MTES

Estd: 1990

MUKTAINAGAR TALUKA EDUCATION SOCIETY'S

SHRIMATI GODAVARIBAI GANPATRAO KHADSE COLLEGE, MUKTAINAGAR

TAL-MUKTAINAGAR, DIST- JALGAON
MAHARASHTRA

GREEN AUDIT

(2023-24)

Prepared by
Nutan Urja Solutions
A 703, Balaji Witefield, Near Sunni's World,
Sus Road, Sus, Pune 411021
Phone: 83568 18381. Email: nutanurja.solutions@gmail.com

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

Date: 11/08/2024

CERTIFICATE

This is to certify that we have conducted Green Audit at Muktainagar Taluka Education Society's Smt. Godawaribai Ganpatrao Khadse College, Muktainagar for the year 2023–24.

The College has already adopted **Green** practices like:

- Installation of Rain Water Harvesting system
- Installation of Bio composting pit
- Usage of Energy Efficient LED
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of Solar Thermal Hot Water syste.
- Installation of Solar PV street lights.
- Installation of 30kW roof top solar PV system

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

Nutan Urja Solutions,

K G Bhatwadekar,

Certified Energy Auditor,

EA - 22428

Report

On

Green Audit

At

Muktainagar Taluka Education Society's

Smt. Godawaribai Ganpatrao Khadse College,

Muktainagar

(Year 2023-24)

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Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Muktainagar Taluka Education Society's Smt. Godawaribai Ganpatrao Khadse College, Muktainagar 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 Muktainagar Taluka Education Society's Smt. Godawaribai Ganpatrao Khadse College, Muktainagar is conducted by Nutan Urja Solutions, Pune. Based On the audit field study, following important points can be presented.

1. Present Energy Consumption

Muktainagar Taluka Education Society's Smt. Godawaribai Ganpatrao Khadse College, Muktainagar 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	7,317	5.85
2	Minimum	1,141	0.91
3	Average	2,974	2.38
4	Total	35,693	28.55

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 a Roof Top Solar PV system of 30kW capacity and Solar thermal hot water system of 1200 liters capacity. Also, college has installed 2 nos. of solar PV street lights.

4. Rain Water Harvesting

The College has installed the Rainwater harvesting project.

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.

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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**

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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

The college Smt. G. G. Khadse Science and Arts College Muktainagar is run by The Muktainagar Taluka Education Society Muktainagar, is located at a natural and peaceful surroundings on a hill, on Bhusawal road, near Gajanan Maharaj Temple. The college is permanently affiliated to the North Maharashtra University Jalgaon.

Though the college is situated in rural area, its progress and development is no less than the other of progress. An attempt is always made to retain standard and attain new horizons. In this attempt the management, the principal, the teaching and non-teaching staff of the collage work together hard for the overall development of the rural students. The college has availed advanced academics, sports and other facilities to the student for their social, physical, spiritual, intellectual and spiritual development. The glorious results of the students in the University exams, the medals and prizes in sports, the state and university level awards of N.S.S. .etc are an outcome of these efforts.

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	Jul-24	-	5,104
2	Jun-24	-	5,104
3	May-24	-	5,104
4	Apr-24	-	8,207
5	Mar-24	-	4,642
6	Feb-24	-	4,642
7	Jan-24	-	4,642
8	Dec-23	1,138	21,064
9	Nov-23	1,640	27,879
10	Oct-23	2,427	37,828
11	Sep-23	2,541	41,383
12	Aug-23	3,129	46,709
	Total	**10,875**	**212,308**

Variation in energy consumption is as follows,

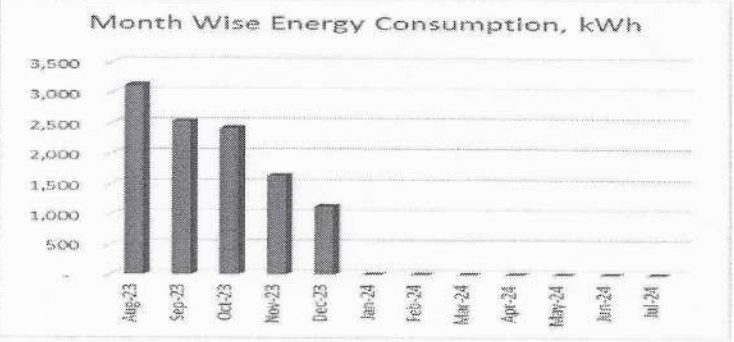

Figure 2.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

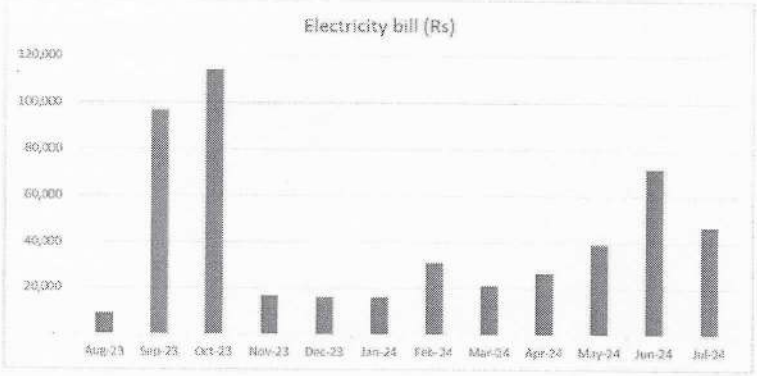

Figure 2.2: Month wise electricity bill

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	3,129	2.50
2	Minimum	-	-
3	Average	906	0.73
4	Total	10,875	8.70

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 & CO_2 Emissions

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jul-24	-	0.00
2	Jun-24	-	0.00
3	May-24	-	0.00
4	Apr-24	-	0.00
5	Mar-24	-	0.00
6	Feb-24	-	0.00
7	Jan-24	-	0.00
8	Dec-23	1,138	0.91
9	Nov-23	1,640	1.31
10	Oct-23	2,427	1.94
11	Sep-23	2,541	2.03
12	Aug-23	3,129	2.50
	Total	**10,875**	**8.70**

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

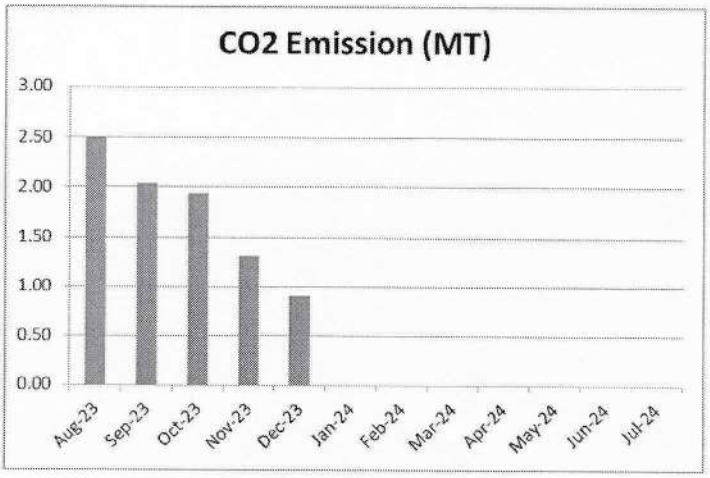

Figure 3.1: Month wise CO2 Emission

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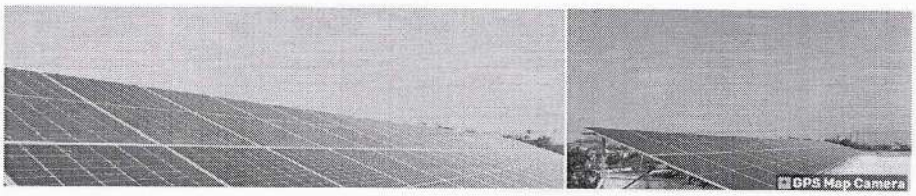
4. Study of Usage of Alternate Energy

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 **30 kWp**.

The College has installed a Solar thermal hot water system of 1200 liters capacity on hostel terrace. Also, college has installed 2 nos. of solar PV street lights.

Photograph of Solar PV system



Photograph of Solar Thermal Water Heaters

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

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	10,875	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	45000	kWh/Annum
3	Total Energy Requirement of College	55,875	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	81	%

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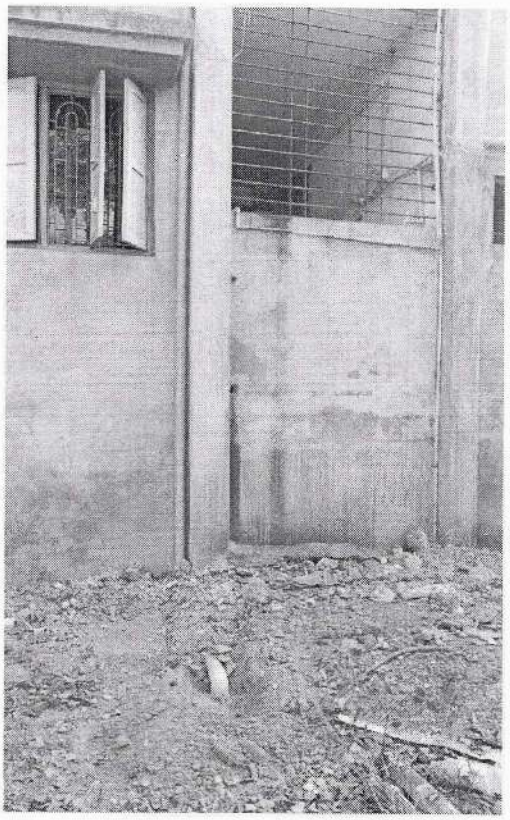
5. Study of Rain Water Harvesting

The College has already installed Rain Water Harvesting project, wherein the rain water falling on the terrace is collected and recharge in the ground.

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.

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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 20% students use own Automobile and 60 % of the students commute by public transport.

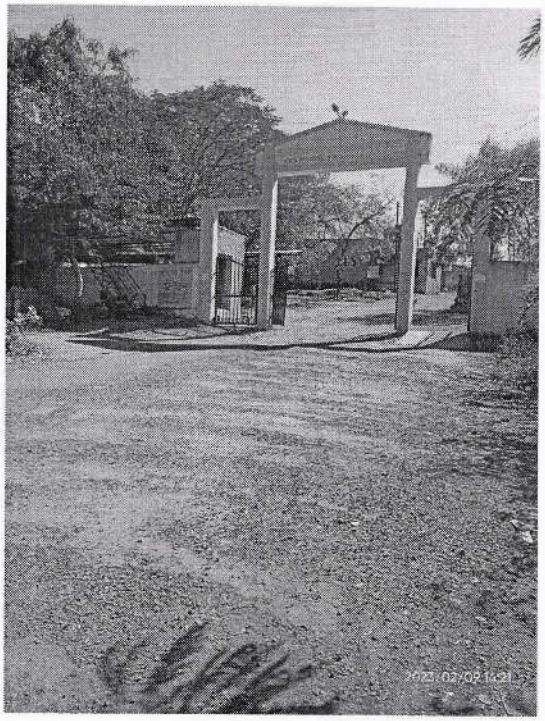
7.2 Usage of Public Transport

During the Students transport study, it was revealed that the 60 % of the students who are residing near areas make use of Public Transport like 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.

7.6 Green Landscaping with Trees and Plants

The Institute has beautiful maintained Garden.

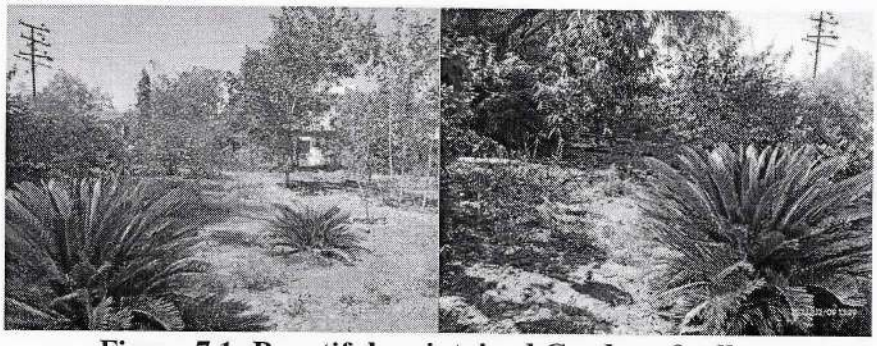


Figure 7.1: Beautiful maintained Garden of college