

# ENERGY AUDIT REPORT

of

## SHREE L. R. TIWARI COLLEGE OF Law,

Shree L. R. Tiwari Educational Campus, Mira Road (East) Thane 401 107



Year: 2020-21


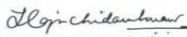
Prepared by:

### ENRICH CONSULTANTS



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## REGISTRATION CERTIFICATES

Regn. No. EA-8192		No. 2942
<b>National Productivity Council</b> (National Certifying Agency)		
<b>PROVISIONAL CERTIFICATE</b>		
This is to certify that Mr. / Ms. <u>Achyut Yashavant Mehendale</u> son / daughter of Mr. <u>Yashavant</u> 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		 Controller of Examination
Date : 10 <sup>th</sup> August 2007		

## BEE ENERGY AUDITOR CERTIFICATE

<b>MAHARASHTRA ENERGY DEVELOPMENT AGENCY</b> <small>An ISO 9001 : 2000 Reg. no. : RD 91 / 2482</small>	
 <b>Maharashtra Energy Development Agency</b> (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/2021-22/CR-14/1577	22 <sup>nd</sup> April, 2021
<b>CERTIFICATE OF REGISTRATION FOR CLASS 'A'</b>	
We hereby certify that, the firm having following particulars is registered with <b>MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)</b> under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.	
<b>Name and Address of the firm</b>	: M/s Enrich Consultants Yashashree, Plot No. 26, Nirmal Bag Society, Near Mukhtangan English School, Parvati, Pune - 411009.
<b>Registration Category</b>	: Empanelled Consultant for Energy Conservation Programme for Class 'A'
<b>Registration Number</b>	: MEDA/ECN/2021-22/Class A/EA-03
<ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li><li>• This empanelment is valid till <b>21<sup>st</sup> April, 2023</b> from the date of registration, to carry out energy audits under the Energy Conservation Programme</li><li>• The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.</li></ul>	
 General Manager (EC)	

## MEDA EMPANELMENT CERTIFICATE

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## **ACKNOWLEDGEMENT**

We Enrich Consultants, Pune, express our sincere gratitude to the management of Shree L. R. Tiwari College of Law, Shree L. R. Tiwari Educational Campus, Mira Road (East) Thane 401 107, for awarding us the assignment of Energy Audit of their Campus for the Year: 2020-21.

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

## EXECUTIVE SUMMARY

1. **Shree L. R. Tiwari College of Law, Mira Road**, consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment.

### 2. Present Energy Consumption & CO<sub>2</sub> Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Total	17554	15.80
2	Maximum	2785	2.51
3	Minimum	197	0.18
4	Average	1462.83	1.32

### 3. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Maximum Usage of Day Lighting

### 4. Usage of Alternate Energy:

- The College has yet to install Roof Top Solar PV Plant.

### 5. Usage of LED Lighting:

- The Total LED Lighting Load of the College is **2.552 kW**.
- The Total Lighting Demand of the College is **2.552 kW**.
- The percentage of LED Lighting to Total Lighting Load is **100 %**.

### 6. Assumptions:

1. Energy Consumption is computed based on Load Utilization Factor
2. **1 kWh** of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere

### 7. Reference:

- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)

## **ABBREVIATIONS**

LED	:	Light Emitting Diode
BEE	:	Bureau of Energy Efficiency
FTL	:	Fluorescent Tube Light
CFL	:	Compact Fluorescent Light
PV	:	Photo Voltaic
Kg	:	Kilo Gram
kWh	:	kilo-Watt Hour
CO <sub>2</sub>	:	Carbon Di Oxide
MT	:	Metric Ton

## **CHAPTER-I INTRODUCTION**

### **1.1 Objectives:**

1. To study Connected Load of the College.
2. To study Present Energy Consumption
3. To Study the present CO<sub>2</sub> emissions
4. To study usage of Renewable Energy
5. To study usage of LED Lighting

### **1.2 Table No 1: General Details of the College:**

<b>No</b>	<b>Head</b>	<b>Particulars</b>
1	Name of College	Shree L. R. Tiwari College of Law
2	Address	Shree L. R. Tiwari Educational Campus, Mira Road (East) Thane 401 107
3	Affiliation	University of Mumbai

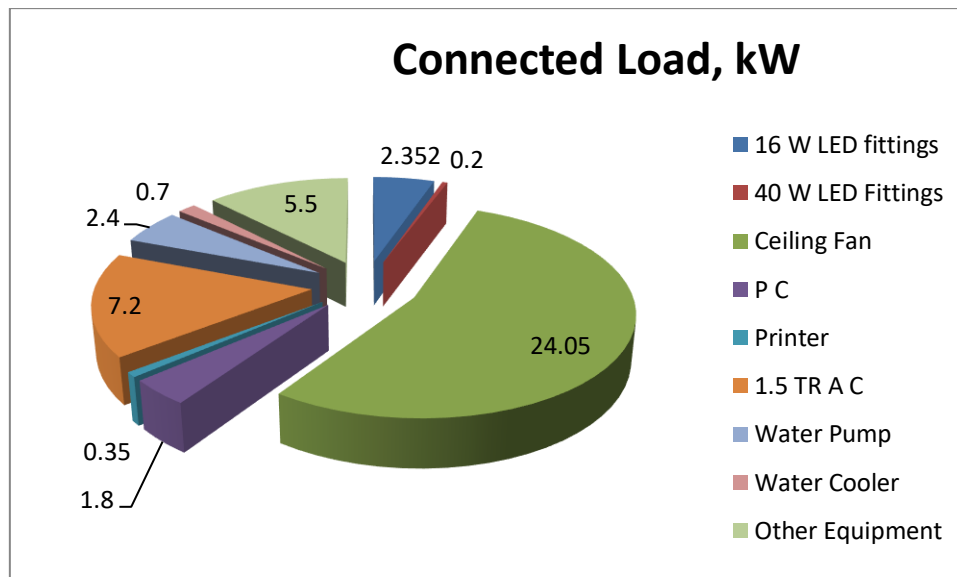
## CHAPTER-II STUDY OF CONNECTED LOAD

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

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

No	Equipment	Qty	Load, W/unit	Load, kW
1	16 W LED fittings	147	16	2.352
2	40 W LED Fittings	5	40	0.2
3	Ceiling Fan	370	65	24.05
4	P C	12	150	1.8
5	Printer	2	175	0.35
6	1.5 TR A C	4	1800	7.2
7	Water Pump	1	2400	2.4
8	Water Cooler	2	350	0.7
9	Other Equipment	22	250	5.5
10	<b>Total</b>			<b>44.55</b>

**Chart No 1: Study of Connected Load:**





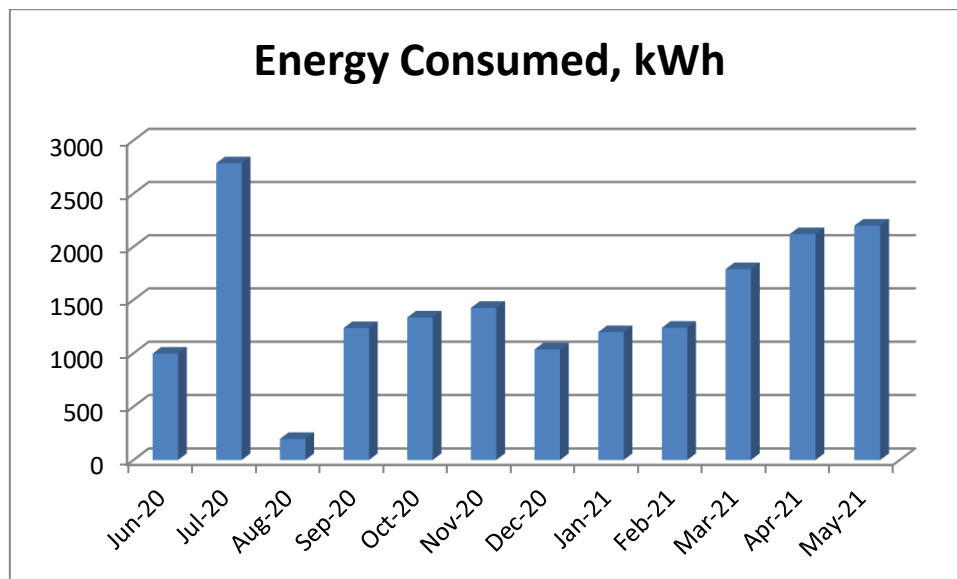
### CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electrical Energy Consumption

**Table No 3: Electrical Energy Consumption Analysis- 2020-21:**

No	Month	Energy Consumed, kWh
1	Jul-20	997
2	Aug-20	2785
3	Sep-20	197
4	Oct-20	1236
5	Nov-20	1336
6	Dec-20	1425
7	Jan-21	1036
8	Feb-21	1198
9	Mar-21	1239
10	Apr-21	1789
11	May-21	2118
12	Jun-21	2198
13	Total	17554
14	Maximum	2785
15	Minimum	197
16	Average	1462.83

**Chart No 2: Variation in Monthly Energy Consumption:**



## CHAPTER-IV CARBON FOOT PRINTING

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

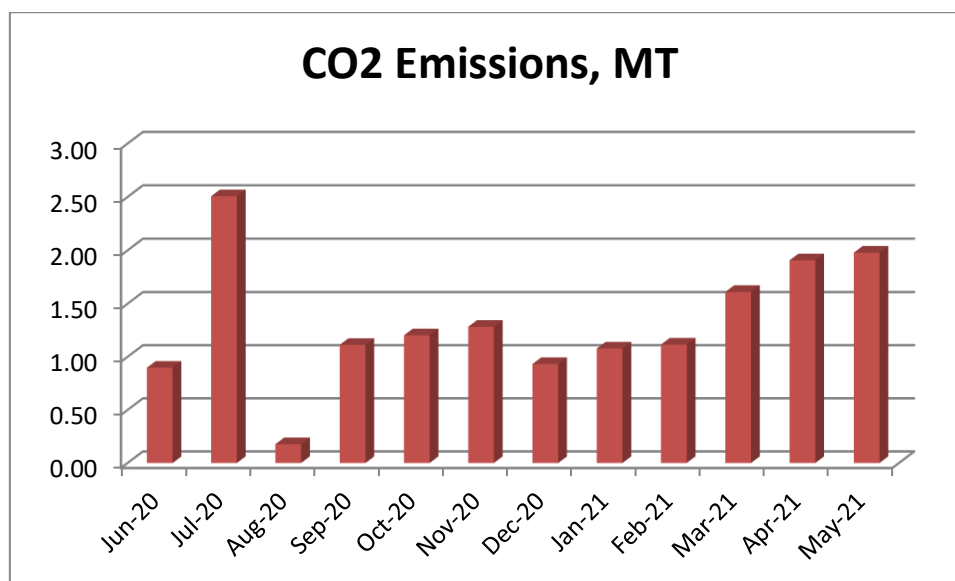
### Basis for computation of CO<sub>2</sub> Emissions:

- 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere

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

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Jun-20	997	0.90
2	Jul-20	2785	2.51
3	Aug-20	197	0.18
4	Sep-20	1236	1.11
5	Oct-20	1336	1.20
6	Nov-20	1425	1.28
7	Dec-20	1036	0.93
8	Jan-21	1198	1.08
9	Feb-21	1239	1.12
10	Mar-21	1789	1.61
11	Apr-21	2118	1.91
12	May-21	2198	1.98
13	Total	17554	15.80
14	Maximum	2785	2.51
15	Minimum	197	0.18
16	Average	1462.83	1.32

**Chart No 3: Month wise CO<sub>2</sub> Emissions:**



## **CHAPTER-V**

### **STUDY OF USAGE OF ALTERNATE ENERGY**

The College has yet to install Solar PV Plant

## **CHAPTER VI STUDY OF USAGE OF LED LIGHTING**

In this chapter, we compute the percentage of usage of LEDs to Total Lighting Load.

**Table No 5: Percentage of Usage of LED Lighting to Total Lighting Load:**

<b>No</b>	<b>Particulars</b>	<b>Value</b>	<b>Unit</b>
1	No of 16 W LED Fittings	147	Nos
2	Load of 16 W LED Fitting	16	W/unit
<b>3</b>	<b>Total Load of 16 W LED Fittings</b>	<b>2.352</b>	<b>kW</b>
4	No of 40 W LED Fittings	5	Nos
5	Load of 40 W LED Fitting	40	W/unit
<b>6</b>	<b>Total Load of 40 W LED Fittings</b>	<b>0.2</b>	<b>kW</b>
7	Total LED Lighting Load= 3+6	<b>2.552</b>	<b>kW</b>
8	Total Lighting Load= 3+6	<b>2.552</b>	<b>kW</b>
9	% of LEDs to Total Lighting Load = $7*100/8$	<b>100</b>	<b>%</b>