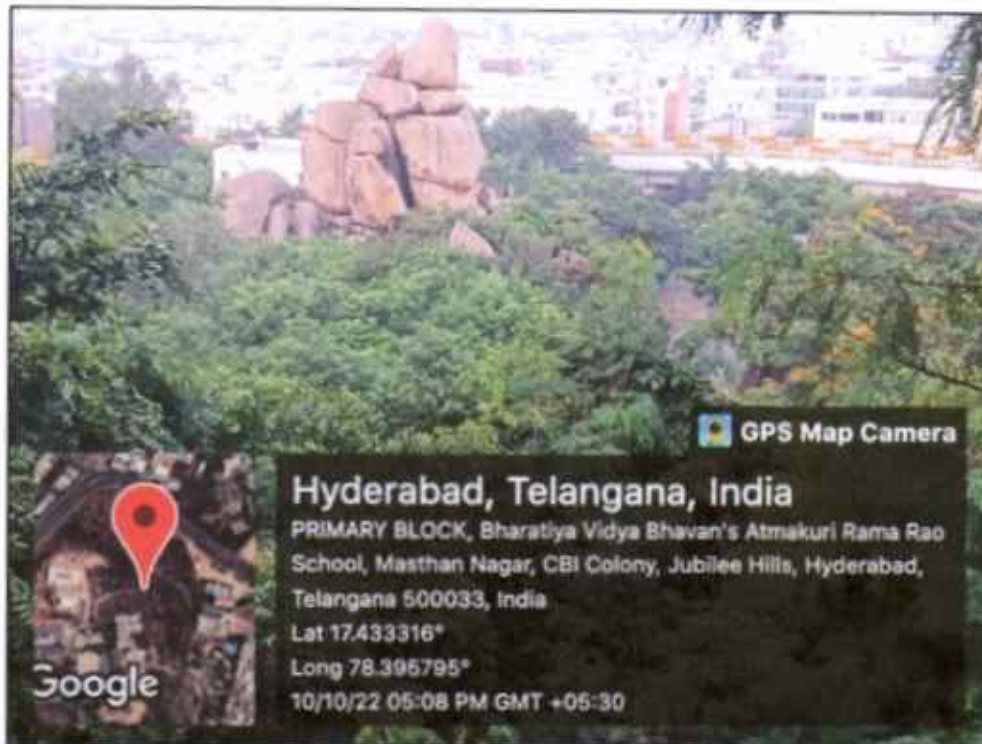
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### 7.5.7 Green Cover in the Campus:

Out of a total area of 22 Acres, almost 54Acres of Land is under, while 3 Acres under the plantation. More than 90% of total area is Green

### Photograph of Green Cover in the Campus:



### 7.6 Participation SWACHH BHARATH ABHIYAN:

The University is an active participant in the Government of India's most prestigious project of SWACHH BHARATH ABHIYAN.

The important highlights under this Program are:

- The campus is SWACHHA from inside: Has adequate number of Toilets, The Hostel facilities are cleanly maintained, The Water supply is sufficient & the cooking equipment are modern & efficient
- There are ample numbers of Garbage Bins and the collection of garbage is on Daily basis.
- The Garden Waste is composted by **Vermi-Composting** route
- The Kitchen waste is used for generating Bio Gas in a Bio Gas Plant
- Swachhta Lectures are held annually
- To promote the **Swachhta Abhiyan** the University has adopted Ghanshe Village, of population 200 & the Village is **Open Defecation Free (ODF)**

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## CHAPTER-VIII

### STUDY OF ECO FRIENDLY & SUSTAINABLE INITIATIVES

In this Chapter, we discuss the various Eco Friendly and Sustainable Initiatives undertaken by the University.

#### 8.1 Participation in Unnat Bharat Abhiyan:

Under this Program, the following activities are taken in the adopted Village:  
Disseminating the information on:

- Need & Importance of Personal Hygiene & Sanitation
- Hygiene of Water resources

#### 8.2 Participation of Affiliated Colleges in National Service Scheme (NSS) Program:

Under the University there are about 50 Plus Learning centers. From these affiliated centers, about 1200 plus students are involved in the National Service Scheme (NSS) program.

The major activities under this Program are:

- Tree Plantation Campaign
- Water conservation

#### Photograph of Tree Plantation Campaign:



## CHAPTER-IX RECOMMENDATIONS

It is recommended to:

1. Install Roof Top Solar PV Plant
2. Replace 600 No's T-5 Fittings by 20 W LED Fittings
3. To set target of reduction in use of paper by about 5 % on year-to-year basis.

  
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ANNEXURE-I

LIST OF PLANTED TREES

| S No | Name of the Plant    | No of plants |
|------|----------------------|--------------|
| 1    | Spanish Cherry       | 27           |
| 2    | Indian elm           | 46           |
| 3    | African tulip tree   | 18           |
| 4    | Neem Tree            | 32           |
| 5    | Peltophorum          | 87           |
| 6    | Rain Tree            | 9            |
| 7    | Portia Tree          | 1            |
| 8    | Yellow Trumpet Tree  | 6            |
| 9    | Eucalyptus           | 64           |
| 10   | Wild date palm       | 1            |
| 11   | Royal Palm           | 22           |
| 12   | Indian Cork wood     | 26           |
| 13   | Trumpet bush tree    | 11           |
| 14   | Pongam tree          | 9            |
| 15   | Teak                 | 42           |
| 16   | Cucumber Tree        | 2            |
| 17   | Pink Trumpet Tree    | 7            |
| 18   | Peepal               | 5            |
| 19   | Lebbek Tree          | 9            |
| 20   | Indian Black Berry   | 4            |
| 21   | Indian almond Tree   | 17           |
| 22   | Silver Oak           | 12           |
| 23   | Ashoka               | 32           |
| 24   | Palmyra alstonia     | 24           |
| 25   | Mahua Butter Tree    | 5            |
| 26   | Leguminosae          | 27           |
| 27   | Wild Indian Almond   | 7            |
| 28   | Tamarind             | 6            |
| 29   | Mango                | 27           |
| 30   | Indian Sissoo        | 13           |
| 31   | Bamboo               | 22           |
| 32   | Manila Tamarind Tree | 8            |
| 33   | Common Fig           | 2            |
| 34   | Ficusbenjamina       | 2            |
| 35   | Banyan Tree          | 2            |
| 36   | Temple Tree          | 16           |
| 37   | Illintha             | 32           |
| 38   | Subhabul             | 1080         |
| 39   | Jujubi               | 6            |
| 40   | Pala Kodesha         | 7            |
| 41   | Thunki               | 11           |
| 42   | Kanchanam            | 6            |
| 43   | Naringhi             | 21           |
| 44   | NallaThumma          | 2            |

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