



# Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.

Affiliated to Sant Gadge Baba Amravati University, Amravati

## NAAC

### Criterion-VII

### Institutional Values and Best Practices

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vvm197@sgbau.ac.in 

Nandgaon Khandeshwar, Amravati 

## **CRITERION-VII**

### **7.1 Institutional Values and Social Responsibilities**



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**7.1.6 Quality audits on environment and energy are regularly undertaken by the Institution. The Institutional environment and energy initiatives are confirmed through the following:**  
**1.Green Audit2.Energy Audit 3. Environment Audit4.Clean and Green Campus recognitions/Awards 5.Beyond the Campus Environmental Promotional Activities.**

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## VINAYAK VIDNYAN MAHAVIDYALAYA

Nandgaon Khandeshwar, Dist. Amravati

(An Institute run by Pravin Khodke Memorial Trust, Amravati)

Sau. Sulbha Sanjay Khodke  
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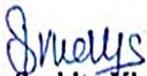
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D. 10/11/2023

### SELF DECLARATION

This is to certify that, the information, reports, true copies of the supporting documents, numerical data and web links furnished in this file are verified by I.Q.A.C. and head of the Institution and found correct.

Hence this certificate is issued.

  
Dr. Suchita Khodke  
I.Q.A.C. Co-ordinator  
Vinayak Vidnyan Mahavidyalaya  
Nandgaon Kh.

  
Dr. Alka A. Bhise  
PRINCIPAL  
Vinayak Vidnyan Mahavidyalaya,  
Nandgaon Khan, Dist. Amravati



## **7.1.6 Quality audits on environment and energy are regularly undertaken by the Institution.**

The Institutional environment and energy initiatives are confirmed through the following

- 1.Green Audit
- 2.Energy Audit
- 3.Environment Audit
- 4.Clean and Green Campus recognitions/Awards
- 5.Beyond the Campus Environmental Promotional Activities.

Responses:-

Any 4 or all of the above

- 1) Green Audit
- 2) Energy Audit
- 3) Environment Audit
- 4) Beyond the Campus Environmental Promotional Activities.

## Certificates of Audits

### Certificate of Green Audit

#### Nutan Urja Solutions

(ISO 9001:2015) 

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

Sus Road, Sus, Pune 411 021

Phone: 83568 18381. Email: [nutanurja.solutions@gmail.com](mailto:nutanurja.solutions@gmail.com)

Date: 21/08/2023

#### CERTIFICATE

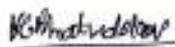
This is to certify that we have conducted Green Audit at Pravin Khodke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati for the year 2022- 23.

The College has already adopted Green practices like:

- Installation of Rain Water Harvesting system
- Usage of Energy Efficient LED
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of Bio Composting pit

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

Nutan Urja Solutions,



K G Bhatwadekar,

Certified Energy Auditor,

EA - 22428



## Certificate of Energy Audit

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Date: 21/08/2023

#### CERTIFICATE

This is to certify that we have conducted Energy Audit at Pravin Khodke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati as per the guidelines of Maharashtra Energy Development Agency ([www.mahaurja.com](http://www.mahaurja.com)) in the year 2022-23.

The College has already adopted Energy Efficient practices like:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment

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



## Certificate of Environment Audit

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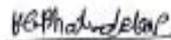
This is to certify that we have conducted Environmental Audit at Pravin Khodke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati in the year 2022-23.

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

- Installation of Rain Water Harvesting System
- Installation of bio composting pit
- 

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,

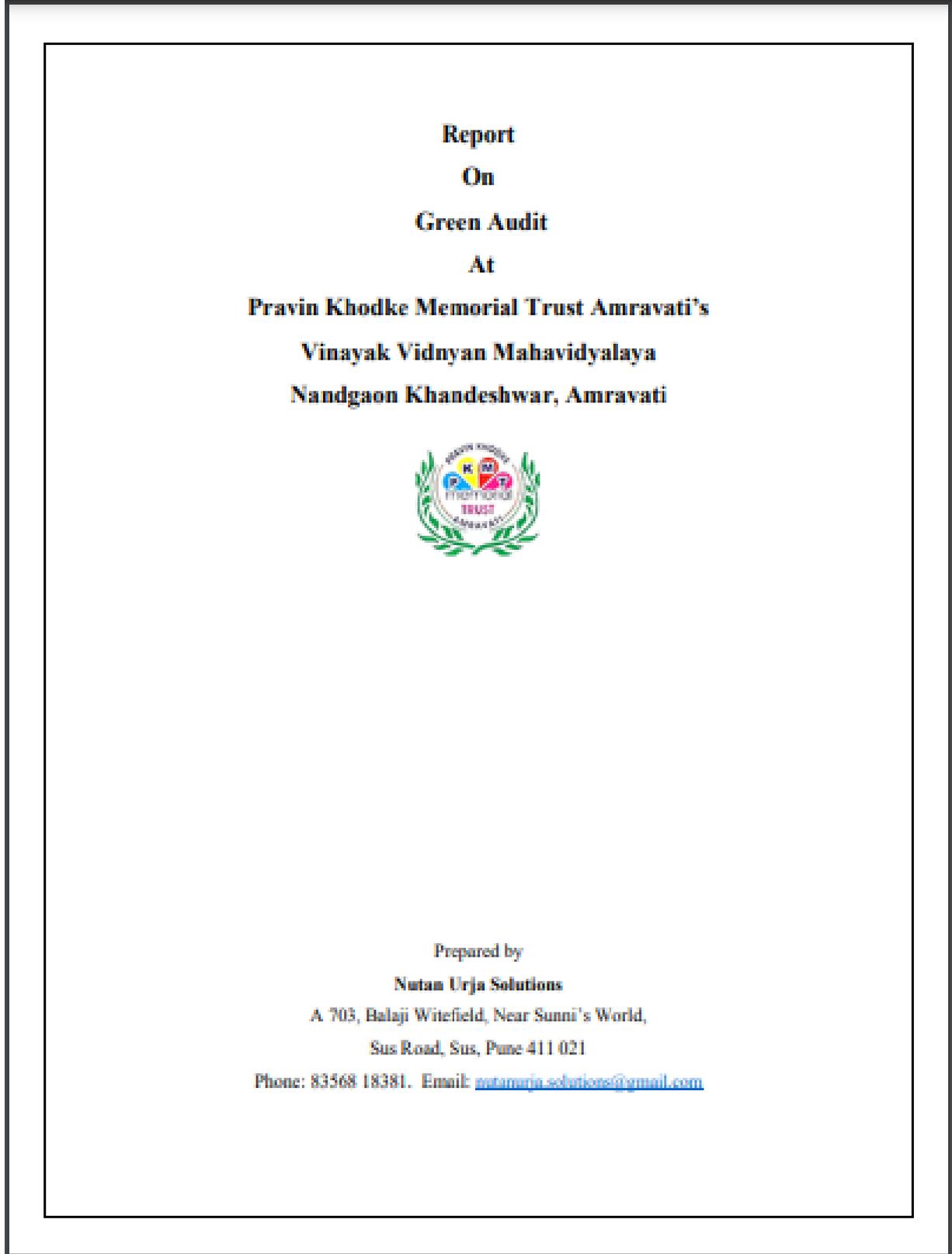


K G Bhatwadekar,  
Certified Energy Auditor,  
EA - 22428



## Reports on Environment and energy audits Submitted by the Auditing Agency.

### 1.Green Audit



Report on Green Audit: P. V. K. Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati

## Contents

Acknowledgement .....	2
Executive Summary .....	3
Abbreviations .....	4
1. Introduction .....	5
1.1 Objectives .....	5
1.2 Audit methodology .....	5
2. Study of Electrical Energy Consumption .....	6
3. Carbon Foot printing .....	9
4. Study of Rain Water Harvesting .....	11
5. Study of Waste Management .....	12
5.1 Solid Waste Management .....	12
5.2 e-Waste Management .....	12
6. Study of Green Practices .....	13
6.1 No of students who don't use own Vehicle for coming to Institute .....	13
6.2 Usage of Public Transport .....	13
6.3 Pedestrian Friendly Roads .....	13
6.4 Plastic Free Campus .....	14
6.5 Paperless Office .....	14
6.6 Green Landscaping with Trees and Plants .....	14



Report on Green Audit: Pravin Khodke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati.

## Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Pravin Khodke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati for awarding us the assignment of Green Audit of their college premises.

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

We hope that the recommendations stated in this report will be useful and worthy of discussions to take things forward to help implementation of energy conservation measures and green practices. While we have made every attempt to adhere to high quality standards, in both data collection and analysis through the report, we would welcome your suggestions so as to improve upon this report further.

Nutan Urja Solutions, Pune.

2



## Executive Summary

Green Audit of Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati is conducted by Nutan Urja Solutions, Pune. Based On the audit field study, following important points can be presented.

### 1. Present Energy Consumption

Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati uses Electrical Energy as the source of Energy for various equipment in the college campus. In the following Table, we present the details of Energy Consumption.

Table no 1: Details of energy consumption

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	933	0.75
2	Minimum	228	0.18
3	Average	639	0.51
4	Total	7,664	6.13

### 2. Various Measures Adopted for Energy Conservation

1. Usage of LED lights at some indoor locations
2. Usage of LED Lights for outdoor lighting.

### 3. Rain Water Harvesting

The College has installed the Rainwater harvesting project, to reduce dependency on municipal corporation water supply.

### 4. Waste Management

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

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

### 5. Notes and Assumptions

1. Daily working hours-10 Nos
2. Annual working Days-250 Nos
3. Average Rate of Electrical Energy : Rs 11/- per kWh



Report on Green Audit: P. V. K. Memorial Trust Amravati's Vinayak Vidya Mahavidyalaya, Nandgaon Khandeshwar, Amravati

## Abbreviations

CFL	:	Compact Fluorescent Lamp
FTL	:	Fluorescent Tube Light
LED	:	Light Emitting Diode
V	:	Voltage
I	:	Current
kW	:	Kilo- Watt
kWh	:	kilo-Watt Hour
kVA	:	Active Power

Nutan Urja Solutions, Pune.

4



## 1. Introduction

Vinayak Vidnyan Mahavidyalaya, located in the rural area of Nandgaon Khandeshwar tehsil of Amravati District, is a premier college offering undergraduate courses in science and commerce faculties. The college was established in 2007 by Pravin Khodke Memorial Trust, Amravati with the aim of providing quality education to students in rural areas, Vinayak Vidnyan Mahavidyalaya has become a leading institution in the region, attracting students from all over the area. Our college is affiliated with Sant Gadge Baba Amravati University, Amravati, and it is recognized by the Government of Maharashtra.

### 1.1 Objectives

1. To study present level of Energy Consumption
2. To Study the present CO<sub>2</sub> emissions
3. To assess the various equipment/facilities from Energy efficiency aspect
4. To measure various Electrical parameters
5. To study Scope for usage of Renewable Energy
6. To study various measures to reduce the Energy Consumption

### 1.2 Audit methodology

1. Study of connected load
2. Study of various Electrical parameters
3. To prepare the Report with various Encon measures with payback analysis



## 2. Study of Electrical Energy Consumption

In this chapter, electricity bills are studied for the analysis of electrical energy consumption.

Table no 2.1: Summary of electricity bills

No	Month	Energy (kWh)	Bill Amount (Rs)
1	Jun-23	920	7910
2	May-23	228	6,860
3	Apr-23	920	7,910
4	Mar-23	626	5,560
5	Feb-23	696	6,120
6	Jan-23	547	4,920
7	Dec-22	618	5,450
8	Nov-22	933	8,020
9	Oct-22	323	3,060
10	Sep-22	608	5,400
11	Aug-22	426	3,950
12	Jul-22	819	7,130
	<b>Total</b>	<b>7,664</b>	<b>72,290</b>

Variation in energy consumption is as follows,



Report on Green Audit: Pooja Khedkar Memorial Trust Amravati's Vinayak Vidya Mahavidyalaya, Nandgaon Khedkarwa, Amravati

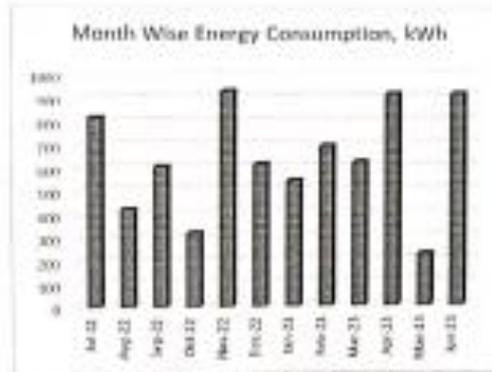


Figure 2.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

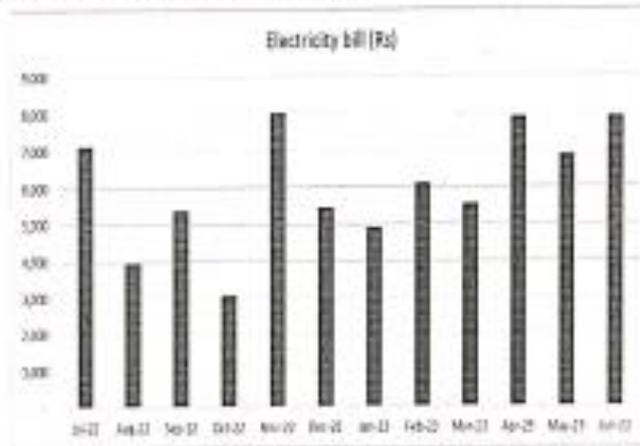


Figure 2.2: Month wise electricity bill



Report on Green Audit: Pravin Khedke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati

Key observations of electricity bill are as follows,

Table no 2.2: Key observations

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	933	0.75
2	Minimum	228	0.18
3	Average	639	0.51
4	Total	7,664	6.13



### 3. Carbon Foot printing

1. A Carbon Foot print is defined as the Total Greenhouse Gas emissions (CO<sub>2</sub> emissions), emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various form of Electrical Energy used by the College for performing its day to day activities

#### 2. Basis for computation of CO<sub>2</sub> Emissions:

The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy is as under

- 1 Unit (kWh) of Electrical Energy releases 0.8 Kg of CO<sub>2</sub> into atmosphere.

Based on the above Data we compute the CO<sub>2</sub> emissions which are being released in to the atmosphere by the College due to its Day to Day operations

We herewith furnish the details of various forms of Energy consumption as under

Table 3.1: Month wise Consumption of Electrical Energy & CO<sub>2</sub> Emissions

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Jun-23	920	0.74
2	May-23	228	0.18
3	Apr-23	920	0.74
4	Mar-23	626	0.50
5	Feb-23	696	0.56
6	Jan-23	547	0.44
7	Dec-22	618	0.49
8	Nov-22	933	0.75
9	Oct-22	323	0.26
10	Sep-22	608	0.49
11	Aug-22	426	0.34
12	Jul-22	819	0.66
	Total	7,664	6.13

In the following Chart we present the CO<sub>2</sub> emissions due to usage of Electrical Energy.



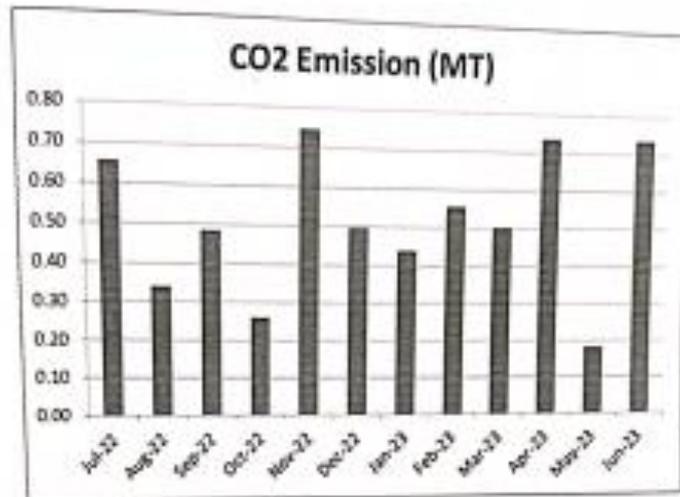


Figure 3.1: Month wise CO2 Emission



## 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



Approved by Green Audit: Pooja Khadke Memorial Trust, Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon, Khandeshwar, Amravati

## 5. Study of Waste Management

### 5.1 Solid Waste Management

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

Photographs of Bio Composting Storage Tanks:



### 5.2 e-Waste Management

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



Report on Green Audit: Pravin Khodke Memorial Trust Anusand's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandolwadi, Anusand

## 6. Study of Green Practices

### 6.1 No of students who don't use own Vehicle for coming to Institute

Out of total students coming to Institute, about 60% students use own Automobile.

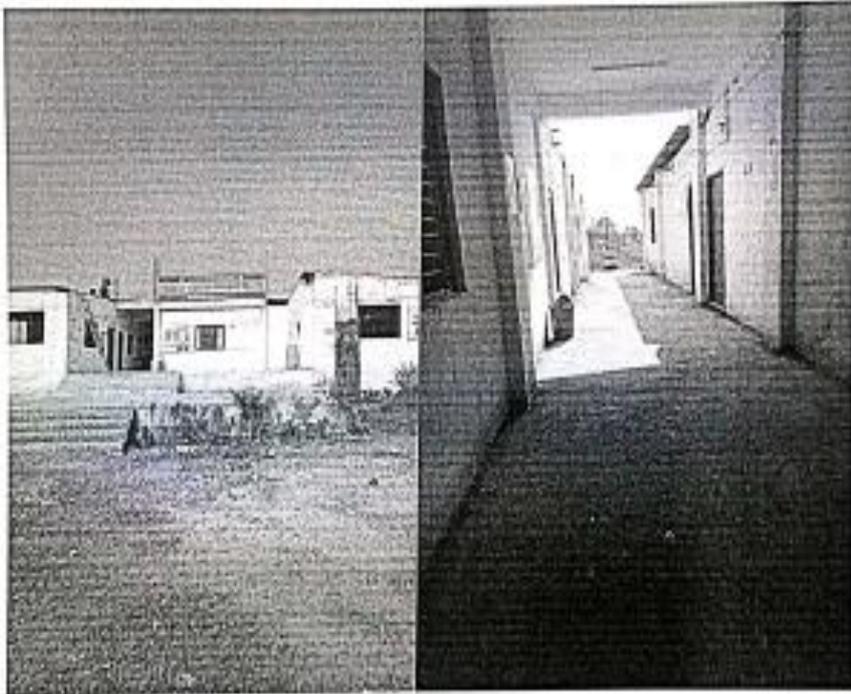
### 6.2 Usage of Public Transport

During the Students transport study, it was revealed that the local students who are residing near areas make use of Public Transport like Municipal Transport local buses, local sharing type auto rickshaws. Some students use bicycles. Institute encourages students to not to use automobiles,

### 6.3 Pedestrian Friendly Roads

The Institute has well defined pedestrian foot paths as to facilitate the easy movement of the students within the campus.

#### Photograph of Road within campus



Report on Green Audit: Pooja Khodke Memorial Trust Amravati's Vinayak Vidyan Mahavidyalaya, Nandgaon Khedolnagar, Amravati

## 6.4 Plastic Free Campus

The Institute is an active participant in the Government of India's most prestigious project of SWATCHH BHART ABHIYAN. The Institute has displayed boards in the Campus, to make the campus plastic free. Various measures adopted for this purpose are as follows

- Installation of Separate waste bins for Dry waste & wet waste
- Usage of paper tea cups in the Institute canteen
- Display of boards in the campus for Plastic Free campus

## 6.5 Paperless Office

The internal communication of the Institute is through the Internet. There are hardly any day to day operations, where printing is required.

## 6.6 Green Landscaping with Trees and Plants

The Institute has beautiful maintained Garden.



Figure 6.1: Beautiful maintained Garden of college



**Energy Audit**

**Report  
On  
Energy Audit  
At**

**Pravin Khodke Memorial Trust Amravati's  
Vinayak Vidnyan Mahavidyalaya  
Nandgaon Khandeshwar, Amravati**



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Report on Energy Audit: Pravin Kherkar Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandolwast, Amravati

Contents	
Acknowledgement .....	2
Executive Summary .....	3
Abbreviations .....	5
1. Introduction.....	6
1.1 Objectives.....	6
1.2 Audit Methodology: .....	6
1.3 General Details of College .....	6
2. Study of connected load.....	7
3. Study of Electrical Energy Consumption .....	9
4. Carbon Foot printing.....	11
5. Study of utilities.....	13
5.1 Study of Lighting .....	13
5.2 Air-conditioners .....	13
5.3 Ceiling Fans.....	13
5.4 Water Pumps .....	13
6. Study of usage of LED lighting .....	14
7. Energy conservation proposals .....	15
7.1 Replacement of old fans with STAR Rated fans.....	15
7.2 Installation of Solar PV panel .....	16
7.3 Summary of Savings .....	17

Nutan Urja Solutions, Pune

1



## Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Pravin Khodke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati for awarding us the assignment of Energy Audit of their college premises.

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

We hope that the recommendations stated in this report will be useful and worthy of discussions to take things forward to help implementation of energy conservation measures through energy savings. While we have made every attempt to adhere to high quality standards, in both data collection and analysis through the report, we would welcome your suggestions so as to improve upon this report further.



## Executive Summary

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the Energy Consumption & mitigate the CO<sub>2</sub> emissions. College consumes Energy in the form of Electrical Energy used for various gadgets, Office & other facilities.

### 1. Present Energy Consumption

In the following Table, we present the details of Energy Consumption.

Table no 2.1: Details of energy consumption

Sr no	Parameter	Energy consumed, (kWh)	CO <sub>2</sub> Emission (MT)
1	Total	7664	6.13
2	Maximum	933	0.75
3	Minimum	228	0.18
4	Average	639	0.51

### 2. Energy Conservation Projects already installed

1. Usage of STAR Rated ACs at new installations
2. Usage of LED lights at some indoor locations
3. Usage of LED Lights for outdoor lighting.

### 3. Key Observations

1. Usage of LED lights.
2. Usage of star rated equipment.
3. Maintained a good power factor.

### 4. Percentage of Usage of LED Lighting

The College has various Types of Light fittings. The percentage of Annual LED Lighting Usage to Annual Lighting requirement works out to be 100 %.



Report on Energy Audit: Pravara Khande Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati

## 5. Recommendations

Table no 1: Recommendations for energy savings

No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs.	Payback period, Months
1	Replacement of 83 Nos Old Ceiling Fans with STAR rating fans	1,079	11,869	1,80,442	182
2	Installation of 4kW grid connected PV panel	6,000	66,000	2,00,000	36
	<b>Total</b>	<b>7,079</b>	<b>77,869</b>	<b>3,80,442</b>	<b>59</b>

## 6. Notes & Assumptions

1. Daily working hours-10 Nos
2. Annual working Days-300 Nos
3. Average Rate of Electrical Energy : Rs 11/- per kWh



Report on Energy Audit: Pravin Khodke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati

## Abbreviations

CFL	:	Compact Fluorescent Lamp
FTL	:	Fluorescent Tube Light
LED	:	Light Emitting Diode
V	:	Voltage
I	:	Current
kW	:	Kilo- Watt
kWh	:	kilo-Watt Hour
kVA	:	Active Power



## 1. Introduction

Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar is located in the rural area of Nandgaon Khandeshwar tehsil of Amravati district. The college is running with Undergraduate courses in Science and Commerce faculties. The College has today become one of the premier institutions of the town.

### 1.1 Objectives

1. To study present level of Energy Consumption
2. To Study Electrical Consumption
3. To assess the various equipment/facilities from Energy efficiency aspect
4. To study various measures to reduce the Energy Consumption

### 1.2 Audit Methodology:

1. Study of connected load
2. Study of various Electrical parameters
3. To prepare the Report with various Encon measures with payback analysis

### 1.3 General Details of College

Table No-1.1: Details of college

No	Head	Particulars
1	Name of Institution	Pravin Khodke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati
2	Address	Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Dist. Amravati.
3	Affiliation	Sant Gadge Baba Amravati University,



## 2. Study of connected load

In this chapter, we present details of various connected electrical equipment and electrical load.

Table No-2.1: Location wise study of Electrical fittings in various buildings

No	Location	LED tube (20W)	LED bulb (12W)	Computers (65W)	Fans
1	Office	2		2	4
2	Principal	2		1	2
3	I.Q.A.C.	2			2
4	Wash Room		1		
5	Wash Room		1		
6	Lang. Dip. English	1			1
7	Dept. Comp.	2			1
8	Maths Dept.	2			1
9	Seminar Hall	9			9
10	Computer Lab	4		40	4
11	Girl's Wash Room	2			
12	Boy's Wash Room	2			
13	Class Room No.4	2			4
14	Class Room No.3	2			4
15	N.S.S.	2			2
16	Class Room No.2	2			4
17	Class Room No. 1	4			6
18	Botany Lab	4			5
19	Zoology Lab	4			5
20	Physics Lab	4		1	5
21	Chemistry Lab	4			5
22	Class Room No. 5	2			4
23	Girl's Comon Room	1			1
24	Library	4		3	6

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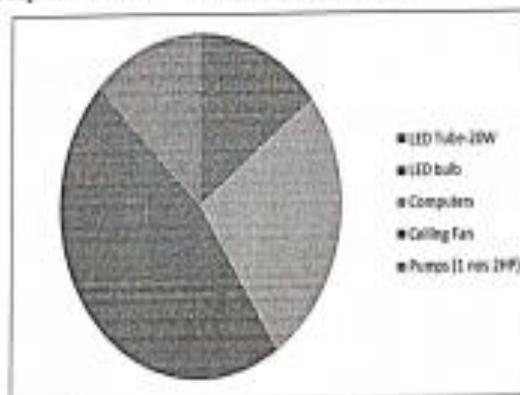
25	Class Room No. 6	1			1
26	Class Room No. 7	1			1
27	Class Room No. 8	1			1
28	Gymnasium	2			3
29	Corridor	13			
30	Canteen	2			2
	<b>Total</b>	<b>83</b>	<b>2</b>	<b>47</b>	<b>83</b>

Apart from above load, the college has pumps, street lights. Individual fitting wise load is as under.

**Table No 2.2: Equipment wise Connected Load**

No	Equipment	Qty	Load, W/Unit	Load, kW
1	LED Tube-20W	83	20	1.7
2	LED bulb	2	12	0.0
3	Computers	47	65	3.1
4	Ceiling Fan	83	65	5.4
5	Pumps (1 nos 2HP)			1.5
	<b>Total</b>			<b>6.9</b>

Data can be represented in terms of PIE chart as under,



**Figure 2.1: Distribution of connected load.**



### 3. Study of Electrical Energy Consumption

In this chapter, electricity bills are studied for the analysis of electrical energy consumption.

Table no 3.1: Summary of electricity bills

No	Month	Energy (kWh)	Bill Amount (Rs)
1	Jun-23	920	7910
2	May-23	228	6,860
3	Apr-23	920	7,910
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	<b>Total</b>	<b>7,664</b>	<b>72,290</b>

Variation in energy consumption is as follows,

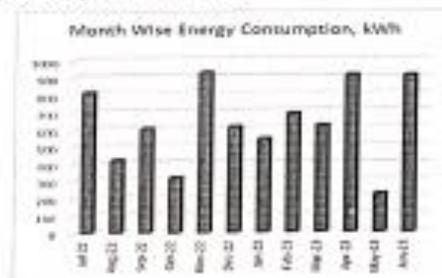


Figure 3.1: Month wise energy consumption



Report on Energy Audit: Pavia Khotke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati

Monthly variation in electricity bill is as follows,

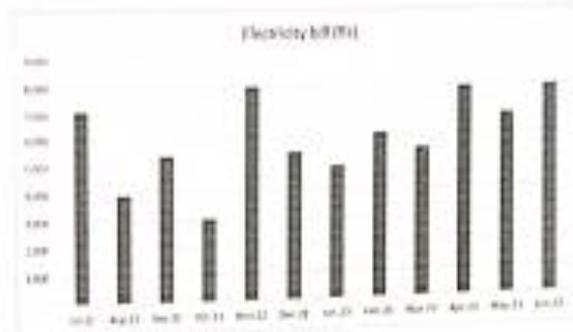


Figure 3.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 3.2: Key observations

Sr no	Parameter	Energy consumed, (kWh)	CO2 Emission (MT)
1	Total	7664	6.13
2	Maximum	933	0.75
3	Minimum	228	0.18
4	Average	639	0.51



Report on Energy Audit: Pooja Khodke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandolwar, Amravati

## 4. Carbon Foot printing

1. A Carbon Foot print is defined as the Total Greenhouse Gas emissions (CO<sub>2</sub> emissions), emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various form of Electrical Energy used by the College for performing its day to day activities

### 2. Basis for computation of CO<sub>2</sub> Emissions:

The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy is as under

- 1 Unit (kWh) of Electrical Energy releases 0.8 Kg of CO<sub>2</sub> into atmosphere.

Based on the above Data we compute the CO<sub>2</sub> emissions which are being released in to the atmosphere by the College due to its Day to Day operations

We herewith furnish the details of various forms of Energy consumption as under

**Table 4.1: Month wise Consumption of Electrical Energy & CO<sub>2</sub> Emissions**

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Jun-23	920	0.74
2	May-23	228	0.18
3	Apr-23	920	0.74
4	Mar-23	626	0.50
5	Feb-23	696	0.56
6	Jan-23	547	0.44
7	Dec-22	618	0.49
8	Nov-22	933	0.75
9	Oct-22	323	0.26
10	Sep-22	608	0.49
11	Aug-22	426	0.34
12	Jul-22	819	0.66
	<b>Total</b>	<b>7,664</b>	<b>6.13</b>

In the following Chart we present the CO<sub>2</sub> emissions due to usage of Electrical Energy.



Report on Energy Audit: Pt. J. K. Memorial Trust Amravati's Vinayak Vidyan Mahavidyalaya, Nandgaon Khednagar, Amravati

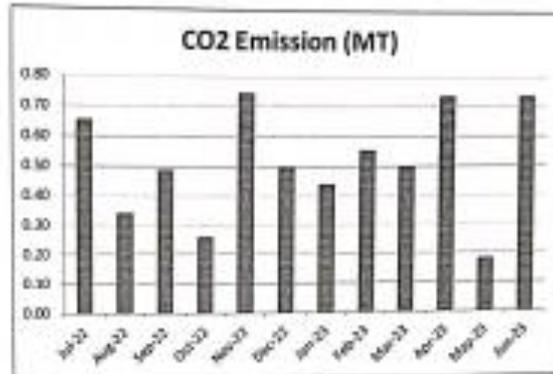


Figure 4.1: Month wise CO2 Emission



## 5. Study of utilities

### 5.1 Study of Lighting

In the facility, the lighting system can be divided mainly in to parts, indoor lighting and outdoor lighting. There are 83 nos of LED tubes, 2 nos of LED bulbs.

### 5.2 Air-conditioners

In the facility, there is no Air-conditioners.

### 5.3 Ceiling Fans

At building facility, there are about 83 Nos Old Ceiling Fans, which consumed about 65 W of Electrical Energy. It is recommended to replace these old Fans with BEE STAR Rated Ceiling Fans.

### 5.4 Water Pumps

There is no Water pump.



## 6. Study of usage of LED lighting

In this chapter we study the lighting system of college and compute the percentage of total load catered by LED lighting.

Table 6.1: Total lighting load

No	Particulars	Qty	Load, W/Unit	Load, kW
	<b>LED lighting load</b>			
1	LED tube	83	20	1.66
2	LED bulbs	2	12	0.024
	<b>Total LED lighting load</b>			<b>1.684</b>
	<b>Total Lighting load</b>			<b>1.684</b>

It can be seen that out of total lighting load 100% load is LED lighting load.



## 7. Energy conservation proposals

### 7.1 Replacement of old fans with STAR Rated fans

During the Audit, it was observed that there are 83 no of fans. It is recommended to replace these old fans with STAR Rated fans.

In the following Table, we present the savings, investment required & payback analysis.

No	Particulars	Value	Unit
1	Present Qty of Old Ceiling Fan fittings	83	Nos
2	Energy Demand of Old Ceiling Fan fitting	65	W/Unit
3	Energy Demand of STAR Rated Fan	52	W/Unit
4	Reduction in demand	13	W/Unit
5	Average Daily Usage period	4	Hrs/Day
6	Daily saving in Energy	4.316	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	1079	kWh/Annum
9	Rate of Electrical Energy	11	Rs/kWh
10	Annual Monetary saving	11869	Rs/Annum
11	Cost of STAR Rated Ceiling Fan	2174	Rs/unit
12	Investment required	180442	Rs lump sum
13	Simple Payback period	182	Months



Report on Energy Audit: Parvati Khadke Memorial Trust Anandaji's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khedolnagar, Anandaji

## 7.2 Installation of Solar PV panel

It is recommended to install 4 kW solar PV panel. In the following Table, we present the savings, investment required & payback analysis.

No	Particulars	Value	Unit
1	Installation of 4kW PV unit	4	kW
2	Energy saving	6000	kWh/Annum
3	Rate of electrical energy	11	Rs
4	Annual monetary savings	66000	Rs/ Annum
5	Investment required	200000	Rs lump sum
6	Simple payback period	36	Months



Report on Energy Audit: P. V. K. M. T. Trust, Anand's Vinayak Vidya Mahavidyalaya, Nandgaon Khairatpur, Anand

## 7.3 Summary of Savings

No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs.	Payback period, Months
1	Replacement of 83 Nos Old Ceiling Fans with STAR rating fans	1,079	11,869	1,80,442	182
2	Installation of 4kW grid connected PV panel	6,000	66,000	2,00,000	36
	Total	7,079	77,869	3,80,442	59



**Environmental Audit**

**Report  
On  
Environmental Audit  
At  
Pravin Khodke Memorial Trust Amravati's  
Vinayak Vidnyan Mahavidyalaya  
Nandgaon Khandeshwar, Amravati**



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Environmental Audit Report - Pwalia Khadike Memorial Trust Anantaji's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khadike, Anantaji

## Table of Contents

Acknowledgement .....	2
Executive Summary .....	3
Abbreviations .....	4
1. Introduction .....	5
1.1 Important Definitions: .....	5
1.2 Objectives .....	6
1.3 Audit Methodology: .....	6
1.4 General Details of College .....	6
2. Study of Consumption of Various Resources .....	7
2.1 Variation of Monthly Electrical Energy Consumption .....	8
2.2 Key Inference drawn .....	9
3. Study of Environmental Pollution .....	10
3.1 Air Pollution .....	10
3.2 Study of Solid Waste Generation .....	11
3.3 Study of Liquid Waste Generation .....	12
3.4 Study of e-Waste Management: .....	12
4. Study of Rain Water Harvesting .....	13
5. Recommendations .....	14



Environmental Audit Report: Pravin Khodke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati

## Acknowledgement

We at Nutan Urja Solutions, Pune wish to express our sincere gratitude to the management of Pravin Khodke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, 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.



Environmental Audit Report: Pravin Khotko Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati

## 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.

Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, 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<sub>2</sub> on account of Electricity & LPG Consumption
- Solid Waste: Bio degradable Kitchen Waste, Garden Waste
- Liquid Waste: Human liquid waste

### 2. Present Level of CO<sub>2</sub> Emissions:

No	Parameter /Value	Energy, kWh	CO <sub>2</sub> Emissions, MT
1	Maximum	933	0.75
2	Minimum	228	0.18
3	Average	639	0.51
4	Total	7,664	6.13

### 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

### 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<sub>2</sub> 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



## 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 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"*

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



Environmental Audit Report: Pwss Khodda Member/ Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Amravati

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	Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar
2	Address	Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Dist. Amravati.
3	Affiliation	Sant Gadge Baba Amravati University.



Environmental Audit Report: Pratik Kholke Memorial Trust Anantvat's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khedolwar, Amravati

## 2. Study of Consumption of Various Resources

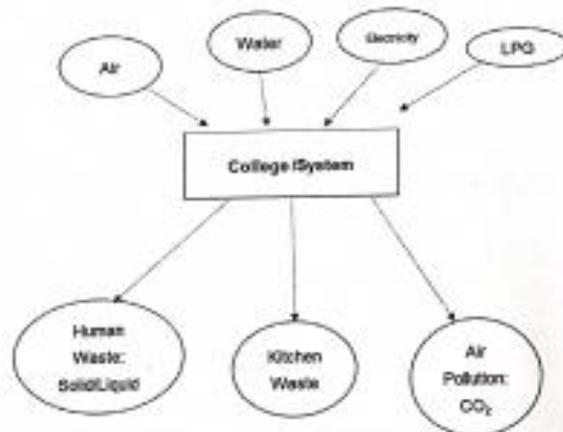
The Institute consumes following basic/derived Resources:

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 CO<sub>2</sub> on account of consumption of Electrical Energy & LPG as under.

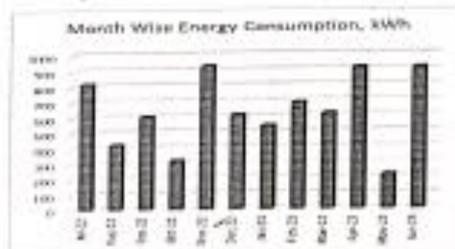
The calculation of electrical energy consumption by college can be given as,

Environmental Audit Report: Pratik Khodke Memorial Trust Annual's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khambhwa, Amravati

**Table 2.1: Electrical Energy Consumption**

No	Month	Energy Consumed, kWh
1	Jun-23	920
2	May-23	228
3	Apr-23	920
4	Mar-23	626
5	Feb-23	696
6	Jan-23	547
7	Dec-22	618
8	Nov-22	933
9	Oct-22	323
10	Sep-22	608
11	Aug-22	426
12	Jul-22	819
	<b>Total</b>	<b>7,664</b>
	<b>Maximum</b>	<b>933</b>
	<b>Minimum</b>	<b>228</b>
	<b>Average</b>	<b>639</b>

## 2.1 Variation of Monthly Electrical Energy Consumption



**Figure 2.1 : Monthly Electrical Energy Consumption**



Environmental Audit Report: Purohit Shree Memorial Trust Amravati's Vinayak Vidya Mahavidyalaya, Nandgaon Khandolwasi, Amravati

## 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	933
2	Minimum	228
3	Average	639
4	Total	7,664



### 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<sub>2</sub> in the atmosphere
- 1 Kg of LPG emits 3 Kg of CO<sub>2</sub> in the atmosphere

In the following Table, we present the CO<sub>2</sub> emissions.

**Table 3.1: Month wise Consumption of Electrical Energy & CO<sub>2</sub> Emissions:**

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Jun-23	7,664	0.74
2	May-23	7,664	0.18
3	Apr-23	7,664	0.74
4	Mar-23	7,664	0.50
5	Feb-23	7,664	0.56
6	Jan-23	7,664	0.44
7	Dec-22	7,664	0.49
8	Nov-22	7,664	0.75
9	Oct-22	7,664	0.26
10	Sep-22	7,664	0.49
11	Aug-22	7,664	0.34
12	Jul-22	7,664	0.66
	<b>Total</b>	<b>7,664</b>	<b>6.13</b>
	<b>Maximum</b>	<b>933</b>	<b>0.75</b>
	<b>Minimum</b>	<b>228</b>	<b>0.18</b>
	<b>Average</b>	<b>639</b>	<b>0.51</b>

In the following Chart we present the CO<sub>2</sub> emissions due to usage of Electrical Energy.

Environmental Audit Report: Pratik Education Merit Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Education, Amravati

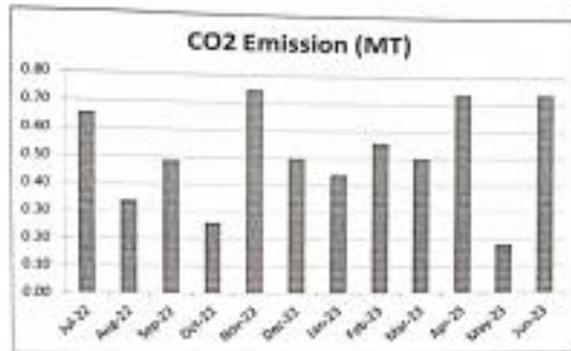


Figure 2.1: CO2 emission due to usage of electrical energy.

### 3.2 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.

#### 3.2.1 Photograph of Bio Composting Processing Tanks



Environmental Audit Report: Pravin Khatke Memorial Trust Anand's Vinayak Vidyan Mahavidyalaya, Nandgaon Khandolberr.  
Annual

### 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.



Environmental Audit Report - Pusa Kholke Memorial Trust Amravati's Vinayak Vidnyan Mahavidyalaya, Nandgaon Khambhewar, Amravati

#### 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:



Environmental Audit Report: Pwile Khadke Memorial Trust Amravati's Vinayak Vidya Mahavidyalaya, Nandgaon Khandolwar, Amravati

## 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



## Beyond the Campus Environmental Promotional Activities.

### Cleanliness rally

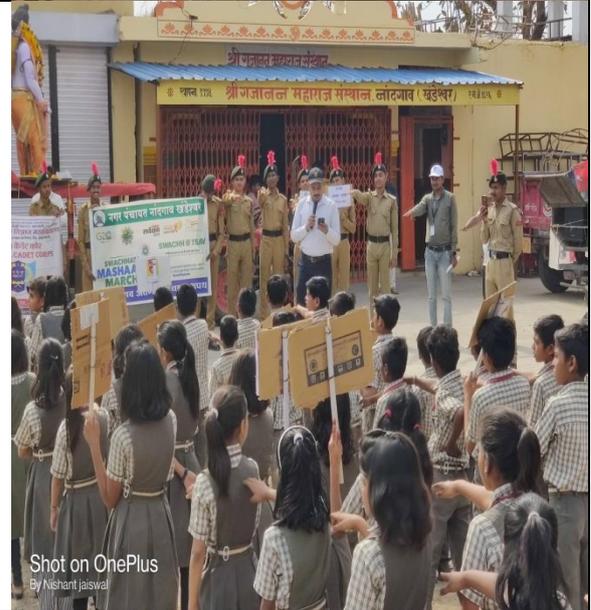
Swachhotsav- 2023

**Cleanliness and order are not matters of instinct, they are matters of education and like most great things, and you must cultivate a taste for them. – Benjamin Disraeli**

Cleanliness rally was organized by National Service Scheme, Vinayak Vidnyan Mahavidyalaya Nandgaon Kh. in collaboration with Panchayat samiti Nandgaon Kh. on 30<sup>th</sup> March 2023. As per the guideline given by central government to create awareness about the cleanliness. This rally was organized to promote sustainable practices and waste management for a cleaner and greener future. The rally was start at 8:00 pm from Nagar Panchayat karyalay to many important and rush area like bus stand, athwadi bajar, budhawara chauk, mungasaji maharaj chauk, Gajanan Maharaj Madir and return to Nagar Panchayat karyalay. In this rally the school and colleges of the Nandgaon kh. like Y.E.S. English School, Shivaji junior college, Ramravji Bhoyar kanya vidyalaya, NCC cadet of Vinayak Vidnyan Mahavidyalaya participate.

Priya Marotkar, Pallavi Tarhekar, Dhanshree Khobragade, Ankush Chavan, Cagar Dandge, Subodh Wagmare and other NSS volunteers along with Mr. Nishant Jaiswal NSS programme officer contribute in this rally.

# Vinayak Vidnyan Mahavidyalaya Nandgaon Kh.



*Bhis*  
**Principal**  
PRINCIPAL  
Vinayak Vidnyan Mahavidyalaya,  
Nandgaon Khan, Dist. Amravati

## “Environment Awareness and Cleanliness Drive”

### Report

World Environment day is celebrated on 5<sup>th</sup> June 2022 under the banner of Environment week from 29<sup>th</sup> May to 5<sup>th</sup> June 2022 to create awareness among people about protecting the environment. The environment plays a vital role in maintaining the balance of the ecosystem where we are leaving. Now a day's most people don't understand the importance of the environment and end up damaging it with their various activities like cutting of tree, tremendous use of plastic, use of unnecessary vehicle uncontrolled use of water. If we continue to degrade the environment, in the long run, the adverse effects will affect human beings too. So, to protect the environment, one should focus on sustainable development. In this way, the demands of human beings will be met without overexploiting the natural resources of the environment. The National Service Scheme of Vinayak Vidnyan Mahavidyalaya organized the **Environment awareness and Cleanliness Drive** in order to celebrate the world environment Day. This program was organized to create an awareness regarding importance of plant and climate change. The Awareness Rally was arranged on dated 3<sup>th</sup> June 2022. The rally was started from College premises the cleaning of college campus area, Panchayat Samiti, Tahasil office, Bus stand was cleaned by NSS volunteers. Student's council the people about global warming and deforestation, how the cutting of tree is hazardous to our environment, they also explain about the plastic waste, which is responsible for the water pollution. Students urge to the people not to cut the tress and try to use plastic in fewer amounts.

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# Vinayak Vidnyan Mahavidyalaya Nandgaon Kh.



*Bhis*

**Principal**  
**PRINCIPAL**

Vinayak Vidnyan Mahavidyalaya,  
Nandgaon Khan. Dist. Amravati