

**Report**  
**On**  
**Green Audit**  
**At**  
**Vidarbha Youth Welfare Society's**  
**Prof. Ram Meghe Institute of Technology and Research**  
**Badnera – Amravati**



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](mailto:nutanurja.solutions@gmail.com)

## Contents

Acknowledgement .....	2
Executive Summary .....	3
Abbreviations .....	5
1. Introduction.....	6
1.1 Objectives.....	6
1.2 Audit methodology.....	6
2. Study of Electrical Energy Consumption .....	7
3. Carbon Foot printing.....	9
4. Study of Usage of Alternate Energy .....	11
5. Study of Rain Water Harvesting.....	12
6. Study of Waste Management .....	13
6.1 Solid Waste Management.....	13
6.2 e-Waste Management.....	13
6.3 Study of Liquid Waste Generation.....	14
7. Study of Green Practices.....	15
7.1 No of students who don't use own Vehicle for coming to Institute.....	15
7.2 Usage of Public Transport.....	15
7.3 Pedestrian Friendly Roads.....	15
7.4 Plastic Free Campus .....	16
7.5 Paperless Office.....	16
8. Green Landscaping with Trees and Plants .....	17
8.1 Green Landscaping with Trees and Plants .....	17

## **Acknowledgement**

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Vidarbha Youth Welfare Society's Prof. Ram Meghe Institute of Technology and Research Badnera – Amravati 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 Vidarbha Youth Welfare Society's Prof. Ram Meghe Institute of Technology and Research Badnera – Amravati is conducted by Nutan Urja Solutions, Pune. Based On the audit field study, following important points can be presented.

### 1. Present Energy Consumption

Vidarbha Youth Welfare Society's Prof. Ram Meghe Institute of Technology and Research Badnera – Amravati 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	29,491	23.59
2	Minimum	14,047	11.24
3	Average	19,790	15.83
4	Total	237,485	189.99

### 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 6 no of 100W capacity solar PV street lights.

### 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**

The Vidarbha Youth Welfare Society's Prof. Ram Meghe Institute of Technology & Research, Badnera-Amravati (Formerly well known as College of Engineering Badnera), is leading technological institute from central India. Established in the year 1983, the institute has a prestigious standing amongst the topmost Technical Institutes of Maharashtra. The Institute is providing an excellent Educational environment, infrastructure, amenities with value-oriented teaching; undoubtedly every student is molded well enough to face challenges of the modern world with the right attitude.

### **1.1 Objectives**

1. To study present level of Energy Consumption
2. To Study the present CO<sub>2</sub> 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

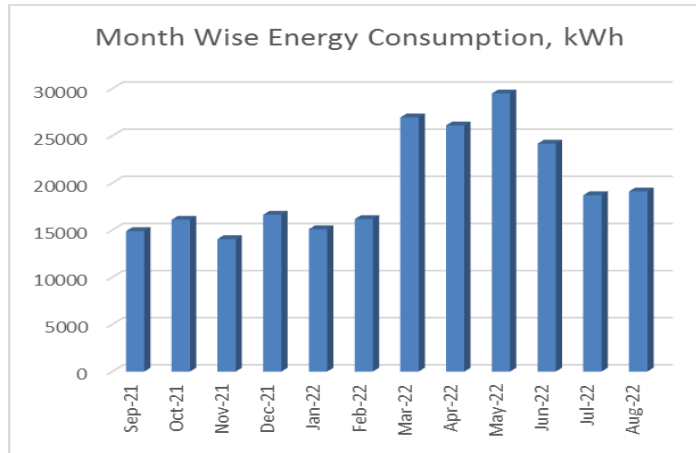
In this chapter, electricity bills are studied for the analysis of electrical energy consumption.

**Table no 2.1: Summary of electricity bills**

<b>No</b>	<b>Month</b>	<b>Energy (kWh)</b>	<b>Bill Amount (Rs)</b>
1	Aug-22	19107	331,193
2	Jul-22	18705	326,529
3	Jun-22	24167	412,429
4	May-22	29491	449,464
5	Apr-22	26107	397,160
6	Mar-22	26955	408,311
7	Feb-22	16169	250,621
8	Jan-22	15099	236,970
9	Dec-21	16631	255,813
10	Nov-21	14047	224,561
11	Oct-21	16107	249,523
12	Sep-21	14900	235,242
	<b>Total</b>	<b>237485</b>	<b>3777816</b>

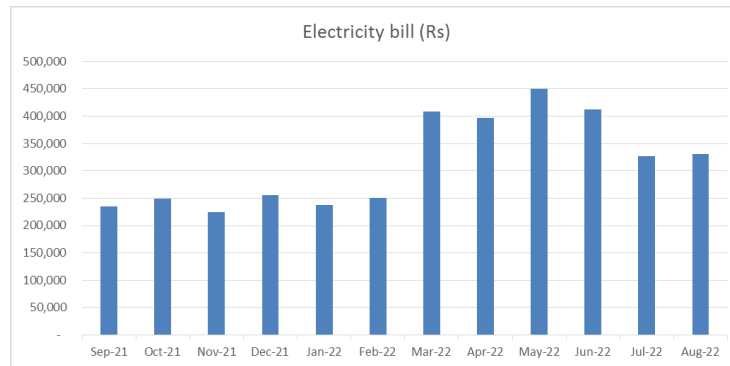
Variation in energy consumption is as follows,





**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	29,491	23.59
2	Minimum	14,047	11.24
3	Average	19,790	15.83
4	Total	237,485	189.99

### 3. Carbon Foot printing

1. A **Carbon Foot print** is defined as the Total Greenhouse Gas emissions (CO<sub>2</sub> 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<sub>2</sub> Emissions:

The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy is as under

- 1 Unit (kWh) of Electrical Energy releases **0.8 Kg of CO<sub>2</sub>** into atmosphere.

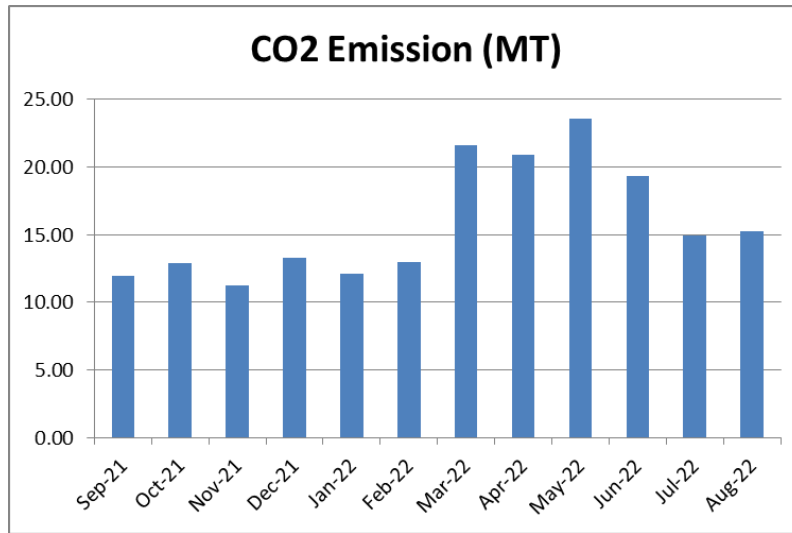
Based on the above Data we compute the CO<sub>2</sub> emissions which are being released in to the atmosphere by the College due to its Day to Day operations

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

**Table 3.1: Month wise Consumption of Electrical Energy & CO<sub>2</sub> Emissions**

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Aug-22	19,107	15.3
2	Jul-22	18,705	15.0
3	Jun-22	24,167	19.3
4	May-22	29,491	23.6
5	Apr-22	26,107	20.9
6	Mar-22	26,955	21.6
7	Feb-22	16,169	12.9
8	Jan-22	15,099	12.1
9	Dec-21	16,631	13.3
10	Nov-21	14,047	11.2
11	Oct-21	16,107	12.9
12	Sep-21	14,900	11.9
	<b>Total</b>	<b>237,485</b>	<b>190.0</b>

In the following Chart we present the CO<sub>2</sub> 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 6 no of 100W capacity solar PV street lights .

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

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	237485	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	1350	kWh/Annum
3	Total Energy Requirement of College	238835	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	0.6	%

## 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

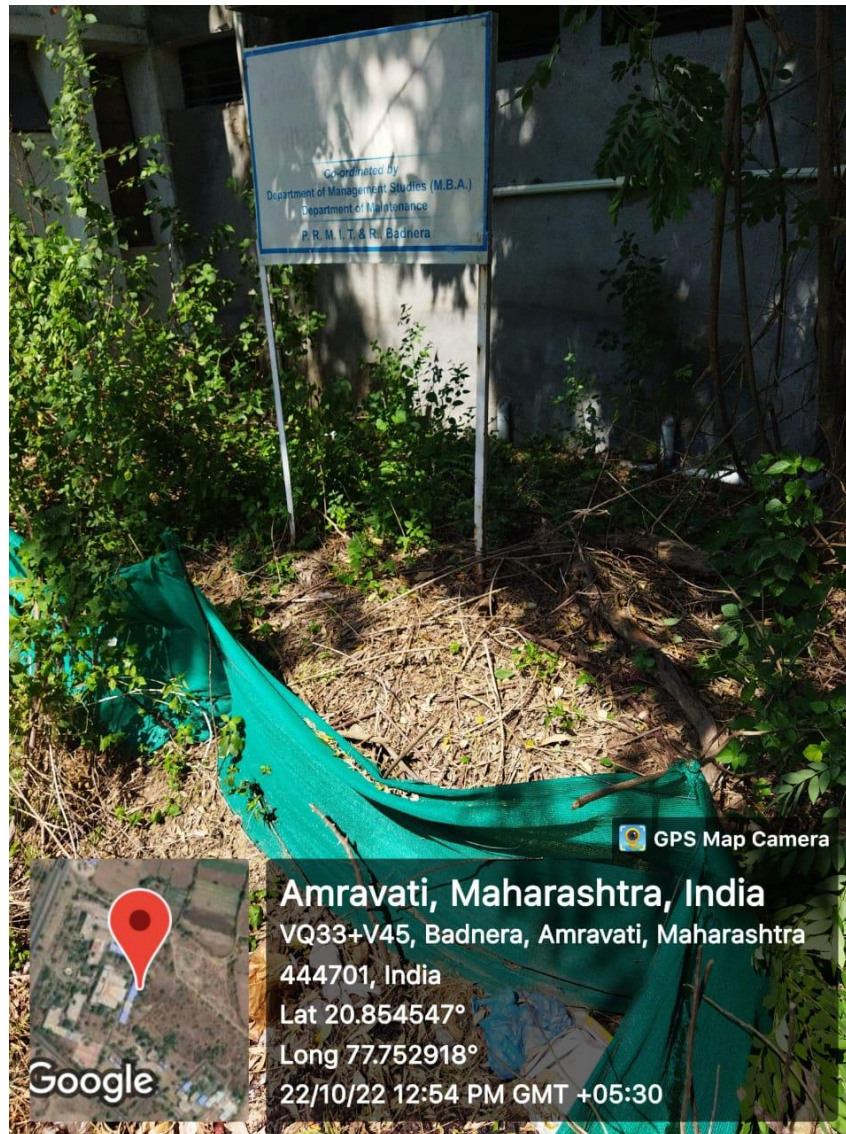


## 6. Study of Waste Management

### 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.

#### Photographs of Bio Composting Storage Tanks:



### 6.2 e-Waste Management

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

### 6.3 Study of Liquid Waste Generation

College is collecting the waste water from college premises in a tank. By using phytoremediation technique, wastewater is polished and recycled in campus garden by pumping. Species used for treatment is Water hyacinth.

#### Photograph of Bio Composting Processing Tanks



## **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

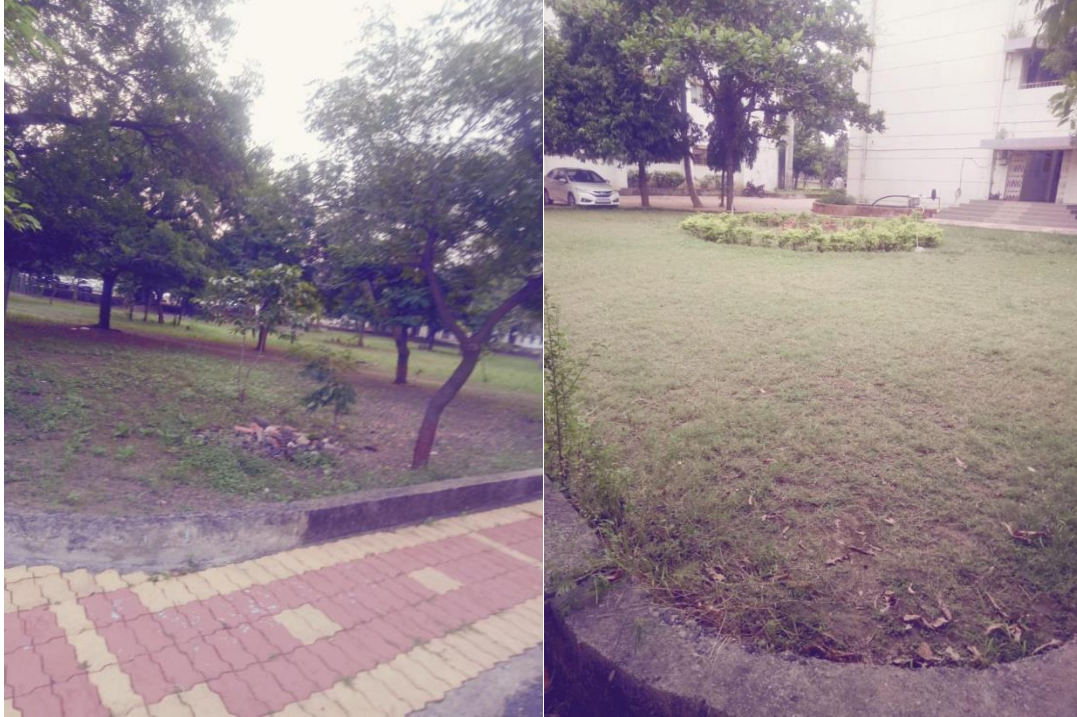
#### **7.5 Paperless Office**

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

## 8. Green Landscaping with Trees and Plants

### 8.1 Green Landscaping with Trees and Plants

The Institute has beautiful maintained Garden.



**Figure 8.1: Beautiful maintained Garden of college**

The college has following plants within the campus

**Table 8.1 List of Plants**

<b>Sr no</b>	<b>Name</b>	<b>No of trees</b>
1	Azadirachta Indica	303
2	Terrninolia Katappa	170
3	Casia Siaea	87
4	Dalbergia Sisso	254
5	Ficus	23
6	Ficus Religiosa	89
7	Ficus Hengalensis	58
8	Acacia	110
9	Bougan Villica	100
10	Tectona Grandis	60
11	Delonix Vegia	114
12	Syzygium Cumuni	2
13	Terminalia Bellerica	3
14	Emblica officinalis	
15	Aegle Marmelos	1
16	Annone Reticulate	1
17	Bauhinia	3
18	Annone Reticulate	3
19	Cathacanthus Rosea	2
20	Saroa Asoka	110
21	Other Bushes	500
22	Other Trees	508
23	Denfrocalamus Strictus	300
24	Acacia Nilotica	2
25	Thevetia	3
26	Pettophorum	4