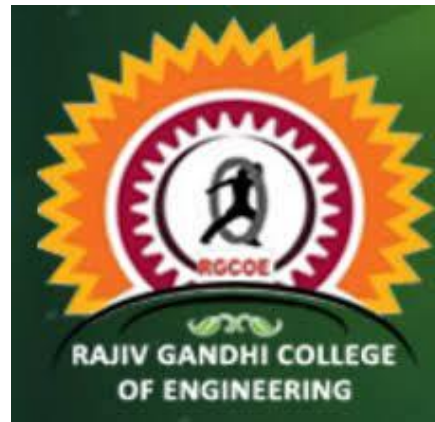


**Report**  
**On**  
**Green Audit**  
**At**  
**Matoshri Shaikshanik Pratishtan's ,**  
**Rajiv Gandhi College of Engineering,**  
**Karjule Harya**  
**(Year 2019-20)**



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## 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
7. Study of Green Practices.....	14
7.1 No of students who don't use own Vehicle for coming to Institute.....	14
7.2 Usage of Public Transport.....	14
7.3 Pedestrian Friendly Roads.....	14
7.4 Plastic Free Campus .....	14
7.5 Paperless Office.....	14
7.6 Green Landscaping with Trees and Plants .....	14

## **Acknowledgement**

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Matoshri Shaikshanik Pratishtan's , Rajiv Gandhi College of Engineering, Karjule Harya 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 Matoshri Shaikshanik Pratishtan's , Rajiv Gandhi College of Engineering, Karjule Harya is conducted by Nutan Urja Solutions, Pune. Based On the audit field study, following important points can be presented.

### 1. Present Energy Consumption

Matoshri Shaikshanik Pratishtan's , Rajiv Gandhi College of Engineering, Karjule Harya 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	8,683	6.95
2	Minimum	2,167	1.73
3	Average	6,325	5.06
4	Total	75,897	60.72

### 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 Solar PV street lights and Solar Thermal Hot Water System.

### 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**

Matoshri Shaikshanik Pratishtan's , Rajiv Gandhi College of Engineering, Karjule Harya is established with a vision to create engineers having drive, skill and confidence to become pioneers of tomorrow. The college is located in wide spread beautiful campus and provides an idea and healthy environment for learning and living. The campus is delightfully planed and splendidly landscaped with impressive building,

### **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

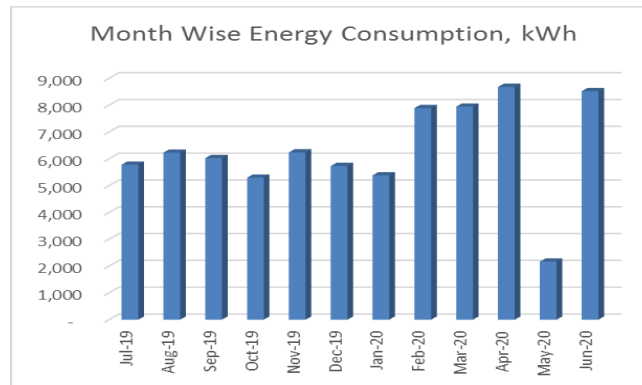
## 2. Study of Electrical Energy Consumption

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

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

No	Month	Energy (kWh)	Bill Amount (Rs)
1	Jun-20	8,523	145,554
2	May-20	2,167	115,061
3	Apr-20	8,683	137,433
4	Mar-20	7,946	126,027
5	Feb-20	7,892	124,883
6	Jan-20	5,382	88,268
7	Dec-19	5,731	90,022
8	Nov-19	6,239	99,159
9	Oct-19	5,297	80,839
10	Sep-19	6,026	88,531
11	Aug-19	6,230	87,913
12	Jul-19	5,781	85,540
	<b>Total</b>	<b>75,897</b>	<b>1,269,229</b>

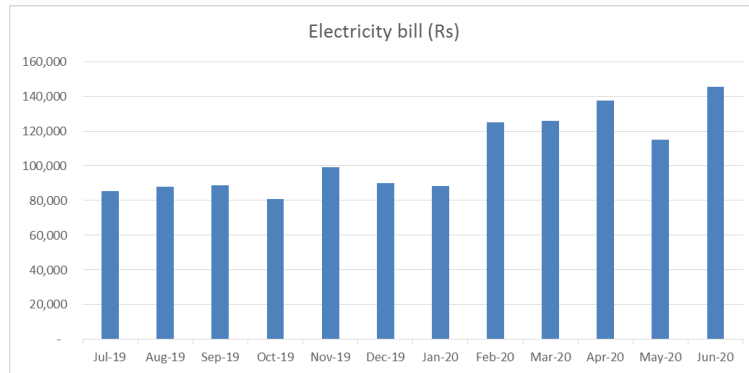
Variation in energy consumption is as follows,



**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**

<b>Sr no</b>	<b>Parameter</b>	<b>Energy consumed, (Units)</b>	<b>CO2 Emission (MT)</b>
1	Maximum	8,683	6.95
2	Minimum	2,167	1.73
3	Average	6,325	5.06
4	Total	75,897	60.72

### 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.

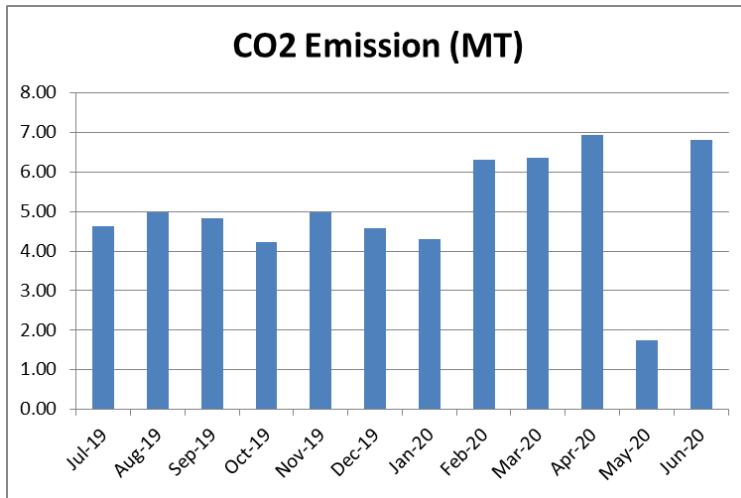
Based on the above Data we compute the CO<sub>2</sub> emissions which are being released in to the atmosphere by the College due to its Day to Day operations

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	Jun-20	8,523	6.82
2	May-20	2,167	1.73
3	Apr-20	8,683	6.95
4	Mar-20	7,946	6.36
5	Feb-20	7,892	6.31
6	Jan-20	5,382	4.31
7	Dec-19	5,731	4.58
8	Nov-19	6,239	4.99
9	Oct-19	5,297	4.24
10	Sep-19	6,026	4.82
11	Aug-19	6,230	4.98
12	Jul-19	5,781	4.62
	<b>Total</b>	<b>75,897</b>	<b>60.72</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 Roof Top Solar Thermal Hot Water System of 4200 liters capacity. Also, college has installed 3 nos of solar PV LED street lights.

##### **Photograph of Solar Thermal Hot Water System and LED street light**



## **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.

## **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.

### **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**