Late Chindhuji Laxmanrao Purke Shikshan Prasarak Mandal's

INDIRA GANDHI KALA MAHAVIDYALAYA

Ralegaon, Dist- Yavatmal, Maharashtra

Affiliated to

Sant Gadge Baba Amravati University, Amravati

2nd Cycle

Assessment & Accreditation by NAAC

Criteria-VII

Institutional Values and Best Practices

Key Indicator -7.1
Institutional Values and Social Responsibilities

Late Chindhuji Laxmanrao Purke Shikshan Prasarak Mandal's Yavatmal

INDIRA GANDHI KALA MAHAVIDYALAYA, RALEGAON

DIST. YAVATMAL (445402)

(Affiliated to Sant Gadge Baba Amravati University College Code-490)
(DD Code - 06610100121)

President
Hon' Prof. Shri Vasantrao C. Purke
Mob No. - 9920997275

Website -www.igkmralegaon.org
E-mail - igkm490@gmail.com

Principal
Dr. Santosh V. Agarkar
Mob. No-9373778210

Date: 12/07/2024

Declaration

The information, reports, true copies of the supporting documents, numerical data, etc. related to the NAAC process furnished in this file is verified by IQAC and found correct.

Hence this certificate.

Co-ordinator
Internal Quality Assurance Cell
Indira Gandhi Kala Mahavidyalaya
Ralegaon

Indira Gandhi Kala Mahavidyalaya * Ralegaon Dist.Yavatmal * College Code 490

PRINCIPAL
Indira Gandhi Kala Mahavidyalaya
Ralegaon Dist.Yavatmal

7.1.3 Quality audits on environment and energy regularly undertaken by the Institution. The institutional environment and energy initiatives are confirmed through the following

1.Green audit / Environment audit

2.Energy audit

3.Clean and green campus initiatives

4.Beyond the campus environmental promotion activities

Response: B. 3 of the above

Sr. No.	Particulars
1.	Energy audit
2.	Green audit / Environment audit
3.	Clean and green campus initiatives

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com
UDYAM Regn. No: UDYAM-MH-26-0135636,
MEDA Regn. No: ECN/2023-24/CR-43/1709
ISO: 9001-2015 Certified (Cert No: 23EQKC13),
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

ENERGY AUDIT CERTIFICATE

Certificate No: ES/IGC/23-24/01 **Date: 30/05/2024**

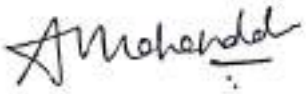
This is to certify that we have conducted Energy Audit at Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal, in the Academic year 2023-24.

.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 Engress Services,



A Y Mehendale,
B E-Mechanical, M Tech- Energy
BEE Certified Energy Auditor, EA-8192

ENERGY AUDIT REPORT

INDIRA GANDHI KALA MAHAVIDYALAYA,

RALEGAON DIST: YAVATMAL 445 402

Year: 2023-24

Prepared by:

ENGRESS SERVICES

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

REGISTRATION CERTIFICATES: BEE, UDYAM, MEDA, ISO-9001 & 14001:

Maharashtra Energy Development Agency

EQUIVALENCE 'A'

National Productivity Council

(National Certifying Agency)

PROVISIONAL CERTIFICATE

Ashyut Yashwant Mohondale

Yashwant

UDYAM REGISTRATION CERTIFICATE

UDYAM REGISTRATION NUMBER	UDYAM-MH-26-0139436
NAME OF ENTERPRISE	ENGRESS SERVICES
TYPE OF ENTERPRISE	Micro
MAJOR ACTIVITY	SERVICES
SOCIAL CATEGORY OF ENTREPRENEUR	GENERAL
NAME OF UNIT(S)	Engress Services
OFFICAL ADDRESS OF ENTERPRISE	Pune
DATE OF INCORPORATION/ REGISTRATION OF ENTERPRISE	13/04/2021
DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS	13/04/2021
NATIONAL INDUSTRY CLASSIFICATION CODE(S)	Services
DATE OF UDYAM REGISTRATION	27/07/2021

Certificate of Registration

This is to certify that

Environmental Management System of

ENGRESS SERVICES

has been noted and found to conform to the requirement of

ISO 14001:2015

for the following scope

Director

Registered: Management Services Pvt. Ltd.

Certificate of Registration

This is to certify that

Quality Management System of

ENGRESS SERVICES

has been noted and found to conform to the requirement of

ISO 9001:2015

for the following scope

Director

Registered: Management Services Pvt. Ltd.

INDEX

ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal for awarding us the assignment of Energy Audit of their Campus for the Year: 2023-24.

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

EXECUTIVE SUMMARY

1. Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal consumes Energy in the form of Electrical Energy; used for various Electrical Equipment, office & other facilities.

2. Present Connected Load & Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	**26**	kW
2	Annual Energy Consumed	**8336**	kWh

3. Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Consumed	8336	kWh
2	Total Built up area of Institute	2134.29	m^2
3	Energy Performance Index =(1) / (2)	**3.90**	kWh/m^2

4. Study of Lighting Power Density & % Usage of LED Lighting:

No	Particulars	Value	Unit
1	Lighting Power density	**0.48**	W/m^2
2	% of Usage of LED Lighting to Total Lighting Load	**100**	%

5. Renewable Energy & Energy Efficiency Projects:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment

6. Assumption:

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO_2 into atmosphere

7. References:

- Audit Methodology: www.mahaurja.com
- Energy Conservation Building Code: ECBC-2017: www.beeindia.gov.in
- For CO_2 Emissions: www.tatapower.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
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 Introduction:

An Energy Audit is conducted at Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal.

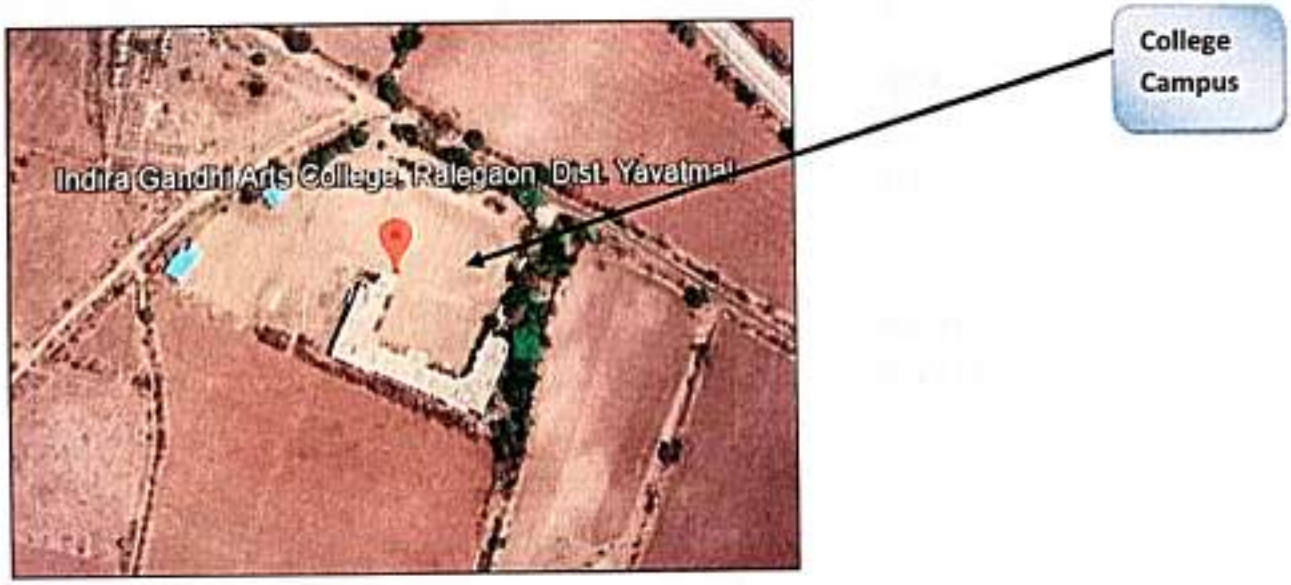
The guidelines followed for conducting the Energy Audit are:

- BEE India's Energy Conservation Building Code: ECBC-2017
- Maharashtra Energy Development Agency (www.mahaurja.com)
- Tata Power: www.tatapower.com

1.2 Key Study Points:

No	Particulars
1	Study of Present Connected Load
2	Study of Present Energy Consumption
3	Study of Per Capita Energy Consumption
4	Study of Lighting
5	Study of Energy Efficiency & Renewable Energy

1.3 College Location Image:



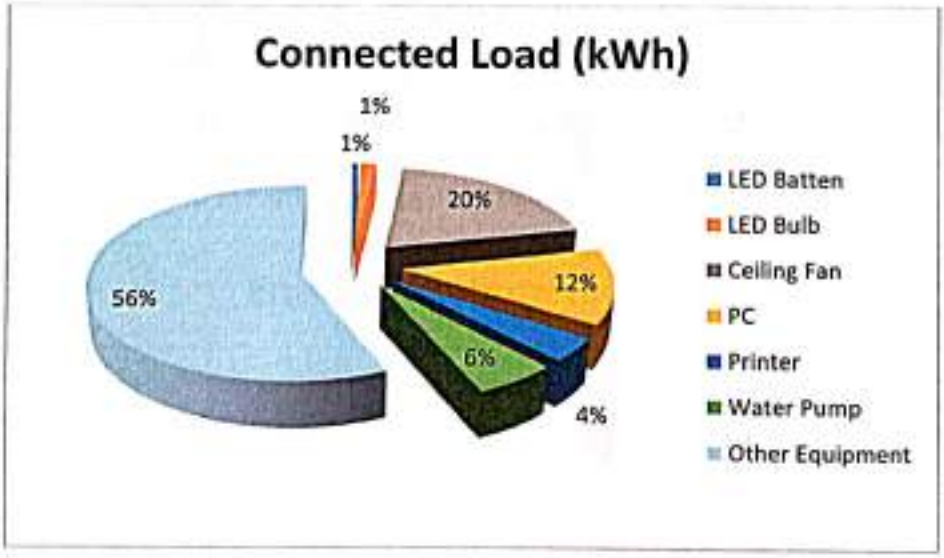
CHAPTER-II
STUDY OF CONNECTED LOAD

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

Table No 1: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	LED Batten	7	20	0.1
2	LED Bulb	40	9	0.4
3	Ceiling Fan	80	65	5.2
4	Computers	22	150	3.3
5	Printer	7	150	1.1
6	Water Pump	1	1492	1.5
7	Other Equipment	100	150	15.0
8	**Total**			**26**

Chart No 1: Study of Connected Load:



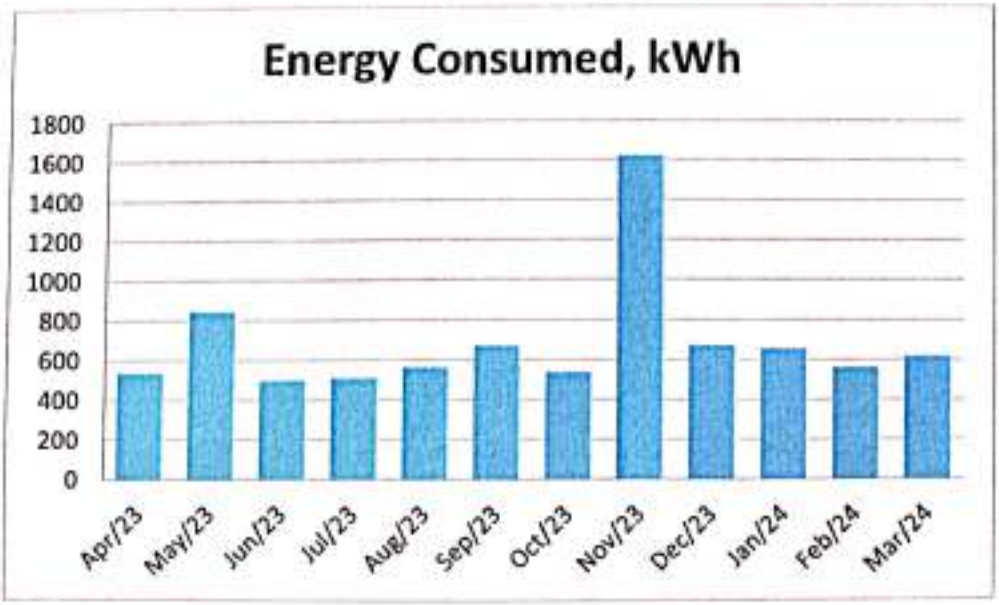
CHAPTER-III
STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 2: Electrical Energy Consumption Analysis- 2023-24:

No	Month	Energy Consumption (kWh)	CO2 Emissions MT
1	Apr-23	540	0.49
2	May-23	848	0.76
3	Jun-23	504	0.45
4	Jul-23	515	0.46
5	Aug-23	565	0.51
6	Sep-23	673	0.61
7	Oct-23	542	0.49
8	Nov-23	1626	1.46
9	Dec-23	675	0.61
10	Jan-24	660	0.59
11	Feb-24	565	0.51
12	Mar-24	623	0.56
13	Total	8336	7.50
14	Maximum	1626	1.46
15	Minimum	504	0.45
16	Average	694.667	0.63

Chart No 2: Variation in Monthly Energy Consumed, kWh:



CHAPTER-IV
STUDY OF PER CAPITA ENERGY CONSUMPTION

Per Capita Energy Consumption Index: Per Capita Energy Consumption Index of an educational Institute/College is its Annual Energy Consumption in Kilo Watt Hours per student studying in the Institute/College.

It is determined by:

$$\text{Per Capita Energy Consumption Index} = \frac{\text{(Annual Energy Consumption in kWh)}}{\text{(Total No of students studying)}}$$

Now we compute the EPI for the College as under:

Table No 3: Computation of Capita Energy Consumption Index:

No	Particulars	Value	Unit
1	Total Annual Energy Consumed	8336	kWh
2	No of students studying in the College	550	Nos
3	Per Capita Energy Consumption **=(1) / (2)**	**15.15**	kWh

CHAPTER-V
STUDY OF LIGHTING

Terminology:

1. Lumen is a unit of light flow or luminous flux. The lumen rating of a lamp is a measure of the total light output of the lamp. The most common measurement of light output (or luminous flux) is the lumen. Light sources are labeled with an output rating in lumens.

2. Lux is the metric unit of measure for illuminance of a surface. One lux is equal to one lumen per square meter.

3. Circuit Watts is the total power drawn by lamps and ballasts in a lighting circuit under assessment.

4. Installed Load Efficacy is the average maintained illuminance provided on a horizontal working plane per circuit watt with general lighting of an interior. Unit: lux per watt per square metre (lux/W/m²)

5. Lamp Circuit Efficacy is the amount of light (lumens) emitted by a lamp for each watt of power consumed by the lamp circuit, i.e. including control gear losses. This is a more meaningful measure for those lamps that require control gear. Unit: lumens per circuit watt (lm/W)

6. Lighting Power Density: It is defined as Total Lighting Load in a room divided by the Area of that Room in square meters.

In this Chapter we compute the Lighting Power density and the percentage usage of LED Lighting to total Lighting Load of the College.

Table No 4: Computation of Lighting Power Density:

No	Particulars	Value	Unit
1	No of 9 W LED Bulbs in Class Room	4	Nos
2	Demand of 9 W LED Bulbs	9	W/Unit
3	Total Lighting Load in the Class Room= **(1) * (2)**	**36**	W
4	Area of Class Room	73.9	m²
5	Lighting Power Density = **(3)/ (4)**	**0.48**	W/m²

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

No	Particulars	Value	Unit
1	Qty of 20 W LED Light Fittings	7	Nos
2	Load per Fitting	20	W/Unit
3	Total Load of 20 W LED Fitting	**0.14**	kW
4	Qty of 9 W LED Light Fittings	40	Nos
5	Load per Fitting	9	W/Unit
6	Total Load of 9 W LED Fitting	**0.36**	kW
7	Total Lighting Load=3+6	**0.5**	kW
8	Total LED Lighting Load=6+9	**0.5**	kW
9	% of Total Lighting Demand met by LED Lighting=8*100/7	**100.00**	%

CHAPTER-VI
STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

6.1 Usage of Renewable 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.

6.2 Energy Efficiency Measures Adopted:

- The Institute has adopted Energy Efficient LED Lighting.

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com
UDYAM Regn. No. UDYAM-MH-26-0135636,
MEDA Regn. No. ECN/2023-24/CR-43/1709
ISO: 9001-2015 Certified (Cert No. 23EQKC13),
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

GREEN AUDIT CERTIFICATE

Certificate No: ES/IGC/23-24/02 **Date: 30/05/2024**

This is to certify that we have conducted Green Audit at Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal, in the Academic year 2023-24.

.The College has adopted following Green & Sustainable Practices:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Segregation of Waste at Source
- Installation of Bio Composting Unit for conversion of Organic Waste
- Installation of Rain Water Management Project
- Maintenance of good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of awareness on Water Conservation by display of posters

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Engress Services,

A Y Mehendale,
B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192
ASSOCHAM GEM Certified Professional: GEM: 22/788

ENGRESS SERVICES PUNE

GREEN AUDIT REPORT

INDIRA GANDHI KALA MAHAVIDYALAYA,

RALEGAON DIST: YAVATMAL 445 402

Year: 2023-24

Prepared by:

ENGRESS SERVICES

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

Registration Certificates: UDYAM, MEDA, ASSOCHAM GEM-CP, ISO: 9001 & 14001:

UDYAM REGISTRATION CERTIFICATE

SERVICES

GEM Certificate

Mr. A V Mahendale

Certificate of Registration

ENGRESS SERVICES

ISO 9001:2015

Maharashtra Energy Development Agency

FORM OF CERTIFICATE FOR CLASS 'A'

Certificate of Registration

ENGRESS SERVICES

ISO 14001:2015

INDEX

ACKNOWLEDGEMENT

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

EXECUTIVE SUMMARY

1. Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal consumes Energy in the form of Electrical Energy; used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO_2 Emission:

No	Particulars	Value	Unit
1	Annual Energy Consumed	8336	kWh
2	Annual CO_2 Emissions	7.50	MT

3. Usage of Renewable Energy:

- It is recommended to install Solar Power Project on the College Building.

4. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Provision of Bio Composting Bed
3	Sanitary Waste	It is recommended to Install Sanitary Waste Incinerator
4	E Waste	Disposed of through Authorized Agency

5. Rain Water Management:

The College has installed the Rainwater Management project; the rain water falling on the terrace is collected and is used for recharging the bore well.

6. Green & Sustainable Practices:

- Maintenance of good Internal Road
- Tree Plantation in the campus.
- Provision of Ramp for Divyangajan
- Creation of awareness on Energy Conservation Display of Posters

7. Assumption:

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO_2 into atmosphere

8. Reference:

- For CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

BEE	Bureau of Energy Efficiency
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO_2	Carbon Di Oxide
Qty	Quantity

CHAPTER-I
INTRODUCTION

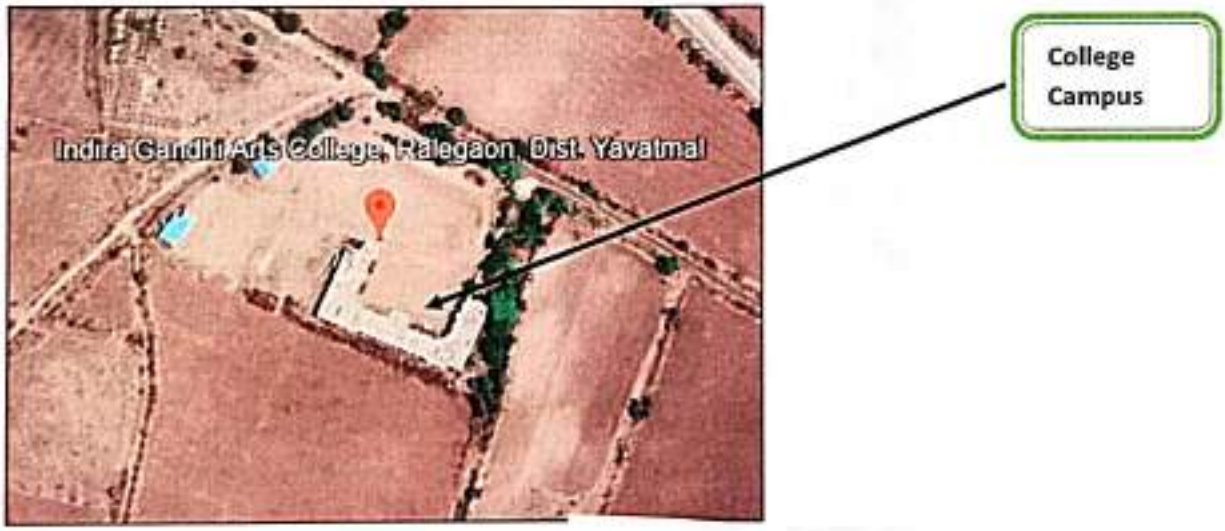
1.1 Introduction:

A Green Audit is conducted at Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal.

1.2 Key Study Points:

No	Particulars
1	Study of Present Energy Consumption & CO_2 Emission
2	Study of Usage of Renewable Energy
3	Study of Waste Management Practices
4	Study of Rain Water Management
5	Study of Green & Sustainable Initiatives

1.3 College Location Image:



CHAPTER-II
STUDY OF ENERGY CONSUMPTION & CO_2 EMISSION

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 1: Month wise Energy Consumption & CO_2 Emissions:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-23	540	0.49
2	May-23	848	0.76
3	Jun-23	504	0.45
4	Jul-23	515	0.46
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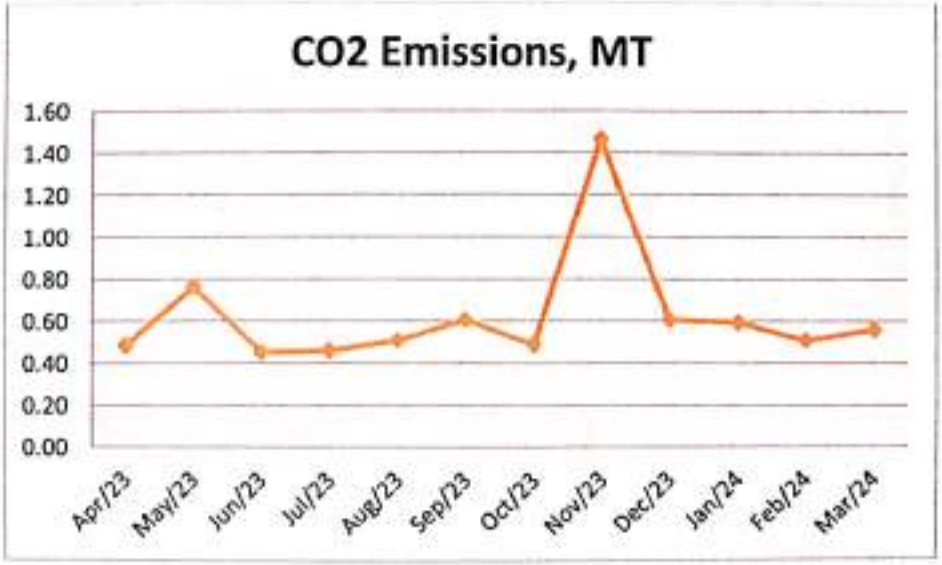
11	Feb-24	565	0.51
12	Mar-24	623	0.56
13	Total	8336	7.50
14	Maximum	1626	1.46
15	Minimum	504	0.45
16	Average	694.667	0.63

Chart No 1: Month wise CO_2 Emissions:



CHAPTER III
STUDY OF USAGE OF RENEWABLE ENERGY

3.1 Usage of Renewable 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.

3.2 Energy Efficiency Measures Adopted:

- The Institute has adopted Energy Efficient LED Lighting.

CHAPTER IV
STUDY OF WASTE MANAGEMENT

In this Chapter, we present the Waste Management Practices, followed by the College.

Details of Waste Management Practices:

No	Head	Observation	Photograph
1	**Solid Waste**	Segregation of Waste at Source: Provision of Waste Collection Bins	**Photo of Waste Collection Bin:** 
2	**Organic Waste**	Provision of Bio Composting Bed: For conversion into Bio Compost	**Photo of Bio Composting Bed:** 
3	**Sanitary Waste**	Provision of Sanitary Waste Collection Bin & Disposal through an Incinerator	**Sanitary Waste Incinerator :** It is recommended installed Sanitary Waste Incinerator for sanitary waste disposal

4	**E Waste**	Provision of E Waste Collection Bin & disposal through Authorized Agency	**Photograph of E Waste Collection Bin** 

CHAPTER-V
STUDY OF RAIN WATER MANAGEMENT

The College has implemented the Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used for recharging the bore well.

Photograph of Rain Water Management Bore well Recharge Section:

CHAPTER-VI
STUDY OF GREEN & SUSTAINABLE PRACTICES

In this Chapter, we present the Green & Sustainable Practices followed by the College.

Green & Sustainable Practices:

No	Head	Observation	Photograph
1	**Easy Movement of Stake Holders**	Provision of Good Internal Road within the Campus	**Photo of Internal Road:** 
2	**Tree Plantation**	Internal Tree Plantation in the Campus	**Photo of Internal Tree Plantation:** 
3	**Facilities for Divyangajan**	Provision of Sloppy Structure for Divyangajan	**Sloppy Structure for Divyangajan:** 

4	**Creation of Awareness among Stake Holders**	Display of Poster on Energy Conservation	**Photograph of Poster on Energy Conservation:** 

ANNEXURE-1:
LIST OF TREES & PLANTS IN THE CAMPUS:

Sr.No.	Name of Plants/Trees	Quantity	Sr.No.	Name of Plants/Trees	Quantity
1	Mehandi	76	24	Ajwan	1
2	Ashoka	12	25	Shatavari	1
3	Kadunimb	18	26	Ashwganda	1
4	Chakri	1	27	Adulsa	1
5	Palm	13	28	Rui	1
6	Angerji Chinch	14	29	Aloevera	3
7	Ghantoli	7	30	Beetle nut	1
8	Kanher	6	31	Prajakta	1
9	Zandu	15	32	Raktchandan	1
10	Bakul	2	33	Shevaga	1
11	Sadafully	10	34	Mosambi	1
12	Jabhul	3	35	Custer apple	1
13	Teak wood	73	36	Gauva	1
14	Pimple	1	37	Coconut	1
15	Karanj	10	38	Akashnim	1
16	Champa	1	39	Java Apple	1
17	Jaswand	7	40	Karvand	1
18	Kadamb	1	41	Lemaon	1
19	Rose	21	42	Curry Leaves	1
20	Thuja	11	43	Sonchafa	1
21	Stobush	1	44	Copper Leaf	4
22	Bramhi	1	45	Awala	2
23	Mogra	9			

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com
UDYAM Regn. No: UDYAM-MH-26-0135636,
MEDA Regn. No: ECN/2023-24/CR-43/1709
ISO: 9001-2015 Certified (Cert No: 23EQKC13),
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

ENVIRONMENTAL AUDIT CERTIFICATE

Certificate No: ES/IGC/23-24/03 **Date: 30/05/2024**

This is to certify that we have conducted Environmental Audit at Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal, in the Academic year 2023-24.

.The College has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Segregation of Waste at Source
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- Tree Plantation in the campus
- Creation of awareness on Water Conservation by display of posters

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green & Eco Friendly.

For Engress Services,

ENGRESS SERVICES PUNE

A Y Mehendale,
B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192
ASSOCHAM GEM Certified Professional: GEM: 22/788

ENVIRONMENTAL AUDIT REPORT

INDIRA GANDHI KALA MAHAVIDYALAYA,

RALEGAON DIST: YAVATMAL 445 402

Year: 2023-24

Prepared by:

ENGRESS SERVICES

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

Registration Certificates: UDYAM, MEDA, ASSOCHAM GEM-CP, ISO: 9001 & 14001:

UDYAM REGISTRATION CERTIFICATE

UDYAM REGISTRATION NUMBER	UDYAM-MH-[illegible]
NAME OF ENTERPRISE	ENGRESS SERVICES
TYPE OF ENTERPRISE	Micro
MAJOR ACTIVITY	SERVICES
SOCIAL CATEGORY OF ENTREPRENEUR	GENERAL
NAME OF UNIT(s)	1. Engress Services
OFFICAL ADDRESS OF ENTERPRISE	MAHARASHTRA
DATE OF INCORPORATION / REGISTRATION OF ENTERPRISE	[illegible]
DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS	[illegible]
NATIONAL INDUSTRY CLASSIFICATION CODE(S)	[illegible]
DATE OF UDYAM REGISTRATION	27/07/2021

GEM Certificate

ASSOCHAM hereby certifies that

Mr. A Y Mehendale

has successfully passed the Green and Eco Friendly Management Certified Professional Test (GEM-CP) with "Excellent Performance" on 05 June 2017

Certificate of Registration

This is to Certify that Quality Management System of

ENGRESS SERVICES

has been assessed and found to conform to the requirements of

ISO 9001:2015

for the following scope

Director

Hegemonic Management Services Pvt. Ltd.

Maharashtra Energy Development Agency

CERTIFICATE OF REGISTRATION FOR CLASS "A"

This is to certify that the firm having following particulars is registered with MAHARASHTRA ENERGY DEVELOPMENT AGENCY and MEDA (MEDA) and is entitled to undertake Energy Conservation Programmes of various

Name and Address of the Firm: M/s Engress Services, Pune

Registration Category: Energy Conservation Programmes

Registration Number: MEDA/EA/2021/[illegible]

- Energy Conservation Programmes include to identify areas where substantial use of energy can be and to undertake the study for Energy Conservation and other allied work as per the recommendations thereof.
- MEDA reserves the right to visit all the sites without giving prior information to such agencies and inspect the work executed by the firm and recording the requirements of the Administration in this connection.
- This registration is valid up to 30th Nov. 2024 from the date of registration or such other period as the Energy Conservation Programme.
- The Executive Director, MEDA reserves the right to cancel the registration at any time without assigning any reason thereof.

Executive Director

Certificate of Registration

This is to certify that Environmental Management System of

ENGRESS SERVICES

has been assessed and found to conform to the requirements of

ISO 14001:2015

for the following scope

Director

INDEX

ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal, for awarding us the assignment of Environmental Audit of their Ralegaon Campus for the Year: 2023-24

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

EXECUTIVE SUMMARY

1. Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal consumes Energy in the form of Electrical Energy; used for various Electrical Equipment, office & other facilities.

2. Pollution due to College Activities:

- Air pollution: Mainly CO_2 on account of Electricity Consumption
- Solid Waste: Bio degradable Garden Waste, Paper & Plastic Waste
- Liquid Waste: Human liquid waste

3. Present Energy Consumption & CO_2 Emission:

No	Particulars	Value	Unit
1	Annual Energy Consumed	8336	kWh
2	Annual CO_2 Emissions	7.50	MT

4. Usage of Renewable Energy:

- It is recommended to install Solar Power Project on the College Building.

5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	57	39	61
2	Minimum	52	34	54

6. Indoor Lux & Noise Level Parameters:

No	Parameter/Value	Lux Level	Noise Level, dB
1	Maximum	310	41
2	Minimum	210	37

7. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Liquid Waste	The Institute has installed Septic Tank
3	E Waste	The Institute has disposed The E Waste through Authorized Agency

8. Rain Water Management:

The Rain water falling on terrace is collected through Pipe and is used to increase the underground water table.

9. Environment Friendly Initiatives:

- Tree Plantation in the campus.
- Creation of awareness on Energy Conservation Display of Posters

10. Assumption:

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO_2 into atmosphere

11. References:

- For CO_2 Emissions: www.tatapower.com
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI Quality Standards: www.cpcb.com

ABBREVIATIONS

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
LPD	:	Liters per Day
LED	:	Light Emitting Diode
AQI	:	Air Quality Index
PM-2.5	:	Particulate Matter of Size 2.5 Micron
PM-10	:	Particulate Matter of Size 10 Micron
CPCB	:	Central Pollution Control Board
ISHRAE	:	The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

CHAPTER-I
INTRODUCTION

1. Important Definitions:

1.1. Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.2. Environmental Audit: Definition:

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment

1.2 Key Study Points:

No	Particulars
1	Study of Present Resource Consumption & CO_2 Emission
2	Study of Usage of Renewable Energy
3	Study of Indoor Air Quality
4	Study of Indoor Lux & Noise Level
5	Study of Water Management
6	Study of Waste Management Practices
7	Study of Environment Friendly Practices

1.3 College Location Image:

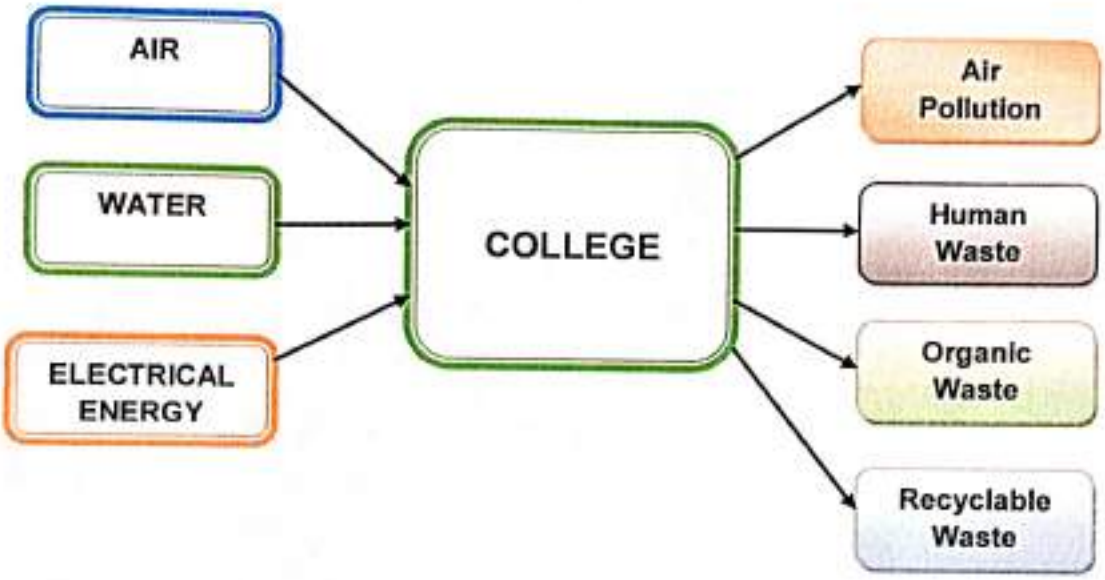
CHAPTER-II
STUDY OF RESOURCE CONSUMPTION & CO_2 EMISSION

The College consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the College System & Environment as under.

Chart No 1: Representation of Resource Requirement & Waste of a College:



Now we compute the Generation of CO_2 on account of consumption of Electrical Energy. The basis of Calculation for CO_2 emissions due to Electrical Energy is as under.

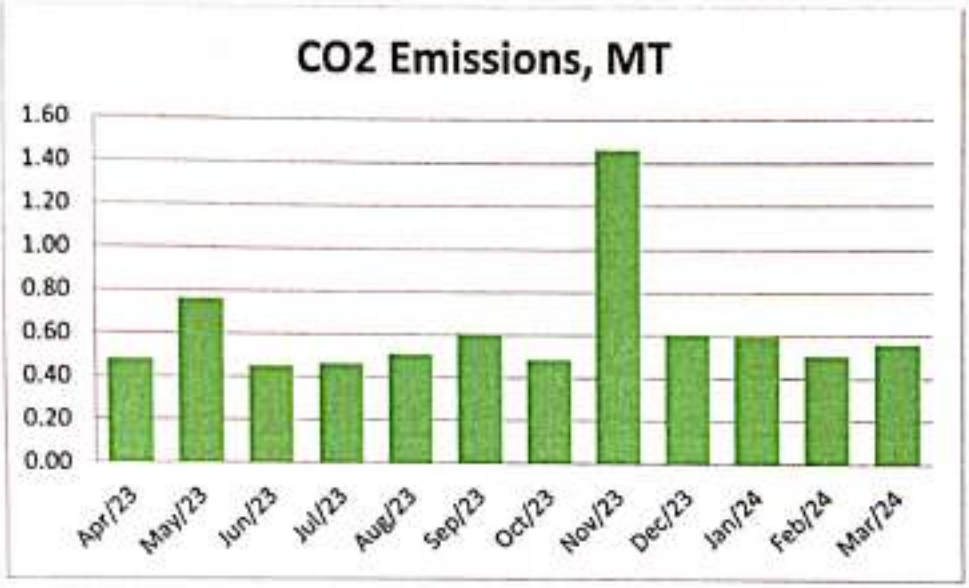
- **1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Table No 1: Study of Purchase of Energy & CO_2 Emissions: 23-24:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-23	540	0.49
2	May-23	848	0.76
3	Jun-23	504	0.45
4	Jul-23	515	0.46
5	Aug-23	565	0.51
6	Sep-23	673	0.61
7	Oct-23	542	0.49
8	Nov-23	1626	1.46
9	Dec-23	675	0.61

10	Jan-24	660	0.59
11	Feb-24	565	0.51
12	Mar-24	623	0.56
13	Total	8336	7.50
14	Maximum	1626	1.46
15	Minimum	504	0.45
16	Average	694.667	0.63

Chart No 2: Month wise CO_2 Emissions:



CHAPTER III
STUDY OF USAGE OF RENEWABLE ENERGY

3.1 Usage of Renewable 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.

3.2 Energy Efficiency Measures Adopted:

- The Institute has adopted Energy Efficient LED Lighting.

CHAPTER IV
STUDY OF INDOOR AIR QUALITY

1. Air: The common name given to the atmospheric gases used in breathing and photosynthesis.

2. Air quality is a measure of the suitability of air for breathing by people, plants and animals.

3. Air Quality Index: Air Quality Index (AQI) is a number used by government agencies to measure the Air Pollution levels and communicate it to the population.

In this Chapter, we present three important Parameters: **AQI**- Air Quality Index, **PM-2.5**- Particulate Matter of Size 2.5 micron and **PM-10**- Particulate Matter of Size 10 micron

Table No 3: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
	Ground Floor			
1	Principal Cabin	54	35	56
2	Staff Room	56	34	60
3	Class Room	57	34	54
4	Music Department	56	37	61
5	Chemistry Department	54	35	61
	First Floor			
6	Class Room	52	36	58
7	Botany Department	56	39	61
8	Zoology Department	54	35	59
9	Physics Department	56	34	60
10	**Maximum**	**57**	**39**	**61**
11	**Minimum**	**52**	**34**	**54**

Table No 4: Air Quality Index Values & Concentration of PM 2.5 & PM10: (By CPCB):

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

Conclusion:

From the above measured values, we conclude that the observed values of AQI, PM-2.5 & PM-10 are in the Satisfactory, as per the guidelines given by Central Pollution Control Board.

CHAPTER V
STUDY OF INDOOR LUX & NOISE PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit. The Parameters include: **Lux Level and Noise Level.**

Table No 4: Study of Indoor Comfort Condition Parameters:

No	Location	Lux Level	Noise Level, dB
Ground Floor			
1	Principal Cabin	220	37
2	Staff Room	240	39.2
3	Class Room	210	37
4	Music Department	230	40
5	Chemistry Department	245	39.2
First Floor			
8	Class Room	244	38.2
9	Botany Department	310	38
10	Zoology Department	305	41
11	Physics Department	289	42
15	**Maximum**	310	41
16	**Minimum**	**210**	**37**

Recommended Lux & Noise Level: As per BEE & ISHRAE Guidelines:

A) Noise Level Reference:		
No	**Location**	**Noise Level Range, dB**
1	Offices	45-50
2	Occupied Class Room	40-45
3	Libraries	35-40
B) Reference Lux Level, Lumens:		
1	For Class Rooms	**200 Plus**
2	For Reading Rooms	**200 Plus**

Conclusion:

From the above measured values, we conclude that

- The Noise Level is within the prescribed Limit
- The Lux Level at various locations is Okay

CHAPTER VI
STUDY OF RAIN WATER MANAGEMENT

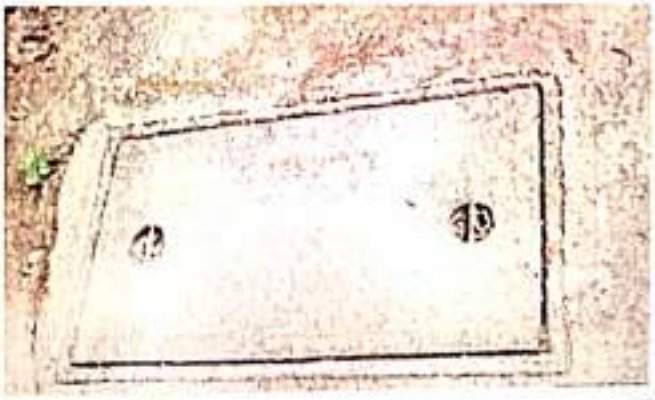
The College has implemented the Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used for recharging the bore well.

Photograph of Rain Water Management Bore well Recharge Section:

CHAPTER-VII
STUDY OF WASTE MANAGEMENT

In this Chapter, we present the Waste Management Practices, followed by the College.

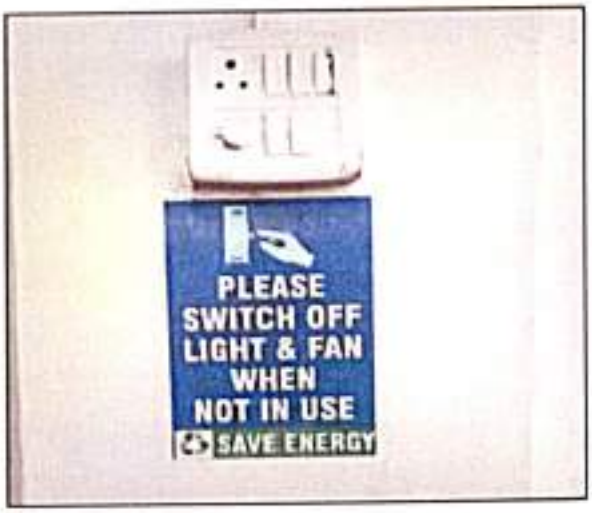
Details of Waste Management Practices:

No	Head	Observation	Photograph
1	**Solid Waste**	Segregation of Waste at Source: Provision of Waste Collection Bins	
2	**Organic Waste**	Provision of Bio Composting Bed: For conversion into Bio Compost	
3	**Liquid Waste**	The Institute has installed Septic Tanks it cleans periodically.	

CHAPTER-VIII
STUDY OF ENVIRONMENT FRIENDLY PRACTICES

In this Chapter, we present the Eco Friendly Practices, followed by the College.

Details of Eco Friendly Practices:

No	Head	Observation	Photograph
1	Tree Plantation	Tree Plantation in the Campus	
2	Creation of Awareness among Stake Holders	Display of Poster on Energy Conservation	

ENERGY AUDIT REPORT

OF

INDIRA GANDHI KALA MAHAVIDYALAYA,

RALEGAON DIST: YAVATMAL 445 402

Year: 2022-23

Prepared by:

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society
Near Muktangan English School, Parvati, Pune 411009
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ENGRESS SERVICES

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

MEDA Registration No: ECN/2022-23/CR-43/1709
ISO: 9001-2015 Certified (Cert No: 23EQKC13),
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

ENERGY AUDIT CERTIFICATE

Certificate No: ES/IGC/22-23/01 **Date: 06/07/2023**

This is to certify that we have conducted an Energy Audit at Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal, in the Year 2022-23.

.The Institute 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,
B E-Mechanical, M Tech- Energy
BEE Certified Energy Auditor, EA-8192

REGISTRATION CERTIFICATES

National Productivity Council

(National Certifying Agency)

PROVISIONAL CERTIFICATE

Ashyut Tashawant Meherdale

Tashawant

AUDITOR CERTIFICATE

Maharashtra Energy Development Agency

CERTIFICATE OF REGISTRATION

FOR CLASS 'A'

MEDA Registration Certificate

Certificate of Registration

ENGRESS SERVICES

ISO 9001:2015

IAF

ISO: 9001-2015 Certificate

Certificate of Registration

ENGRESS SERVICES

ISO 14001:2015

IAF

ISO: 14001-2015 Certificate

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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal for awarding us the assignment of Energy Audit of their Campus for the Year: 2022-23.

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

EXECUTIVE SUMMARY

1. **Indira Gandhi Kala Mahavidyalay, Ralegaon, Yavatmal** consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, office & other facilities.

2. **Present Connected Load & Annual Energy Consumption:**

No	Particulars	Value	Unit
1	Total Connected Load	26.40	kW
2	Annual Energy Consumption	9062	kWh
3	Annual CO_2 Emissions	8.15	MT

3. **Energy Performance Index:**

No	Particulars	Value	Unit
1	Total Annual Energy Consumed	9062	kWh
2	Total Built up area of Institute	2134.29	m^2
3	Energy Performance Index =(1) / (2)	**4.24**	kWh/m^2

4. **Study of Lighting Power Density & % of LED Lighting:**

No	Particulars	Value	Unit
1	Lighting Power density	0.48	W/m^2
2	% of Usage of LED Lighting to Total Lighting Load	100	%

5. **Renewable Energy & Energy Efficiency Projects:**

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting

6. **Assumption:**

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

7. **References:**

- Audit Methodology: www.mahaurja.com
- Energy Conservation Building Code: ECBC-2017: www.beeindia.gov.in
- For CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

LED	:	Light Emitting Diode
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
BEE	:	Bureau of Energy Efficiency
ECBC	:	Energy Conservation Building Code
MEDA	:	Maharashtra Energy Development Agency
PV	:	Photo Voltaic
Kg	:	Kilo Gram
kWh	:	kilo-Watt Hour
CO_2	:	Carbon Di Oxide
MT	:	Metric Ton

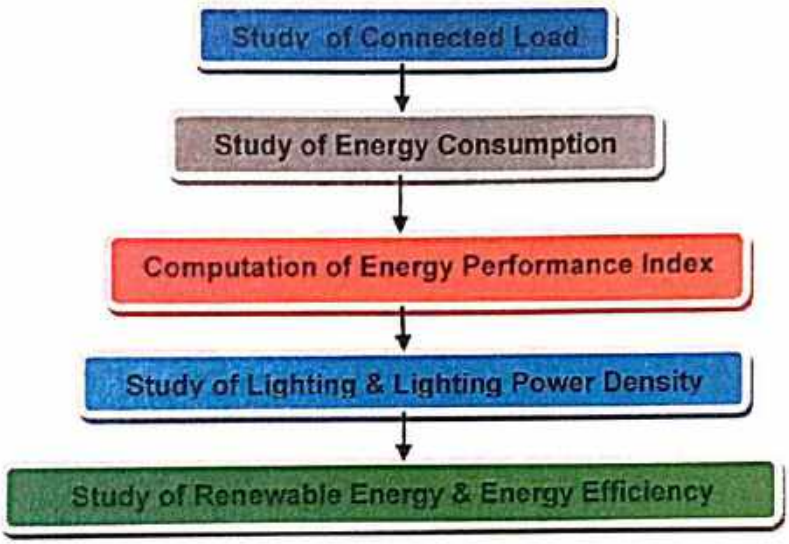
CHAPTER-I
INTRODUCTION

1.1 Introduction:

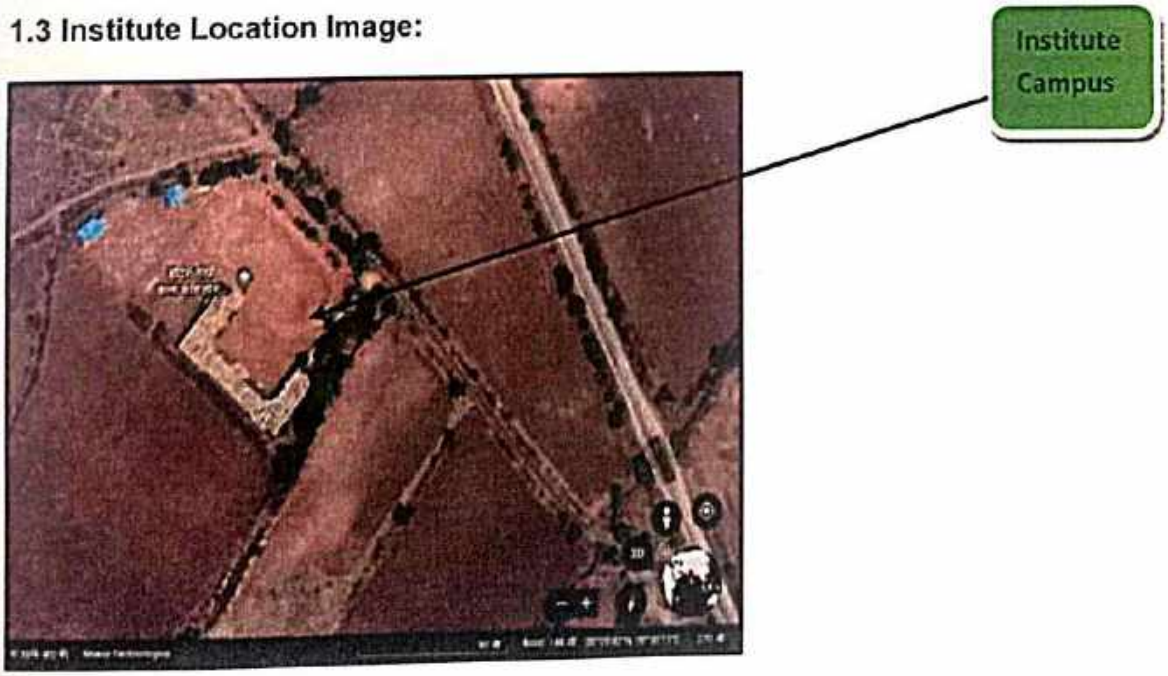
An Energy Audit is conducted at Indira Gandhi Kala Mahavidyalay, Ralegaon, Yavatmal. The guidelines followed for conducting the Energy Audit are:

- BEE India's Energy Conservation Building Code: ECBC-2017
- Maharashtra Energy Development Agency (www.mahaurja.com)
- Tata Power: www.tatapower.com

1.2 Audit Procedural Steps:



1.3 Institute Location Image:



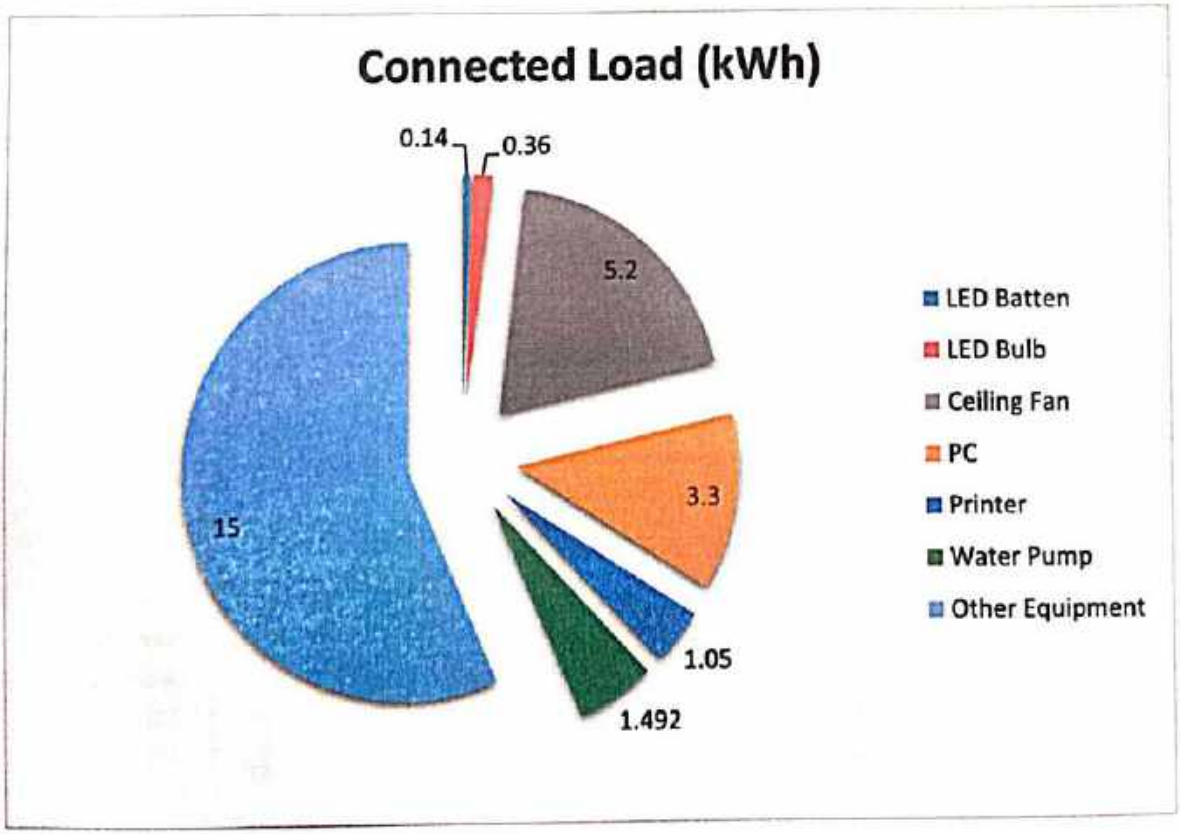
CHAPTER-II
STUDY OF CONNECTED LOAD

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

Table No 1: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	LED Batten	7	20	0.14
2	LED Bulb	40	9	0.36
3	Ceiling Fan	80	65	5.2
4	PC	22	150	3.3
5	Printer	7	150	1.05
6	Water Pump	1	1492	1.492
7	Other Equipment	100	150	15
8	**Total**			**26.402**

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 2: Electrical Bill Analysis- 2022-23:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-22	853	0.767
2	May-22	945	0.850
3	Jun-22	1004	0.903
4	Jul-22	545	0.490
5	Aug-22	407	0.366
6	Sep-22	673	0.605
7	Oct-22	542	0.487
8	Nov-22	1626	1.463
9	Dec-22	675	0.607
10	Jan-23	680	0.612
11	Feb-23	533	0.479
12	Mar-23	579	0.521
13	Total	9062	8.155
14	Maximum	1626	1.463
15	Minimum	407	0.366
16	Average	755.167	0.679

Chart No 2: Variation in Monthly Energy Consumption:

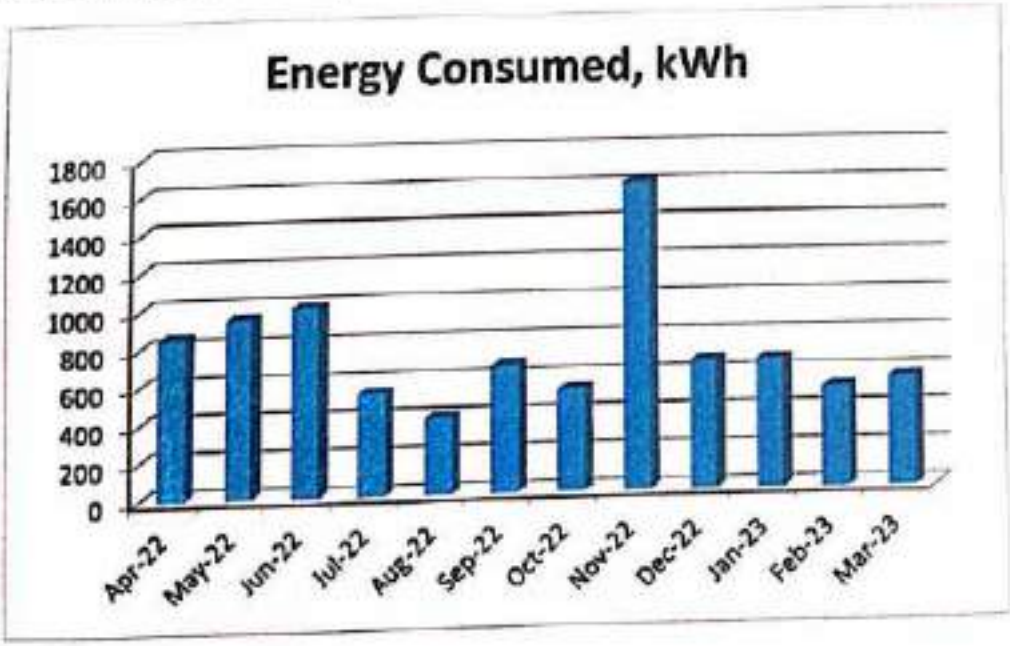


Table No 3: Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh	CO_2 Emissions, MT
1	Total	9062	8.155
2	Maximum	1626	1.463
3	Minimum	407	0.366
4	Average	755.167	0.679

CHAPTER-IV
STUDY OF ENERGY PERFORMANCE INDEX

Energy Performance Index: Energy Performance Index of a Building is its Annual Energy Consumption in Kilo Watt Hours per square meter of the Building

It is determined by:

$$EPI = \frac{\text{(Annual Energy Consumption in kWh)}}{\text{(Total Built-up area in m}^2\text{)}}$$

Now we compute the EPI for the Institute as under:

Table No 4: Computation of Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Consumed	9062	kWh
2	Total Built up area of Institute	2134.29	m^2
3	Energy Performance Index =(1) / (2)	**4.24**	kWh/m^2

CHAPTER V
STUDY OF LIGHTING

Terminology:

1. Lumen is a unit of light flow or luminous flux. The lumen rating of a lamp is a measure of the total light output of the lamp. The most common measurement of light output (or luminous flux) is the lumen. Light sources are labeled with an output rating in lumens.

2. Lux is the metric unit of measure for illuminance of a surface. One lux is equal to one lumen per square meter.

3. Circuit Watts is the total power drawn by lamps and ballasts in a lighting circuit under assessment.

4. Installed Load Efficacy is the average maintained illuminance provided on a horizontal working plane per circuit watt with general lighting of an interior. Unit: lux per watt per square metre (lux/W/m²)

5. Lamp Circuit Efficacy is the amount of light (lumens) emitted by a lamp for each watt of power consumed by the lamp circuit, i.e. including control gear losses. This is a more meaningful measure for those lamps that require control gear. Unit: lumens per circuit watt (lm/W)

6. Installed Power Density. The installed power density per 100 lux is the power needed per square metre of floor area to achieve 100 lux of average maintained illuminance on a horizontal working plane with general lighting of an interior
Unit: watts per square metre per 100 lux (W/m²/100 lux) 100 Installed power density (W/m²/100 lux)

7. Lighting Power Density: It is defined as Total Lighting Load in a room divided by the Area of that Room in square meters.

In this Chapter we compute: Lighting Power Density of a Class Room. We also compute the percentage usage of LED Lighting to total Lighting Load of the Institute.

Table No 5: Computation of Lighting Power Density:

No	Particulars	Value	Unit
1	No of 9 W LED Bulbs in Class Room	4	Nos
2	Demand of 9 W LED Bulbs	9	W/Unit
3	Total Lighting Load in the Class Room= (1) * (2)	36	W
4	Area of Class Room	73.9	m^2
5	Lighting Power Density = (3)/ (4)	0.48	W/m^2

Now, we compute the usage of LED Lighting to Total Lighting Load, as under.

Table No 6: Percentage Usage of LED Lighting to Annual Lighting Load:

No	Particulars	Value	Unit
1	Qty of 20 W LED Light Fittings	7	Nos
2	Load per Fitting	20	W/Unit
3	Total Load of 20 W LED Fitting	**0.14**	kW
4	Qty of 9 W LED Light Fittings	40	Nos
5	Load per Fitting	9	W/Unit
6	Total Load of 9 W LED Fitting	**0.36**	kW
7	Total Lighting Load=3+6	**0.5**	kW
8	Total LED Lighting Load=6+9	**0.5**	kW
9	% of Total Lighting Demand met by LED Lighting=8*100/7	**100.00**	%

CHAPTER-VI
STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

6.1 Usage of Renewable 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

6.2 Energy Efficiency Measures Adopted:

- The Institute has adopted Energy Efficient LED Lighting

GREEN AUDIT REPORT

OF

INDIRA GANDHI KALA MAHAVIDYALAYA,

RALEGAON DIST: YAVATMAL 445 402

Year: 2022-23

Prepared by:

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society

Near Muktangan English School, Parvati, Pune 411009

Phone: 09890444795 Email: engress123@gmail.com

ENGRESS SERVICES

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Parvati, Pune 411 009 Tel: 09890444795 Email: engress123@gmail.com
MEDA Registration No: ECN/2022-23/CR-43/1709
ISO: 9001-2015 Certified (Cert No: 23EQKC13),
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

GREEN AUDIT CERTIFICATE

Certificate No: ES/IGC/22-23/02 **Date: 06/07/2023**

This is to certify that we have conducted Green Audit at Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal, in the Year 2022-23.

The Institute has adopted following Energy Efficient & Green Practices:

- Usage of Energy Efficient LED Light Fitting
- Segregation of Waste at Source
- Installation of Bio Composting Pit
- College has installed septic tanks and it cleans periodically
- Installation of Rain Water Management Project
- Maintenance of good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of awareness by display of Posters on Resource Conservation

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Engress Services,

A Y Mehendale,
B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192
ASSOCHAM GEM Certified Professional: GEM: 22/788

ENGRESS SERVICES PUNE

REGISTRATION CERTIFICATES

Maharashtra Energy Development Agency

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

MEDA Registration Certificate

GEM Certificate

ASSOCHAM

ASSOCHAM hereby certifies that

Mr. A Y Mehendale

has successfully passed the

Green and Eco-friendly Movement Certified Professional Test (GEM CP)

with

"Excellent Performance"

GEM Certified Professional Certificate

Certificate of Registration

This is to Certify that
Quality Management System of

ENGRESS SERVICES

has been assessed and found to conform to the requirements of
ISO 9001:2015

Director

Magnitude Management Services Pvt. Ltd.

ISO: 9001-2015 Certificate

Certificate of Registration

ENGRESS SERVICES

has been assessed and found to conform to the requirements of
ISO 14001:2015

Director

ISO: 14001-2015 Certificate

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ACKNOWLEDGEMENT

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1. **Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal** consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, office & other facilities.

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

No	Particulars	Value	Unit
1	Annual Energy Consumption	9062	kWh
2	Annual CO_2 Emissions	8.15	MT

3. **Renewable Energy & Energy Efficiency Projects:**

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting

4. **Waste Management:**

4.1 Segregation of Waste at Source:

The Waste is segregated at source in separate Waste Bins & is handed over for further action.

4.2 Bio Composting Pit:

The College has a Bio Composting Pit, to convert the Leafy Waste into Bio Compost.

4.3 Liquid Waste Management:

The College has installed Septic Tank and it cleans periodically.

4.4 Sanitary Waste Management:

The College has not installed Sanitary Waste Incinerator for sanitary waste disposal. It is recommended to install Sanitary Waste Incinerator.

4.5 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.

5. Rain Water Management:

The Institute has installed the Rainwater Management project; the rain water falling on the terrace is collected through pipes and is used for recharging the land water table.

6. Green & Sustainable Practices:

- Maintenance of good Internal Road
- Maintenance of Internal Garden: 100 plus Trees in the campus.
- Provision of Ramp for Divyangajan
- Creation of awareness on Resource Conservation Display of Posters

7. Assumption:

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

8. Reference:

- For CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

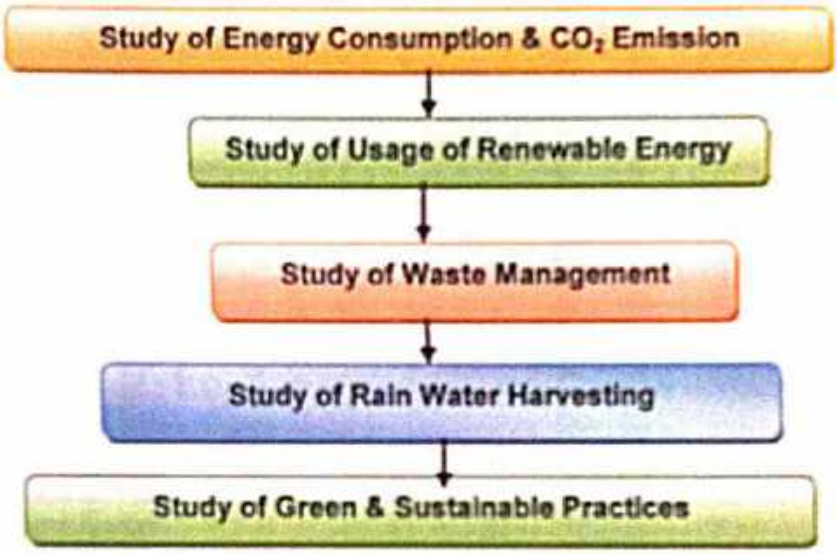
BEE	Bureau of Energy Efficiency
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO_2	Carbon Di Oxide
Qty	Quantity

CHAPTER-I
INTRODUCTION

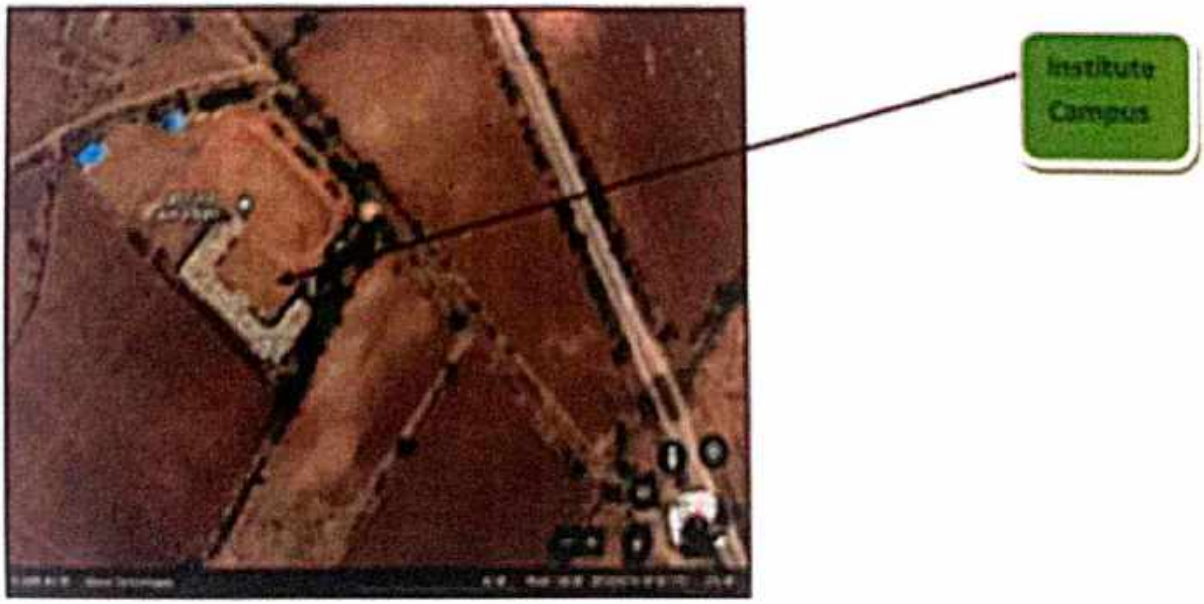
1.1 Introduction:

A Green Audit is conducted at Indira Gandhi Kala Mahavidyalaya,Ralegaon, Yavatmal.

1.2 Audit Procedural Steps:



1.3 Institute Location Image:



CHAPTER-II
STUDY OF ENERGY CONSUMPTION & CO_2 EMISSION

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 Institute for performing its day to day activities

The Institute uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO_2 Emissions:

The basis of Calculation for CO_2 emissions due to Electrical Energy is as under

- 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 Institute due to its Day to Day operations

Table No 1: Month wise CO_2 Emissions:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-22	853	0.767
2	May-22	945	0.850
3	Jun-22	1004	0.903
4	Jul-22	545	0.490
5	Aug-22	407	0.366
6	Sep-22	673	0.605
7	Oct-22	542	0.487
8	Nov-22	1626	1.463
9	Dec-22	675	0.607
10	Jan-23	680	0.612
11	Feb-23	533	0.479
12	Mar-23	579	0.521
13	Total	9062	8.155
14	Maximum	1626	1.463
15	Minimum	407	0.366
16	Average	755.167	0.679

Chart No 1: Month wise CO_2 Emissions:

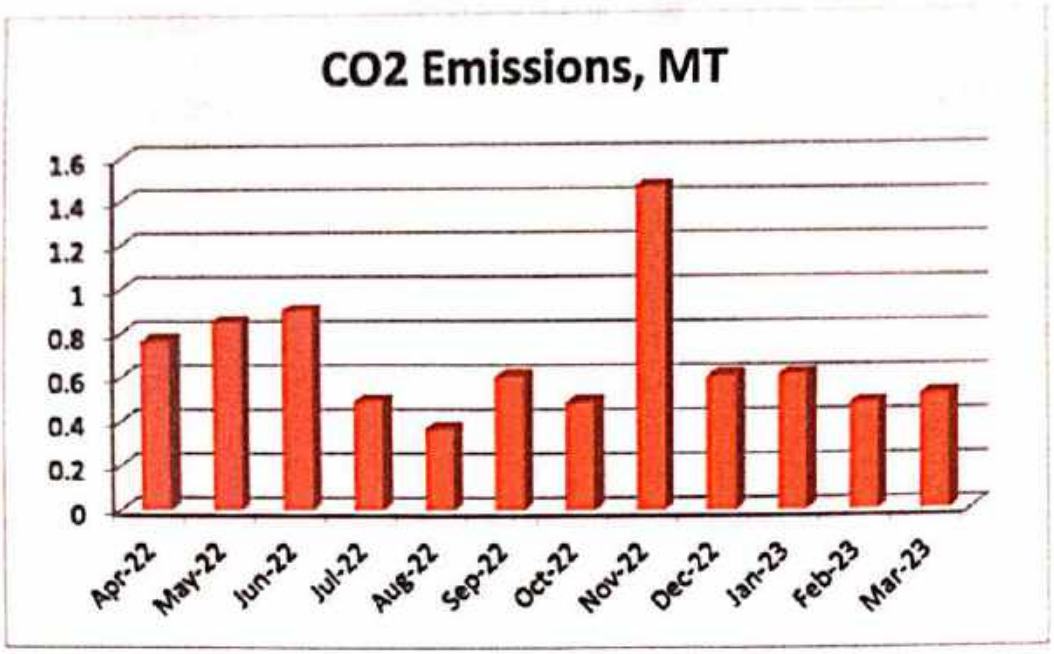


Table No 2: Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh	CO_2 Emissions, MT
1	Total	9062	8.155
2	Maximum	1626	1.463
3	Minimum	407	0.366
4	Average	755.167	0.679

CHAPTER III
STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has not installed Roof Top Solar PV Plant. It is recommended to install Roof Top Solar PV Plant.

CHAPTER IV
STUDY OF WASTE MANAGEMENT

4.1 Segregation of Waste at Source:

The Waste is segregated at source in separate Waste Bins & is handed over for further action.

Photograph of Waste Collection Bins:

4.2 Bio Composting Pit:

The Institute has a Bio Composting Pit, to convert the Leafy Waste into Bio Compost.

Photograph of Bio Composting Pit:

4.3 Liquid Waste Management:

The Institute has installed Septic Tanks it cleans periodically.

4.4 Sanitary Waste Management:

The College has not installed Sanitary Waste Incinerator for sanitary waste disposal. It is recommended to install Sanitary Waste Incinerator.

4.5 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.

CHAPTER V
STUDY OF RAIN WATER MANAGEMENT

The College has installed the Rainwater management project and bore well charging project, is used to increase the underground water table, but the piping system for rain water collection is under maintenance. It is recommended for intact the project.

Photograph of Rain Water Charging:

CHAPTER VI
STUDY OF GREEN & SUSTAINABLE PRACTICES

6.1 Pedestrian Friendly Road & Internal Tree Plantation:

The Institute has well maintained internal road to facilitate the easy movement of the students within the campus. The Institute has well maintained landscaped garden in the campus.

Photograph of Internal Road & Tree plantation:

6.2 Provision of Ramp for Divyangajan:

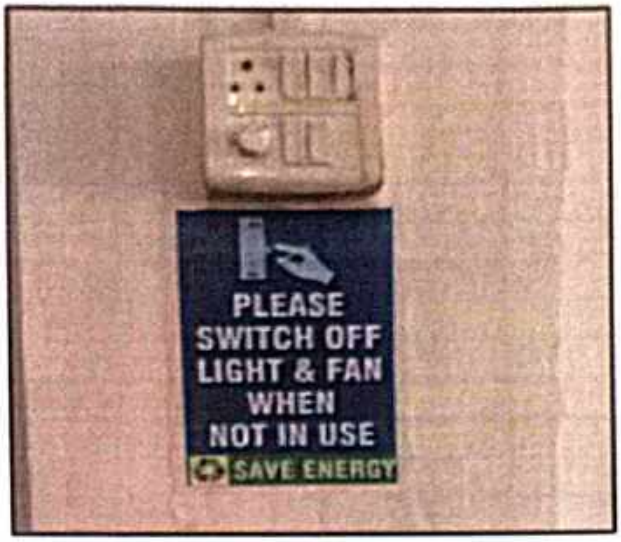
For easy movement of Divyangajan, the Institute has made provision of Ramp.

Photograph of Ramp:

6.3 Creation of Awareness about Water & Energy Conservation:

The Institute has displayed posters emphasizing on importance of Water & Energy Conservation

Photograph of Poster on Water Conservation:



6.4 Best Practices and Initiative for Social Awareness:

The College has taken initiative for different social awareness program, like water conservation, trees plantations, society cleanness etc under National Service Scheme.

Photograph of Best Practices:

ANNEXURE-1:

LIST OF TREES & PLANTS IN THE CAMPUS:

Presently the College has well maintained landscaped garden within the Campus and planted more than 100 trees, some of listed below:

Sr.No.	Name of Plants/Trees	Quantity
1	Mehandi	76
2	Ashoka	12
3	Kadunimb	18
4	Chakri	1
5	Palm	13
6	Angerji Chinch	14
7	Ghantoli	7
8	Kanher	6
9	Zandu	15
10	Bakul	2
11	Sadafully	10
12	Jabhul	3
13	Teak wood	73
14	Pimple	1
15	Karanj	10
16	Champa	1
17	Jaswand	7
18	Kadamb	1
19	Rose	21
20	Thuja	11
21	Stobush	1
22	Bramhi	1
23	Mogra	9
24	Ajwan	1
25	Shatavari	1
26	Ashwganda	1
27	Adulsa	1
28	Rui	1
29	Alcevera	3
30	Beetle nut	1
31	Prajakta	1
32	Raktchandan	1
33	Shevaga	1
34	Mosambi	1
35	Custer apple	1
36	Gauva	1
37	Coconut	1
38	Akashnim	1
39	Java Apple	1
40	Karvand	1
41	Lemaon	1
42	Curry Leaves	1
43	Sonchafa	1

44	Copper Leaf	4
45	Awala	1

ENVIRONMENTAL AUDIT REPORT

OF

INDIRA GANDHI KALA MAHAVIDYALAYA,

RALEGAON DIST: YAVATMAL 445 402

Year: 2022-23

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

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School,
Parvati, Pune 411 009 Tel: 09890444795 Email: engress123@gmail.com
MEDA Registration No: ECN/2022-23/CR-43/1709
ISO: 9001-2015 Certified (Cert No: 23EQKC13),
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

ENVIRONMENTAL AUDIT CERTIFICATE

Certificate No: ES/IGC/22-23/03 **Date: 06/07/2023**

This is to certify that we have conducted Environmental Audit at Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal, in the Year 2022-23.

The Institute has adopted following Energy Efficient & Green Practices:

- Usage of Energy Efficient LED Light Fitting
- Segregation of Waste at Source
- Installation of Bio Composting Pit
- College has installed septic tanks and it cleans periodically
- Installation of Rain Water Management Project
- Maintenance of good Internal Road
- Tree Plantation in the Campus
- Creation of awareness by display of Posters on Resource Conservation

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the Eco Friendly.

For Engress Services,

A Y Mehendale,
B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192
ASSOCHAM GEM Certified Professional: GEM: 22/788

REGISTRATION CERTIFICATES


Maharashtra Energy Development Agency

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

MEDA Registration Certificate


GEM Certificate

ASSOCHAM

Mr. A Y Mehendale

"Excellent Performance"

GEM Certified Professional Certificate


Certificate of Registration

ENGRESS SERVICES

ISO 9001:2015

IAF

Director

ISO: 9001-2015 Certificate


Certificate of Registration

ENGRESS SERVICES

ISO 14001:2015

IAF

Director

ISO: 14001-2015 Certificate

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ACKNOWLEDGEMENT

We Engress Services, Pune express our sincere gratitude to the management of Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal for awarding us the assignment of Environmental Audit of their Campus for the Year 2022-23.

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

EXECUTIVE SUMMARY

1. **Indira Gandhi Kala Mahavidyalaya, Ralegaon, Yavatmal** consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, office & other facilities.

2. **Pollution due to Institute Activities:**

   - **Air pollution:** Mainly CO_2 on account of Electricity Consumption
   - **Solid Waste:** Bio degradable Garden Waste
   - **Liquid Waste:** Human liquid waste

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

No	Particulars	Value	Unit
1	Annual Energy Consumption	**9062**	kWh
2	Annual CO_2 Emissions	**8.15**	MT

4. **Various initiatives taken for Environmental Conservation:**

   - Usage of Energy Efficient LED fittings
   - Bio Composting Pit Installation

5. **Indoor Air Quality Parameters:**

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	49	32	44
2	Minimum	36	24	32

6. **Indoor Comfort Conditions:**

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	33.2	46	310	39
2	Minimum	32.5	41	210	36

7. **Waste Management:**

7.1 Segregation of Waste at Source:

The Waste is segregated at source in separate Waste Bins & is handed over for further action.

7.2 Bio Composting Pit:

The Institute has a Bio Composting Pit, to convert the Leafy Waste into Bio Compost.

7.3 Liquid Waste Management:

The Institute has installed Septic Tank and it cleans periodically.

7.4 Sanitary Waste Management:

The College has not installed Sanitary Waste Incinerator for sanitary waste disposal. It is recommended to install Sanitary Waste Incinerator.

7.5 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.

8. Rain Water Management:

The Institute has installed the Rainwater Management project; the rain water falling on the terrace is collected through pipes and is used for recharging the land water table and gardening purpose.

9. Environment Friendly Initiatives:

- Maintenance of Internal Garden: About **100 Plus** Trees in the campus.
- Display of Posters on Resource Conservation

10. Assumption:

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

11. References:

- For CO_2 Emissions: www.tatapower.com
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI &Water Quality Standards: www.cpcb.com

ABBREVIATIONS

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
LPD	:	Liters per Day
LED	:	Light Emitting Diode
AQI	:	Air Quality Index
PM-2.5	:	Particulate Matter of Size 2.5 Micron
PM-10	:	Particulate Matter of Size 10 Micron
CPCB	:	Central Pollution Control Board
ISHRAE	:	The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

CHAPTER-I
INTRODUCTION

1. Important Definitions:

1.1. Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.2. Environmental Audit: Definition:

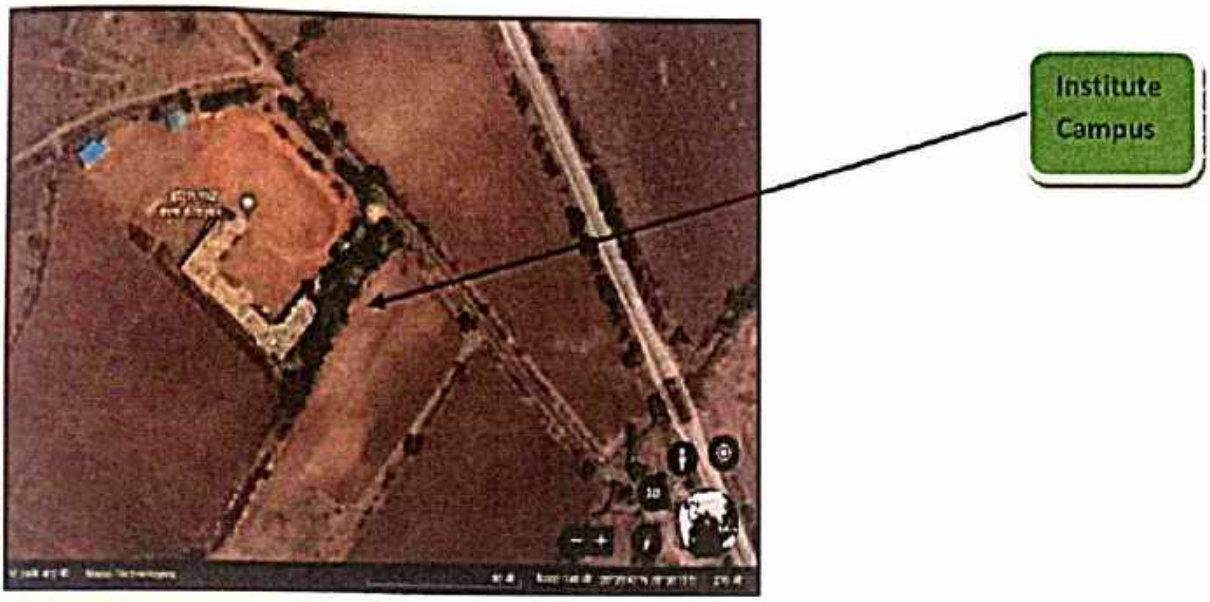
An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

*According to UNEP, 1990, **"Environmental audit can be defined as a management tool** comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment*

1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.4 Audit Procedural Steps:

1.5 Institute Location Image:

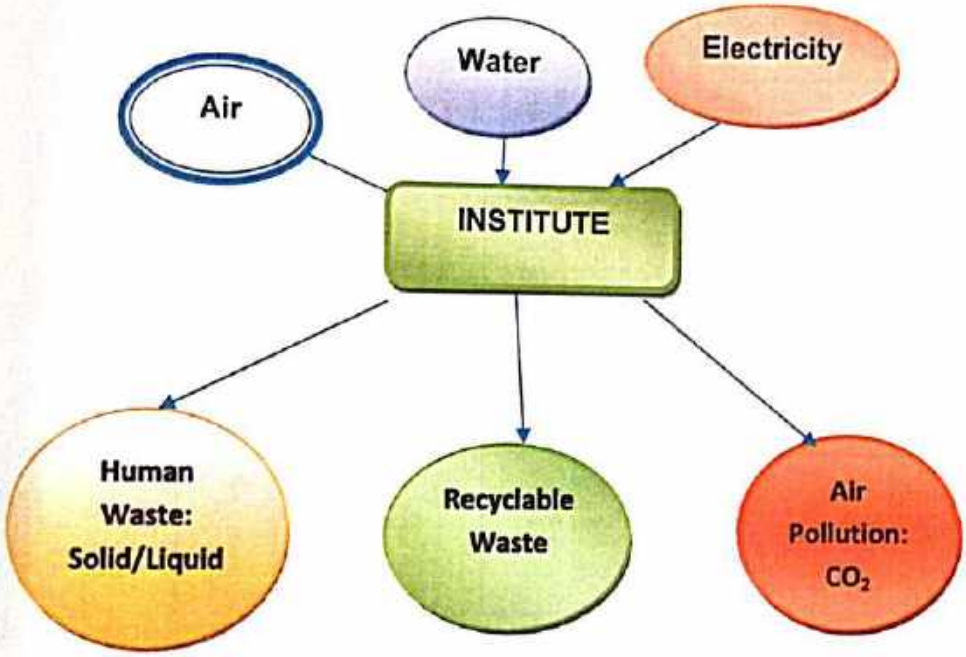


CHAPTER-II
STUDY OF RESOURCE CONSUMPTION & CO_2 EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the Institute System & Environment as under.
Chart No 1: Representation of Institute as System & Study of Resources & Waste



Now we compute the Generation of CO_2 on account of consumption of Electrical Energy.
The basis of Calculation for CO_2 emissions due to Electrical Energy is as under.

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

Table No 5: Study of Consumption of Electrical Energy & CO_2 Emissions: 22-23:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-22	853	0.767
2	May-22	945	0.850
3	Jun-22	1004	0.903
4	Jul-22	545	0.490
5	Aug-22	407	0.366
6	Sep-22	673	0.605
7	Oct-22	542	0.487
8	Nov-22	1626	1.463

9	Dec-22	675	0.607
10	Jan-23	680	0.612
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12	Mar-23	579	0.521
13	Total	9062	8.155
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Chart No 2: Month wise CO_2 Emissions:

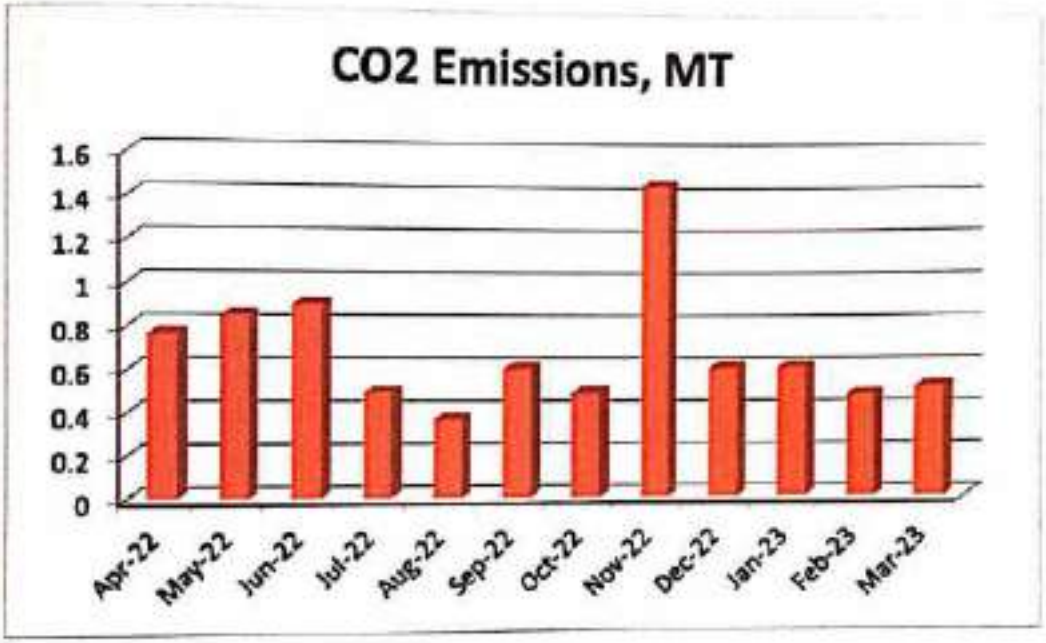

Table No 6: Important Parameters:

No	Parameter/ Value	Net Energy Consumption (kWh)	CO2 Emissions MT
1	Total	9062	8.155
2	Maximum	1626	1.463
3	Minimum	407	0.366
4	Average	755.167	0.679

CHAPTER III
STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has not installed Roof Top Solar PV Plant. It is recommended to install Roof Top Solar PV Plant.

CHAPTER IV
STUDY OF INDOOR AIR QUALITY

4.1 Importance of Air Quality:

Air: The common name given to the atmospheric gases used in breathing and photosynthesis.

By volume, Dry Air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.039% carbon dioxide, and small amounts of other gases.

On average, a person inhales about **14,000 liters** of air every day. Therefore, poor air quality may affect the quality of life now and for future generations by affecting the health, the **environment, the economy and the city's livability.**

Air quality is a measure of the suitability of air for breathing by people, plants and animals.

4.2 Air Quality Index:

An **Air Quality Index (AQI)** is a number used by government agencies to measure the **air pollution** levels and communicate it to the population. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects. The measurement of the **AQI** requires **an air monitor** and an **air pollutant** concentration over a specified **averaging period.**

We present herewith following important Parameters.

1. AQI- Air Quality Index
2. PM-2.5- Particulate Matter of Size 2.5 micron
3. PM-10- Particulate Matter of Size 10 micron

Table No 7: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
Ground Floor				
1	Principal Cabin	47	29	37
2	Staff Room	46	28	36
3	Class Room	49	30	44
4	Music Department	48	29	40
5	Chemistry Department	45	28	36
First Floor				
8	Class Room	46	30	44
9	Botany Department	44	29	40
10	Zoology Department	48	32	41
11	Physics Department	36	24	32
15	Maximum	49	32	44
16	Minimum	36	24	32

CHAPTER V
STUDY OF INDOOR COMFORT CONDITION PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit. The Parameters include:

1. Temperature
2. Humidity
3. Lux Level
4. Noise Level.

Table No 8: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
		Ground Floor			
1	Principal Cabin	33	46	280	37
2	Staff Room	33	46	240	38
3	Class Room	32.6	44	210	37.2
4	Music Department	32.6	42	230	39
5	Chemistry Department	32.5	41	245	37.1
		First Floor			
8	Class Room	33.1	42	244	37.1
9	Botany Department	33	44	310	36
10	Zoology Department	33.2	45	305	36
11	Physics Department	33	44	289	37
15	Maximum	33.2	46	310	39
16	Minimum	32.5	41	210	36

CHAPTER VI
STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The Waste is segregated at source in separate Waste Bins & is handed over for further action.

Photograph of Waste Collection Bins:

6.2 Bio Composting Pit:

The Institute has a Bio Composting Pit, to convert the Leafy Waste into Bio Compost.

Photograph of Bio Composting Pit:

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The Institute has installed Septic Tanks it cleans periodically.

6.4 Sanitary Waste Management:

The College has not installed Sanitary Waste Incinerator for sanitary waste disposal. It is recommended to install Sanitary Waste Incinerator.

6.5 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.

CHAPTER-VII
STUDY OF RAIN WATER MANAGEMENT

The College has installed the Rainwater management project and bore well charging project, is used to increase the underground water table, but the piping system for rain water collection is under maintenance. It is recommended for intact the project.

Photograph of Rain Water Charging:

CHAPTER-VIII
STUDY OF ECO FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The Institute has well maintained landscaped garden in the campus.

Photograph of Tree plantation:

8.2 Creation of Awareness about Water & Energy Conservation:

The Institute has displayed posters emphasizing on importance of Water & Energy Conservation.

Photograph of Poster on Water Conservation:

ANNEXURE-I:
VARIOUS AIR QUALITY, WATER QUALITY, NOISE & INDOOR COMFORT STANDARDS:

1. Category Wise Air Quality Index Values & Concentration of PM 2.5 & PM10:

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

2. Recommended Water Quality Standards:

No	Designated Best Use	Criteria
1	Drinking Water Source without conventional Treatment but after disinfection	pH between **6.5 to 8.5** Dissolved Oxygen **6 mg/l or more**
2	Drinking water source after conventional treatment and disinfection	pH between **6 to 9** Dissolved Oxygen **4 mg/l or more**
3	Outdoor Bathing (Organized)	pH between **6.5 to 8.5** Dissolved Oxygen **5 mg/l or more**
4	Controlled Waste Disposal	pH between **6 to 8.5**

3. Recommended Noise Level Standards:

No	Location	Noise Level dB
1	Auditoriums	20-25
2	Outdoor Playground	55
3	Occupied Class Room	40-45
4	Un occupied Class Room	35
5	Apartment, Homes	35-40
6	Offices	45-50
7	Libraries	35-40
8	Restaurants	50-55

4. Thermal Comfort Conditions: For Non-conditioned Buildings:

No	Parameter	Value
1	Temperature	Less Than 33°C
2	Humidity	Less Than 70%

PRINCIPAL
Indira Gandhi Kala Mahavidyalaya
Ralegaon Dist.Yavatmal

ENGRESS SERVICES PUNE

ENERGY AUDIT REPORT

OF

INDIRA GANDHI KALA MAHAVIDYALAY, RALEGAON DIST: YAVATMAL 445 402

Year: 2021-22

Prepared by:

Enrich Consultants

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

ENRICH CONSULTANTS • 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: eec@mahaurja.com, Web: www.mahaurja.com

ECN/2021-22/CR-14/1577 22nd April, 2021

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 Enrich Consultants** Yashashree, Plot No. 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune - 411009.
Registration Category	:	*Empanelled Consultant for Energy Conservation Programme for Class 'A'*
Registration Number	:	***MEDA/ECN/2021-22/Class A/EA-03***

- 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 **21st April, 2023** 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)

Enrich Consultants

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

Ref: EC/IGC/21-22/06

Date: 25/05/2022

CERTIFICATE

This is to certify that we have conducted Energy Audit at Indira Gandhi Kala Mahavidyalay, Ralegaon, Yavatmal - 445 402 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 Enrich Consultants,

ENRICH CONSULTANTS * PUNE *

A Y Mehendale,
Certified Energy Auditor
EA-8192

INDEX

ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of at Indira Gandhi Kala Mahavidyalay Ralegaon, 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. Indira Gandhi Kala Mahavidyalay, Ralegaon, Yavatmal - 445 402 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	5457	4.911
2	Maximum	777	0.699
3	Minimum	287	0.258
4	Average	454.75	0.409

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, solar thermal water heating plant. It is recommended to install solar power rooftop system and solar thermal water heating plant on the college building as per availability of funds.

5. Usage of LED Lighting:

- The Total Annual Lighting Demand of the College is 233.28 kWh.
- The Total Annual LED Lighting Demand is 233.28 kWh.
- The percentage of Annual LED Lighting to Annual Lighting Demand is 100%.

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. Daily working hours-4 Nos (For Lighting Calculations)
4. Annual working Days-120 Nos (For Lighting Calculations)

7. References:

- For CO_2 Emissions: www.tatapower.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	Indira Gandhi Kala Mahavidyalay
2	Address	Kalamb Road,Ralegaon,Dist: Yavatmal 445 402
3	Affiliation	Sant Gadge Baba Amravati University

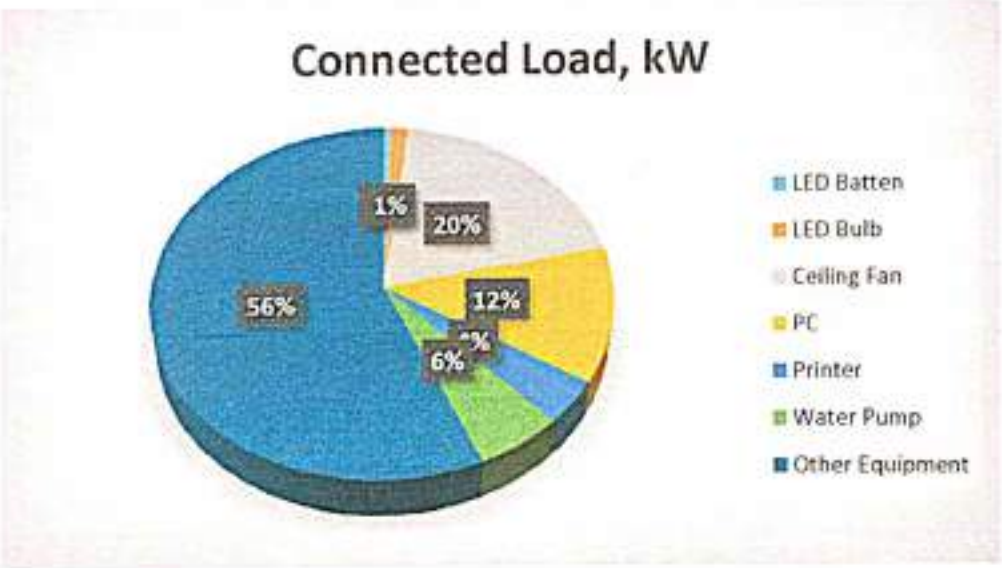
CHAPTER-II
STUDY OF CONNECTED LOAD

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	LED Batten	7	20	0.14
2	LED Bulb	40	9	0.36
3	Ceiling Fan	80	65	5.2
4	PC	22	150	3.3
5	Printer	7	150	1.05
6	Water Pump	1	1492	1.492
7	Other Equipment	100	150	15
8	**Total**			**27**

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	485
2	May-21	643
3	Jun-21	777
4	Jul-21	304
5	Aug-21	287
6	Sep-21	439
7	Oct-21	382
8	Nov-21	500
9	Dec-21	425
10	Jan-22	409
11	Feb-22	325
12	Mar-22	481
13	Total	5457
14	Maximum	777
15	Minimum	287
16	Average	454.75

Chart No 2: Variation in Monthly Energy Consumption:

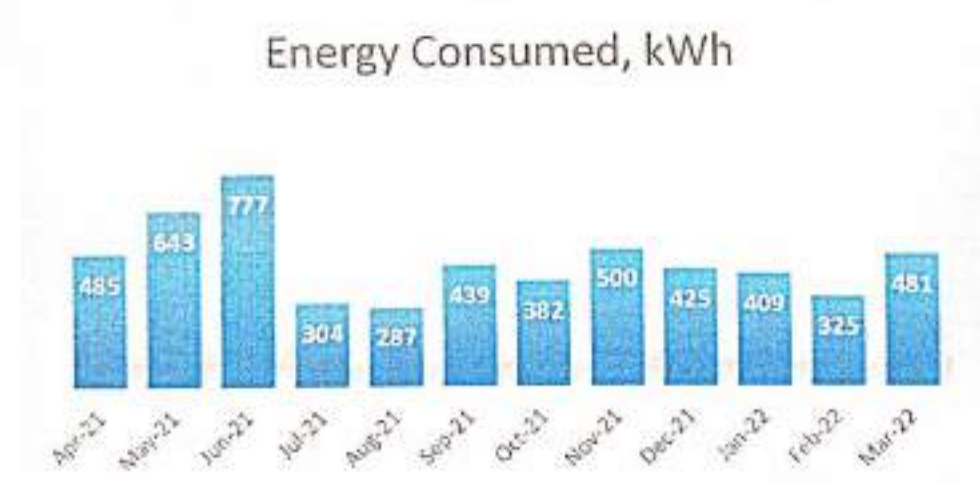


Table No4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	5457
2	Maximum	777
3	Minimum	287
4	Average	454.75

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 No5: Month wise CO_2 Emissions:

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Apr-21	485	0.4365
2	May-21	643	0.5787
3	Jun-21	777	0.6993
4	Jul-21	304	0.2736
5	Aug-21	287	0.2583
6	Sep-21	439	0.3951
7	Oct-21	382	0.3438
8	Nov-21	500	0.45
9	Dec-21	425	0.3825
10	Jan-22	409	0.3681
11	Feb-22	325	0.2925
12	Mar-22	481	0.4329
13	Total	5457	4.9113
14	Maximum	777	0.6993
15	Minimum	287	0.2583
16	Average	454.75	0.4092

Chart No 3: Month wise CO_2Emissions:

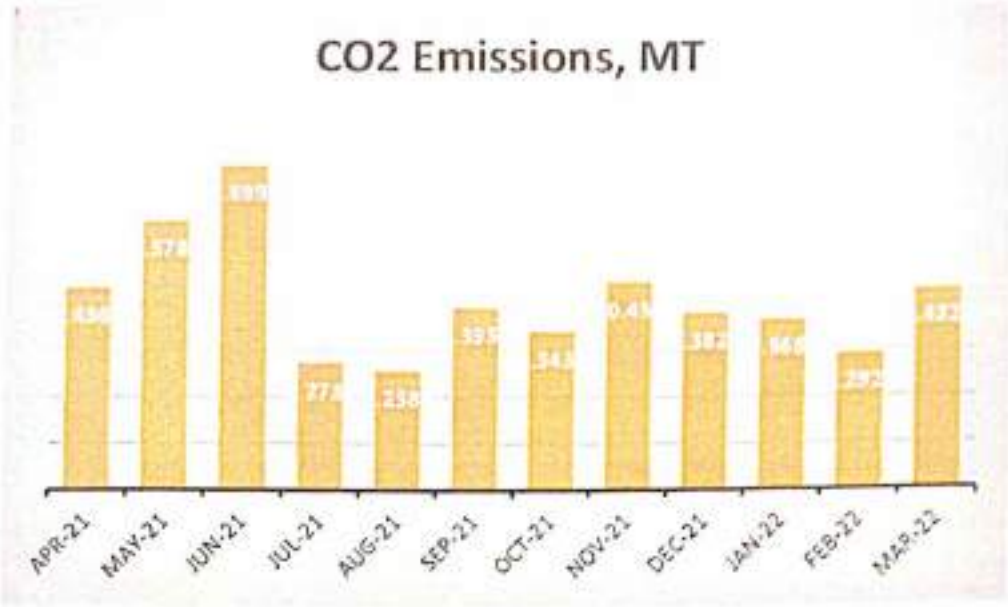


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	5457	4.9113
2	Maximum	777	0.6993
3	Minimum	287	0.2583
4	Average	454.75	0.4092

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:

1	No of 9 W LED Bulb Light Fittings	40	Nos
2	Demand of 9 W LED Bulb Light Fitting	9	W/Unit
3	Total Electrical Load of 9 W LED Bulb Light Fittings	**0.36**	kW
4	No of 18 W LED Tube Lights	7	Nos
5	Demand of 18 W LED Tube Light	18	W/Unit
6	Total Electrical Load of 18 W LED Fittings	**0.126**	kW
7	Total Lighting Load=3+6	**0.486**	kW
8	Total LED Lighting Load= 6	**0.486**	kW
9	Average Daily Usage Period	4	Hours
10	Annual Working Days	120	Nos
11	Annual Total Lighting Load = 7*9*10	**233.28**	kWh
12	Annual LED Lighting Load = 8*9*10	**233.28**	kWh
13	**Annual Lighting Requirement met by LED= 12*100/11**	**100.00**	%

ENVIRONMENTAL AUDIT REPORT

OF

INDIRA GANDHI KALA MAHAVIDYALAY, RALEGAON DIST: YAVATMAL 445 402

Year: 2021-2022

Prepared by:

Enrich Consultants

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

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/2021-22/CR-14/1577 — 22nd April, 2021

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 Enrich Consultants** Yashashree, Plot No. 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune - 411009.
Registration Category	:	*Empanelled Consultant for Energy Conservation Programme for Class 'A'*
Registration Number	:	***MEDA/ECN/2021-22/Class A/EA-03***

- 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 **21st April, 2023** from the date of registration, to carry out energy audits under the Energy Conservation Programme
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General Manager (EC)

Enrich Consultants

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

Ref: EC/IGC/20-21/06

Date: 25/05/2022

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Indira Gandhi Kala Mahavidyalay, Ralegaon in the Academic year 2021-22.

The College has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Light Fitting
- Maximum Usage of Day Lighting
- Provision of Separate bins for Dry & Wet Waste
- The College has installed septic tanks and cleans periodically.
- Implementation of Rain Water Management Project
- Tree Plantation in the campus
- Creation of awareness by Display of Posters on Resource Conservation

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Enrich Consultants,

A Y Mehendale,
Certified Energy Auditor
EA-8192

ENRICH CONSULTANTS * PUNE *

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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management Indira Gandhi Kala Mahavidyalay, Ralegaon for awarding us the assignment of Environmental Audit of their Campus for the Academic Year 2021-22

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

EXECUTIVE SUMMARY

1. Indira Gandhi Kala Mahavidyalay, Ralegaon consumes Energy in the form of Electrical Energy used for various Electrical Equipment, office & other facilities.

2. Various Pollution due to College Activities:

- Air Pollution: Mainly CO_2 on account of Electricity Consumption
- Solid Waste: Bio degradable Garden Waste
- Liquid Waste: Human liquid waste

3. Present Energy Consumption & CO_2 Emission:

No	Parameter/ Value	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	5457	4.911
2	Maximum	777	0.699
3	Minimum	287	0.258
4	Average	454.75	0.409

4. Various initiatives taken for Energy Conservation:

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

5. Usage of Renewable Energy & Reduction in CO_2 Emission:

- It is recommended to install roof-top solar PV Plant on college building as per availability of funds.

6. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	60	36	47
2	Minimum	41	26	24

7. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, ^0C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	35.1	47	360	38
2	Minimum	34.5	43	201	32

8. Waste Management:

8.1 Segregation of Waste at Source:

The Waste is segregated at source and the recyclable waste, like paper, plastic waste is handed over to Authorized waste collecting agent for further recycling.

8.2 Organic Waste Management:

The College has installed bio-composting pit, to convert bio-degradable waste into bio-fertilizer.

8.3 Liquid Waste Management:

The College has installed Septic and is cleaned periodically.

8.4 E-Waste Management:

The E-Waste is disposed of through Authorized E-Waste collecting agency.

9. Rain Water Management:

The College has installed the Rainwater management project and bore well charging project, but the piping system for rain water collection is under maintenance. It is recommended for intact the project.

10. Environment Friendly Initiatives:

- Tree Plantation in the campus.
- Display of Posters on Resource Conservation

11. Notes &Assumptions:

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO_2 into atmosphere

12. References:

- For CO_2 Emissions: www.tatapower.com
- For Energy Saved by Solar Thermal Water Heating System: www.mahaurja.com
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI &Water Quality Standards: www.cpcb.com

ABBREVIATIONS

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
LPD	:	Liters per Day
LED	:	Light Emitting Diode
AQI	:	Air Quality Index
PM-2.5	:	Particulate Matter of Size 2.5 Micron
PM-10	:	Particulate Matter of Size 10 Micron
CPCB	:	Central Pollution Control Board
ISHRAE	:	The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

CHAPTER-I
INTRODUCTION

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment

1.1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.1.4. Table No-1: Relevant Environmental Laws in India:

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

1.1.5. Table No-2: Some Important Environmental Rules in India:

1989	Hazardous Waste (Management and Handling) Rules
1989	Manufacture, Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Rules
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules
2011	E-waste (Management and Handling) Rules
2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

1.1.6 Table No-3: National Environmental Plans & Policy Documents:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research Institute)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency
10	The Road to Copenhagen, India's Position on Climate Change Issues (MoEF)

1.2 Objectives:

1. Study Resource Consumption& CO_2 Emissions
2. Study of CO_2 Emission Reduction
3. Study of Indoor Air Quality Parameters
4. Study of Indoor Comfort Condition Parameters
5. Study of Waste Management
6. Study of Rain Water Management
7. Study of Environment Friendly Initiatives

1.3 General Details of College: Table No 4:

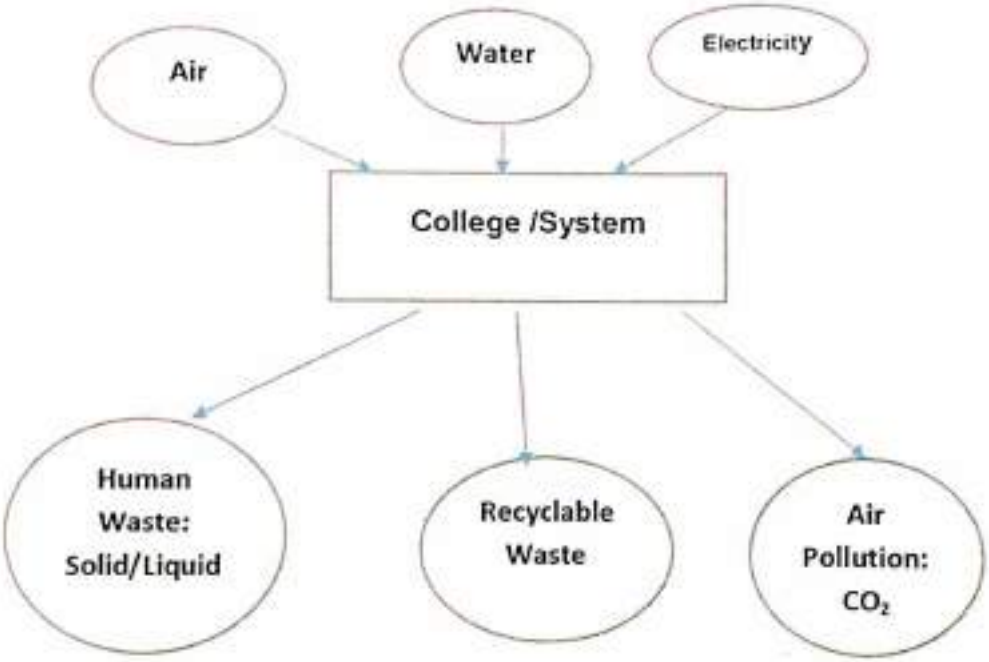
No	Head	Particulars
1	Name of Institution	Indira Gandhi Arts & Science College
2	Address	Kalamb Road,Ralegaon,Dist: Yavatmal 445 402
3	Affiliation	Sant Gadge Baba Amravati University

CHAPTER-II
STUDY OF CONSUMPTION OF RECOURCES & CO_2 EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the College System & Environment as under.
Chart No 1: Representation of College as System & Study of Resources & Waste



Now we compute the Generation of CO2 on account of consumption of Electrical Energy.

The basis of Calculation for CO_2 emissions due to usage of Electrical Energy are as under

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

Table No 5: Study of Consumption of Electrical Energy & CO_2 Emissions: 2020-21:

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Apr-21	485	0.4365
2	May-21	643	0.5787
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Chart No 2: Month wise CO_2Emissions:

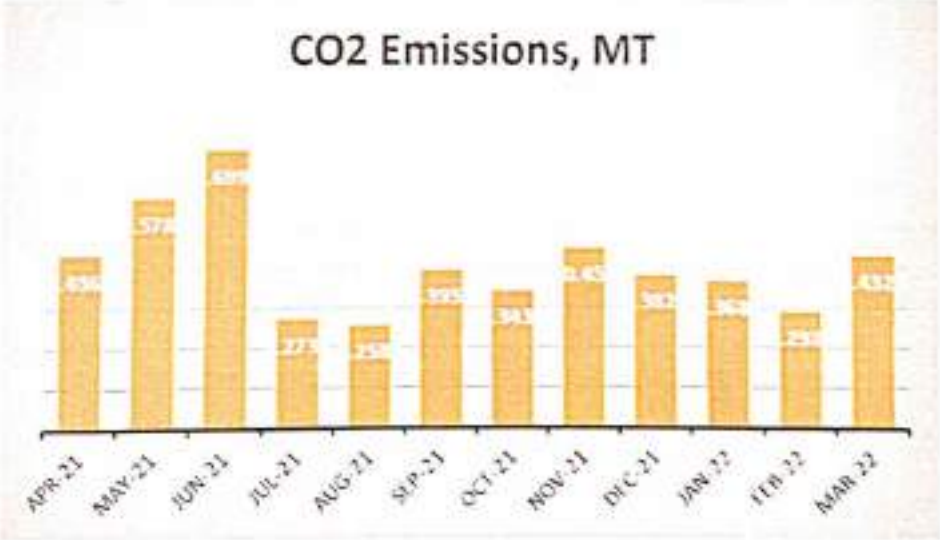

Table No 6: Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	5457	4.9113
2	Maximum	777	0.6993
3	Minimum	287	0.2583
4	Average	454.75	0.4092

ENRICH CONSULTANTS Pune

CHAPTER III
STUDY OF CO_2 EMISSION REDUCTION

The college has not installed solar roof-top PV plant, it is recommended to install solar roof-top PV plant on the college building as per the availability of fund

CHAPTER IV
STUDY OF INDOOR AIR QUALITY

4.1 Importance of Air Quality:

Air: The common name given to the atmospheric gases used in breathing and photosynthesis.

By volume, Dry Air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.039% carbon dioxide, and small amounts of other gases.

On average, a person inhales about **14,000 liters** of air every day. Therefore, poor air quality may affect the quality of life now and for future generations by affecting the health, the environment, the economy and the city's livability.

Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981.

Air quality is a measure of the suitability of air for breathing by people, plants and animals.

According to Section 2(b) of Air (Prevention and control of pollution) Act, 1981 '**air pollution**' has been defined as '**the presence in the atmosphere of any air pollutant.**'

4.2 Air Quality Index:

An **Air Quality Index (AQI)** is a number used by government agencies to measure the **air pollution** levels and communicate it to the population. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects. The measurement of the **AQI** requires an **air monitor** and an **air pollutant** concentration over a specified **averaging period**.

We present herewith following important Parameters.

1. AQI- Air Quality Index
2. PM-2.5- Particulate Matter of Size 2.5 micron
3. PM-10- Particulate Matter of Size 10micron

Table No 8: Indoor Air Quality Parameters:

No	Locations	AQI	PM2.5	PM10
Ground Floor				
1	Principal Cabin	41	33	47
2	Staff Room	51	31	45
3	Class Room	52	36	44
4	Music Department	54	36	44
5	Chemistry Department	52	30	41
First Floor				
6	Class Room	42	26	24
7	Botany Department	60	31	44

8	Zoology Department	60	31	44
9	Physics Department	54	32	38
10	NSS Office	51	31	45
12	Maximum	60	36	47
13	Minimum	41	26	24

CHAPTER V
STUDY OF INDOOR COMFORT CONDITION PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit. The Parameters include:

1. Temperature
2. Humidity
3. Lux Level
4. Noise Level.

Table No9: Study of Indoor Comfort Condition Parameters:

No	Locations	Temperature (°C)	Humidity (%)	Lux Level	Noise Level (dB)
Ground Floor					
1	Principal Cabin	36	45	210	36
2	Staff Room	35.1	45	185	32
3	Class Room	35.2	44	360	32
4	Music Department	35.6	46	320	34
5	Chemistry Department	35.6	47	280	37
First Floor					
6	Class Room	36.4	46	335	34
7	Botany Department	36.5	45	316	38
8	Zoology Department	36.4	45	325	34
9	Physics Department	36.3	44	356	34
10	NSS Office	36.5	43	201	35
12	Maximum	35.1	47	360	38
13	Minimum	34.5	43	201	32

CHAPTER VI
STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The Waste is segregated at source and the recyclable waste, like paper waste is handed over to authorized waste collecting agent for further recycling.

Photograph of Waste Collection Bins:

6.2 Organic Waste Management:

The College has installed bio-composting pit, to convert bio-degradable waste into bio-fertilizer.

6.3 Liquid Waste Management:

The College has installed Septic tank and is cleaned periodically.

6.4 E-Waste Management:

The E-Waste is disposed of through Authorized Agency.

6.5 Sanitary Waste Incinerator:

The College has not installed Sanitary Waste Incinerator for sanitary waste disposal. It is recommended to install Sanitary Waste Incinerator.

CHAPTER-VII
STUDY OF RAIN WATER MANAGEMENT

The College has installed the Rainwater management project and bore well charging project, is used to increase the underground water table, but the piping system for rain water collection is under maintenance. It is recommended for intact the project.

Photograph of Rain Water Charging:

CHAPTER-VIII
STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The College has well maintained Tree Plantation in the campus.

Photograph of Tree plantation:

8.2 Creation of Awareness about Energy Conservation:

The College has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:

8.3 Best Practices and Initiative for Social Awareness:

The College has taken initiative for different social awareness program, about water and forest conservation, Society cleanness under National Service Scheme.

Photograph of Best Practices and Initiative:

ANNEXURE-I:
VARIOUS AIR QUALITY, WATER QUALITY, NOISE & INDOOR COMFORT STANDARDS:

1. Category Wise Air Quality Index Values & Concentration of PM 2.5 & PM10:

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

2. Recommended Water Quality Standards:

No	Designated Best Use	Criteria
1	Drinking Water Source without conventional Treatment but after disinfection	pH between **6.5 to 8.5** Dissolved Oxygen **6 mg/l or more**
2	Drinking water source after conventional treatment and disinfection	pH between **6 to 9** Dissolved Oxygen **4 mg/l or more**
3	Outdoor Bathing (Organized)	pH between **6.5 to 8.5** Dissolved Oxygen **5 mg/l or more**
4	Controlled Waste Disposal	pH between **6 to 8.5**

3. Recommended Noise Level Standards:

No	Location	Noise Level dB
1	Auditoriums	20-25
2	Outdoor Playground	55
3	Occupied Class Room	40-45

4	Un occupied Class Room	35
5	Apartment, Homes	35-40
6	Offices	45-50
7	Libraries	35-40
8	Restaurants	50-55

4. Thermal Comfort Conditions: For Non-conditioned Buildings:

No	Parameter	Value
1	Temperature	Less Than 33^{0}C
2	Humidity	Less Than 70%

GREEN AUDIT REPORT

OF

INDIRA GANDHI KALA MAHAVIDYALAY, RALEGAON DIST: YAVATMAL 445 402

Year: 2021-22

Prepared by:

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- Usage of Energy Efficient LED Light Fitting
- Maximum Usage of Day Lighting
- Provision of Separate bins for Dry & Wet Waste
- The College has installed Septic Tank and is cleaned periodically.
- Implementation of Rain Water Management Project
- Maintenance of good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of awareness by Display of Posters on Resource Conservation

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Enrich Consultants,

ENRICH CONSULTANTS PUNE

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3	Minimum	287	0.258
4	Average	454.75	0.409

3. Various initiatives taken for Energy Conservation:

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

4. Usage of Renewable Energy & CO_2 Emission Reduction:

- It is recommended to install *roof-top* solar PV Plant on college building.

5. Waste Management:

5.1 Segregation of Waste at Source:

The Waste is segregated at source and the recyclable waste, like paper, plastic waste is handed over to Authorized waste collecting agent for further recycling.

5.2 Organic Waste Management:

The College has installed bio-composting pit, to convert bio-degradable waste into bio-fertilizer.

5.3 Liquid Waste Management:

The College has installed Septic and is cleaned periodically.

5.4 E-Waste Management:

The E-Waste is disposed of through Authorized E-Waste collecting agency.

6. Rain Water Management:

The College has installed the Rainwater management project and bore well charging project, but the piping system for rain water collection is under maintenance. It is recommended for intact the project.

7. Green & Sustainable Initiatives

- Maintenance of good Internal Road
- Maintenance of Internal Garden
- Display of Posters on Resource Conservation
- Best Practices and Initiative for Social Awareness

8. Notes &Assumptions

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO_2 into atmosphere

9. References

- For CO_2 Emissions www.tatapower.com

ABBREVIATIONS

BEE	Bureau of Energy Efficiency
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO_2	Carbon Di Oxide
Qty	Quantity

CHAPTER-I
INTRODUCTION

1.1 Objectives:

1. To study present Energy Consumption
2. To Study CO_2 emissions
3. To study usage of Renewable Energy
4. Study of Waste Management
5. Study of Rain Water Management
6. Study of Green & Sustainable Practices

1.2 General Details of College: Table No 1:

No	Head	Particulars
1	Name of Institution	Indira Gandhi Kala Mahavidyalay
2	Address	Kalamb Road,Ralegaon,Dist. Yavatmal 445 402
3	Affiliation	Sant Gadge Baba Amravati University

CHAPTER-II
STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 2: Electrical Bill Analysis- 2021-22:

No	Month	Energy Purchased, kWh
1	Apr-21	485
2	May-21	643
3	Jun-21	777
4	Jul-21	304
5	Aug-21	287
6	Sep-21	439
7	Oct-21	382
8	Nov-21	500
9	Dec-21	425
10	Jan-22	409
11	Feb-22	325
12	Mar-22	481
13	Total	5457
14	Maximum	777
15	Minimum	287
16	Average	454.75

Chart No 1: Variation in Monthly Energy Consumption:

Table No 3: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	5457
2	Maximum	777
3	Minimum	287
4	Average	454.75

CHAPTER III
STUDY OF 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 College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO_2 Emissions:

The basis of Calculation for CO_2 emissions is as under.

- **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 No4: Month wise CO_2 Emissions:

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Apr-21	485	0.4365
2	May-21	643	0.5787
3	Jun-21	777	0.6993
4	Jul-21	304	0.2736
5	Aug-21	287	0.2583
6	Sep-21	439	0.3951
7	Oct-21	382	0.3438
8	Nov-21	500	0.45
9	Dec-21	425	0.3825
10	Jan-22	409	0.3681
11	Feb-22	325	0.2925
12	Mar-22	481	0.4329
13	Total	5457	4.9113
14	Maximum	777	0.6993
15	Minimum	287	0.2583
16	Average	454.75	0.4092

Chart No 2: Month wise CO_2Emissions:

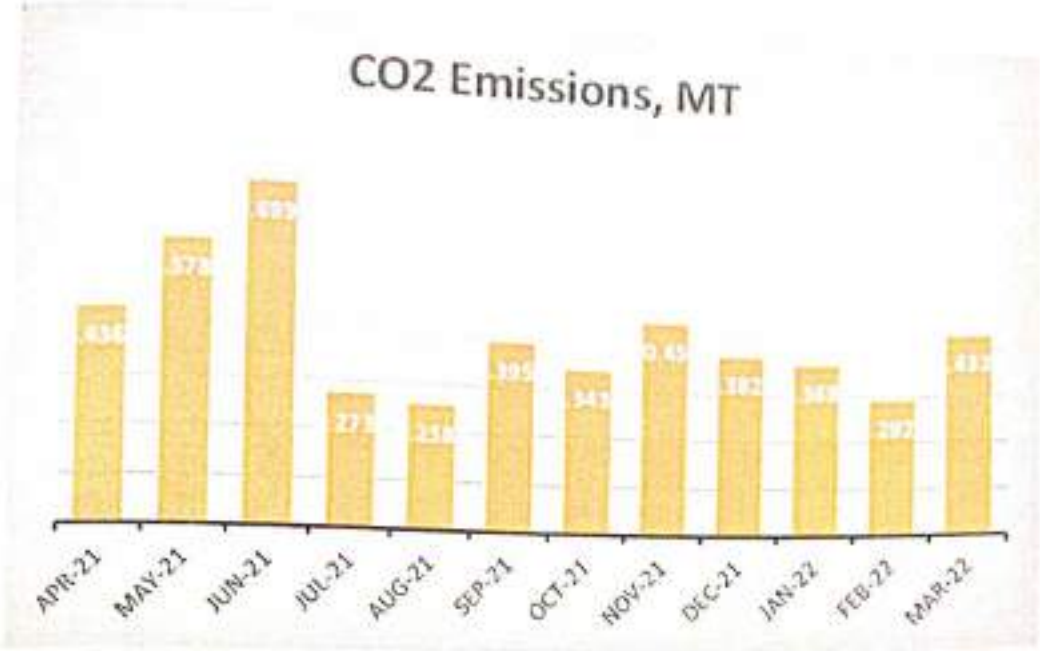

Table No 5: Variation in Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	5457	4.9113
2	Maximum	777	0.6993
3	Minimum	287	0.2583
4	Average	454.75	0.4092

CHAPTER IV
STUDY OF USAGE OF RENEWABLE ENERGY

It is recommended to install solar roof-top PV plant on the college building as per the availability of fund

CHAPTER V
STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The Waste is segregated at source and the recyclable waste, like paper waste is handed over to authorized waste collecting agent for further recycling

5.2 Organic Waste Management:

The College has installed bio-composting pit, to convert bio-degradable waste into bio-fertilizer

5.3 Liquid Waste Management:

The College has installed Septic tank and is cleaned periodically

5.4 E-Waste Management:

The E-Waste is disposed of through Authorized Agency

5.5 Sanitary Waste Incinerator:

The College has not installed Sanitary Waste Incinerator for sanitary waste disposal. It is recommended to install Sanitary Waste Incinerator

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CHAPTER-VI

STUDY OF RAIN WATER MANAGEMENT

The College has installed the Rainwater management project and bore well charging project, is used to increase the underground water table, but the piping system for rain water collection is under maintenance. It is recommended for intact the project.

Photograph of Rain Water Charging:

CHAPTER-VII
STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Roads:

The College has well maintained internal road to facilitate the easy movement of the students within the campus.

Photograph of Internal Road:

7.2 Internal Tree Plantation:

The College has maintained botanical garden and having well tree plantation in the campus.

Photograph of Tree plantation:

7.3 Provision of Ramp:

For easy movement for Divyangajan, the College has made provision for Ramp

7.4 Creation of Awareness about Energy Conservation:

The College has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:

7.5 Best Practices and Initiative for Social Awareness:

The College has taken initiative for different social awareness program, about water and forest conservation, trees plantations, society cleanness etc under National Service Scheme.

Photograph of Best Practices and Initiative:

ANNEXURE-1:
DETAILS OF TREES & PLANTS:

Sr.No.	Name of Plants/Trees	Quantity
1	Mehandi	76
2	Ashoka	12
3	Kadunimb	18
4	Chakri	1
5	Palm	13
6	Angeri Chinch	14
7	Ghantoli	7
8	Kanher	6
9	Zandu	15
10	Bakul	2
11	Sadafully	10
12	Jabhul	3
13	Teak wood	73
14	Pimple	1
15	Karanj	10
16	Champa	1
17	Jaswand	7
18	Kadamb	1
19	Rose	21
20	Thuja	11
21	Stobush	1
22	Bramhi	1
23	Mogra	9
24	Ajwan	1
25	Shatavari	1
26	Ashwganda	1
27	Adulsa	1
28	Rui	1
29	Aloevera	3
30	Beetle nut	1
31	Prajakta	1
32	Raktchandan	1
33	Shevaga	1
34	Mosambi	1
35	Custer apple	1
36	Gauva	1
37	Coconut	1
38	Akashnim	1
39	Java Apple	1
40	Karvand	1
41	Lemaon	1

42	Curry Leaves	1
43	Sonchafa	1
44	Copper Leaf	4
45	Awala	1

PLANTATION

Late Chindhuji Laxmanrao Purke Shikshan Prasarak Mandal's

Indira Gandhi Kala Mahavidyalaya,

Ralegaon - 445402, Dist. Yavatmal (M.S.)

Affiliated to Sant Gadge Baba Amravati University

Website -www.igkmralegaon.org **E-mail - igkm490@gmail.com**

Policy Statement on Green Initiatives

Introduction

Indira Gandhi Kala Mahavidyalaya,Ralegaon recognizes that environmental sustainability is crucial for the well-being of current and future generations and hence committed to integrating green initiatives into our core business strategies and operations. This policy outlines our dedication to minimizing environmental impact, conserving resources, and promoting sustainable practices throughout our organization.

Objectives

- To reduce greenhouse gas emissions through energy efficiency improvements, responsible transportation practices, and the adoption of renewable energy sources.
- To promote resource conservation by optimizing water and energy usage, minimizing waste generation.
- To Promote Sustainable Products and Services
- To educate and empower employees to participate in our green initiatives, fostering a culture of environmental stewardship and responsibility.

Scope

This policy applies to all components and stakeholders of Indira Gandhi Kala Mahavidyalaya, Ralegaon. The scope includes but is not limited to:

- Energy consumption and efficiency
- Waste management
- Water conservation
- Stakeholder and community relations

Indira Gandhi Kala Mahavidyalaya, Ralegaon. is committed to continuously improving our environmental performance, complying with relevant environmental legislation and regulations, and striving to exceed industry standards for sustainability. By integrating these objectives into our business practices, we aim to make a positive impact on the environment and contribute to a more sustainable future for all.

The Practices

- Plastic Free Campus
- Pedestrian Friendly Pathway
- Tree Plantation Drive
- Celebration of Environment related days

Co-ordinator
Internal Quality Assurance Cell
Indira Gandhi Kala Mahavidyalaya
Ralegaon

Gandhi Kala Mahavidyalaya College Code 490 Ralegaon Dist.Yavatmal

PRINCIPAL
Indira Gandhi Kala Mahavidyalaya
Ralegaon Dist.Yavatmal

Plastic Free Campus

Co-ordinator
Internal Quality Assurance Cell
Indira Gandhi Kala Mahavidyalaya
Ralegaon

Indira Gandhi Kala Mahavidyalaya
College Code 490
Ralegaon Dist.Yavatmal

PRINCIPAL
Indira Gandhi Kala Mahavidyalaya
Ralegaon Dist.Yavatmal

Pedestrian Friendly Pathway

Co-ordinator
Internal Quality Assurance Cell
Indira Gandhi Kala Mahavidyalaya
Ralegaon

Indira Gandhi Kala Mahavidyalaya College Code 490 Ralegaon Dist.Yavatmal

PRINCIPAL
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Ralegaon Dist.Yavatmal

Tree Plantation Drive

Co-ordinator
Internal Quality Assurance Cell
Indira Gandhi Kala Mahavidyalaya
Ralegaon

Indira Gandhi Kala Mahavidyalaya
College Code 490
Ralegaon Dist. Yavatmal

PRINCIPAL
Indira Gandhi Kala Mahavidyalaya
Ralegaon Dist.Yavatmal

Celebration of Environment related days

देशोन्नती

इंदिरा गांधी कला महाविद्यालयात जागतिक ओझोन दिन

देशोन्नती वृत्तसंकलन...

राळेगाव ■ स्थानिक इंदिरा गांधी कला महाविद्यालय राळेगाव येथील भूगोल, वनस्पती शास्त्र व राष्ट्रीय सेवा योजना यांच्या वतीने जागतिक ओझोन दिन साजरा करण्यात आला. या कार्यक्रमाच्या अध्यक्ष स्थानी महाविद्यालयाचे प्राचार्य डॉ. एस. व्हि. आगरकर, प्रमुख अतिथी म्हणून प्रा. आर. कोठेकर प्रा. व्हि. डी. समर्थ, प्रा. एस. व्हि. गोरे, प्रा. एन. एम. देशमुख प्रा. एम. डी. बावणे उपस्थित होते. यावेळी प्राचार्यांनी ओझोन वायू बदल माहिती दिली व त्यांच्या संरक्षण करिता मार्गदर्शन केले. तसेच महाविद्यालयीन स्तरावर स्पर्धा परीक्षा घेण्यात आली. (ता.प्र.)

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Celebration of World ozone day on dated 16/09/2022

Tree Planation on the Occasion of World Environment Days

“WORLD OZONE DAY” Celebration- Poster Competition-2023

Plantation by college staff on the occasion of World Environment Day 2023

Co-ordinator
Internal Quality Assurance Cell
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