Report

On

Environmental Audit

At

Shree H.V.P. M's Degree College Of Physical Education, Amravati.

(Year 2018-19)

Prepared by

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Acknowledgement

We at Nutan Urja Solutions, Pune wish to express our sincere gratitude to the management of Shree H.V.P.M's Degree College Of Physical Education, Amravati 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.

Shree H.V.P.M's Degree College Of Physical Education, Amravati 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	94,168	75.3
2	Minimum	56,482	45.2
3	Average	73,529	58.8
4	Total	882,350	705.9

3. The various projects already implemented for Environmental Conservation:

- Usage of Energy Efficient BEE STAR Rated ACs
- Usage of Natural Day light in corridors
- Implementation of Solid Waste management system
- Implementation of Rain Water Harvesting
- Installation of **50 kW** Solar PV Power Plant.

4. Recommendations:

1. Installation of Bio Gas Generator 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	Shree H.V.P.M's Degree College Of Physical Education, Amravati
2	Address	Hanuman Vyayam Nagar, H.V.P. Mandal, Amravati, Maharashtra. (444605)
3	Affiliation	Sant Gadge Baba Amravati University, Amravati

2. Study of Consumption of Various Resources

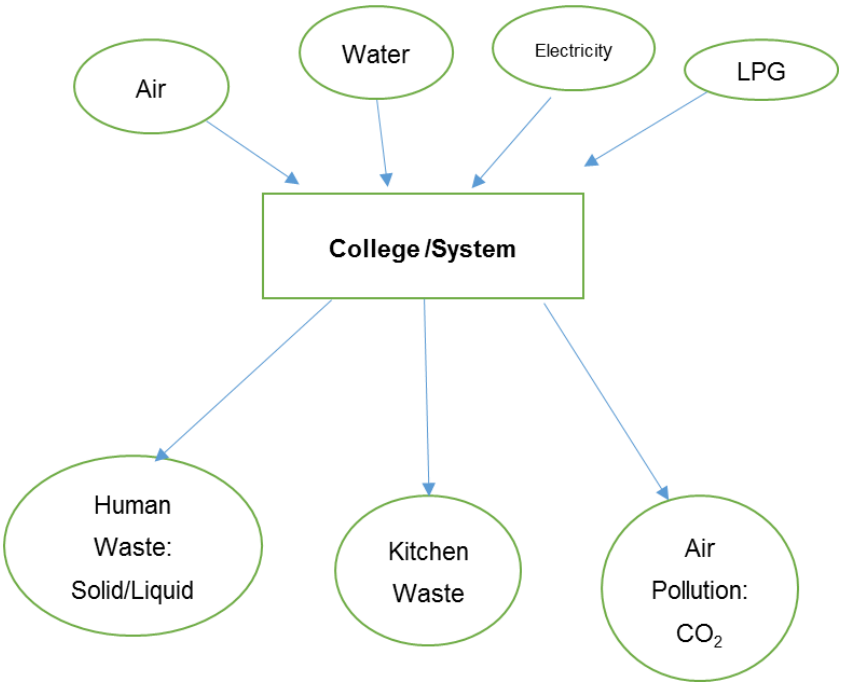
The Institute consumes following basic/derived Resources:

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,

Table 2.1: Electrical Energy Consumption

No	Month	Energy (kWh)
1	Jun-19	60,160
2	May-19	85,157
3	Apr-19	94,168
4	Mar-19	86,433
5	Feb-19	63,325
6	Jan-19	57,919
7	Dec-18	62,311
8	Nov-18	56,482
9	Oct-18	84,571
10	Sep-18	84,810
11	Aug-18	82,839
12	Jul-18	64,175
	Total	**882,350**
	Maximum	94,168
	Minimum	56,482
	Average	73,529

2.1 Variation of Monthly Electrical Energy Consumption

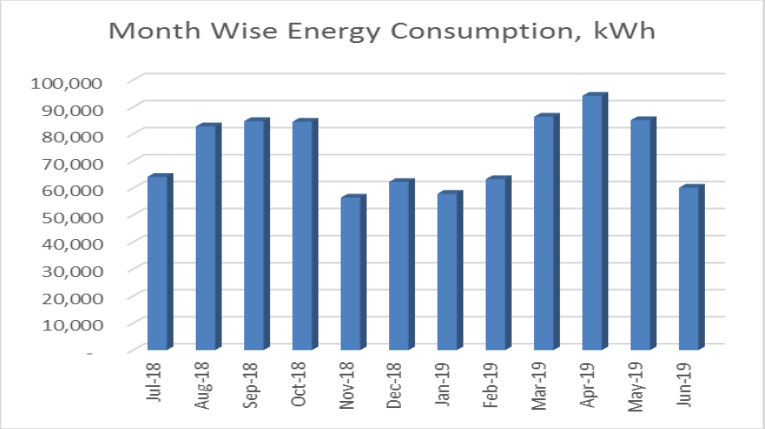


Figure 2.1 : Monthly Electrical Energy Consumption

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	Total	882,350
2	Maximum	94,168
3	Minimum	56,482
4	Average	73,529

3. Study of Environmental Pollution

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

3.1 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 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 Consumed, kWh	CO2 Emissions, MT
1	Jun-19	60,160	48.1
2	May-19	85,157	68.1
3	Apr-19	94,168	75.3
4	Mar-19	86,433	69.1
5	Feb-19	63,325	50.7
6	Jan-19	57,919	46.3
7	Dec-18	62,311	49.8
8	Nov-18	56,482	45.2
9	Oct-18	84,571	67.7
10	Sep-18	84,810	67.8
11	Aug-18	82,839	66.3
12	Jul-18	64,175	51.3
	Total	**882,350**	**705.9**
	Maximum	94,168	75.3
	Minimum	56,482	45.2
	Average	73,529	58.8

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

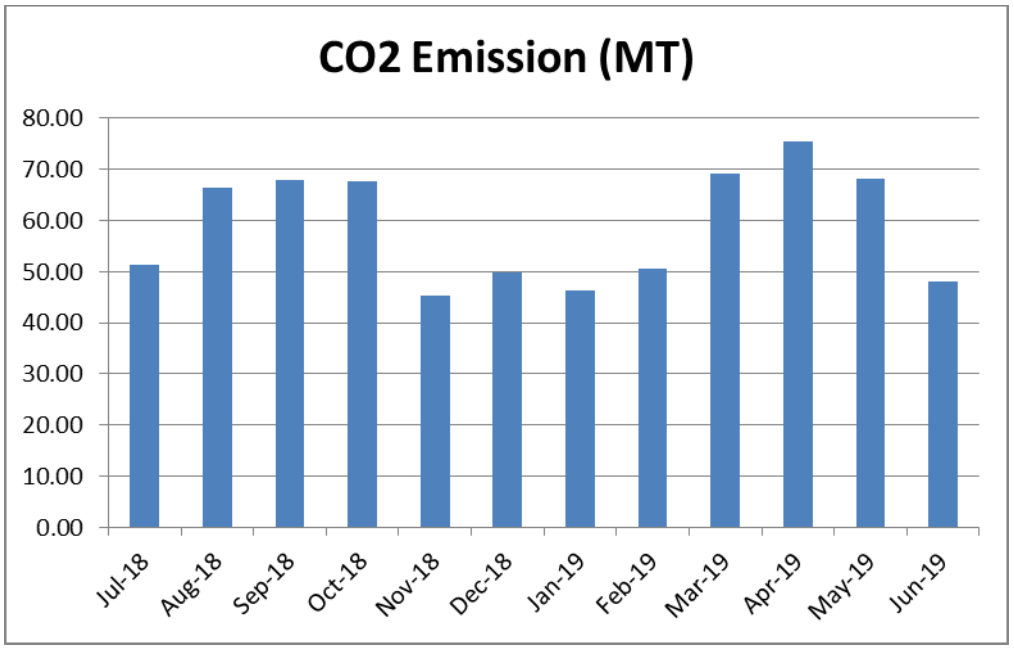


Figure 3.1: CO2 emission due to usage of electrical energy.

3.2 Study of Solid Waste Generation

The premises of Degree College of Physical Education is spread over 38.17 Acres having number of buildings of class rooms, hostels, mess, store, hospital, and also gardens, landscapes play grounds etc. So every day huge solid waste is collected. If this waste is not controlled properly it will produce big pollution in the premises. To reduce the pollution in building and in premises Degree College of Physical Education is conducting many cleanliness drives.

The college has designed a waste management machine to deal with this big problem of pollution in the premises. All the waste of the institute is collected and with the help of this machine it is processed and converted into fertilizer. This fertilizer is used in the gardens which improve the quality of flowers and also soil in the premises.

The institute has installed dustbins in each building such as in class rooms, libraries, laboratories etc. Everyday wet and dry waste is collected in the main dustbin from these dustbins. Amravati Municipal Co-operation, Amravatitakes away this waste and clean the main dustbin.

Leftover blank sheets from evalued answer books are collected and notebooks are prepared by binding it. These notebooks are distributed to needy students of the institute and

outside the institute along with writing material, colour box, scale, etc. as a social responsibility.

Photographs of Solid Waste Management System:

3.3 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.

3.4 Study of e-Waste Management:

The computer laboratories in college are furnished with the latest computer systems and all other necessary peripherals. The laboratories are extensively used by the students for performing practical of their respective courses. Due to heavy use, the computer systems break down or stop working. They continuously need to be repaired and maintained. In some extreme cases they may become out of use. Moreover, the old and out dated computers need to be replaced with new computers with latest configuration to provide exposure to the students to use state of the art technologies.

The old but working computers are donated to schools in small towns to keep the children acquainted with the use of computers. Computers which are totally out of use and non- functional are stored in the store house and after some period sold out as scrap. In this manner, the institute performs e-waste management.

4. Study of Rain Water Harvesting

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.

Photographs of Solid Waste Management System:

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
- Installation of Sewage treatment Plant to make campus a Zero Discharge campus