

Report
On
Environmental Audit
At



Shri Shivaji Education Society, Amravati's
Jijamata Mahavidyalaya Buldana



(Year 2022-23)

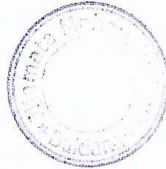
Prepared by

Nutan Urja Solutions


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Phone: 83568 18381. Email: nutanurja.solutions@gmail.com

Date: 21/08/2023

CERTIFICATE

This is to certify that we have conducted Environmental Audit at at Shri Shivaji Education Society, Amravati's Jijamata Mahavidyalaya Buldana in the year 2022-23.

The College has already adopted following projects for making the campus **Energy Efficient**.

- Installation of Bio Composting Pit
- Installation of Rain Water Harvesting System

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

Nutan Urja Solutions,



K G Bhatwadekar,
Certified Energy Auditor,
EA - 22428



Contents

| | |
|--|----|
| Acknowledgement | 3 |
| Executive Summary | 4 |
| Abbreviations | 5 |
| 1. Introduction | 6 |
| Important Definitions: | 6 |
| Objectives..... | 7 |
| Audit Methodology | 7 |
| General Details of College..... | 8 |
| 2. Study of Consumption of Various Resources | 9 |
| Variation of Monthly Electrical Energy Consumption | 10 |
| Key Inference drawn | 11 |
| 3. Study of Environmental Pollution..... | 12 |
| Air Pollution..... | 12 |
| Study of Solid Waste Generation..... | 13 |
| Study of Liquid Waste Generation..... | 14 |
| Study of e-Waste Management: | 15 |
| 4. Study of Rain Water Harvesting | 19 |
| 5. Recommendations | 20 |



Acknowledgement

We at Nutan Urja Solutions, Pune wish to express our sincere gratitude to the management of at Shri Shivaji Education Society, Amravati's Jijamata Mahavidyalaya, Buldhana for assigning the work of Environmental Audit of college campus.

We appreciate the co-operation and support extended to our team members during the entire tenure of field study.

We are also thankful to various Head of Departments & other Staff members for helping us during the field measurements.

We are also thankful to all other staff members who helped us during the Measurements at the field and for giving us the necessary inputs to carry out this vital exercise.



Executive Summary

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the dependency on Natural resources & reduce the pollution. At Shri Shivaji Education Society, Amravati's Jijamata Mahavidyalaya Buldhana consumes various resources for day to day operations, namely: Air, Water, Electrical Energy & LPG.

1. Various Pollution due to College Activities:

- Air pollution: Mainly CO₂ on account of Electricity & LPG Consumption
- Solid Waste: Biodegradable Kitchen Waste, Garden Waste
- Liquid Waste: Human liquid waste

2. Present Level of CO₂ Emissions:

| Sr. no. | Parameter | Energy consumed, (Units) | CO ₂ Emission (MT) |
|---------|-----------|--------------------------|-------------------------------|
| 1 | Maximum | 2,250 | 1.8 |
| 2 | Minimum | 1 | 0.0 |
| 3 | Average | 814 | 0.7 |
| 4 | Total | 9,767 | 7.8 |

3. The various projects already implemented for Environmental Conservation:

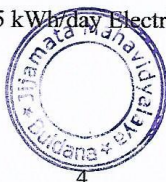
- Usage of Energy Efficient BEESTAR Rated ACs.
- Usage of Natural Daylight in corridors.
- Implementation of Bio Composting pit for disposal of Biodegradable waste.
- Implementation of Rain Water Harvesting.

4. Recommendations:

1. Installation of Bio Gas Generator Plant instead of Bio-composting Plant.
2. Installation of Sewage treatment Plant to make campus a Zero Discharge campus.

5. Notes & Assumptions:

1. 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere.
2. 1 kWp Solar PV plant generates 5 kWh/day Electrical Energy for 300 days in a year.



Abbreviations

| | | |
|--------------|----------|---|
| AC | : | Air conditioner |
| PES | : | Progressive Education Society |
| CFL | : | Compact Fluorescent Lamp |
| FTL | : | Fluorescent Tube Light |
| LED | : | Light Emitting Diode |
| kWh | : | kilo-Watt Hour |
| Qty | : | Quantity |
| W | : | Watt |
| kW | : | Kilo Watt |
| PF | : | Power Factor |
| M D | : | Maximum Demand |
| PC | : | Personal Computer |
| MSEDL | : | Maharashtra State Electricity Distribution Company Ltd |



1. Introduction

Important Definitions:

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

Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are complied 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"

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

Relevant Environmental Laws in India: Table No-1:

| | |
|------|--|
| 1927 | The Indian Forest Act |
| 1972 | The Wild life 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 |

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) |

Objectives

1. To study present usage of Natural resources the College is consuming
2. To Study the present pollution sources
3. To study various measures to make the campus Self sustainable in respect of Natural resources
4. To suggest the various measures to reduce the pollution: Air, Water, Noise

Audit Methodology:

1. Study of College as System
2. Study of Electrical Energy Consumption
3. Study of CO₂ emissions
4. Suggestions on usage of Renewable Energy



General Details of College

| No. | Head | Particulars |
|-----|---------------------|---|
| 1 | Name of Institution | Shri Shivaji Education Society, Amravati's Jijamata Mahavidyalaya, Buldhana |
| 2 | Address | Near Devi Mandir, Chikhli Road, Buldhana- 443001 |
| 3 | Affiliation | Sant Gadge Baba Amravati University, Amravati. |



2. Study of Consumption of Various Resources

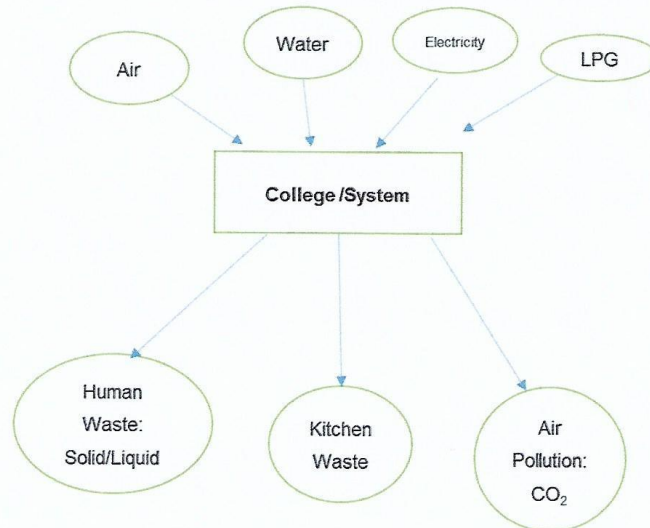
The Institute consumes following basic/derived Resources:

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

Also, college emits following pollutants to environment

1. Human Waste: Solid/ Liquid
2. Kitchen waste
3. Air pollution

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



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy & LPG as under.

The calculation of electrical energy consumption by college can be given as,



Table2.1: Electrical Energy Consumption

| No. | Month | Energy (kWh) |
|-----|----------------|--------------|
| 1 | Jun-23 | 772 |
| 2 | May-23 | 105 |
| 3 | Apr-23 | 280 |
| 4 | Mar-23 | 13 |
| 5 | Feb-23 | 224 |
| 6 | Jan-23 | 494 |
| 7 | Dec-22 | 381 |
| 8 | Nov-22 | 1 |
| 9 | Oct-22 | 2,155 |
| 10 | Sep-22 | 1,564 |
| 11 | Aug-22 | 1,528 |
| 12 | Jul-22 | 2,250 |
| | Total | 9,767 |
| | Maximum | 2,250 |
| | Minimum | 1 |
| | Average | 814 |

Variation of Monthly Electrical Energy Consumption

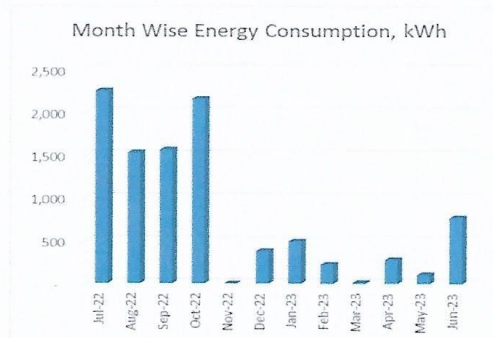
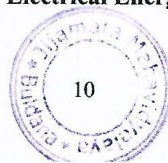


Figure 2.1 : Monthly Electrical Energy Consumption

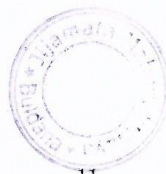


Key Inference drawn

From the above analysis, we present following important parameters:

Table2.2: Variation in Important Parameters

| No | Parameter / Value | Energy Consumed, kWh |
|----|-------------------|----------------------|
| 1 | Total | 9,767 |
| 2 | Maximum | 2,250 |
| 3 | Minimum | 1 |
| 4 | Average | 814 |



3. Study of Environmental Pollution

In this Chapter, we present the various types of Pollution as under:

Air Pollution

The College is using two forms of Energies, namely: Thermal in the form of LPG and Electrical Energy used for day to day operations of the College. The major pollutant on account of above Energy forms is the Carbon Di Oxide.

- 1 unit (kWh) of Electrical Energy emits 0.8 Kg of CO₂ in the atmosphere
- 1 Kg of LPG emits 3 Kg of CO₂ in the atmosphere in the following Table, we present the CO₂ emissions.

Table 3.1: Month wise Consumption of Electrical Energy & CO₂ Emissions:

| No | Month | Energy Consumed, kWh | CO ₂ Emissions, MT |
|----|--------------|----------------------|-------------------------------|
| 1 | Jun-23 | 772 | 0.6 |
| 2 | May-23 | 105 | 0.1 |
| 3 | Apr-23 | 280 | 0.2 |
| 4 | Mar-23 | 13 | 0.0 |
| 5 | Feb-23 | 224 | 0.2 |
| 6 | Jan-23 | 494 | 0.4 |
| 7 | Dec-22 | 381 | 0.3 |
| 8 | Nov-22 | 1 | 0.0 |
| 9 | Oct-22 | 2,155 | 1.7 |
| 10 | Sep-22 | 1,564 | 1.3 |
| 11 | Aug-22 | 1,528 | 1.2 |
| 12 | Jul-22 | 2,250 | 1.8 |
| | Total | 9,767 | 7.8 |
| | Maximum | 2,250 | 18,245 |
| | Minimum | 1 | 453 |
| | Average | 814 | 6,928 |



In the following Chart we present the CO₂ emissions due to usage of Electrical Energy.

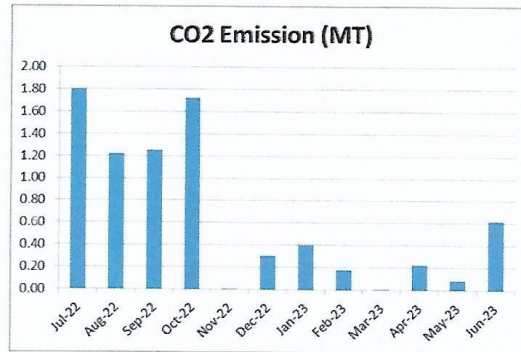


Figure 3.1: CO₂ emission due to usage of electrical energy.

Study of Solid Waste Generation

The College has already installed a Bio-composting Plant, wherein, the bio- degradable waste is composted & is used as fertilizer for the garden.

Photograph of Bio Composting Processing Tanks





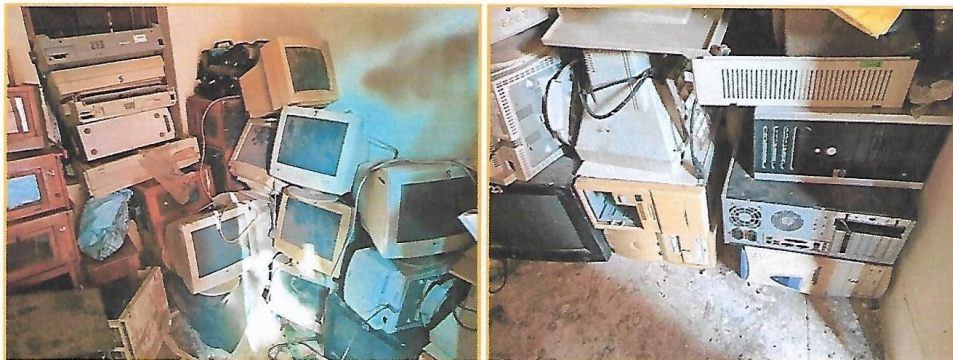
Study of Liquid Waste Generation

At present the Liquid Waste generated due to day to day operations is drained off to the municipal Corporation through a pipe.



Study of e-Waste Management:

The internal communication is through emails and there is hardly any generation of e- Waste in the premises. The E-waste materials are collected from departments by the committee and with the approval of CDC and Principal are sold as scrap to recycling agencies.



Form-6
[SEE E WASTE (MANAGEMENT) RULES, 2016)- RULE 19]
E WASTE MANIFEST

| | | |
|----|---|---|
| 1 | Sender's name and mailing address (Including Phone No.) | Jijamata Arts, Commerce & Science Mahavidyalaya, Buldhana |
| 2 | Sender's Authorization No., if applicable. | |
| 3 | Manifest Document No. | JM/ E WASTE / 23-24/01 |
| 4 | Transporter's Name & Address (Including Phone No.) | |
| 5 | Type of Vehicle | (Truck / Tanker / Special Vehicle) |
| 6 | Transporter's Registration No. | |
| 7 | Vehicle Registration No. | |
| 8 | Receiver's Name & Mailing Address (Including Phone No) | Suritex Private Ltd Works , B - 111 , MIDC , Butibori, Office: 5-6Zal Complex, Residency Road Sadar, Nagpur - 440001, Mobile No. :- 09049981347 |
| 9 | Receiver's Authorization No. if applicable | MPCB/RO(HQ)/HSMD/Autho/2021/EW-28 |
| 10 | Description of E-Waste (Item, Weight/ Numbers) | E Waste |
| 11 | Name and stamp of Sender* (Manufacturer or Producer or Bulk Consumer or Collection Centre or Refurbisher or Dismantler): Jijamata Arts, Commerce & Science Mahavidyalaya, Buldhana | <p align="center">Principal Jijamata Mahavidyalaya, Buldhana (Maharashtra)</p> <p>Month Day Year 1 0 / 2 2 / 0 2 3</p> |
| 12 | Transporter Acknowledgement of Receipt of E-Waste | <p align="center">Principal Jijamata Mahavidyalaya, Buldhana (Maharashtra)</p> <p>Month Day Year 1 0 / 2 2 / 0 2 3</p> |
| 13 | Receiver* (Collection Centre or Refurbisher or Dismantler or Recycler) certification of receipt of E-waste) Suritex Private Ltd Works , B - 111 , MIDC , Butibori, Office: 5-6Zal Complex, Residency Road Sadar, Nagpur - 440001, Mobile No. :- 09049981347 | <p align="center">Signature </p> <p align="center">SURITEX PRIVATE LIMITED NAGPUR</p> <p>Month Day Year 1 0 / 2 2 / 0 2 3</p> |

* As applicable

- COPY 1 (YELLOW)** TO BE RETAINED BY THE SENDER AFTER TAKING SIGNATURE ON IT FROM THE TRANSPORTER AND OTHER THREE COPIES WILL BE CARRIED BY TRANSPORTER.
- COPY 2 (PINK)** TO BE RETAINED BY THE RECEIVER AFTER SIGNATURE OF THE TRANSPORTER.
- COPY 3 (ORANGE)** TO BE RETAINED BY THE TRANSPORTER AFTER TAKING SIGNATURE OF THE RECEIVER.
- COPY 4 (GREEN)** TO BE RETURNED BY THE RECEIVER WITH HIS/HER SIGNATURE TO THE SENDER



Form-6
[SEE E WASTE (MANAGEMENT) RULES, 2016]- RULE 19]
E WASTE MANIFEST

| | | |
|-----------------|--|--|
| 1 | Sender's name and mailing address (Including Phone No.) | Jijamata Arts, Commerce & Science Mahavidyalaya, Buldhana |
| 2 | Sender's Authorization No., if applicable. | |
| 3 | Manifest Document No. | JM/ E WASTE / 23-24/01 |
| 4 | Transporter's Name & Address (Including Phone No.) | |
| 5 | Type of Vehicle | (Truck / Tanker / Special Vehicle) |
| 6 | Transporter's Registration No. | |
| 7 | Vehicle Registration No. | |
| 8 | Receiver's Name & Mailing Address (Including Phone No) | Suritex Private Ltd Works , B - 111 , MIDC , Butibori, Office: 5-6Zal Complex, Residency Road Sadar, Nagpur - 440001, Mobile No. :- 09049981347 |
| 9 | Receiver's Authorization No. if applicable | MPCB/RO(HQ)/HSMD/Autho/2021/EW-28 |
| 10 | Description of E-Waste (Item, Weight/ Numbers) | E Waste |
| 11 | Name and stamp of Sender* (Manufacturer or Producer or Bulk Consumer or Collection Centre or Refurbisher or Dismantler): Jijamata Arts, Commerce & Science Mahavidyalaya, Buldhana Principal Jijamata Mahavidyalaya, Buldhana (Maharashtra) Typed Name & Stamps: | Month Day Year 1 0 1 2 2 0 2 3 |
| 12 | Transporter Acknowledgement of Receipt of E-Waste Principal Jijamata Mahavidyalaya, Buldhana (Maharashtra) Typed Name & Stamps: | Month Day Year 1 0 1 2 2 0 2 3 |
| 13 | Receiver* (Collection Centre or Refurbisher or Dismantler or Recycler) certification of receipt of E-waste Suritex Private Ltd Works , B - 111 , MIDC , Butibori, Office: 5-6Zal Complex, Residency Road Sadar, Nagpur - 440001, Mobile No. :- 09049981347 Signature SURITEX PRIVATE LIMITED NAGPUR Typed Name & Stamps: | Month Day Year 1 0 1 2 2 0 2 3 |
| * As applicable | | |
| COPY 1 (YELLOW) | TO BE RETAINED BY THE SENDER AFTER TAKING SIGNATURE ON IT FROM THE TRANSPORTER AND OTHER THREE COPIES WILL BE CARRIED BY TRANSPORTER. | |
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| COPY 4 (GREEN) | TO BE RETURNED BY THE RECEIVER WITH HIS/HER SIGNATURE TO THE SENDER | |





श्री शिवाजी शिक्षण संस्था, अमरावती द्वारा संचालित
श्री शिवाजी विज्ञान महाविद्यालय
शिवाजी नगर, मोर्शी रोड, अमरावती-४४४ ६०२ (महा.)
NAAC Accredited by Grade 'A' with E-GPA of 3.52 (IV Cycle)
UGC Assisted Status of UPE (U. Punjab)
Identified by DSE (Government of India for ECE, SCRA) Level College
ISO 9001:2015 Certified College & not 2022 Rank Band: 151 (201)



श्री. हर्षवर्धन प्र. देसमुख
अध्यक्ष

डॉ. म. वि. कोरये
प्राचार्य

डॉ. पंजाबराय उपाख्य
भाऊसाहेब देसमुख

Ref No. SC/ 8331/2023

दिनांक 26.9.2023

प्रती,
प्राचार्य
जिजामता महाविद्यालय,
बुलढाणा

संदर्भ:- पत्र क्र जा.क्र.शि.अधी/५/३२२३/२०२३ दि. २०.०९.२०२३

विषय:- आंतरराष्ट्रीय ई-कचरा दिनानिमित्त "Electronic Waste Dump & Donate Drive" उपक्रमा अंतर्गत आपल्या महाविद्यालयामध्ये ई कचरा संकलन करण्याबाबत.

आदरणीय महोदय,

उपरोक्त विश्यांकित व संदर्भीय पत्राच्या अनुषंगाने कळविण्यात येते कि भाऊसाहेबांच्या १२५व्या जयंती निमित्त पर्यावरणशास्त्र विभाग श्री शिवाजी विज्ञान महाविद्यालय, अमरावती व सुरिटेक्स प्रायवेट लिमिटेड, नागपूर यांच्या मार्फत १४ ऑक्टोबर २०२३ शनिवार रोजी आंतरराष्ट्रीय ई-कचरा दिनानिमित्त श्री शिवाजी शिक्षण संस्था, अमरावती अंतर्गत येणाऱ्या सर्व शाळा व महाविद्यालय करिता "Electronic Waste Dump & Donate Drive" चे आयोजन केलेले आहे. याकरिता श्री शिवाजी शिक्षण संस्था, अमरावती च्या पत्रा नुसार आपल्या जिल्ह्यामधील शाळा व महाविद्यालय करिता आपले महाविद्यालय संकलन केंद्र म्हणून ठरविलेले आहे.

तरी आपणास नम्र विनंती आहे कि आपल्या कडे आलेला ई कचरा १३ ऑक्टोबर २०२३ पर्यंत संकलित करावा. आपण संकलित केलेला ई कचरा श्री शिवाजी विज्ञान महाविद्यालय, अमरावतीला आणण्याची जबाबदारी ये सुरिटेक्स प्रायवेट लिमिटेड नागपूर व श्री शिवाजी विज्ञान महाविद्यालय, अमरावती यांची राहिल.

प्राचार्य



Dr. M. V. Korde
Shri Shivaji Science College,
Amravati



4. Study of water conservation system

The College already has water conservation system, wherein the rain water falling on the terrace and other ground area of campus is collected and through natural slope/pipes it is fed to Water Storage pond. The open well is recharged by this pond. This stored water is then reused for domestic purpose.

Photograph of water conservation system

Open well Recharge by
CONSTRUCTION OF POND



4. Recommendations

In order to reduce the dependency on Natural resources and also in order to reduce the various pollutions arising due to the day to day operations of the College we herewith recommend following recommendations.

- Installation of Bio Gas Generator Plant instead of Bio composting Plant.
- Installation of Sewage treatment Plant to make campus a Zero Discharge campus.

