



K J's Educational Institute

K J College of Engineering and Management Research

Sec No.25 & 27, Pisoli At Tal-Haveli, Dist-Pune

7.1.3.1 ENVIRONMENT AUDIT

Environment auditing is the process of identification and determination of the institution's practices in creating awareness and practising the environment friendly measures. Over the period of time over exploitation of resources like energy, water, etc. have resulted in the environmental degradation. It is necessary to check whether our way of living and handling resources is not going to cause detrimental effects in our surroundings. It also focus on air quality, water conservation, waste management etc. Environment Audit Report helps at summarising the Institute's contribution and its activeness in creating awareness and consciousness in practically applying the environmental friendly measures.

Following are the Environmental Audit Reports of K J College of Engineering and Management Research, Pune for last three years prepared by external expert of the government recognised organization.

Sr. No.	Particular	Page No.
1	Environmental Audit Report for the year 2021-22	1
2	Environmental Audit Report for the year 2020-21	24
3	Environmental Audit Report for the year 2019-20	42



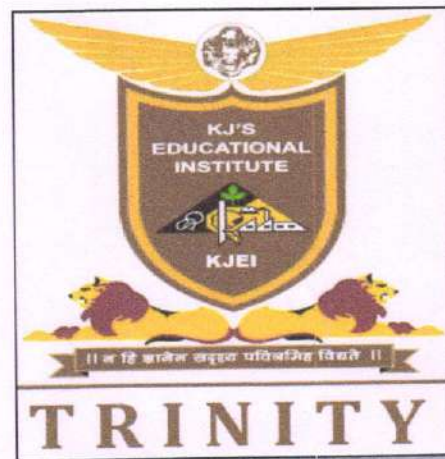
Principal

KJ College of Engineering & Management Research

Sr No. 25 & 27, Bopdev Ghat,

Kondhawa - Saswad Road, Pune - 411 048

ENVIRONMENTAL AUDIT REPORT
of
KJ's Educational Institutes,
K J College of Engineering and Management Research,
Pune 411 048



Year: 2021-22

Prepared by

ENGRESS SERVICES

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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
(Government of Maharashtra Institution)
Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,
Aundh, Pune, Maharashtra 411067
Ph No: 020-35000450
Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2022-23/CR-43/1709 10th May, 2022

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**


We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : M/s Engress Services
Yashshree, 26, Nirmal Bag Society,
Near Muktangan English School,
Parvati, Pune - 411 009.

Registration Category : Empanelled Consultant for Energy Conservation Programme for Class 'A'

Registration Number : MEDA/ECN/2022-23/Class A/EA-32.

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **09th May, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.


General Manager (FC)



ENGRESS SERVICES

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

Ref: ES/KJCOEMR/21-22/03

Date: 12/6/2022

CERTIFICATE

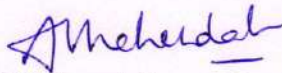
This is to certify that we have conducted Environmental Audit at KJ's Educational Institutes, K J College of Engineering and Management Research, Pune in the year 2021-22.

The College has adopted Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of 30 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Bio Composting Pit for conversion of Leafy Waste
- Installation of Sewage Treatment Plant of Capacity 450 KLPD
- Installation of Rain Water Harvesting Project
- Internal Tree Plantation
- Creation of Awareness on Resource 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 Energy Efficient, Green and Environment Friendly.

For Engress Services,



A Y Mehendale,
Certified Energy Auditor
EA-8192



INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	8
1	Introduction	9
2	Study of Resource Consumption & CO ₂ Emission	12
3	Study of CO ₂ Emission Reduction	14
4	Study of Indoor Air Quality	15
5	Study of Indoor Comfort Condition Parameters	17
6	Study of Waste Management	18
7	Study of Rain Water Management	20
8	Study of Environment Friendly Initiatives	21
	Annexure	
I	Various Standards in respect of Indoor Air Quality, Water, Noise & Indoor Comfort Condition	22



ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of KJ's Educational Institutes, K J College of Engineering and Management Research, Pune for awarding us the assignment of Environmental Audit of their campus for the Year: 2021-22.

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



EXECUTIVE SUMMARY

1. KJ's Educational Institutes, K J College of Engineering and Management Research, Pune consumes Energy in the form of **Electrical Energy** used for various gadgets, Office & other facilities.

2. Pollution caused due to College Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity & LPG Consumption
- **Solid Waste:** Bio degradable Waste, Garden Waste, Recyclable Waste and Human Waste
- **Liquid Waste:** Human & Laboratory Liquid waste

3. Present Energy Consumption & CO₂ Emission:

No	Parameter /Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	80675	72.61
2	Maximum	10600	9.54
3	Minimum	5140	4.63
4	Average	6722.94	6.05

4. Various projects implemented for Environmental Conservation:

- Usage of Energy Efficient BEE STAR Rated Equipment
- Installation of 30 kWp Roof Top Solar PV Plant
- Installation of Sewage Treatment Plant

5. Usage of Renewable Energy & CO₂ Emission Reduction:

- The College has installed Roof Top Solar PV Plant of Capacity **30 kWp**.
- Energy Generated by Solar PV Plant in 2021-22 is **36000 kWh**
- Annual Reduction in CO₂ Emissions is **32.4 MT**.

6. Indoor Air Quality:

No	Parameter/Value	AQI	PM2.5	PM10
1	Maximum	70	42	49
2	Minimum	50	28	32

7. Indoor Comfort Condition Parameters:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	25.5	91	750	52
2	Minimum	22.8	86	119	40

8. Waste Management:

8.1 Segregation of Waste at source:

The waste is segregated at the source and further handed over to agency for further recycling

8.2 Organic Waste Management:

A Bio Composting Pit is used to convert the Leafy Waste into Bio compost.

8.3 Liquid Waste Water Management:

The College has installed Sewage Treatment Plant of Capacity **450 KLPD**, to treat the Liquid Waste Water. The treated water is used for gardening purpose.

8.4 E Waste Management:

The E Waste is disposed of through Authorized Agency.

9. Rain Water Harvesting:

The College has implemented Rain Water Harvesting Project. The Rain Water from the terraces and Hill slope is channelized properly through channels and pipes and is stored in a specially constructed Water Storage Lake. This Water is used for domestic purpose.

10. Environment Friendly Initiatives:

- Internal tree Plantation.
- Creation of Awareness in respect of Resource Conservation by displaying posters

11. Notes & Assumptions:

1. 1 kWh of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. **1 kWp** Solar PV system generates **4 kWh** of Electrical Energy per Day
3. Annual Solar Energy Generation Days: **300 Nos**

12. References:

- For CO₂ Emission computation: www.tatapower.com
- For Solar PV Energy Generation: www.solarroftop.gov.in
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI & Water Quality Standards: www.cpcb.com

ABBREVIATIONS

kWh	:	kilo-Watt Hour
KLPD	:	Kilo Liters Per Day
Qty	:	Quantity
MT	:	Metric Ton
CO ₂	:	Carbon Di Oxide
kWp	:	Kilo Watt Peak
AQI	:	Air Quality Index
PM2.5	:	Particulate Matter of Size 2.5 microns
PM 10	:	Particulate Matter of Size 10 microns
CPCB	:	Central Pollution Control Board
ISHARE	:	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. Relevant Environmental Laws in India: Table No-1:

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

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

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 College)
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 Audit Methodology:

1. Study of College as System
2. Study of present Resource Consumption & CO₂ Emission
3. Study of CO₂ Emission Reduction
4. To study Indoor Air Quality and Indoor Comfort Condition Parameters
5. Study of Waste Management
6. Study of Rain Water Harvesting
7. Study of Environmental Friendly Initiatives

1.3 Google Earth Image:



College
Campus



1.4 General Details of College: Table No:4

No	Head	Particulars
1	Name	KJ's Educational Institutes, K J College of Engineering and Management Research
2	Address	Sr. No.25 & 27, Pisoli, Near Bopdeo Ghat, Haveli, Dist: Pune 411 048
3	Year of Establishment	2009
4	Affiliation	Savitribai Phule Pune University



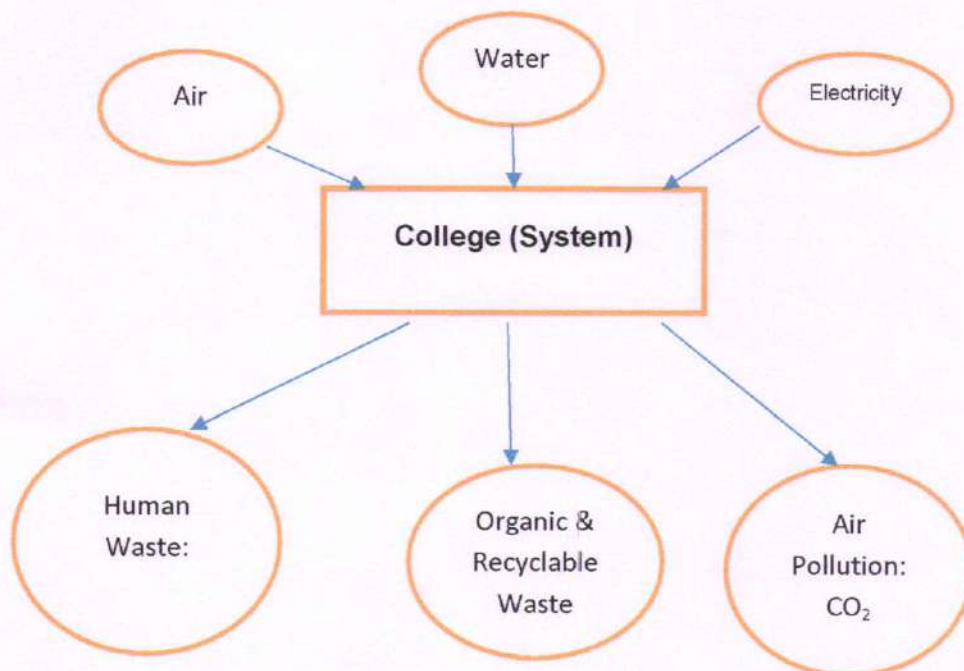
CHAPTER-II STUDY OF CONSUMPTION OF RESOURCES & CO₂ EMISSION

The College consumes following Natural/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:



A **Carbon Foot print** is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Here 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 basis of Calculation for CO₂ emissions due to Electrical Energy is:

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

Table No 5: Study of Energy Consumption & CO₂ Emission: 21-22:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-21	5425	4.88
2	May-21	5140	4.63
3	Jun-21	5212	4.69
4	Jul-21	5696	5.13
5	Aug-21	5711	5.14

6	Sep-21	6236	5.61
7	Oct-21	6494	5.84
8	Nov-21	7147	6.43
9	Dec-21	7906	7.12
10	Jan-22	7615	6.85
11	Feb-22	7493	6.74
12	Mar-22	10600	9.54
13	Total	80675	72.61
14	Maximum	10600	9.54
15	Minimum	5140	4.63
16	Average	6722.94	6.05

Chart No 2: Representation of Month wise CO₂ emissions:

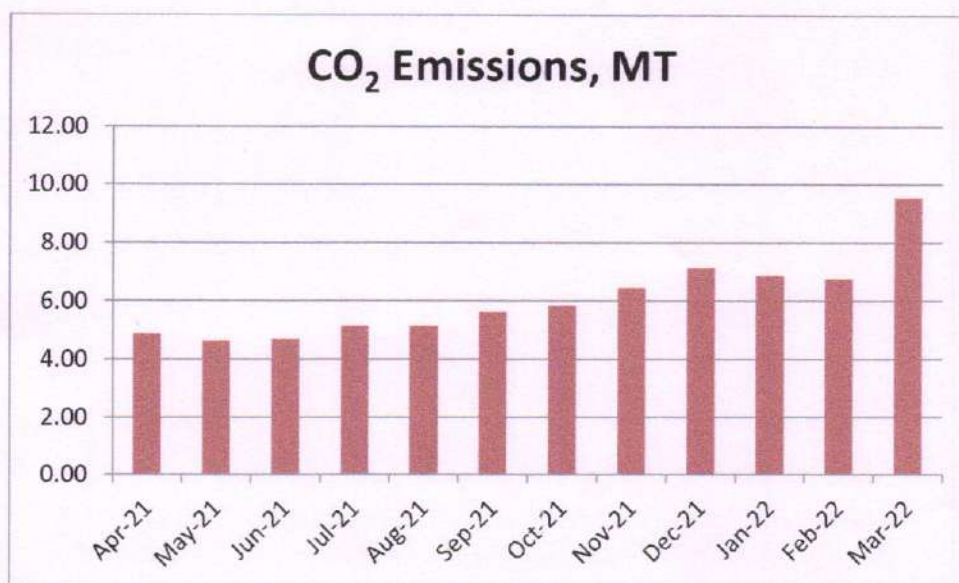


Table No 6: Key Parameters:

No	Value	Energy Purchased, kWh	CO ₂ emissions, MT
1	Total	80675	72.61
2	Maximum	10600	9.54
3	Minimum	5140	4.63
4	Average	6722.94	6.05

CHAPTER-III STUDY OF CO₂ EMISSION REDUCTION

The College has installed 30 kWp Roof Top Solar PV Plant. In the following Table, we present the Annual Reduction in CO₂ Emissions due to usage of Renewable Energy.

Table No 6: Calculation of Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	30	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	36000	kWh
5	1 kWh of Energy is equivalent to	0.9	Kg of CO ₂
6	Reduction in Annual CO ₂ Emissions= (4) * (5)/1000	32.4	MT

Photograph of 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 liveability.

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.'

As per Section 2(a) of Air (Prevention and control of pollution) Act, 1981 'air pollutant' has been defined as 'any solid, liquid or gaseous substance [(including noise)] present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment

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
3. PM 2.5- Particulate Matter of Size 2.5

Table No7: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
	Ground Floor			
1	Admission Cell	55	34	33

2	Admin Office	59	38	39
	Mechanical Department			
3	Workshop	51	31	36
4	Class Room-2	50	30	34
	First Floor			
5	A-101	56	34	36
6	A-106	51	28	37
7	A-113	61	37	38
8	A-114	63	38	42
	Second Floor			
9	Transportation Engg. Lab	66	38	43
10	Surveying Lab	56	34	37
11	A-202	55	33	32
12	A-206	65	39	46
	Third Floor			
13	Class Room-15	60	38	45
14	Faculty Room	53	33	34
15	Communication Lab	70	42	49
16	Computer Lab	60	36	37
	Fourth Floor			
17	Database Management Lab	60	36	42
18	Programming Lab-1	59	35	40
19	Programming Lab-2	51	31	32
20	Research Lab	60	32	40
	Maximum	70	42	49
	Minimum	50	28	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 No8: Study of Indoor Comfort Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
Ground Floor					
1	Admission Cell	25.5	88	215	49
2	Admin Office	25	88.2	119	48
Mechanical Department					
3	Workshop	24.9	88	125	49
4	Class Room-2	24.8	87.9	135	42
First Floor					
5	A-101	24.8	88	138	42
6	A-106	25	87.4	149	45
7	A-113	25.2	87.3	151	43
8	A-114	25.3	88	175	52
Second Floor					
9	Transportation Engg. Lab	22.8	86	750	43
10	Surveying Lab	24.8	89	135	42
11	A-202	25	89.1	156	48
12	A-206	25.2	87.5	166	47
Third Floor					
13	Class Room-15	24.5	89.1	175	43
14	Faculty Room	24.2	90	166	40
15	Communication Lab	24	90	173	47
16	Computer Lab	24.5	90	131	49
Fourth Floor					
17	Database Management Lab	24.9	91	119	50
18	Programming Lab-1	24.8	90	120	47
19	Programming Lab-2	24.8	91	131	42
20	Research Lab	25.1	89.5	124	45
	Maximum	25.5	91	750	52
	Minimum	22.8	86	119	40

CHAPTER VI STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source

The College has good housekeeping practices. The Waste is segregated at source and separate Waste Collection Bins are placed for collection of Dry & Wet Waste.

Photograph of Waste Collection Bin:



6.2 Organic Waste Management:

A Bio Composting Pit is used to convert the Leafy Waste into Bio Compost.

Photograph of Bio Composting Pit Arrangement:



6.3 Liquid Waste Water Management:

The College has installed Sewage Treatment Plant of Capacity **450 KLPD**, to treat the Liquid Waste Water. The treated water is used for gardening purpose.

Photograph of Sewage Treatment Plant:



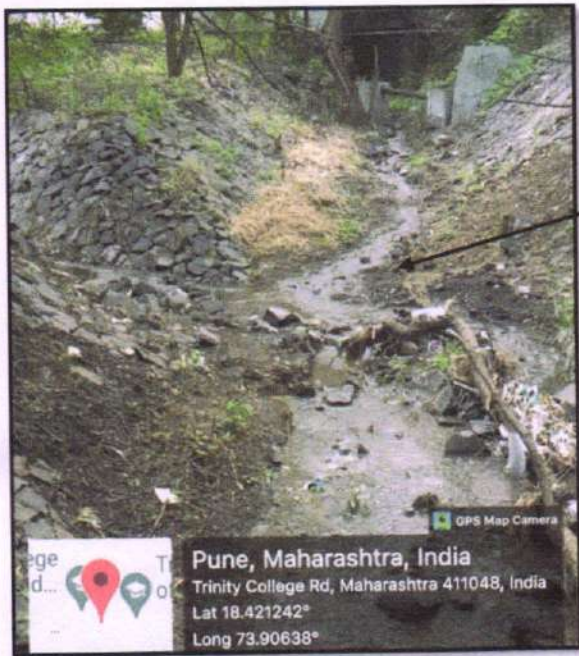
6.4 E Waste Management:

The E Waste is disposed of through Authorized Agency.

CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

The College has implemented Rain Water Management project. The Rain Water from the terraces and Hill slope is channelized properly through channels and pipes and is stored in a specially constructed Water Storage Lake. The Water Storage Capacity is about 1.5 crore Liters. This Water is used for domestic purpose.

Photograph of Rain Water Carrying Channel and Water Storage Lake:



Rain Water Channel



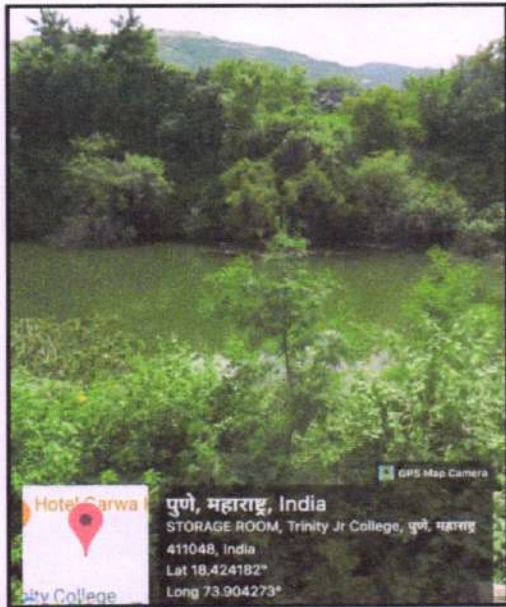
Water Storage Lake

CHAPTER-VIII STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The College has beautiful maintained lawn and tree plantation in the campus.

Photograph of Tree Plantation in the campus:



8.2 Creation of Awareness about Resource Conservation:

The College has displayed Posters on Importance of Energy Conservation.

Photograph of Posters on Resource Conservation:



ANNEXURE: 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

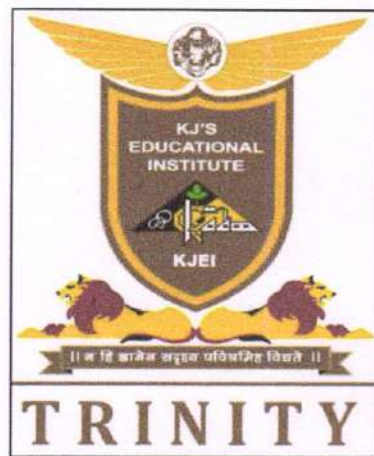
4. Thermal Comfort Conditions: For Non-conditioned Buildings:

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



ENVIRONMENTAL AUDIT REPORT

of
KJ's Educational Institute,
K J College of Engineering and Management Research,
Pune 411 048



Year: 2020-21

Prepared by

ENRICH CONSULTANTS

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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY

An ISO 9001 : 2000 Reg. no. : RQ 91 / 2462



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
- 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 Mukhtangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/KJCOEMR/2020-21/03

Date: 12/5/2021

CERTIFICATE

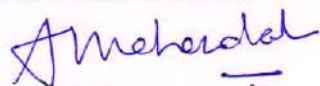
This is to certify that we have conducted Environmental Audit at KJ's Educational Institute, K J College of Engineering and Management Research, Pune in the year 2020-21.

The College has adopted Energy Efficient & Green Practices:

- Usage of Energy Efficient LED Fittings
- Installation of 30 kWp Roof Top Solar PV Plant
- Usage of Energy Efficient BEE STAR Rated equipment
- Segregation of Waste at source
- Installation of Sewage Treatment Plant of Capacity 450 KLPD
- Internal tree Plantation
- Creation of Awareness on Resource 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 Energy Efficient, Green and Environment Friendly.

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	8
1	Introduction	9
2	Study of Consumption of Resources & CO ₂ Emission	11
3	Study of CO ₂ Emission Reduction	13
4	Study of Indoor Comfort Condition Parameters	14
5	Study of Waste Management	15
6	Study of Rain Water Harvesting	16
7	Study of Environment Friendly Initiatives	17
	Annexure	
I	Various Standards in respect of Indoor Comfort Condition	18



ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of KJ's Educational Institute, K J College of Engineering and Management Research, Pune, for awarding us the assignment of Green Audit of their campus for the Year: 2020-21.

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



EXECUTIVE SUMMARY

1. KJ's Educational Institute, K J College of Engineering and Management Research, Pune consumes Energy in the form of **Electrical Energy** used for various gadgets, Office & other facilities.

2. Pollution caused due to College Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity & LPG Consumption
- **Solid Waste:** Bio degradable Waste, Garden Waste, Recyclable Waste and Human Waste
- **Liquid Waste:** Human & Laboratory Liquid waste
-

3. Present Energy Consumption & CO₂ Emission:

No	Parameter /Value	Energy Purchased, kWh	CO ₂ emissions, MT
1	Total	66853	60.17
2	Maximum	6282	5.65
3	Minimum	4565	4.11
4	Average	5571.12	5.01

4. Various projects implemented for Environmental Conservation:

- Usage of Energy Efficient BEE STAR Rated Equipment
- Installation of 30 kWp Roof Top Solar PV Plant
- Installation of Sewage Treatment Plant

5. Usage of Renewable Energy & CO₂ Emission Reduction:

- The College has installed Roof Top Solar PV Plant of Capacity **30 kWp**.
- Energy Generated by Solar PV Plant in 2020-21 is **36000 kWh**.
- Annual Reduction in CO₂ Emissions in 2020-21 is **32.4 MT**.

6. Indoor Comfort Condition Parameters:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	32.4	38.2	325	51
2	Minimum	31.3	35	105	42

7. Waste Management:

7.1 Segregation of Waste at source:

The waste is segregated at the source and further handed over to agency for further recycling

7.2 Liquid Waste Management:

The College has installed Sewage Treatment Plant of Capacity **450 KLPD**, to treat the Liquid Waste Water. The treated water is used for gardening purpose.

7.3 E Waste Management:

The E Waste is disposed of through Authorized Agency.

8. Rain Water Harvesting:

The College has implemented Rain Water Harvesting project. The Rain Water from the terraces and Hill slope is channelized properly through channels and pipes and is stored in a specially constructed Water Storage Lake. This Water is used for domestic purpose.

9. Environment Friendly Initiatives:

- Internal tree Plantation.
- Creation of Awareness in respect of Resource Conservation by displaying posters

10. Notes & Assumptions:

1. 1 kWh of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. **1 kWp** Solar PV system generates **4 kWh** of Electrical Energy per Day
3. Annual Solar Energy Generation Days: **300 Nos**

11. References:

- For CO₂ Emission computation: www.tatapower.com
- For Solar PV Energy Generation: www.solarroftop.gov.in
- For Various Indoor Air Parameters: www.ishrae.com

ABBREVIATIONS

kWh	:	kilo-Watt Hour
KLPD	:	Kilo Liters Per Day
Qty	:	Quantity
MT	:	Metric Ton
CO ₂	:	Carbon Di Oxide
kWp	:	Kilo Watt Peak
CPCB	:	Central Pollution Control Board
ISHARE	:	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. Relevant Environmental Laws in India: Table No-1:

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

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

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 College)
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 Audit Methodology:

1. Study of College as System
2. Study of present Resource Consumption & CO₂ Emission
3. Study of CO₂ Emission Reduction
4. Study of Indoor Air Quality Parameters
5. Study of Waste Management
6. Study of Rain Water Harvesting
7. Study of Environmental Friendly Initiatives

1.3 General Details of College: Table No: 4

No	Head	Particulars
1	Name	KJ's Educational Institutes, K J College of Engineering and Management Research
2	Address	Sr. No.25 & 27, Pisoli, Near Bopdeo Ghat, Haveli, Dist: Pune 411 048
3	Year of Establishment	2009
4	Affiliation	Savitribai Phule Pune University

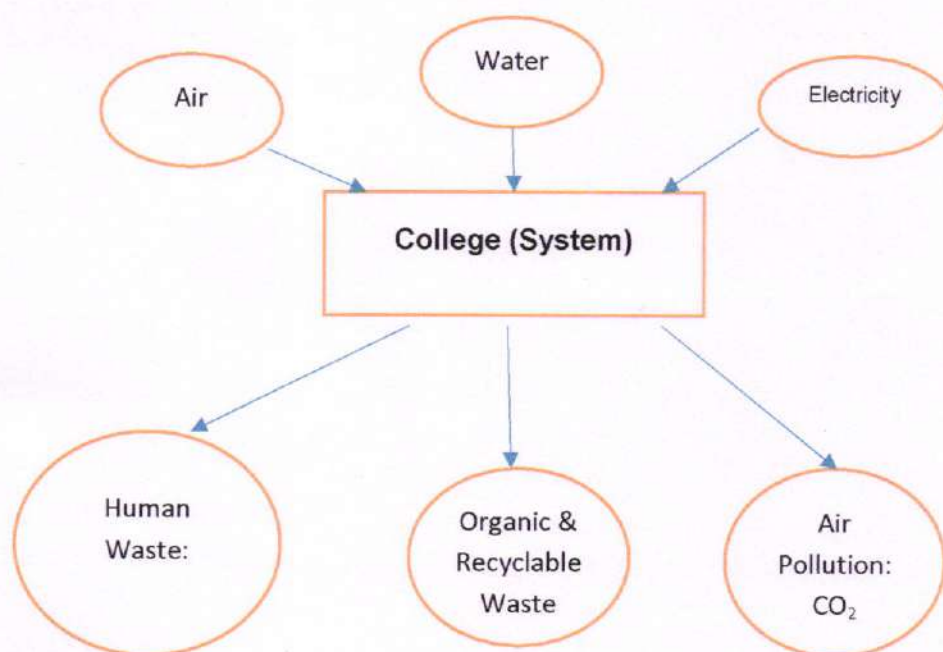
CHAPTER-II STUDY OF CONSUMPTION OF RESOURCES & CO₂ EMISSION

The College consumes following Natural/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:



A **Carbon Foot print** is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Here 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 basis of Calculation for CO₂ emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

Table No 5: Study of Energy Consumption & CO₂ Emission: 2020-21:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-20	4687	4.22
2	May-20	5118	4.61
3	Jun-20	5443	4.90
4	Jul-20	6166	5.55
5	Aug-20	6183	5.56

6	Sep-20	6236	5.61
7	Oct-20	5225	4.70
8	Nov-20	4565	4.11
9	Dec-20	5059	4.55
10	Jan-21	5996	5.40
11	Feb-21	6282	5.65
12	Mar-21	5893	5.30
13	Total	66853	60.17
14	Maximum	6282	5.65
15	Minimum	4565	4.11
16	Average	5571.12	5.01

Chart No 2: Representation of Month wise CO₂ Emissions:

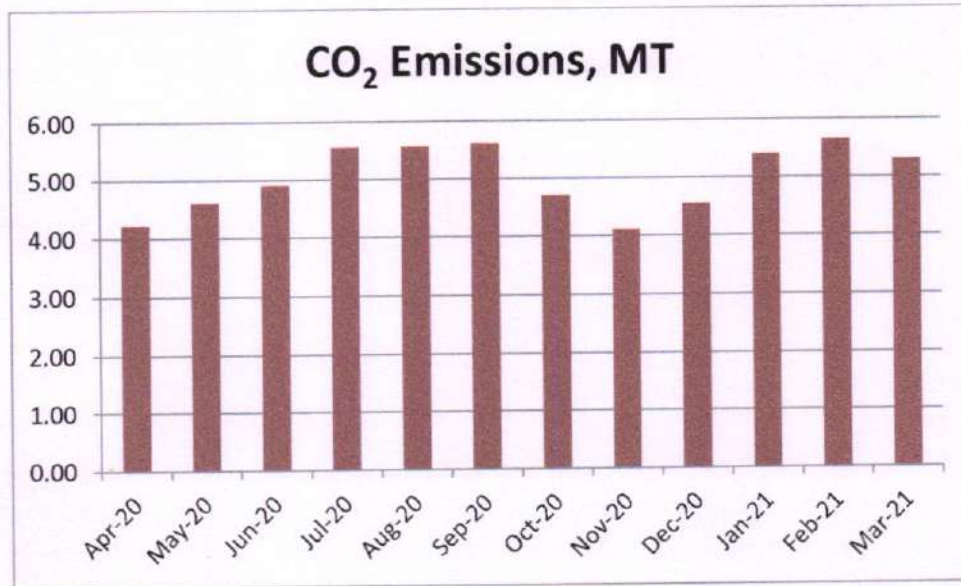


Table No 6: Key Parameters:

No	Value	Energy Purchased, kWh	CO ₂ emissions, MT
1	Total	66853	60.17
2	Maximum	6282	5.65
3	Minimum	4565	4.11
4	Average	5571.12	5.01

CHAPTER-III STUDY OF CO₂ EMISSION REDUCTION

The College has installed 30 kWp Roof Top Solar PV Plant. In the following Table, we present the Annual Reduction in CO₂ Emissions due to usage of Renewable Energy.

Table No 7: Calculation of Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	30	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	36000	kWh
5	1 kWh of Energy is equivalent to	0.9	Kg of CO ₂
6	Reduction in Annual CO ₂ Emissions= (4) * (5)/1000	32.4	MT

Photograph of Solar PV Plant:



CHAPTER IV STUDY OF INDOOR COMFORT 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 Parameters:

No	Location	Temperature, 0C	Humidity, %	Lux Level	Noise Level, dB
	Ground Floor				
1	Admission Cell	31.5	38	195	51
2	Admin Office	31.4	38.2	105	49
	Mechanical Department				
3	Workshop	31.6	38	169	48
4	Class Room-2	32	37.9	175	49
	First Floor				
5	A-101	31.3	36.9	185	42
6	A-106	31.4	36.8	210	45
	Second Floor				
7	Surveying Lab	31.5	36.5	325	43
8	A-202	32	36.4	125	44
	Third Floor				
9	Class Room-15	32.2	36	125	44
10	Computer Lab	32.3	35	150	45
	Fourth Floor				
11	Database Management Lab	32.3	36	169	44
12	Research Lab	32.4	36	178	45
	Maximum	32.4	38.2	325	51
	Minimum	31.3	35	105	42

CHAPTER V

STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The College has good housekeeping practices. The Waste is segregated at source and separate Waste Collection Bins are placed for collection of Dry & Wet Waste.

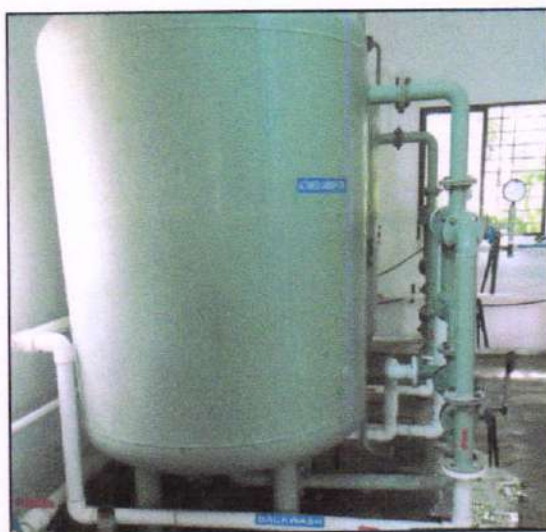
Photograph of Waste Collection Bin:



5.2 Liquid Waste Management:

The College has installed Sewage Treatment Plant of Capacity **450 KLPD**, to treat the Liquid Waste Water. The treated water is used for gardening purpose.

Photograph of Sewage Treatment Plant:



5.3 E Waste Management:

The E Waste is disposed of through Authorized Agency.

CHAPTER-VI

STUDY OF RAIN WATER HARVESTING

The College has implemented Rain Water Harvesting project. The Rain Water from the terraces and Hill slope is channelized properly through channels and pipes and is stored in a specially constructed Water Storage Lake. This Water is used for domestic purpose.

Photograph of Rain Water Carrying Channel:



Rain Water Channel

CHAPTER-VII

STUDY OF ENVIRONMENT FRIENDLY PRACTICES

7.1 Internal Tree Plantation:

The College has beautiful maintained lawn and tree plantation in the campus.

Photograph of Tree Plantation in the campus:



7.2 Creation of Awareness about Resource Conservation:

The College has displayed Posters on Importance of Energy Conservation.

Photograph of Posters on Resource Conservation:



ANNEXURE: VARIOUS INDOOR COMFORT STANDARDS:

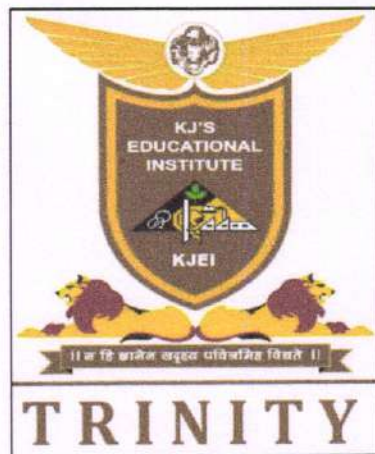
1. Recommended Noise Level Standards:

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

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

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

ENVIRONMENTAL AUDIT REPORT
of
KJ's Educational Institute,
K J College of Engineering and Management Research,
Pune 411 048



Year: 2019-20

Prepared by

ENRICH CONSULTANTS

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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(A Government of Maharashtra undertaking)
2nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,
Ph No: 020-26614393/266144403
Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2018-19/CR-05/4174

19th September, 2018

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : **Enrich Consultants**
Yashashree, Plot No. 26, Nirmal Bag Society,
Near Mukhtangan English School,
Parvati, Pune - 411009.

Registration Category : *Empanelled Consultant for Energy Conservation Programme*

Registration Number : *MEDA/ECN/CR-05/2018-19/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 the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **31st March 2021** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.


(Smita Kudarikar)
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/KJCOEMR/2019-20/03

Date: 14/7/2020

CERTIFICATE

This is to certify that we have conducted Environmental Audit at KJ's Educational Institute, K J College of Engineering and Management Research, Pune in the year 2019-20.

The College has adopted Energy Efficient & Green Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of 30 kWp Capacity Roof Top Solar PV Plant
- Segregation of Waste at source
- Installation of Sewage Treatment Plant of Capacity 450 KLPD
- Internal tree Plantation
- Creation of Awareness on Energy 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 Energy Efficient, Green and Environment Friendly.

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	8
1	Introduction	9
2	Study of Resource Consumption & CO ₂ Emission	11
3	Study of CO ₂ Emission Reduction	13
4	Study of Waste Management	14
5	Study of Rain Water Management	15
6	Study of Environment Friendly Initiatives	16



ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of KJ's Educational Institute, K J College of Engineering and Management Research, Pune, for awarding us the assignment of Green Audit of their campus for the Year: 2019-20.

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



EXECUTIVE SUMMARY

1. KJ's Educational Institute, K J College of Engineering and Management Research, Kondhwa, Pune consumes Energy in the form of **Electrical Energy** used for various gadgets, Office & other facilities.

2. Pollution caused due to Institute Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity & LPG Consumption
- **Solid Waste:** Bio degradable Waste, Garden Waste, Recyclable Waste and Human Waste
- **Liquid Waste:** Human & Laboratory Liquid waste

3. Present Energy Consumption & CO₂ Emission:

No	Value	Energy Consumed, kWh	CO ₂ emissions, MT
1	Total	118953	95.16
2	Maximum	11263	9.01
3	Minimum	8006	6.41
4	Average	9912.77	7.93

4. Various projects implemented for Environmental Conservation:

- Usage of Energy Efficient BEE STAR Rated Equipment
- Maximum Usage of Day Lighting
- Installation of Sewage Treatment Plant

5. Usage of Renewable Energy & CO₂ Emission Reduction:

- The College has installed Roof Top Solar PV Plant of Capacity **30 kWp**.
- Energy Generated by Solar PV Plant in 19-20 is **24000 kWh**
- Annual Reduction in CO₂ Emissions is **19.2 MT**.

6. Waste Management:

6.1 Segregation of Waste at source:

The waste is segregated at the source and further handed over to agency for further recycling

6.2 Liquid Waste Management:

The Institute has installed Sewage Treatment Plant of Capacity **450 KLPD**, to treat the Liquid Waste Water. The treated water is used for gardening purpose.

6.3 E Waste Management:

The E Waste is disposed through Authorized Agency.

7. Rain Water Harvesting:

The Institute has implemented Rain Water Harvesting project. The Rain Water from the terraces and Hill slope is channelized properly through channels and pipes and is stored in a specially constructed Water Storage Lake. This Water is used for domestic purpose.

8. Environment Friendly Initiatives:

- Internal tree Plantation.
- Creation of Awareness in respect of Resource Conservation by displaying posters

9. Assumptions:

1. 1 kWh of Electrical Energy releases **0.8 Kg of CO₂** into atmosphere
2. **1 kWp** Solar PV system generates **4 kWh** of Electrical Energy per Day
3. Solar PV System installed in **August-2019**.
4. Annual Solar Energy Generation Days: **200 Nos**

10. References:

- For Solar PV Energy Generation: www.solarrooftop.gov.in

ABBREVIATIONS

kWh	:	kilo-Watt Hour
KLPD	:	Kilo Liters Per Day
Qty	:	Quantity
MT	:	Metric Ton
CO ₂	:	Carbon Di Oxide
kWp	:	Kilo Watt Peak



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

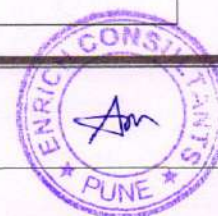
1.1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

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

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

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

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 Audit Methodology:

1. Study of Institute as System
2. Study of present Resource Consumption & CO₂ Emission
3. Study of CO₂ Emission Reduction
4. Study of Waste Management
5. Study of Rain Water Harvesting
6. Study of Environmental Friendly Initiatives.

1.3 General Details of Institute: Table No: 4

No	Head	Particulars
1	Name	KJ's Educational Institutes, K J College of Engineering and Management Research
2	Address	Sr. No.25 & 27, Pisoli, Near Bopdeo Ghat, Haveli, Dist: Pune 411 048
3	Year of Establishment	2009
4	Affiliation	Savitribai Phule Pune University



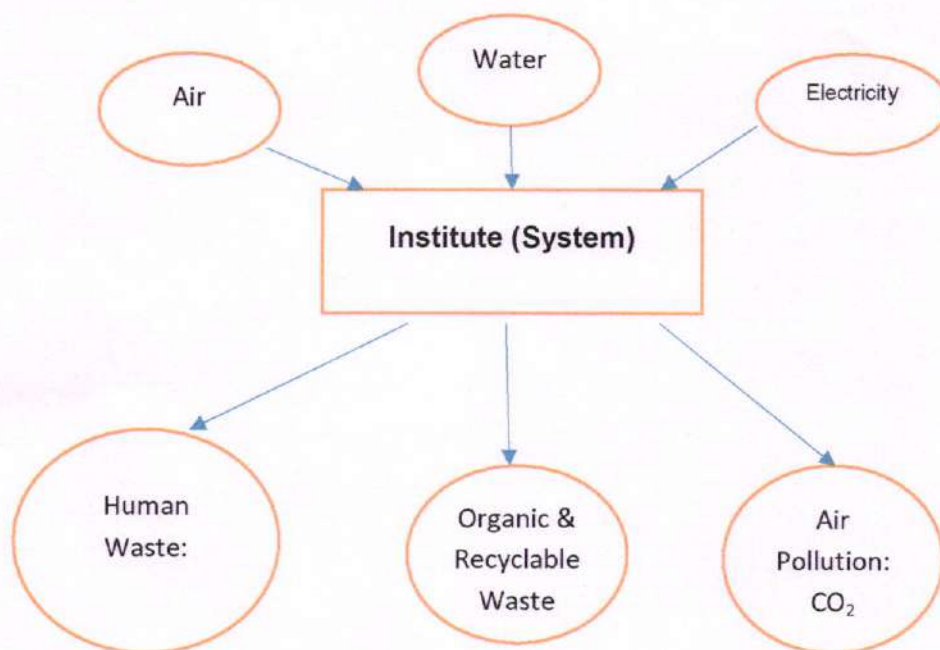
CHAPTER-II STUDY OF CONSUMPTION OF RESOURCES & CO₂ EMISSION

The Institute consumes following Natural/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:



A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Here 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 basis of Calculation for CO₂ emissions due to Electrical Energy are: 1 Unit (kWh) of Electrical Energy releases **0.8 Kg of CO₂** into atmosphere

Table No 5: Study of Energy Consumption & CO₂ Emission:2019-20:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Apr-19	10928	8.74
2	May-19	9864	7.89
3	Jun-19	8006	6.41
4	Jul-19	9544	7.63

5	Aug-19	10134	8.11
6	Sep-19	11263	9.01
7	Oct-19	9928	7.94
8	Nov-19	9184	7.35
9	Dec-19	9432	7.55
10	Jan-20	10441	8.35
11	Feb-20	10115	8.09
12	Mar-20	10115	8.09
13	Total	118953	95.16
14	Maximum	11263	9.01
15	Minimum	8006	6.41
16	Average	9912.77	7.93

Chart No 2: Representation of Month wise CO₂ emissions:

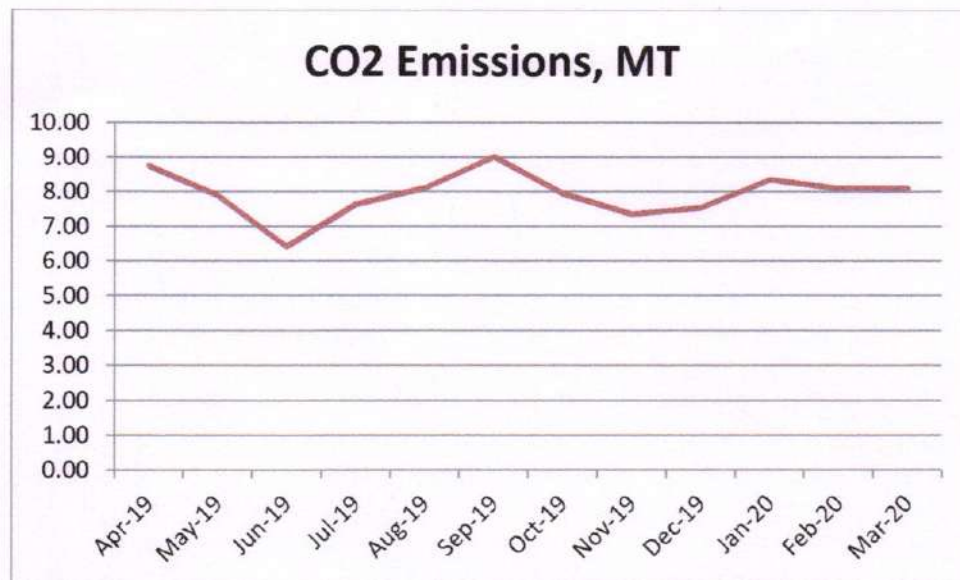


Table No 6: Key Parameters:

No	Value	Energy Consumed, kWh	CO ₂ emissions, MT
1	Total	118953	95.16
2	Maximum	11263	9.01
3	Minimum	8006	6.41
4	Average	9912.77	7.93



CHAPTER-III STUDY OF CO₂ EMISSION REDUCTION

The College has installed 30 kWp Roof Top Solar PV Plant. The system was installed in August-2019. Hence, for Calculation purpose we consider the Solar Energy Generation Days in 19-20 to be 200 Nos. In the following Table, we present the Annual Reduction in CO₂ Emissions due to usage of Renewable Energy.

Table No 6: Calculation of Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	30	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	200	Nos
4	Annual Solar Energy Generated	24000	kWh
5	1 kWh of Energy is equivalent to	0.8	Kg of CO ₂
6	Reduction in Annual CO ₂ Emissions= (4) * (5)/1000	19.2	MT

Photograph of Solar PV Plant:



CHAPTER IV

STUDY OF WASTE MANAGEMENT

4.1 Segregation of Waste at Source

The Institute has good housekeeping practices. The Waste is segregated at source and separate Waste Collection Bins are placed for collection of Dry & Wet Waste.

Photograph of Waste Collection Bin:



4.2 Liquid Waste Management:

The Institute has installed Sewage Treatment Plant of Capacity 450 KLPD, to treat the Liquid Waste Water. The treated water is used for gardening purpose.

Photograph of Sewage Treatment Plant:



4.3 E Waste Management:

The E Waste is disposed of through Authorized Agency.

CHAPTER-V

STUDY OF RAIN WATER MANAGEMENT

The College has implemented Rain Water Management project. The Rain Water from the terraces and Hill slope is channelized properly through channels and pipes and is stored in a specially constructed Water Storage Lake. This Water is used for domestic purpose.

Photograph of Rain Water Storage Lake:



CHAPTER-VI

STUDY OF ENVIRONMENT FRIENDLY PRACTICES

6.1 Internal Tree Plantation:

The Institute has beautiful maintained lawn and tree plantation in the campus.

Photograph of Tree Plantation in the campus:



6.2 Creation of Awareness about Resource Conservation:

The Institute has displayed Posters on Importance of Energy Conservation.

Photograph of Posters on Resource Conservation:

