Report

On

Environmental Audit

At

Khandesh College Education Society's College Of Education and Physical Education, Jalgaon

(Year 2022-23)

Prepared by

Nutan Urja Solutions

A 703, Balaji Witefield, Near Sunni's World,

Sus Road, Sus, Pune 411 021

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

Table of Contents

Acknowledgement

We at Nutan Urja Solutions, Pune wish to express our sincere gratitude to the management of Khandesh College Education Society's College Of Education and Physical Education, Jalgaon 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.

Khandesh College Education Society's College Of Education and Physical Education, Jalgaon consumes various resources for day to day operations, namely: Air, Water, Electrical Energy & LPG.

1. Various Pollution due to College Activities:

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

2. Present Level of CO_2 Emissions:

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	1,802	1.44
2	Minimum	638	0.51
3	Average	960	0.77
4	Total	11,520	9.22

3. The various projects already implemented for Environmental Conservation:

- Usage of Natural Day light in corridors
- Implementation of Bio Composting pit for disposal of Bio degradable waste
- Implementation of Rain Water Harvesting
- Installation of **1.8 kW** Solar PV Power Plant.

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 CO_2** into atmosphere
2. 1 kWp Solar PV plant generates 5 kWh/day Electrical Energy for 300 days in an 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
MSEDCL	:	Maharashtra State Electricity Distribution Company Ltd

1. 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 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

1.3 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

1.4 General Details of College

No	Head	Particulars
1	Name of Institution	Khandesh College Education Society's College Of Education and Physical Education, Jalgaon
2	Address	MJ College Campus, Chowk, near Bank Of Maharashtra, Prabhat Colony, Jalgaon, Maharashtra 42500.
3	Affiliation	Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon.

2. Study of Consumption of Various Resources

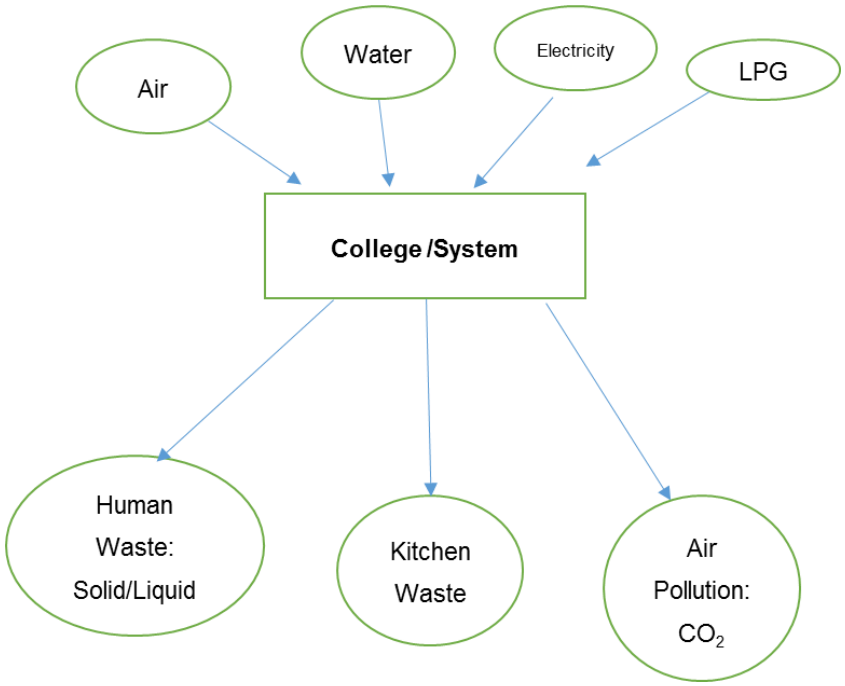
The Institute consumes following basic/derived Resources:

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,

Table 2.1: Electrical Energy Consumption

No	Month	Energy (kWh)
1	May-23	1,069
2	Apr-23	916
3	Mar-23	736
4	Feb-23	638
5	Jan-23	658
6	Dec-22	654
7	Nov-22	720
8	Oct-22	967
9	Sep-22	1,802
10	Aug-22	1,098
11	Jul-22	1,046
12	Jun-22	1,216
	Total	**11520**

2.1 Variation of Monthly Electrical Energy Consumption

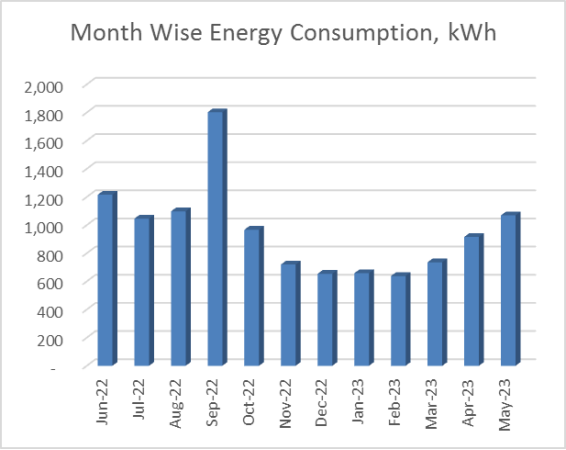


Figure 2.1 : Monthly Electrical Energy Consumption

2.2 Key Inference drawn

From the above analysis, we present following important parameters:

Table 2.2: Variation in Important Parameters

No	Parameter/ Value	Energy Consumed, kWh
1	Maximum	1,802
2	Minimum	638
3	Average	960
4	Total	11,520

3. Study of Air Pollution and Liquid Waste Generation

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.

3.1 Study of Carbon Emission

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 CO_2 in the atmosphere
- 1 Kg of LPG emits 3 Kg of CO_2 in the atmosphere

In the following Table, we present the CO_2 emissions.

Table 3.1: Month wise Consumption of Electrical Energy & CO_2 Emissions:

No	Month	Energy (kWh)	Bill Amount (Rs)
1	May-23	1,069	9,500
2	Apr-23	916	7,850
3	Mar-23	736	6,400
4	Feb-23	638	5,580
5	Jan-23	658	5,770
6	Dec-22	654	5,730
7	Nov-22	720	6,260
8	Oct-22	967	8,270
9	Sep-22	1,802	6,130
10	Aug-22	1,098	9,320
11	Jul-22	1,046	8,900
12	Jun-22	1,216	9,220
	Total	**11520**	**88,930**
	Maximum	1,802	9,500
	Minimum	638	5,580
	Average	960	7,411

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

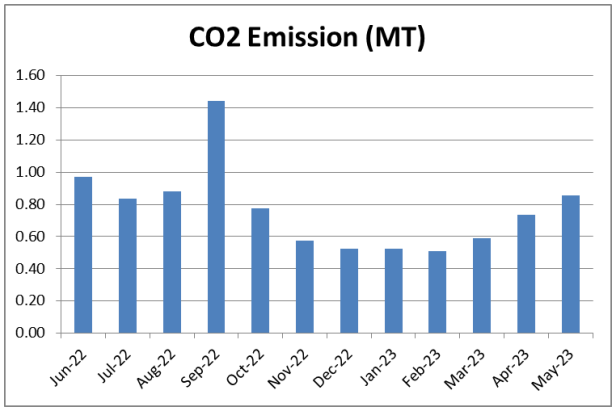


Figure 3.1: CO2 emission due to usage of electrical energy.

3.2 Air pollution from vehicles

Pollution Under Control (PUC) is mandatory for the Vehicles coming in the campus. The following practices are observed in college premises

1. Staff and student entries are strictly prohibited without wearing of helmets.
2. The campus have dense canopy of indigenous bloomed plants.
3. Most of plants play major role in minimize the air and noise pollution.

3.3 Study of Liquid waste Generation

The college has designed the outflow of the liquid waste in such away as to prevent contamination in the campus. A properly constructed leakage proof sewer system is used for drainage. At present the Liquid Waste generated due to day to day operations is drained off to the municipal Corporation through a pipe.

The College has already installed Rain Water Harvesting project, wherein the rain water falling on the terrace is collected and through pipes it is fed to underground Water Storage tank. This stored water is then reused for domestic purpose.

Photograph of Rain Water Harvesting pipe

4. Study of Solid Waste Generation

In this chapter, we study solid waste generated in college and disposal mechanism of solid waste in college.

4.1 Solid waste collection

The garbage collected in college is segregated into wet and dry centrally in campus. Waste bins are placed in college campus for collection of waste. It is daily dispatched to solid waste collection vehicle of Municipal Corporation.

Proper dustbins are provided to each department. Also 2 large (Steel and plastic) dustbins are install at various location in the college campus for collection of waste including administration office, college canteen, near garden etc. Some dustbins are provided to girl‟s hostel (1 dustbin for 2 rooms) for collection of solid waste. The stored waste is collected by Municipal Corporation on every day.

Photograph of Dustbins in college campus

4.2 Mess and Canteen food wastage

The students and canteen staff are encouraged to have minimal food wastage. Canteen contractor have food license and shop act certificate. Food waste collected in canteen disposed for vermicomposting pit. The canteen is encouraged for usage of paper tea cups. Around 80 kg/ day food and other waste is generated in the form of biodegradable solid waste from the hostel mess and canteen.

4.3 E-waste management

All electronic gadgets are periodically repaired for efficient utilization and replaced under bye back scheme of supplier. Hence, minimum e-waste is generated in the campus. The

remaining non-working computers, monitors and printers are discarded and scrapped on a systematic basis. If some parts are useful, in other systems they are kept aside for future use.

4.4 Paper wastage

The students and office staff are encouraged to work with minimal use of paper. Regular activities of students are digitally monitored. Two sides of paper (back to back) printing method is preferable. The projects reports pages (one Sided) submitted by students was used to avoid the dependence on fresh pages.

4.5 Bio composting pit

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

5. 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