ENERGY AUDIT REPORT

of

GONDIA EDUCATION SOCIETY'S

S. S. GIRLS' COLLEGE

GONDIA – 441601

॥ यत्र नार्यस्तु पूज्यन्ते रमन्ते तत्र देवताः ॥

Estd. 1970

Year: 2020-21

Prepared by:

ENGRESS SERVICES

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

ENGRESS SERVICES PUNE

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)

ENGRESS SERVICES

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

Ref: ES/SSG/21-22/01 Date: 18/11/2022

CERTIFICATE

This is to certify that we have conducted Energy Audit at S S Girls' College Gondia in the Academic year 2021-22.

The College has adopted following Energy Efficient practices:

- Usage of Energy Efficient LED fittings
- 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 Engress Services,

A Y Mehendale,
Certified Energy Auditor
EA-8192

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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of S.S.Girls' College Gondia for awarding us the assignment of Energy Audit of their Campus for the Academic Year: 21-22.

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

EXECUTIVE SUMMARY

1. **S.S.Girls' College Gondia** consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, office & other facilities.

2. **Present Energy Consumption & CO_2 Emission:**

No	Parameter/ Value	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	16629	14.966
2	Maximum	2348	2.113
3	Minimum	753	0.677
4	Average	1385.75	1.247

3. **Energy Conservation projects already installed:**

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

4. **Usage of Alternate Energy:**

- As on today College has not installed solar rooftop power plant. It is recommended to install solar power rooftop system on the college building as per availability of funds.

5. **Usage of LED Lighting:**

- The Total Lighting Load is **5.50 KW**
- The Total LED Lighting Load is **1.34 KW.**
- The percentage of Annual LED Lighting to Annual Lighting Demand is **23.69 %.**

6. **Assumptions:**

1. **1 kWh** of Electrical Energy releases **0.9 Kg** of **CO_2** into atmosphere.
2. **100 LPD** Solar Thermal System saves **1500 kWh** of Electrical Energy per Annum.
3. Average Energy generated by **1 kWp** Solar PV Plant: **4 kWh/Day**.
4. Annual Solar Energy Generation Days: **300 Nos.**

7. **References:**

- For CO_2 Emissions: www.tatapower.com
- For Roof Top Solar Energy Generation: www.solarrooftop.gov.in
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI & Water Quality Standards: www.cpcb.com

ABBREVIATIONS

LED	:	Light Emitting Diode
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
IQAC	:	Internal Quality Assurance Cell
BEE	:	Bureau of Energy Efficiency
FTL	:	Fluorescent Tube Light
Kg	:	Kilo Gram
kWh	:	kilo-Watt Hour
CO_2	:	Carbon Di Oxide
MT	:	Metric Ton

CHAPTER-I
INTRODUCTION

1.1 Objectives:

1. To study present Energy Consumption
2. To Study the present CO_2 emissions
3. To study usage of Alternate Energy
4. To study usage of LED Lighting

1.2Table No 1: General Details of the College:

No	Head	Particulars
1	Name of Institution	S. S. Girls' College
2	Address	Gondia – 441601 (Maharashtra)
3	Affiliation	Rashtra Sant Tukadoji Maharaj,Nagpur University, Nagpur

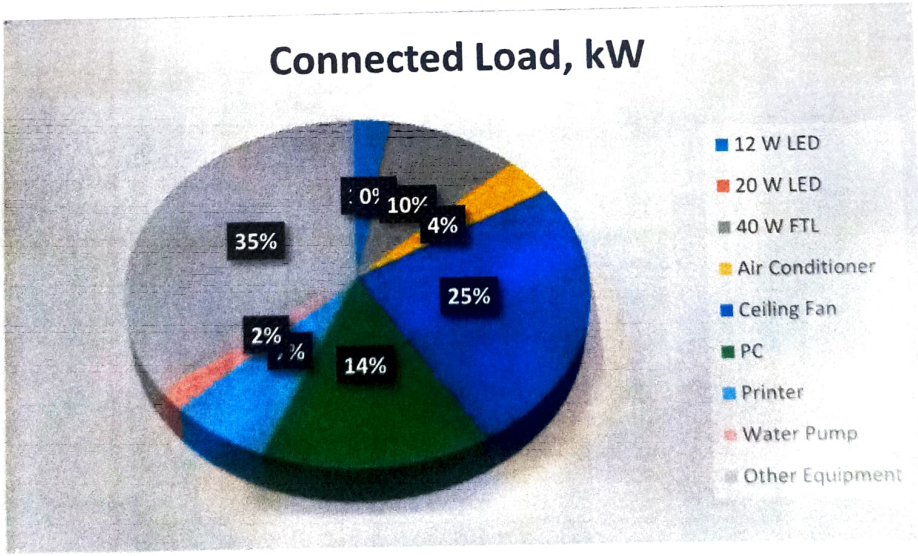
CHAPTER-II
STUDY OF CONNECTED LOAD

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	12 W LED	102	12	1.224
2	20 W LED	4	20	0.08
2	40 W FTL	105	40	4.2
3	Air Conditioner	1	1500	1.5
4	Ceiling Fan	164	65	10.66
5	PC	41	150	6.15
6	Printer	19	150	2.85
7	Water Pump	1	746	0.746
8	Other Equipment	100	150	15
9	**Total**			**42**

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 Bill Analysis- 2021-22:

No	Month	Energy Purchased, kWh
1	Apr-21	1558
2	May-21	2348
3	Jun-21	1527
4	Jul-21	2160
5	Aug-21	1860
6	Sep-21	753
7	Oct-21	1697
8	Nov-21	1158
9	Dec-21	1092
10	Jan-22	779
11	Feb-22	795
12	Mar-22	902
13	Total	16629
14	Maximum	2348
15	Minimum	753
16	Average	1385.75

Chart No 2: Variation in Monthly Energy Consumption:

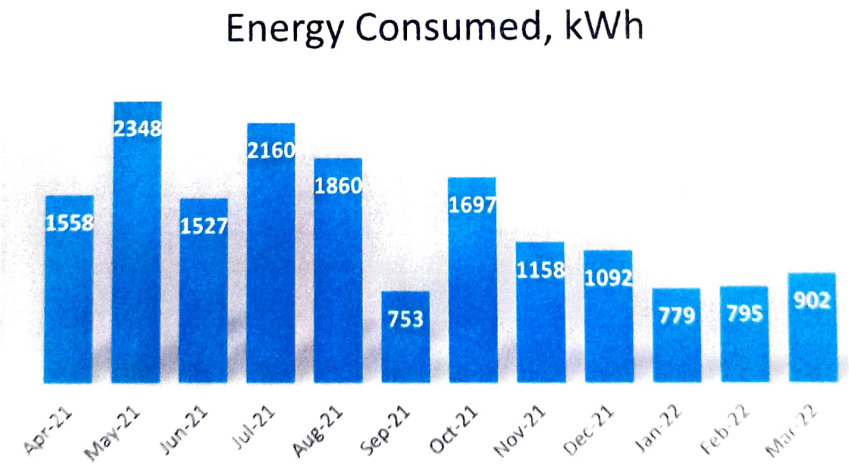


Table No4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	16629
2	Maximum	2348
3	Minimum	753
4	Average	1385.75

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 taking into account the usage of the Electrical Energy.

Basis for computation of CO_2 Emissions:

- **1 kWh** of Electrical Energy releases **0.9 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 College due to its Day to Day operations

Table No 5: Month wise CO_2 Emissions:

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Apr-21	1558	1.402
2	May-21	2348	2.113
3	Jun-21	1527	1.374
4	Jul-21	2160	1.944
5	Aug-21	1860	1.674
6	Sep-21	753	0.677
7	Oct-21	1697	1.527
8	Nov-21	1158	1.042
9	Dec-21	1092	0.982
10	Jan-22	779	0.701
11	Feb-22	795	0.715
12	Mar-22	902	0.811
13	Total	16629	14.966
14	Maximum	2348	2.113
15	Minimum	753	0.677
16	Average	1385.75	1.2471

Chart No 3: Month wise CO_2Emissions:

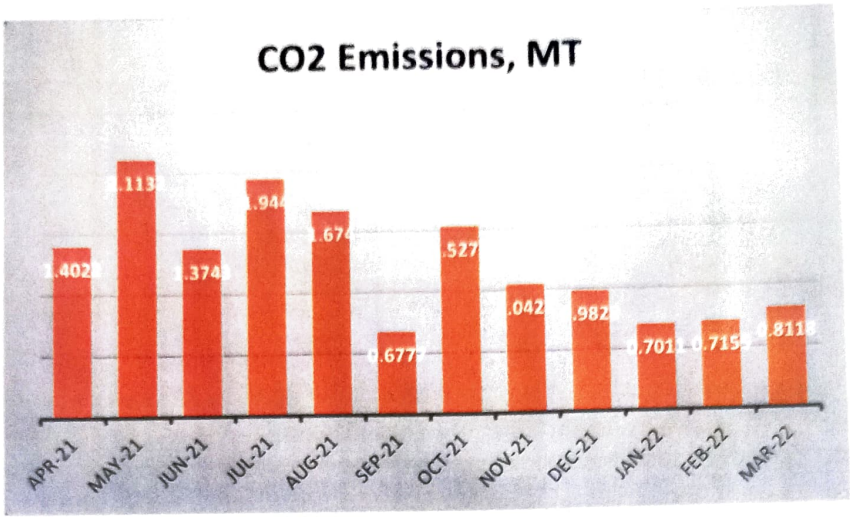


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	16629	14.966
2	Maximum	2348	2.113
3	Minimum	753	0.677
4	Average	1385.75	1.2471

CHAPTER V
STUDY OF USAGE OF ALTERNATE ENERGY

As on today College has not install solar roof-top PV plant, solar thermal water heating plant; the percentages of uses of alternate energy to the annual energy demand work to be zero percent.

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.

Table No 8: Percentage of Usage of LED Lighting to Annual Lighting Load

No	Particulars	Value	Unit
1	No of 40 W FTL Fittings	105	Nos
2	Demand of 40 W FTL Fitting	40	W/Unit
3	Total Electrical Load of 40 W FTL Fittings	**4.2**	kW
4	No of 20 W LED Tube Lights	4	Nos
5	Demand of 20 W LED Tube Light	20	W/Unit
6	Total Electrical Load of 20 W LED Fittings	**0.08**	kW
7	No of 12 W LED Tube Lights	102	Nos
8	Demand of 12 W LED Tube Light	12	W/Unit
9	Total Electrical Load of 12 W LED Fittings	**1.224**	kW
10	Total Lighting Load=3+6+9	**5.504**	kW
11	Total LED Lighting Load= 6+9	**1.304**	kW
15	**Annual Lighting Requirement met by LED= 11*100/10**	**23.69**	%