Nutan Urja Solutions

A 703, Balaji Witefield, Near Sunni's World, Sus Road, Sus, Pune 411 021 Phone: 83568 18381. Email: <u>nutanurja.solutions@gmail.com</u>

Date: 10/07/2022

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Dr. Madhukarrao Wasnik P.W.S. Arts, Commerce, Science College, Nagpur in the year 2021-22.

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

- Installation of Bio Composting Pit
- Installation of Rain Water Harvesting System
- > Installation of 20 kW Solar PV Power Plant.

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,

Rendwaleker

K G Bhatwadekar, Certified Energy Auditor, EA – 22428



Report

On

Environmental Audit

At

Dr. Madhukarrao Wasnik P.W.S. Arts, Commerce, Science

College, Nagpur

(Year 2021-22)



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



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Acknowledgement

We at Nutan Urja Solutions, Pune wish to express our sincere gratitude to the management of Dr. Madhukarrao Wasnik P.W.S. Arts, Commerce, Science College, Nagpur 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.

Dr. Madhukarrao Wasnik P.W.S. Arts, Commerce, Science College, Nagpur 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: Bio degradable Kitchen Waste, Garden Waste
- Liquid Waste: Human liquid waste

2. Present Level of CO₂ Emissions:

		Energy	<i>E</i> .
		consumed,	CO2 Emission
Sr no	Parameter	(Units)	(MT)
1	Maximum	2,151	1.72
2	Minimum	328	0.26
3	Average	1,261	1.01
4	Total	15,128	12.10

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 Bio Composting pit for disposal of Bio degradable waste
- Implementation of Rain Water Harvesting
- Installation of 20 kW Solar PV Power Plant.

4. Recommendations:

Installation of Bio Gas Generator Plant instead of Bio composting Plant.

- 2. Installation of Sewage treatment Plant to make campus a Zero Discharge campus
- 3. Installation of sensor on water tank to reduce water wastage due to overflow.

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 an year.

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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

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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 Env	vironmental Laws	in Inc	lia: Table	e No-1:
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1927	The Indian Forest Act	
1972	The Wildlife Protection Act	
1974 The Water (Prevention and Control of Pollution) Ac		
1977	The Water (Prevention & Control of Pollution) Cess Act	
1980 The Forest (Conservation) Act		
1981 The Air (Prevention and Control of Pollution) Act		
1986	86 The Environment Protection Act	
1991	The Public Liability Insurance Act	
2002	D2 The Biological Diversity Act	
2010	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	Jrja So
2000	Noise Pollution (Regulation and Control) Rules	
.2000	Ozone Depleting Substances (Regulation and Control) Rules	3()
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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	Dr. Madhukarrao Wasnik P.W.S. Arts, Commerce, Science College, Nagpur			
2	Address	786, Kamptee Rd, Old Teka Naka, Teka Naka, Nagpur, Maharashtra 440026.			
Affiliation Rashtrasant Tukdoji Maharaj Nagpur Univer		Rashtrasant Tukdoji Maharaj Nagpur University, Nagur			
(R	tan			

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,



No	Month	Energy (kWh)
1	Jun-22	676
2	May-22	792
3	Apr-22	848
4	Mar-22	865
5	Feb-22	328
6	Jan-22	402
7	Dec-21	1,743
8	Nov-21	1,916
9	Oct-21	1,672
10	Sep-21	2,151
11	Aug-21	1,926
12	Jul-21	1,809
	Total	15128
	Maximum	2151
	Minimum	328
	Average	1261

Table 2.1: Electrical Energy Consumption

2.1 Variation of Monthly Electrical Energy Consumption





Figure 2.1 : Monthly Electrical Energy Consumption



2.2 Key Inference drawn

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From the above analysis, we present following important parameters:

No	Parameter/ Value	Energy Consumed, kWh
1	Maximum	2151
2	Minimum	328
3	Average	1261
4	Total	15128

Table 2.2: Variation in Important Parameters



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 CO₂ in the atmosphere
- 1 Kg of LPG emits 3 Kg of CO_2 in the atmosphere

In the following Table, we present the CO₂ emissions.

		Energy Consumed,	CO2
No	Month	kWh	Emissions, MT
1	Jun-22	676	0.54
2	May-22	792	0.63
3	Apr-22	848	0.68
4	Mar-22	865	0.69
5	Feb-22	328	0.26
6	Jan-22	402	0.32
7	Dec-21	1,743	1.39
8	Nov-21	1,916	1.53
9	Oct-21	1,672	1.34
10	Sep-21	2,151	1.72
11	Aug-21	1,926	1.54
12	Jul-21	1,809	1.45
	Total	15,128	12.10
	Maximum	2,151	1.72
	Minimum	328	0.26
	Average	1,261	1.01

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





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



3.2 Study of Solid Waste Generation

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

3.2.1 Photograph of Bio Composting Processing Tanks



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 internal communication is through emails and hence there is hardly any generation of e-Waste in the premises.



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.

Photograph of Rain Water Harvesting Pipe:



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.
- Installation of sensor on water tank to reduce water wastage due to overflow.

