GREEN AUDIT REPORT

of

YASHWANTRAO CHAVAN MAHARASHTRA OPEN UNIVERSITY,

Dnyangangotri, Near Gangapur Dam,
Nashik 422 222

Year: 2021-22

Prepared by:

ENGRESS SERVICES

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

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
(Government of Maharashtra Institution)
Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,
Aundh, Pune, Maharashtra 411067
Ph No: 020-35000450
Email: eee@mahaurja.com, Web: www.mahaurja.com

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

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

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

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

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

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

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

General Manager (EC)

ASSOCHAM
Ideate · Innovate · Impact

GEM Certificate

ASSOCHAM hereby certifies that

Mr. A Y Mehendale

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

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

Pankaj R. Dharkar
Chairman, GEM

GEM CP 22/788

Deepak Sood
Secretary General, ASSOCHAM

ENGRESS SERVICES PUNE

ENGRESS SERVICES

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

Ref: ES/YCMOU/21-22/02 Date: 11/6/2022

CERTIFICATE

This is to certify that we have conducted Green Audit at Yashwantrao Chavan Maharashtra Open University, Dnyangangotri, Near Gangapur Dam, Nashik in the year 2021-22.

The University has 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.
- In process Installation of 55 kWp off Grid Solar PV Plant
- Segregation of Waste at source
- Installation of a Bio Gas Plant, for conversion of Food Waste
- Installation of Sanitary Waste Incinerator
- Construction of Internal Bandhara of Capacity 26.2 Million Liters
- Construction of Farm pond
- Rain Water Harvesting project for making use of rain water falling on terrace
- Good Internal Roads
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Plastic Free Campus Initiatives
- Paperless Campus Initiatives
- Construction of an Eco Friendly and Low Cost Model Bamboo House

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 Engress Services,

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

ENGRESS SERVICES PUNE

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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Yashwantrao Chavan Maharashtra Open University, Dnyangangotri, Near Gangapur Dam, Nashik 422 222for awarding us the assignment of Green Audit of their Nashik Campus, for the Year: 2021-22.

We are thankful to:

- Prof. Dr. P. G. Patil, Vice Chancellor
- Dr. Dinesh Bhonde, Registrar
- Dr. Surya Gunjal, CIQA Director
- Shri Kiran Hire, Junior Engineer
- Shri Nandakumar Jadhav, Electrician
- Shri Sandeep Bhagwat, Farm Manager

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

EXECUTIVE SUMMARY

1. Yashwantrao Chavan Maharashtra Open University, Nashik Energy in three forms, namely: **Electrical Energy, Diesel and LPG**.

2. Present Energy Consumption & CO2 Emission:

No	Parameter/ Value	Energy Purchased, kWh	Diesel Consumed, Liters	CO_2 Emissions, MT
1	Total	501718	28700	528.46
2	Maximum	52466	2560	54.08
3	Minimum	33359	2090	35.62
4	Average	41809.83	2391.67	44.04

3. Energy Conservation Projects already installed:

- Usage of Energy Efficient LED fittings
- Usage of Maximum Day Lighting
- Installation of **13625 LPD** Solar Thermal Water Heating System.
- Under Installation of Off Grid Solar PV Plant of Capacity **55 kWp.**

4. Usage of Renewable Energy:

1. The University has installed a **13625 LPD** Solar Thermal Water Heating System.
2. The University is also installing Off Grid Solar PV Plants which include: Roof Top Plants, Solar Outdoor Lighting and Solar PV based Water Pump.
3. The Total Solar PV Plant capacity is **55 kWp.**

5. Waste Management:

5.1 Segregation of Waste at Source:

The recyclable Waste, like paper, plastic waste is segregated at source and is handed over to Authorized Agency.

5.2 Vermi-Composting:

The University has Vermi-composting facility &about **100 MT** of Vermi compost is produced annually and is used in the own campus.

5.3 Biogas Plant:

The University has installed a Biogas plant at the Yash Inn facility, to convert the kitchen waste into bio gas, which in turn is used for cooking.

5.4 Sanitary Waste Management:

The University has installed a Sanitary Waste Incinerator, for disposal of Sanitary Waste generated.

5.5 Liquid Waste Management:

It is recommended to install a Sewage Treatment Plant, for treatment of Liquid Waste.

5.6 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.

6. Rain Water Harvesting:

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

- Construction of **Yashwant Bandhara** of storage capacity **26.2 Million Liters,**
- Farm Pond
- Rain Water Harvesting and usage for bore well recharge.

7. Green & Sustainable Initiatives:

1. Good Internal Roads
2. Tree Plantation in the campus
3. Provision of Ramp for Divyangajan
4. Plastic Free Campus Initiatives
5. Paperless Office Initiatives
6. Construction of Low Cost and Eco Friendly Model Bamboo House

9. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg** of CO_2into atmosphere
2. **1 Liter of Diesel** releases **2.68 Kg of CO_2** into atmosphere.

10. Reference:

- For calculation of CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

kWh	Kilo Watt Hour
kWp	Kilo Watt Peak
Kg	Kilo Gram
MT	Metric Ton
CO_2	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

CHAPTER-I
INTRODUCTION

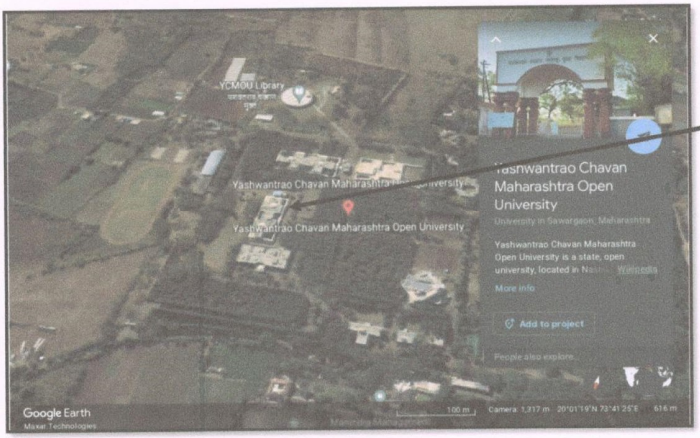
1.1 Objectives:

1. To study present level of Energy Consumption
2. To study the present CO_2 emissions
3. To study usage of Renewable Energy
4. To study Waste Management.
5. To study Rain Water Harvesting.
6. To study Green and Sustainable Initiatives.

1.2 Table No 1: General Details of the University:

No	Head	Particulars
1	Name of Institution	Yashwantrao Chavan Maharashtra Open University
2	Address	Dnyangangotri, Near Gangapur Dam, Nashik 422 222
3	Year of Establishment	1989
4	Academic Programs Offered	200 Plus

1.3 Google Earth Image:



University Campus

CHAPTER-II
STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Energy Consumption

Table No 2: Study of Electrical Energy and Diesel Consumption: 21-22:

No	Month	Energy Purchased, kWh	Diesel Consumed, Liters
1	Apr-21	48321	2449
2	May-21	44012	2540
3	Jun-21	46867	2360
4	Jul-21	44528	2280
5	Aug-21	41360	2416
6	Sep-21	38444	2560
7	Oct-21	36614	2430
8	Nov-21	33359	2390
9	Dec-21	37795	2540
10	Jan-22	37578	2510
11	Feb-22	40374	2090
12	Mar-22	52466	2135
13	Total	501718	28700
14	Maximum	52466	2560
15	Minimum	33359	2090
16	Average	41809.83	2391.67

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

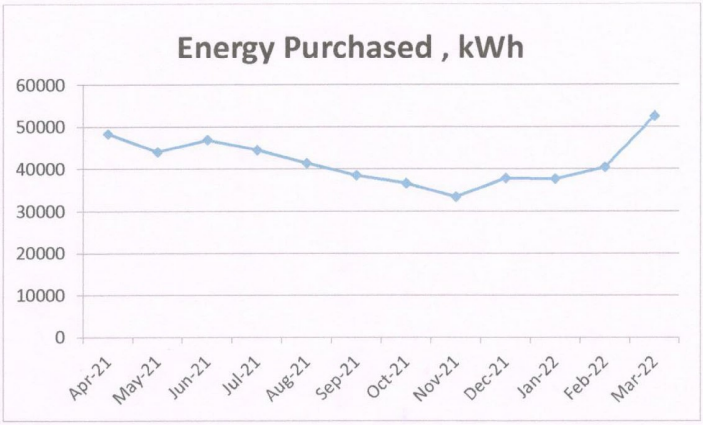


Chart No 2: Study of Month wise Diesel Consumption:

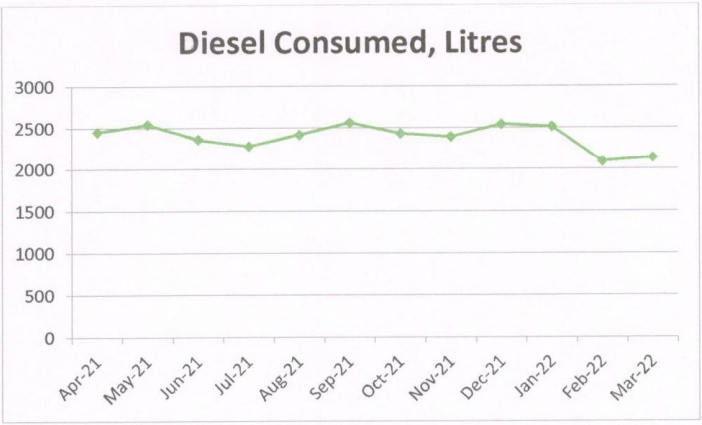


Table No 3: Variation in Important Parameters:

No	Parameter/ Value	Electrical Energy Consumed, kWh	Diesel Consumed, Liters
1	Total	501718	28700
2	Maximum	52466	2560
3	Minimum	33359	2090
4	Average	41809.83	2391.67

CHAPTER-III
STUDY OF CO_2 EMISSION

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 two forms of Energy namely: Electrical Energy for various Electrical gadgets and Diesel.

Basis for computation of CO_2 Emissions:

The basis of Calculation for CO_2 emissions due to Electrical Energy & Diesel are as under

- 1 Unit (kWh) of Electrical Energy releases **0.9 Kg** of CO_2 into atmosphere
- 1 Liter of Diesel releases **2.68 Kg** of CO_2 into atmosphere.

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

Table No 4: Month wise Energy Consumption & CO_2 Emissions:

No	Month	Energy Purchased, kWh	Diesel Consumed, Liters	CO_2 Emissions, MT
1	Apr-21	48321	2449	50.05
2	May-21	44012	2540	46.42
3	Jun-21	46867	2360	48.51
4	Jul-21	44528	2280	46.19
5	Aug-21	41360	2416	43.70
6	Sep-21	38444	2560	41.46
7	Oct-21	36614	2430	39.47
8	Nov-21	33359	2390	36.43
9	Dec-21	37795	2540	40.82
10	Jan-22	37578	2510	40.55
11	Feb-22	40374	2090	41.94
12	Mar-22	52466	2135	52.94
13	Total	501718	28700	528.46
14	Maximum	52466	2560	54.08
15	Minimum	33359	2090	35.62
16	Average	41809.83	2391.67	44.04

Chart No 3: Representation of Month wise CO_2 Emissions:

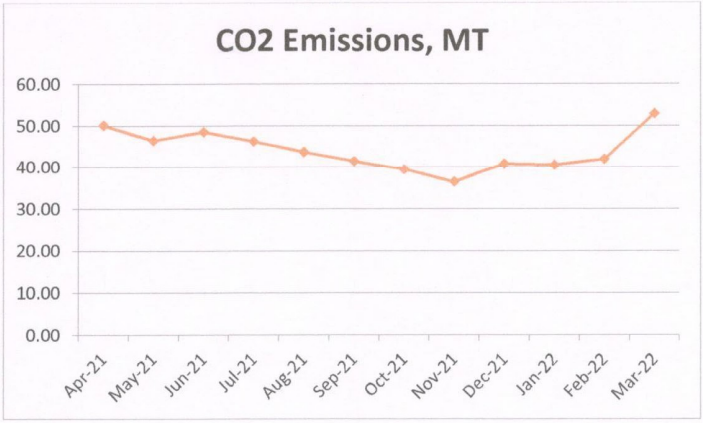


Table No 5: Variation in Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	Diesel Consumed, Liters	CO_2 Emissions, MT
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CHAPTER-IV
STUDY OF RENEWABLE ENERGY

The University has installed Solar Thermal Water Heating System. The details of installation are as under.
The University is in process of Installation of Off Grid Solar PV Plant for various Applications like: Outdoor Lighting, Water pump etc.

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

No	Location	Capacity in LPD
1	Yash Inn Centre	8625
2	Godavari Hostel	2500
3	Abhyagat Niwas	2500
4	**Total**	**13625**

Photograph of Solar Thermal Water Heating System:

CHAPTER V
STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

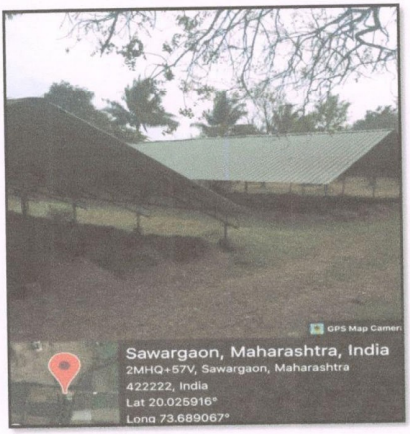
The recyclable Waste, like paper, plastic waste is segregated at source and is handed over to Authorized Agency.

Photograph of Waste collection Bin:

5.2 Vermi Composting Plant:

The University has Vermi-composting facility &about 100 MT of Vermi compost is produced annually and is used in the own campus.

Photograph of Vermi Composting Plant:



5.3 Bio Gas Plant:

The University has installed a Biogas plant at the Yash Inn facility, to convert the kitchen waste into bio gas, which in turn is used for cooking.

Photograph of Bio Gas Plant:

5.4 Sanitary Waste Management:

The University has installed a Sanitary Waste Incinerator, for disposal of Sanitary Waste generated.

Photograph of Sanitary Waste Incinerator:

5.5 Liquid Waste Management:

It is recommended to install a Sewage Treatment Plant, for treatment of Liquid Waste.

5.6 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.

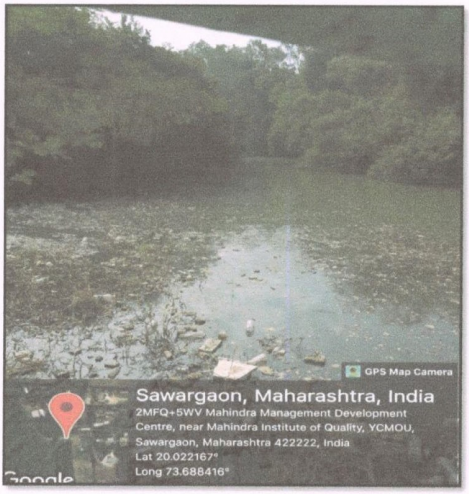
CHAPTER-VI
STUDY OF RAIN WATER HARVESTING

The University has implemented the Rain Water Harvesting Project by three ways, namely:

1. Yashwant Bandhara
2. Farm Pond and
3. Collecting the rain water from terrace & using the same for Bore well recharging.

6.1 Yashwant Bandhara: The Water Storage capacity is about **26.2 Million Liters.**

Photograph of Yashwant Bandhara:



6.2 Farm Pond:

The University has a farm pond which can store approximately -- 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.

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 Yashwant Dam.

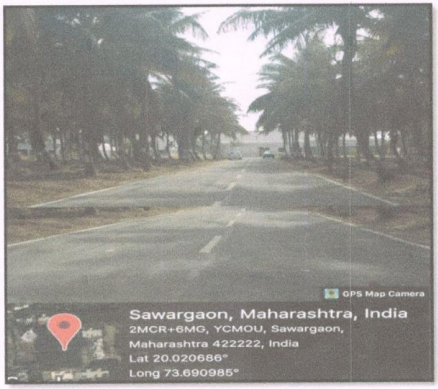
Photograph of Rain Water Collecting Pipe from Terrace:

CHAPTER-VII
STUDY OF GREEN AND SUSTAINABLE INITIATIVES

7.1 Pedestrian Friendly Roads:

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

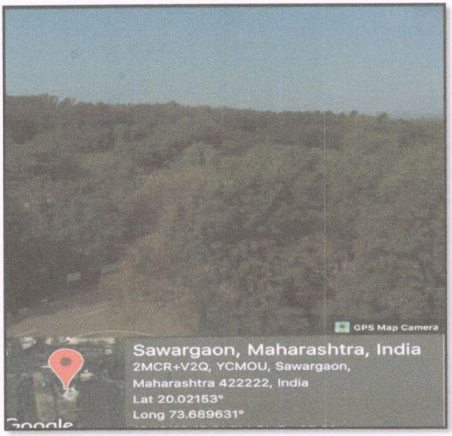
Photograph of internal road in the campus:



7.2 Internal Tree Plantation:

Out of total area of 140 Acres, almost 90 % of the Area is under Green Cover.

Photograph of Tree Plantation:



7.3 Provision of Ramp for Divyangajan:

The University has constructed Ramp, for Divyangajan.

Photograph of Ramp for Divyangajan:

7.4 Plastic Free Campus Initiatives:

The University is taking strict measures to keep the campus Plastic Free. At prominent places, boards are displayed to keep the campus Plastic Free. The Water Bottles for all Staff members are of Glass.

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

7.5 Paperless Office Initiatives:

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:

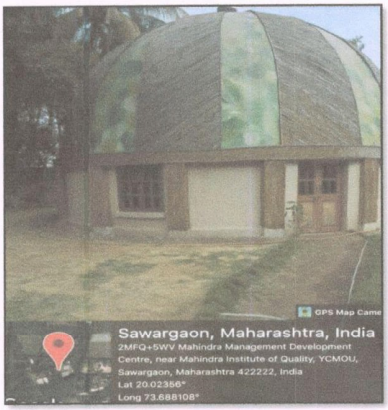
- ✓ E-Books Down load
- ✓ YCMOU Regional Centers
- ✓ Finance
- ✓ Admission
- ✓ Results
- ✓ Migration
- ✓ Grievances
- ✓ Scanned copy of Mark list, to name a few
- ✓ Revaluation of Answer Book
- ✓ E-Tenders

7.6 Low Cost Energy Efficient Model Bamboo House:

In order to build a small house with minimum usage of external items and maximum use of Eco friendly and readily available Agro material, the University has built a Model Bamboo house in the University campus.
The major highlights of this House are:

- Eco friendly Bamboo material usage
- Readily Availability of Material
- Usage of Bamboo for Columns, Beams, Foundation& Walls
- Non usage of Steel & Cement
- Green Building
- Low cost & Low Energy Usage during Construction Phase

Photograph of Model Bamboo House:



ANNEXURE-I
DETAILS OF PLANTED TREES

No	Name of the Tree	Qty
1	Babhul	1188
2	Eucalyptus	3404
3	Casurina	522
4	Australian Acacia	1869
5	Subabul	60
6	Neem	244
7	Cashew	13
8	Mango	10
9	Jamun	16
10	Umbar	42
11	Kashid	117
12	Shiso	385
13	Vilayati Chinch	11
14	Glyrisidia	715
15	Shivan	76
16	Karani	133
17	Bamboo	20
18	Tembhurni	10
19	Sadada	19
20	Waras	06
21	Agasti	70
22	Moha	31
23	Bhendi	15
24	Kadamb	61
25	Pimpal	22
26	Jakaranda	38
27	Shiras	766
28	Raintree	279
29	Silver Oak	54