



Nutan Urja Solutions

A 703, Balaji Whitefield, Near Sunni's World, Sus Road, Sus, Pune 411 021.

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

Ref: NU/EAC/09

Date: 28/10/2021

CERTIFICATE

This is to certify that we have conducted **Energy Audit** at
Nagpur Shikshan Mandal's
Shri Binzani City College
Umrer Road, Nagpur

as per the guidelines of Maharashtra Energy Development Agency
(www.mahaurja.com)
for the years 2018-19, 2019-20 and 2020-21.

The College has already adopted **Energy Efficient** practices like:

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

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



Keshavnadekar

K. G. Bharwadekar

Certified Energy Auditor,

EA - 22428



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- > **Installation of Bio Composting Pit**
- > **Installation of Rain Water Harvesting System**

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Report on Green Audit: Nagpur Shikshan Mandal's Shri Binzani City College, Nagpur

Report
On
Green Audit
At
Nagpur Shikshan Mandal's
Shri Binzani City College
Umrer Road, Nagpur



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Executive Summary

Green Audit of Nagpur Shikshan Mandal's Shri Binzani City College, Nagpur is conducted by Nutan Urja Solutions, Pune. Based On the audit field study, following important points can be presented.

1. Present Energy Consumption

Nagpur Shikshan Mandal's Shri Binzani City College, Nagpur 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 Emmision (MT)
1	Maximum	4573	3.66
2	Minimum	2372	1.90
3	Average	3354	2.68
4	Total	40252	32.20

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. Rain Water Harvesting

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

4. Waste Management

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

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

5. Notes and Assumptions

1. Annual working Days-250Nos
2. Average Rate of Electrical Energy : Rs 8.2/- 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

Shri. Binzani City College, one of the oldest and premier educational institutions, was established on 17th July 1930. It is run under the aegis of Nagpur Shikshan Mandal, Nagpur. It is affiliated to Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur. The college has an imposing building. It is in five separate blocks. It has a huge play ground, a rich library and a well-equipped Physical Education Dept.

1.1 Objectives

1. To study present level of Energy Consumption
2. To Study the present CO₂ 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	Sep-21	4214	19,250
2	Aug-21	3300	17,360
3	Jul-21	3296	15,700
4	Jun-21	3437	12,350
5	May-21	3605	11,750
6	Apr-21	4573	10,070
7	Mar-21	2372	13,010
8	Feb-21	3212	13,520
9	Jan-21	2814	11,630
10	Dec-20	2933	12,120
11	Nov-20	3560	16,749
12	Oct-20	2936	13,963
	Total	40252	167,472

Variation in energy consumption is as follows,

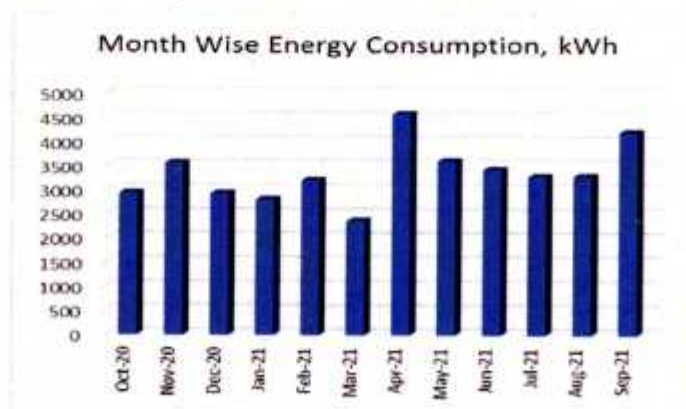


Figure 2.1: Month wise energy consumption



Monthly variation in electricity bill is as follows,

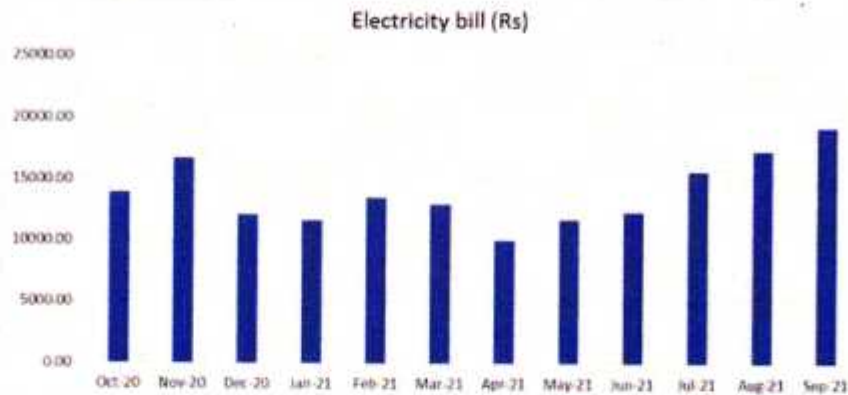


Figure 2.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 2.2: Key observations

Sr no	Parameter	Energy consumed, (Units)	CO2 Emmission (MT)
1	Maximum	4573	3.66
2	Minimum	2372	1.90
3	Average	3354	2.68
4	Total	40252	32.20

3. Carbon Foot printing

1. A **Carbon Foot print** is defined as the Total Greenhouse Gas emissions (CO₂ 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 CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy is as under

- 1 Unit (kWh) of Electrical Energy releases **0.8 Kg of CO₂** into atmosphere



Based on the above Data we compute the CO₂ 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	Sep-21	4,214	3.37
2	Aug-21	3,300	2.64
3	Jul-21	3,296	2.64
4	Jun-21	3,437	2.75
5	May-21	3,605	2.88
6	Apr-21	4,573	3.66
7	Mar-21	2,372	1.90
8	Feb-21	3,212	2.57
9	Jan-21	2,814	2.25
10	Dec-20	2,933	2.35
11	Nov-20	3,560	2.85
12	Oct-20	2,936	2.35
	Total	40252	32.20

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

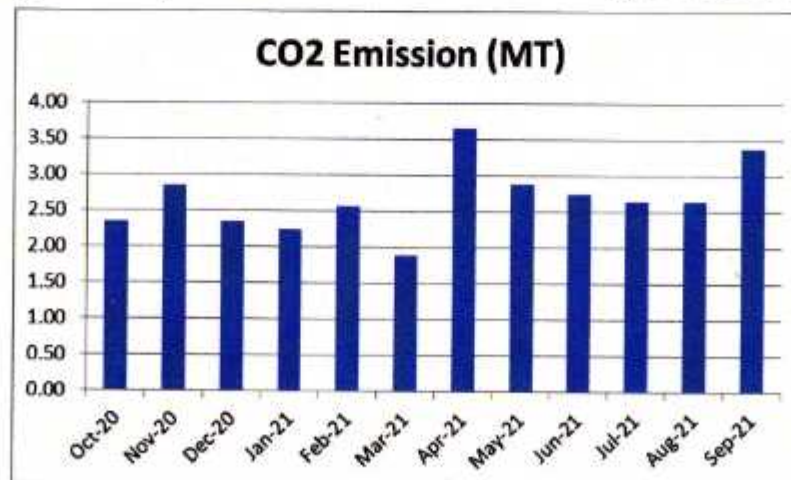


Figure 3.1: Month wise CO2 Emission



4. Study of 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. Study of Waste Management

5.1 Solid Waste Management

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

5.2 e-Waste Management

The internal communication is through emails and hence there is hardly any generation of paper waste in the premises.



6. Study of Green Practices

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

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

6.2 Usage of Public Transport

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

In order to encourage students, college celebrates fourth Saturday of each month as no vehicle day. On no vehicle day, personal vehicle in college is not allowed.

6.3 Pedestrian Friendly Roads

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

Photograph of Road within campus



6.4 Plastic Free Campus

The Institute is an active participant in the Government of India's most prestigious project of SWATCHH BHARAT ABHIYAN. 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

6.5 Paperless Office

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

6.6 Green Landscaping with Trees and Plants

The Institute has beautiful maintained Garden.



Figure 7.1: Beautiful maintained Garden of college



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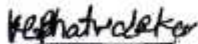
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Table no 1: Details of energy consumption

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	3,180	2.54
2	Minimum	1,607	1.29
3	Average	2,265	1.81
4	Total	27,176	21.74

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. Rain Water Harvesting

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

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5. Notes and Assumptions

1. Annual working Days-250 Nos



2. Average Rate of Electrical Energy : Rs 8.2/- per kWh

Abridged Table:

Sl. No.	Description	Rate (Rs/kWh)
1	Central Air-conditioning Plant	12.0
2	Refrigerator Plant	11.0
3	Lighting Plant	8.2
4	Water	0.0
5	Power	0.0
6	Gas	0.0
7	Hot Water	0.0
8	Other	0.0



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



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No	Month	Energy (kWh)	Bill Amount (Rs)
1	Jun-22	2,355	19,140
2	May-22	3,180	9,430
3	Apr-22	3,080	40,200
4	Mar-22	1,822	15,050
5	Feb-22	1,607	13,450
6	Jan-22	1,837	15,180
7	Dec-21	2,042	16,960
8	Nov-21	2,503	20,190
9	Oct-21	2,276	18,480
10	Sep-21	2,387	17,443
11	Aug-21	2,137	13,870
12	Jul-21	1,950	19,221
	Total	27,176	218,614

Variation in energy consumption is as follows,



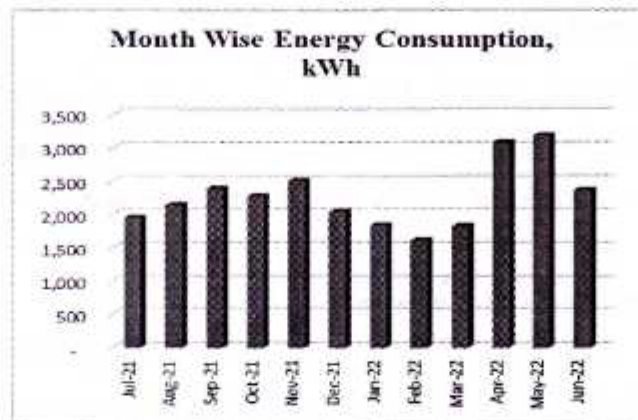


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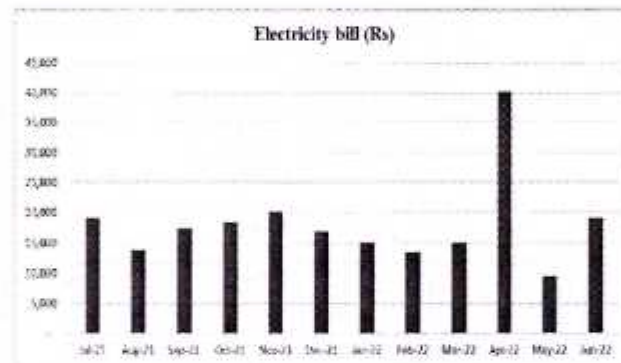


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The basis of Calculation for CO₂ emissions due to Electrical Energy is as under

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11	Aug-21	2,137	1.71
12	Jul-21	1,950	1.56
	Total	27176	21.74



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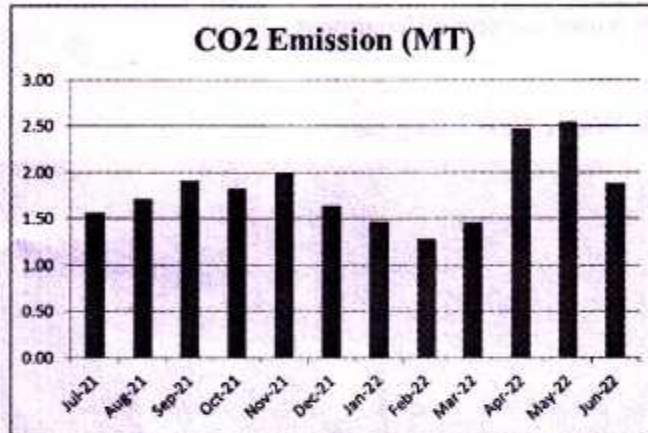


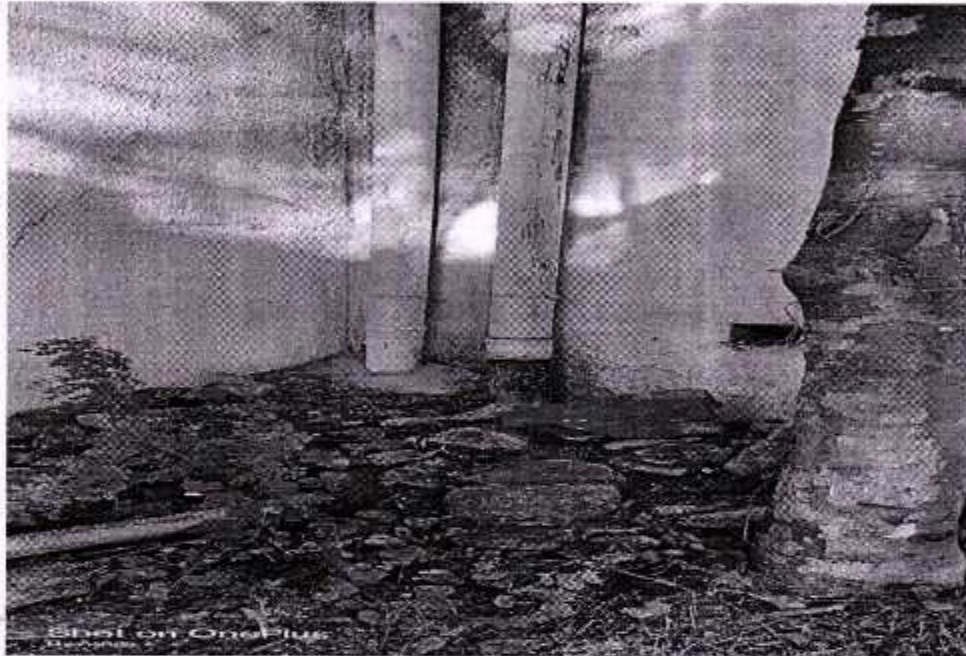
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