ENVIRONMENTAL AUDIT REPORT

of

Shri Sharda Bhavan Education Society's

INSTITUTE OF TECHNOLOGY & MANAGEMENT

VIP ROAD, NANDED

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

Director

Shri Sharda Bhavan Education Society's

Institute of Technology and Management,

NANDED.

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School,
Parvati, Pune 411 009Tel: 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/ITM/22-23/03 **Date: 19/06/2023**

This is to certify that we have conducted Environmental Audit at Shri Sharda Bhavan Education Society's Institute of Technology & Management, Nanded, in the Year 2022-23.

The Institute has adopted following Energy Efficient & Green Practices:

- Usage of Energy Efficient LED Light Fitting
- Installation of 60 kWp Roof Top Solar PV Plant
- Segregation of Waste at Source
- Installation of Sanitary Waste Incinerator
- Installation of Bio Composting Pit
- Institute has installed septic tanks and it cleans periodically
- Installation of Rain Water Management Project
- 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.

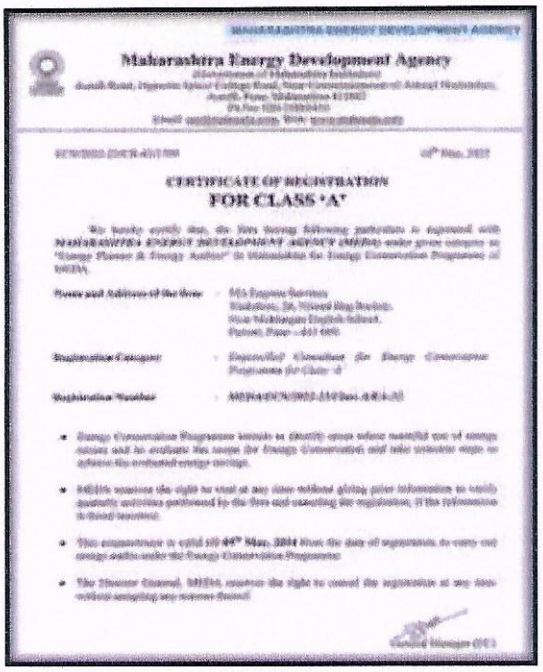
For Engress Services,

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

ENGRESS SERVICES PUNE

I.T.M.

REGISTRATION CERTIFICATES



Maharashtra Energy Development Agency

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

MEDA Registration Certificate

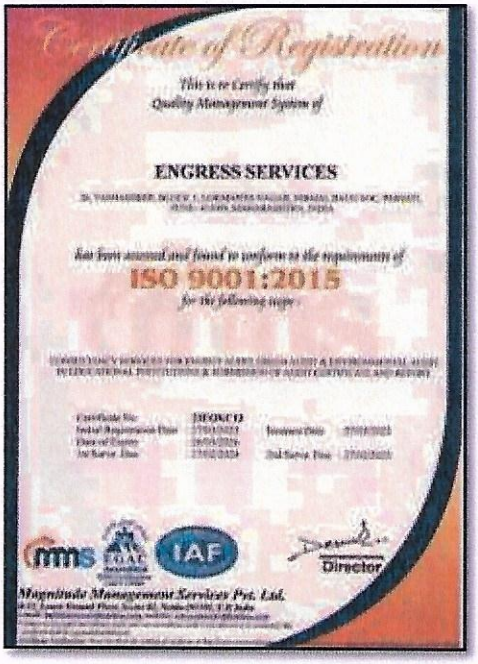
GEM Certificate

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"
on
06 June, 2022

GEM Certified Professional Certificate



Certificate of Registration

This is to Certify that
Quality Management System of

ENGRESS SERVICES

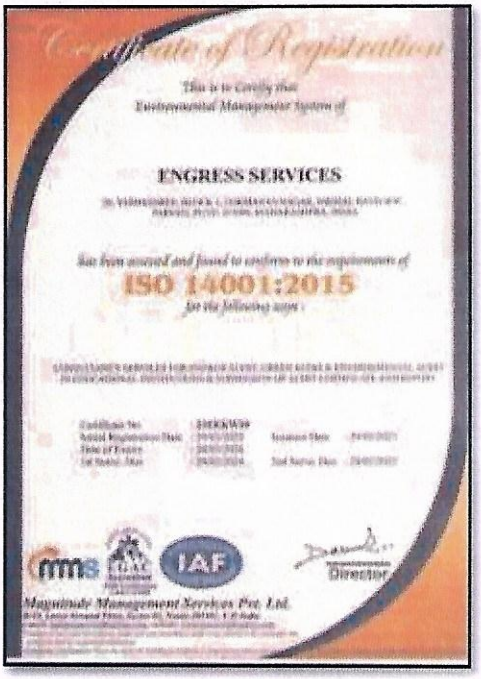
has been assessed and found to conform to the requirements of
ISO 9001:2015
for the following scope :

IAF

Director

Magnitude Management Services Pvt. Ltd.

ISO: 9001-2015 Certificate



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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Shri Sharda Bhavan Education Society's Institute of Technology & Management, Nanded 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. Institute of Technology & Management, Nanded 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	**96290**	kWh
2	Annual CO_2 Emissions	**86.66**	MT

4. Various initiatives taken for Environmental Conservation:

- Usage of Energy Efficient LED fittings
- Installation of 60 kWp Roof Top Solar PV Plant
- Installation of Bio Composting Pit

5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	50	31	42
2	Minimum	33	20	26

6. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	33.1	45	305	43
2	Minimum	31.9	42	137	38

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 Institute has installed Sanitary Waste Incinerator, for disposal of the Sanitary Waste.

7.5 E Waste Management:

The E Waste is disposed through Authorized Agency by institution.

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 bore well.

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:

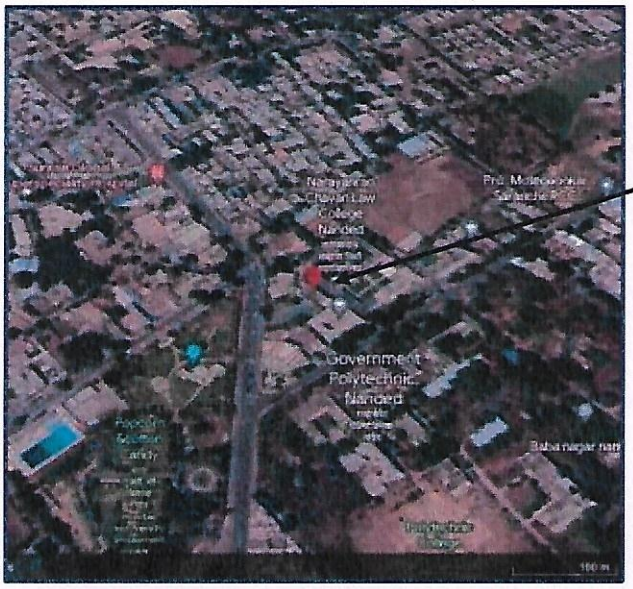
An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

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:

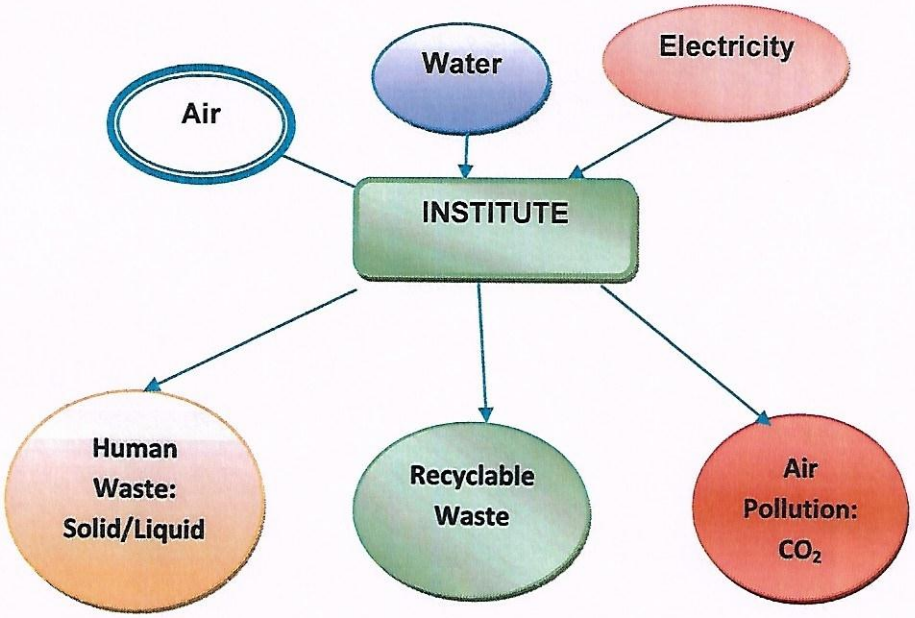


CHAPTER-II
STUDY OF RESOURCE CONSUMPTION & CO_2 EMISSION

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	CO2 Emissions, MT
1	Mar-22	9111	8.200
2	Apr-22	9616	8.655
3	May-22	10652	9.587
4	Jun-22	8941	8.047
5	Jul-22	7238	6.514
6	Aug-22	8261	7.434

7	Sep-22	8823	7.940
8	Oct-22	7777	6.998
9	Nov-22	4691	4.221
10	Dec-22	5718	5.145
11	Jan-23	5348	4.812
12	Feb-23	10114	9.102
13	Total	96290	86.66
14	Maximum	10652.7	9.587
15	Minimum	4690.86	4.221
16	Average	8024.19	7.221

Chart No 2: Month wise CO_2 Emissions:

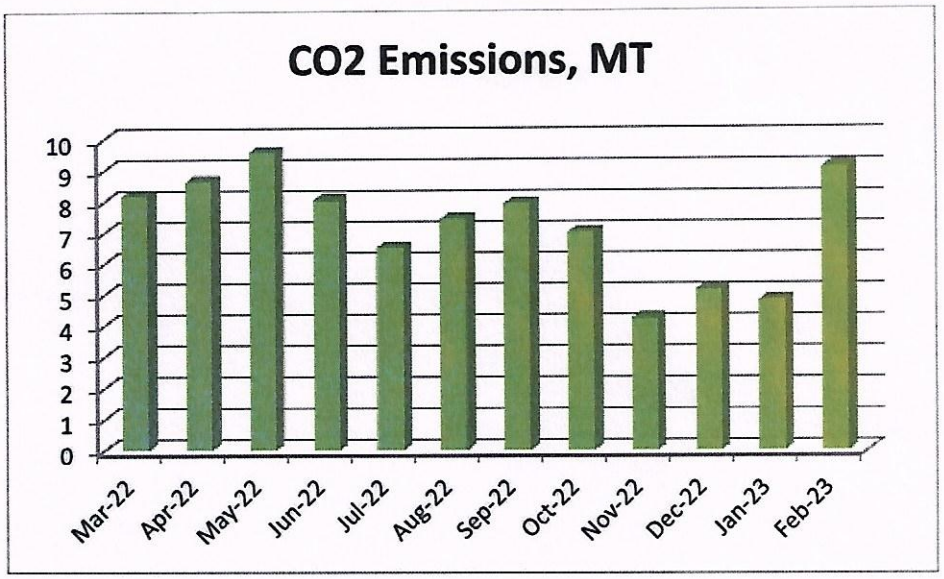


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh	CO2 Emissions, MT
1	Total	96290	86.66
2	Maximum	10652.7	9.587
3	Minimum	4690.86	4.221
4	Average	8024.19	7.221

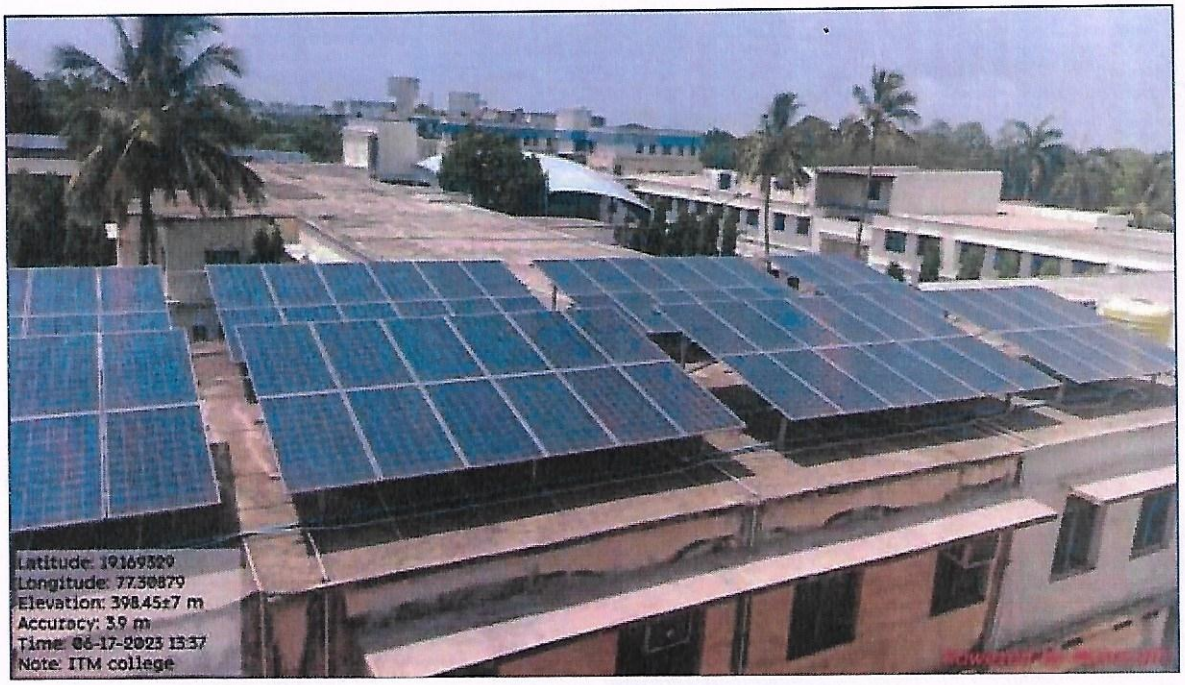
CHAPTER III
STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity **60 kWp**.

In the following Table, we compute the Annual Reduction in CO_2 Emissions due to installation of Roof TOP Solar PV Plant.

Table No6: Computation of Annual Reduction in CO_2 Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	60	kWp
2	Energy Generated in per kWp	4	kWh/kWp
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 22-23	72000	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	**Qty of CO_2 Saved by Solar PV Plant =(4)*(5) /1000**	**64.8**	**MT of CO_2**



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	Director Office	46	30	32
2	Administrative office	46	27	42
3	Seminar Hall	50	30	42
4	B.Sc.(HS) Restaurant Hall	46	28	42
5	B.Sc.(HS) Food Production Lab	35	21	26
6	Lecture Hall:-01	45	23	37
7	Lecture Hall:-03	50	31	42
First Floor				
8	B.Sc.(HS) House Keeping Lab	33	23	30
9	Lecture Hall:-04	46	28	39
10	Lecture Hall:-07	48	27	34
11	Computer Lab:-01	33	20	28

12	IQAC office	41	24	31
Second Floor				
13	Library	40	25	31
14	Lecture Hall No.08	41	27	33
15	Lecture Hall No.12	40	28	32
Third Floor				
16	Training & Placement Cell	41	28	32
17	Lecture Hall No.14	41	27	34
18	Lecture Hall No.19	42	29	31
19	Maximum	50	31	42
20	Minimum	33	20	26

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	Director Office	32	42	137	41
2	Administrative office	32.2	44	240	41.2
3	Seminar Hall	32.3	44	210	41.3
4	B.Sc.(HS) Restaurant Hall	32	44	230	40
5	B.Sc.(HS) Food Production Lab	33	45	245	41
6	Lecture Hall:-01	32.2	44	244	43
7	Lecture Hall:-03	32.3	45	305	39
First Floor					
8	B.Sc.(HS) House Keeping Lab	32	44	220	41
9	Lecture Hall:-04	32	44.8	225	40
10	Lecture Hall:-07	31.9	44.8	244	41
11	Computer Lab:-01	32	44	240	41
12	IQAC office	32	44	230	40
Second Floor					
13	Library	33	43.9	245	41
14	Lecture Hall No.08	32	43.5	250	40
15	Lecture Hall No.12	32	44	250	40
Third Floor					
16	Training & Placement Cell	33	44	260	39
17	Lecture Hall No.14	33.1	44.2	265	38
18	Lecture Hall No.19	32	44.2	261	38
19	Maximum	33.1	45	305	43
20	Minimum	31.9	42	137	38

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.

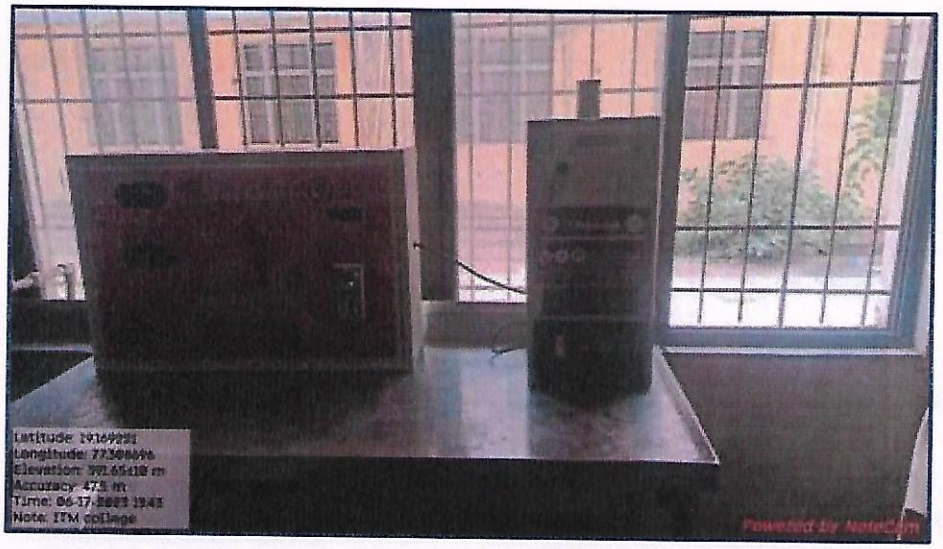
Photograph of Bio Composting Pit:

6.3 Liquid Waste Management:

The Institute has installed Septic Tanks it cleans periodically.

6.4 Sanitary Waste Management:

The Institute has installed Sanitary Waste Incinerator for disposal of the Sanitary Waste.



6.5 E Waste Management:

The E Waste is disposed through Authorized Agency by institution.

CHAPTER-VII
STUDY OF RAIN WATER MANAGEMENT

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

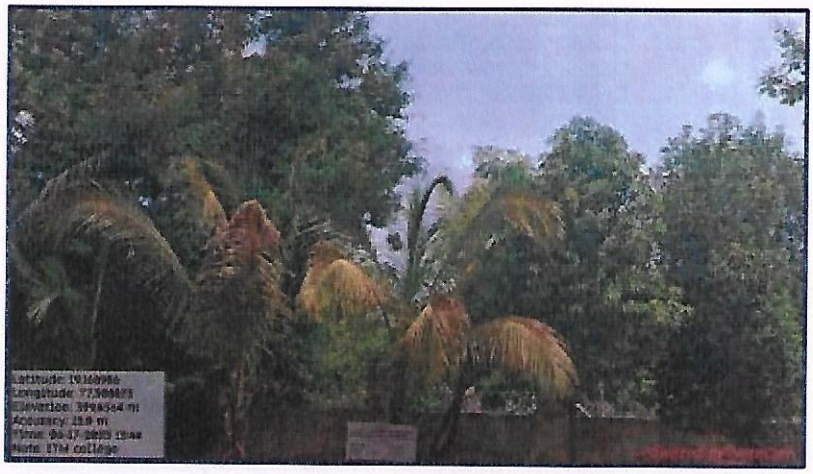
Photograph of Rain Water Management Section:

CHAPTER-VIII
STUDY OF ECO FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The Institute has well maintained tree plantation in the campus.

Photograph of Tree plantation:



8.2 Creation of Awareness about Energy Conservation:

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

Photograph of Poster on Energy 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 $33^{0}C$
2	Humidity	Less Than 70%

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Director
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NANDED.

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

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

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

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

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

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

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

General Manager (EC)

ENGRESS SERVICES

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

Ref: ES/ITM/21-22/03

Date: 12/6/2022

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Shri Sharda Bhavan Education Society's Institute of Technology & Management, Nanded in the Academic Year 2021-22.

The Institute 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 Institute 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 Engress Services,

ENGRESS SERVICES PUNE

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I.T.M. NANDED

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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	92310	83.079
2	Maximum	10616	9.555
3	Minimum	5100	4.590
4	Average	7692.55	6.923

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	52	35	44
2	Minimum	41	29	34

7. **Indoor Comfort Conditions:**

No	Parameter/Value	Temperature, ^0C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	34.1	47	345	43
2	Minimum	32	43	146	37

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

8.3 Liquid Waste Management:

The College has installed Septic and is cleaned periodically.

8.4 E-Waste Management:

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

9. Rain Water Management:

The College has Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is used to increase the underground water table.

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
2. Average Energy generated by **1 kWp** Solar PV Plant : **4 kWh/Day**
3. Annual Solar Energy Generation Days: **300 Nos**

12. References:

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- For Energy Saved by Solar Thermal Water Heating System: www.mahaurja.com
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- For AQI &Water Quality Standards: www.cpcb.com

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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 Harvesting
7. Study of Environment Friendly Initiatives

1.3 General Details of College: Table No 4:

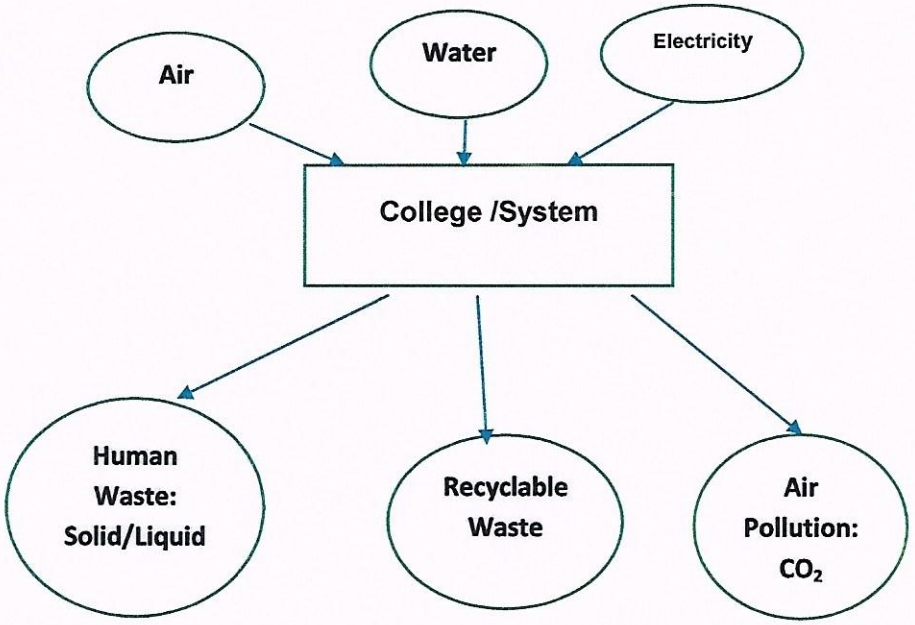
No	Head	Particulars
1	Name of Institution	Shri Sharda Bhavan Education Society's, Institute of Technology & Management
2	Address	Near Kusum Auditorium, VIP Road,Nanded 431 602
3	Affiliation	S.R.T.Marathawada University, Nanded

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: 2021-22:

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Mar-21	8741	7.867
2	Apr-21	9546	8.591
3	May-21	10617	9.555
4	Jun-21	8865	7.978
5	Jul-21	7159	6.443
6	Aug-21	8210	7.389
7	Sep-21	8676	7.808
8	Oct-21	7766	6.989
9	Nov-21	5101	4.590
10	Dec-21	6499	5.848
11	Jan-22	5348	4.812
12	Feb-22	5782	5.204
13	Total	92310	83.079
14	Maximum	10617	9.555
15	Minimum	5101	4.590
16	Average	7692.55	6.923

Chart No 2: Month wise CO_2Emissions:

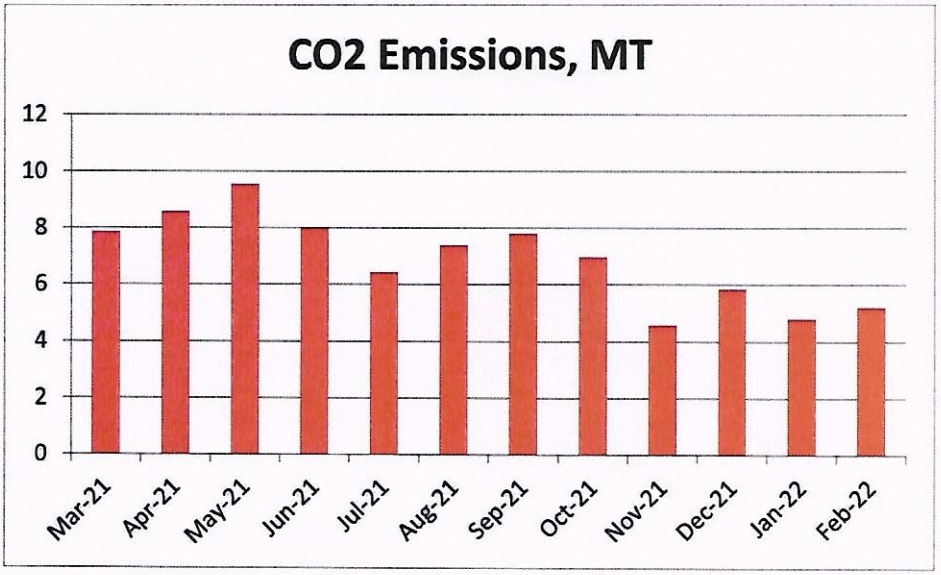


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	92310	83.079
2	Maximum	10617	9.555
3	Minimum	5101	4.590
4	Average	7692.55	6.923

CHAPTER III
STUDY OF CO_2 EMISSION REDUCTION

As on today College has not install solar roof-top 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.

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	Location	AQI	PM-2.5	PM-10
Ground Floor				
1	Director Office	48	32	43
2	Administrative office	48	29	40
3	Seminar Hall	52	32	41
4	B.Sc.(HS) Restaurant Hall	48	30	41
5	B.Sc.(HS) Food Production Lab	42	33	44
6	Lecture Hall:-01	47	33	43
7	Lecture Hall:-03	51	33	42
First Floor				

8	B.Sc.(HS) House Keeping Lab	41	29	38
9	Lecture Hall:-04	48	34	41
10	Lecture Hall:-07	47	32	42
11	Computer Lab:-01	41	29	37
12	IQAC office	44	32	42
Second Floor				
13	Library	43	32	43
14	Lecture Hall No.08	42	31	42
15	Lecture Hall No.12	44	31	43
Third Floor				
16	Training & Placement Cell	43	30	34
17	Lecture Hall No.14	43	31	34
18	Lecture Hall No.19	44	35	41
19	Maximum	52	35	44
20	Minimum	41	29	34

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 9: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, oC	Humidity, %	Lux Level	Noise Level, dB
Ground Floor					
1	Director Office	32.2	47	146	39
2	Administrative office	32.1	46	241	40.1
3	Seminar Hall	32	46	235	42.1
4	B.Sc.(HS) Restaurant Hall	33	46	247	40
5	B.Sc.(HS) Food Production Lab	33	46	257	40
6	Lecture Hall:-01	33.2	47	259	43
7	Lecture Hall:-03	33.2	46	271	37
First Floor					
8	B.Sc.(HS) House Keeping Lab	34	46	265	40.1
9	Lecture Hall:-04	33.9	45	249	40
10	Lecture Hall:-07	33.2	46	296	39.9
11	Computer Lab:-01	33	46	301	39.8
12	IQAC office	33	45	301	41
Second Floor					
13	Library	33.2	44	310	41
14	Lecture Hall No.08	32.9	43.5	305	41
15	Lecture Hall No.12	32.5	44	302	41.1
Third Floor					
16	Training & Placement Cell	34.1	43	345	40.1
17	Lecture Hall No.14	34.1	43.5	341	39
18	Lecture Hall No.19	34	44.2	314	37
19	Maximum	34.1	47	345	43
20	Minimum	32	43	146	37

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 Bio Composting Pit:

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

Photograph of Bio Composting Pit:

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, it is recommended to install Sanitary Waste Incinerator for disposal sanitary waste.

CHAPTER-VI

STUDY OF RAIN WATER MANAGEMENT

The Institute has implemented the Rain Water Management Project. The Institute 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 Section:

CHAPTER-VIII
STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

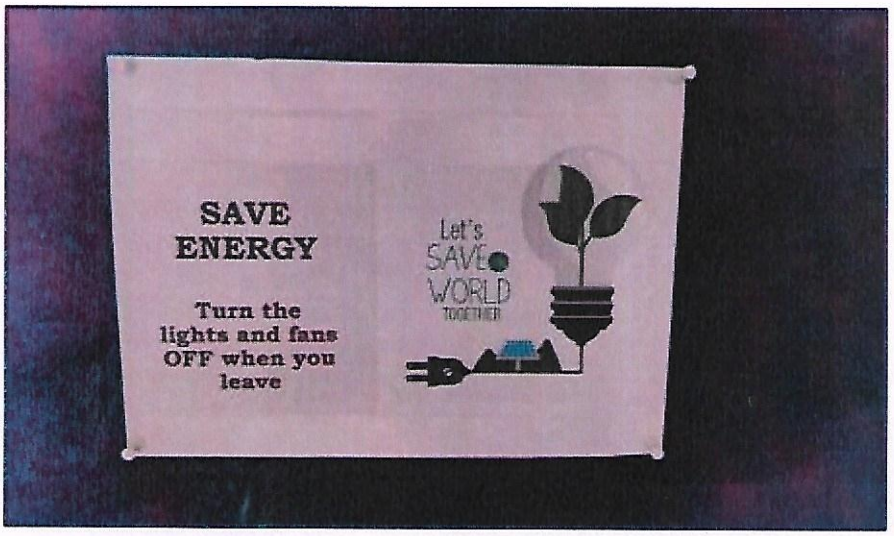
The College has well maintained Tree Plantation in the campus.

Photograph of Tree plantation:

8.2 Creation of Awareness about Energy Conservation:

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

Photograph of Poster on Energy Conservation awareness:



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 33^0C
2	Humidity	Less Than 70%

ENVIRONMENTAL AUDIT REPORT

of

Shri Sharda Bhavan Education Society's,

INSTITUTE OF TECHNOLOGY & MANAGEMENT

VIP Road, Nanded

Year: 2020-21

Prepared by

ENRICH CONSULTANTS

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

Director
Shri Sharda Bhavan Education Society's
Institute of Technology and Management,
NANDED.

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 Muktangan 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 **31stMarch 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.

19/9/18

(Smita Kudarikar)
General Manager (EC)

INSTITUTE OF TECHNOLOGY AND MANAGEMENT I.T.M.

ENRICH CONSULTANTS Pune

Enrich Consultants

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

Ref: EC/ITM/20-21/03

Date: 30/5/2021

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Shri Sharda Bhavan Education Society's Institute of Technology & Management, Nanded in the Year 2020-21.

The Institute has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Segregation of Waste at Source
- Installation of Rain Water Management Project
- Tree Plantation in the campus
- 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 Eco Friendly.

For Enrich Consultants,

A Y Mehendale,
Certified Energy Auditor,
EA-8192

ENRICH CONSULTANTS * PUNE *

S.B.E.S.'s INSTITUTE OF TECHNOLOGY AND MANAGEMENT I.T.M. NANDED

INDEX

ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of Shri Sharda Bhavan Education Society's, Institute of Technology & Management, Nanded for awarding us the assignment of Environmental Audit of their Nanded Campus, for the Academic Year: 2020-21.

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

EXECUTIVE SUMMARY

1. Institute of Technology & Management, Nanded 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 CO_2 on account of Electricity Consumption.
- **Solid Waste:** Bio degradable Waste, Garden Waste, Recyclable Waste and Human Waste.
- **Liquid Waste:** Human liquid Waste.

3. Present Energy Consumption & CO_2 Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO_2 Emissions, MT
1	Total	95987	86.3883
2	Maximum	11360	10.224
3	Minimum	4767	4.2903
4	Average	7998.92	7.19903

4. Usage of Renewable Energy:

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

5. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, ^0C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	34.1	47	345	42.1
2	Minimum	32	43	146	37

6. Waste Management:

6.1 Segregation of Waste at Source:

The solid waste is segregated at source. There are separate bins for collection at various points and is disposed of for further for recycling.

6.2 Organic Waste Management:

It is recommended to go for Bio composting for conversion of organic waste.

6.3 Sanitary Waste Management:

The College has not install Sanitary Waste Incinerator, It is recommended to install Sanitary Waste Incinerator for disposal of the Sanitary Waste.

7. Rain Water Management:

The College has Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is used to increase the underground water table.

8. Environmental Friendly Initiatives:

- Internal Tree Plantation
- Creation of awareness on Energy Conservation by Display of Posters

9. Assumptions:

- **1 kWh** of Electrical Energy releases **0.9 Kg** of **CO_2** into atmosphere
- **1 Kg** of LPG releases **2.68 Kg of CO_2** into atmosphere

10. References:

- For CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
LED	:	Light Emitting Diode
CPCB	:	Central Pollution Control Board

CHAPTER-I
INTRODUCTION

1.1Important Definitions:

1.1.1Environment: 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
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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. To study Resource Consumption & CO_2 Emissions
2. To Study Usage of Renewable Energy
3. To Study Waste Management
4. To Study Rain Water Management
5. To Study Environment Friendly Initiatives

1.3 General Details of College: Table No: 4

No	Head	Particulars
1	Name of the Institution	Shri Sharda Bhavan Education Society's, Institute of Technology & Management
2	Address	Near Kusum Auditorium, VIP Road, Nanded 431 602
3	Year of Establishment	1997

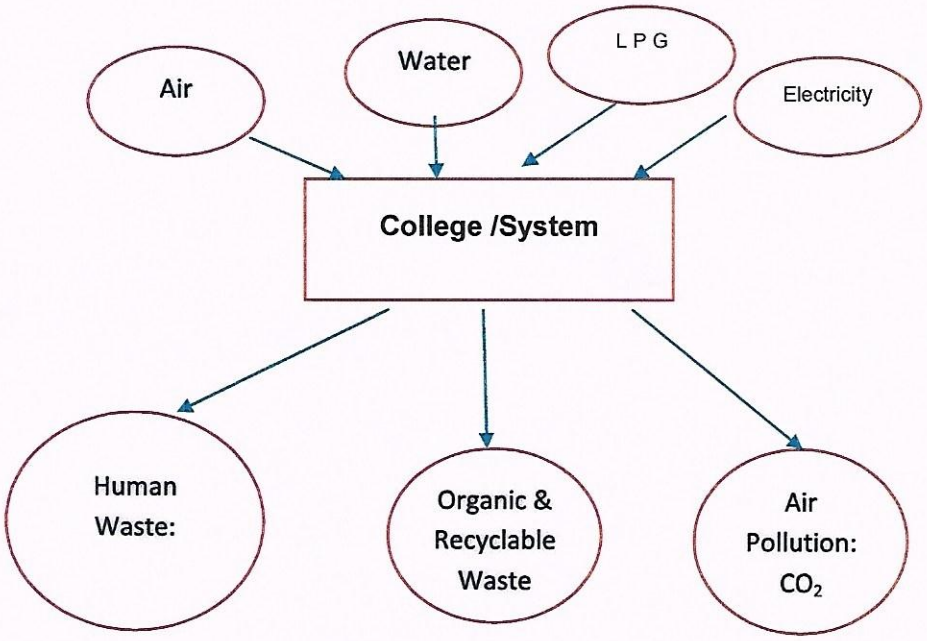
CHAPTER-II
STUDY OF RESOURCE CONSUMPTION & CO_2 EMISSION

The College consumes following Natural/derived Resources:

1. Air
2. Water
3. Electrical Energy
4. Liquefied Petroleum Gas

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

Chart No 1: Representation of College as System:



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 LPG & 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 Energy & CO_2 Emissions: 19-20:

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Mar-20	9430	8.487
2	Apr-20	9140	8.226
3	May-20	11360	10.224
4	Jun-20	8670	7.803
5	Jul-20	7310	6.579
6	Aug-20	8125	7.3125
7	Sep-20	8925	8.0325

8	Oct-20	7835	7.0515
9	Nov-20	4767	4.2903
10	Dec-20	5843	5.2587
11	Jan-21	5235	4.7115
12	Feb-21	9347	8.4123
13	Total	95987	86.3883
14	Maximum	11360	10.224
15	Minimum	4767	4.2903
16	Average	7998.92	7.19903

Chart No 2: Study of CO_2 Emission:

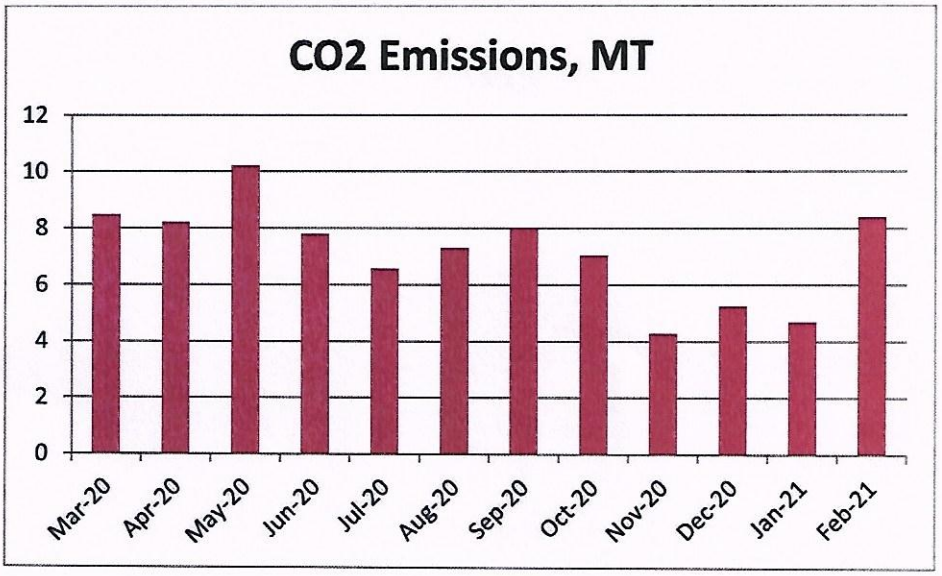


Table No 6: Various Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	95987	86.3883
2	Maximum	11360	10.224
3	Minimum	4767	4.2903
4	Average	7998.92	7.19903

CHAPTER III
STUDY OF CO_2 EMISSION REDUCTION

As on today College has not installed solar roof-top PV plant, solar thermal water heating plant, it is recommend to install solar rooftop plant on the College building.

CHAPTER IV
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 7: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
Ground Floor					
1	Director Office	32.2	47	146	39
2	Administrative office	32.1	46	241	40.1
3	Seminar Hall	32	46	235	42.1
4	B.Sc.(HS) Restaurant Hall	33	46	247	40
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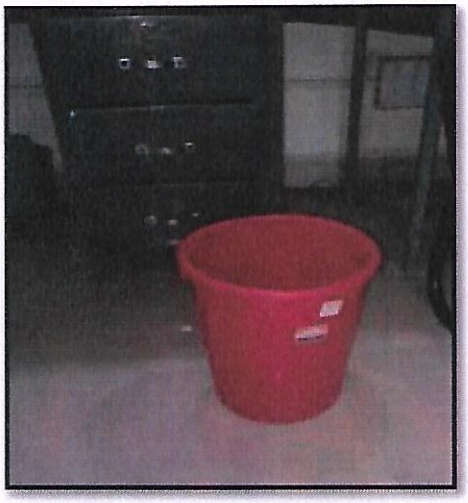
12	Training & Placement Cell	34.1	43	345	40.1
13	Lecture Hall No.19	34	44.2	314	37
14	Maximum	34.1	47	345	42.1
15	Minimum	32	43	146	37

CHAPTER V
STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The solid waste is segregated at source. Bins are kept at various points.

Photograph of Waste Collection Bin:



5.2 Organic Waste Management:

It is recommended to go for Bio composting to convert the Organic waste into Bio compost.

5.3 Sanitary Waste Management:

The College has not install Sanitary Waste Incinerator, It is recommended to install Sanitary Waste Incinerator for disposal of the Sanitary Waste.

CHAPTER-VI
STUDY OF RAIN WATER MANAGEMENT

The College has Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is used to increase the underground water table.

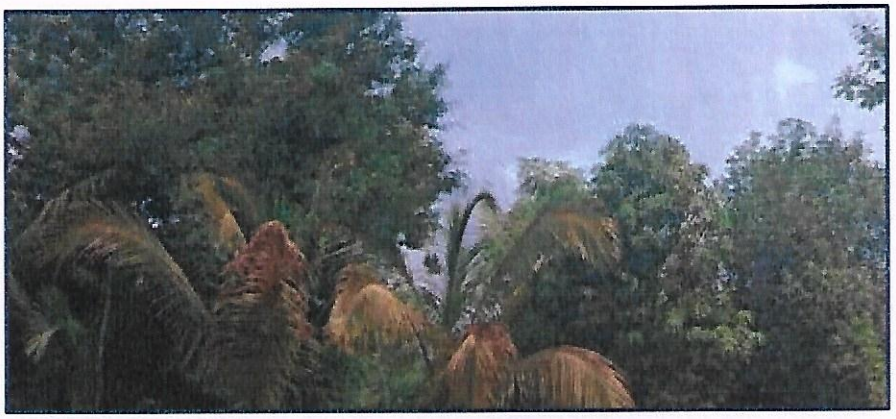
Photograph of Underground Rain Water Carrying Pipe:

CHAPTER-VII
STUDY OF ENVIRONMENTAL FRIENDLY PRACTICES

7.1 Internal Tree Plantation:

The College has well maintained Internal Tree Plantation.

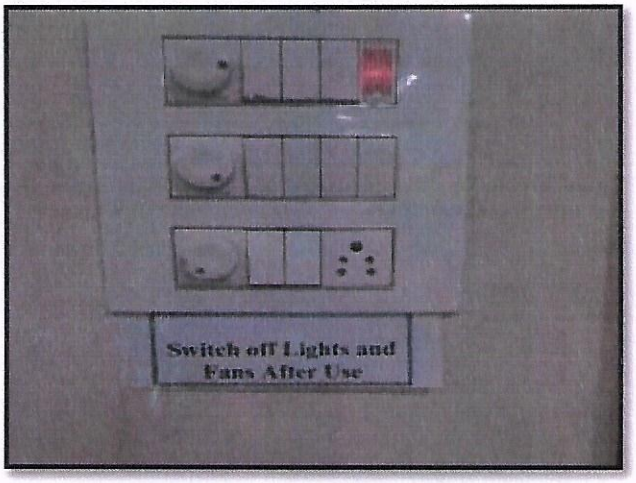
Photograph of Trees in the campus:



7.2 Creation of Awareness on Energy Conservation:

The College has displayed board on Energy Conservation, to create awareness among the stake holders.

Photograph of Display Board on Energy 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 33^0C
2	Humidity	Less Than 70%