ENERGY AUDIT REPORT

of

AJEENKYA D Y PATIL UNIVERSITY,

Charholi Budruk, Via Lohegaon, Pune 412 105

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

REGISTRATION CERTIFICATES

Regn. No. EA-8192

No. 2942

National Productivity Council

(National Certifying Agency)

PROVISIONAL CERTIFICATE

This is to certify that Mr. / Ms. Achyut Yashavant Mehendale

son / daughter of Mr. Yashavant

has passed the National Certification Examination for Energy Auditors in April - 2007, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India.

He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for the Accredited Energy Auditor and issue of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.

Place : Chennai, India

Date : 10th August 2007

Controller of Examination

BEE AUDITOR CERTIFICATE

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)

MEDA EMPANELMENT CERTIFICATE

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ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of Ajeenkya D Y Patil University, Charholi Budruk Pune 412 105 for awarding us the assignment of Energy Audit of their Charholi campus for the Academic Year: 2021-22.

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

EXECUTIVE SUMMARY

1. Ajeenkya D Y Patil University, Charholi Budruk, Pune 412 105 consumes Energy in the form of **Electrical Energy** used for various gadgets, Office & other facilities.

2. Present Level of Energy Consumption & CO_2 Emission:

No	Parameter	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	464070	417.66
2	Maximum	65419	58.88
3	Minimum	15612	14.05
4	Average	38672.50	34.81

3. Various Measures adopted for Energy Conservation:

- Usage of Energy Efficient LED fittings
- Installation of **800 kWp** Roof top Solar PV Plant

4. Usage of Alternate Energy Source:

- The University has installed Roof Top Solar PV Plant of Capacity **800 kWp.**
- Energy purchased from MSEDCL is **464070 kWh**
- Energy generated by 80 kWp Roof Top Solar PV Plant is **960000 kWh**
- Total Annual Energy Demand is **1424070 kWh**
- Percentage of Usage of Alternate Energy to Annual Energy Demand is **67.41 %**

5. Percentage of Lighting Power Requirement met by LEDs:

- The LED Lighting Load is **18.584 kW.**
- The Total Lighting Load is **27.664 kW.**
- The percentage of LED to the total annual lighting power requirement is **67.18 %**

6. Assumptions:

1. Energy consumption is computed based on Load Utilization Factor
2. **1 kWh** of Electrical Energy releases **0.9 Kg** of **CO_2** into atmosphere
3. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
4. Annual Solar Energy Generation Days: **300 Nos**

7. References:

1. For CO_2 Emissions: www.tatapower.com
2. For Energy generated by Solar PV Plant: www.solarrooftop.gov.in

ABBREVIATIONS

AC	:	Air conditioner
MSEDCL	:	Maharashtra Energy Distribution Company Limited
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
PC	:	Personal Computer
MT	:	Metric Ton

CHAPTER-I
INTRODUCTION

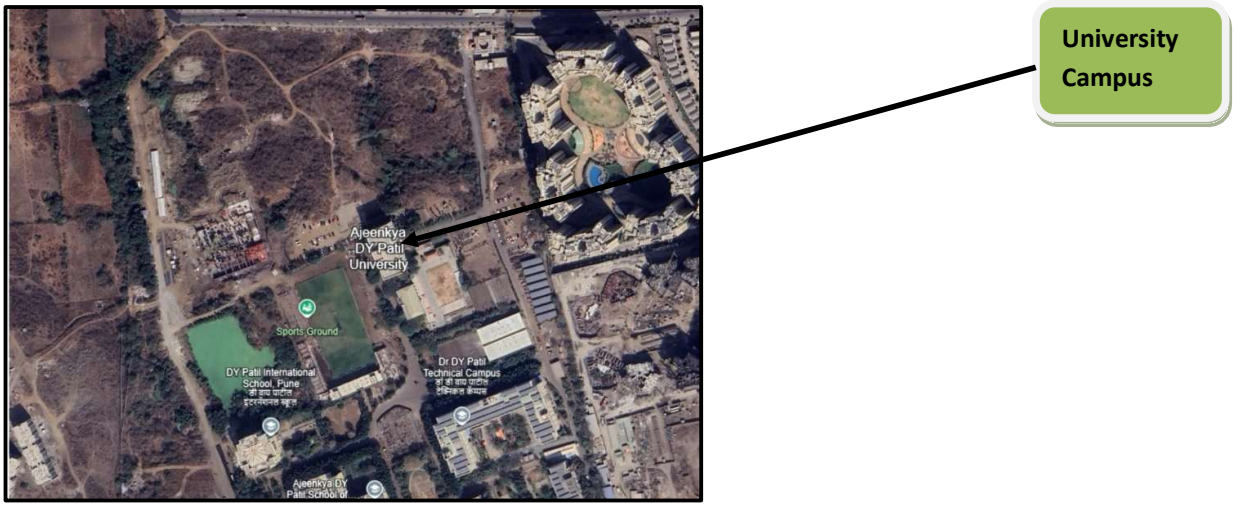
1.1 Objectives:

1. To study Connected Load
2. To study the present Energy Consumption
3. To compute the CO_2 emissions
4. To study usage of Renewable Energy
5. To study usage of LED Lighting

1.2 Table No-1: General Details of University:

No	Head	Particulars
1	Name	Ajeenkya D Y Patil University
2	Address	Charholi Budruk Pune 412 105

1.3 Google Earth Image:



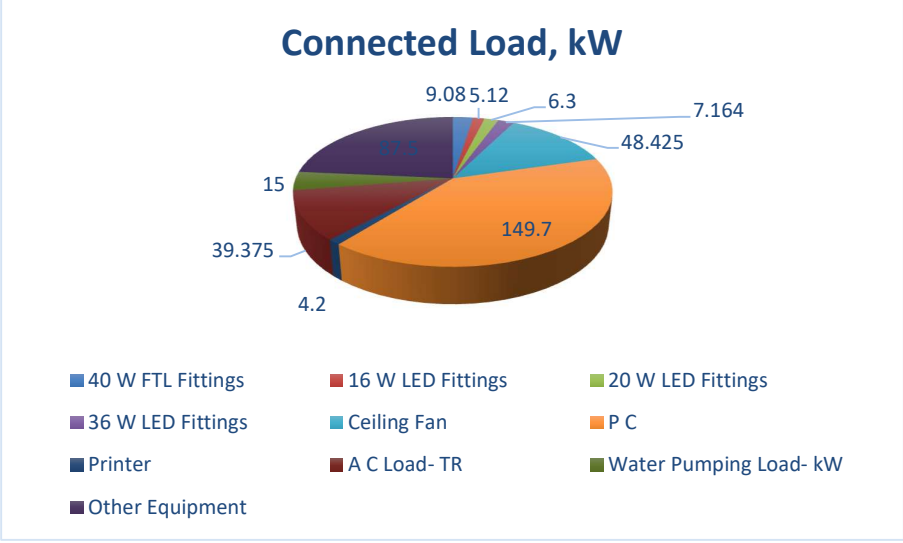
CHAPTER-II
STUDY OF CONNECTED LOAD

In this chapter, we present the details of various Electrical loads as under

Table No 2: Details of Overall Connected Load:

No	Equipment	Qty	Load, W/unit	Load, kW
1	40 W FTL Fittings	227	40	9.08
2	16 W LED Fittings	320	16	5.12
3	20 W LED Fittings	315	20	6.3
4	36 W LED Fittings	199	36	7.164
5	Ceiling Fan	745	65	48.425
6	P C	998	150	149.7
7	Printer	24	175	4.2
8	A C Load- TR	35	1125	39.375
9	Water Pumping Load- kW	15	1000	15
10	Other Equipment	250	350	87.5
11	**Total**			**371.86**

Chart No 1: Total Connected Load:



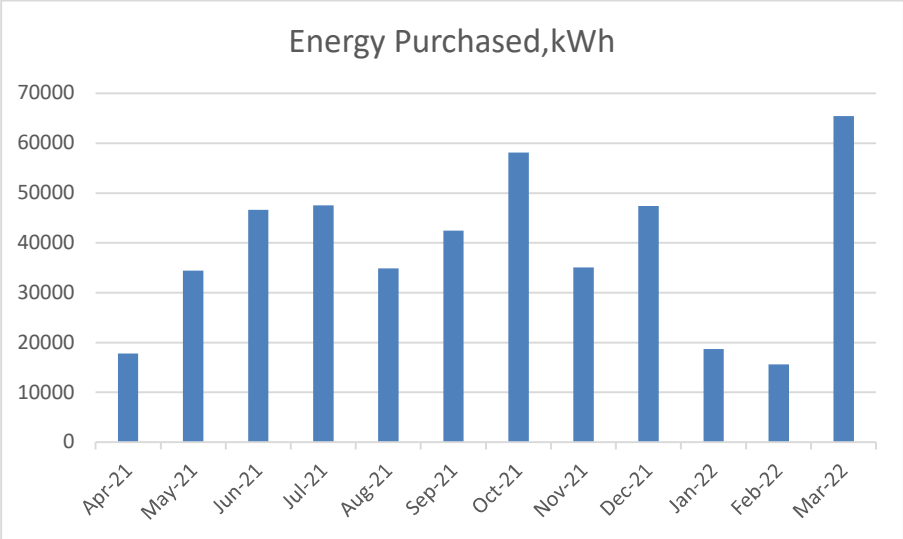
CHAPTER-III
STUDY OF ELECTRICAL ENERGY CONSUMPTION

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

Table No 3: Electrical Bill Analysis- 2021-22:

No	Month	Energy Purchased, kWh	CO_2 Emission, MT
1	Apr-21	17785	16.01
2	May-21	34436	30.99
3	Jun-21	46632	41.97
4	Jul-21	47582	42.82
5	Aug-21	34875	31.39
6	Sep-21	42468	38.22
7	Oct-21	58127	52.31
8	Nov-21	35059	31.55
9	Dec-21	47366	42.63
10	Jan-22	18709	16.84
11	Feb-22	15612	14.05
12	Mar-22	65419	58.88
13	Total	464070	417.66
14	Maximum	65419	58.88
15	Minimum	15612	14.05
16	Average	38672.50	34.81

Chart No 2: To study the variation of Month wise Energy Consumption, kWh:



CHAPTER-IV
CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. **Basis for computation of CO_2 Emissions:**

- **1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Table No 4: Month wise CO_2 Emissions:

No	Month	Energy Purchased, kWh	CO_2 Emission, MT
1	Apr-21	17785	16.01
2	May-21	34436	30.99
3	Jun-21	46632	41.97
4	Jul-21	47582	42.82
5	Aug-21	34875	31.39
6	Sep-21	42468	38.22
7	Oct-21	58127	52.31
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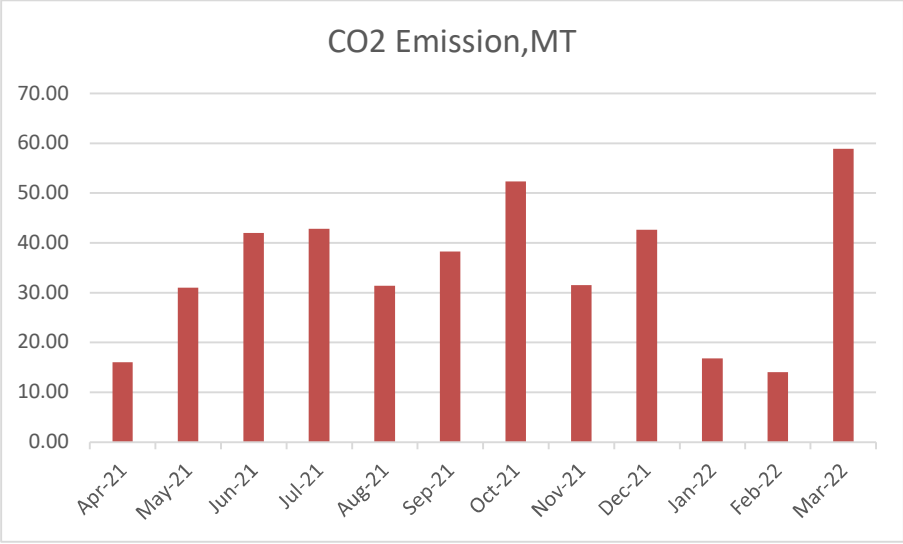
9	Dec-21	47366	42.63
10	Jan-22	18709	16.84
11	Feb-22	15612	14.05
12	Mar-22	65419	58.88
13	Total	464070	417.66
14	Maximum	65419	58.88
15	Minimum	15612	14.05
16	Average	38672.50	34.81

Chart No 3: Representation of Month wise CO_2 emissions:



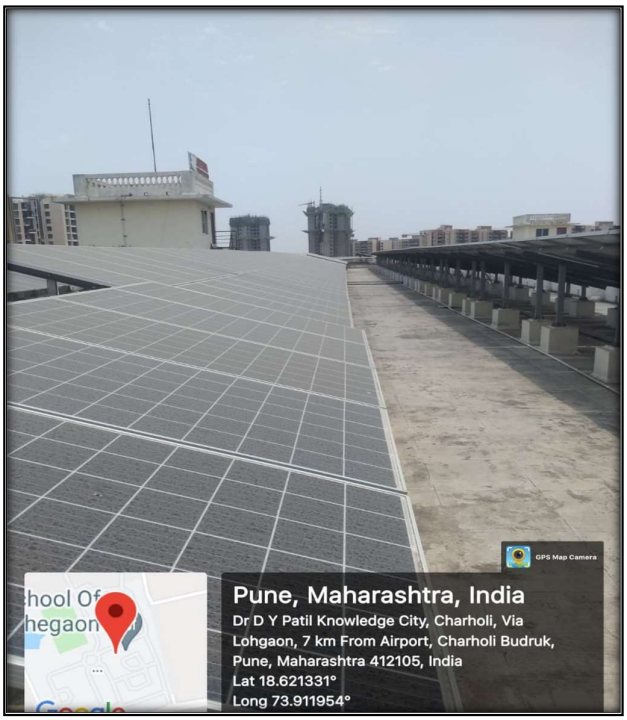
CHAPTER-V
STUDY OF USAGE OF ALTERNATE ENERGY

The University has installed Roof Top Solar PV Plant of Capacity **800 kWp.**
In the following Table, we compute the percentage of usage of Alternate Energy to total Energy Demand.

Table No 5: Computation of % usage of Alternate Energy to Annual Energy Demand:

No	Particulars	Value	Unit
1	Annual Energy Purchased: As per Energy Consumption	**464070**	kWh/Annum
2	Solar PV Plant Capacity	800	kWp
3	Average Energy generated per kWp	4	kWh/kWp
4	Annual working days	300	Nos
5	Annual Energy generated = **(2) * (3) * (4)**	**960000**	kWh/Annum
6	Total Annual Power requirement = **(1) + (5)**	1424070	kWh/Annum
7	% of Annual power requirement met by Solar Energy = **(5)*100/(6)**	**67.41**	%

Photograph of Roof Top Solar PV Plant:



CHAPTER-VI
STUDY OF USAGE OF LED LIGHTS

In this Chapter, we present the annual Lighting requirements and usage of LEDs.

Table No 6: Computation of Annual Lighting Power requirement met by LED Lights:

No	Particulars	Value	Unit
1	No of 40 W FTL Fittings	227	Nos
2	Load/unit of 40 W FTL Fitting	40	W/unit
3	Total Load of 40 W FTL Fitting	**9.08**	kW
4	No of 16 W LED Fittings	320	Nos
5	Load/unit of 16 W LED Fitting	16	W/unit
6	Total Load of 16 W LED Fitting	**5.12**	kW
7	No of 20 W LED Fittings	315	Nos
8	Load/unit of 20 W LED Fitting	20	W/unit
9	Total Load of 20 W LED Fitting	**6.3**	kW
10	No of 16 W LED Fittings	199	Nos
11	Load/unit of 16 W LED Fitting	36	W/unit
12	Total Load of 16 W LED Fitting	**7.164**	kW
13	Total LED Lighting Load =6+9+12	**18.584**	kW
14	Total LED Lighting Load =3+6+9+12	**27.664**	kW
15	% of Usage of LED to Total Lighting Load=13*100/14	**67.18**	%