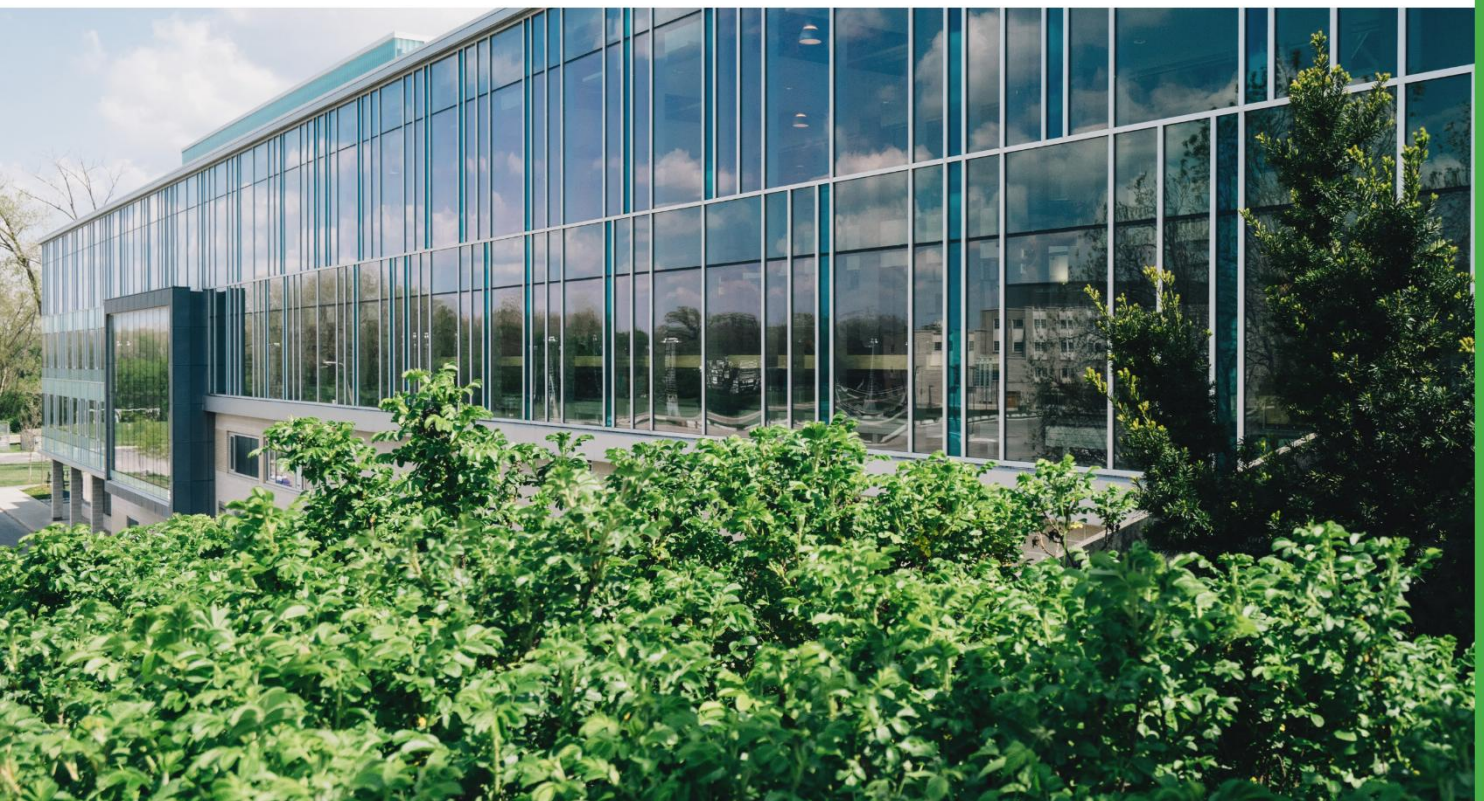




Adarsh Institute of Technology and Research Centre, Vita

Audit Report
2024-2025



**ENVIRONMENTAL & CIVIL
ENGINEERING SOLUTIONS**
ISO 9001: 2015, IEC 17025: 2017

Presented by
ECS

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Editorial

In the Era of global warming and climate change every citizen has to reduce their own carbon footprints to tackle with the adverse impacts of climate change. A green audit of any academic institution reveals ways in which we can reduce energy consumption, water use and reduction in emission of carbon dioxide in the environment. It is a process to look into and ask us whether we are also contributing to the degradation of the environment and if so, in what manner and how we can minimize this contribution and bring it down to zero and preserve our environment for future generations.

Adarsh Institute of Technology and Research Centre, Vita administration has already taken a step towards the green approach and conducted green audit of campus in the year 2024-2025. As an outcome of this institute has taken green steps to reduce its carbon foot prints by several means in campus viz. sustainable fittings, tree plantation and green computing in the administration and examination. The responsibility of carrying out the scientific green audit was given to Environmental and Civil Engineering Solutions. The organization has followed the rules and regulation of Ministry of Environment and Forest, Govt. of India and Central Pollution Control Board, New Delhi.

A questionnaire was prepared based on the guidelines and format of CPCB, New Delhi, to conduct a green audit. The information related to consumption of resources like water, electricity and handling of solid and hazardous waste was collected in the formats from main building support services and departments. The data collected was grouped and was tabulated in Excel sheets and analysis. The graphs of the data analyzed were prepared for getting quick ideas of the status. Interpretation of the overall outcomes was made which incorporates primary and secondary data, references and interrelations within. Final report preparation was carried out using this interpretation to prepare an environment management plan for the institute for the next two years.

During the preparation of the Audit Report Audit Report Hon. Principal and Vice principal, Dean IQAC encouraged us with their full support. IQAC and other officers of the institute also gave support to carry out this work. We also thank all Heads of the departments and the Co-Ordinator's gave full co-operation.



A handwritten signature in blue ink, appearing to read "Nikhil N. Kamble".

Nikhil N. Kamble
(Lead Auditor)
**Environmental and Civil
Engineering Solutions**

Acknowledgement

We express our gratitude for calling upon us for this audit, mainly the principal and all other staff members, who were ever helpful and supported us with all the input needed for this audit. We thank all the teaching, non-teaching and students for helping us in conducting this audit. The green audit team along with the AITRC internal audit team is mentioned below.

Green Audit Team

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Institutional Audit Committee

Dr. P. S. Patil

(Principal)

Mr. A. D. Chavan

(Registrar)

Dr. A. R. Nichal

(IQAC Coordinator)

Mr. N. M. Patil

(T&P Coordinator)

1. Introduction:

Modernization and industrialization are the two important outputs of the twentieth century which have made human life more luxurious and comfortable. Simultaneously, they are responsible for voracious use of natural resources, exploitation of forests and wildlife, producing massive solid waste, polluting the scarce and sacred water resources and finally making our mother Earth ugly and inhospitable. Today, people are getting more familiar with global issues like global warming, the greenhouse effect, ozone depletion and climate change etc. Now, it is considered as a final call by Mother Earth to walk on the path of sustainable development. The time has come to wake up, unite and combat together for sustainable environment.

Considering the present environmental problems of pollution and excess use of natural resources, Hon. Prime Minister, Shri. Narendra Modiji has declared the Mission of Swachh Bharat Abhiyan. Also, University Grants Commission has mentioned “Green Campus, Clean Campus” mission mandatory for all higher educational institutes. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

Green Audit is the most efficient ecological tool to solve such environmental problems. It is a process of regular identification, quantification, documenting, reporting and monitoring of environmentally important components in a specified area. Through this process regular environmental activities are monitored within and outside of the sites concerned which have a direct and indirect impact on the surroundings. Green audit can be one of the initiatives for such institutes to account for their energy, water resource use as well as wastewater, solid waste, E- waste, hazardous waste generation. Green Audit process can play an important role in promotion of environmental awareness and sensitization about resource use. It can create consciousness towards ecological values and ethics. Through green audit one can get direction about how to improve the condition of environment.

1.1 Need for audit:

Green auditing is the process of identifying and determining whether institutions practices are eco-friendly and sustainable. Traditionally, we are good and efficient users of natural resources. But over the period excess use of resources like energy, water, and chemicals are become habitual for everyone, especially, in common areas. Now, it is necessary to check

whether our processes are consuming more than required resources? Whether we are handling waste carefully? Green audit regulates all such practices and gives an efficient way of natural resource utilization. In the era of climate change and resource depletion it is necessary to verify the processes and convert it into green and clean ones. Green audit provides an approach for it. It also increases overall consciousness among the people working in institution towards an environment.

1.2 Goals of audit:

The Institute has conducted an audit with specific goals such as:

1. Identification and documentation of green practices followed by college.
2. Identify strength and weaknesses in green practices.
3. Conduct a survey to know the ground reality about green practices.
4. Analyze and suggest solutions for problems identified from survey.
5. Assess facility of different types of waste management.
6. Increase environmental awareness throughout campus.
7. Identify and assess environmental risk.
8. Motivates staff for optimized sustainable use of available resources.
9. The long-term goal of the environmental audit program is to collect baseline data of environmental parameters and resolve environmental issues before they become problem.

1.3 Objectives of Audit:

1. To examine the current practices which can impact on environment such as resource utilization, waste management etc.
2. To identify and analyze significant environmental issues.
3. Setup goal, vision and mission for Green practices in campus.
4. Establish and implement Environmental Management in various departments.
5. Continuous assessment for betterment in performance in green practices and its evaluation.
6. To prepare an Environmental Statement Report on green practices followed by different departments, support services and administration building.

1.4 NAAC criteria VII Environmental Consciousness:

Institutes are playing a key role in development of human resources worldwide. Higher education institutes campus run various activities with aim to percolate the knowledge along with practical dimension among the society. Likewise different technological problems higher education institutes also try to give solution for issues related to environment. Different types of evolutionary methods are used to assess the problem concerning environment. It includes Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), Carbon Footprint Mapping, Green audit etc

National Assessment and Accreditation Council (NAAC) which is a self-governing organization that declares the institutions as Grade according to the scores assigned at the time of accreditation of the institution. The intention of green audit is to upgrade the environmental condition inside and around the institution. It is performed by considering environmental parameters like water and wastewater accounting, energy conservation, waste management, air, noise monitoring etc. for making the institution more eco-friendly.

Students are the major strength of any academic institution. Practicing green actions in any educational institution will inculcate the good habit of caring natural resources in students. Many environmental activities like plantation and nurturing saplings and trees, Cleanliness drives, Bird watching camps, No vehicle day, Rain water harvesting, etc. will make the students good citizen of the country. Through Green Audit, higher educational institutions can ensure that they contribute towards the reduction of Global warming through Carbon Footprint reduction measures.

1.5 Benefits of Green Audit to an Educational Institute:

There are many advantages of green audit to an Educational Institute:

1. It would help to protect the environment in and around the campus.
2. Recognize the cost saving methods through waste minimization and energy conservation.
3. Find out the prevailing and forthcoming complications
4. Empower the organization to frame a better environmental performance.
5. It portrays good image of institution through its clean and green campus.

2. Overview of Institute:

Adarsh Institute of Technology and Research Centre, Vita has huge area of 15 acres and has been serving the mankind in the field of Science and technology.



Figure: Adarsh Institute of Technology and Research Centre, Vita

Adarsh Institute of Technology and Research Centre Vita, is a state of the art technical institute spread across 15 acres of space in the picturesque and serene land of prospering Vita, Sangli. Every single thing minutely defines the taste, spirit and tradition of the group and the people who dream to make it big for the land and the industry.

Loknete Hon. Hanamantrao Patil Charitable Trust, Vita which was founded in the Year 1995. The Trust from day one has been painstakingly striking the right cord to meet the highest and revolutionary educational standards and fulfil its motto of human welfare through social obligations in the interest of society and the nation at large.

Today the trust has a recordable 8 pre- primary schools, 10 primary schools, 6 secondary schools, 3 colleges. It also includes a Pharmacy College, a D.Ed. College, a Polytechnic College and an Engineering College.

AITRC aims at bringing out a leader, globally competent, innovative and geared to drive the future, out of each student enrolled. And to meet this aim the institute has strategically fortified its position as a pioneer in educational technology, designed in-demand technical

programs and curriculum, has brought in a team of competent, renowned and dedicated staff, well equipped digital research labs, secure wireless network access been provided to all students, faculty, and staff from any location on the Tech campus.

The institute has developed and maintained a communication and data network that is comparable to that of the most innovative institutions, a hi-tech and vibrant campus and building with enthuses a innovative learning environment, all the more the campus is studded with the best hostel facility, making learning all the more thrilling and inviting.



Figure: Saraswati Idol at AITRC Campus

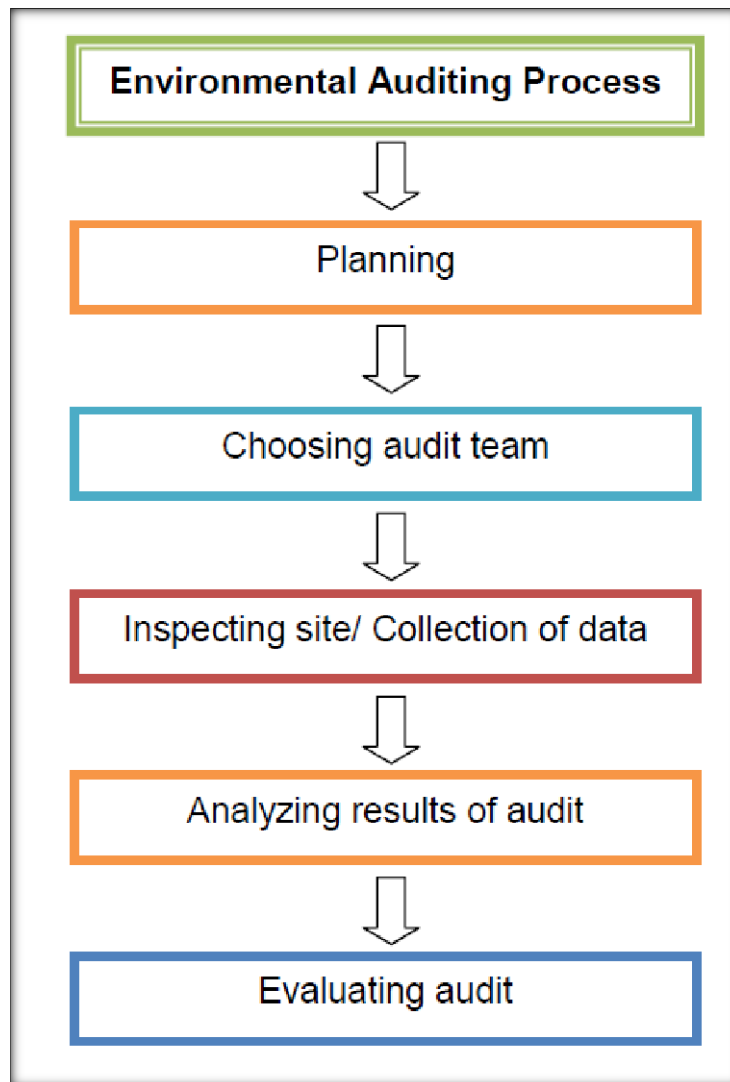
Vision of the institute:

To be the benchmarked Institute of excellence in technical educational and research, committed to deliver competent human resources for prosperity and well-being of the society.

Mission of the institute:

To impart state-of-the-art technical education, generating engineers competent with fundamentals, design, analysis, and investigation capable of handling modern tools and technology, applied to solve real world engineering problems.

3. Methodology:



3.1 Audits to be carried out:

- Green and Carbon footprint audit
- Energy audit
- Environmental audit
 - Water audit
 - Wastewater audit
 - Solid waste audit

The background is a watercolor illustration. At the top, there are two large, fluffy clouds in shades of light blue and pink. The middle section is a pale, textured green. At the bottom, there are several dark green, pointed evergreen trees. The overall style is soft and artistic.

GREEN AUDIT

4. Green and Carbon footprint audit:

Green Audit is the most efficient ecological tool to solve such environmental problems. It is a process of regular identification, quantification, documenting, reporting and monitoring of environmentally important components in a specified area. Through this process regular environmental activities are monitored within and outside of the sites concerned which have direct and indirect impact on the surroundings. Green audit can be one of the initiatives for such institutes to account for their energy, water resource use as well as wastewater, solid waste, E- waste, hazardous waste generation. Green Audit process can play an important role in promotion of environmental awareness and sensitization about resource use. It can create consciousness towards ecological values and ethics. Through green audit one can get direction about how to improve the condition of environment.

Carbon is the basis of life on Mother Earth. It is incorporated into the plants through photosynthesis, consumed by animal species through food, presents in the form of carbon dioxide (CO₂) the atmosphere, locked into the rocks as limestone and compressed into the different fossil fuels such as coal and oil. As CO₂ level in the atmosphere continue to increase, most climate designs or project that the oceans of the world and trees will keep soaking up more than half CO₂ . The plants on land and in the sea, taken up carbon by over many years increased the percentage discharged during decay, and this increased carbon became locked away as fossil fuels beneath the surface of the planet. The starting of the 21st century brought growing concern about global warming, climate change, food security, poverty and population growth. In the 21st century more carbon has been released into the atmosphere than that has been absorbed. CO₂ is a principle component causing global warming. Atmospheric carbon dioxide levels have increased to 40 % from preindustrial levels to more than 390 parts per million CO₂. On this background it is a need of time to cover the research areas interrelated with climate change.

4.1 Green Cover:

AITRC has got a huge green cover and has almost 41+ species of vegetation inside the campus. The institute has 15.00 acres of campus and most of this is covered by green area. They have huge plantations along with variation in species. Greenery is maintained well by the institute.



Figure: Adarsh Institute of Technology and Research Centre, Vita

The Institute has taken huge efforts to develop its green cover. The institute has 4.59 acres of green cover approximately. In the vicinity of the institute there are about approximately 2850+ fully grown trees and more than 880+ growing plants. The table below shows some of the common tree species found.

Table: Variation of species of trees at AITRC

Common name	Count	Common name	Count
Coconut	150	Sonchafa	3
Chikoo	50	Sadha Chafa	20
Mango	250	Dusanda	1000
Arika Palm	50	Lawn	600
Boram Palm	100	Konophaikas	70
Forest Trees	50	Flower trees	25
Kudya	150	Fig Trees	25
Phaikas	30	Supari	7
Morpankhi	30	Akaliya	100
Guvava	5	Sonchafa	3

Institutes have huge plantations and due to this the institute has high carbon sequestering values. Considering the vicinity some dry plants were observed to be approximately about 13. Plants absorb sunlight, 50% is absorbed and 30% reflected so this helps to create a cooler and more pleasant climate through a 3°C temperature reduction in the vicinity. This has also led to an increase in biodiversity as more than 18 species of birds were observed. Some of the common birds were viz. Sparrow, wild parrots, little stint, black kite etc.

4.2 Carbon Footprint Audit:

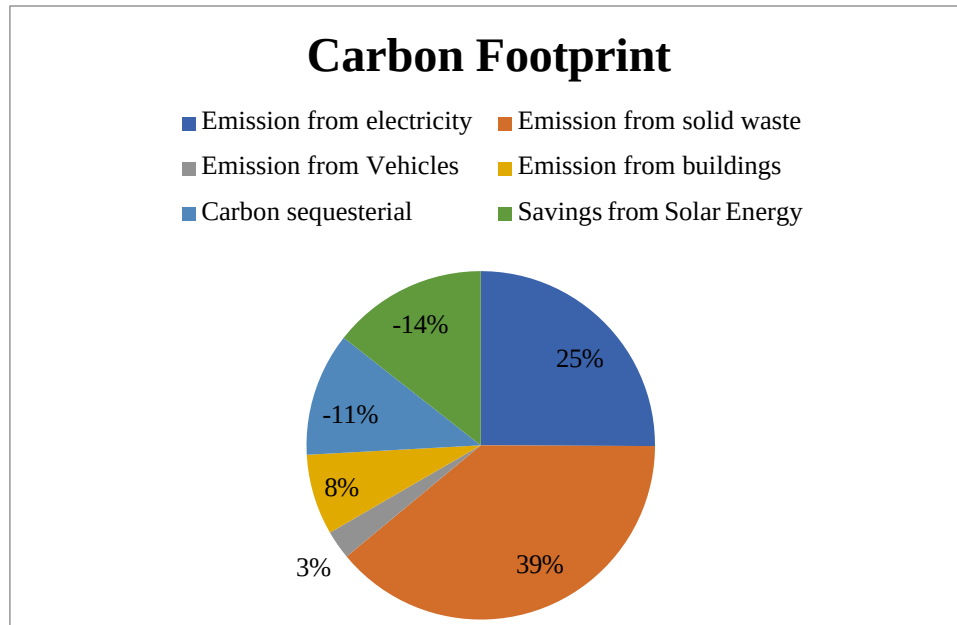
Institute has estimated its carbon footprint by IPCC 2021 guidelines. Various IPCC factors and Carbon Footprint software developed by ECS was used to estimate the carbon emissions from Consumption of electricity, generation of solid waste, use of vehicles in campus, carbon emissions due to human breathing and emissions from buildings. At last they have also calculated Carbon sequesterial value i.e. carbon that is absorbed by the plants.

Table: Carbon Footprint Analysis

Sr. No.	Section	Emission (Ton CO ₂ eq.)/ year
1	Emission from electricity	1.88
2	Emission from solid waste	3.71
3	Emission from Vehicles	0.28
4	Emission from Buildings	3.19
5	Carbon sequestering	-1.18
6	Sustainable savings	-1.71

The institute has total 835 students. Considering all the staff viz. junior teachers, senior teachers, Non grant, grant CHB they are total of 51. The staff's works for about averagely 6 hours a day in the institute and the students are present for 5 hours averagely daily. The energy consumption contributes 1.88 Ton CO₂ eq. Vehicles emit significant amount of gases in environment and the institute has various parking sections in the campus. It was found that averagely 168 vehicles entered the institute daily and travel about 200 m of distance from the gate. Cars also enter the institute and as per observation 15 cars are observed daily. Hence, Overall the institute emits 0.28 Ton CO₂ eq. Solid waste is very important as it emits significant amount of carbon through it. Institute has a good solid waste management system. Hence the institute develops about 1325 kg of waste daily in both the form of wet and dry. Overall for a year the generation is about 3.71 Ton CO₂ eq. Buildings play an important role in carbon contribution. During the construction operation and use phase they emit significant amount of carbon. Hence considering total built-up area the carbon emissions could be

evaluated. After the estimation the total built-up area observed was approximately about 15957 sq. ft. and the carbon emission were 3.19 Ton CO₂ eq. Carbon sequestering is important as it is the carbon absorbed by the trees. The campus has many fully grown trees in the campus; hence the sequential value is about -1.18 Ton CO₂ eq.



4.3 Conclusion:

- The emission from solid waste comprises of 3.71 Ton CO₂ eq. This can be significantly reduced by following simple means. Waste segregation is properly observed by the institute and they should follow the cut out plastic plans. There should be complete ban in using the plastic inside the campus. There should be minimization of food waste as it contributes highest in carbon emissions.
- Considering emission from electricity they can be significantly reduced by decrease in electricity use. This can be done by installing LED lights and using energy efficient equipment's such as machines with high star ratings which save more. Institute can recognize renewable energy sources and have a setup in the institute. This can lead in significant saving of electricity and reduction in carbon emissions.
- Vehicles have the least emissions in the institute and it is due to the easy approached parking so that vehicles do not roam in the vicinity. All the vehicles travel hardly 200 m in the campus and this has led to lower emissions. Still institute can follows "NO Vehicle Day" on every 2nd Saturday of each month.

- Institute reduces about -1.18 Ton of CO₂ per by the means of plants. This could be increased by increasing in plantations. Institute can plant more trees in open areas available.
- The plants having highest Carbon sequestration values are suggested. Cinnamomum Verum, Eugenia Caryophyllid, Bumelia celestina, Acacia Berland Eri, Acacia Francescana, Moringa oleífer, some of the suggested species for plantation.



Figure: Green Campus at AITRC

The background is a watercolor illustration. The top half features soft, pastel-colored clouds in shades of light blue, pink, and yellow against a pale greenish-yellow sky. The bottom half shows the dark green, pointed tops of several evergreen trees. The overall style is soft and artistic.

ENVIRONMENT AUDIT

5. Environmental Audit:

An Environmental audit is a type of evaluation intended to identify environmental compliance and management system implementation gaps, along with related corrective actions. ISO 14001 is a voluntary international standard for environmental management systems ("EMS"). ISO 14001:2004 provides the requirements for an EMS and ISO 14004 gives general EMS guidelines. An EMS meeting the requirements of ISO 14001:2004 is a management tool enabling an organization of any size or type to:

- Identify and control the environmental impact of its activities, products or services.
- Improve its environmental performance continually, and
- Implement a systematic approach to setting environmental objectives and targets, to achieving these and to demonstrating that they have been achieved.

The audit examines the potential hazards or risks posed by the institutes. Areas examined may include environmental policies and procedures, energy use practices, recycling, waste, conservation, and pollution. Then, the institute can use the results to determine what changes need to be made for compliance. In a broad sense, environmental auditing aims to help protect the environment and minimize the risks of business activities to the environment and human safety and health.

5.1 Water Audit and wastewater audit:

Water auditing is a method of quantifying water flows and quality in systems, with a view to reducing water usage and often saving money on otherwise unnecessary water use. Water audits are an effective management tool for minimizing losses, optimizing various uses and thus enabling considerable conservation of water. Water audits trace water use from its point of entry into the facility/system to its discharge into the sewer/river/canal etc. Wastewater audit deals with effective management of wastewater in the system. It deals with proper generation, management, treatment, transfer and disposal of wastewater.

ECS has carried out water and wastewater audit for AITRC and has suggested many more ways for water conservation, reuse and recycle. These audits evaluate the entire waste stream of a facility or organization, including recyclable, compostable, hazardous, and landfill-bound waste. The goal is to provide a detailed overview of waste generation and management practices. The detailed water and waste water audit report is mentioned below.

5.2 Water Audit report:

Water audit for the “AITRC” was carried out. The purpose of the water audit is to provide a thorough understanding of the water use by identifying and measuring all water using fixtures, appliances, and practices in order to recommend potential water saving efficiencies.

PRIMARY DATA

Sr. No.	Title	Information
1	Name of Institute	Adarsh Institute of Technology and Research Centre
2	Address	Sangli, Vita
3	Name of company under which water audit is carried out	Environmental and Civil Engineering Solutions, Sangli
4	Number of floors	G + 1 (Variable)
5	Category of building	Educational Institute
6	Nearest ESR location	Next to campus
7	Water supply hours	3 hrs. daily
8	Water meter present	No

POPULATION DETAILS

Title	Section	Count
Fixed population (Students)	Male	488
	Female	347
Fixed population (Staff)	Male	31
	Female	20

SOURCE INFORMATION

Title	Information
Sources of water	Open well and bore-well
Connection details	1” PVC pipe inlet and 1” outlet distribution pipe

STORAGE DETAILS

Title	Information
Overhead tank type	Overhead PCC Tanks
Location	On terrace
Number of tanks	2500 lit PVC X 2 and 5000 lit PVC X 1
Pumping period	3 hours daily
Underground sump	Yes (RCC Water tank 70,000 Liters)

WATER USAGE

Section	Number of users	Water consumption in Liters
Gents toilet	519	6228
Washbasin	886	665
Ladies toilet	367	6606
Toilet cleaning		1000
Floor cleaning		1000
Gardening		1500
Laboratories		2500
Total	19,499 Liters	

WATER USAGE IN HOSTEL SECTIONS

Section	Number of users	Water consumption in Liters
Boys Hostel	102	13,770
Girls Hostel	78	10,530
Total	24,300 Liters	

5.3 Waste water audit:

Adarsh Institute of Technology and Research Centre campus generates huge amount of wastewater. The source for wastewater in the campus is hostels, institute, mess and the washrooms and urinals inside the campus. To estimate the amount of wastewater generated all the water that is used in the washrooms, quarters and hostels is considered as wastewater.

Table: Wastewater generation scenario at AITRC

Sr. No.	Section	Wastewater generated in litres
1	Wastewater generated in Campus	14,623.00
2	Wastewater generated at Hostel Sections	18,225.00

Adarsh Institute of Technology and Research Centre has dedicated wetland system for waste water treatment. The institute holds septic tanks for initial treatment and secondary treatment is done in wetlands. A constructed wetland is an artificial wetland to treat sewage, grey water, storm water runoff or industrial wastewater. A constructed wetland is an engineered sequence of water bodies designed to treat wastewater or storm water runoff. Vegetation in a wetland provides a substrate (roots, stems, and leaves) upon which microorganisms can grow as they break down organic materials.



5.4 RO plant at institute

Adarsh Institute of Technology and Research Centre have dedicated RO water treatment plant installed in the campus. The plant supplies water to all the sections. The water quality analysis is presented below.

Supply water analysis

Sr. No.	Test	Results	Limit
1	pH	6.0-7.1	6.5-8.5
2	TDS	112	-
3	E.C	101	-
4	Hardness	128	200
5	Chlorides	98	200
6	MPN	Ab	1.0
7	Odor and Color	Ab	-

RO water analysis

Sr. No.	Test	Results	Limit
1	pH	6.7-7.2	6.5-8.5
2	TDS	86	-
3	E.C	78	-
4	Hardness	98	200
5	Chlorides	110	200
6	MPN	Ab	1.0
7	Odor and Color	Ab	-



Figure: RO plant at institute

5.5 Solid waste Audit:

A waste audit is a physical analysis of waste composition to provide a detailed understanding of problems, identify potential opportunities, and give you a detailed analysis of your waste composition. A waste audit will help you clearly identify your waste generation to establish baseline or benchmark data, Characterize and quantify waste stream, Verify waste pathways, identify waste diversion opportunities and identify source reduction opportunities.

Solid waste is the unwanted or useless solid material generated from the human activities in residential, industrial or commercial area. Solid waste management reduce or eliminates the adverse impact on the environment and human health. Solid waste audit Adarsh Institute of Technology and Research Centre was carried out. The entire premise was analysed for solid waste generation and waste characterization. Overall waste was observed and characterization was done. The below table shows the components of solid waste at institute campus. Quartering method was used and 1 Kg of waste was selected.

The table below shows the composition of segregated waste at AITRC College.

Table: Solid waste composition at AITRC

Sr. No.	Type of waste	Composition %
1	Plastic	31
2	Paper	25
3	Rubber	2
4	Food	16
5	Glass	1
6	Metals	1
7	Garden trimmings	23
8	Cloth and fiber	1

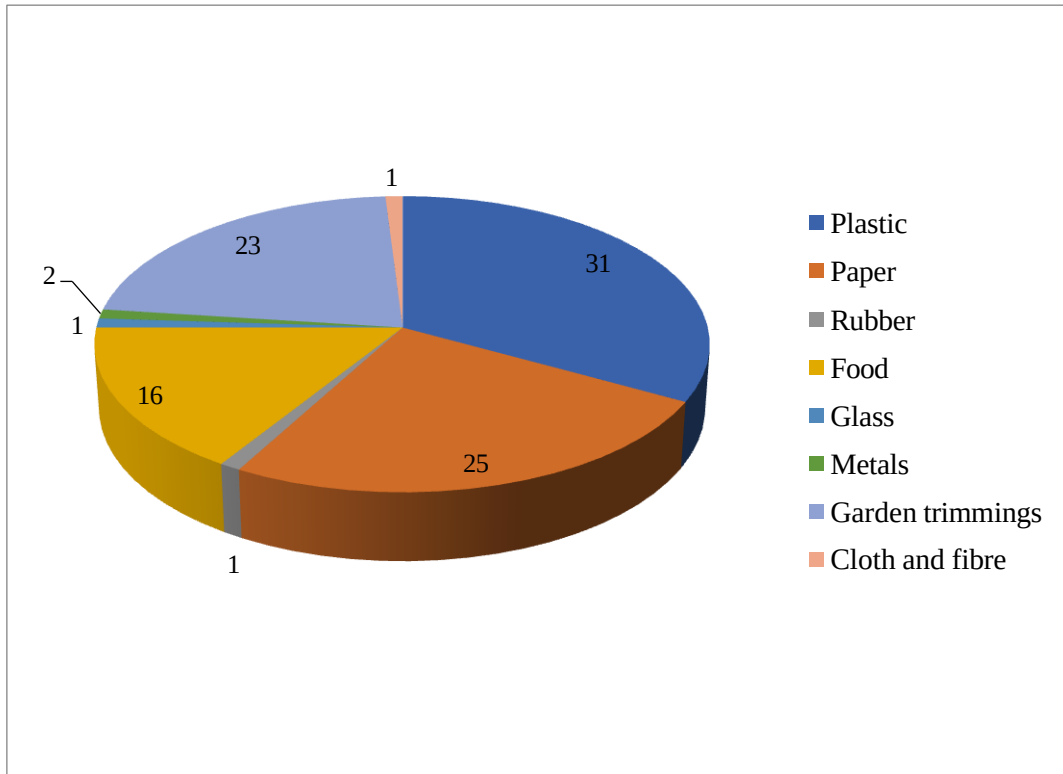


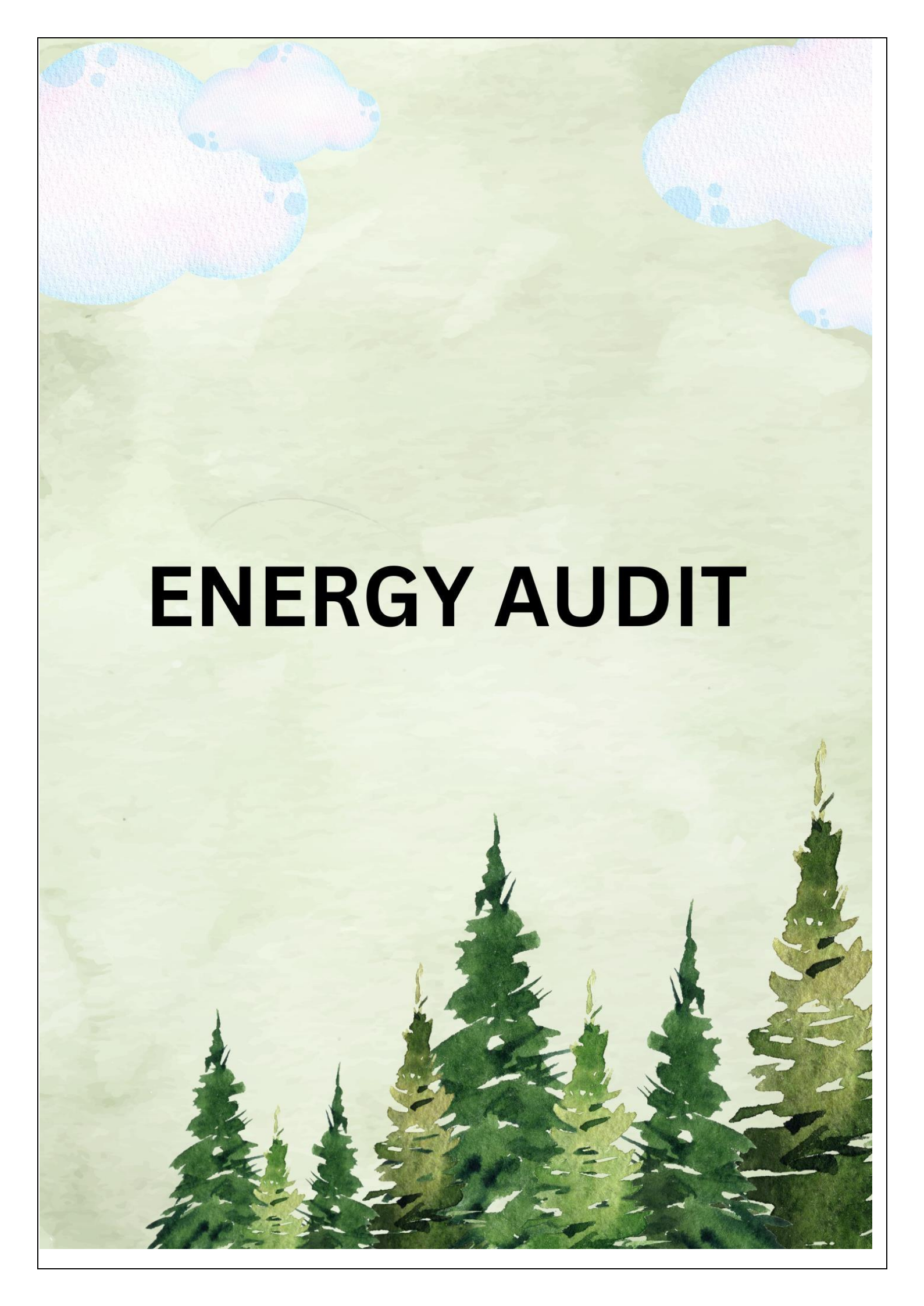
Figure: Generated waste distribution at AITRC

After analyzing all the bins, it was observed that plastic had the highest contribution viz. 31% followed by the paper waste i.e. 25%. Mostly common observed plastic items were plastic wrappers of chips, soft drinks bottles and chocolate wrappers. The paper waste included paper wrappers, notebook pages, pamphlets and some pieces of cardboard. The third highest waste included garden trimmings. It included small grass, minute branches etc. The least contribution was cloth, fiber, glass and metals.

5.6 Observations and Conclusion:

- There are separate bins for wet waste and dry waste. Hence, source segregation takes place.
- Institute has taken steps towards paper recycling. The paper waste collected from the bins is send to vendors.
- Plastic ban in campus is implemented but due to lack of seriousness in the students plastic is used in campus. Institute should conduct plastic awareness seminars for both the staff and students.



The background is a watercolor illustration. At the top, there are two stylized clouds in shades of light blue and pink. The middle section is a pale, textured green. At the bottom, there are several green evergreen trees of varying heights. The text 'ENERGY AUDIT' is centered in the middle section.

ENERGY AUDIT

6. Energy Audit:

An energy audit is an inspection survey and an analysis of energy flows for energy conservation in a building. It may include a process or system to reduce the amount of energy input into the system without negatively affecting the output. In commercial and industrial real estate, an energy audit is the first step in identifying opportunities to reduce energy expense and carbon footprint.

A nation is tiring to advance in quantity and quality to the spread of education among the common India and development of their intelligence. In India the entire field of education and other fields of intelligent activities had been monopolized by a handful of men before independence. But today we are marching towards the desirable status of a developed nation with fast strides. But the development should be a sustained one. For achieving such an interminable development energy management is essential. As far as concerning electricity crisis, we are facing lack of electricity during office work. So, institutional management is taking design regarding production of electricity and saving electricity for Eco social aspect. Energy requirement of India is growing and incomplete domestic fossil fuel treasury. The country has motivated strategy to enlarge its renewable energy resources and policy to establish the nuclear power plants. India increases the involvement of nuclear power to largely electrical energy development facility from 4.2% to 9%. India's industrial demand accounted for 35% of electrical power requirement, domestic household use accounted for 28%, agriculture 21%, commercial 9%, and public lighting and other miscellaneous applications accounted for the rest. Energy conservation means reduction in energy consumption without making any sacrifice of quantity or quality. A successful energy management program begins with energy conservation; it will lead to adequate rating of equipment's, using high efficiency equipment and change of habits which causes enormous wastages of energy. By observing all these study lack of electricity and huge electricity demands. It is necessary to plan to be self-sufficient in electricity requirement.

6.1 Connection details:

Institute receives electricity from State Electricity Distribution. The following are the details about connection.

- **Type of connection:** LT **Contract demand:** 200 KVA
- **Feeder voltage:** 11 KV / 415 **Tariff:** 89 LT – VII B I

Tariff Structure:

As for Distribution Company, HT and LT consumers have an option to take Time of Day (TOD) tariff instead of the normal tariff. Under TOD tariff electricity consumption and maximum demand in respect of HT consumers for different periods of the day i.e. normal period, peak load period and off-peak load period could be recorded by installing TOD meter. The maximum demand and consumption recorded in different periods could be billed on the following rates of the applicable tariff.

Table: TOD Chart for Billing

TOD Tariffs	Rate % (Rs./Unit)
0000 Hrs- 0600 Hrs & 2200 Hrs- 2400 Hrs	-1.500
0600 Hrs- 0900 Hrs & 1200 Hrs- 1800 Hrs	0.000
0900 Hrs- 1200 Hrs	0.800
1800 Hrs- 2200 Hrs	1.100

Power Factor:

Power Factor (PF) is an indicator of efficient utilization of power. In an AC (Alternating Current) electrical power system, PF is defined as the ratio of real power flowing to the load, to the apparent power in the circuit and is a dimensionless number.

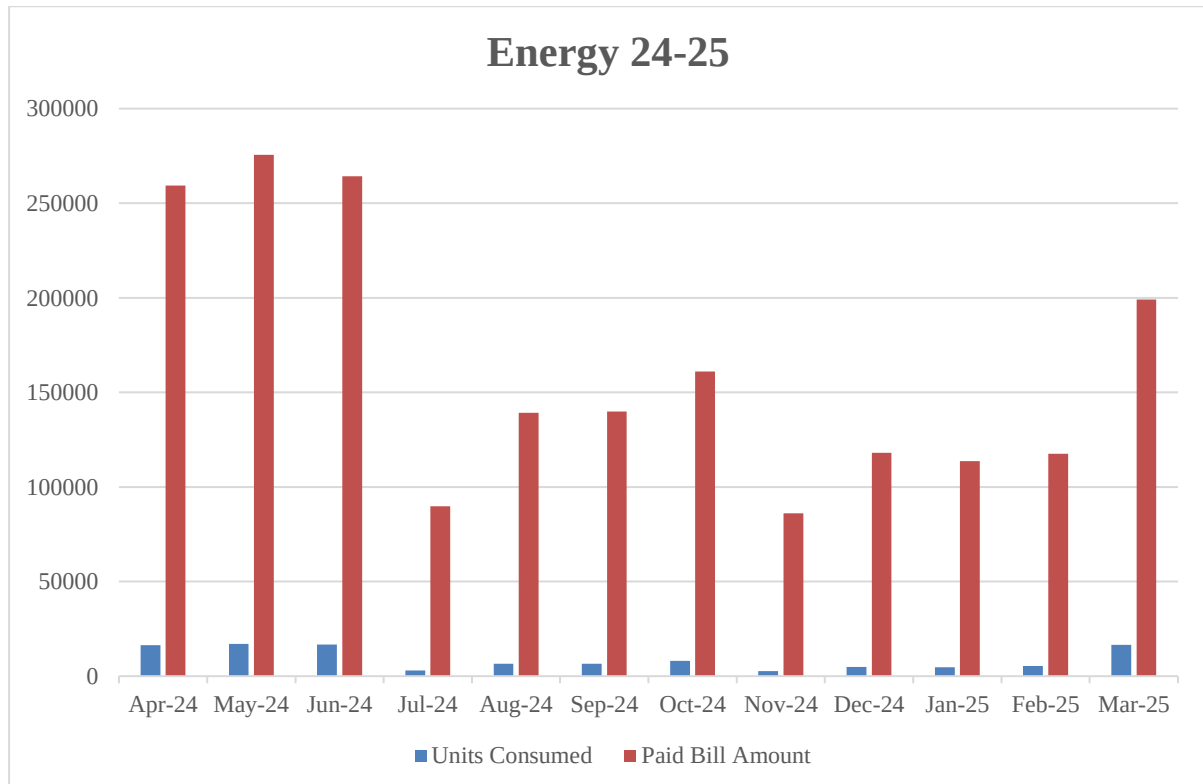
**Figure** Energy Meter

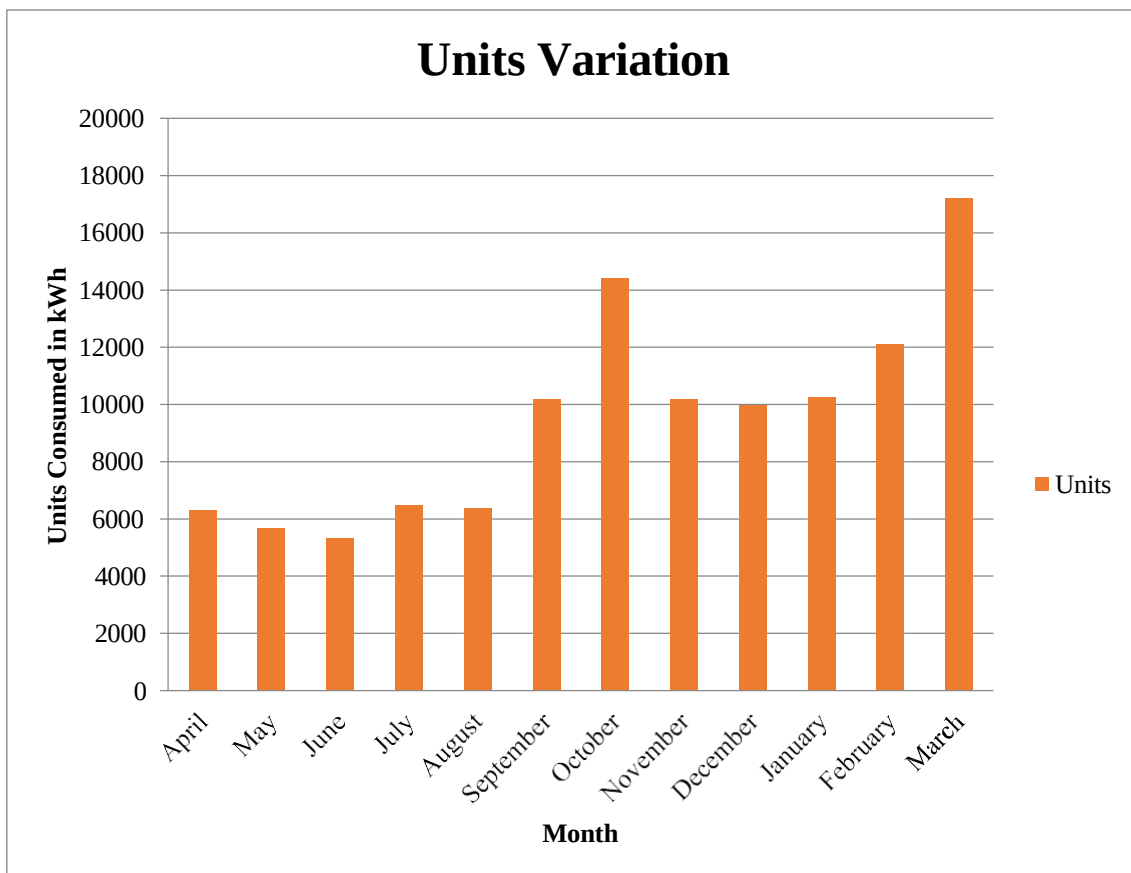
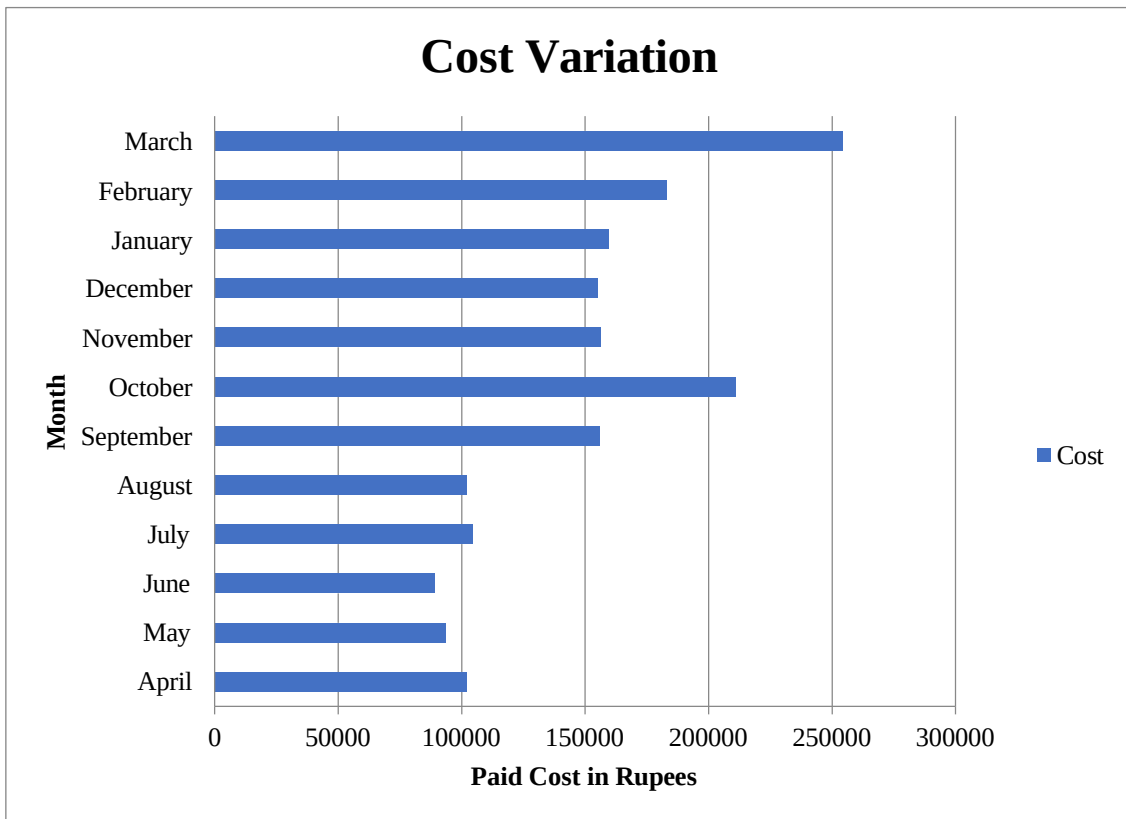
6.2 Bill analysis:

Bill analysis for Adarsh Institute of Technology and Research Centre had been presented for academic year 2024-2025.

Table Energy Consumption and Bill for 2024-2025

Sr. No.	Month	Units Consumed	Paid Bill Amount
1	Apr-24	16406	259400
2	May-24	17118	275638
3	Jun-24	16654	264245
4	Jul-24	3022	89892
5	Aug-24	6559	139275
6	Sep-24	6607	139938
7	Oct-24	8112	161100
8	Nov-24	2610	86154
9	Dec-24	4929	118131
10	Jan-25	4670	113598
11	Feb-25	5332	117605
12	Mar-25	16588	199080





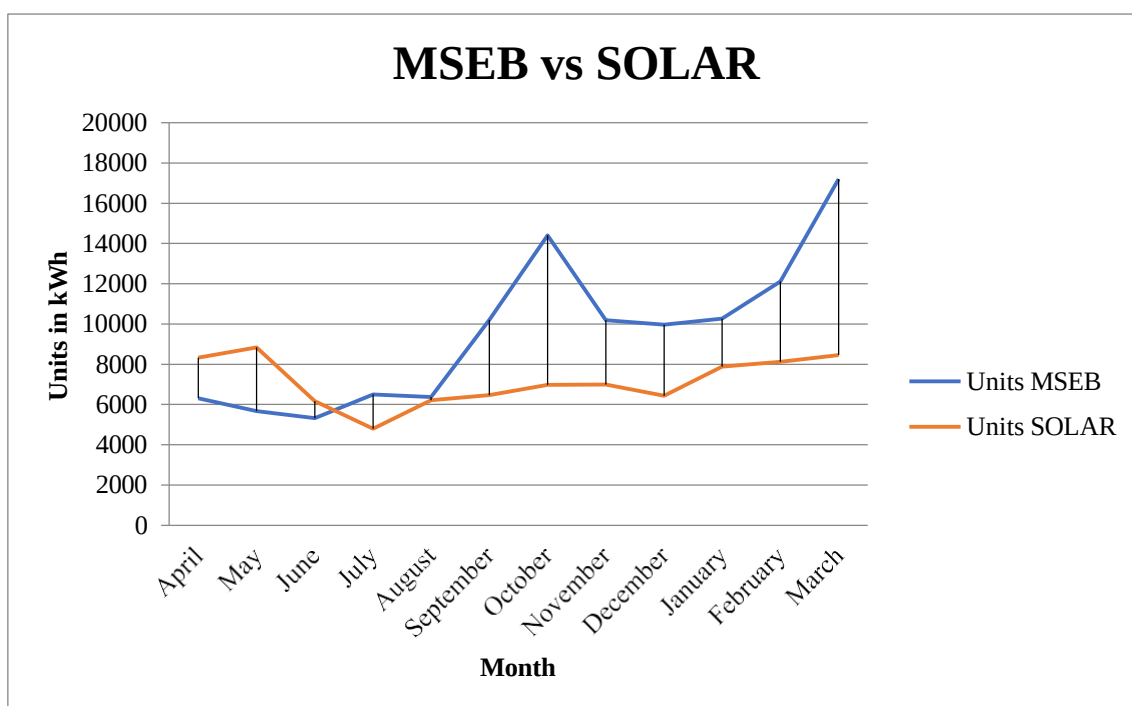
Graphs: Variation in Units consumed and cost paid.

6.3 Sustainable solar energy at AITRC:

Adarsh Institute of Technology and Research Centre had installed high efficiency solar panels for sustainable energy generation. The above table describes the units generated and send to grid for the academic year 2024-2025.

Table Energy Consumption and Bill for 2024-2025

Sr. No.	Month	Units Consumed
1	Apr-24	6313
2	May-24	5666
3	Jun-24	5319
4	Jul-24	6501
5	Aug-24	6367
6	Sep-24	10198
7	Oct-24	14408
8	Nov-24	10182
9	Dec-24	9971
10	Jan-25	10266
11	Feb-25	12116
12	Mar-25	17211



6.4 ILER analysis:

Lighting is provided in industries, commercial buildings, indoor and outdoor for providing comfortable working environment. The primary objective is to provide the required lighting effect for the lowest installed load i.e. highest lighting at lowest power consumption. The purpose of performance test is to calculate the installed efficacy in terms of lux/watt/m² (existing or design) for general lighting installation. The calculated value can be compared with the norms for specific types of interior installations for assessing improvement options.

Table 1 ILER Base table

Range	Condition
0.5 or less	Urgent activity required (UAR)
0.51 - 0.70	Review Suggested (RS)
0.70- above	Good

ILER analysis for various sections in the institute was carried out. Firstly using LUX meter illumination was measured and then numerical analysis was carried out. ILER gives idea about lighting conditions and measured regarding improving them.

Table 2 ILER Analysis

Sr. No.	Section	PLUX	ILER	Condition
1	Library	181	0.80	Good
2	Classrooms	162	0.82	Good
3	Chemistry lab	192	0.80	Good
4	Research lab	190	0.81	Good
5	Computer lab	191	0.81	Good
6	Office section	155	0.81	Good
7	Other sections (Avg.)	178	0.82	Good

Reasons for Good ILER:

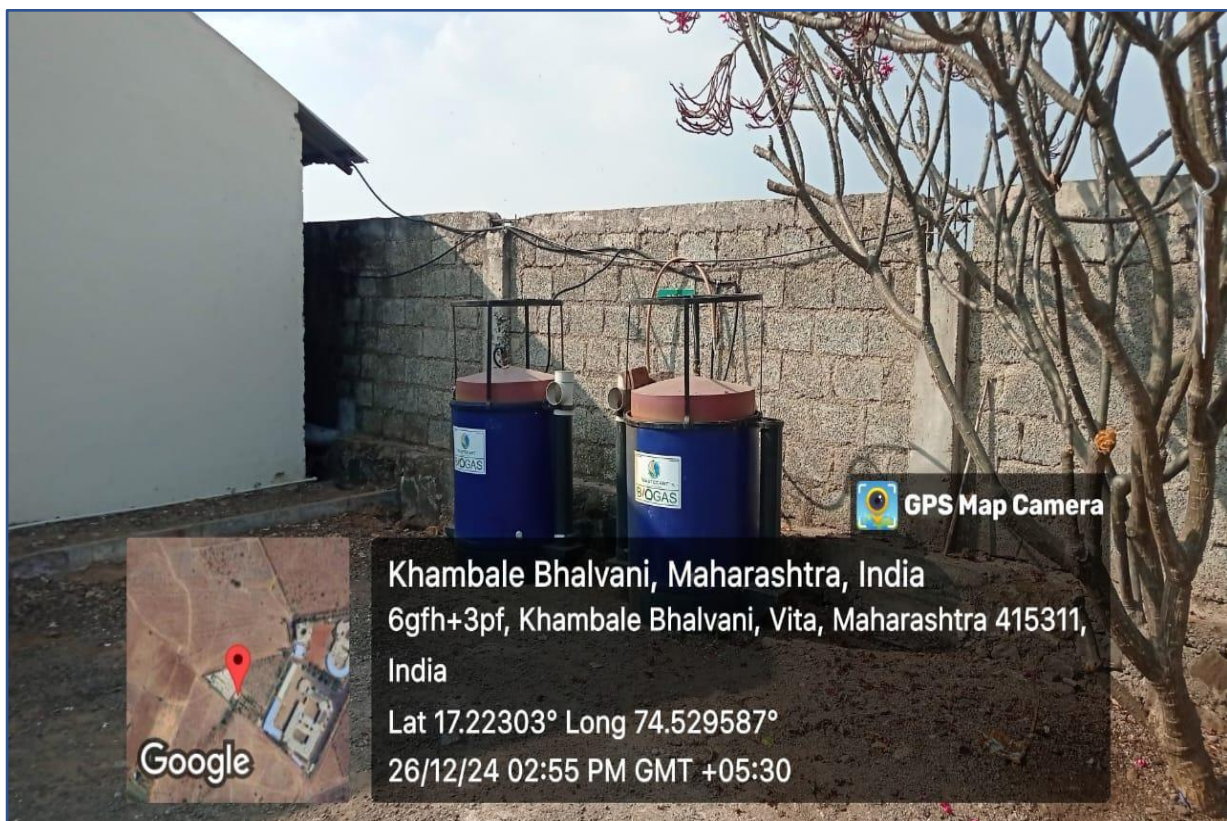
- Proper placement of windows and doors so that natural light is available well.
- Good ventilation system.

6.5 Sustainable practices at AI:

Solar Energy generation



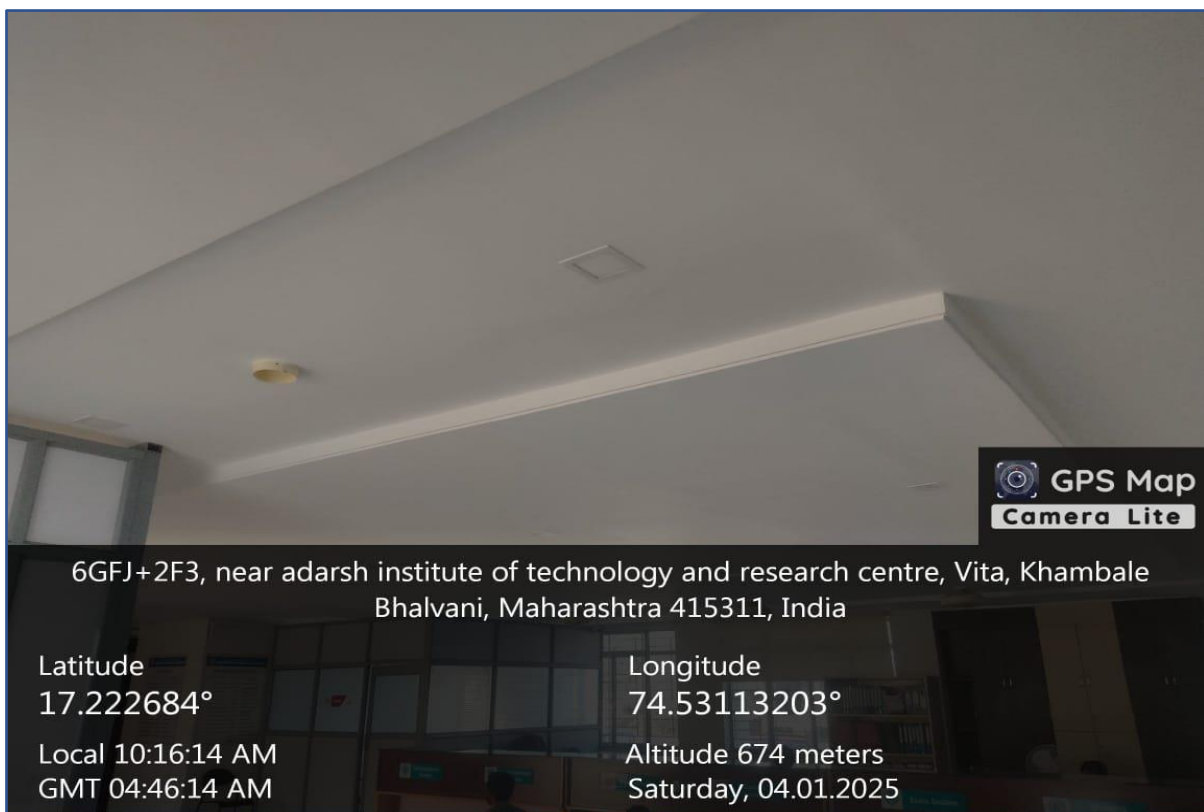
Biogas Plant for waste to energy



Sensor Based solar street lamps for energy conservation



LED Lights for energy conservation



Vermicomposting Pit for waste management



Wetland for waste water treatment



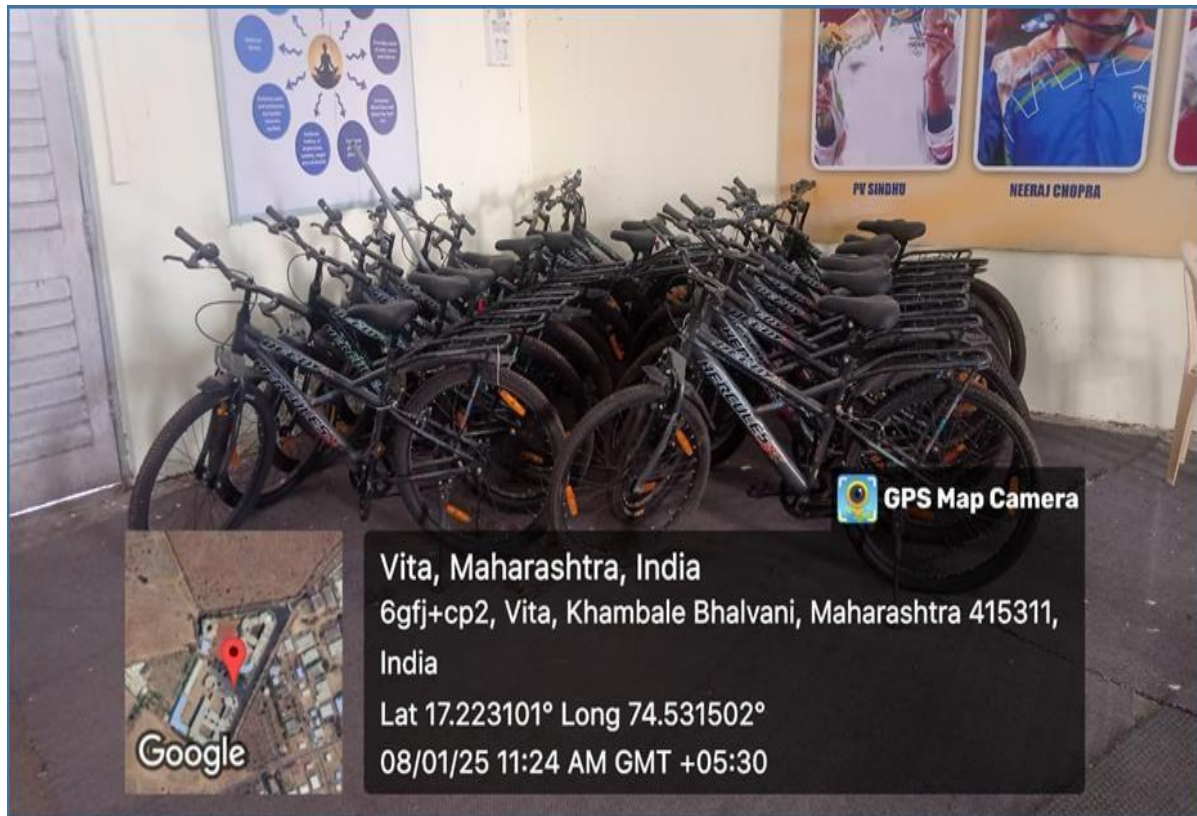
Rain water harvesting for ground water recharge



Drip irrigation for water conservation



Bicycles for internal transport of students



Plastic ban campus awareness media

