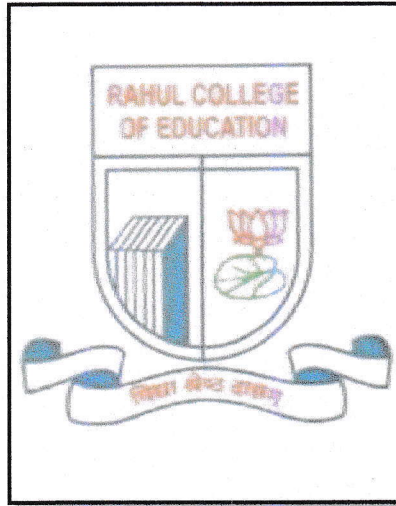


ENERGY AUDIT REPORT

of

RAHUL COLLEGE OF EDUCATION

Navghar Raod, Bhayander (East), Thane 401 105

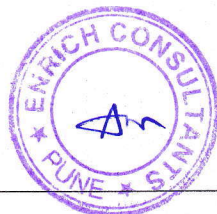


Year: 2019-20

Prepared by:

ENRICH CONSULTANTS



Yashashree, 26, Nirmal Bag Society,
Near Muktagan English School, Parvati, Pune 411009
Phone: 09890444795 Email: enrichcons@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. <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 th August 2007		

BEE AUDITOR CERTIFICATE

MAHARASHTRA ENERGY DEVELOPMENT AGENCY	
 Maharashtra Energy Development Agency (A Government of Maharashtra undertaking) 2 nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006, Ph No: 020-26614393/26614403 Email: eee@mahaurja.com, Web: www.mahaurja.com	
ECN/2018-19/CR-05/4174	19 th September, 2018
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	: Enrich Consultants Yashashree, Plot No. 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune - 411009.
Registration Category	: Empanelled Consultant for Energy Conservation Programme
Registration Number	: MEDA/ECN/CR-05/2018-19/EA-03
<ul style="list-style-type: none">• 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 the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.• This empanelment is valid till 31st March 2021 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.	
 (Smriti Kudarikar) General Manager (EC)	

MEDA EMPANELMENT CERTIFICATE



ENRICH CONSULTANTS

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

Ref: EC/RCOE/19-20/01

Date: 18/7/2020

CERTIFICATE

This is to certify that we have conducted Energy Audit at Rahul College of Education, Bhayander (East) Thane 401 105, in the Academic year 2019-20.

The College has adopted following Energy Efficient Practices:

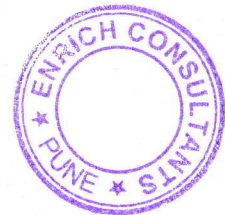
- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Maximum usage of Day Lighting

We appreciate the support of Management, involvement of faculty members and students in the process of making the Campus Energy Efficient.

For Enrich Consultants,

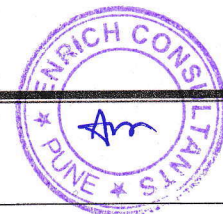


A Y Mehendale,
Certified Energy Auditor
EA-8192



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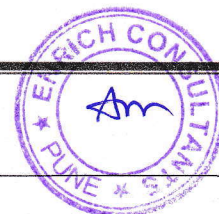
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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Rahul College of Education, Bhayander (East) Thane 401 105, for awarding us the assignment of Energy Audit of their Campus for the Year: 2019-20.

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



EXECUTIVE SUMMARY

1. **Rahul College of Education, Bhayander**, consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment.

2. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	22480	20.23
2	Maximum	2698	2.43
3	Minimum	878	0.79
4	Average	1873.33	1.69

3. Energy Conservation Measures Implemented:

- 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 **0.964 kW**.
- The Total Lighting Demand of the College is **5.384 kW**.
- The percentage of LED Lighting to Total Lighting Load is **17.90 %**.

6. Assumption:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

7. Reference:

- For CO₂ Emissions: 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 ₂	:	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 CO₂ 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:

No	Head	Particulars
1	Name of College	Rahul College of Education
2	Address	Navghar Road, Bhayander (East) Thane 401 105
3	Affiliation	University of Mumbai

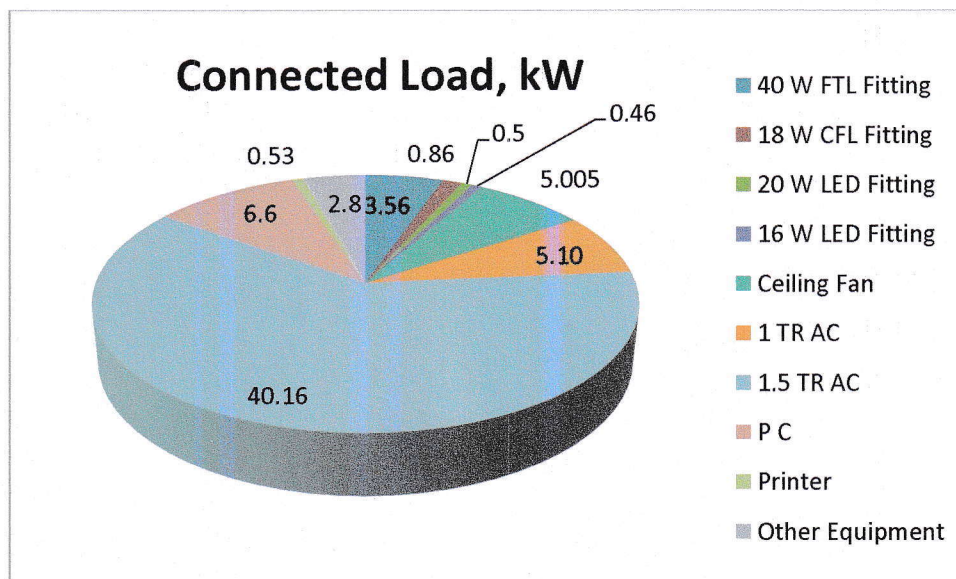
CHAPTER-II STUDY OF CONNECTED LOAD

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	40 W FTL Fitting	89	40	3.56
2	18 W CFL Fitting	43	20	0.86
3	20 W LED Fitting	25	20	0.5
4	16 W LED Fitting	29	16	0.46
5	Ceiling Fan	77	65	5.005
6	1 TR AC	4	1275	5.10
7	1.5 TR AC	21	1912.5	40.16
8	P C	44	150	6.6
9	Printer	3	175	0.53
10	Other Equipment	8	350	2.8
11	Total			65.58

Chart No 1: Study of Connected Load:



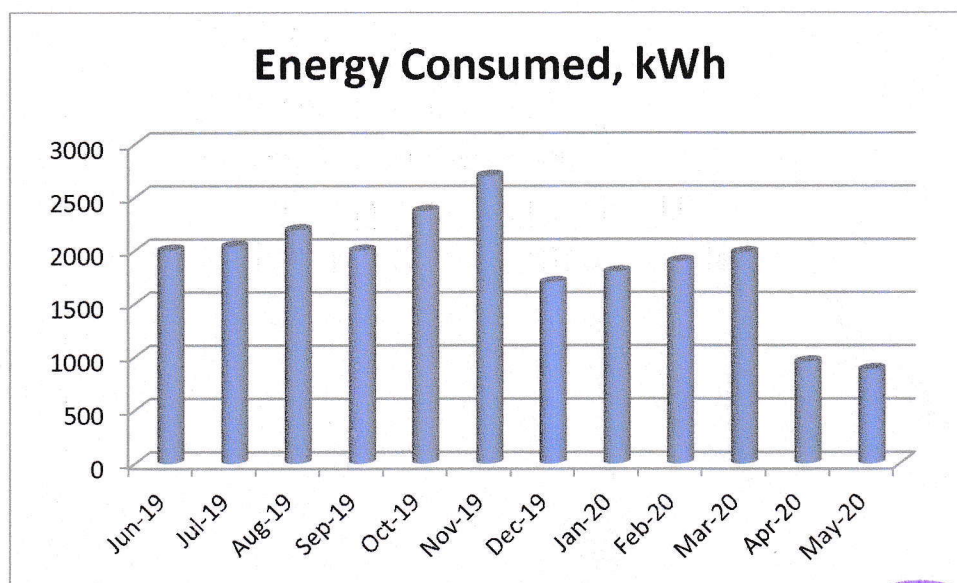
CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 3: Electrical Energy Consumption Analysis- 2019-20:

No	Month	Energy Consumed, kWh
1	Jun-19	1998
2	Jul-19	2036
3	Aug-19	2189
4	Sep-19	1996
5	Oct-19	2369
6	Nov-19	2698
7	Dec-19	1697
8	Jan-20	1797
9	Feb-20	1895
10	Mar-20	1978
11	Apr-20	949
12	May-20	878
13	Total	22480
14	Maximum	2698
15	Minimum	878
16	Average	1873.33

Chart No 2: Variation in Monthly Energy Consumption:



CHAPTER-IV CARBON FOOT PRINTING

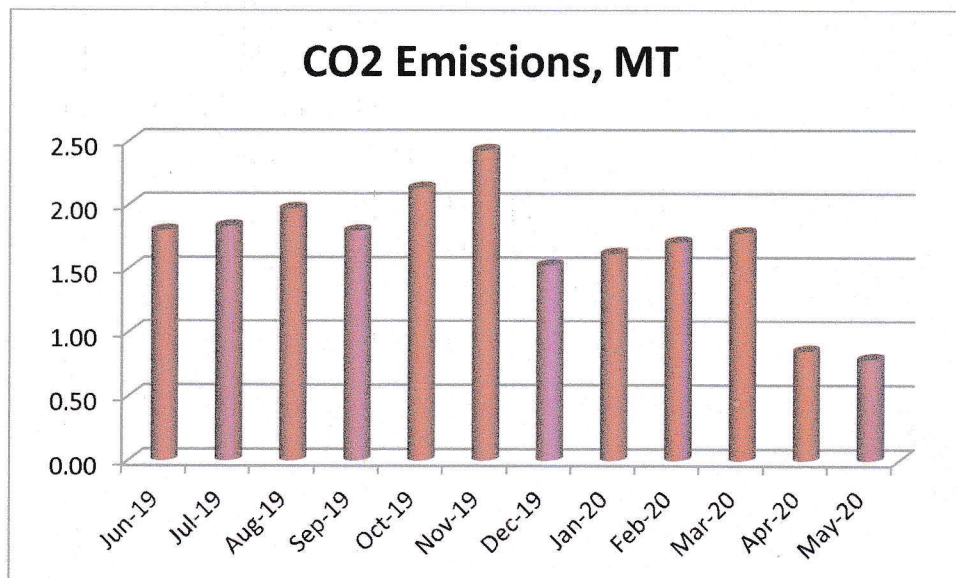
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. **Basis for computation of CO₂ Emissions:**

- 1 Unit (kWh) of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

Table No 4: Month wise CO₂ Emissions:

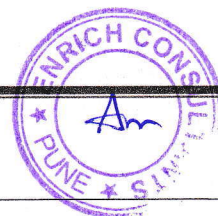
No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Jun-19	1998	1.80
2	Jul-19	2036	1.83
3	Aug-19	2189	1.97
4	Sep-19	1996	1.80
5	Oct-19	2369	2.13
6	Nov-19	2698	2.43
7	Dec-19	1697	1.53
8	Jan-20	1797	1.62
9	Feb-20	1895	1.71
10	Mar-20	1978	1.78
11	Apr-20	949	0.85
12	May-20	878	0.79
13	Total	22480	20.23
14	Maximum	2698	2.43
15	Minimum	878	0.79
16	Average	1873.33	1.69

Chart No 3: Month wise CO₂ 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:

No	Particulars	Value	Unit
1	No of 40 W FTL Fittings	89	Nos
2	Load of 40 W FTL Fitting	40	W/unit
3	Total Load of 40 W FTL Fitting	3.56	kW
4	No of 18 W CGL Fittings	43	Nos
5	Load of 18 W CGL Fitting	20	W/unit
6	Total Load of 18 W CGL Fitting	0.86	kW
7	No of 20 W LED Fittings	25	Nos
8	Load of 20 W LED Fitting	20	W/unit
9	Total Load of 20 W LED Fitting	0.5	kW
10	No of 16 W LED Fittings	29	Nos
11	Load of 16 W LED Fitting	16	W/unit
12	Total Load of 16 W LED Fitting	0.464	kW
13	Total LED Lighting Load= 9+12	0.964	kW
14	Total Lighting Load= 3+6+9+12	5.384	kW
15	% of LED to Total Lighting Load= $13 \times 100 / 14$	17.90	%