Report

On

Green Audit

At

Motiwala College of Educational Sciences, Nashik

(Year 2022-23)

Prepared by

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M.E.W.T.'S COLLEGE OF EDUCATIONAL SCIENCES NASHIK

PRINCIPAL
Motiwala College of Educational Sciences, Nashik

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Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Motiwala College of Educational Sciences, Nashik 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.

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Executive Summary

Green Audit of Motiwala College of Educational Sciences, Nashik is conducted by Nutan Urja Solutions, Pune. Based On the audit field study, following important points can be presented.

1. Present Energy Consumption

Motiwala College of Educational Sciences, Nashik 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	15,073	12.06
2	Minimum	3,346	2.68
3	Average	9,192	7.35
4	Total	1,10,309	88.25

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 70 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 college has also installed waste water treatment plant.

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

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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**

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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

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1. Introduction

Motiwala College of Educational Sciences is located in Nashik. The college is running with Degree courses in Educational Science classes. It was started with the sole aim of creating and developing professional education facilities to train the aspiring young generation and thus provide dedicated, ambitious and skilled professionals to serve the society and the nation at large. The College has today become one of the premier institutions of the city.

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

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2. Study of Electrical Energy Consumption

In this chapter, electricity bills are studied for the analysis of electrical energy consumption. Motiwala College of Educational Sciences, Nashik is situated in Motiwala Education and Welfare Trust campus. Entire Campus is having single energy meter for all institutes situated in campus. The energy consuption analysis is carried for entire campus.

Table no 2.1: Summary of electricity bills

No	Month	Energy (kWh)	Bill Amount (Rs)
1	Jun-23	15073	226248
2	May-23	3346	63558
3	Apr-23	11595	176212
4	Mar-23	11157	157112
5	Feb-23	7614	112120
6	Jan-23	7300	108007
7	Dec-22	10583	152784
8	Nov-22	7449	110224
9	Oct-22	5950	90391
10	Sep-22	10602	150013
11	Aug-22	9783	138885
12	Jul-22	9857	139331
	Total	**1,10,309**	**16,24,885**

Variation in energy consumption is as follows,

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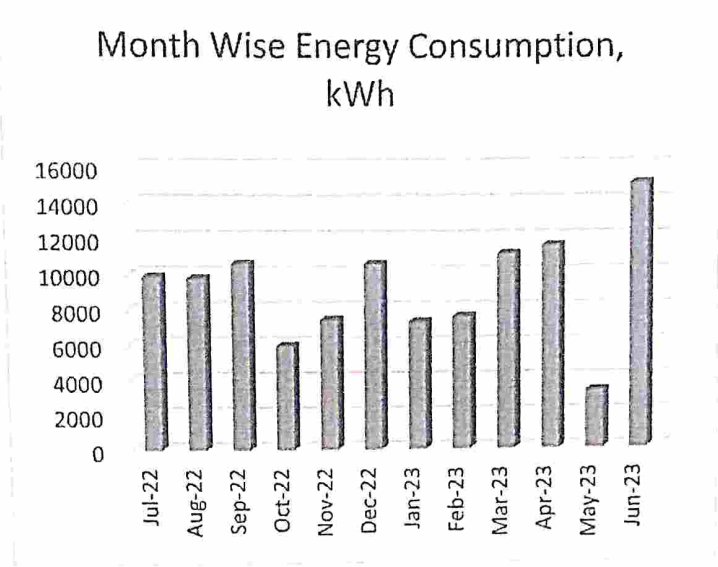

Figure 2.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

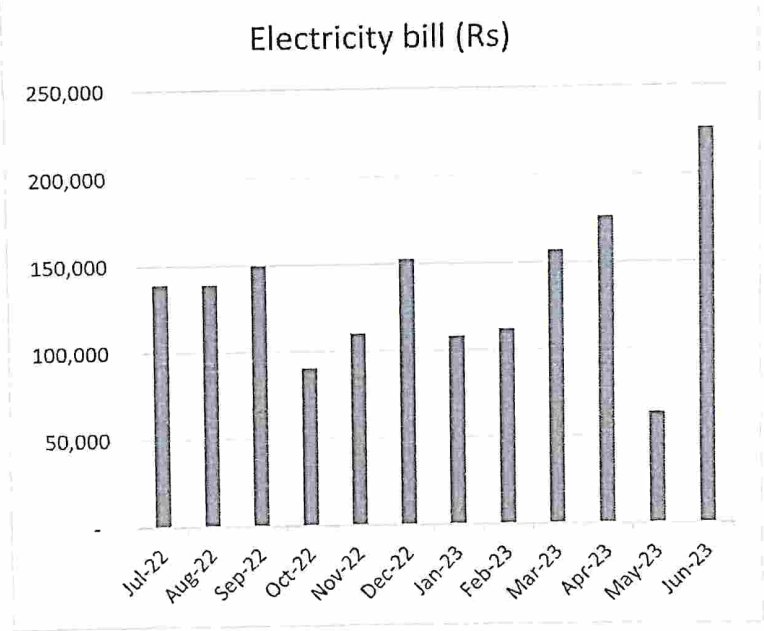

Figure 2.2: Month wise electricity bill

Key observations of electricity bill are as follows,

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Table no 2.2: Key observations

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	15,073	12.06
2	Minimum	3,346	2.68
3	Average	9,192	7.35
4	Total	1,10,309	88.25

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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

Motiwala College of Educational Sciences, Nashik is situated in Motiwala Education and Welfare Trust campus. Entire Campus is having single energy meter for all institutes situated in campus. The carbon emission analysis is carried for entire campus.

We herewith furnish the details of various forms of Energy consumption as under

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

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-23	15,073	12.06
2	May-23	3,346	2.68
3	Apr-23	11,595	9.28
4	Mar-23	11,157	8.93
5	Feb-23	7,614	6.09
6	Jan-23	7,300	5.84
7	Dec-22	10,583	8.47
8	Nov-22	7,449	5.96
9	Oct-22	5,950	4.76
10	Sep-22	10,602	8.48
11	Aug-22	9,783	7.83
12	Jul-22	9,857	7.89
	Total	**1,10,309**	**88.25**

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

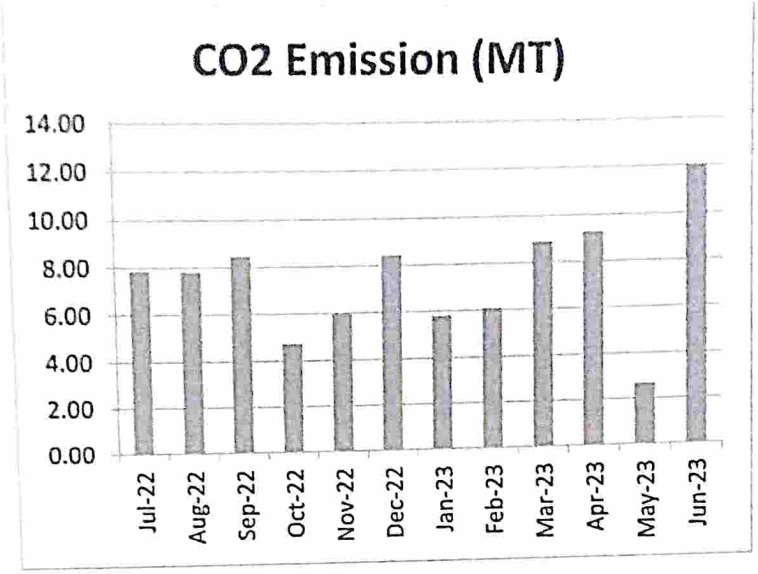

Figure 3.1: Month wise CO2 Emission

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4. Study of Usage of Alternate Energy

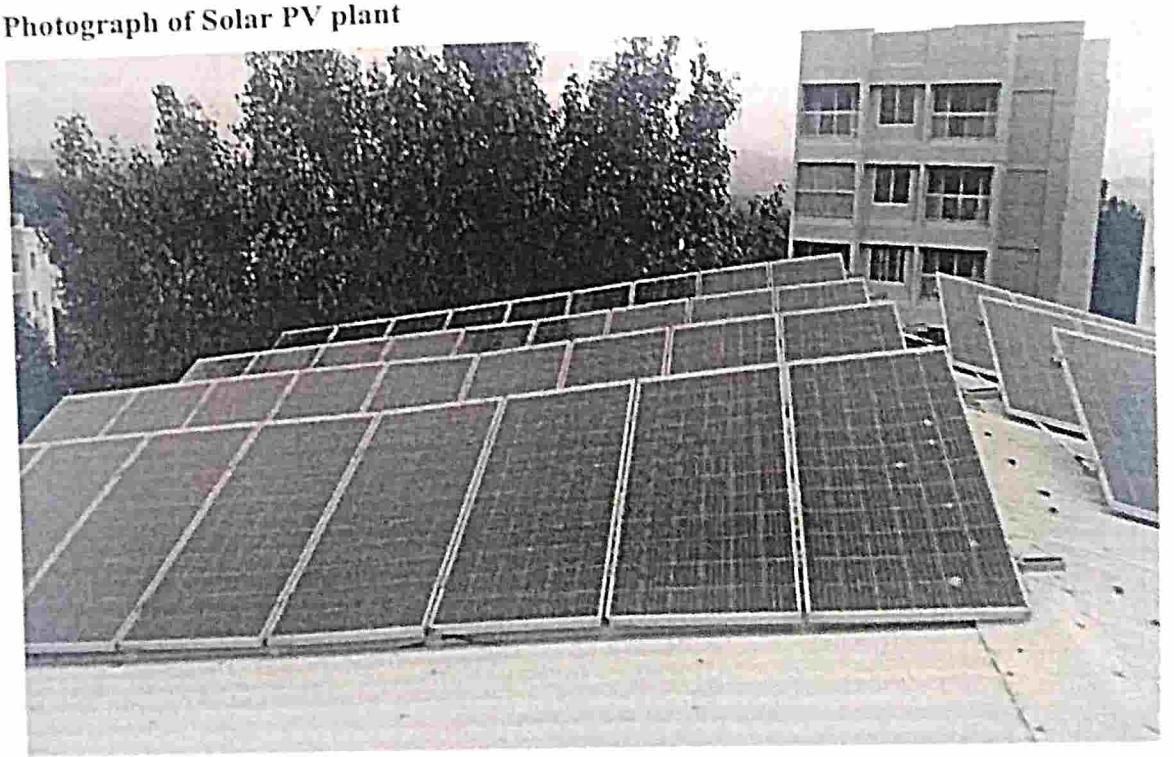
In this Chapter, we compute the percentage of Usage of Alternate/Renewable Energy to Annual Energy Requirement of the College.

Motiwala College of Educational Sciences, Nashik is situated in Motiwala Education and Welfare Trust campus. Entire Campus is having single energy meter for all institutes situated in campus. The bill analysis is carried for electricity bills of entire campus. The campus has installed Solar PV System of 70kW capacity.

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

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	1,10,309	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	105000	kWh/Annum
3	Total Energy Requirement of College	2,15,309	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	49	%

Photograph of Solar PV plant



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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 through pipes it is fed to underground Water Storage tank near bore well.

Photograph of Rain Water Harvesting pipe

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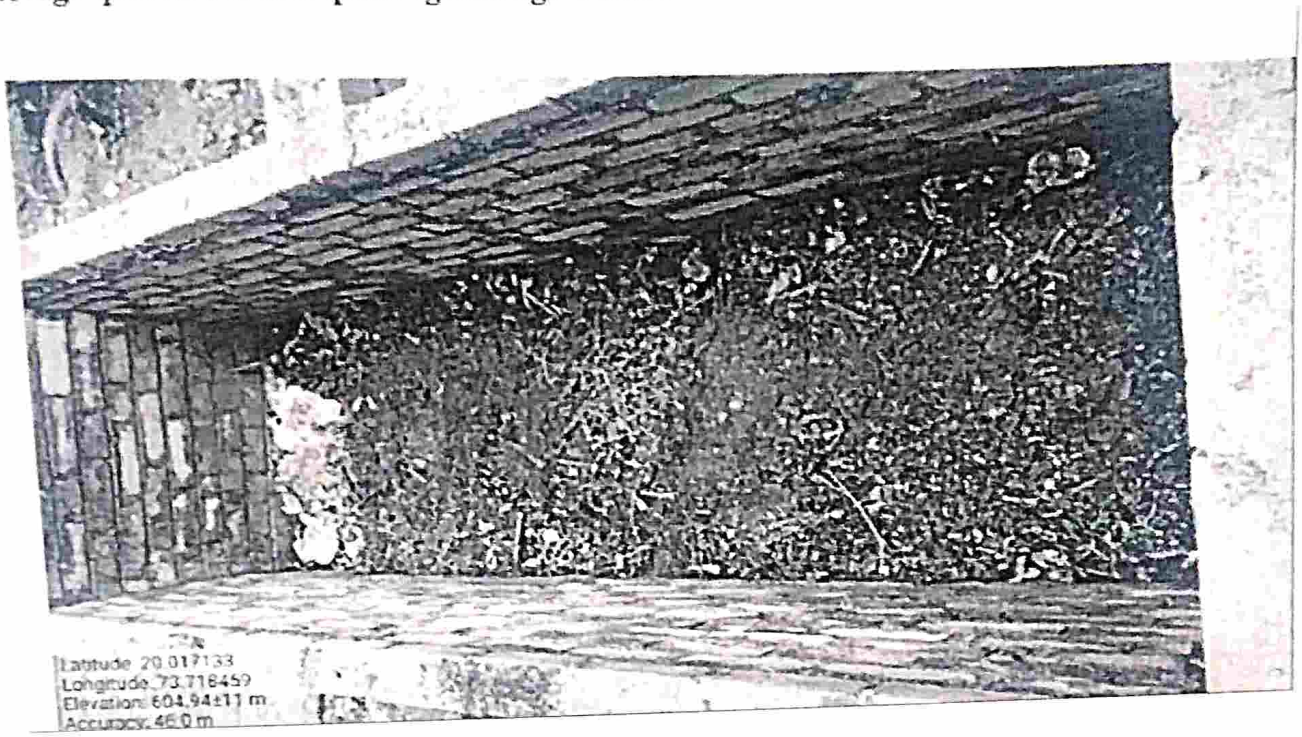
6. Study of Waste Management

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.

Photographs of Bio Composting Storage Tanks:



6.2 Study of Liquid Waste Generation

The waste water generated in college campus is treated in Water Recycle plant. This plant aims to remove contaminants from sewage to produce an effluent that is suitable for reuse application in garden. The plant is having water storage tank with having 12,000 liters capacity.

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Photos of Waste Water Treatment Plant

6.2 e-Waste Management

The internal communication is through emails and hence 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 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. Institute encourages students to not to use automobiles. To encourage the student for using electric vehicle the institute has installed Charging Points for the same.

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

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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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