Nagpur Agricultural Development Trust, Nagpur

Arts Commerce College, Patansaongi

Tah. Saoner, Dist. Nagpur

(Affiliated with R.T.M. Nagpur University, Nagpur)

Sunilbabu Kedar
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Guide
Mob. 9822700846

Ad. R. R. Thaware
Secretary
Mob. 9890725698

Outward No.

Date :.....

Criteria 7.1.3.	**Quality audits on environment and energy regularly undertaken by the Institution. The institutional environment and energy initiatives are confirmed through the following**
Findings of DVV	1] Kindly provide the clearly visible authenticated detail report in English language of clean and green campus initiatives and beyond the campus environmental promotion activities along with photographs appropriately captioned and dated duly certified by principal. 2]Kindly provide the policy document on environment and energy usage duly certified by principal.
Response/ Clarification	As per the clarification to provide the visible authenticated detail report clean and green campus initiatives and beyond the campus environmental promotion activities along with photographs appropriately captioned and Policy Document

Acting Principal
Art-Commerce College,
Patansaongi
Tah. Saoner Dist. Nagpur

Appendex I

Report

On

Energy Audit

At

Arts Commerce College,

Patansaongi Dist. Nagpur

(Year 2021-22)

Prepared by

Nutan Urja Solutions

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Sus Road, Sus, Pune 411 021

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Contents

Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Arts Commerce College, Patansaongi 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, (kWh)	CO2 Emission (MT)
1	Total	2,187	1.75
2	Maximum	346	0.28
3	Minimum	-	-
4	Average	182	0.15

2. Energy Conservation Projects already installed

1. Usage of LED lights at some indoor locations
2. 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 Alternate Energy

The College has installed a Roof Top Solar PV Plant. The percentage of usage of Alternate Energy to Annual Energy Requirement is 77 %.

5. 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 %.

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 25 Nos Old Ceiling Fans with STAR rating fans	1,250	13,750	54,350	47
	Total	**1,250**	**13,750**	**54,350**	**47**

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

Arts Commerce College is located in Patansaongi, Dist. Nagpur. The college is running Bachelor of arts and Bachelor of Commerce. 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	Arts Commerce College, Patansaongi
2	Address	Arts Commerce College, Patansaongi, Tal. Saoner, Dist. Nagpur
3	Affiliation	R.T. M. Nagpur University.

2. Study of connected load

In this chapter, we present details of various connected electrical equipment and electrical load. Individual fitting wise load is as under.

Table No 2.1: Equipment wise Connected Load

No	Equipment	Qty	Load, W/Unit	Load, kW
1	LED Tube-20W	31	20	0.6
2	LED bulb	10	12	0.1
3	Computers	28	65	1.8
4	Ceiling Fan	25	65	1.6
5	Pumps (2 nos 2HP)			1.5
	Total			3.1

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

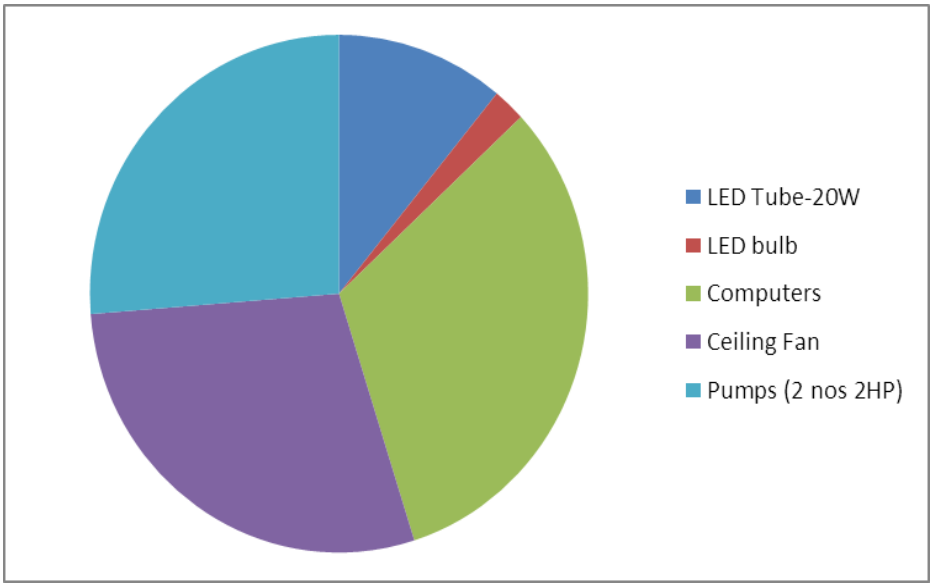

Figure 2.1: Distribution of connected load.

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-22	117	1451
2	May-22	215	2010
3	Apr-22	318	3069
4	Mar-22	346	3382
5	Feb-22	307	2993
6	Jan-22	287	2798
7	Dec-21	268	2613
8	Nov-21	224	2184
9	Oct-21	105	1100
10	Sep-21	0	373
11	Aug-21	0	373
12	Jul-21	0	373
	Total	**2,187**	**22,719**

Variation in energy consumption is as follows,

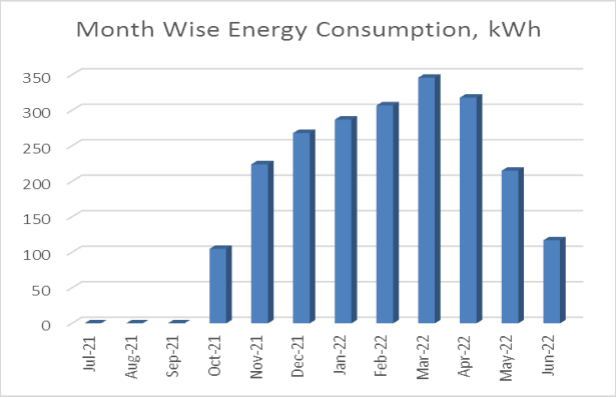

Figure 3.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

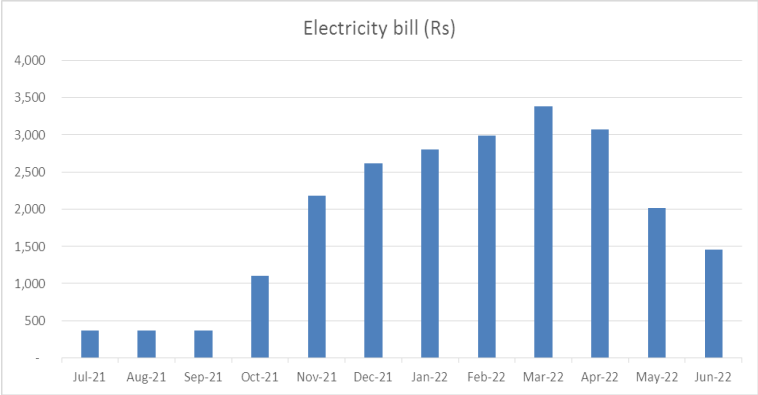

Figure 3.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 3.2: Key observations

Sr no	Parameter	Energy consumed, (kWh)	CO2 Emission (MT)
1	Total	2,187	1.75
2	Maximum	346	0.28
3	Minimum	-	-
4	Average	182	0.15

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-22	117	0.09
2	May-22	215	0.17
3	Apr-22	318	0.25
4	Mar-22	346	0.28
5	Feb-22	307	0.25
6	Jan-22	287	0.23
7	Dec-21	268	0.21
8	Nov-21	224	0.18
9	Oct-21	105	0.08
10	Sep-21	-	0.00
11	Aug-21	-	0.00
12	Jul-21	-	0.00
	Total	**2,187**	**1.75**

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

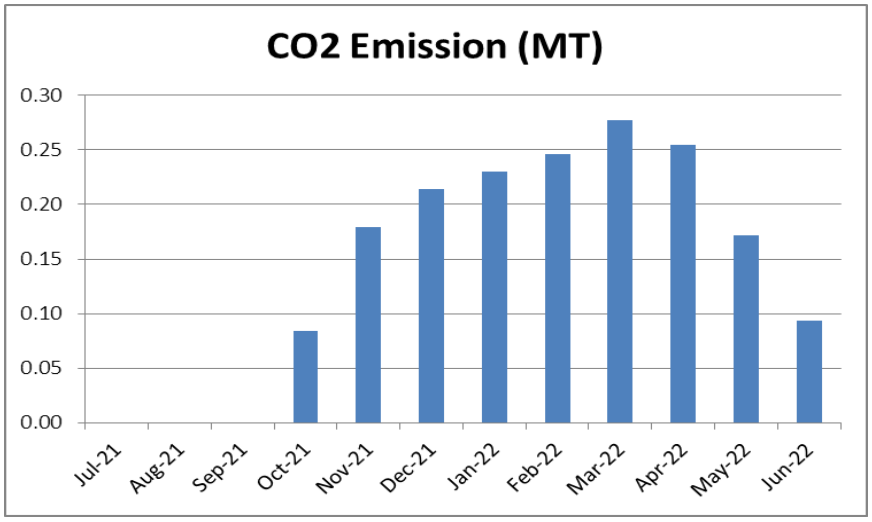

Figure 4.1: Month wise CO2 Emission

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 31 nos of LED tubes, 10 nos of LED bulbs.

5.2 Ceiling Fans

At building facility, there are about 25 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.

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 5 **kWp**.

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

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	2,187	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	7500	kWh/Annum
3	Total Energy Requirement of College	9,687	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	77	**%**

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
	LED lighting load			
1	LED tube	31	20	0.62
2	LED bulbs	10	12	0.12
	Total LED lighting load			0.74
	Total Lighting load			0.74

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 25 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	25	Nos
2	Energy Demand of Old Ceiling Fan fitting	65	W/Unit
3	Energy Demand of STAR Rated Fan	40	W/Unit
4	Reduction in demad	25	W/Unit
5	Average Daily Usage period	8	Hrs/Day
6	Daily saving in Energy	5	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	1250	kWh/Annum
9	Rate of Electrical Energy	11	Rs/kWh
10	Annual Monetary saving	13750	Rs/Annum
11	Cost of STAR Rated Ceiling Fan	2174	Rs/unit
12	Investment required	54350	Rs lump sum
13	Simple Payback period	47	Months

8.2 Summary of Savings

No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs.	Payback period, Months
1	Replacement of 25 Nos Old Ceiling Fans with STAR rating fans	1,250	13,750	54,350	47
	Total	**1,250**	**13,750**	**54,350**	**47**

Report

On

Energy Audit

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Prepared by

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1. Present Energy Consumption

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

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Sr no	Parameter	Energy consumed, (kWh)	CO2 Emission (MT)
1	Total	3,779	3.02
2	Maximum	577	0.46
3	Minimum	-	-
4	Average	315	0.25

2. Energy Conservation Projects already installed

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

3. Key Observations

1. Usage of LED lights.
2. Usage of star rated equipment.
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The College has installed a Roof Top Solar PV Plant. The percentage of usage of Alternate Energy to Annual Energy Requirement is 66 %.

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

6. Recommendations

Table no 1: Recommendations for energy savings

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1	Replacement of 25 Nos Old Ceiling Fans with STAR rating fans	1,250	13,750	54,350	47
	Total	**1,250**	**13,750**	**54,350**	**47**

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

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In this chapter, we present details of various connected electrical equipment and electrical load. Individual fitting wise load is as under.

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2	LED bulb	10	12	0.1
3	Computers	28	65	1.8
4	Ceiling Fan	25	65	1.6
5	Pumps (2 nos 2HP)			1.5
	Total			3.1

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

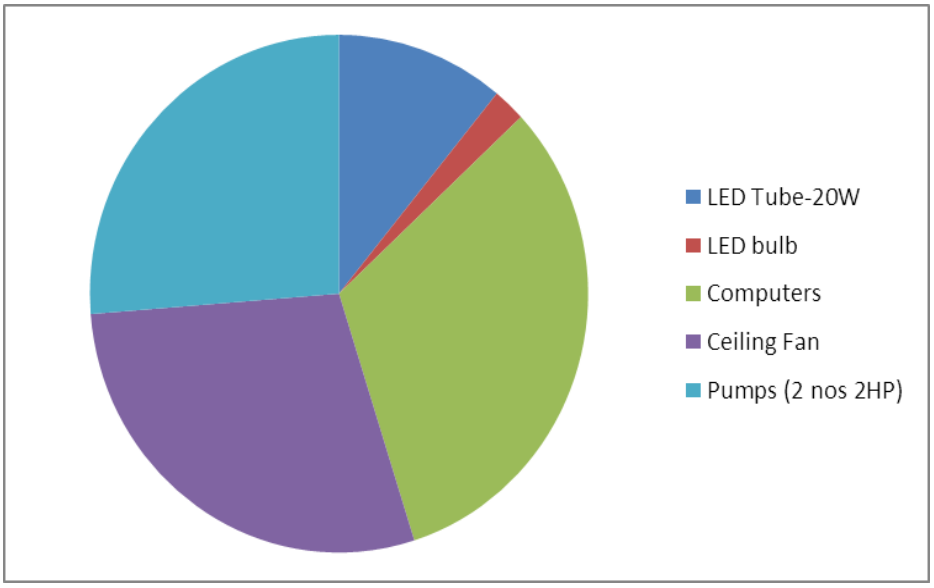

Figure 2.1: Distribution of connected load.

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	215	2,010
2	May-23	105	1,100
3	Apr-23	348	3,358
4	Mar-23	355	3,426
5	Feb-23	318	3,069
6	Jan-23	508	4,748
7	Dec-22	577	5,331
8	Nov-22	346	3,382
9	Oct-22	460	4,343
10	Sep-22	430	4,090
11	Aug-22	117	1,451
12	Jul-22	-	364
	Total	**3,779**	**36,672**

Variation in energy consumption is as follows,

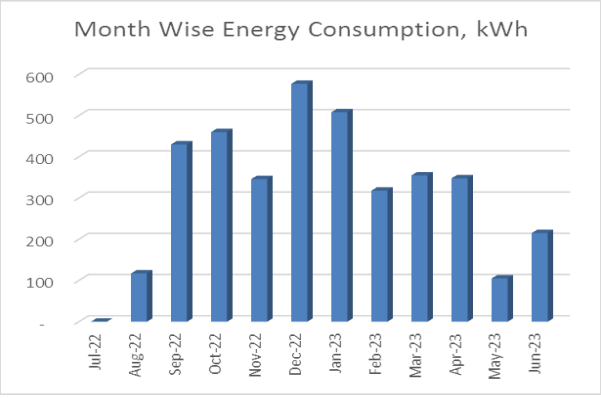

Figure 3.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

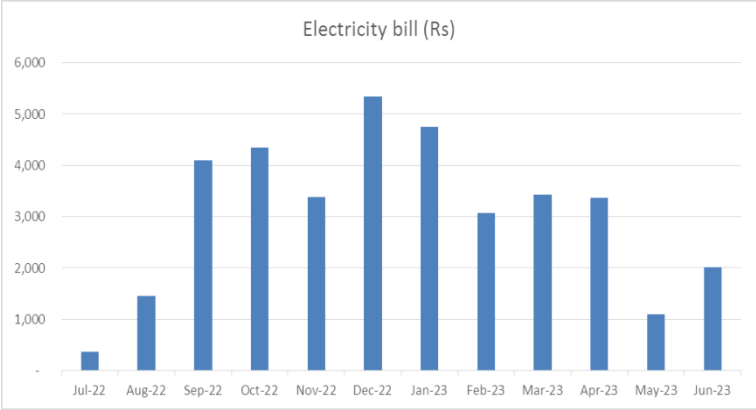

Figure 3.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 3.2: Key observations

Sr no	Parameter	Energy consumed, (kWh)	CO2 Emission (MT)
1	Total	3,339	3.02
2	Maximum	577	0.46
3	Minimum	-	-
4	Average	315	0.25

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	215	0.17
2	May-23	105	0.08
3	Apr-23	348	0.28
4	Mar-23	355	0.28
5	Feb-23	318	0.25
6	Jan-23	508	0.41
7	Dec-22	577	0.46
8	Nov-22	346	0.28
9	Oct-22	460	0.37
10	Sep-22	430	0.34
11	Aug-22	117	0.09
12	Jul-22	-	0.00
	Total	**3,779**	**3.02**

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

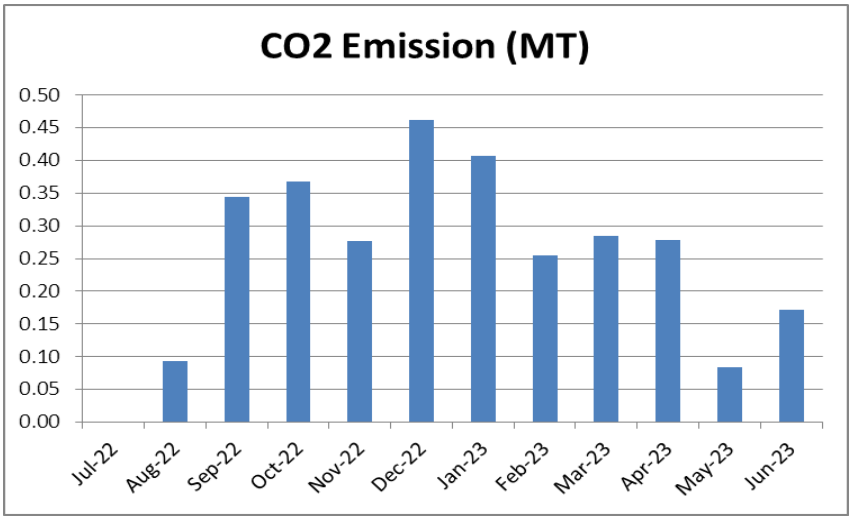

Figure 4.1: Month wise CO2 Emission

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 31 nos of LED tubes, 10 nos of LED bulbs.

5.2 Ceiling Fans

At building facility, there are about 25 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.

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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 5 **kWp**.

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

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	3,779	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	7500	kWh/Annum
3	Total Energy Requirement of College	11,279	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	66	**%**

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
	LED lighting load			
1	LED tube	31	20	0.62
2	LED bulbs	10	12	0.12
	Total LED lighting load			0.74
	Total Lighting load			0.74

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 25 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	25	Nos
2	Energy Demand of Old Ceiling Fan fitting	65	W/Unit
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4	Reduction in demad	25	W/Unit
5	Average Daily Usage period	8	Hrs/Day
6	Daily saving in Energy	5	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	1250	kWh/Annum
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10	Annual Monetary saving	13750	Rs/Annum
11	Cost of STAR Rated Ceiling Fan	2174	Rs/unit
12	Investment required	54350	Rs lump sum
13	Simple Payback period	47	Months

8.2 Summary of Savings

No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs.	Payback period, Months
1	Replacement of 25 Nos Old Ceiling Fans with STAR rating fans	1,250	13,750	54,350	47
	Total	**1,250**	**13,750**	**54,350**	**47**

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Environmental Audit

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Prepared by

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Table of Contents

Acknowledgement

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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.

Arts Commerce College, Patansaongi 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:

No	Parameter /Value	Energy, kWh	CO_2 Emissions, MT
1	Maximum	138	0.11
2	Minimum	-	-
3	Average	50	0.04
4	Total	594	0.48

3. The various projects already implemented for Environmental Conservation:

- Usage of Natural Day light in corridors
- Implementation of Bio Composting pit for disposal of Bio degradable waste
- Implementation of Rain Water Harvesting
- Installation of **5 kW** Solar PV Power Plant.

4. Recommendations:

1. Installation of Bio Gas Generator Plant instead of Bio composting Plant.
2. Installation of Sewage treatment Plant to make campus a Zero Discharge campus

5. Notes & Assumptions:

1. **1 kWh** of Electrical Energy releases **0.8 Kg of CO_2** into atmosphere
2. 1 kWp Solar PV plant generates 5 kWh/day Electrical Energy for 300 days in an year.

Abbreviations

AC	:	Air conditioner
PES	:	Progressive Education Society
CFL	:	Compact Fluorescent Lamp
FTL	:	Fluorescent Tube Light
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
PF	:	Power Factor
M D	:	Maximum Demand
PC	:	Personal Computer
MSEDCL	:	Maharashtra State Electricity Distribution Company Ltd

1. Introduction

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment

1.1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.1.4. Relevant Environmental Laws in India: Table No-1:

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

1.1.5. Some Important Environmental Rules in India: Table No-2:

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2. To Study the present pollution sources
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1.3 Audit Methodology:

1. Study of College as System
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3. Study of CO2 emissions
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2. Study of Consumption of Various Resources

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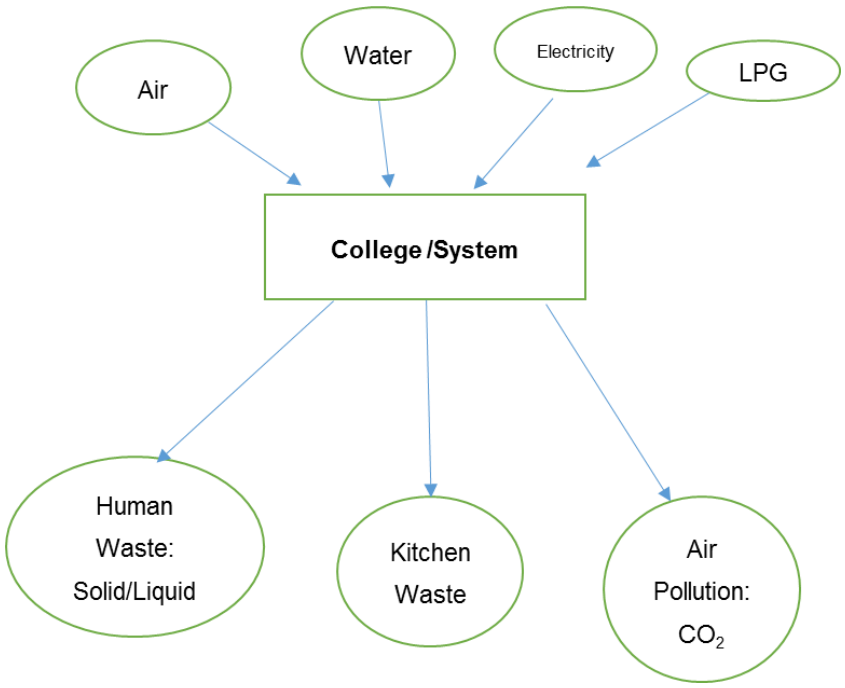

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The calculation of electrical energy consumption by college can be given as,

Table 2.1: Electrical Energy Consumption

No	Month	Energy Consumed, kWh
1	Jun-21	0
2	May-21	0
3	Apr-21	0
4	Mar-21	0
5	Feb-21	0
6	Jan-21	0
7	Dec-20	75
8	Nov-20	75
9	Oct-20	75
10	Sep-20	106
11	Aug-20	125
12	Jul-20	138
	Total	**594**
	Maximum	138
	Minimum	-
	Average	50

2.1 Variation of Monthly Electrical Energy Consumption

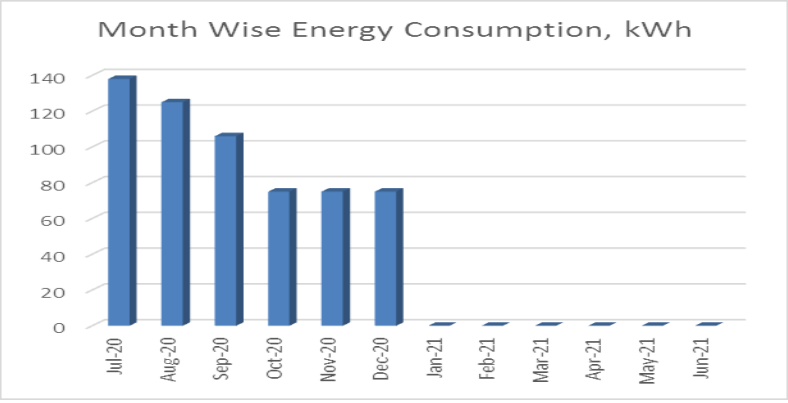

Figure 2.1 : Monthly Electrical Energy Consumption

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**	138
2	**Minimum**	-
3	**Average**	50
4	**Total**	594

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	CO_2 Emissions, MT
1	Jun-21	-	0.00
2	May-21	-	0.00
3	Apr-21	-	0.00
4	Mar-21	-	0.00
5	Feb-21	-	0.00
6	Jan-21	-	0.00
7	Dec-20	75	0.06
8	Nov-20	75	0.06
9	Oct-20	75	0.06
10	Sep-20	106	0.08
11	Aug-20	125	0.10
12	Jul-20	138	0.11
	Total	**594**	**0.48**
	Maximum	138	0.11
	Minimum	-	-
	Average	50	0.04

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

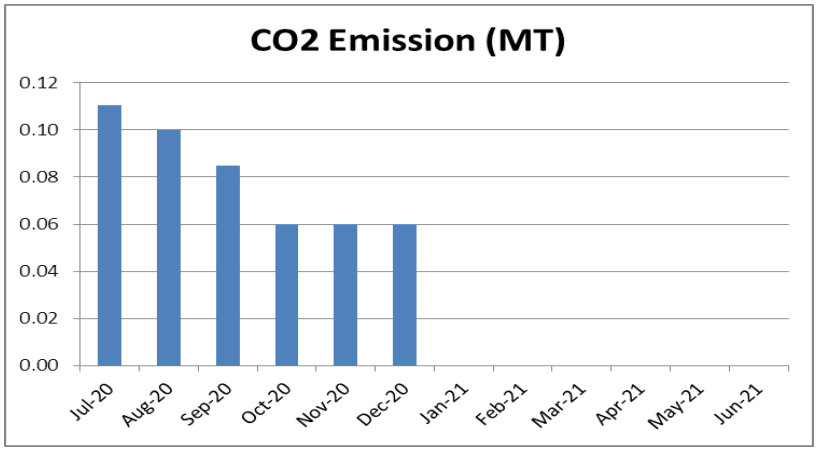

Figure 2.1: CO2 emission due to usage of electrical energy.

3.2 Study of Solid Waste Generation

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

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At present the Liquid Waste generated due to day to day operations is drained off to the municipal Corporation through a pipe.

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

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The College has 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.

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.
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Report

On

Environmental Audit

At

Arts Commerce College,

Patansaongi Dist. Nagpur

(Year 2021-22)

Prepared by

Nutan Urja Solutions

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

Sus Road, Sus, Pune 411 021

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

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Arts Commerce College, Patansaongi 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:

No	Parameter /Value	Energy, kWh	CO_2 Emissions, MT
1	Maximum	346	0.28
2	Minimum	-	-
3	Average	182	0.15
4	Total	2,187	1.75

3. The various projects already implemented for Environmental Conservation:

- Usage of Natural Day light in corridors
- Implementation of Bio Composting pit for disposal of Bio degradable waste
- Implementation of Rain Water Harvesting
- Installation of **5 kW** Solar PV Power Plant.

4. Recommendations:

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5. Notes & Assumptions:

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Abbreviations

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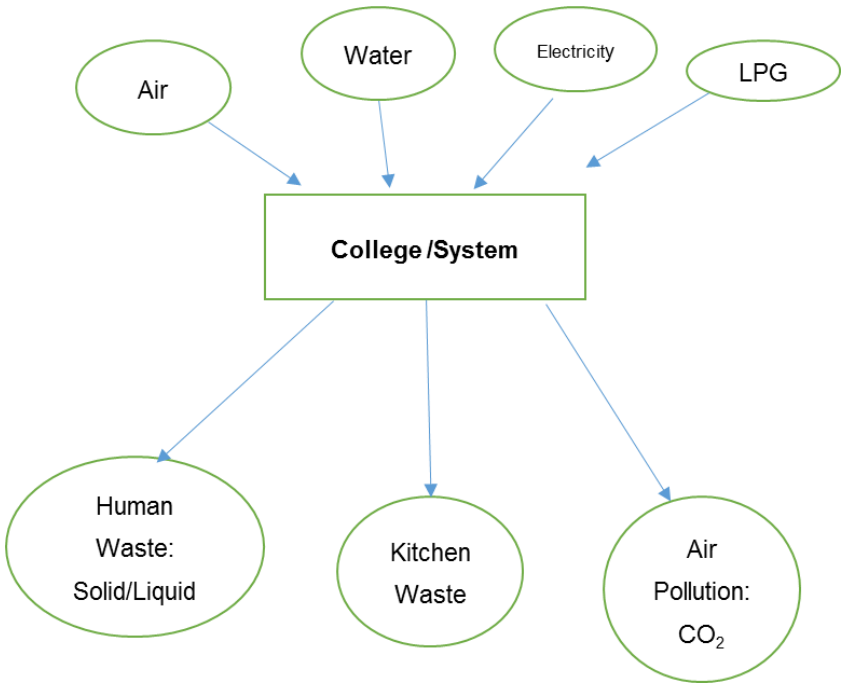

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The calculation of electrical energy consumption by college can be given as,

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No	Month	Energy Consumed, kWh
1	Jun-22	117
2	May-22	215
3	Apr-22	318
4	Mar-22	346
5	Feb-22	307
6	Jan-22	287
7	Dec-21	268
8	Nov-21	224
9	Oct-21	105
10	Sep-21	0
11	Aug-21	0
12	Jul-21	0
	Total	**2,187**
	Maximum	346
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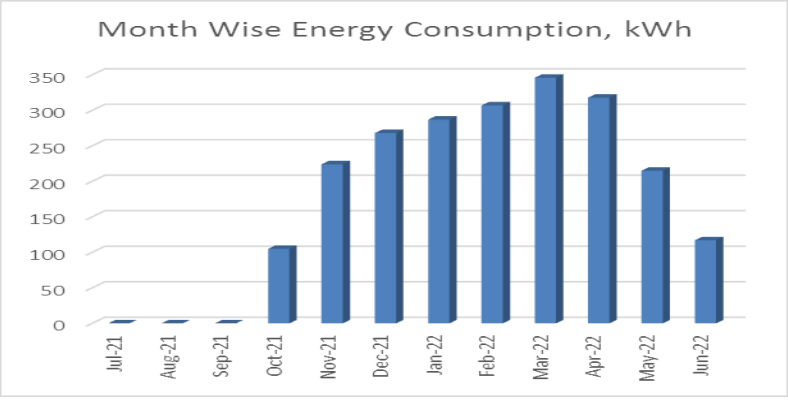
2.1 Variation of Monthly Electrical Energy Consumption



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1	Jun-22	117	0.09
2	May-22	215	0.17
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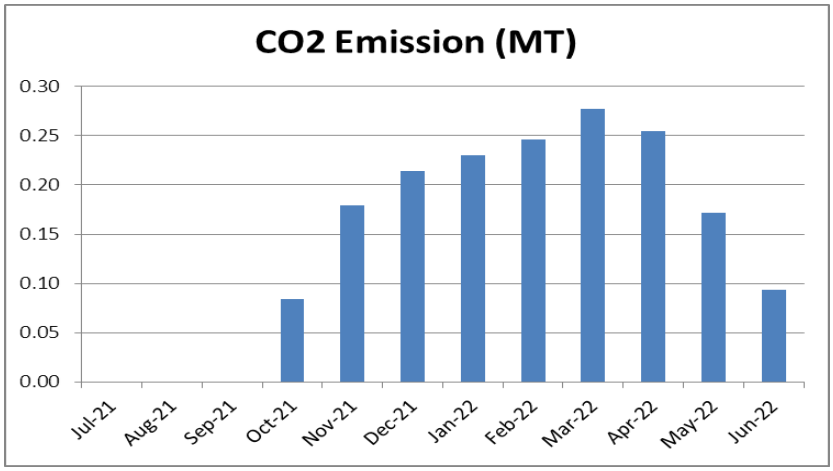

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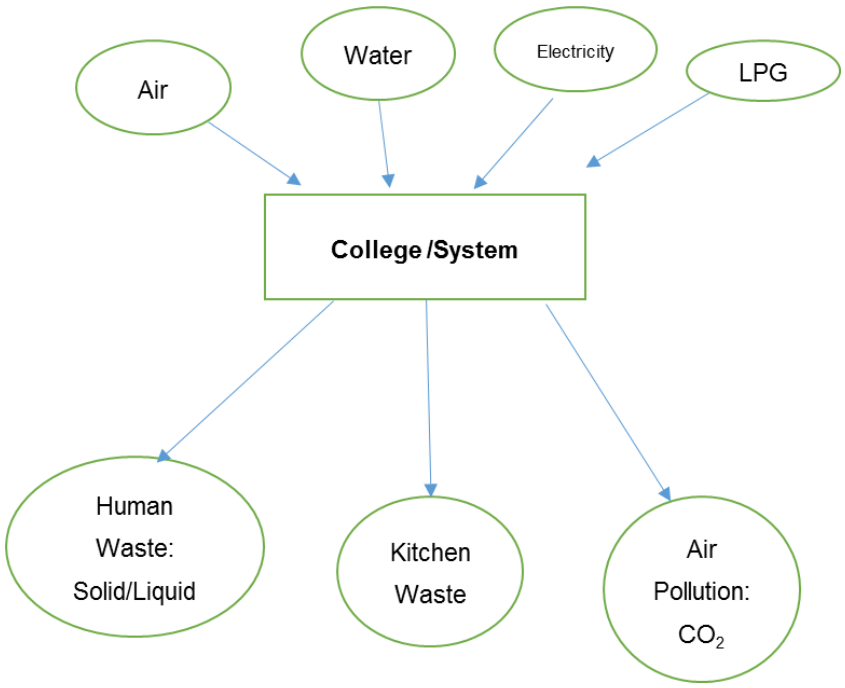

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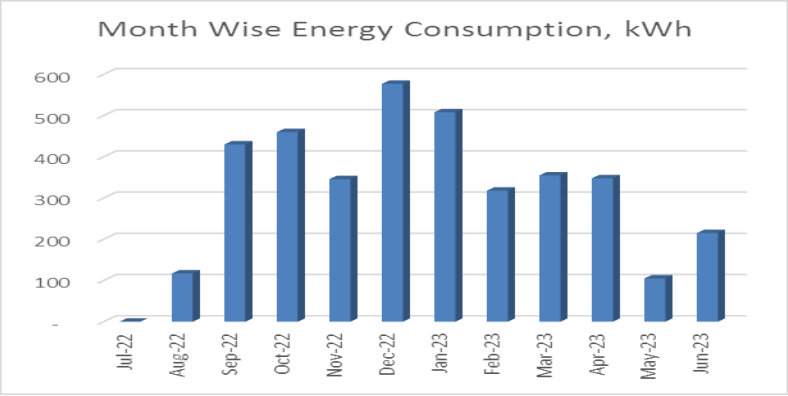

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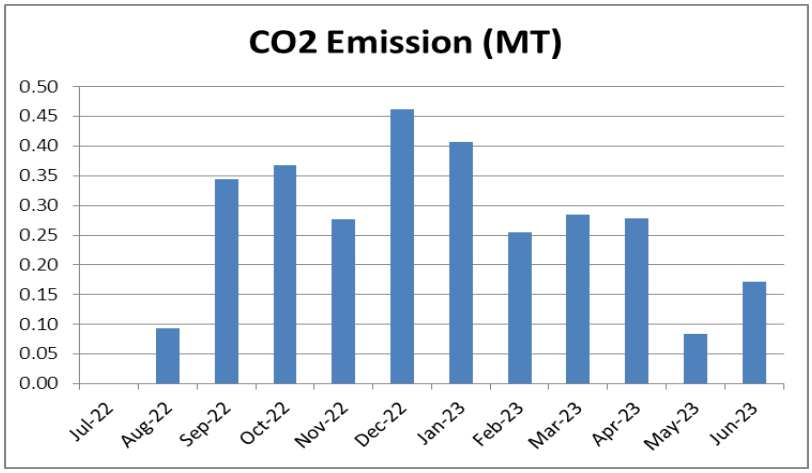

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- Installation of Sewage treatment Plant to make campus a Zero Discharge campus

Report

On

Green Audit

At

Arts Commerce College,

Patansaongi Dist. Nagpur

(Year 2020-21)

Prepared by

Nutan Urja Solutions

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

Sus Road, Sus, Pune 411 021

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

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1. Present Energy Consumption

Arts Commerce College, Patansaongi 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	138	0.11
2	Minimum	-	-
3	Average	50	0.04
4	Total	594	0.48

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. Usage of Renewable Energy

The collage has installed Solar PV Power Plant of 5kW capacity.

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

5. Waste Management

The College has 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
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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

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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-21	0	461
2	May-21	0	373
3	Apr-21	0	373
4	Mar-21	0	5651
5	Feb-21	0	333
6	Jan-21	0	-996
7	Dec-20	75	848
8	Nov-20	75	848
9	Oct-20	75	848
10	Sep-20	106	1033
11	Aug-20	125	1219
12	Jul-20	138	1346
	Total	**594**	**12,337**

Variation in energy consumption is as follows,

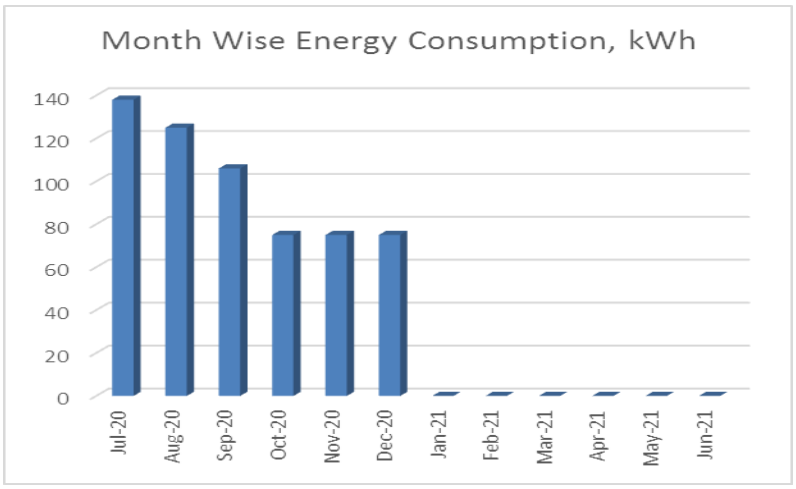

Figure 2.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

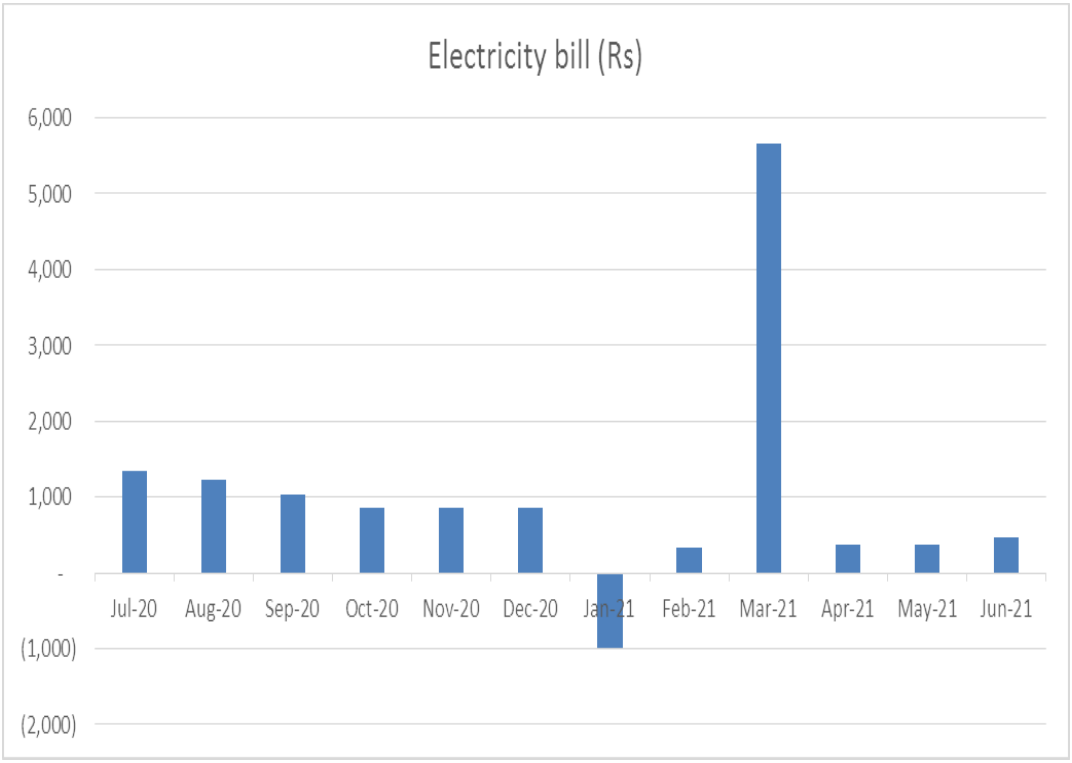

Figure 2.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 2.2: Key observations

Sr no	Parameter	Energy consumed, (Units)	CO2 Emmision (MT)
1	Maximum	138	0.11
2	Minimum	-	-
3	Average	50	0.04
4	Total	594	0.48

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-21	-	0.00
2	May-21	-	0.00
3	Apr-21	-	0.00
4	Mar-21	-	0.00
5	Feb-21	-	0.00
6	Jan-21	-	0.00
7	Dec-20	75	0.06
8	Nov-20	75	0.06
9	Oct-20	75	0.06
10	Sep-20	106	0.08
11	Aug-20	125	0.10
12	Jul-20	138	0.11
	Total	**594**	**0.48**

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

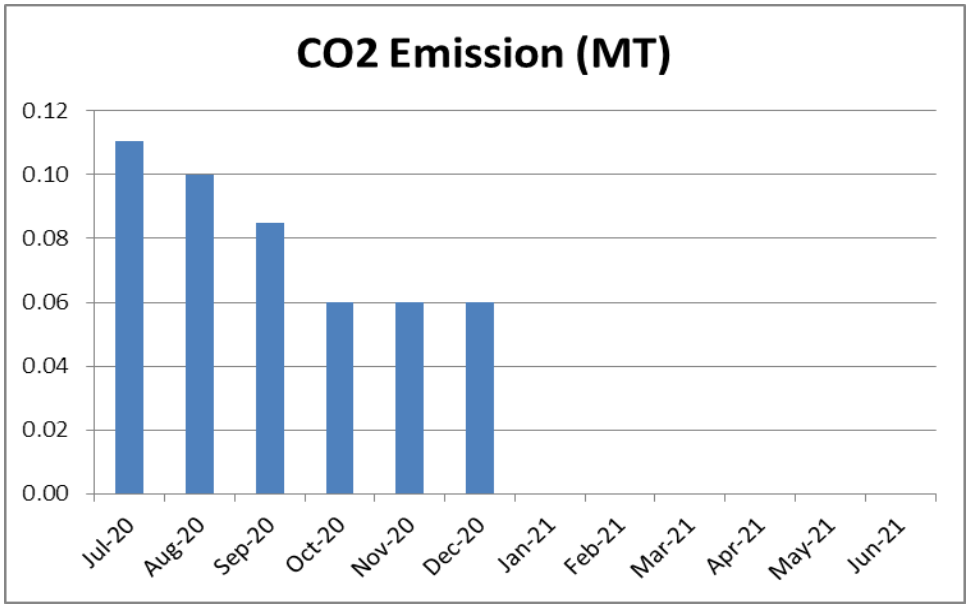

Figure 3.1: Month wise CO2 Emission

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 Solar PV System of 5kW capacity.

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

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	594	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	7500	kWh/Annum
3	Total Energy Requirement of College	8,094	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	93	**%**

Photograph of Solar PV plant

5. Study of Rain Water Harvesting

The College has 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.

6. Study of Waste Management

6.1 Solid Waste Management

The College has 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 hence 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 60% 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. The average number of students is approximately 40 %. 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.

7.6 Green Landscaping with Trees and Plants

The Institute has beautiful maintained Garden.

Figure 7.1: Beautiful maintained Garden of college

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Table no 1: Details of energy consumption

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	346	0.28
2	Minimum	-	-
3	Average	182	0.15
4	Total	2,187	1.75

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. Usage of Renewable Energy

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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
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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-22	117	1451
2	May-22	215	2010
3	Apr-22	318	3069
4	Mar-22	346	3382
5	Feb-22	307	2993
6	Jan-22	287	2798
7	Dec-21	268	2613
8	Nov-21	224	2184
9	Oct-21	105	1100
10	Sep-21	0	373
11	Aug-21	0	373
12	Jul-21	0	373
	Total	**2,187**	**22,719**

Variation in energy consumption is as follows,

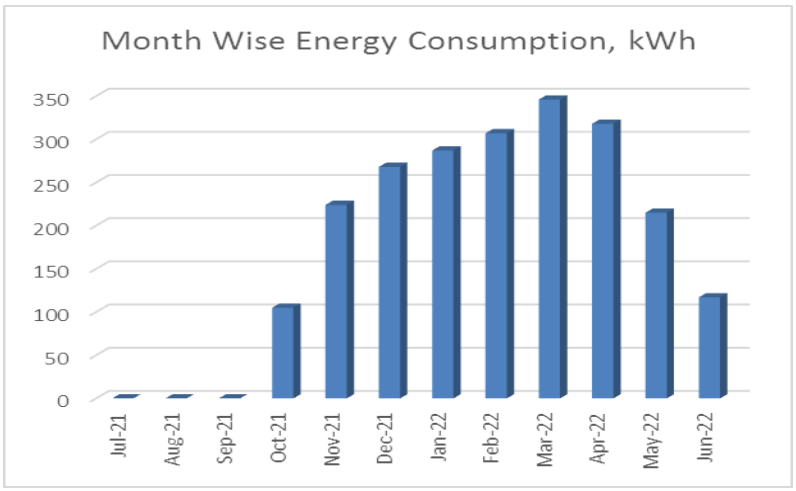

Figure 2.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

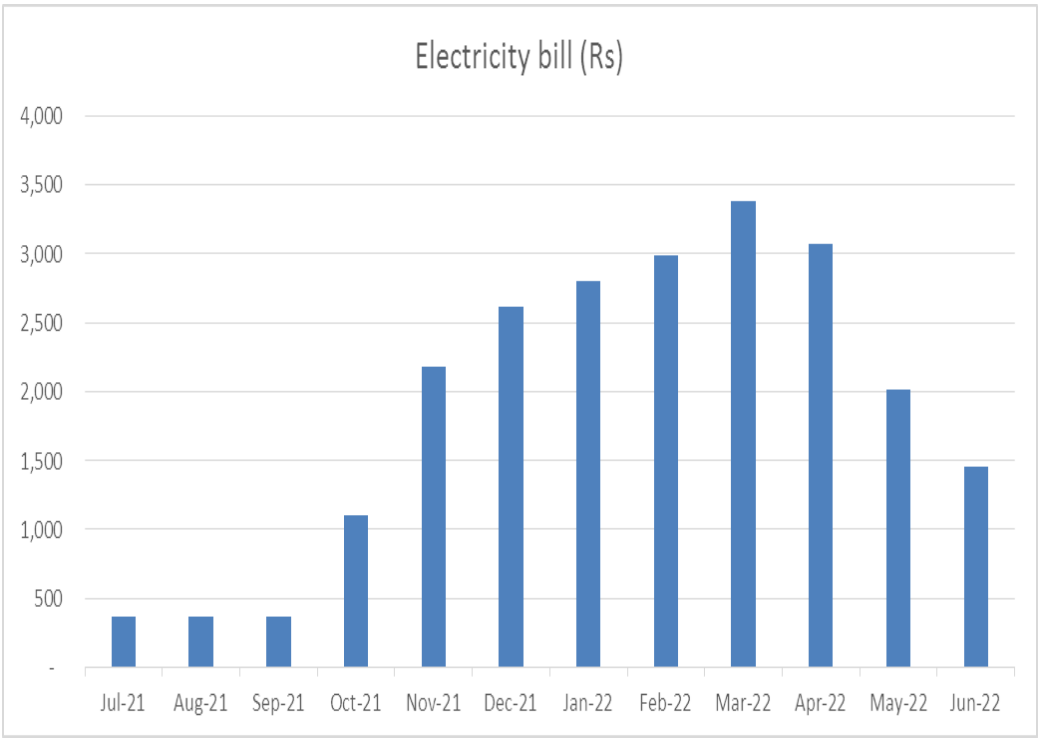

Figure 2.2: Month wise electricity bill

Key observations of electricity bill are as follows,

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Sr no	Parameter	Energy consumed, (Units)	CO2 Emmision (MT)
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The basis of Calculation for CO_2 emissions due to Electrical Energy is as under

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

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-22	117	0.09
2	May-22	215	0.17
3	Apr-22	318	0.25
4	Mar-22	346	0.28
5	Feb-22	307	0.25
6	Jan-22	287	0.23
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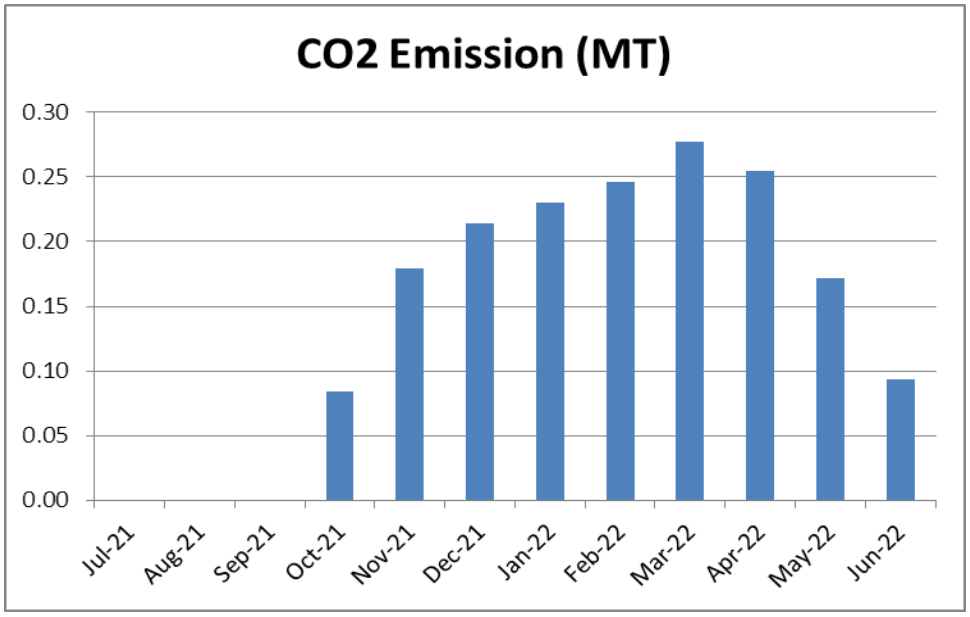
In the following Chart we present the CO2 emissions due to usage of Electrical Energy.



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No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	2,187	kWh/Annum
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3	Total Energy Requirement of College	9,687	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	77	**%**

Photograph of Solar PV plant

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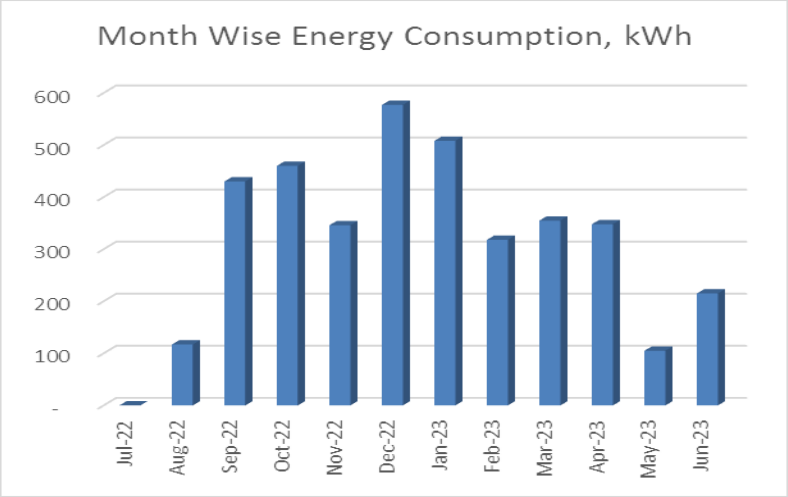
4	Mar-23	355	3,426
5	Feb-23	318	3,069
6	Jan-23	508	4,748
7	Dec-22	577	5,331
8	Nov-22	346	3,382
9	Oct-22	460	4,343
10	Sep-22	430	4,090
11	Aug-22	117	1,451
12	Jul-22	-	364
	Total	**3,779**	**36,672**

Variation in energy consumption is as follows,



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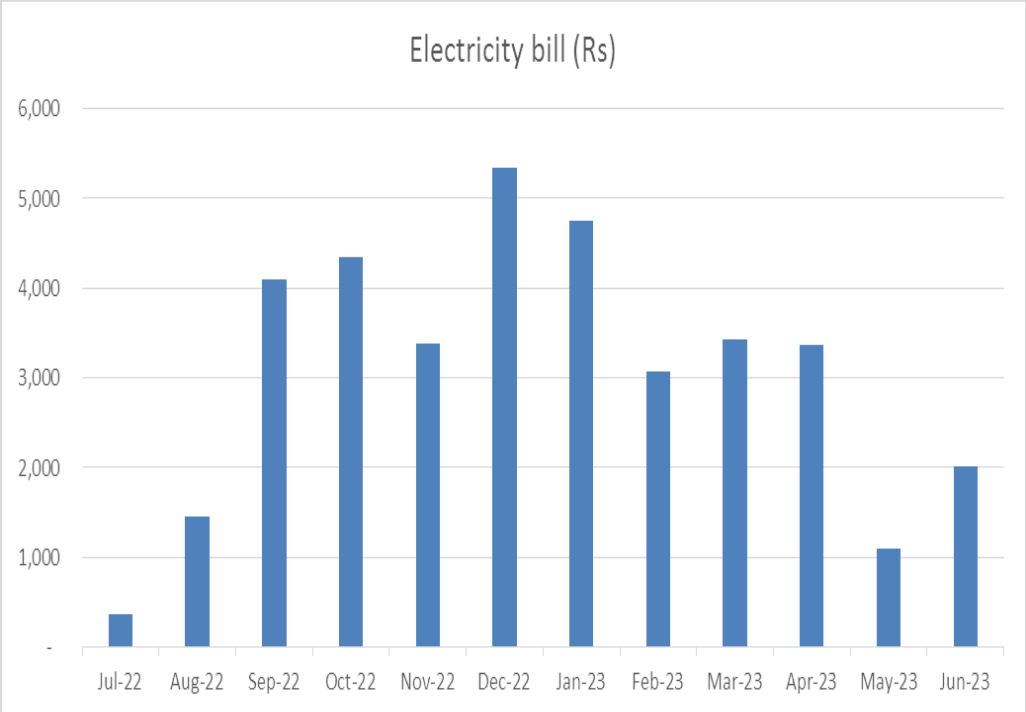

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	Total	**3,779**	**3.02**

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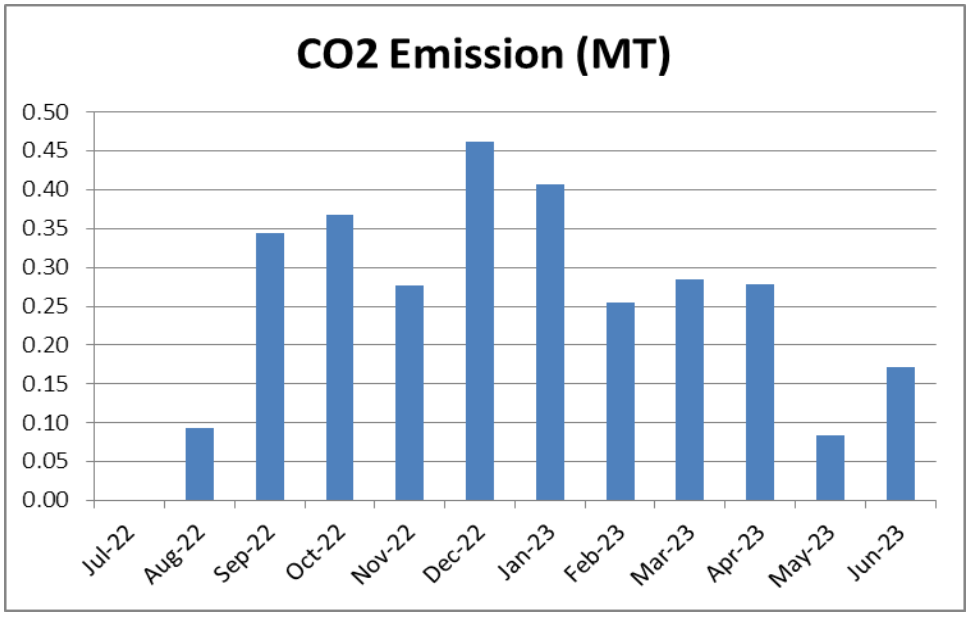

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Table 4.1: Computation of % Usage of Alternate Energy to Annual Energy Requirement

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4	% of Usage of Alternate Energy to Annual Energy Requirement	66	**%**

Photograph of Solar PV plant

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Out of total students coming to Institute, about 60% 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. The average number of students is approximately 40 %. 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.

7.6 Green Landscaping with Trees and Plants

The Institute has beautiful maintained Garden.

Figure 7.1: Beautiful maintained Garden of college

Report

On

Energy Audit

At

Arts Commerce College,

Patansaongi Dist. Nagpur

(Year 2020-21)

Prepared by

Nutan Urja Solutions

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Sus Road, Sus, Pune 411 021

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

Contents

Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Arts Commerce College, Patansaongi 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, (kWh)	CO2 Emission (MT)
1	Total	594	0.48
2	Maximum	138	0.11
3	Minimum	-	-
4	Average	50	0.04

2. Energy Conservation Projects already installed

1. Usage of LED lights at some indoor locations
2. 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 Alternate Energy

The College has installed a Roof Top Solar PV Plant. The percentage of usage of Alternate Energy to Annual Energy Requirement is 93 %.

5. 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 %.

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 25 Nos Old Ceiling Fans with STAR rating fans	1,250	13,750	54,350	47
	Total	**1,250**	**13,750**	**54,350**	**47**

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

Arts Commerce College is located in Patansaongi, Dist. Nagpur. The college is running Bachelor of arts and Bachelor of Commerce. 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	Arts Commerce College, Patansaongi
2	Address	Arts Commerce College, Patansaongi, Tal. Saoner, Dist. Nagpur
3	Affiliation	R.T. M. Nagpur University.

2. Study of connected load

In this chapter, we present details of various connected electrical equipment and electrical load. Individual fitting wise load is as under.

Table No 2.1: Equipment wise Connected Load

No	Equipment	Qty	Load, W/Unit	Load, kW
1	LED Tube-20W	31	20	0.6
2	LED bulb	10	12	0.1
3	Computers	28	65	1.8
4	Ceiling Fan	25	65	1.6
5	Pumps (2 nos 2HP)			1.5
	Total			3.1

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

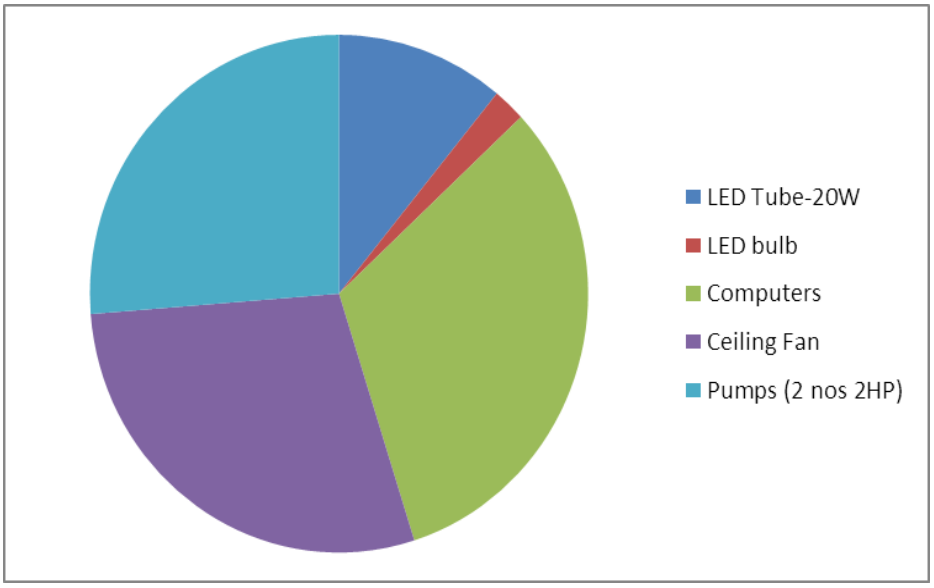

Figure 2.1: Distribution of connected load.

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-21	0	461
2	May-21	0	373
3	Apr-21	0	373
4	Mar-21	0	5651
5	Feb-21	0	333
6	Jan-21	0	-996
7	Dec-20	75	848
8	Nov-20	75	848
9	Oct-20	75	848
10	Sep-20	106	1033
11	Aug-20	125	1219
12	Jul-20	138	1346
	Total	**594**	**12,337**

Variation in energy consumption is as follows,

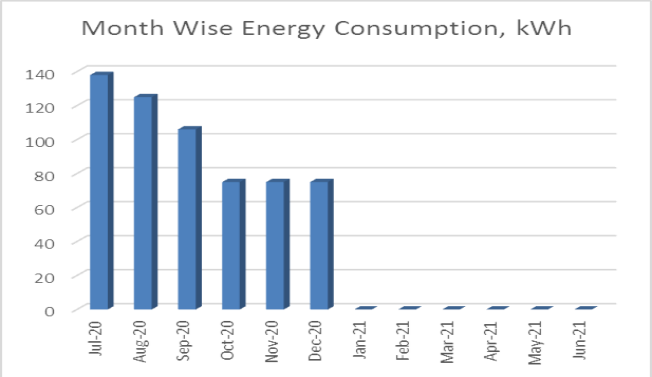

Figure 3.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

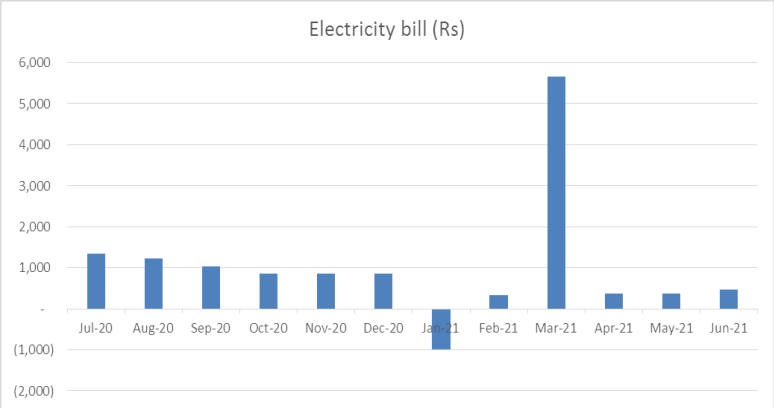

Figure 3.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 3.2: Key observations

Sr no	Parameter	Energy consumed, (kWh)	CO2 Emission (MT)
1	Total	594	0.48
2	Maximum	138	0.11
3	Minimum	-	-
4	Average	50	0.04

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-21	-	0.00
2	May-21	-	0.00
3	Apr-21	-	0.00
4	Mar-21	-	0.00
5	Feb-21	-	0.00
6	Jan-21	-	0.00
7	Dec-20	75	0.06
8	Nov-20	75	0.06
9	Oct-20	75	0.06
10	Sep-20	106	0.08
11	Aug-20	125	0.10
12	Jul-20	138	0.11
	Total	**594**	**0.48**

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

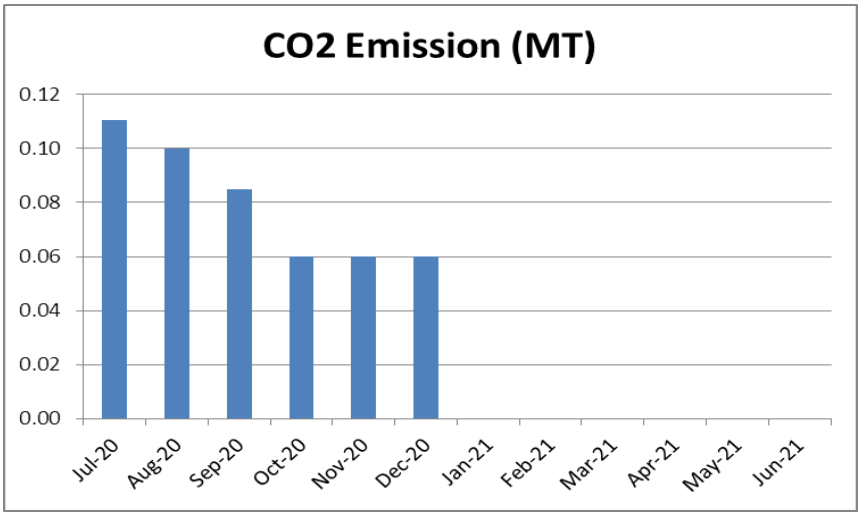

Figure 4.1: Month wise CO2 Emission

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 31 nos of LED tubes, 10 nos of LED bulbs.

5.2 Ceiling Fans

At building facility, there are about 25 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.

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 5 **kWp**.

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

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	594	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	7500	kWh/Annum
3	Total Energy Requirement of College	8,094	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	93	**%**

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
	LED lighting load			
1	LED tube	31	20	0.62
2	LED bulbs	10	12	0.12
	Total LED lighting load			0.74
	Total Lighting load			0.74

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 25 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	25	Nos
2	Energy Demand of Old Ceiling Fan fitting	65	W/Unit
3	Energy Demand of STAR Rated Fan	40	W/Unit
4	Reduction in demad	25	W/Unit
5	Average Daily Usage period	8	Hrs/Day
6	Daily saving in Energy	5	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	1250	kWh/Annum
9	Rate of Electrical Energy	11	Rs/kWh
10	Annual Monetary saving	13750	Rs/Annum
11	Cost of STAR Rated Ceiling Fan	2174	Rs/unit
12	Investment required	54350	Rs lump sum
13	Simple Payback period	47	Months

8.2 Summary of Savings

No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs.	Payback period, Months
1	Replacement of 25 Nos Old Ceiling Fans with STAR rating fans	1,250	13,750	54,350	47
	Total	**1,250**	**13,750**	**54,350**	**47**

Entry Gate


कला-वाणिज्य महाविद्यालय पाटण
राष्ट्रीय सेवा योजना
MH31SW 8643
GPS Map Camera
Patansaongi, Maharashtra, Inde
82M8+MWF, Chhindwara Rd, Patansaongi, Maharashtra 441113, Inde
Lat 21.334483°
Long 79.017409°
16/04/24 10:21 AM GMT +05:30
Google

College Building

Front Ground

Play Ground

First Floor Class Rooms 1 to 6


Room No. 1
B.A 1st
GPS Map Camera
Patansaongi, Maharashtra, Inde
82M9+M3H, Patansaongi, Maharashtra 441113, Inde
Lat 21.334632°
Long 79.01789°
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Google


Room No. 2
B.A 2nd
GPS Map Camera
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82P8+QHM, Patansaongi, Maharashtra 441113, India
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Google


Room No. 3
B.A 3rd
GPS Map Camera
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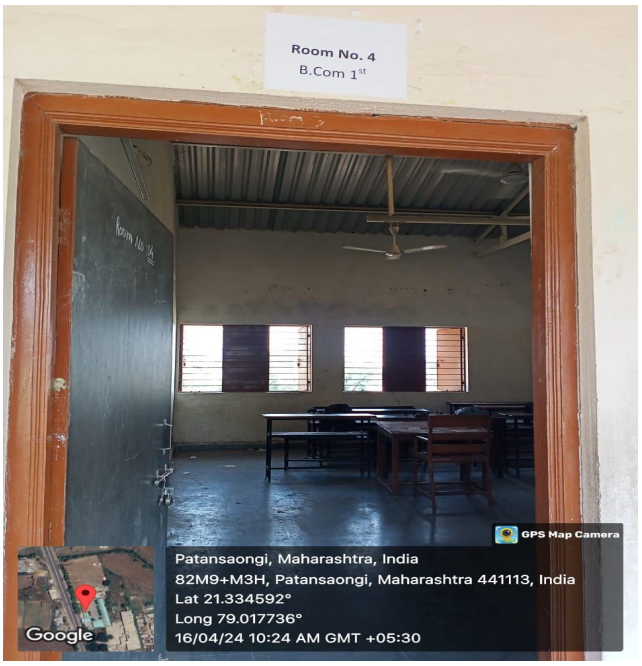
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B.Com 1st
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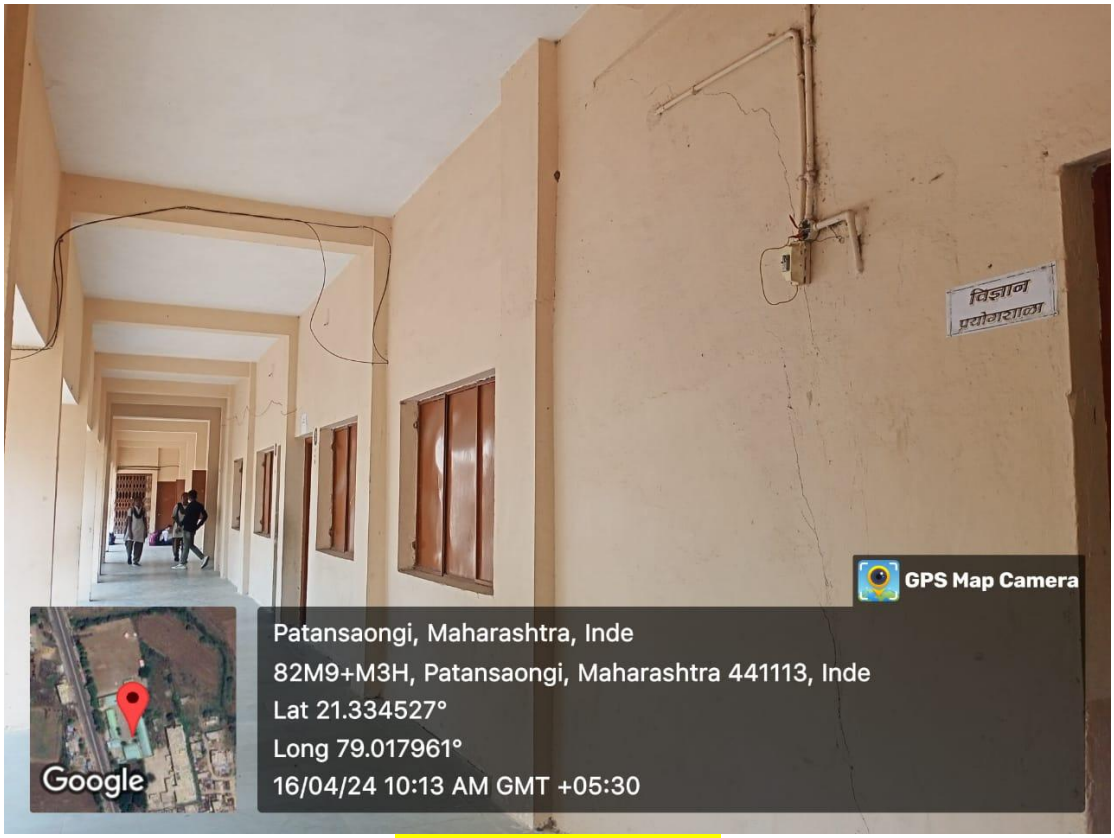
Google

Ground Floor Room No.7 to 11



Computer lab

Digital Board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Google


Room No. 9
Smart Class
10
GPS Map Camera
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82P8+QHM, Patansaongi, Maharashtra 441113, India
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Long 79.017921°
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Google


Room No. 10
N.S.S. Office
GPS Map Camera
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82M9+M3H, Patansaongi, Maharashtra 441113, Inde
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Google


Room No. 11
Seminar Hall
Room No 68
GPS Map Camera
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Long 79.017768°
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Google

WI-FI


GPS Map Camera
Nagpur, Maharashtra, Inde
42WV+6PP, Ram Nagar, Nagpur, Maharashtra 440033, Inde
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Long 79.04448°
23/03/24 10:34 AM GMT +05:30
Google


GPS Map Camera
Patansaongi, Maharashtra, India
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GPS Map Camera
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PRINTER


GPS Map Camera
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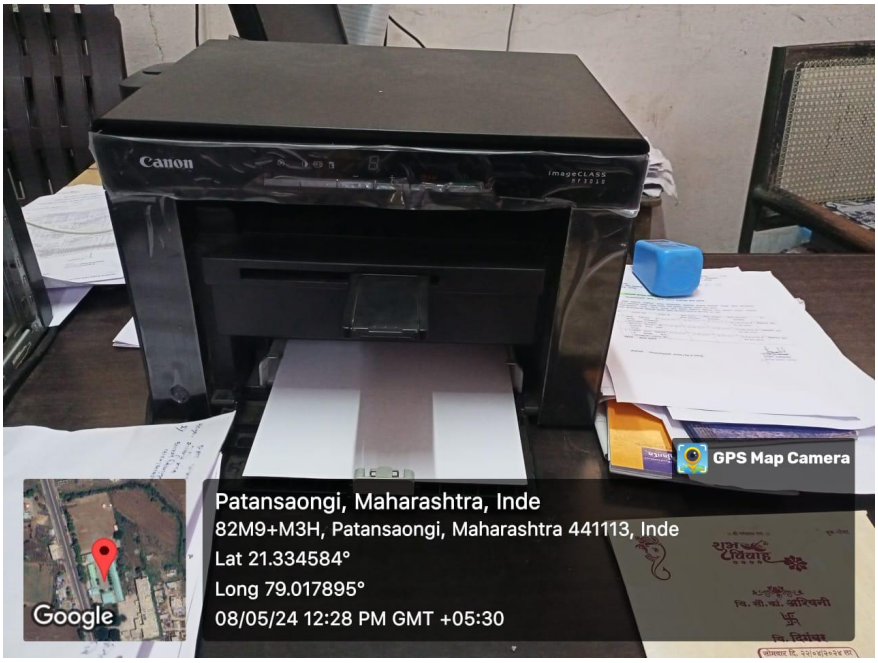
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Google


K.V.M.P/10/1
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Google


xerox
GPS Map Camera
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Long 79.01794°
08/05/24 11:42 AM GMT +05:30
Google

CCTV Camera


GPS Map Camera
Patansaongi, Maharashtra, Inde
82M9+M3H, Patansaongi, Maharashtra 441113, Inde
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Long 79.017679°
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Google


GPS Map Camera
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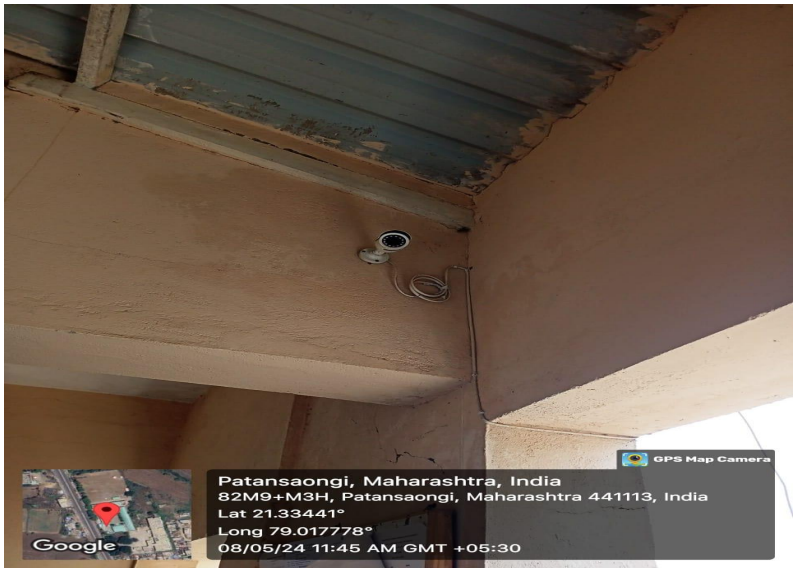

GIRLS WAHROOM

BOYS WASHROOM

SENITORY NAPKIN

Water Tap


water
GPS Map Camera
Nagpur, Maharashtra, Inde
42WV+6PP, Ram Nagar, Nagpur, Maharashtra 440033, Inde
Lat 21.145658°
Long 79.04448°
23/03/24 10:47 AM GMT +05:30
Google

WATER COOLER

LED LIGHT


GPS Map Camera
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82M9+M3H, Patansaongi, Maharashtra 441113, India
Lat 21.334542°
Long 79.017787°
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Google

DUST BIN


स्वच्छ भारत
एक कदम स्वच्छता की ओर
GARBAGE BIN /DUST BIN
कचरा/कुडा पेटी
GPS Map Camera
Patansaongi, Maharashtra, India
82M9+M3H, Patansaongi, Maharashtra 441113, India
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Google


स्वच्छ भारत
एक कदम स्वच्छता की ओर
GARBAGE BIN /DUST BIN
कचरा/कुडा पेटी
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GPS Map Camera
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Long 79.017842°
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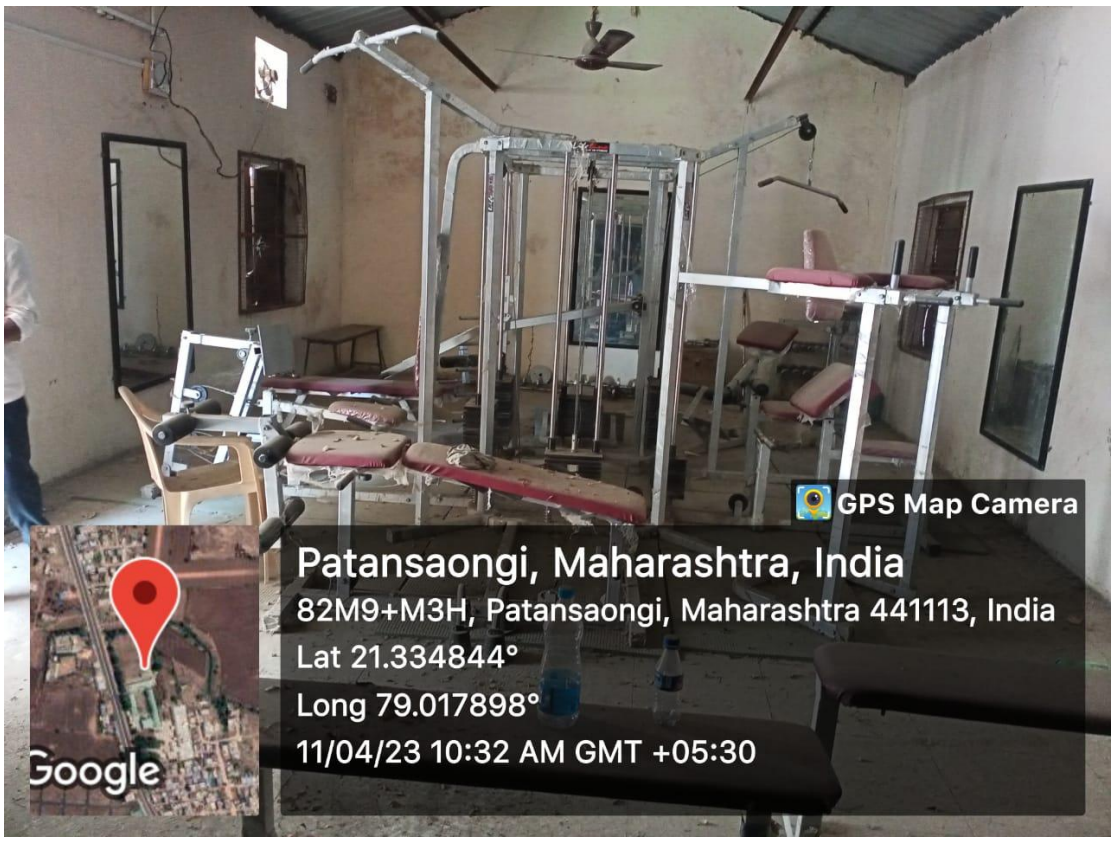
Google

SENITIZATION

FIRE EXTINGUISHERS

GYM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Google

LIBRURY

STAFF ROOM


Staff Room
GPS Map Camera
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82M9+M3H, Patansaongi, Maharashtra 441113, India
Lat 21.334725°
Long 79.018013°
17/06/23 12:53 PM GMT +05:30
Google

OFFICE


कार्यालय
कला-वाणिज्य महाविद्यालय
प्रवेश देणे सुरु आहे.
ADMISSION OPEN
B.A - B.Com
GPS Map Camera
Patansaongi, Maharashtra, Inde
82M9+M3H, Patansaongi, Maharashtra 441113, Inde
Lat 21.3346°
Long 79.01791°

Appendex- II

Nagpur Agricultural Development Trust, Nagpur

Arts Commerce College, Patansaongi

Tah. Saoner, Dist. Nagpur

(Affiliated with R.T.M. Nagpur University, Nagpur)

Sunilbabu Kedar
President
MLA & Trustees
Mob. 9422108360

Manoharrao Bute
Guide
Mob. 9822700846

Ad. R. R. Thaware
Secretary
Mob. 9890725698

Outward No. Date :.....

Green and Environment Policy

Introduction:

At Arts Commerce College, Patansaongi we recognize our responsibility to contribute to the preservation and protection of the environment. We are committed to adopting sustainable practices, reducing our environmental impact, and promoting a culture of environmental responsibility among our employees, stakeholders, and communities. Our Commitment:

1) **Sustainability:** We are dedicated to conducting our operations in an environmentally sustainable manner that respects the delicate balance of ecosystems and the planet's finite resources.

2) Environmental Compliance: We commit to complying with all relevant environmental laws, regulations, and standards in our operations.

3)Continuous Improvement: We will continually assess and improve our environmental performance by setting measurable goals and objectives.

Our Goals:

1) **Resource Conservation:** We will minimize our consumption of energy, water, and raw materials through efficient practices and technologies.

2) **Waste Reduction:** We aim to reduce waste generation and promote recycling and responsible disposal methods.

3) Carbon Footprint: We will work towards reducing our carbon emissions through energy-efficient practices and exploring renewable energy sources.

4) **Biodiversity:** We will protect and enhance biodiversity by minimizing habitat disruption and supporting conservation efforts.

5) **Green Procurement:** We will prioritize the procurement of environmentally friendly products and services.

Nagpur Agricultural Development Trust, Nagpur

Arts Commerce College, Patansaongi

Tah. Saoner, Dist. Nagpur

(Affiliated with R.T.M. Nagpur University, Nagpur)

Sunilbabu Kedar
President
MLA & Trustees
Mob. 9422108360

Manoharrao Bute
Guide
Mob. 9822700846

Ad. R. R. Thaware
Secretary
Mob. 9890725698

Outward No.

Date :.....

Our Strategies:

1) **Employee Engagement:** We will educate and engage our employees in environmentally responsible practices, fostering a sense of ownership in our sustainability efforts.

2) **Stakeholder Collaboration:** We will collaborate with suppliers, customers, and partners to promote shared environmental values and goals.

3) **Community Involvement:** We will actively participate in community environmental initiatives and support local sustainability efforts.

4) **Transparency:** We will communicate openly and transparently about our environmental initiatives, progress, and challenges. Reporting and

5) **Accountability:** We will regularly monitor and report on our environmental performance, seeking opportunities for improvement. Our leadership team is responsible for ensuring the effective implementation of this Green and Environment Policy across all levels of the organization. Conclusion: By adopting this Green and Environment Policy, Arts, Commerce College, Patansaongi reaffirms its commitment to environmental stewardship and sustainable practices. Together, we can contribute to a greener and healthier future for current and future generations.

Acting Principal
Art-Commerce College,
Patansaongi
Tah. Saoner Dist. Nagpur