Miraj Mahavidyalaya Miraj

Maharashtra

Green & Environment Audit Report

January 2024

Sharad Institute of Technology

College of Engineering, Yadrav.

www.sitcoe.ac.in

GREEN & ENVIRONMENT AUDIT REPORT

of

Yashwant Shikshan Sanstha's

Miraj Mahavidyalaya Miraj

Miraj, Maharashtra.

Conducted by

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C. List of Abbreviations

MMM	: Miraj Mahavidyalaya Miraj
BEE	: Bureau of Energy Efficiency
MEDA	: Maharashtra Energy Development Agency
EB	: Electricity Board
DG	: Diesel Generator
ECM	: Energy Conservation Measures
GCV	: Gross Calorific Value
kWh	: kilo Watt hour
LT	: Low Tension
HT	: High Tension
MSEDCL	: Maharashtra State Electricity Distribution Co. Ltd.
MT	: Metric Ton
MTOE	: Metric Ton Oil Equivalent
kW	: Kilo Watt
TPA	: Tons per Annum
SEC	: Specific Energy Consumption
SPC	: Specific Power Consumption
TPH	: Tons per Hour
VFD	: Variable Frequency Drive
DOL	: Direct On Line
Yr	: Year
Kg	: Kilo Gram
W	: Watt
^{0}C	: Celsius

II. Acknowledgement

Green Audit Team of SITCOE expresses our sincere gratitude to management of Miraj Mahavidyalaya Miraj, Maharashtra, for providing us an opportunity to conduct a Green and Environment Audit of their Institute. We are grateful to **Hon. Rajgonda Annasaheb Patil**, Chairman, **Dr. A. R. Jadhav**, Principal **Mr. Manoj Patil**, Office Superintendent and other officials for showing keen interest in the study and for the help and co-operation extended to SITCOE Green Audit Team during study.

We do hope that you will find the recommendations given in this report useful in helping you save energy. While we have made every attempt to adhere to high quality standards, in both data collection and analysis, as well as in presentation through the report, we should welcome any suggestions from your side as to how we can improve further.

In case of any suggestions or queries:

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III. Introduction

Project	Green and Environment Audit
Client	Miraj Mahavidyalaya, Miraj
Segment	Education
Contact	**Mr. Manoj Patil**
	Office Suprintendent
Site	Miraj, 416410, Maharashtra, India
Consultant	**Dr. Sanjay Khot (EA-7218)**
	Principal, SITCOE, Yadrav
Involved faculty	Dr. M. M. Khade
	Prof. U. S. Patil

Involved from Institute:

Mr. Rajkumar Pandurang Medsinge (Head, Department of Botany)
Mrs. Shubhangi Pradeep Patil (Asst. Prof. Department of Botany)
Mr. Sunil Paradhi (Office Staff)
Mr. Santosh Gaikwad (Lab Attendant)

Duration	January 2024
Project scope:	Conducting Green and Environment audit at Miraj Mahavidyalaya Miraj to monitor environment performance and manage environmental issues.
Report	This document gives recommendations, details of findings and the way forward.
Notes	The suggestions/ alternatives in the audit report are based on the operating conditions of equipment/ systems during the field work and based on information and details collected from site and to the best of our knowledge. It is recommended to obtain vendor quotations before implementation

1. Energy and Utility System Description

1.1 About Institute

"In the eastern part of the city of Miraj and Miraj taluka, the former MLA of the Miraj Vidhan Sabha constituency, Mr. Sharad Patil, initiated the establishment of arts, science, and commerce colleges recognized by the government since June 1993. The College with arts, science and Commerce departments began in the premises of the Hindu Dharmashala. In the initial years, although physically inadequate within the building of the Hindu Dharmashala, efforts by enthusiastic and passionate teachers, along with administrative cooperation, rapidly increased the educational quality of the students. Due to these efforts, and with the support of the administration, this college, though briefly, has become renowned. Many youths who have obtained degrees in arts and science from this college are effectively contributing in various fields of society.

The Maharashtra government provided around three acres of land from the Budhgaonkar mala in Miraj city for the college. The institution raised funds and constructed the building, and since 2005, the college has been functioning in its self-owned remarkable building.

After undergoing reevaluation by the NAAC, an organization evaluating academic colleges nationwide, in 2019, the college received a 'B+' grade. The commerce department which initially couldn't commence; but due to student demand, it has been operational since 2016-17 without government financial aid."

1.2 Vision and Mission Statement of the Institute

Vision

"To make the institution a leading centre, imparting quality education with special emphasis on the overall development of students before itself".

Mission

The founder members of this institution have undertaken the work of spreading education with firmest conviction that education is the only energy that brings about the physical, moral and ethical regeneration of all kinds of backward societies and raises them up to the sustainable level with the help of advanced technologies.

1.3 Location of the Institute

Fig. 01 Layout of Miraj Mahavidyalaya Miraj

1.4 Objectives of Green Audit

1. To Conduct water audit in institute campus.
2. To monitor the energy consumption pattern of the institute.
3. To quantify the liquid and solid waste generation in the campus.
4. To assess the carbon foot print of the college
5. To identify of green practices followed by the institute.

2. Water Management

2.1 Water Audit

Water consumption in the college campus

Daily water requirement of Miraj Mahavidyalaya is around 5000 liters. Water supplied from Municipal Corporation is stored in overhead tank of 500 liters capacity for drinking purpose. Water lifted from borewell and transferred to overhead tanks of 5000 liter capacity.

Table 01: Daily Water Consumption

Description	Unit	value
Total Persons (Approx.)	Nos.	2916
Water requirement per persons per day	lit	45
Existing System		
Overhead Tank Pump	hp	7.5
Measured Power Consumption		
Measured water discharge	m3/hr.	0.625
Working hour of pump	Hr	8
Quantity of water supplied per day	m3/day	5
Actual water distributed per capita	lit.	1.71

Daily water consumed per capita is less compared to standard given by central ground water authority, New Delhi.

2.2 Waste water treatment Plant

In college campus total persons including student and staff are around 2910. According standard 45 lit. water consumed per capita.

Total water used 2910X45=130950 lit.

Estimated sewage=80% of water used

=0.8X130950=104760 lit.

Assuming a peak flow rate of 1.2 times the average flow rate.

Peak flow rate=1.2 X 104760=125712 lit.

STP capacity considered as 0.8 to 0.9 times peak flow rate

STP capacity=0.85X125712=106855 lit.

STP capacity considered as 100kLD

College campus need to be installed Sewage Treatment Plant (STP) of 100KLD capacity. Sewage treatment water can be used for the plantation and gardening.

2.3 Rain water Harvesting

It is the collection and storage of rain, rather than allowing it to run off. Rainwater is collected from a roof-like surface and redirected to a tank, cistern, deep pit (well, shaft, or borehole), aquifer, or a reservoir with percolation, so that it seeps down and restores the ground water. Dew and fog can also be collected with nets or other tools. Rainwater harvesting differs from storm water harvesting as the runoff is typically collected from roofs and other surfaces for storage and subsequent reuse. The basic rainwater harvesting system is more of a plumbing job than a technical job, as all the outlets from the building's terrace are connected through a pipe to an underground tank that stores water. There are common components that are installed in such systems, such as pre-filters, drains/gutters, storage containers.

College campus has drain pits for rainwater harvesting, drain water collected finally in tank.

2.3.1 Rain Water Harvesting Potential

Rainwater harvesting (RWH) is the collection and storage of rain, rather than allowing it to run off. Rainwater is collected from a roof-like surface and redirected to a tank, deep pit. Rain Water Harvesting is practiced by the institute that can produces 688 m^3 of water.

Table 02: Annual rain water harvesting potential

Area sqm	Average Rain fall-m	Runoff coefficient (C)	Total in cuM	In litres
1443.75	0.6811	0.7	688.34	688337

Fig.02: Rain Water Harvesting

3. Waste Management

3.1 Waste disposal in campus:

Waste disposal are the activities and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process. The waste from all around the college is separated daily as wet and dry waste in different bags which are disposed separately. Dry waste includes paper, cardboard, glass tin cans etc. on the other hand; wet waste refers to organic waste such as vegetable, left-over food etc. Separation of waste is essential as the amount of waste being generated today causes immense problem. The material was composted and evaluated as a fertilizing material. Disposal of these waste results in the production of good quality organic manure that can be used as soil amendments and source of plant nutrients. Waste management is helping colleges and universities to achieve a higher level of environmental performance. By reusing or recycling are contributing to the conservation of natural resources, saving energy, helping to protect the environment, reducing landfill. Miraj Mahavidyalaya adopts environment friendly practices and takes necessary actions such as – energy conservation, waste recycling, carbon neutral etc. The biological reusable waste are processed as organic manure for the plants available in the college campus and the other solid waste generated in the college campus is taken to the community bin of municipality for recycling and disposal.

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus.

3.2 Liquid waste management

Water conservation is a key activity as water availability affects on the development of the campus as well as on all area of development such as farming, industries, etc. Keeping this view water conservation activity is carried out. The waste water generated is disposed through waste water drainage to municipal server. The source of wastewater is Domestic Waste Water i.e.,

Sewage water. The Sewage water mainly comes from Toilets of college, hostel, kitchen and canteen. Sewage Treatment Plant having capacity of 100 kLD need to be installed in the campus. The Treated water can use for gardening Purpose and sludge is taken frequently from the collection tank and used for manure.

3.3 Solid waste management

Waste generated from tree droppings is major solid wastes generated in the campus. Separate dustbins are provided for Bio-degradable and Plastic waste in order to segregate them at the source itself. Single sided used papers are reused for writing and printing in all the departments to minimize the usage of papers. Very less plastic waste (0.1Kg/day) is generated by some departments, office, garden etc. and campus is declared as Plastic Free zone. Metal waste and wooden waste is stored and sent to authorize scrap agents for further processing. The college has separate bins to collect biodegradable and non-biodegradable waste generated in the campus. Regular meetings are conducted with ground staff regarding the cleanliness of the campus and proper disposal of waste.

Fig. 03 Solid Waste Management

3.4 E-Waste Management

E-waste is a consumer and business electronic equipment that is near or at the end of its useful life. This waste makes up about 5% of all municipal solid waste worldwide. It is hazardous than other waste because electronic components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

E-waste generated in the campus is of minimal quantity. It is being effectively managed, keeping in mind the environmental hazards that may arise if not disposed properly. The cartridges of laser printers are refilled outside the college campus. The E- wastes and defective items from computer laboratories are being stored properly and recycled in effective Manner. The minimal amount of e- waste that is generated and handover to Sangli Miraj Kupwad Muncipal Corporation through E-Kachra Sankalan Mohim.

Date 14-10-23

To,

Sangli, Miraj & Kupwad Municipal Corporation,

Subject: - Electronic Waste Material (E-Waste)

Dear Sir,

Following listed Electronic Waste (E-Waste) Material has been collected by Miraj Mahavidyalaya, Miraj and it is handed over to you to you to disposal E-Waste.

Sr No	Product Name	Qty
1	CPU	10
2	Keyboard	18
3	Mouse	30
4	Monitor	6
5	HDD	25
6	SMPS	16
7	CD-RAM	7
8	Switch	7
9	Cartridge	2
8	CD	5
9	CMOS CELL	50
10	Samall fan	4
11	Batter Small	3
12	Sepkar set	1

Kindly acknowledge,

Thanking you in anticipation,

Regards,

उपप्राचार्य,
मिरज महाविद्यालय,मिरज.

Received Date

Power Ground Thermax
Foundation - Pune
Waste Foundation, Miraj
Secretary

Fig. 04 E-scrap certificate

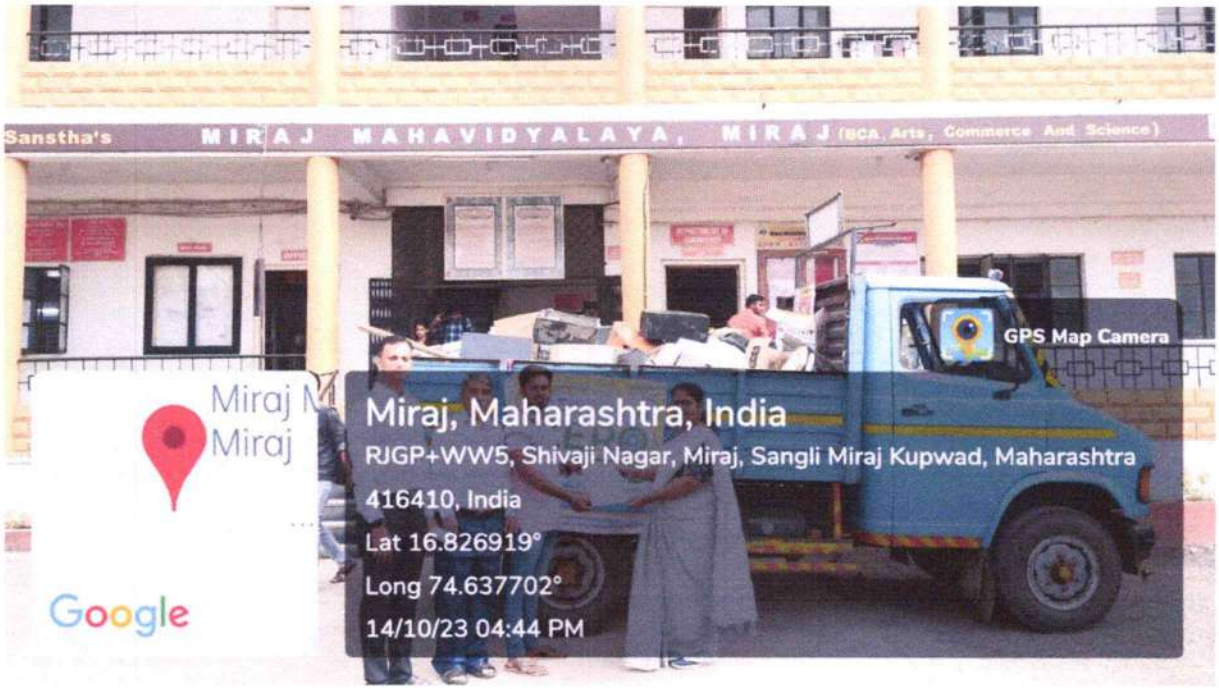

Fig. 05 E-Waste Collection

Fig. 06 E-Waste Collection

4. Environmental audit

4.1 Tree Diversity in campus

Miraj Mahavidyalaya Miraj is within the geo-position between latitude $16^0$51'39.4" N and longitude $74^0$33'52.5" E. The area is immensely diverse with a variety of tree species performing a variety of functions. Most of these tree species are planted in different periods of time through various plantation programs organized by the authority and have become an integral part of the college. The trees of the college have increased the quality of life, not only the college fraternity but also the people around of the college in terms of contributing to our environment by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, and supporting wildlife, controlling climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer. Many species of birds are dependent on these trees mainly for food and shelter. Nectar of flowers and plants is a favorite of birds and many insects. Leaf –covered branches keep many animals, such as birds and squirrels, out of reach of predators. Different species display a seemingly endless variety of shapes, forms, texture and vibrant colours. Even individual trees vary their appearance throughout the course of the year as the seasons change. The strength, long lifespan and regal stature of trees give them a monument – like quality. They also remind us the glorious history of our institution in particular. We often make an emotional connection with these trees and sometime become personally attached to the ones that we see every day. A thick belt of large shady trees in the periphery of the college have found to be bringing down noise and cut down dust and storms. The following are the tree species with whom we are being attached.

Table: 03 List of Plant in campus

Sr. No.	Botanical Name	Family	Common Name	Nos.
1	Albizia saman F. Muell	Mimosaceae	Rain Tree (Shirish)	1
2	Alstonia scholris (L) R. Br.	Apocynaceae	Blackboard Tree (Saptaparni)	3
3	Artocarpus heterophyllus Lam	Moraceae	Jackfruit (Phanas)	1
4	Azadirachta indica A. Juss	Meliaceae	Kadulimb	7
5	Bauhumia variegate (L) Benth	Fabaceae	Camel's Foot Tree	3
6	Canna indica L.	Cannaceae	African Arrow Root (Kardal)	1
7	Carica papaya L.	Caricaceae	Papaya	5
8	Cassia biflora L.	Caesalpinaceae	Desert Cassia	1
9	Cassia fistula L.	Fabaceae	Golden Shower Tree (Bahava)	8
10	Cocos nucifea L.	Arecaceae	Coconut Palm (Naral)	8
11	Cordia sebestina L.	Boraginaceae	Scarlet Cordia	1
12	Duranta erecta L.	Verbenaceae	Pigeon Berry	2
13	Dypsis lutescens (H. Wendi) Beentje & J. Dransf	Arecaceae	Golden Cane Palm	15
14	Eucalyptus oblique L. Her	Myrtaceae	Gum Tree (Nilgiri)	2
15	Ficus benjamina L.	Moraceae	Weeping Fig	28
16	Galphimia glauca Cav	Malphigiaceae	Goldshower Plant	10
17	Grevillea robusta A. Cunn ex. R. Br.	Proteaceae	Silver Oak	20
18	Hamelia patens Jacq.	Rubiaceae	Fire Bush	10
19	Holoptelia integrifolia (Roxb.) Planch	Ulmaceae	Paisa	1
20	Ixora coccinea L.	Rubiaceae	West Indian Jasmine	2

Small bushes inside shade list are as given below.

Table: 04 List of small bushes in shade net

Sr. No.	Botanical Name	Family	Sr. No.	Botanical Name	Family
1	Acalypha sp.	Euphorbiaceae	31	Ficus glomerata	Moraceae
2	Acorus calamus	Acoraceae	32	Ficus religiosa	Moraceae
3	Acrostichum aureum	Pteridaceae	33	Hibiscus rosa-sinensis	Mavaceae
4	Aloe barbadensis	Fam.-Liliaceae	34	Justicia adhatoda	Acanthaceae
5	Annina squamosal	Annonaceae	35	Licuala grandis	Arecaceae
6	Araucaria sp.	Araucariaceae	36	Livistona chinensis	Arecaceae
7	Asparagus facemosus	Liliaceae	37	Magnolia champaca	Magnoliaceae
8	Azadirachta indica	Meliaceae	38	Mentha piperata	Lamiaceae
9	Bryophyllum sp.	Crassulaceae	39	Moringa oleifera	Moringaceae
10	Cactus sp.	Cactaceae	40	Murraaya koenigii	Rutaceae
11	Catharanthus roseus	Apocynaceae	41	Nephrolepsis exaltata	Nephrolepidaceae
12	Celosia cristata	Amarathaseae	42	Nyctanthus arbor-tristis	Oleaceae
13	Chlorophytum comosum	Asparagaceae	43	Ocimum santum	Lamiaceae
14	Cinnamomum tamala	Lauraceae	44	Petunia hybrida	Solanaceae
15	Citrus medica	Retaceae	45	Phyllanthus emblica	Euphorbiaceae
16	Codiaeum variegatum	Euphorbiaceae	46	Poinsettia pulcherriuma	Euphorbiaceae
17	Colocasia sp.	Araceae	47	Psidium guajava	Myrtaceae
18	Couroupita guianensis	Lecythidaceae	48	Pteridium aquilinum	Pteridiaceae
19	Croton petra	Euphorbiaceae	49	Pteris longifolia	Pteridiaceae
20	Croton variegatum	Euphorbiaceae	50	Punica granatum	Punicaceae
21	Cycas circinalis	Cycadaceae	51	Rosa indica	Rosaceae
22	Cycas revolute	Cycadaceae	52	Sanseviera hyacithoides	Asparagaceae
23	Cymbopogon schoenanthus	Poaceae	53	Schizoloma dichotoma	Dennstaidtiaceae
24	Dieffenbachia picta	Araceae	54	Sesbania sesban	
25	Dracaena sp.	Asparagaceae	55	Solanum nigrum	Solanaceae
26	Emblica officinalis	Euphorbiaceae	56	Strobilanthes sp.	Acanthaceae
27	Erenthemum nigrum	Acanthaceae	57	Syzygium cumini	Myrtaceae
28	Erenthemum sp.	Acanthaceae	58	Tamarindus spathacea	Fabaceae
29	Euphorbia eritrea (cactus)	Euphorbiaceae	59	Tradescantia spathacea	Commelinaceae
30	Ficus bebgalensis	Moraceae	60	Zinnia sp.	Asteraceae

4.2 Weather Data of Miraj

The average annual temperature of Sangli Miraj Kupwad is around 24°C although it varies from around 21°C during winter (December) to 39°C during the summer (May). Sangli-Miraj and Kupwad typically receives about 84.75 millimeters (3.34 inches) of precipitation and has 124.2 rainy days (34.03% of the time) annually.

4.3 Air Quality in Miraj

An air quality monitoring station recorded an annual average RSPM concentration of 61 gm^3 against standard limit of 40 gm^3. The annual average level of Nitrogen oxides was 34 gm^3. According to The energy and resources institute (TERI), the air quality often fell in moderate category.

4.4 Lux & Noise Monitoring

Illumination is one of the most important environmental factors in the classroom. Lux monitoring can help in providing a Comfort Vision Environment to Students. When assessing noise exposure in campus environments, it can be difficult to determine whether the level of sound has reached a point where it interferes with student learning and staff productivity, or worse, becomes a threat to their health and well-being and Monitored reports are enclosed.

Table 05: Measurements of Lux

Department/Lab	Lux Level
Ground Floor Office	595.13
Dept. of Chemistry	155.55
Lab 2	186.60
Microbiology Lab Msc.	278.43
Class room 3	322.71
Class room 6	162.89
Physics	491.50
Boys reading room	499.50
Girls reading room	353.50
New building Jr. College Ground floor Science B5 Class room 8	101.36
First floor Class room 4	844.89

Lux level varies from 101 to 845 in various departments. Average lux value is 363 lux. Labs or class room having Lux level below 150 should take initiatives to increase lux level by addition of tube lights and bulbs.

4.5 Noise Level in the Surrounding

The human ear is constantly being assailed by man-made sounds from all sides, and there remain few places in populous areas where relative quiet prevails. There are two basic properties of sound are Loudness and Frequency. Loudness is the strength of sensation of sound perceived by the individual. It is measured in terms of Decibels. Just audible sound is about 10 dB, a whisper about 20 dB, library place 30 dB, normal conversation about 35-60 dB, heavy street traffic 60-95 dB, boiler factories 120 dB, jet planes during take-off is about 150 dB, rocket engine about 180 dB. The loudest sound a person can stand without much discomfort is about 80 dB. Sounds beyond 80 dB can be safely regarded as Pollutant as it harms hearing system. The WHO has fixed 45 dB as the safe noise level for a city. For international standards a noise level up to 65 dB is considered tolerate. Loudness is also expressed in sones. One sone equals the loudness of 40 dB sound pressure at 1000 Hz. Frequency is defined as the number of vibration per second. It is denoted as Hertz (Hz).

Noise level meter was used to measure the noise level. Noise level meter detect of any noise, music or sound in your surroundings.

Measurement Procedure

The noise level was recorded at the different Important Locations of campus. At each spot, the measurements were taken during working hours and noted down the measurements.

The results of the experiments at different places have been tabulated in the following table:

Table 06: Measurements of Noise

Department/Lab name	Noise Level (dBA)
Ground Floor Office	54.56
Dept. of Chemistry	65.83
Lab 2	53.90
Microbiology Lab Msc	62.70
Lab 2	69.50
Class room 3	62.98
Class room 6	62.97
Physics	71.00
Boys reading room	65.97
Girls reading room	58.30
New building Jr. College Ground floor science B5 Class room 8	59.48
First floor Class room 4	53.68

Noise level varies from 54 to 71 dBA inside campus. Average noise level was 62 dBA. Almost all labs noise level is within prescribed level.

4.6 Potable Water:

Drinking or using contaminated water can result in severe illness or death. That is why it is important to ensure that drinking water is safe, clean and free from bacteria and disease. The parameters for water quality are determined by the intended use. Work in the area of water quality tends to be focused on water that is treated for human consumption.Campus equipped with RO system for potable water.

Fig. 07 RO system for potable water

4.7 Carbon Footprint - Emission & Absorption

The **carbon footprint** (or **greenhouse gas footprint**) serves as an indicator to compare the total amount of greenhouse gases emitted from an activity, product, company or country. Carbon footprints are usually reported in tons of emissions (CO_2-equivalent) per unit of comparison; such as per year, person, kg protein, km travelled and alike.

Table: 07 Carbon footprint by different sources

Description	Units	Value	CO_2 emission per year
Electricity used per year	kWh	22985	18.85
LPG used per year	kg	456	1.36
Diesel used per year	liters	1200	3.18
Transportation car (12 Cars, 110 Two wheelers)	Liters	12180	29.13

CO_2 emission by electricity used

Co_2 emission = 0.82*kWh used in year/1000=18.85Ton of CO_2

CO_2 emission by LPG used per year

Co_2 emission=LPG used in kg per year X 2.983

=456 X 2.983=1.36 Ton of CO_2

CO_2 emission by Diesel used per year

Co_2 emission=Diesel used in liters per year X 2.653

=1200 X 2.653=3.18 Ton of CO_2

CO_2 emission by transportation (car) used per year

Co_2 emission=Petrol/Diesel used in liters per year X 2.392

=12180 X 2.2392=29.13 Ton of CO_2

Instittute has 12 cars and 110 two wheelers

Total CO2 emission per year= cumulative by electricity usage + Diesel usage + LPG combustion + Car and two wheeler transportation

= (18.85 + 1.36 + 3.18 + 29.13 = 52.53 ton)

4.8 Carbon Absorption by Flora in the Institution

There are 129 full grown trees of different species in the campus spread over 14164 sqm. Carbon absorption capacity of one full grown tree is 22 kg CO_2. Therefore Carbon absorption capacity of 129 full-grown trees 129 x 22 kg CO_2 =2.84 tons of CO_2.

The carbon absorption capacity of 60 small trees is in the net shade area is 200g. Based on this, total carbon absorption by small tree is 60 x 200 g = 0.012 tons of CO_2. Grand total of carbon absorption capacity of the campus is 2.85 tons of CO_2.

5. Energy Scenario

5.1 Electrical Power Consumption at Miraj Mahavidyalaya:

The analysis of plant electricity consumption from EB is given below. For the electricity consumption analysis, electricity bill for the last twelve months (March-2023 to February 2024) is considered.

Table 08: Electrical Bill Analysis of Main Building

Month	Consumption kWh	Fixed Charges	Energy charges	Wheeling Charges	FAC	Electricity Duty	Tax on sale	Other Charges	Total Bill ₹	Unit Charge ₹/kWh
Feb-24	1393	422	8274.42	1629.81	417.9	2256.27	265.23	0	13265.63	9.52
Jan-24	1159	422	6884.46	1356.03	347.7	1892.14	220.67	0	11123	9.60
Dec-23	1204	422	7151.76	1408.68	361.2	1962.16	229.24	0	11535.04	9.58
Nov-23	1771	422	10519.74	2072.07	265.65	2788.69	337.2	0	16405.35	9.26
Oct-23	1582	422	9397.08	1850.94	237.3	2500.54	301.21	0	14709.07	9.30
Sep-23	1557	422	9248.58	1821.69	0	2413.38	296.45	0	14202.1	9.12
Aug-23	1217	422	7228.98	1423.89	0	1905.72	231.72	0	11212.31	9.21
Jul-23	1382	422	8209.08	1616.94	0	2152.08	263.13	0	12663.23	9.16
Jun-23	2153	422	12788.82	2519.01	0	3303.26	409.93	203.85	19646.87	9.13
May-23	1626	422	9658.44	1902.42	0	2516.4	309.59	0	14808.85	9.11
Apr-23	1371	384	6265.47	1850.85	1233.9	2044.19	261.04	0	12039.45	8.78
Mar-23	1060	384	4844.2	1431	954	1598.77	201.82	0	9413.79	8.88
Min	1060	384	4844.2	1356.03	0	1598.77	201.82	0	9413.79	8.78
Max	2153	422	12788.82	2519.01	1233.9	3303.26	409.93	203.85	19646.87	9.60
Average	1425.77	413.23	8101.17	1710.72	293.67	2225.57	271.47	15.68	13110.65	9.19
Total	16082	4566	92196.6	19253.5	3399.8	25077.3	3062.0	203.9	147759.1	

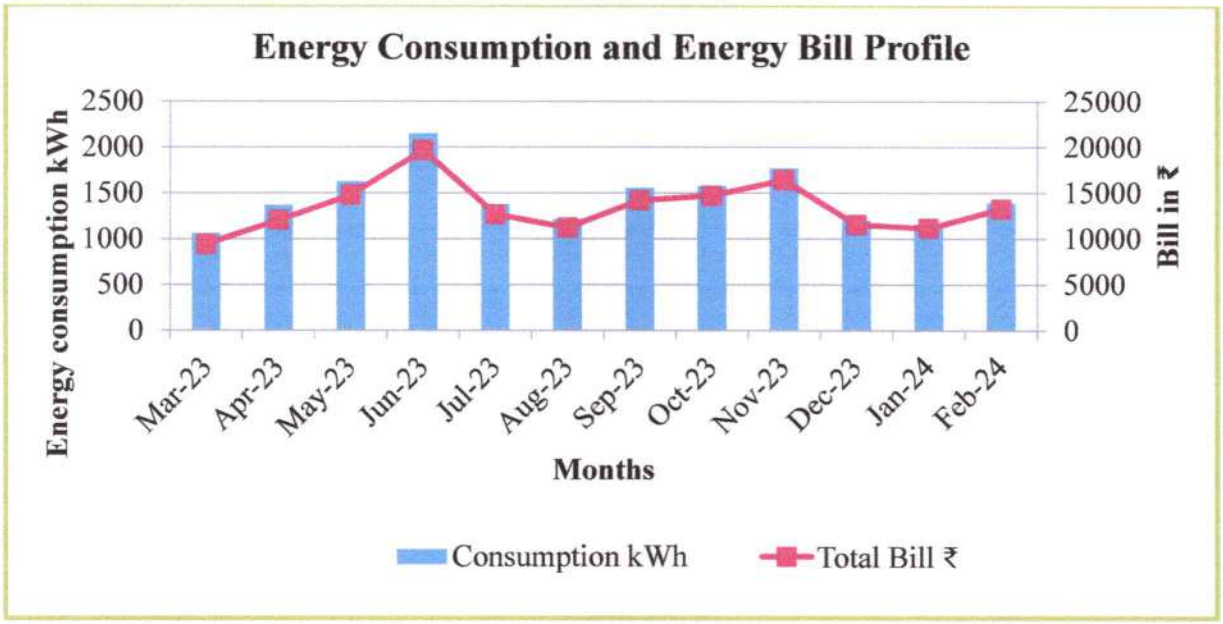

Figure 08: Annual Energy Consumption

Observation:

- The average energy consumption is 16082 kWh.
- The maximum energy consumption was 2153 kWh in the month if June 2023.
- Total bill for energy consumption was ₹147759.

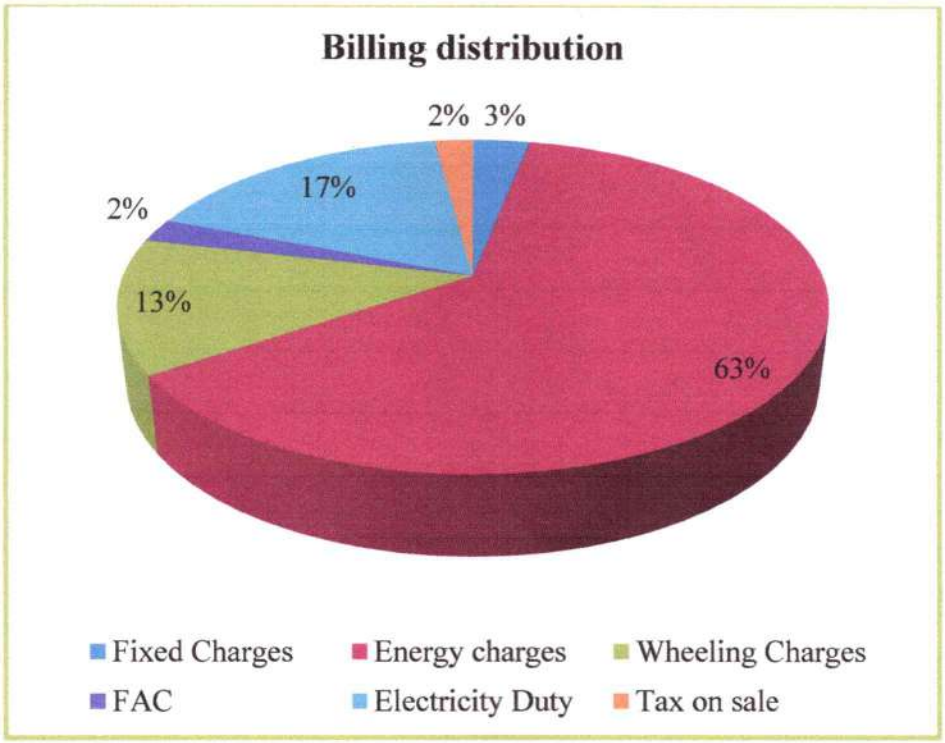

Figure 09: Billing Distribution

Observations

- Energy charges are 63 % of total bill.
- Fixed charges are 3 % of total bill.

Table 09: Electrical Bill Analysis of Jr. College

Month	Consumption kWh	Fixed Charges	Energy charges	Wheeling Charges	FAC	Electricity Duty	Tax on sale	Other Charges	Total Bill ₹	Unit Charge ₹/kWh
Feb-24	278	422	1651.32	325.26	83.4	397.12	52.93	0	2932.03	10.55
Jan-24	277	422	1645.38	324.09	83.1	395.93	52.74	0	2923.24	10.55
Dec-23	267	422	1585.98	312.39	80.1	384.08	50.84	0	2835.39	10.62
Nov-23	566	422	3362.04	662.22	84.9	724.99	107.77	0	5363.92	9.48
Oct-23	409	422	2429.46	478.53	61.35	542.61	77.87	0	4011.82	9.81
Sep-23	473	422	2809.62	553.41	0	605.6	90.06	0	4480.69	9.47
Aug-23	453	422	2690.82	530.01	0	582.85	86.25	0	4311.93	9.52
Jul-23	327	422	1942.38	382.59	0	439.52	62.26	0	3248.75	9.94
Jun-23	227	422	1348.38	265.59	0	325.76	43.22	40.3	2445.25	10.77
May-23	257	422	1526.58	300.69	0	359.88	48.93	0	2658.08	10.34
Apr-23	253	384	1156.21	341.55	227.7	337.51	48.17	0	2495.14	9.86
Mar-23	211	384	964.27	284.85	189.9	291.68	40.17	0	2154.87	10.21
Min	211	384	964.27	265.59	0	291.68	40.17	0	2154.87	9.47
Max	566	422	3362.04	662.22	227.7	724.99	107.77	40.3	5363.92	10.77
Average	323.77	413.23	1852.05	386.67	62.34	436.86	61.64	3.10	3232.00	10.05
Total	3720	4566	21461.1	4435.9	727.1	4990.4	708.3	40.3	36929.1	

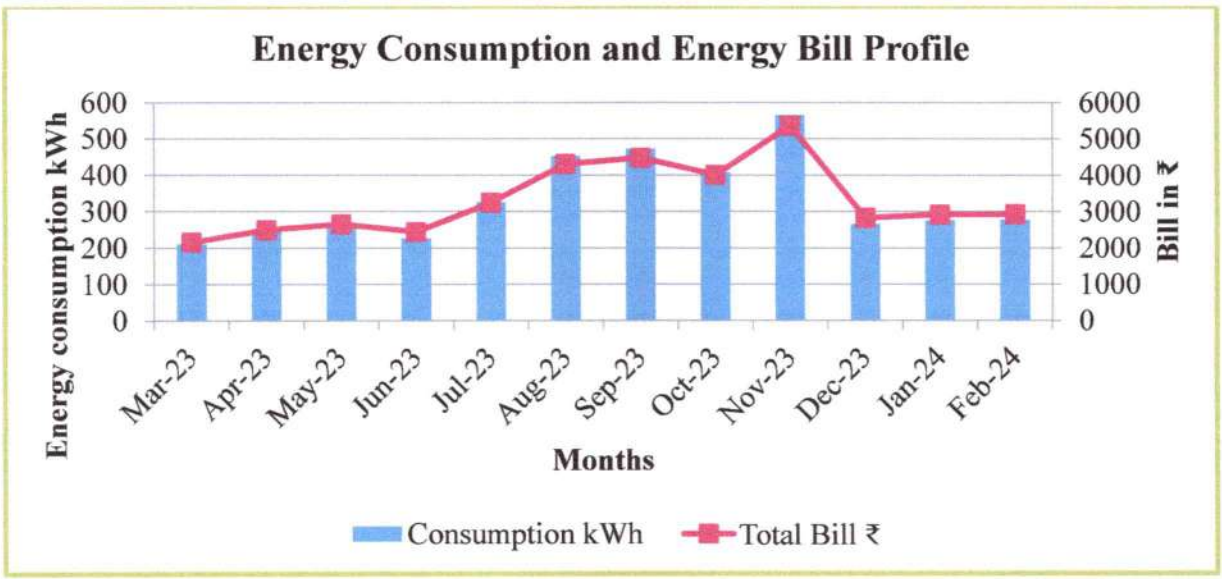

Figure 10: Annual Energy Consumption

Observation:

- The average energy consumption is 323.77 kWh.
- The maximum energy consumption was 566 kWh in the month if November 2023.
- Total bill for energy consumption was ₹ 36929.

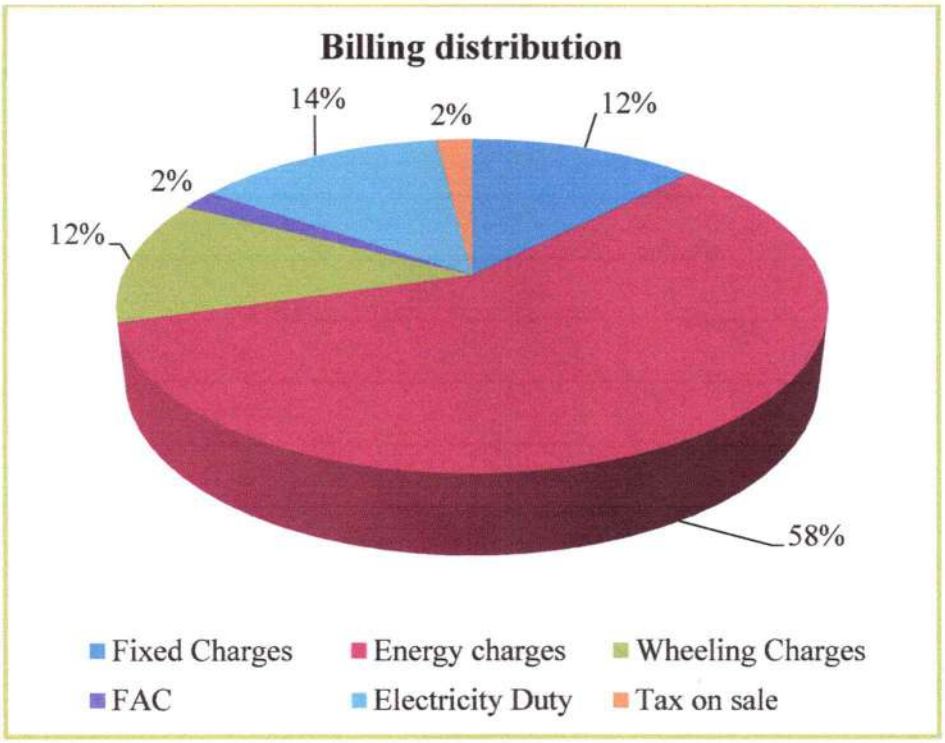

Figure 11: Billing Distribution

Observations

- Energy charges are 58 % of total bill.
- Fixed charges are 12 % of total bill.

Table 10: Electrical Bill Analysis of Hostel

Month	Consumption kWh	Fixed Charges	Energy charges	Wheeling Charges	FAC	Electricity Duty	Tax on sale	Other Charges	Total Bill ₹	Unit Charge ₹/kWh
Feb-24	185	422	1098.9	216.45	55.5	376.5	35.22	0	2204.57	11.92
Jan-24	140	422	831.6	163.8	42	306.47	26.66	0	1792.53	12.80
Dec-23	126	422	748.44	147.42	37.8	284.69	23.99	0	1664.34	13.21
Nov-23	258	422	1532.52	301.86	38.7	481.97	49.12	0	2826.17	10.95
Oct-23	197	422	1170.18	230.49	29.55	388.97	37.51	0	2278.7	11.57
Sep-23	247	422	1467.18	288.99	0	457.42	47.03	0	2682.62	10.86
Aug-23	400	422	2376	468	0	685.86	76.16	0	4028.02	10.07
Jul-23	371	422	2203.74	434.07	0	642.56	70.64	0	3773.01	10.17
Jun-23	428	422	2542.32	500.76	0	727.67	81.49	61.29	4335.53	10.13
May-23	301	422	1787.94	352.17	0	538.04	57.31	0	3157.46	10.49
Apr-23	393	384	1796.01	530.55	353.7	643.49	74.83	0	3782.58	9.62
Mar-23	322	384	1471.54	434.7	289.8	541.81	61.31	0	3183.16	9.89
Min	126	384	748.44	147.42	0	284.69	23.99	0	1664.34	9.62
Max	428	422	2542.32	530.55	353.7	727.67	81.49	61.29	4335.53	13.21
Average	268.77	413.23	1521.14	324.36	65.16	489.24	51.17	4.71	2874.85	10.87
Total	3183	4566	17927.5	3852.8	791.6	5699.0	606.1	61.3	33504.1	

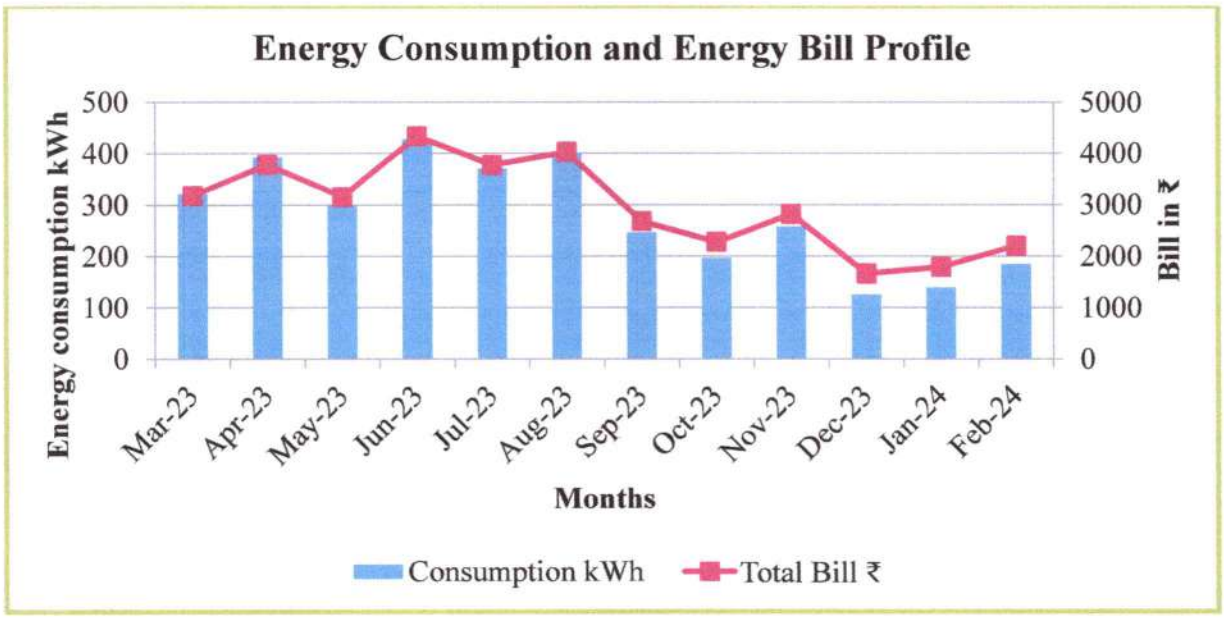

Figure 12: Annual Energy Consumption

Observation:

- The average energy consumption is 268.77 kWh.
- The maximum energy consumption was 428 kWh in the month if June 2023.
- Total bill for energy consumption was ₹ 33504.

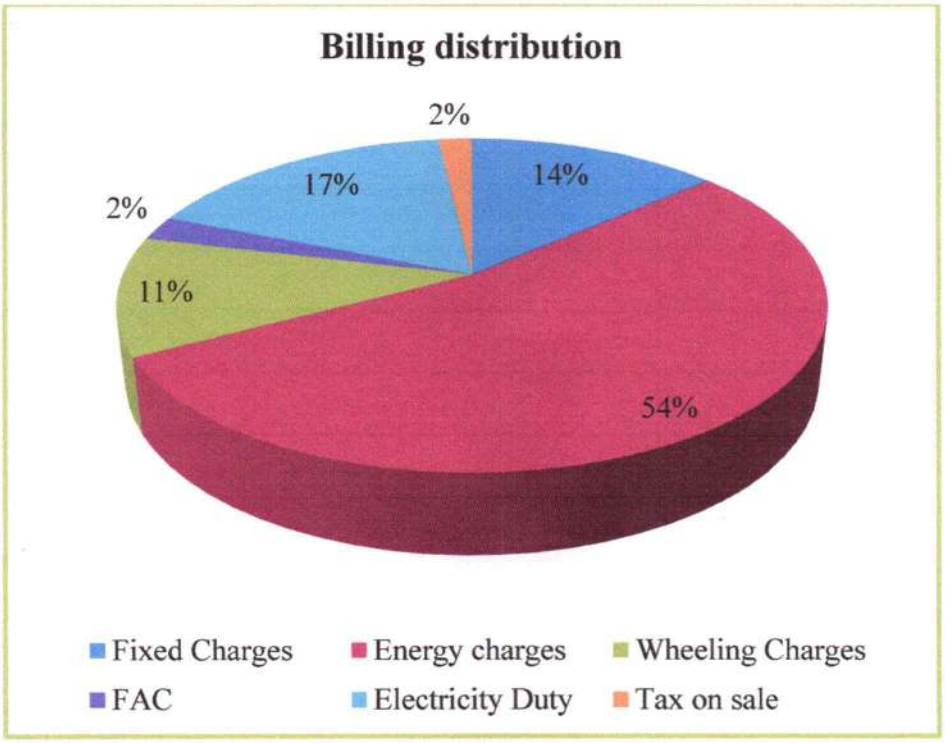

Figure 13: Billing Distribution

Observations

- Energy charges are 54% of total bill.
- Fixed charges are 14 % of total bill.

6. Recommendations

1. The food waste generated from college, hostel mess, canteens should be converted into biogas which can be further utilized for hostel kitchens.
2. The solar battery-operated vehicles should be used on the campus to overcome the vehicle footprint.
3. Green computing or E- work is helping the organization to reduce footprint very effectively.
4. The solar energy-based street lamps on campus will reduce carbon footprint.
5. "Carbon Sequestration" survey should be conducted on the campus. Carbon sequestration is a process of converting atmospheric carbon i.e. CO_2 into other sinks of carbon such as vegetation, soil, ocean, etc. in various forms to mitigate global warming audit is one of the important clauses of the Kyoto Protocol.
6. Eco-friendly parameters should be included in the purchase of articles and goods for the institute campus.
7. Water Meter should be installed at every building of institute for monitoring of water consumption per capita.
8. Enhance recycling can be done by creating a group where students can recycle books, personal clothes and other material to needy students. This can be an initiative under green program.
9. Solar power plant should be increased to fulfill at least 70% of the electricity requirements.
10. Plant distribution program in nearby villages and societies should be initiated periodically.
11. Green building guidelines for future expansion projects of the campus.

7. Conclusion

Establish eco club in MIraj Mahavidyalaya Miraj promotes conservation of resources. Overall 40% of institute campus is for landscaping and 30.91% is green cover. The Miraj Mahavidyalaya makes a significant effort to act in an environmentally responsible manner and takes into account the environmental effects of the majority of its activities. It's important to increase the Solar PV capacity up to 21 kW_p. Additionally, advise installing water meters at each building/block and prepare water balancing report.

8. Annexure

Glimpses of awareness program conducted by institute


GPS Map Camera
Miraj, Maharashtra, India
RJGP+WW5, Shivaji Nagar, Miraj, Sangli Miraj Kupwad, Maharashtra 416410, India
Lat 16.827478°
Long 74.637499°
01/10/23 10:02 AM GMT +05:30
Google


GPS Map Camera
Miraj, Maharashtra, India
RJGP+WW5, Shivaji Nagar, Miraj, Sangli Miraj Kupwad, Maharashtra 416410, India
Lat 16.826858°
Long 74.637799°
01/10/23 09:49 AM GMT +05:30
Google


GPS Map Camera
Miraj, Maharashtra, India
RJGP+WW5, Shivaji Nagar, Miraj, Sangli Miraj Kupwad, Maharashtra 416410, India
Lat 16.826876°
Long 74.637966°
01/10/23 09:50 AM GMT +05:30
Google


GPS Map Camera
Miraj, Maharashtra, India
795, Gulabrao Patil Educational Complex, near Govt. Milk Dairy, Shivaji Nagar, Miraj, Maharashtra 416410, India
Lat 16.827547°
Long 74.63789°
15/07/23 11:41 AM GMT +05:30
Google

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's
SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING
An Autonomous Institute Affiliated to Dr.Babasaheb Ambedkar Technological University, Lonere
Approved by AICTE, New Delhi, Recongnized by DTE, Government of Maharashtra
NBA Accredited Programmes | Accredited by NAAC with 'A' Grade | An ISO 9001:2015 Certified Institute

Dr. S. A. Khot, Principal | Shri. Anil A. Bagane, Executive Director | Dr. Rajendra Patil (Yadravkar), Ex-Minister of State, Govt of Maharashtra, Chairman

Ref No: SITCOE/EA/2023-24/ 824 Date: - 05/04/2024

Green & Environment Audit Certificate

This is to certify that Green & Environment Audit of the Miraj Mahavidyalaya Miraj conducted in month of January 2024. The outcome of implementation of the said audit involves green inventory, carbon sequestration potential and awareness program conducted for the society. The institute have good sustainable green practices. The said Green & Environment audit is a compilation of the data provided by the organization and verified by its actual onsite visit verification. The Green & Environment audit has been conducted strictly as per the guidelines of the Ministry of Environment, Forest and Climate Change, New Delhi.

Place: - Yadrav
Date: - 05/04/2024

Dr. Sanjay A. Khot
Certified Energy Auditor (EA-7218)
Principal

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