Nutan Urja Solutions

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Date: 13/09/2022

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Shri. Kisanlal Nathmal Goenka Arts & Commerce College Karanja (Lad) 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

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,

Nutan Urja Solutions

K G Bhatwadekar,
Certified Energy Auditor,
EA – 22428

Report

On

Environmental Audit

At

Shri. Kisanlal Nathmal Goenka Arts & Commerce College

Karanja (Lad)

(Year 2022-23)

Prepared by

Nutan Urja Solutions

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Acknowledgement

We at Nutan Urja Solutions, Pune wish to express our sincere gratitude to the management of Shri. Kisanlal Nathmal Goenka Arts & Commerce College Karanja (Lad) 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.

Shri. Kisanlal Nathmal Goenka Arts & Commerce College Karanja (Lad) 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	1,565	1.3
2	Minimum	-	-
3	Average	723	0.6
4	Total	8,673	6.9

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 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_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	Shri. Kisanlal Nathmal Goenka Arts & Commerce College Karanja (Lad)
2	Address	Karanja, Washim - 444105, At Post Karanja Lad Taluka Karanja District Washim
3	Affiliation	Sant Gadge Baba Amravati University, Amravati.

2. Study of Consumption of Various Resources

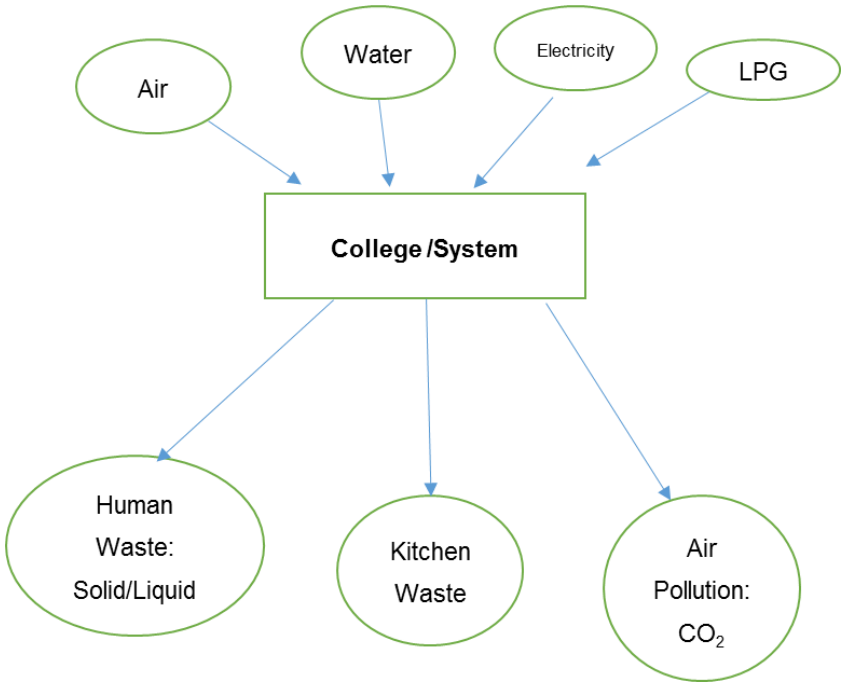
The Institute consumes following basic/derived Resources:

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-23	28
2	May-23	-
3	Apr-23	-
4	Mar-23	-
5	Feb-23	-
6	Jan-23	800
7	Dec-22	1,037
8	Nov-22	939
9	Oct-22	1,403
10	Sep-22	1,565
11	Aug-22	1,468
12	Jul-22	1,433
	Total	**8673**
	Maximum	1,565
	Minimum	-
	Average	723

2.1 Variation of Monthly Electrical Energy Consumption

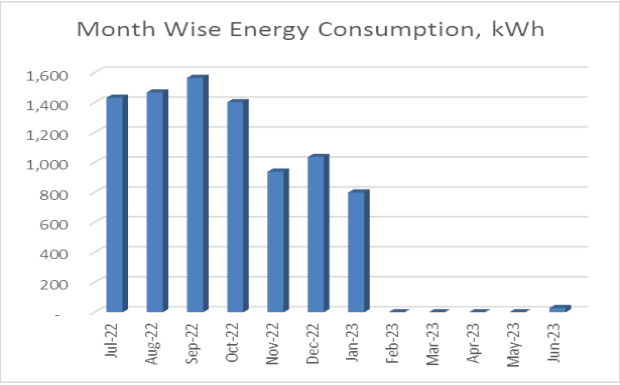


Figure 2.1 : Monthly Electrical Energy Consumption

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**	1,565
2	**Minimum**	-
3	**Average**	723
4	**Total**	8,673

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-23	28	0.02
2	May-23	-	0.00
3	Apr-23	-	0.00
4	Mar-23	-	0.00
5	Feb-23	-	0.00
6	Jan-23	800	0.64
7	Dec-22	1,037	0.83
8	Nov-22	939	0.75
9	Oct-22	1,403	1.12
10	Sep-22	1,565	1.25
11	Aug-22	1,468	1.17
12	Jul-22	1,433	1.15
	Total	**8,673**	**6.94**
	Maximum	1,565	1.3
	Minimum	-	-
	Average	723	0.6

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

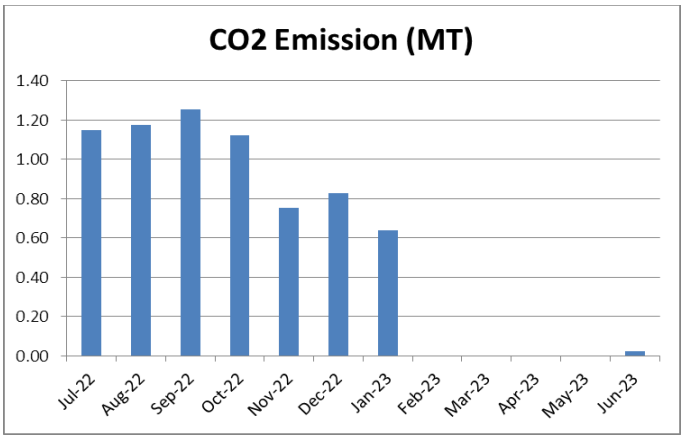


Figure 2.1: CO2 emission due to usage of electrical energy.

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.

3.3 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 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

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Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Shri. Kisanlal Nathmal Goenka Arts & Commerce College Karanja (Lad) 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_2 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, (Units)	CO2 Emission (MT)
1	Maximum	1,565	1.3
2	Minimum	-	-
3	Average	723	0.6
4	Total	8,673	6.9

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. There are 1 Nos, 1.5 TR Old ACs which need to be replaced with STAR Rated ACs.

4. Usage of Renewable Energy

The college has installed roof top solar PV panel of 20kW capacity. Total percentage usage of renewable energy is 75%.

5. Percentage of Usage of LED Lighting

The College has various Types of Light fittings, namely: LED tubes, LED flood lights and LED tubes. Usage to Annual Lighting requirement works out to be 100 %.

6. 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 94 Nos Old Ceiling Fans with STAR rating fans	1,222	13,442	204,356	182
2	Replacement of 1 Nos Old 1.5 TR Acs with STAR rating Acs	1,000	11,000	52,875	58
	Total	**2,222**	**24,442**	**257,231**	**126**

7. Notes & Assumptions

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

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

Kisanlal Nathmal arts and commerce Karanja was established in 1961 on the land generously donated by Kisanlal Nathmal Goenka . It is run by the Berar general education society Akola. It is situated in a rural area.

The College, definitely, has promoted research activities. As a result many of the teachers have acquired the Doctoral degree in the respective areas. Environmental concern has been another task of the college. Regular teaching of environmental studies is the salient feature of the college curriculum.

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	Shri. Kisanlal Nathmal Goenka Arts & Commerce College Karanja (Lad)
2	Address	Karanja, Washim - 444105, At Post Karanja Lad Taluka Karanja District Washim
3	Affiliation	Sant Gadge Baba Amravati University, Amravati.

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)	Fans	Computers (65W)	1.5TR Star rated AC	1.5TR old ACs
1	Open University	1	5	1			
2	Security Guard Room	2					
3	NRC hall		5	12			
4	Room no 1		2	3			
5	Room no 2		1	3			
6	Room no 3		1	1			
7	Room no 4		1	2			
8	Room no 5	1		4			
9	Room no 101			4			
10	Room no 102		1	2			
11	Room no 103			1			
12	Room no 104			2			
13	Room no 105			5			
14	Marathi Department		2	1	1		
15	English Department		1	1	6		
16	Reading hall	8	4	6			
17	Library	4	1	4	4		
18	Library Storage 1	3	1	2			
19	Library Storage 2	2	2	2			
20	Library Veranda		4				
21	Office Veranda	2	0				

22	Office	12	3	6	6		
23	PrincipalCabin	8	3	4	1	1	1
24	Staff Room		4	2			
25	History and Eco Department		3	2	2		
26	Hostel Outside	2	2				
27	Auditoriam hall	6	1	6			
28	Computer lab	7		6	17		
29	Commerce department		2	2	1		
30	Science Building	2					
31	Physics Department	3	2	2			
32	Home Economics Department	3	2	3			
33	Science lab staff	1		1			
34	Physics lab	3		1			
35	Biology lab	3		1			
36	Chemistry lab	4		1			
37	Main Gate		2				
38	Consumer store		1	1			
	Total	**77**	**56**	**94**	**38**	**1**	**1**

Apart from above load, the school has pumps, LED street lights on streets and grounds. Individual fitting wise load is as under.

Table No 2.2: Equipment wise Connected Load

No	Equipment	Qty	Load, W/Unit	Load, kW
1	Ceiling Fan	94	65	6.1
2	AC-Old (1.5 Tr)	1	2200	2.2
3	AC-New (1.5 TR)	1	1838	1.8
4	LED-20W	77	20	1.5
5	LEDBulb	56	12	0.7
6	Computers	38	65	2.5
7	Pump (1.5HP)			1.1
8	LED street lights (100W)	4	100	0.4
9	LED street lights (50W)	5	50	0.3
	Total			16.6

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

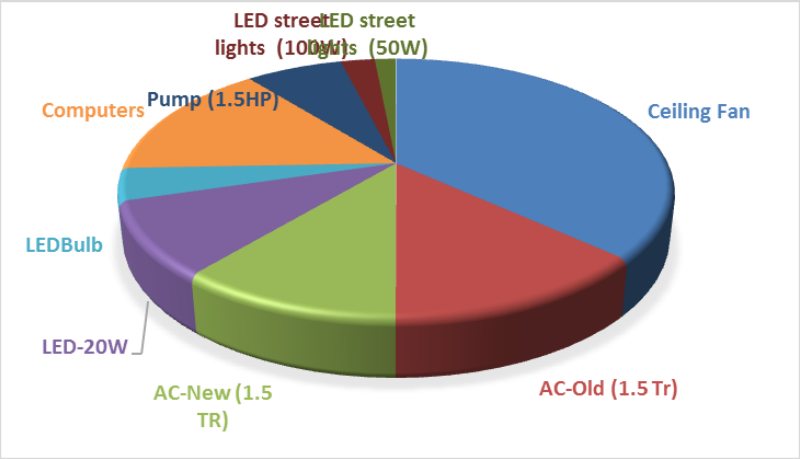

Figure 2.1: Distribution of connected load.

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	28	422
2	May-23	-	265
3	Apr-23	-	422
4	Mar-23	-	384
5	Feb-23	-	384
6	Jan-23	800	6,927
7	Dec-22	1,037	8,847
8	Nov-22	939	8,053
9	Oct-22	1,403	11,812
10	Sep-22	1,565	13,124
11	Aug-22	1,468	12,339
12	Jul-22	1,433	12,055
	Total	**8673**	**75,034**

Variation in energy consumption is as follows,

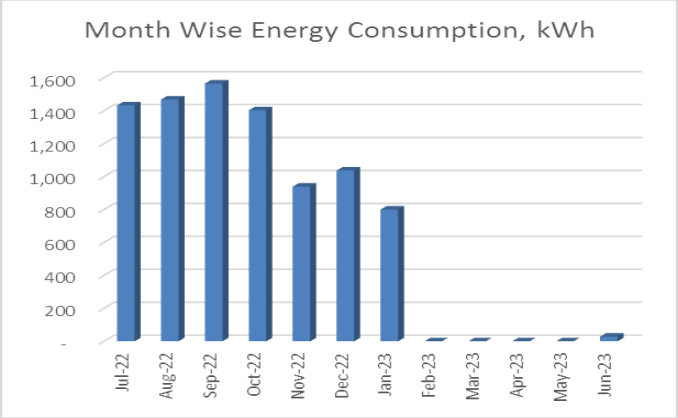

Figure 3.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

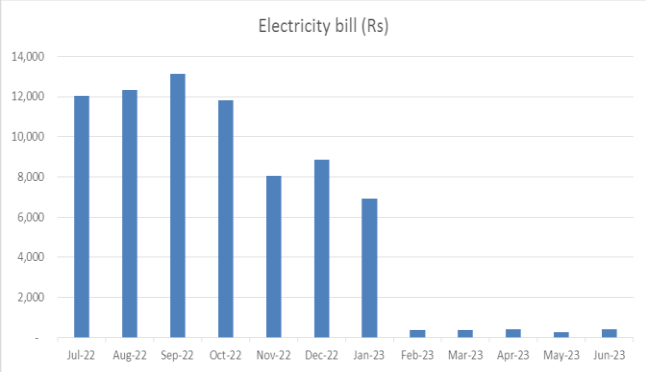

Figure 3.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 3.2: Key observations

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	1,565	1.3
2	Minimum	-	-
3	Average	723	0.6
4	Total	8,673	6.9

4. Carbon Foot printing

1. A Carbon Foot print is defined as the Total Greenhouse Gas emissions (CO_2 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_2 Emissions:

The basis of Calculation for CO_2 emissions due to Electrical Energy is as under

- 1 Unit (kWh) of Electrical Energy releases **0.8 Kg of CO_2** into atmosphere.

Based on the above Data we compute the CO_2 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 & CO2 Emissions

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-23	28	0.02
2	May-23	-	0.00
3	Apr-23	-	0.00
4	Mar-23	-	0.00
5	Feb-23	-	0.00
6	Jan-23	800	0.64
7	Dec-22	1,037	0.83
8	Nov-22	939	0.75
9	Oct-22	1,403	1.12
10	Sep-22	1,565	1.25
11	Aug-22	1,468	1.17
12	Jul-22	1,433	1.15
	Total	**8,673**	**6.94**

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

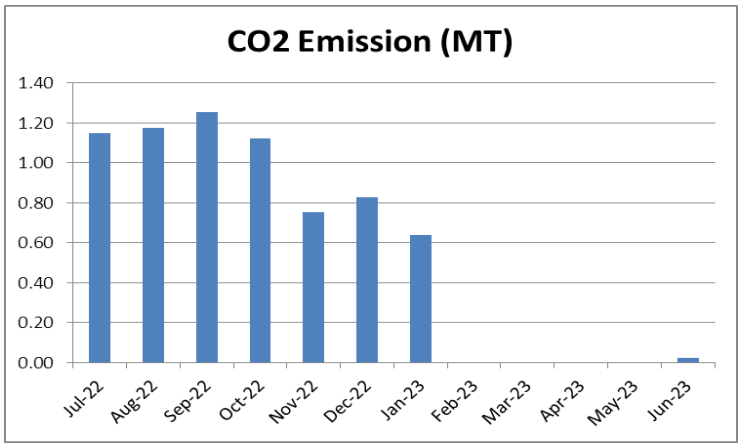

Figure 4.1: Month wise CO2 Emission

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 56 LED bulbs and 77 LED tubes in indoor lighting. There are 9 No of LED street lights.

5.2 Air-conditioners

In the facility, there are about 01 Nos. of 1.5 Tr old Air-conditioners. It is recommended to replace these Old ACs with BEE STAR Rated ACs. There is 1 star rated new AC of 1.5Tr capacity.

5.3 Ceiling Fans

At building facility, there are about 94 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 are in total 1 Water pumps with 1.5HP capacity.

6. Study of usage of alternate energy

In this Chapter, we compute the percentage of Usage of Alternate/Renewable Energy to Annual Energy Requirement of the College. The College has installed Roof Top Solar PV System. The Installed Capacity of Solar PV Plant is **15 kWp**.

Table 6.1: Computation of % Usage of Alternate Energy to Annual Energy Requirement

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	14,580	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	22500	kWh/Annum
3	Total Energy Requirement of College	37,080	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	61	%

Photograph of Solar PV plant

7. 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 7.1: Total lighting load

No	Particulars	Qty	Load, W/Unit	Load, kW
1	F T L-40 W	0	40	0
	LED lighting load			
1	LED tube	77	20	1.54
2	LED bulb	56	12	0.672
3	LED street lights (100W)	4	100	0.4
4	LED street lights (50W)	5	50	0.25
	Total LED lighting load			**2.862**
	Total Lighting load			**2.862**

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

8. Energy conservation proposals

8.1 Replacement of old fans with STAR Rated fans

During the Audit, it was observed that there are 94 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	94	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 demad	13	W/Unit
5	Average Daily Usage period	4	Hrs/Day
6	Daily saving in Energy	4.888	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	1222	kWh/Annum
9	Rate of Electrical Energy	11	Rs/kWh
10	Annual Monetary saving	13442	Rs/Annum
11	Cost of STAR Rated Ceiling Fan	2174	Rs/unit
12	Investment required	204356	Rs lump sum
13	Simple Payback period	182	Months

8.2 Replacement of 1.5 TR Old ACs with STAR Rated ACs

During the Audit, it was observed that there are 1 Nos, of 1.5 TR old ACs. It is recommended to replace these old ACs with STAR Rated ACs.

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

No	Particulars	Value	Unit
1	Present Qty of 1.5 TR Old ACs	1	Nos
2	Energy Demand of Old 1.5 TR AC	2.15	kW/Unit
3	Energy Demand of New AC	1.15	kW/Unit
4	Reduction in demad	1	kW/Unit
5	Average Daily Usage period	4	Hrs/Day
6	Daily saving in Energy	4	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	1000	kWh/Annum
9	Rate of Electrical Energy	11	Rs/kWh
10	Annual Monetary saving	11000	Rs/Annum
11	Cost of STAR Rated 1.5 TR AC	52875	Rs/unit
12	Investment required	52875	Rs lump sum
13	Simple Payback period	58	Months

8.3 Summary of Savings

No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs.	Payback period, Months
1	Replacement of 94 Nos Old Ceiling Fans with STAR rating fans	1,222	13,442	204,356	182
2	Replacement of 1 Nos Old 1.5 TR Acs with STAR rating Acs	1,000	11,000	52,875	58
	Total	**2,222**	**24,442**	**257,231**	**126**

Report

On

Green Audit

At

Shri. Kisanlal Nathmal Goenka Arts & Commerce College

Karanja (Lad)

(Year 2022-23)

Prepared by

Nutan Urja Solutions

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Contents

Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Shri. Kisanlal Nathmal Goenka Arts & Commerce College Karanja (Lad) 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.

Executive Summary

Green Audit of Shri. Kisanlal Nathmal Goenka Arts & Commerce College Karanja (Lad) is conducted by Nutan Urja Solutions, Pune. Based On the audit field study, following important points can be presented.

1. Present Energy Consumption

Shri. Kisanlal Nathmal Goenka Arts & Commerce College Karanja (Lad) 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	1,565	1.3
2	Minimum	-	-
3	Average	723	0.6
4	Total	8,673	6.9

2. Various Measures Adopted for Energy Conservation

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. Usage of Renewable Energy

The college has installed solar PV panel of 15kW capacity.

4. Rain Water Harvesting

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

5. 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.

6. 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**

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

Kisanlal Nathmal arts and commerce Karanja was established in 1961 on the land generously donated by Kisanlal Nathmal Goenka . It is run by the Berar general education society Akola. It is situated in a rural area.

The College, definitely, has promoted research activities. As a result many of the teachers have acquired the Doctoral degree in the respective areas. Environmental concern has been another task of the college. Regular teaching of environmental studies is the salient feature of the college curriculum.

1.1 Objectives

1. To study present level of Energy Consumption
2. To Study the present CO_2 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	28	422
2	May-23	-	265
3	Apr-23	-	422
4	Mar-23	-	384
5	Feb-23	-	384
6	Jan-23	800	6,927
7	Dec-22	1,037	8,847
8	Nov-22	939	8,053
9	Oct-22	1,403	11,812
10	Sep-22	1,565	13,124
11	Aug-22	1,468	12,339
12	Jul-22	1,433	12,055
	Total	**8673**	**75,034**

Variation in energy consumption is as follows,

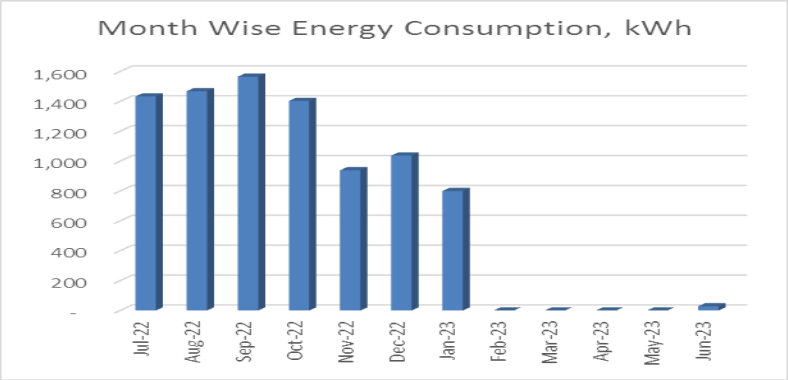


Figure 2.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

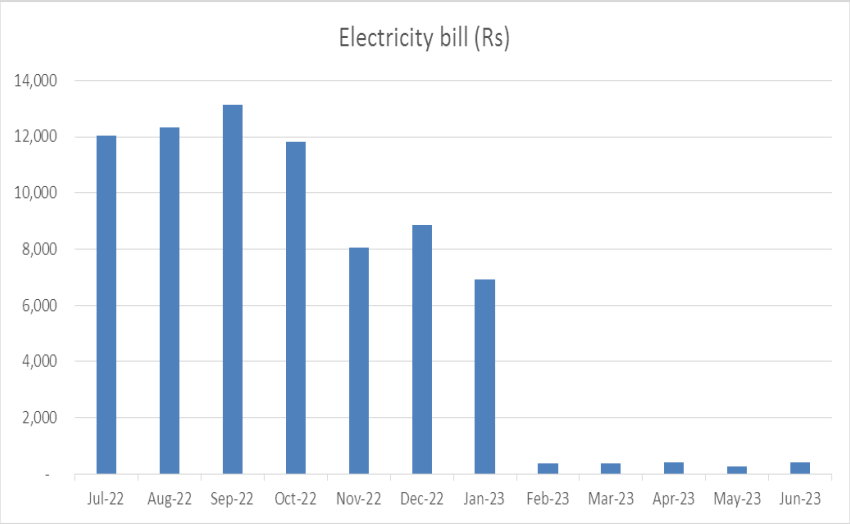


Figure 2.2: Month wise electricity bill

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	1,565	1.3
2	Minimum	-	-
3	Average	723	0.6
4	Total	8,673	6.9

3. Carbon Foot printing

1. A Carbon Foot print is defined as the Total Greenhouse Gas emissions (CO_2 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_2 Emissions:

The basis of Calculation for CO_2 emissions due to Electrical Energy is as under

- 1 Unit (kWh) of Electrical Energy releases **0.8 Kg of CO_2** into atmosphere.

Based on the above Data we compute the CO_2 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 & CO2 Emissions

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-23	28	0.02
2	May-23	-	0.00
3	Apr-23	-	0.00
4	Mar-23	-	0.00
5	Feb-23	-	0.00
6	Jan-23	800	0.64
7	Dec-22	1,037	0.83
8	Nov-22	939	0.75
9	Oct-22	1,403	1.12
10	Sep-22	1,565	1.25
11	Aug-22	1,468	1.17
12	Jul-22	1,433	1.15
	Total	**8,673**	**6.94**

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

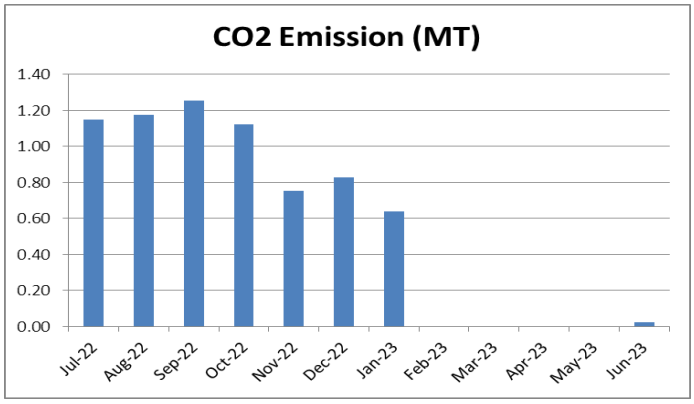


Figure 3.1: Month wise CO2 Emission

4. Study of Usage of Alternate Energy

In this Chapter, we compute the percentage of Usage of Alternate/Renewable Energy to Annual Energy Requirement of the College. The College has installed Roof Top Solar PV System. The Installed Capacity of Solar PV Plant is **15 kWp**.

Table 4.1: Computation of % Usage of Alternate Energy to Annual Energy Requirement

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	14,580	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	22500	kWh/Annum
3	Total Energy Requirement of College	37,080	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	61	%

Photograph of Solar PV plant

5. 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

6. Study of Waste Management

6.1 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.

6.2 e-Waste Management

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

7. Study of Green Practices

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

Out of total students coming to Institute, about 40% students use own Automobile.

7.2 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.

7.3 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

7.4 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

7.5 Paperless Office

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

8. Green Landscaping with Trees and Plants

The Institute has beautiful maintained Garden. The trees in college campus are as follows.

Table 8.1: Trees in college campus.

Sr no	Botanical Name	Comman Name	Total nos
1	Azadirachta Indica A. Juss	Kadunim	12
2	Aeglemormelos (I.) Corr	Bel	1
3	Millingtonia hortensis	Buch	9
4	Dentrocalamusstrictus (Roxb.) Nees	Mamboo	2
5	Terminalia catapa	Kadubadam	24
6	Acacia nilotica (L.) Wild ex. Delile	Subhabhul	12
7	Murrayakoenigii (L.) Spreng	Godnimbh	1
8	Roystonea regia O.F. Cook	Palm tree	53
9	Ficus religiosa	Pimple	6
10	Nerium Oleander L.	Kanher	11
11	Hibiscus rosa-sinensisL.	jaswand	2
12	Delonix regia	Gulmohor	6
13	Saraca asoca	Ashoka	11
14	Prunus duleis	Badam	3
15	Pilea peperomioides	Maniplant	4
16	Platycladus Orientails	Vidhya	8
17	Mitragyna speciosa leaves	Krotams	14
18	LawsoniainermisL	Mehandi	1
19	Jasminum sambac	Batmogra	1
20	ficus racemosa	Umber	2
21		Octosus	2
22		Christmas	1
23	Dita bark	Saptparni	23
24		Kashid	16
25	Carica papaya	Papai	1
26	Ficus benghalensis	Wad	3
27		Munga	1
28		Tikoma	10
29	Dalbergia sissoo	Sisam	10

Figure 8.1: Beautiful maintained Garden of college

The Berar General Education Society

Shri Kisanlal Nathmal Goenka College of Arts and Commerce

Karanja (Lad), Dist. Washim

3.4.2: Awards and recognitions received for extension activities from government / government recognised bodies

3.4.2 Number of awards and recognitions received for extension activities from government /government recognised bodies during the last five years (05)			
Name of the activity	**Name of the Award/ recognition for Institution**	**Name of the Awarding government/ government recognised bodies**	**Year of award**
2022-2023			
Cleanliness	Clean College Award-2023	Nagar Parishad Karanja Lad	2022-2023
2021-2022			
Cleanliness	Clean College Award-2022	Nagar Parishad Karanja Lad	2021-22
Promoting Eco friendly environment in College Campus	EFEC -Enroll & Educate Award 2022	Bio-diversity Facilitator -EFEC	2021-22
Exceptional Courage & Devotion Towards NSS activities & promoting conservation of nature	EFEC -Enroll & Educate Award 2022	Bio-diversity Facilitator -EFEC	2021-22
Exceptional Courage & Devotion work in "Pani Foundation"	EFEC -Enroll & Educate Award 2022	Bio-diversity Facilitator -EFEC	2021-22
2020-2021			
Cleanliness	Clean College Award-2021	Nagar Parishad Karanja Lad	2020-2021
Cleanliness	Clean College Award-2021	Nagar Parishad Karanja Lad	2020-2021
2019-2020			
---	---	---	---
---	---	---	---
2018-2019			
---	---	---	---

Officiating Principal
Shri K. N. Goenka College
Karanja Lad

Name of the activity- Cleanliness

Clean College Award-2023

Nagar Parishad Karanja Lad

नगर परिषद कारंजा ता. वाशिम

स्वच्छ सर्वेक्षण 2023

प्रमाणपत्र

प्रमाणित करण्यात येते कि, **स्वच्छ भारत अभियान** अंतर्गत

स्वच्छ सर्वेक्षण 2023 स्पर्धेमध्ये

श्री किसनलाल नथमल गोयनका कला व वाणिज्य महाविद्यालय

यांना स्वच्छ महाविद्यालय म्हणून गौरविण्यात येत आहे.

श्री. दीपक मोरे

मुख्याधिकारी

नगर परिषद कारंजा

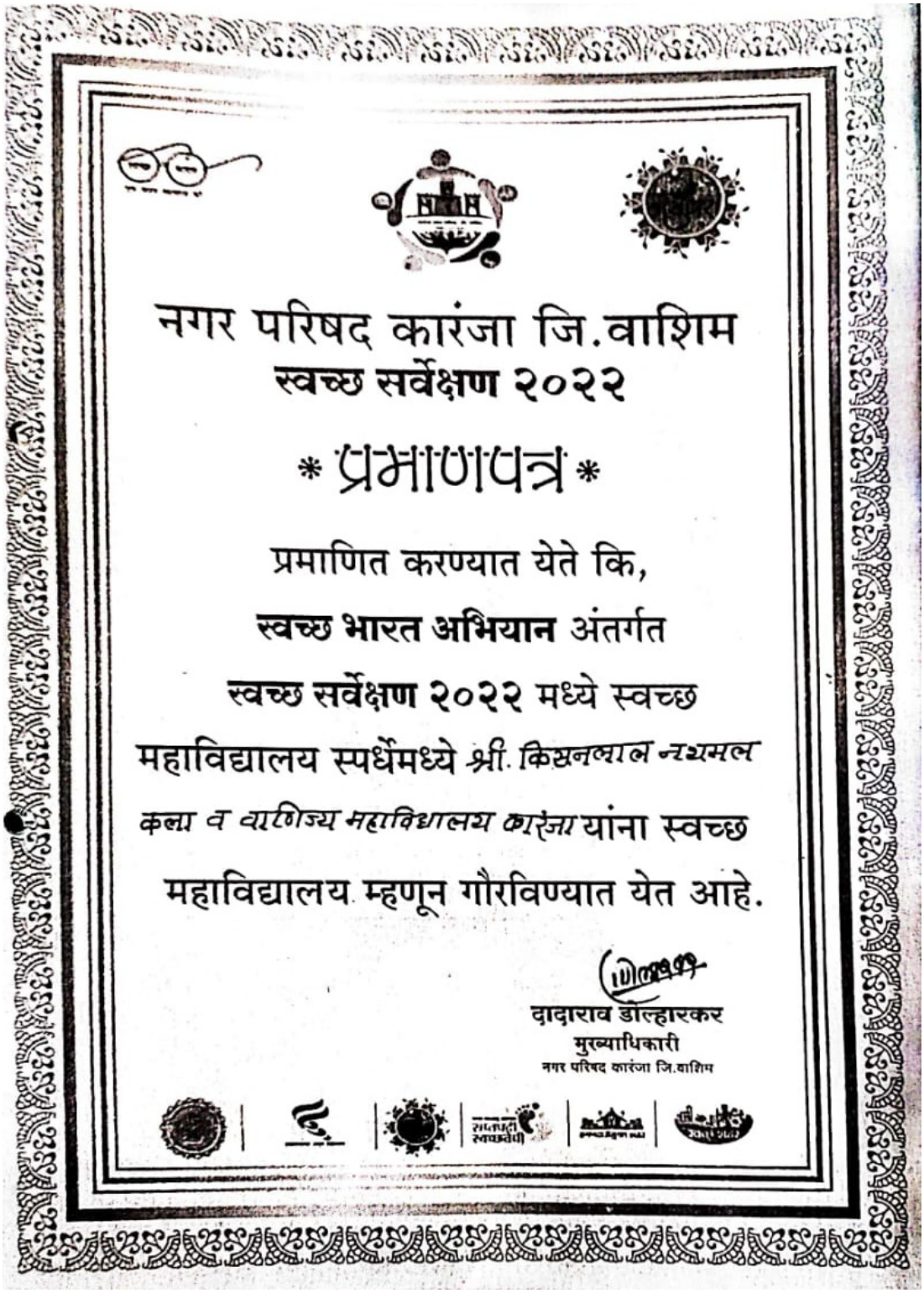
स्वातंत्र्याचा अमृत महोत्सव

सप्तपदी स्वच्छतेची

Year 2021-2022

Clean College Award-2022

Nagar Parishad Karanja Lad



नगर परिषद कारंजा जि.वाशिम

स्वच्छ सर्वेक्षण २०२२

* प्रमाणपत्र *

प्रमाणित करण्यात येते कि,

स्वच्छ भारत अभियान अंतर्गत

स्वच्छ सर्वेक्षण २०२२ मध्ये स्वच्छ

महाविद्यालय स्पर्धेमध्ये श्री. किसनलाल नथमल

कला व वाणिज्य महाविद्यालय कारंजा यांना स्वच्छ

महाविद्यालय म्हणून गौरविण्यात येत आहे.

दादाराव डोल्हारकर

मुख्याधिकारी

नगर परिषद कारंजा जि.वाशिम

Promoting Eco friendly environment in College Campus

EFEC -Enroll & Educate Award 2022

Bio-diversity Facilitator -EFEC

Exceptional Courage & Devotion Towards NSS activities & promoting conservation of nature
EFEC -Enroll & Educate Award 2022
Bio-diversity Facilitator -EFEC

Exceptional Courage & Devotion work in "Pani Foundation"
EFEC -Enroll & Educate Award 2022
Bio-diversity Facilitator -EFEC

Cleanliness

Clean College Award-2020

Nagar Parishad Karanja Lad

2020-2021

Clean College Award-2020

Nagar Parishad Karanja Lad

2020-2021

Officiating Principal
Shri K. N. Goenka College
Karanja Lad

The Berar General Education Society

Shri Kisanlal Nathmal Goenka College of Arts and Commerce

Karanja (Lad), Dist. Washim

Report on Environmental Promotional Activities

Environmental Promotional Activities
• Eco Friendly Rakshabandhan
• Eco Friendly Holi
• Plastic Ban Activity
• NSS Environmental Promotional Activities in Adopted Village
• Cleanliness Campaign

SHRI KISANLAL NATHMAL GOENKA ARTS & COMMERCE, COLLEGE
KARAJA LAD, DIST-WASHIM

Name of the Programme	:	**Eco Friendly Rakshabandhan**	
Organization	:	**Department of NSS**	
Date	:	**06th October, 2018**	
Chairperson	:	**Dr. V.R.Kodape**	
Guest	:	**Shri. Jayant Chaware**	
Number of Beneficiaries	:	**Teachers**	**02**
		Students	**84**
		Total	**86**

Outcome of the Programme :

- The students training to make Rakhi from seeds.
- The students got knowledge about Eco friendly Rakshabandan
- The students got knowledge about importance of planting trees.

Short Description of the Programme

The festival of Raksha Bandhan is celebrated all over the country. The department of NSS celebrated Rakshabandhan in a unique way at Shree Kisanlal Nathamal Goenka College, Karanja Lad. Keeping in mind the need to protect nature, the volunteers expressed their feelings

by tying Rakhi's to the trees. At the same time, the volunteers collected the seeds of the Seed trees and prepared its 'Rakhi'. With the feeling that trees help man to live, so man should show awareness to save them, tree seed Rakhi was constructed in the College as well as Smt. Shankutla Bai Dhabekara College, Karanja and Vidhya Bharatiy College, Karanja (Lad). This activity was implemented with the feeling that if this rakhi falls on the ground, a tree will grow somewhere through its seeds.

We get oxygen from plants. We are forgetting that we live on the basis of these trees. Therefore, the students decided to save the trees and participated in this activity. Training Program Officer Dr.Kiran Waghmare gave the students training to make Rakhi. The activity was successfully completed under the guidance of the Principal of College, Dr. VR Kodope. Festivals in India are based on nature. On this occasion, hope is being expressed that if the thought and need of nature protection is conveyed to the society through these festivals in a positive way, nature will be protected.

Head, Department of NSS

Signature of the IQAC Co-ordinator

Photos of Programme

Preparation of Rakhi's from tree Seed

Eco Friendly Rakshabandhan at Shakuntalabai Dhabekar College, Karanja Lad

Eco-Friendly Rakshabandhan at Vidhyabharti College, Karanja Lad

SHRI. KISANLAL NATHMAL GOENKA ARTS & COMMERCE, COLLEGE
KARAJA LAD, DIST-WASHIM

Name of the Programme : **Eco Friendly Holi**

Organization : **NSS Department**

Shri. Kisanlal Nathmal Goenka Arts & Commerce, College, Karanja Lad

Date : **9th March, 2020**

Number of Beneficiaries :	**Teachers**	**05**
	Students	**48**
	Total	**53**

Outcome of the Programme:

- Students got knowledge about preparing colurs from flowers.
- Students aware about the importance of eco friendly environment.
- Students took imitative in earn and learn policy.

Short Description of the Programme

Festivals in Hindu culture are joyful, energetic as well as meaningful. Holi is a festival of colors and sacrifice of evil things. On the occasion of Holi and Rangpanchami, in accordance with the environment complementary Holi celebration by the National Service Scheme Department of Shri. Kisanlal Nathamal Goenka College, celebrate Holi Festival. NSS volunteers did the work of making colors from 'Palas Flowers' for Rangpanchami under the guidance of the program officer of the NSS. Around 50 volunteers participated in this activity.

Colours were prepared and sold from 'Palas' flower. Students benefited from the Learn and Earn scheme. College professors and citizens of Karanja city bought this color.

Signature of the organizer

Signature of the IQAC Co-ordinator

Photos and News of the Programme


AI QUAD CAMERA


AI QUAD CAMERA


Latitude: 20.487455
Longitude: 77.49075
Elevation: 413.28m
Accuracy: 3.8m
Time: 03-09-2020 12:02
Note: 12


Latitude: 20.487455
Longitude: 77.49075
Elevation: 413.25m
Accuracy: 3.8m
Time: 03-09-2020 12:02
Note: 12


Latitude: 20.487457
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Elevation: 411.62m
Accuracy: 3.8m
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Note: 12

SHRI. KISANLAL NATHMAL GOENKA ARTS & COMMERCE, COLLEGE
KARAJA LAD, DIST-WASHIM

Name of the Programme	:	**Plastic Ban Activity**
Organization	:	**NSS Department** Shri. Kisanlal Nathmal Goenka Arts & Commerce, College, Karanja Lad
Date	:	**27th September, 2020**
Chairperson	:	**Dr. V.R. Kodape**
Guest	:	**Shri.Rahul Sawant** Municipal commission
Number of Beneficiaries	:	**Teachers 02** **Students 45** **Total 47**

Outcome of the Programme:

- Students got knowledge about disadvantage of plastic use.
- Students got information about how plastic harmful for human also animal too.
- Students know about that Due to the uncontrolled use of plastic, its disposal has become a huge problem in major cities and towns alike.

Short Description of the Programme

Plastic Pollution is affecting the whole earth, including mankind, wildlife, and aquatic life. With an objective to make everyone realize the harmful impact it has on our lives and urge them to adopt a plastic-free life style, Shri. Kisanlal Nathmal Goenka, College, Karanja lad. initiated the campaign 'Say No to Plastic'. The NSS volunteers undertook a pledge to protect the environment from the toxic plastics by keeping their homes free of plastic materials like Polythene bags, boxes, bottles, glasses, plastic containers, straws etc. and also promised to spread awareness among their friends and relatives.

The interactors showed their deep concern towards environment by designing e- posters which brought out their reflective ideas on how plastic is polluting oceans, lands, our biodiversity, human health and pristine beauty of the earth. The posters were a perfect blend of imagination and technical acumen. Students made beautiful posters with a splash of colours and displayed the things made from single-use plastic. They also took a pledge to motivate each individual to take necessary steps to stop plastic pollution. They emphasized the hazards caused by plastic in human and marine life. This activity helped them understand the need to take an immediate action to save our planet from plastic pollution.

Signature of the organizer

Signature of the IQAC Co-ordinator

Photos and News of the Programme


''राष्ट्रीय सेवा योजना''
सुस्वागतम

Handmade paper Bag

Posters for no use of Plastic

Sant Gadge Baba Amravati University, Amravati

National Service Scheme

Special Camp Report

Session 2021-2022

Adopted Village - Kupti

A special camp was organized by our college NSS Team at adopted village, Kupti, Tq. Karnja Lad from 5th to 12th March 2022. Executive Member of the Berar Education Society Dr. Ajay Kant inaugurated the camp on 6thMarch 2022. All the executive members of the organization were also present. All the Volunteers cleaned the village roads under leadership of the NSS program officer Dr. Kiran Waghmare and Dr. Neelam Chhangani. The cemetery of the village was beautified under Shrama Sanskara in this camp.

In the camp, social and educational awareness was conducted on various topics in the camp. In this, S.S. Chavan, Mrs. Prajaktai Bahitkar, Praveen Dihade, ShyamSawai, Amar Kakade etc. guided. In the night session, health camp, bhajan evening and cultural programs of students were organized.

The camp was concluded on March 12 by the principal of the college. Under the chairmanship of Dr. Vinay Kodape and Sarampach Mrs. Sushma Harish Balang and Deputy Sarpanch Mrs. The head of Alka Rajesh Munde was present. A total of 100 volunteers participated in the camp including, 50 boys and 50 girls. The villagers appreciated the various activities done by the volunteers through the camp.

Making Water Bowl from Waste Coconut

Making Notebook with Rough Pages
Earn and Learn Scheme

Special Camp Activity

Visit to Adivasi Family

Covid –Vaccination Campaign

Selfie With Tree

Selfie with Mask

Dr.Kiran Waghmare	Dr.Neelam Chhangani	Dr. V.R.Kodape
Program Officer	**Women Program Officer**	**Principal**

Activities in Swacha Bhart Abhiyan

Cleanliness Activity in Institute

Officiating Principal
Shri K. N. Gounda College
Kamala Lad