

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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[Handwritten Signature]
Authorized Signatory
Director, CIQA
Dr. B.R. Ambedkar Open University
Hyderabad - 500033



Certificate

HYM International Certifications Pvt. Ltd.

Certified that the Energy 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 Energy standards

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

1st Surveillance : 16/10/2023

Renewal Date : 16/10/2025

2nd Surveillance : 16/10/2024



Authorized Signature

Certificate No : **En9186414092**

HYM International Certifications Pvt. Ltd.

NOTE: This Certificate is Valid From 17/10/2022 to 16/10/2025

This is an awarded certificate authorized for work by Accreditation Bureau for Training Bodies (ABTB) Limited who have assessed H.Y.M International Certifications Pvt. Ltd. against defined criteria and is registered at ISO 17021:2015 "Certification Requirements - Requirements for bodies providing audit and certification of management systems" www.hymcertifications.com for checking the validation of the Certification.

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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 **2500LPD** 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 


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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.

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 ₂ Emissions, MT
Total	486373	348	1779	357.23
Maximum	42199	43.5	300	38.25
Minimum	31821	14.5	0	23.54
Average	37413	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 100 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

7. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. **1 Kg of LPG** releases **2.93 Kg of CO₂** into atmosphere.
3. **1 Liter of Diesel** emits **2.68 Kg CO₂** 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 CO₂ Emissions: *****
- For Energy Saved by Solar Thermal Plant: *****

ABBREVIATIONS

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

CHAPTER-I

INTRODUCTION

1.1 Objectives:

1. To study Connected Load
2. To study present level of Energy Consumption
3. To study the present CO₂emissions
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 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

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:



CHAPTER-III

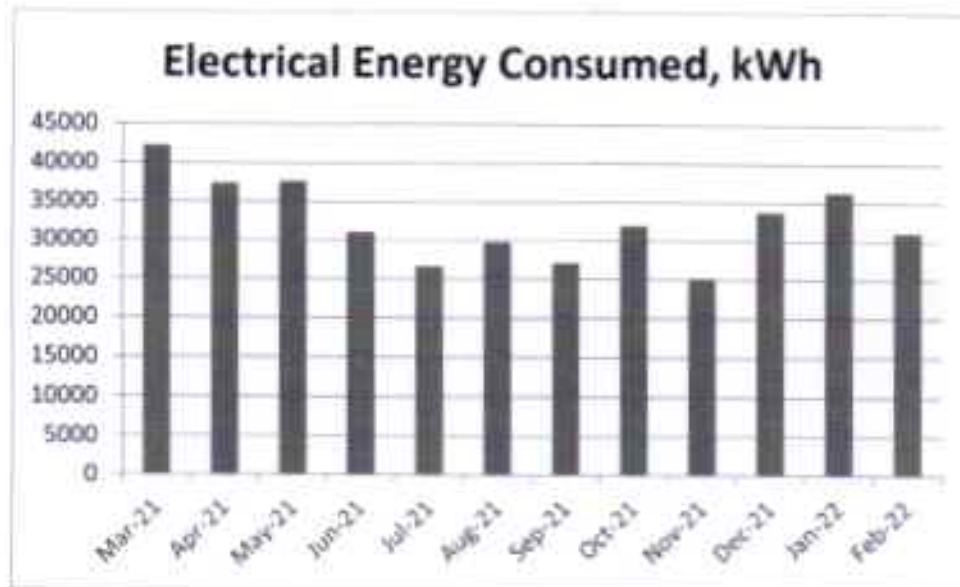
STUDY OF PRESENT ENERGY CONSUMPTION

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

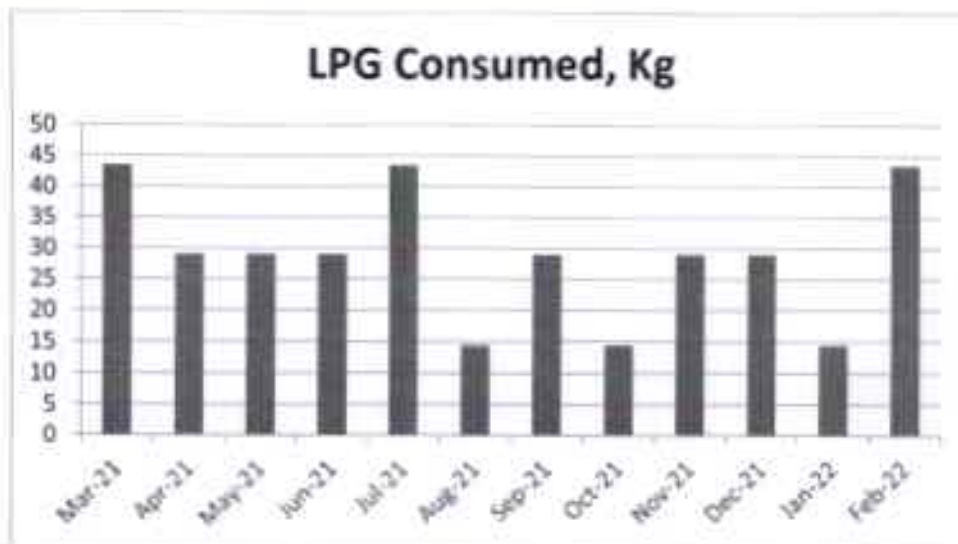
3.1 Table No 3: Study of Electrical Energy, LPG and Diesel Consumption: 2021-22

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	31821	29	25
5	Jul-21	37734	43.5	32
6	Aug-21	38033	14.5	300
7	Sep-21	36659	29	52
8	Oct-21	38361	14.5	300
9	Nov-21	34227	29	300
10	Dec-21	33120	29	0
11	Jan-22	39775	14.5	300
12	Feb-22	42318	43.5	0
13	Mar-22	37099	28	300
14	Total	486373	348	1779
15	Maximum	42199	43.5	300
16	Minimum	31821	14.5	0
17	Average	37413	29	148.25

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

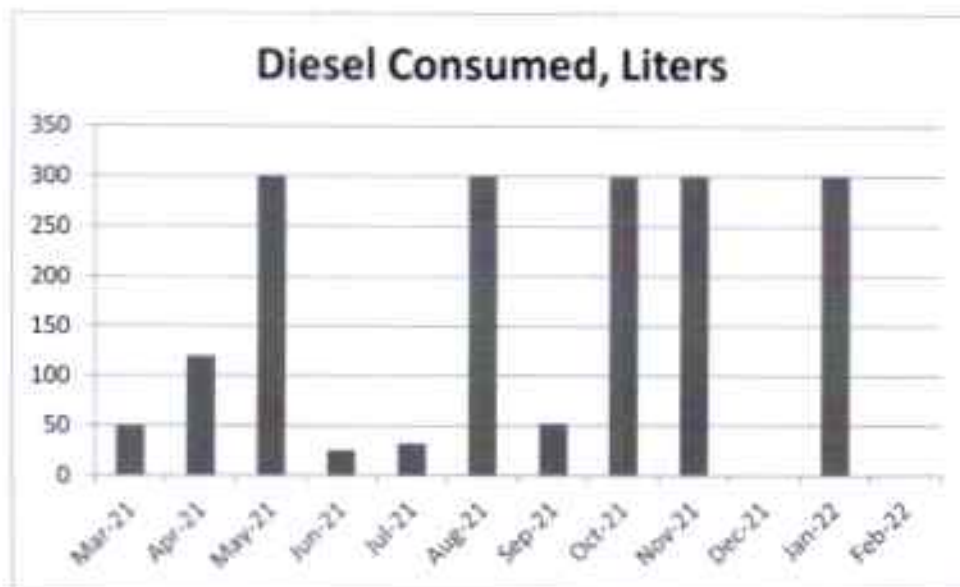


3.3 Study of Month wise LPG Consumption: Chart No: 3



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

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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	486373	348	1779
2	Maximum	42199	43.5	300
3	Minimum	31821	14.5	0
4	Average	37413	29	148.25

CHAPTER-IV

CARBON FOOTPRINTING

A Carbon Foot Print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.


In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the 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 CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to LPG & Electrical Energy are as under

- 1Unit(kWh)ofElectricalEnergyreleases0.9KgofCO₂intoatmosphere.
- 1KgofLPGreleases2.93KgofCO₂intoatmosphere.
- 1LiterofDieselreleased2.68KgofCO₂intoatmosphere.


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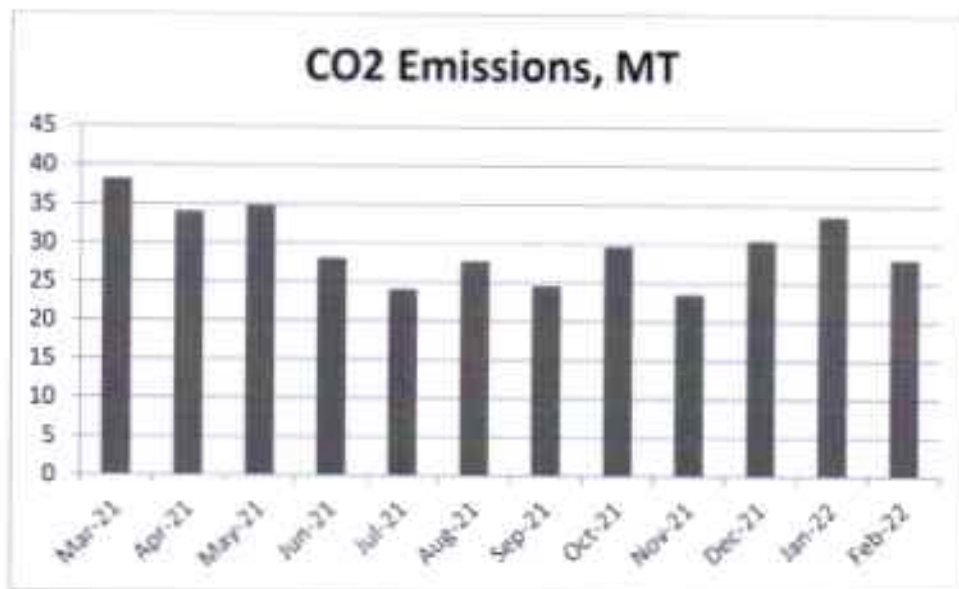
Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the University due to its Day to Day operations.

Table No 5: Month wise Energy Consumption & CO₂ Emissions

No	Month	Electrical Energy Consumption, kWh	LPG Consumed, Kg	Diesel Consumed, Liters	CO ₂ 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	31821	29	25	28.08
5	Jul-21	37734	43.5	32	24.17
6	Aug-21	38033	14.5	300	27.75
7	Sep-21	36659	29	52	24.63
8	Oct-21	38361	14.5	300	29.71
9	Nov-21	34227	29	300	23.54
10	Dec-21	33120	29	0	30.48
11	Jan-22	39775	14.5	300	33.59
12	Feb-22	42318	43.5	0	28.12
13	Mar-22	37099	28	300	24.17
14	Total	486373	348	1779	357.23
15	Maximum	42199	43.5	300	38.25
16	Minimum	31821	14.5	0	23.54
17	Average	37413	29	148.25	29.76

Representation of Month wise CO₂ 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.

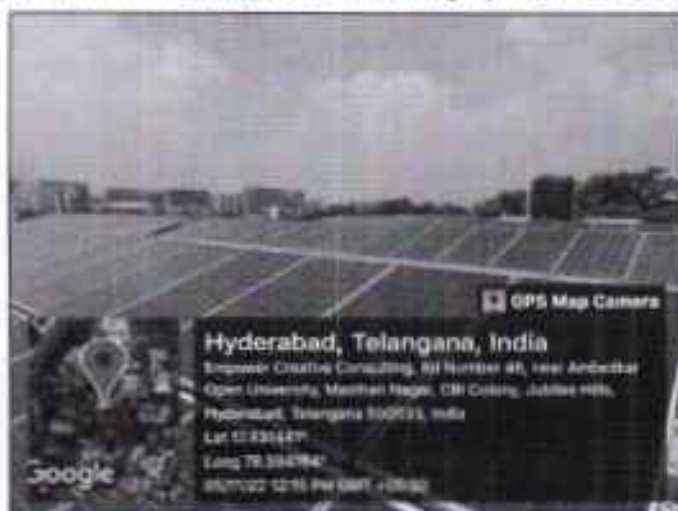
Table No 6: Details of Solar Thermal Water Heating System

No	Location	Capacity in LPD
1	Gust house Building	2500
	Total	2500

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 1500Nos, 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	%

CHAPTER-VII

RECOMMENDATIONS

It is recommended to:

1. Install Roof Top Solar PV Plant
2. Replace 50 No's W LED Fittings by 100 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

