Report

On

Green Audit

Khandesh College Education Society's College Of Education and Physical Education, Jalgaon

(Year 2022-23)

Prepared by

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Contents

Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Khandesh College Education Society's College Of Education and Physical Education, Jalgaon 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 Khandesh College Education Society's College Of Education and Physical Education, Jalgaon is conducted by Nutan Urja Solutions, Pune. Based On the audit field study, following important points can be presented.

1. Present Energy Consumption

Khandesh College Education Society's College Of Education and Physical Education, Jalgaon 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	1,802	1.44
2	Minimum	638	0.51
3	Average	960	0.77
4	Total	11,520	9.22

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 collage has installed **1.8 kW** Solar PV Power Plant.

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

Under the Global Visionary Management of Khandesh College Education Society, Jalgon, the KCES College of Education & Physical Education has started its beginning of training the teachers for tomorrow from the year 1965. The total intake capacity of B.Ed. is 150 students.

The College is bestowed with the status as CTE (College for teacher Education) by the HRD Ministry of Central Government. The Extension Service Centre of the College, which is patron aged by the State Government of Maharastra, caters to the in service training for secondary school teachers of Jalgaon District. The education in the distant mode is undertaken by the college with the help of IGNOU, YCMOU.

The college is situated in the 26 Acers of beautiful academic campus centrally located in Jalgaon city and district headquarters. The college campus is 2.6 K.M. away from the Jalgaon Railway stations. The College campus is well equipped with the necessary facilities like Gymkhana, spacious play ground, Indoor & Outdoor sports facility, Bank, Canteen, vehicle parking facilities and ultra modern Ladies and Gents Hostels. The College is situated along with Primary School, Secondary School and College buildings in the campus..

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	May-23	1,069	9,500
2	Apr-23	916	7,850
3	Mar-23	736	6,400
4	Feb-23	638	5,580
5	Jan-23	658	5,770
6	Dec-22	654	5,730
7	Nov-22	720	6,260
8	Oct-22	967	8,270
9	Sep-22	1,802	6,130
10	Aug-22	1,098	9,320
11	Jul-22	1,046	8,900
12	Jun-22	1,216	9,220
	Total	**11520**	**88,930**

Variation in energy consumption is as follows,

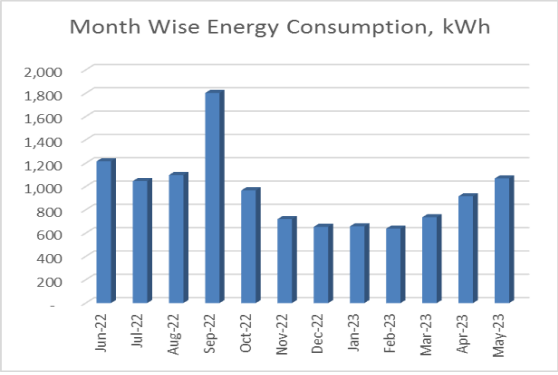

Figure 2.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

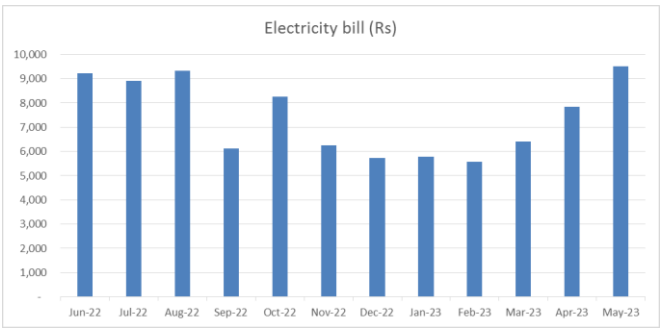

Figure 2.2: Month wise electricity bill

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	1,802	1.44
2	Minimum	638	0.51
3	Average	960	0.77
4	Total	11,520	9.22

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	May-23	1,069	0.86
2	Apr-23	916	0.73
3	Mar-23	736	0.59
4	Feb-23	638	0.51
5	Jan-23	658	0.53
6	Dec-22	654	0.52
7	Nov-22	720	0.58
8	Oct-22	967	0.77
9	Sep-22	1,802	1.44
10	Aug-22	1,098	0.88
11	Jul-22	1,046	0.84
12	Jun-22	1,216	0.97
	Total	**11,520**	**9.22**

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

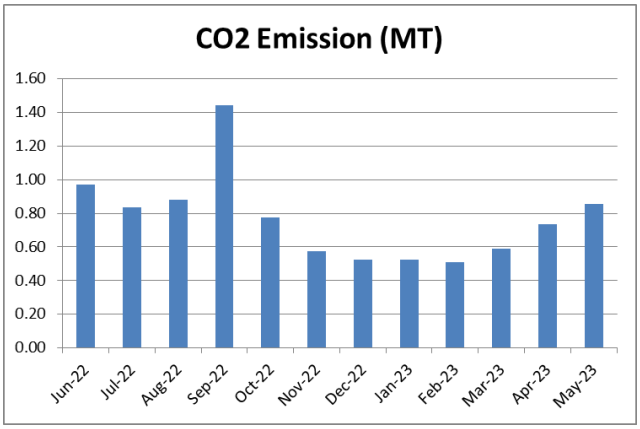

Figure 3.1: Month wise CO2 Emission

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 **1.8 kWp**.

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

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	11,520	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	2,700	kWh/Annum
3	Total Energy Requirement of College	14,220	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	**19**	**%**

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. The collected wastes from garden, debris, leaf latter are collect dumped into vermicomposting bins to prepare the compost manure from the waste. Eisenia Foetida species of earthworm is used for the process.

Photographs of Bio Composting Storage Tanks:

6.2 e-Waste Management

The internal communication is through emails and hence there is hardly any generation of paper waste in the premises. The E-waste generated in all colleges of Khandesh Education Society is collected. Most of the material in waste is reused before disposal.

7. Study of Green Practices

7.1 Usage of vehicles for coming to Institute

The college conducts campaign for students and faculty to understand the importance of environmental protection and be mindful about saving energy. The authority frequently appeals to the students and faculty to maintain the tradition of no vehicle day on Saturday. To motivate and aware the students regarding minimum use of vehicles “Cycle Day” programme is arranged by college facility.

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

To understand the plant biodiversity of the campus, the college has been conducting census of tree, herbs and shrubs. The college campus has rich plant biodiversity including 33 tree species with a dominance of family *Caesalpinacease*. With regard to shrubs dominance of *Securinega virosa* and herbs with dominance of *Veruoniacerneria* are recorded.

Photograph of Beautiful maintained Garden of college