GREEN AUDIT REPORT

CONSULTATION REPORT

Anwarul Uloom College (Autonomous)

11-3-918, New Mallepally, HYDERABAD,
TELANGANA-500 001

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

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ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore takes this opportunity to appreciate & thank the management of **Anwarul Uloom College, Hyderabad** for giving us an opportunity to conduct Green audit for the College

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation the course of study.

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ACCREDITATION CERTIFICATE

BUREAU OF ENERGY EFFICIENCY

Examination Registration No.: EA- 7271

Accreditation Registration No.: AEA-284

Certificate of Accreditation

This is to certify that Mr./Ms. Shri. Rajesh Kumar Singadiya having its trade/registered office at ..... has been given accreditation as accredited energy auditor. The certificate shall be effective from 9th day of May, 2018

The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

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Your name has been entered at AEA No. 284 in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this 5th day of October, 2018

Secretary,
Bureau of Energy Efficiency
New Delhi

EXECUTIVE SUMMARY

Green Initiative Taken by College

- **Campaign of Plantation and Green Campus:**

The college has approximately 1532 trees on its campus. This proactive step taken by the management towards creating a green campus through the plantation campaign is commendable.

- **Areas for Improvement:**

3 Dustbin Systems:

It has been observed that the college currently employs a single dustbin system for all types of waste generated on the campus. It is recommended to implement a 3-dustbin system for the proper segregation of various types of waste.

QR Code System on Trees:

As the world increasingly embraces digital platforms and people have less time for extensive reading and information processing, the college could consider providing QR codes on trees. This innovative approach would offer quick access to information about the trees and leverage the growing QR code platform for a unique purpose.

- **OTHER SUGGESTIONS & RECOMMNEDATION**

Some of the very important suggestions are:-

- Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.
- Increase recycling education on campus.
- Increase Awareness of Environmentally Sustainable Development in college campus.

- Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.
- Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in environmentally sustainable development.
- Collaborate for Interdisciplinary Approaches- To develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- Increase reduce, reuse, and recycle education on campus.
- Develop a butterfly garden that arouses appreciation towards flora and fauna diversity.
- Name all the trees and plants (Plant DNA barcodes) with its common name and scientific name.
- Arrange training programmes on environmental management system and nature conservation.
- Ensure participation of students and teachers in local environmental issues.
- Renovation of cooking system in the canteen to save gas by installation solar water heater system with heat pump.
- Avoid plastic/ thermocol plates and cups in the college level or department level functions.

CHAPTER-1
INTRODUCTION

1.1 About College: -

Anwarul Uloom College was established in 1953. The Anwarul Uloom College under the Aegis of Anwarul Uloom Educational Association. The Anwarul Uloom College is an institute of knowledge, learning, excellence and humility, the institution with a vision of imparting education & empowering minority. This institution is with an adherence to principles. Anwarul Uloom is an institution with a great history and achievements, exemplary students from this institution have taken stride in the concept of education taking it forward to the next level by placing it on the global map with virtue and integrity.

The privilege of being The Largest Autonomous Minority Serving Institute in Telangana as one of its many feats including the distinction of glorious 109 years celebrations of its establishment - the noble act which is surely the stuff of dreams is achieved by Anwarul Uloom College. The meticulous institute has boarded the train of success and achieved this colossal feat with the hard work, determination and vision of its management and students and has vowed to never slow down its trail of achievements in the years to come. The college conducted its Grand Convocation Ceremony marking the 109 year celebration of its establishment rewarding its exemplary students with prestigious awards for their efforts. 118 students from various courses received their degrees for their overall excellence in academics and 18 students received gold medals for their extraordinary performance and overall personality exuberance showing path breaking achievements in the aspects of sports, academic, humanitarian endeavours and creativity.

Anwarul Uloom College is an Autonomous institution Affiliated to O.U the institution was granted autonomy by UGC in the year 1989. Anwarul Uloom College also have an accreditation of A Grade by NAAC- in May 2023. The Institution runs a CBCS with Semester System pattern. Anwarul Uloom College has crafted an environment keeping in mind student requirements and market demand with a shift system to help them master theory concepts and strategies as well as develop and hone their skills in the field of corporate culture. Situated in the heart of the city with a sprawling 3 acre campus, spacious class rooms, laboratories, library, reading rooms conference halls , offering advanced courses in Retail marketing and diplomas in E commerce,

training students in various aspects of personal growth and providing detailed and upgraded training modules for group 1 and 2 exams.

Anwarul Uloom College is located in the heart of the city on the main road at Mallepally Hyderabad, Anwarul Uloom College has a campus area of 3,221 Sq Mtrs. The campus atmosphere is congenial for the holistic development of the students coming from varied backgrounds.

The academic quality of college life is enhanced by the provision of the best faculty and all possible infrastructural facilities for the benefit of the student community of minority community and other communities.

Anwarul Uloom College, Hyderabad is a very popular college in the state of Telangana. It is one of the leading college in Arts, Humanities and Social Sciences, Business Finance and Commerce, Management Studies and Science and Mathematics. It is located in Hyderabad, Telangana. Anwarul Uloom College, Hyderabad is a Private institution. More than 19 courses are taught in this institution.

Under the Arts, Humanities and Social Sciences, there are a total of 4 courses. For Under Graduate studies, B.A. (Economics) and B.A. are available for enrolment. For Post Graduate studies, M.A. (Economics) and M.A. (History) are available for enrolment.

Under the Business Finance and Commerce, there are a total of 6 courses. The Under Graduate category has 5 courses which are B.Com., B.Com. (Computer), B.Com. (E - Commerce), B.Com. (Hons.) and many more. For Post Graduate studies, M.Com. is the only course taught.

Under the Management Studies, 1 course is available. For Under Graduate studies, BBA is the only course taught. Under the Science and Mathematics, there are a total of 9 courses. For Under Graduate studies, B.Sc. and B.Sc. (Computer Science and Engg.) are available for enrolment. Under the Post Graduate studies, 7 courses are taught which are M.Sc. (Information Systems), M.Sc. (Physics), M.Sc. (Botany), M.Sc. (Chemistry) and many more.

Vision: -

To provide skill-based quality higher education by striving continuously for excellence in educational service to all sections of the society especially the minority students who are socially, economically and academically under privileged with the focus on empowerment of youth to contribute constructively towards the national goals by upholding the values of secularism, national integration and social commitment".

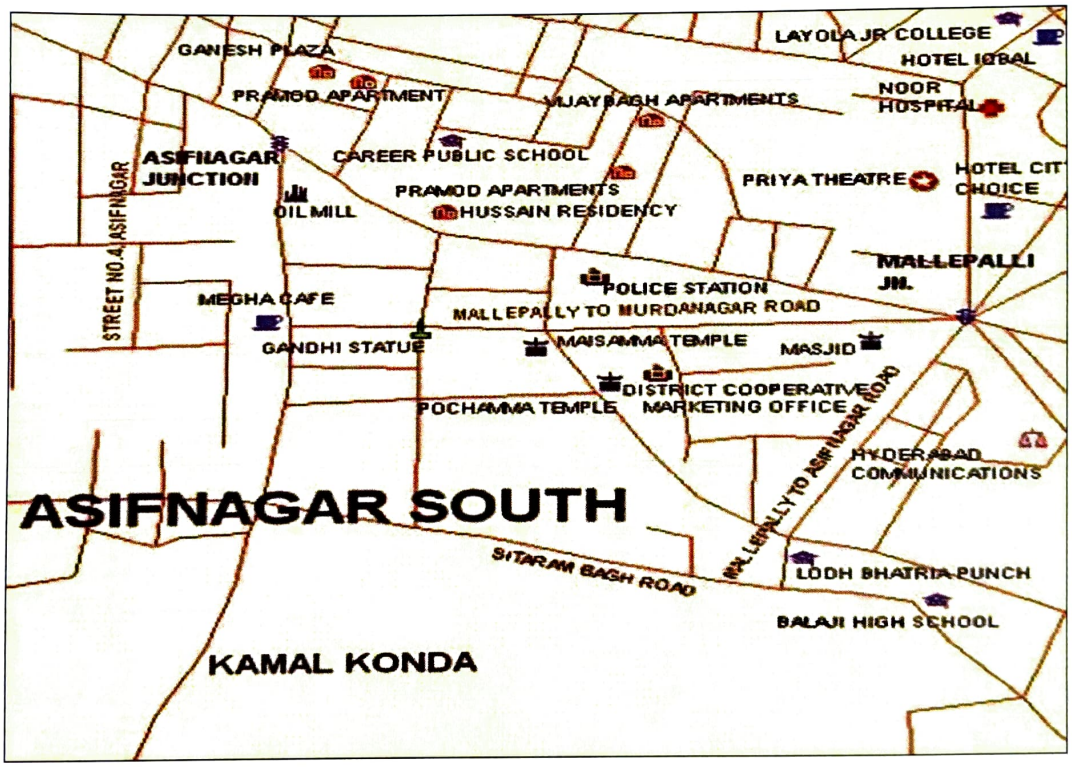
Mission:

To provide higher education for empowerment of youth of Telangana State especially the marginalized people has been the main thrust of this college. The institution is committed to the under-privileged of the society and students with high potential facing difficult socio-economic circumstances, so as to bring them at par with mainstream. Our mission is to impart quality education and exposure for the holistic development of students and equip them to cope with the latest requirements, through innovative techniques and practices.

1.2 About College Campus:

The college is housed in a five different blocks with total built up area of around 35,000 Sq Ft. The total area of the campus is 3,221 Sq Mtrs.

1.3 Layout of College Buildings



1.4 Green Monitoring Committee

Anwarul Uloom College (Autonomous)
(Affiliated to Osmania University)
Accredited with 'A+' Grade by NAAC
New Mallepally, Hyderabad- 500001, T.S., India.

Date: June 14, 2023

OFFICE ORDER

The Energy Monitoring Committee of Anwarul Uloom College (Autonomous) is constituted as follows:

1. Mr. Mahammed Gouse, Senior Electrician
2. Mr. Mohd. Haseeb Ali, Accountant
3. Mr. T. Hemanth Kumar, Asst. Prof., Dept. of Commerce

The term of the members shall be two years.

Director

Copy to:
All concerned.

1.5 About Green Auditing

Eco campus is concepts implemented in many educational institutions, all over the worldto make them sustainable because of their mass resource utilization and waste discharge in to the environment.

Green audit means to identify opportunities to sustainable development practices, enhance environmental quality, improve health, hygiene and safety, reduce liabilities achieve values of virtue. Green audit also provides a basis for calculating the economic benefits of resource conservation projects by establishing the current rates of resource use and their associated costs.

Green auditing of **"Anwarul Uloom College, Hyderabad"** enables to assess the life style, action and its impact on the environment. This green audit was mainly focused on greening indicators like utilisation of green energy (solar energy) and optimum use of secondary energy sources (petrol and diesel) in the College campus, vegetation, and carbon foot print of the campus etc. The aim of green auditing is to help the institution to apply sustainable development practices and to set examples before the community and young learners.

1.6 Objectives of Green Auditing

The general objective of green audit is to prepare a baseline report on "Biodiversity" and alternative energy sources (solar energy), measures to mitigate resource wastage and improve sustainable practices.

The specific objectives are:

- To suggest measures to make the College campus biodiversity rich
- To demarcate areas within the institute campus which have potential for restoration of biodiversity
- To make recommendations for the conservation, protection and rejuvenation of the natural vegetation and animal life by involving students and faculty members
- To inculcate values of sustainable development practices through green audit mechanism.
- Providing a database for corrective actions and future plans.
- To identify the gap areas and suggest recommendations to improve the green campus status of the College.

1.7 Target Areas of Green Auditing

Green audit forms part of a resource management process. Although they are individual events, the real value of green audit is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time.

Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency. Target areas included in this green auditing is biodiversity, green energy and carbon foot print.

1.8 Audit for Biodiversity

India is mega-biodiversity hottest hot-spot in the world with tremendous diversity in plants and animals. Such biotic forms are endemic to the different bio-geographic habitats in urban and in forest areas of the country as well. Biodiversity is defined as genetic, species and ecosystem diversity, which offers variability and therefore added values to bio-resources.

1.9 Audit of Green Energy:

According to the **Environmental Protection Agency (EPA)**, green energy provides the highest environmental benefit and includes power produced by solar, wind, geothermal, biogas, low-impact hydroelectric, and certain eligible biomass sources. Green energy can also reduce your carbon footprint and achieve a sustainable lifestyle.

CHAPTER- 2
GREEN CAMPUS AND BIODIVERSITY

2.1 Biodiversity Audit

In the survey, focus has been given on assessment of present status of diversity in form of plants, in college campus and efforts made by the College authorities for nature conservation. Campus is located in the vicinity of approximately more than 1532 trees/ medicinal herbs/ ornamental plants. The detail is given below:

Figure:-2.1 Green Campus of College

Figure:-2.2 Green Campus of College

Figure:-2.3 Green Campus of College

Figure:-2.4 Green Campus of College

2.2 GREENING THE CAMPUS

1	**Is there a garden in your institute?**	**Yes, about 1.5 Acre is the Green Area.**	
2	Do students spend time in the garden?	2-4 Hours during winters	
3	Total number of Plants in Campus	Plant type	Approx. number
		Trees	More than 350
		Shrubs	More than 1000
		Grass Cover	1.5 Acre
4	Suggest plants for your campus. (Trees, vegetables, herbs, etc.)	Ashoka, Ficus Religeosa, Boganvellia, Alovera, Azadirachta indica , and many more as per geographical regime.	
5.	Is the College campus have any Horticulture Department	Yes	
	Number of Staff working in Horticulture Department	Five Gardeners	
6	Number of Tree Plantation Drives organized by College per annum. (If Any)	Yes, Three Tree Plantation Drives are Organized Annually. 50+ trees and 100+ shrubs planted in this financial year.	
7	Number of Trees Planted in Last FY.	80	
	Survival Rate	90%	
8	Plant Distribution Program for Students and Community	Yes, Seed Bank is developed and, Saplings are distributed to Students and visitors at various Occasions.	
9	Plant Ownership Program	No	

2.3 List of plants in College campus

The college has 1532 trees on its campus. This initiative taken by the management to create a green campus under the plantation campaign is highly commendable.

Sr. No.	Name of Tree/Plant	Botanical Name	Family
1	Veld grape	Cissus quadrangularis	Vitaceae
2	Crown of throns	Euphorbia milii	Euphorbiaceae
3	Adenium	Adenium obesum	Apocynaceae
4	Starfish flower	Huernia macrocarpa	Apocynaceae
5	Jade Plant	Crassula ovata	Crassulaceae
6	Miracle leaf	Kalanchoe pinnata	Crassulaceae
7	Senecio himalaya	Senecio barbertonicus	Asteraceae
8	Widow's-thrill	Kalanchoe fedtschenkoi	Crassulaceae
9	Swiss cheese plant	Monstera adansonii	Araceae
10	Snake plant	Dracaena trifasciata	Asparagaceae
11	Holy basil or Tulsi plant	Ocimum sanctum	Lamiaceae
12	Sabza Plant	Ocimum basilicum	Lamiaceae
13	Areca Palm	Dypsis lutescens	Arecaceae
14	Fishtail Palm	Caryota urens	Arecaceae
15	Foxtail palm	Wodyetia bifurcata,	Arecaceae
16	Neem	Azadirachta indica	Meliaceae
17	Nerium	Nerium Oleander	Apocynaceae
18	Yellow flame	Peltophorum pterocarpum	Fabaceae

19	Peacock Flower	Caesalpinia pulcherrima	Fabaceae
20	Insulin Plant	Costus igneus	Costaceae
21	Golden duranta	Duranta erecta	Verbenaceae
22	Aloe	Aloe vera	Liliaceae
23	Cactus	Opuntia	Cactaceae
24	Butterfly Pea	Clitoria ternatea	Fabaceae
25	Hairy Stem Spiderwort	Tradescantia fluminensis	Commelinaceae
26	4'o clock plant	Mirabilis jalapa	Nyctaginaceae
27	Weeping Bottlebrush	Melaleuca viminalis	Myrtaceae
28	West Indian Holly	Leea Coccinea	Vitaceae
29	Weeping fig	Ficus benjamina	Moraceae
30	Garden croton	Codiaeum variegatum	Euphorbiaceae
31	Chinese fan palm	Livistona chinensis	Arecaceae
32	Cabbage palm	Cordyline fruticosa	Asparagaceae
33	Arrowhead vine	Syngonium podophyllum	Araceae
34	Indian acalypha	Acalypha indica	Malpighiales

Chapter-03
Carbon Foot print

3.1 About carbon foot print.

Climate change is one of the greatest challenges facing nations, governments, institutions, business and mankind today.

Carbon footprint is a measure of the impact your activities have on the amount of carbon dioxide (CO_2) produced through the burning of fossil fuels and is expressed as a weight of CO_2emissions produced in tonnes.

We focus on consumption in each of our five major categories: housing, travel, food, products and services. In addition to these we also estimate the share of national emissions over which we have little control, government purchases and capital investment.

For simplicity and clarity all our calculations follow one basic method. We multiply a use input by an emissions factor to calculate each footprint. All use inputs are per individual and include things like fuel use, distance, calorie consumption and expenditure. Working out your inputs is a matter of estimating them from your home, travel, diet and spending behaviour.

Although working out you inputs can take some investigation on your part the much more challenging aspect of carbon calculations is estimating the appropriate emissions factor to use in your calculation. Where possible you want this emissions factor to account for as much of the relevant life cycle as possible.

We all have a carbon footprint...

3.2 Methodology and Scope

The carbon footprint gives a general overview of the **Anwarul Uloom College (Autonomous)** greenhouse gas emissions, converted into CO_2 -equivalents and it is based on reported data from internal and external systems. The purposes of the carbon indicators are to measure the carbon intensity per unit of product, in addition to showing environmental transparency towards external stakeholders. The carbon footprint reporting approach undertaken in this study follows the guidelines and principles set out in the "Greenhouse Gas Protocol Corporate Accounting and Reporting Standard" (hereafter referred to as the GHG Protocol) developed by the Greenhouse Gas Protocol Initiative and international standard for the quantification and reporting of greenhouse gas emissions -ISO 14064. This is the most widely used and accepted methodology for conducting corporate carbon footprints. The study has assessed carbon emissions from the **Anwarul Uloom College (Autonomous), Hyderabad.** This involves accounting for, and reporting on, the GHG emissions from all those activities for which the company is directly responsible. The items quantified in this study are as classified under the ISO 14064 standards: The report calculates the greenhouse gas emissions from the **Anwarul Uloom College (Autonomous), Hyderabad**. This includes electricity, as well as emission associated with diesel consumption in the institute vehicle. The emission associated with air travel, waste generation, administration, and marketing related activities has been excluded from the current study. Emissions from business activities are generally classified as scope 1, 2 or 3 areas classified under the ISO 14064 standards.

3.3 Carbon emission from electricity

Direct emissions factors are widely published and show the amount of emissions produced by power stations in order to produce an average kilowatt-hour within that grid region

Unlike with other energy sources the carbon intensity of electricity varies greatly depending on how it is produced and transmitted. For most of us, the electricity we use comes from the grid and is produced from a wide variety of sources. Although

working out the carbon intensity of this mix is difficult, most of the work is generally done for us.

Electricity used in the site is the significant contributors towards GHGs emission from the unit. Electricity used onsite is the most direct, and typically the most significant, a contributor to a unit's carbon footprint. Thus, using an average fuel mix of generating electricity, carbon dioxide intensity of electricity for national grid is assumed to be 0.9613 KgCO2/Kwh

(Reference: Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/database_11.zip)

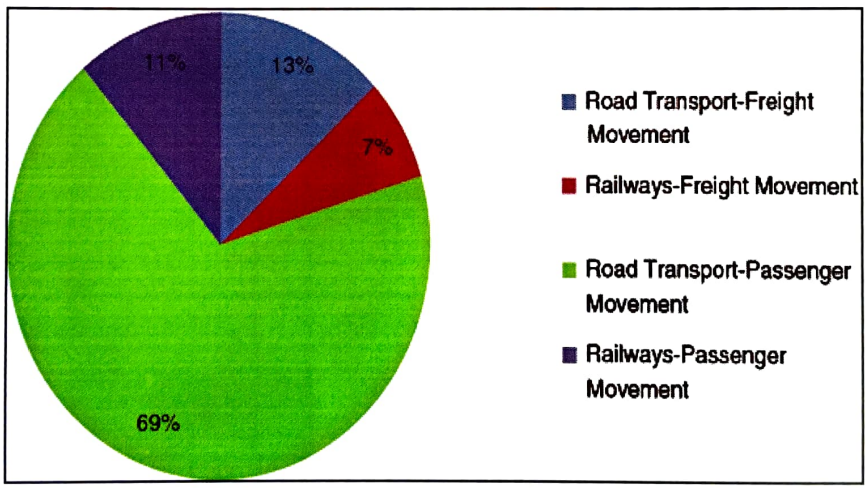
Electricity Purchased from the grid

Table:- 3.1 Electricity Purchased from the grid and Emissions from the electricity Import

Sr. No	Parameter	Value	Unit	Emission Factor kg CO2e/kWh	Emission ton CO2e/year
1	Electricity	88044	kWh	0.9613	84.63
	Total				**84.63**

3.4 Carbon emission from vehicles.

In India, it is the third most CO^2 emitting sector, and within the transport sector, road transport contributed more than 90% of total CO^2 emissions (IEA, 2020; Ministry of Environment Forest and Climate Change, 2018)



3.5 Biomass Calculation of tree:

Sr. no.	Tree Name	Botanical Name	Average Diameter cm (10 to 100)	AGB	BGB	Total	Carbon Storage	Amount of CO_2 Sequestered	Total	Total Amount of CO_2 Sequestered	Annually CO_2 Sequestered amount (Ton/year)
1	Veld grape	Cissus quadrangularis	20	144.7	21.7	166.4	83.2	305.0	25	1525	0.02
2	Crown of throns	Euphorbia milii	30	403.5	60.5	464.0	232.0	850.5	20	4252	0.06
3	Adenium	Adenium obesum	10	21.7	3.3	24.9	12.5	45.7	15	549	0.01
4	Starfish flower	Huernia macrocarpa	50	1328.4	199.3	1527.6	763.8	2800.1	2	42002	0.57
5	Jade Plant	Crassula ovata	90	4807.5	721.1	5528.7	2764.3	10134.0	4	50670	0.69
6	Miracle leaf	Kalanchoe pinnata	40	798.0	119.7	917.7	458.9	1682.2	8	8411	0.11
7	Senecio himalaya	Senecio barbertonicus	10	21.7	3.3	24.9	12.5	45.7	1	914	0.01
8	Widow's-thrill	Kalanchoe fedtschenkoi	40	798.0	119.7	917.7	458.9	1682.2	1	16822	0.23
9	Swiss cheese plant	Monstera adansonii	12	35.4	5.3	40.7	20.4	74.7	3	373	0.01
10	Snake plant	Dracaena trifasciata	50	1328.4	199.3	1527.6	763.8	2800.1	2	84004	1.15
11	Holy basil or Tulsi plant	Ocimum sanctum	40	798.0	119.7	917.7	458.9	1682.2	80	8411	0.11
12	Sabza Plant	Ocimum basilicum	100	6016.8	902.5	6919.3	3459.6	12683.1	300	253661	3.46
13	Areca Palm	Dypsis lutescens		34.5	5.2	39.6	19.8	72.7	4	363	0.00

14	Fishtail Palm	Caryota urens	15	66.2	9.9	76.2	38.1	139.6	10	1396	0.02
15	Foxtail palm	Wodyetia bifurcata	25	257.1	38.6	295.7	147.8	542.0	30	4878	0.07
16	Neem	Azadirachta indica	50	1328.4	199.3	1527.6	763.8	2800.1	10	28001	0.38
17	Nerium	Nerium Oleander	59	1921.8	288.3	2210.0	1105.0	4051.0	6	40510	0.55
18	Yellow flame	Peltophorum pterocarpum	70	2796.4	419.5	3215.8	1607.9	5894.7	1	29473	0.40
19	Peacock Flower	Caesalpinia pulcherrima	15	66.2	9.9	76.2	38.1	139.6	5	698	0.01
20	Insulin Plant	Costus igneus	15	66.2	9.9	76.2	38.1	139.6	4	1396	0.02
21	Golden duranta	Duranta erecta	35	583.8	87.6	671.3	335.7	1230.6	2	12306	0.17
22	Aloe	Aloe vera	90	4807.5	721.1	5528.7	2764.3	10134.0	4	101340	1.38
23	Cactus	Opuntia	10	21.7	3.3	24.9	12.5	45.7	2600	457	0.01
24	Butterfly Pea	Clitoria ternatea	50	1328.4	199.3	1527.6	763.8	2800.1	2	84004	1.15
25	Hairy Stem Spiderwort	Tradescantia fluminensis	40	798.0	119.7	917.7	458.9	1682.2	80	8411	0.11
26	4'o clock plant	Mirabilis jalapa	100	6016.8	902.5	6919.3	3459.6	12683.1	300	253661	3.46
27	Weeping Bottlebrush	Melaleuca viminalis		34.5	5.2	39.6	19.8	72.7	4	363	0.00
28	West Indian Holly	Leea Coccinea	15	66.2	9.9	76.2	38.1	139.6	10	1396	0.02
29	Weeping fig	Ficus benjamina	25	257.1	38.6	295.7	147.8	542.0	30	4878	0.07
30	Garden croton	Codiaeum variegatum	50	1328.4	199.3	1527.6	763.8	2800.1	10	28001	0.38

31	Chinese fan palm	Livistona chinensis	59	1921.8	288.3	2210.0	1105.0	4051.0	6	40510	0.55
32	Cabbage palm	Cordyline fruticosa	70	2796.4	419.5	3215.8	1607.9	5894.7	1	29473	0.40
33	Arrowhead vine	Syngonium podophyllum	15	66.2	9.9	76.2	38.1	139.6	5	698	0.01
34	Indian acalypha	Acalypha indica	15	66.2	9.9	76.2	38.1	139.6	4	1396	0.02
						Total					15.61

The college has 1532 trees on its campus. This initiative taken by the management for creating a green campus under the plantation campaign is commendable. It's truly appreciable. The total amount of CO_2 sequestered is 15.61 tons per year. This is also highly commendable.

3.6 Total CO_2 Emission by the College

Sr. No.	CO_2 Emission by	Total CO_2 Emission ton/year
Total CO_2 Emission		
CO_2 Emission Neutralized by		
1	Trees	15.61

3.7 Other Emissions Excluded

This study did not evaluate the carbon sequestration potential of existing plantation activities and emission from the staff commuting, food supply, official flights, paper products, water supply, and waste disposal and recycling due to limited data availability. The current study identifies areas where data monitoring, recording and archiving need to be developed for enlarging the scope of mapping of GHGs emission in the future years. Accordingly, a set of tools and record keeping procedure will be developed for improving the quality of data collection for the next year carbon footprint studies.

CHAPTER- 4
WASTE MANAGEMENT

4.1 About Waste:

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health Waste management is important for an eco-friendly campus. In College different types of wastes are generated, its collection and management are very challenging.

Solid waste can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. A bio-degradable waste includes food wastes, canteen waste, wastes from toilets etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the College. Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus, the minimization of solid waste is essential to a sustainable College. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems

Table 4.1 Different types of waste generated in the College Campus.

Sr. No.	Types of Waste	Particulars
1	Solid wastes	Damaged furniture, paper waste, paper plates, food wastes etc
2	Plastic waste	Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc
3	E-Waste	Computers, electrical and electronic parts etc
4	Glass waste	Broken glass wares from the labs etc

5	Chemical wastes	Laboratory waste etc
6	Bio-medical Waste	Sanitary Napkin etc

4.2 Waste Management Practices adopted by the College

The audit team visited various departments, classrooms, and other areas to identify waste generation points and waste collection areas for potential improvement. Detailed information is provided in the table. At present college adopt 2 dustbin systems. **It's appreciable.**

College is implemented **"Three dust Bin"** waste collection system. All kind of waste generated from various activity is collected.

Recommendation:

It is recommended adopted 5 Bin Waste Collection System for collect different type of waste generated in college premises.

Figure 4.2: Recommended 5 Dust Bin waste collection System

4.3 Some plantation by Anwarul Uloom College, Hyderabad

Fig.4.3 some plantation by Anwarul Uloom College, Hyderabad

CHAPTER- 5
RECOMMENDATIONS AND SUGGESTIONS

5.1 QR Code System and Biodiversity:

While the world seems to be going digital, people lack the time to read books and process the information they contain. Hence, College can be provided QR codes on the trees for its information and to exploit the rapidly growing platform for a unique purpose.

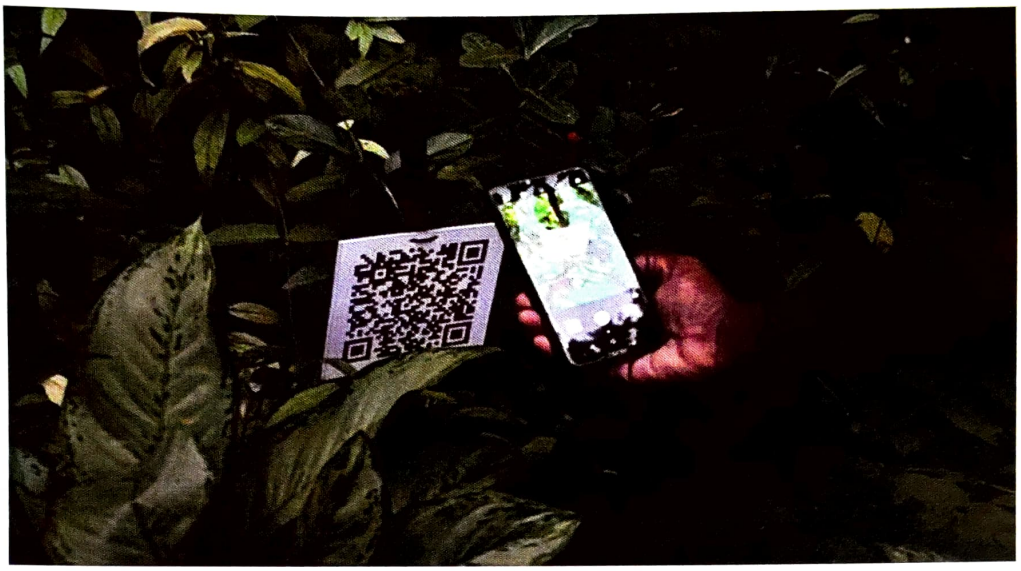


Fig: 5.1 QR Code System for plants

These codes can give students all the information they need to know about the tree — from its scientific name to its medicinal value. They only need to put their smart-phones to use. QR codes to them, making it easier for everybody to learn about a plant or a tree at the tip of their fingers," If any app generating a QR code, which is available for free on the online stores, can be used to avail the information of the trees.

- **Eco-restoration programmes**
  - Frame long-term eco-restoration programmes for replacing exotic Acacia plantations with indigenous trees and need of the hour is to frame a holistic campus development plan.

5.2 Other Suggestions

Some of the very important suggestions are: -

- Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.
- Increase recycling education on campus.
- Increase Awareness of Environmentally Sustainable Development in College campus.
- Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.
- Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in environmentally sustainable development.
- Collaborate for Interdisciplinary Approaches- To develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- Increase reduces, reuse, and recycle education on campus.
- Develop a butterfly garden that arouses appreciation towards flora and fauna diversity.
- Name all the trees and plants (Plant DNA barcodes) with its common name and scientific name.
- Arrange training programmes on environmental management system and nature conservation.
- Renovation of cooking system in the canteen to save gas by installation solar water heater system with heat pump.
- Establish a procurement policy that is energy saving and eco-friendly.

ANNEXURE -1

Recommendation for Herbal & medicinal plants:

S.No.	Hindi Name	Botanical Name	Family
1	Asopalav	Polyalthia longifolia	Annonaceae
2	Gudhal	Hibiscus-rosa-sinensis	Malvaceae
3	Nandee	Ficus Benjamina	Moraceae
4	Bahera	Terminalia Bellirica	Combretaceae
5	Khirni	Manilkara hexandra	Sapotaceae
6	Kaner	Nerium indicum	Apocynaceae
7	Champa	Plumeria fragrance	Apocynaceae
8	Peepal	Ficus religiosa	Moraceae
9	Jackfruit	Artocarpus heterophyllus	Moraceae
10	Amla	Emblica officinalis	Euphorbiaceae
11	Bael	Aegle marmelos	Rutaceae
12	Amrood	Psidium guajava	Myrtaceae
13	Ghratkumari	Aloe barbadensis	Liliaceae
14	Nimbu	Citrus lemon	Rutaceae
15	Mogra	Jasminum sambac	Oleaceae
16	Parijaat	Nyctanthes arbor-tristis	Oleaceae
17	Aam	Mangifera indica	Anacardiaceae
18	Peela kaner	Thevetia nerifolia	Apocynaceae
19	Jaamun	Syzugium cumini	Myrtaceae
20	Kachnar	Bauhinia variegata	Fabaceae
21	Ratanjot	Jatropha curcas	Euphorbiaceae

22	Shewt ark	Calotropis procera	Asclepiadaceae
23	Drumstick	Moringa oleifera	Moringaceae
24	Neem	Azadirachta indica	Meliaceae
25	Arandi	Ricinus communis	Euphorbiaceae
26	Arjuna	Terminlia arjuna	Combretaceae
27	Putranjiva	Putranjiva roxburghii	Putranjivaceae
28	Anjeer	Ficus carica	Moraceae
29	Shikakai	Acacia concina	Fabaceae
30	Pila amaltas	Cassia glauca	Fabaceae
31	Nirgundi	Vitex negundo	Lemiaceae
32	Sheesham	Dalbergia sissoo	fabaceae
33	Dhawda/ Gumghatti	Anogeissus latifolia	Combrataceae
34	Paras peepal	Thespasia populina	Malvaceae
35	Kanak champa	Pterospermum acerifolium	Malvaceae
36	Maulshree	Mimusops alengi	Sapotaceae
37	Tendu	Diospyros melanoxylon	Ebanaceae

SAVE ENERGY

SAVE ENVIRONMENT

END OF THE REPORT

THANKS

ENERGY AUDIT REPORT

CONSULTATION REPORT

Anwarul Uloom College (Autonomous)

11-3-918, New Mallepally, HYDERABAD,
TELANGANA-500 001

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

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Bhawarkuan, Indore – 452 001 (M. P.), India
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www.eeplgroups.com

(2023-24)

CONTENT

ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore takes this opportunity to appreciate & thank the management of **Anwarul Uloom College (Autonomous), Hyderabad** for giving us an opportunity to conduct energy audit for the College.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation the course of study.

Rajesh Kumar Singadiya

(Director)

M.Tech (Energy Management), PhD (Research Scholar)
Accredited Energy Auditor [AEA-0284]
Certified Energy Auditor [CEA-7271]
(BEE, Ministry of Power, Govt. of India)
Empanelled Energy Auditor with MPUVN, Bhopal M.P.
Lead Auditor ISO50001:2011 [EnMS) from FICCI, Delhi
Certified Water Auditor (NPC, Govt of India)
Charted Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]

ACCREDITATION CERTIFICATE

BUREAU OF ENERGY EFFICIENCY

Examination Registration No.: EA- 7271

Accreditation Registration No.: AEA-284

Certificate of Accreditation

This is to certify that Mr./Ms. Shri. Rajesh Kumar Singadiya having its trade/registered office at ..... has been given accreditation as accredited energy auditor. The certificate shall be effective from 9th day of May, 2018

The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No. 284 in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this 5th day of October, 2018

Secretary,
Bureau of Energy Efficiency
New Delhi

EXECUTIVE SUMMARY

The executive summary of the energy audit report furnished in this section briefly gives the identified energy conservation measures and other recommendation during the project that can be implemented in a phased manner to conserve energy, increase productivity inside the College campus.

AREA OF IMPROVEMENT

- **LIGHTING SYSTEM**

  Replacement of "conventional T-12 (40 Watt) and T-8 (36 Watt)" tube light by energy efficient LED lighting fixture was taken up phased manner.

- **TIMER CONTROLLED STREET LIGHTS**

  Installation of "Timer control on high mast and street lighting" in College campus is recommended.

- **CEILING FAN AND EXHAUST FAN:**

  Replacement of "conventional ceiling fan (60 Watt to 80 Watt)" by energy efficient star rated fan or BLDC based energy efficient fan (20 to 25 Watt) in "admin building, class rooms, laboratories and faculties cabin" have great potential for energy saving.

  Replacement of "conventional exhaust fan (90 Watt to 125Watt)" by energy efficient star rated fan or BLDC based energy efficient Fan (20 to 40 Watt) in old building class rooms, laboratories and faculties cabin have great potential for energy saving.

- **IOT BASED ENERGY MONITORING SYSTEM AT MAIN FEEDER**
  - Installation of "Cloud based (IoT based) energy monitoring system" including harmonic measurement (total voltage and current harmonic distortion %) in power house will be good initiate for energy monitoring as well as student demo project for management. Expected energy saving potential about 2 to 4%.
  - Installation of energy meters between transformer and main PCC panel with IOT system will monitor line losses of the system. It will give real time measurement of power factor and line losses from the cable.

- **TRANSFORMER LOSS OPTIMIZATION:**
  - Replacement of "existing conventional sub–station by new compact type sub-station" in HT yard is highly recommend to management to develop "Demo Project" in college will be technology up gradation as well as learning center for student and faculties.
  - Replacement of existing transformer by "Energy efficient star rated transformer by BEE, Government of India or energy efficiency level-3" can be good project for management for energy saving as well as learning center for student and faculties.
- **SYNCHRONIZATION OF DG SET WITH SOLAR SYSTEM**
  - Installation of "Cloud based fuel and unit generation monitoring system" in DG set will help to monitor specific unit generation by DG set failure of the grid power.
  - It was observed that during the power failure of the grid, solar unit generations also stop. Synchronization of the solar system with DG set increases the utilization capacity of the solar system.
- **ENERGY MANAGEMENT WORKSHOP AND TRAINING:**
  - Develop energy management policies for university. Establish a procurement policy that is energy saving and eco-friendly.
  - Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in energy management system.

CHAPTER-1
INTRODUCTION

1.1 About College: -

The privilege of being The Largest Autonomous Minority Serving Institute in Telangana as one of its many feats including the distinction of glorious 109 years celebrations of its establishment - the noble act which is surely the stuff of dreams is achieved by ANWARUL ULOOM COLLEGE. The meticulous institute has boarded the train of success and achieved this colossal feat with the hard work, determination and vision of its management and students and has vowed to never slow down its trail of achievements in the years to come.

Anwarul Uloom College was established in 1953. The Anwarul Uloom College under the Aegis of Anwarul Uloom Educational Association. The Anwarul Uloom College is an institute of knowledge, learning, excellence and humility, the institution with a vision of imparting education & empowering minority. This institution is with an adherence to principles. Anwarul Uloom is an institution with a great history and achievements, exemplary students from this institution have taken stride in the concept of education taking it forward to the next level by placing it on the global map with virtue and integrity.

Anwarul Uloom College is located in the heart of the city on the main road at Mallepally Hyderabad. The campus atmosphere is congenial for the holistic development of the students coming from varied backgrounds.

Anwarul Uloom College, Hyderabad is a very popular college in the state of Telangana. It is one of the leading college in Arts, Humanities and Social Sciences, Business Finance and Commerce, Management Studies and Science and Mathematics. It is located in Hyderabad, Telangana. Anwarul Uloom College, Hyderabad is a Private institution. More than 19 courses are taught in this institution. Under the Arts, Humanities and Social Sciences, there are a total of 4 courses. For Under Graduate studies, B.A. (Economics) and B.A. are available for enrolment. For Post Graduate studies, M.A. (Economics) and M.A. (History) are available for enrolment.

ANWARUL ULOOM COLLEGE is an Autonomous institution Affiliated to O.U the institution was granted autonomy by UGC in the year 1989. Anwarul Uloom also have an accredition of A+ Grade by NAAC- in May 2023 The Institution runs a CBCS with Semester System pattern. Anwarul Uloom College has crafted an environment keeping in mind student requirements and market demand with a shift system to help them master theory concepts and strategies as well as develop and hone their skills in the field of corporate culture. Situated in the heart of the city with a sprawling 3 acre campus, spacious class rooms, laboratories, library, reading rooms conference halls , offering advanced courses such as BBA BBM BBA Artificial Intelligence and Data Science training students in various aspects of personal growth and providing detailed and upgraded training modules for group 1 and 2 exams.

The academic quality of college life is enhanced by the provision of the best faculty and all possible infrastructural facilities for the benefit of the student community of minority community and other communities.

Under the Business Finance and Commerce, there are a total of 6 courses. The Under Graduate category has 5 courses which are B.Com., B.Com. (Computer), B.Com. (E - Commerce), B.Com. (Hons.) and many more. For Post Graduate studies, M.Com.is the only course taught?

Under the Management Studies, 1 course is available. For Under Graduate studies, BBA is the only course taught. Under the Science and Mathematics, there are a total of 9 courses. For Under Graduate studies, B.Sc. and B.Sc. (Computer Science and Engg.) are available for enrolment. Under the Post Graduate studies, 7 courses are taught which are M.Sc. (Information Systems), M.Sc. (Physics), M.Sc. (Botany), M.Sc. (Chemistry) and many more.

Vision: -

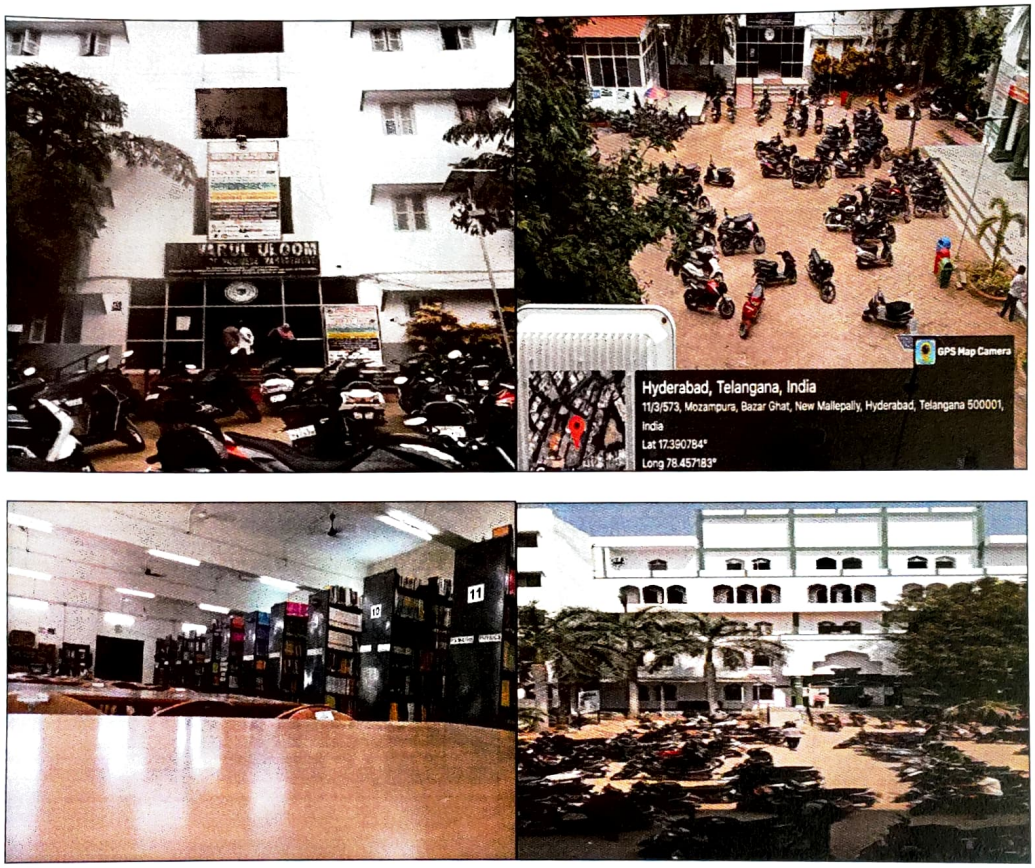
To provide skill-based quality higher education by striving continuously for excellence in educational service to all sections of the society especially the minority students who are socially, economically and academically under privileged with the focus on empowerment of youth to contribute constructively towards the national goals by upholding the values of secularism, national integration and social commitment".

Mission:

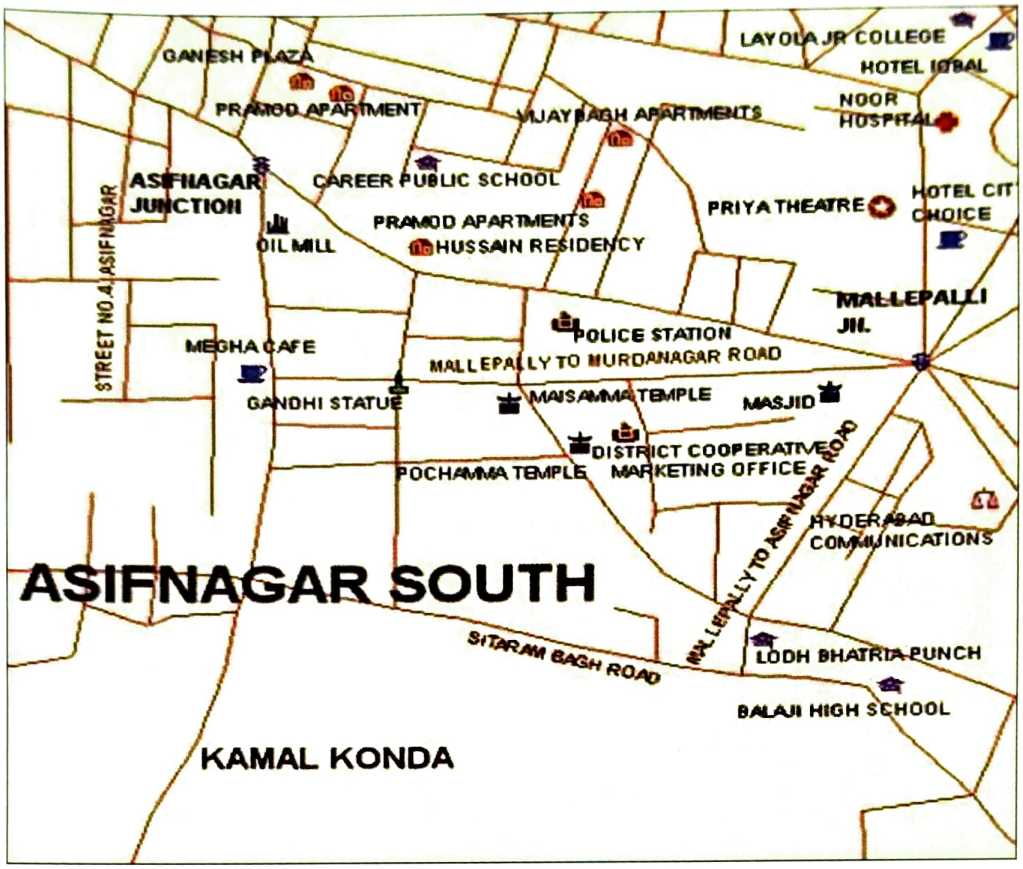
To provide higher education for empowerment of youth of Telangana State especially the marginalized people has been the main thrust of this college. The institution is committed to the under-privileged of the society and students with high potential facing difficult socio-economic circumstances, so as to bring them at par with mainstream. Our mission is to impart quality education and exposure for the holistic development of students and equip them to cope with the latest requirements, through innovative techniques and practices.

1.2 About College Campus:

The college is housed in a five different blocks with total built up area of around 35,000 Sq Ft. The total area of the campus is 3,221 Sq Mtrs.



1.3 Layout of College Buildings: -



1.4 Energy Monitoring Committee

Anwarul Uloom College (Autonomous)
(Affiliated to Osmania University)
Accredited with 'A+' Grade by NAAC
New Mallepally, Hyderabad– 500001, T.S., India.

Date: June 14, 2023

OFFICE ORDER

The Energy Monitoring Committee of Anwarul Uloom College (Autonomous) is constituted as follows:

1. Mr. Mahammed Gouse, Senior Electrician
2. Mr. Mohd. Haseeb Ali, Accountant
3. Mr. T. Hemanth Kumar, Asst. Prof., Dept. of Commerce

The term of the members shall be two years.

Director

Copy to:
All concerned.

1.5 Energy Audit Team

The study team constituted of the following senior technical executives from **Empirical Exergy Private Limited,**

- **Mr. Rakesh Pathak**, [Director]
- **Dr. Suresh Soni** [Reviewer]
- **Mrs. Laxmi Raikwar Singadiya**,[Energy Engineer]
- **Mr. Charchit Pathak** [Asst. Project Engineer]
- **Mr. Ajay Nahra,** [Site Engineer]

1.6 About Energy Audit

Energy audit helps to understand more about the ways energy is used in any plant and helps in identifying areas where waste may occur and scope for improvement exists. The overall energy efficiency from generation to final consumer becomes 50%. Hence one unit saved in the end user is equivalent to two units generated in the power plant.

Energy audit is the most efficient way to identify the strength and weakness of energy management practices and to find a way to solve problems. Energy audit is a professional approach in utilizing economic, financial, and social and natural resources responsibility. Energy audits "adds value" to management control and is a way of evaluating the system.

Empirical Exergy Private Limited (EEPL), Indore M.P. carried out the "Energy Audit" at the site to find gaps in the energy consumption pattern for **Anwarul Uloom College, Hyderabad.** A technical report is prepared as per the need and the requirement of the project.

1.7 Objectives of Energy Auditing

An energy audit provides vital information base for overall energy conservation program covering essentially energy utilization analysis and evaluation of energy conservation measures. It aims at:

- Identifying the quality and cost of various energy inputs.

- Assessing present pattern of energy consumption in different cost centers of operations.
- Relating energy inputs and production output.
- Identifying potential areas of thermal and electrical energy economy.
- Highlighting wastage in major areas.
- Fixing of energy saving potential targets for individual cost centers.
- Implementation of measures for energy conservation & realization of savings.

1.8 Methodology:

Methodology adopted for achieving the desired objectives viz.: Assessment of the current operational status and energy savings include the following:

- Discussions with the concerned officials for identification of major areas of focus and other related systems.
- Measurements and monitoring with the help of appropriate instruments including continuous and / or time-lapse recording, as appropriate and visual observations were made to identify the energy usage pattern and losses in the system.
- Trend analysis of costs and consumptions.
- Capacity and efficiency test of major utility equipment's, wherever applicable.
- Estimation of various losses
- Computation and **in-depth analysis** of the collected data, including utilization of computerized analysis and other techniques as appropriate were done to draw inferences and to evolve suitable energy conservation plan/s for improvements/ reduction in specific energy consumption.

1.9 Present Energy Scenario

The college acquires energy in the form of electricity procured from the TSSPDCL grid. The total billing amount is Rs.11,97,587, reflecting an annual energy consumption of 88,044 units, with an overall per-unit charge of Rs. 13.60/- per unit during the period from Mar 2024 to Apr 2023.

CHAPTER- 2
POWER SUPPLY SYSTEM

2.1 Power Supply System

The college's power supply primarily derives from the grid. In the event of grid power failure, an emergency power supply is provided by a DG set.

Grid Power

The college acquires energy in the form of electricity procured from the TSSPDCL grid. The total billing amount is Rs.11,97,587, reflecting an annual energy consumption of 88,044 units, with an overall per-unit charge of Rs. 13.60/- per unit during the period from Mar 2024 to Apr 2023.

DG Set

A DG set is utilized in instances of grid power failure.

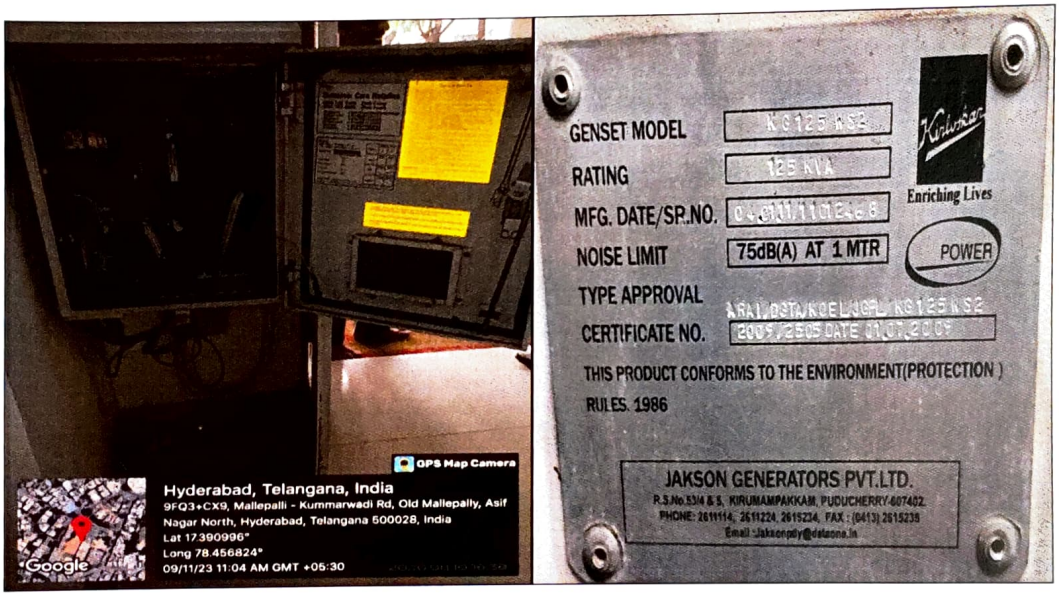


Figure 2.1:- Transformer on the college campus

2.2 DG Set

A single DG set is present on the college campus. The technical specifications for the DG set are provided in the following table (Table 2.1):

Table 2.1: Technical Specifications for DG Set

Sr.No.	Parameter	Technical Specification
1	Make	Jakson Limited
2	Capacity (KVA)	125
5	Phase	3
6	Power factor	0.8

Figure 2.2:- DG set on the college campus

Observation

- DG set is used only in case of power failure.

CHAPTER- 3
ELECTRICITY BILL ANALYSIS

3.1 Monthly electrical energy consumption (2023-24):

The monthly electrical consumption for the College is given in the table.

Table 3.1 Energy consumption and billing amount (year 2023-24)

Sr. No	Month & Year	Total Unit Consumption (KWH)	Total Amount (Rs/-)	Rs. /kWh
1	Mar-24	7078	108720	15.36
2	Feb-24	6187	81769	13.21
3	Jan-24	4292	56142	13.08
4	Dec-23	8613	126234	15.18
5	Nov-23	6533	104097	15.93
6	Oct-23	7983	92555	11.59
7	Sep-23	10084	140295	13.91
8	Aug-23	7753	88314	11.39
9	Jul-23	6628	80474	12.14
10	Jun-23	6614	77828	11.76
11	May-23	8050	147344	18.30
12	Apr-23	8229	93809	11.39
		Total = 88,044	**Total = Rs.11,97,587**	**Average =13.60**

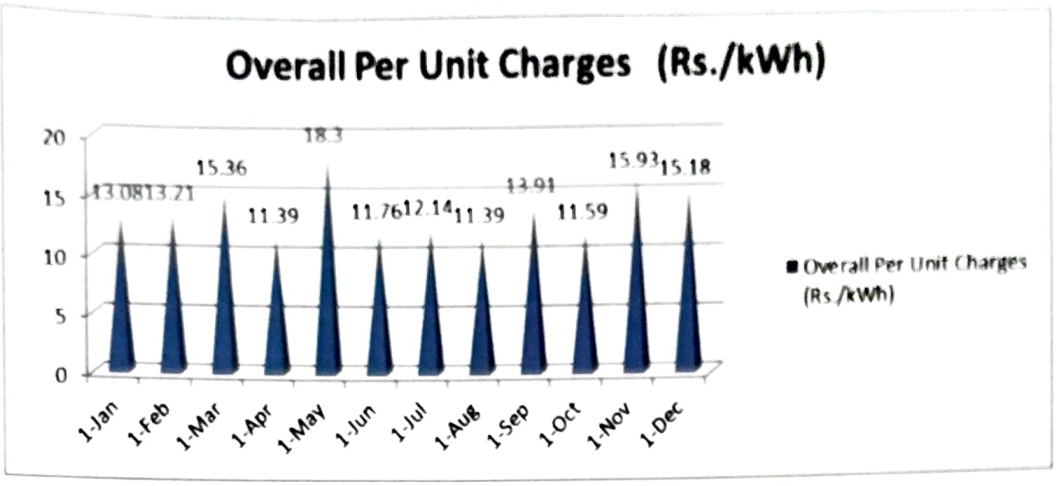


Figure 3.1 Graphical presentation of actual per unit charges year 2023-24

Observation - The annual energy consumption for the mentioned connection is 88,044 units and the overall charge is Rs. 13.60 per unit.

3.2 Monthly Power factor in year (2023-24):

Table 3.2:- Power factor in year 2023-24

Sr.No.	Month& Year	Power Factore
1	Mar-24	0.99
2	Feb-24	0.99
3	Jan-24	0.99
4	Dec-23	0.99
5	Nov-23	0.99
6	Oct-23	0.98
7	Sep-23	0.98
8	Aug-23	0.98
9	Jul-23	0.98
10	Jun-23	0.98
11	May-23	0.99
12	Apr-23	0.97
	Average	**0.99**

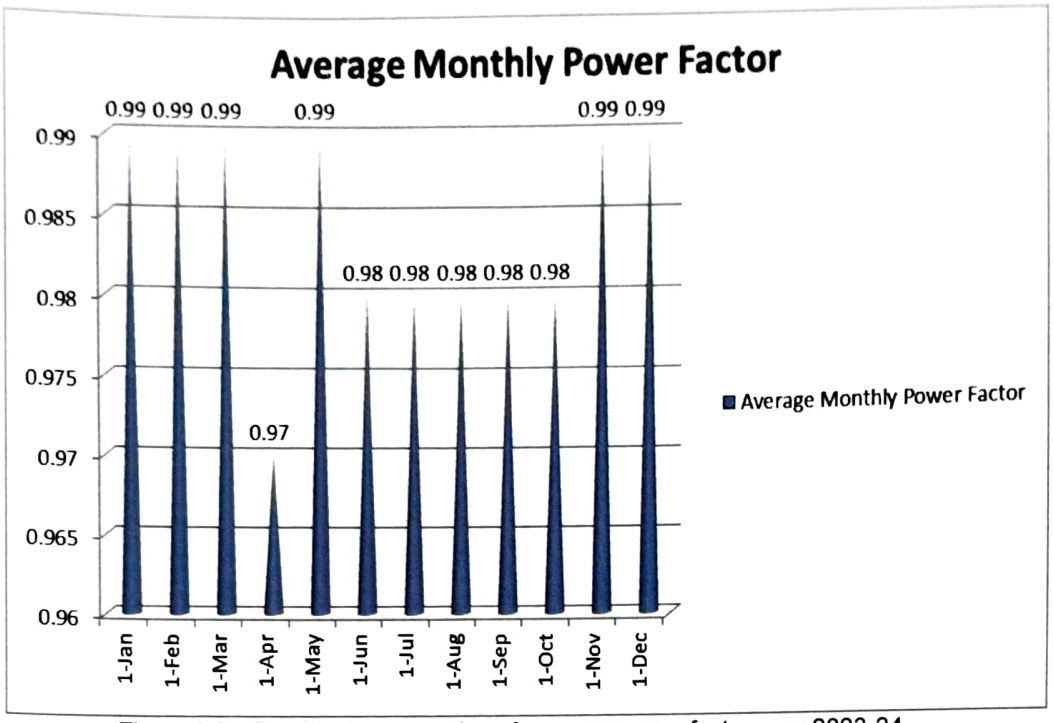


Figure 3.2:- Graphical presentation of average power factor year 2023-24

Observation:

The average power factor is 0.99

CHAPTER-4
CONNECTED LOAD

4.1 Connected load details of the college

Table-4.1 Connected Load of College

Sr.No.	Block Name	Connected Load (Kw)
1	Degree Block	45
2	PG Block	20
Total Connected Load		**65 Kw**

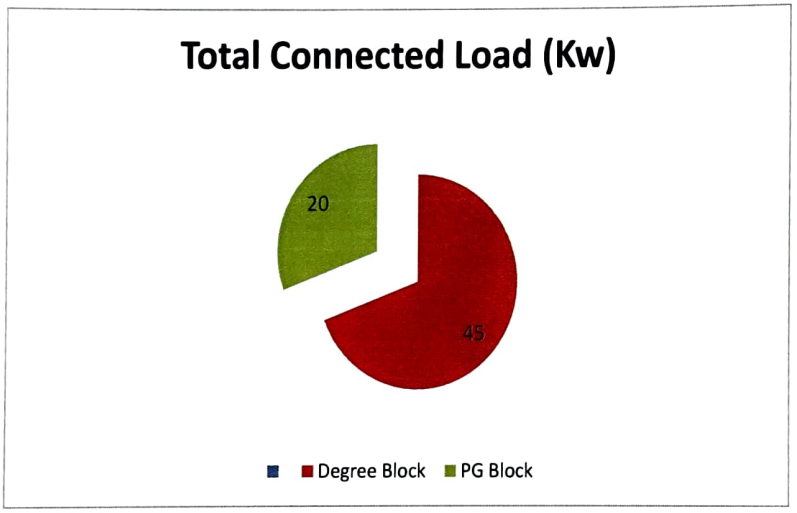


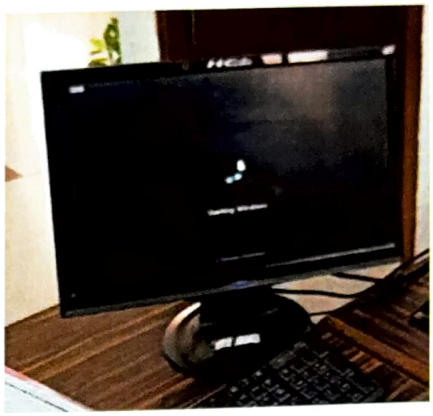
Fig.4.1: Connected Load of College Campus

Observation:

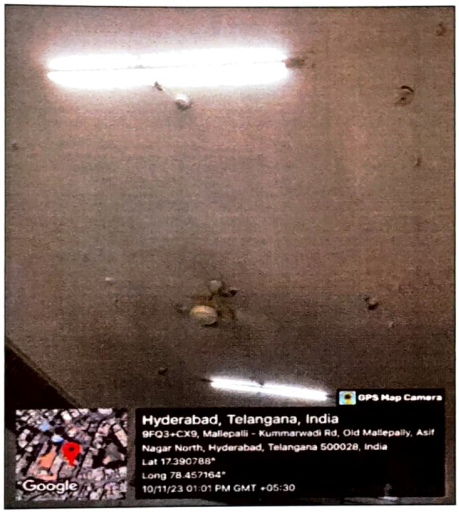
The Connected Load of College is 65 Kw.

4.2 Some Photographs of Electrical Equipment

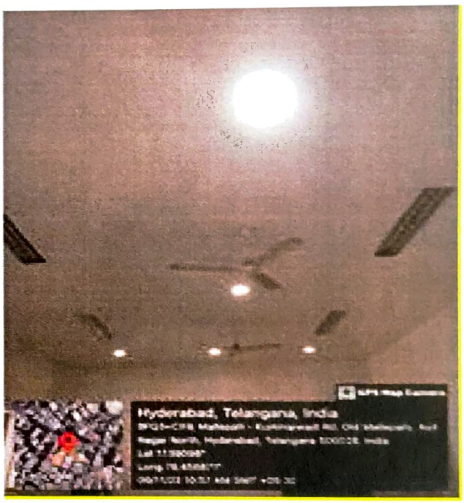
LED Street light



PC



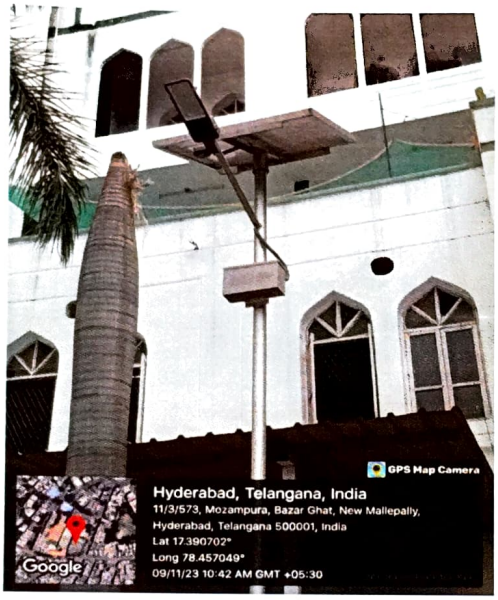
LED tube light(18W)



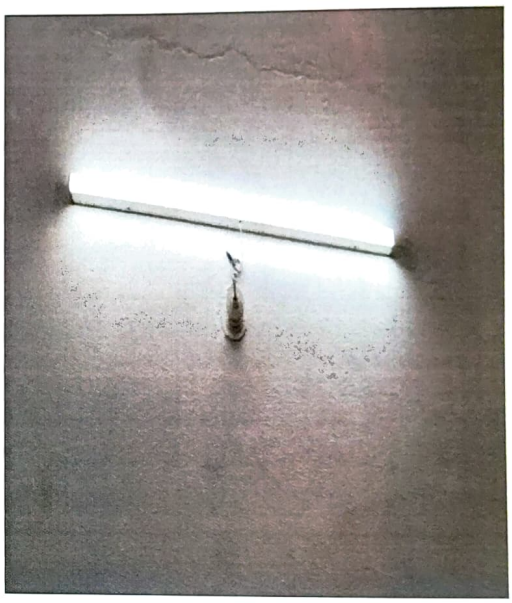
Ceiling Fan(60W)

AC (Air Conditioner)

Printer



LED Street light



LED tube light(18W)

Fig.-4.2 Some Photographs of Electrical Equipment

CHAPTER- 5
ENERGY CONSERVATION MEASURES

5.1 Case Study

Lighting

- Switch off lights when absent from your work area for more than 30 minutes including in bathrooms, meeting rooms, lecture theatres and corridors.
- Maximize the use of natural light and turn on lights only when there is inadequate lighting.
- Promote LED lamps instead of incandescent bulbs.
- Promote electronic chokes for florescent lamps instead of EMT chokes.

5.2 Case Study

Installation of IoT based Energy Monitoring System (EMS).

Observation:
During the energy audit it was observed that at present daily energy monitoring by manually.

Recommendation:
Installation of cloud-based energy monitoring system in present system play great roll to Generated data based for energy consumption in the system. The result of the system will be reflecting in terms of long-term energy saving project

5.3 Case Study

Computer and Monitors

- Online UPS – Battery Status Indication. It can be switched-off during non-use period. To minimize no-load power consumption.
- Advice on PC energy saving features like advanced LED monitor.
- Switch-off the Offline UPS. When the power failure is less. Improves life of SMF Batteries. Over charging will leads to bulging of batteries and leads to battery failure.
- Adjust your power management settings to put your screen to sleep if it is not in use for more than five minute

5.4 Case Study

Air Conditioning System:

Recommendation:

- It is recommended to replaced Sprit AC by BEE star rated AC
- It is recommended "Fall Ceiling "in air conditioning area. It will be reduced air conditioning load of AC and unit consumption.
- According to studies, for every one degree we raise the temperature of AC to, up to 6% electricity can be saved, So far, the default temperature for AC's in India was 20 or 21 Degrees. Thus by increasing it to 24 degree you bare savings 18 to 20 % electricity- It is simple Maths.
- Reduced the infiltration from door and window in air conditioning area
- Keep doors and windows closed in air-conditioned space, particularly doors leading to stairwells and external areas.
- Avoid Usage of Air-conditioners in the evening hours & favorable climate conditions.
- Use pedestal fan instead of air-conditioners during non-laboratory hours.
- Routine maintenance for air filters& cooling pins to make proper operation at regular interval.
- Use air curtains in front of door to avoid false air entry.

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END OF THE REPORT
THANKS

ENVIRONMENT AUDIT REPORT

CONSULTATION REPORT

Anwarul Uloom College (Autonomous)

11-3-918, New Mallepally, HYDERABAD,
TELANGANA-500 001

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

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(2023-24)

CONTENT

ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore takes this opportunity to appreciate & thank the management of of **Anwarul Uloom College (Autonomous), Hyderabad** for giving us an opportunity to conduct environment audit for the College

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation the course of study.

Rajesh Kumar Singadiya

(Director)

M.Tech (Energy Management), PhD (Research Scholar)
Accredited Energy Auditor [AEA-0284]
Certified Energy Auditor [CEA-7271]
(BEE, Ministry of Power, Govt. of India)
Empanelled Energy Auditor with MPUVN, Bhopal M.P.
Lead Auditor ISO50001:2011 [EnMS) from FICCI, Delhi
Certified Water Auditor (NPC, Govt of India)
Charted Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]

ACCREDITATION CERTIFICATE

BUREAU OF ENERGY EFFICIENCY

Examination Registration No.: EA- 7271

Accreditation Registration No.: AEA-284

Certificate of Accreditation

This is to certify that Mr./Ms. Shri. Rajesh Kumar Singadiya having its trade/registered office at ..... has been given accreditation as accredited energy auditor. The certificate shall be effective from 9th day of May, 2018

The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No. 284 in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this 5th day of October, 2018

Secretary,
Bureau of Energy Efficiency
New Delhi

EXECUTIVE SUMMARY

The executive summary of the environment audit report furnished in this section briefly gives the identified water conservation measures that can be implemented in a phased manner to water conservation and increase the productivity of the college

Initiative for Environment Management Taken by College

- **PLASTIC BANNED**
  - **As per environmental policy college has adopted plastic banned system in campus.** It's appreciable.

ENVIRONMENT AUDIT RECOMMENDATION

- **FRESH WATER MONITORING SYSTEM**
  - Installation of **"Cloud based (IoT based) ground water extraction monitoring system"** for bore well to quantify fresh water consumption per day in the college
  - Install water flow meters (Mechanical or Electronics) on borewell for quantity per day water consumption.
- **WASTE WATER TREATMENT PLANT**
  - There is requirement to install sewerage treatment plant (STP) for waste water generated from various activities in college. All waste water generated from drinking, washing is collected in separate tank and it should be treated in propose STP plant.
- **DRIP WATER IRRIGATION SYSTEM.**
  - Use drip water irrigation system for trees and plants.
- **WATER SPRINKLER SYSTEM**
  - There is good potential to install water sprinkler system for garden area in college. It will be reduced water consumption of college.
- **USE EFFICIENT WATER TAPS**
  - Water saving taps either reduce water flow or automatically switch off to help save water. So, it is highly recommended to install efficient water taps in college to reduce water consumption.

- **USE EFFICIENT URINAL TAPS.**
  - Replacing these inefficient fixtures with water sense labelled flushing urinal can save between 0.5 to 04 litres per flush without sacrificing performance. Installing water saving flushing urinal will not only reduce water use in facilities but also save pumping energy on water bills.

- **INSTALLATION OF WATER OVERFLOW SENSOR IN TANKS**
  - It was observed that water overflow in overhead tanks after tank filling. So, it is recommended installation of water overflow sensor to avoid water overflow.

OTHER SUGGESTIONS.

Some of the very important suggestions are: -

- Establish institutional ecology policy and set an example of environmental responsibility and practices of resource conservation, recycling, waste management.
- Involve all stakeholders and encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in water conservation and sustainable development.
- Collaborate for interdisciplinary approaches to develop curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- Arrange training programmes on water management system and nature conservation.
- Conduct seminars, workshops and exhibitions on water and environmental education.

CHAPTER-1
INTRODUCTION

1.1 About College: -

Anwarul Uloom College (Autonomous) was established in 1953. The Anwarul Uloom College under the Aegis of Anwarul Uloom Educational Association. The Anwarul Uloom College is an institute of knowledge, learning, excellence and humility, the institution with a vision of imparting education & empowering minority. This institution is with an adherence to principles. Anwarul Uloom College is an institution with a great history and achievements, exemplary students from this institution have taken stride in the concept of education taking it forward to the next level by placing it on the global map with virtue and integrity.

The privilege of being The Largest Autonomous Minority Serving Institute in Telangana as one of its many feats including the distinction of glorious 109 years celebrations of its establishment - the noble act which is surely the stuff of dreams is achieved by Anwarul Uloom College. The meticulous institute has boarded the train of success and achieved this colossal feat with the hard work, determination and vision of its management and students and has vowed to never slow down its trail of achievements in the years to come..

Anwarul Uloom College is an Autonomous institution Affiliated to O.U the institution was granted autonomy by UGC in the year 1989. Anwarul Uloom College also have an accreditation with A+ Grade by NAAC- in May 2023. The Institution runs a CBCS with Semester System pattern. Anwarul Uloom College has crafted an environment keeping in mind student requirements and market demand with a shift system to help them master theory concepts and strategies as well as develop and hone their skills in the field of corporate culture. Situated in the heart of the city with a sprawling 3 acre campus, spacious class rooms, laboratories, library, reading rooms conference halls , offering advanced courses such as BBA, BBM, BBA Artificial intelligence & Data Science, training students in various aspects of personal growth and providing detailed and upgraded training modules for group 1 and 2 exams.

Anwarul Uloom College is located in the heart of the city on the main road at Mallepally Hyderabad.

The academic quality of college life is enhanced by the provision of the best faculty and all possible infrastructural facilities for the benefit of the student community of minority community and other communities.

Under the Business Finance and Commerce, there are a total of 6 courses. The Under Graduate category has 5 courses which are B.Com., B.Com. (Computer), B.Com. (E - Commerce), B.Com. (Hons.) and many more. For Post Graduate studies, M.Com. is the only course taught.

Under the Management Studies, 1 course is available. For Under Graduate studies, BBA is the only course taught .Under the Science and Mathematics, there are a total of 9 courses. For Under Graduate studies, B.Sc. and B.Sc. (Computer Science and Engg.) are available for enrolment. Under the Post Graduate studies, 7 courses are taught which are M.Sc. (Information Systems), M.Sc. (Botany), M.Sc. (Chemistry), etc.

Vision: -

To provide skill-based quality higher education by striving continuously for excellence in educational service to all sections of the society especially the minority students who are socially, economically and academically under privileged with the focus on empowerment of youth to contribute constructively towards the national goals by upholding the values of secularism, national integration and social commitment".

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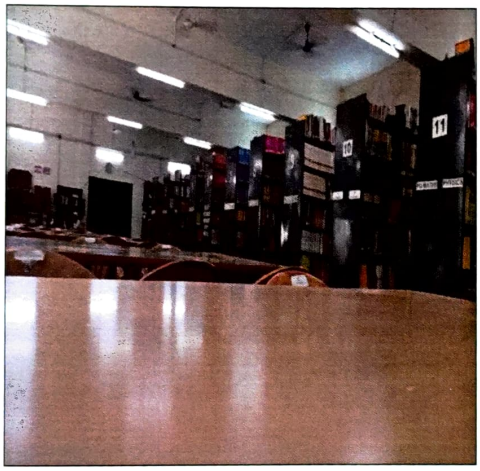
Mission:

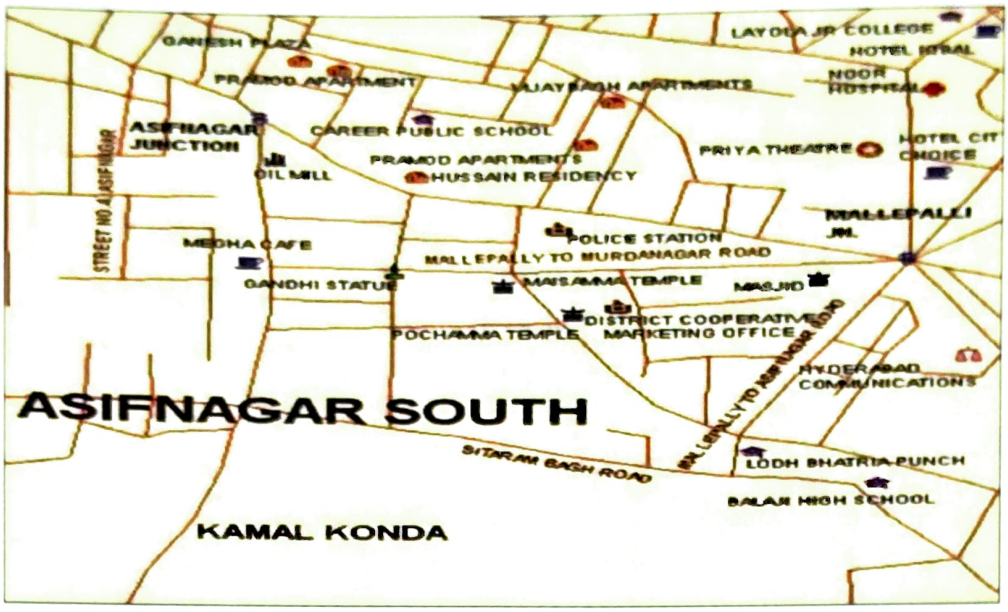
To provide higher education for empowerment of youth of Telangana State especially the marginalized people has been the main thrust of this college. The institution is committed to the under-privileged of the society and students with high potential facing difficult socio-economic circumstances, so as to bring them at par with mainstream. Our mission is to impart quality education and exposure for the holistic development of students and equip them to cope with the latest requirements, through innovative techniques and practices.

1.2 About College Campus:

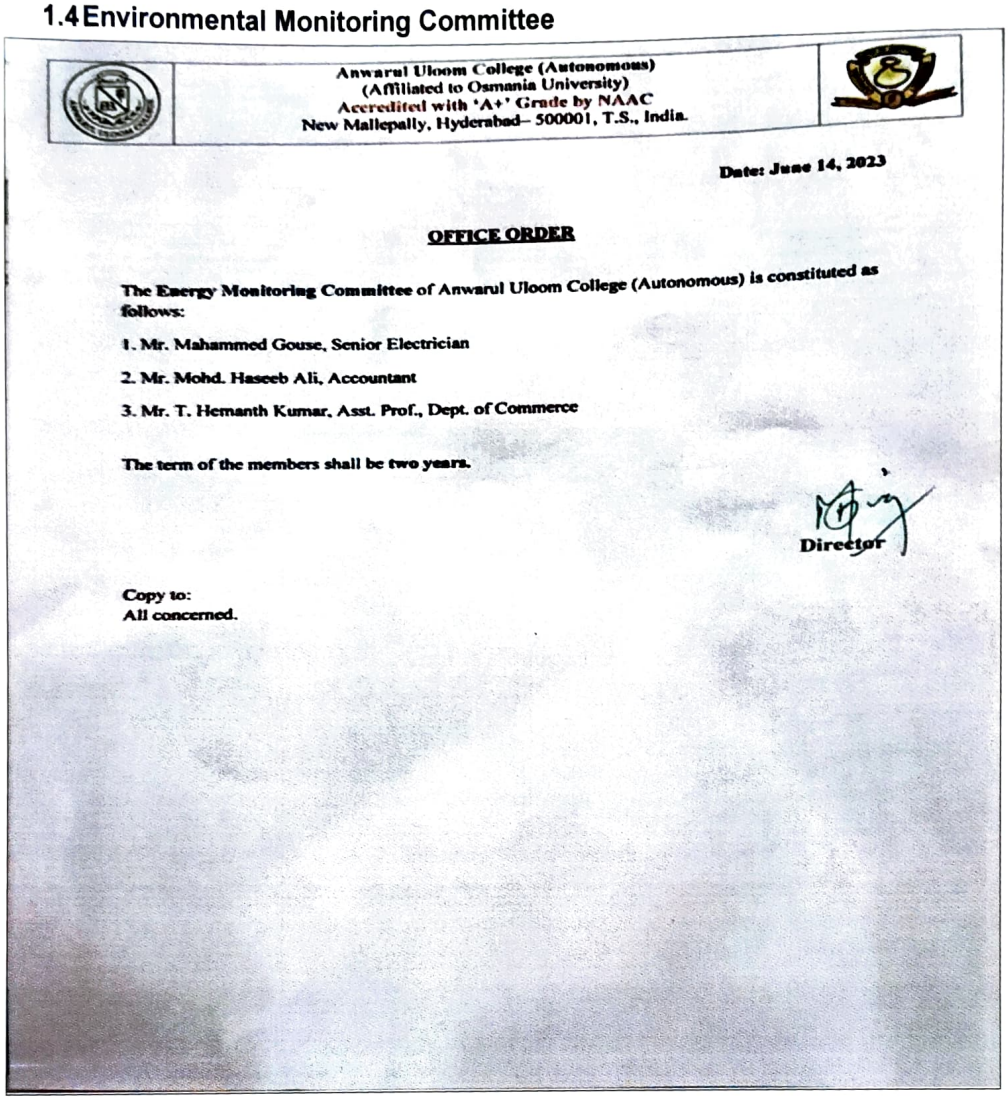
The college is housed in a five different blocks with total built up area of around 35,000 Sq Ft. The total area of the campus is 3,221 Sq Mtrs.



1.3 Layout of College Buildings: -



1.4 Environmental Monitoring Committee



Anwarul Uloom College (Autonomous)
(Affiliated to Osmania University)
Accredited with 'A+' Grade by NAAC
New Mallepally, Hyderabad– 500001, T.S., India.

Date: June 14, 2023

OFFICE ORDER

The Energy Monitoring Committee of Anwarul Uloom College (Autonomous) is constituted as follows:

1. Mr. Mahammed Gouse, Senior Electrician
2. Mr. Mohd. Haseeb Ali, Accountant
3. Mr. T. Hemanth Kumar, Asst. Prof., Dept. of Commerce

The term of the members shall be two years.

Director

Copy to:
All concerned.

1. 5 Environmental Audit Team

The study team constituted of the following senior technical executives from **Empirical Exergy Private Limited,**

- **Mr. Rakesh Pathak**, [Director]
- **Dr. Suresh Soni** [Reviewer]
- **Mrs. Laxmi Raikwar Singadiya**,[Energy Engineer]
- **Mr. Charchit Pathak** [Asst. Project Engineer]
- **Mr. Ajay Nahra,** [Site Engineer]

1.6 About Water Auditing

Environment audits can be a highly valuable tool for institute in a wide range of ways to improve their energy, environment and economic performance. while reducing wastages and operating costs. Water audits provide a basis for calculating the economic benefits of water conservation projects by establishing the current rates of water use and their associated cost.

1.7 Objectives of Environment audit

The general objective of water audit is to prepare a baseline report on water conservation measures to mitigate consumption, improve quality and sustainable practices.

The specific objectives are:

- To monitor the water consumption and water conservation practices.
- To assess the quantity of water, usage, quantity of waste water generation and their reduction within the college.

1.8 Target Areas of Environment audit

This indicator addresses water sources, water consumption, irrigation, storm water, appliances and fixtures aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

1.9 Methodology followed for conducting Environment audit

Step 1: Walk through survey

- Understanding of existing water sourcing, storage and distribution facility.
- Assessing the water demand and water consumption areas/processes.
- Preparation of detailed water circuit diagram.

Step 2: Secondary Data Collection

- Analyse historic water use and wastewater generation
- Field measurements for estimating current water use
- Metered & unmetered supplies.
- Understanding of "base" flow and usage trend at site
- Past water bills
- Wastewater treatment scheme & costs etc.

Step 3: Site Environment Audit Planning (based on site operations and practices)

- Preparation of water flow diagram to quantify water use at various locations
- Wastewater flow measurement and sampling plan

Step 4: Conduction of Detailed Environment Audit & Measurements

- Conduction of field measurements to quantify water/wastewater streams
- Power measurement of pumps/motors
- Preparation of water balance diagram
- Establishing water consumption pattern
- Detection of potential leaks & water losses in the system
- Assessment of productive and unproductive usage of water
- Determine key opportunities for water consumption reduction, reuse & recycle.

Step 5: Preparation of Water Audit Report

- Documentation of collected & analysed water balancing and measurement details
- Projects and procedures to maximize water savings and minimize water losses.

CHAPTER- 2
WATER CONSUMPTION AND WASTE WATER SOURCES

2.1 Details of Source of Fresh Water and Use Areas

The main source of freshwater is Borewell for the college. The freshwater is mainly used for drinking, housekeeping, gardening, domestic activity and new construction project. Details of the pumps are given in table.

Table:2.1 Details of Fresh water sources

Sr. No	Source of Water	Depth (ft/m)	Type of Pumps	Rated (HP)
1	Bore well -01	170ft	Submersible	5 kW
2	Bore well-02	200ft	Submersible	3 kW

Figure: - 2.1 fresh water supply from Borewell for College campus

2.2 Water use areas in College Campus

Water is preliminary used for drinking, domestic, gardening and clinical activity. Audit team visited various departments and buildings to determine appliances.

2.3 Fresh Water uses for Gardening

College has installed drip irrigation system in Stadium and Sport ground. **Its Appreciable** The one of major contribution from fresh water consumption is watering for other plants in college campus. There is good potential for water saving by adopt "Automatic Watering 360 adjustable misting nozzle irrigation Dripper's system" for plants. adjustable drip irrigation tools to provide different amounts of water depending on the water requirements of different plants. The drip speed can be set as for indoor and outdoor plants.

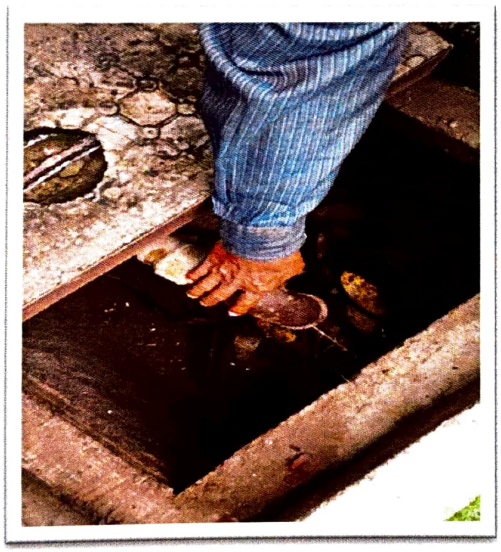
Adjustable Misting Nozzle Irrigation Drippers

Automatic Water Timer Unit

Fig: Technology for Drip Water Irrigation for plant

2.4 Water metering system

It is observed that there is requirement of water flow meters on bore well quantify per day ground water extraction from different locations.



2.5 Waste Water Generation sources: -

Water Quality Assessment:

To cater the water requirement for the campus, two bore wells and one open well water are used for the activities. However in summer, to cater the additional shortage of water, a tanker from outside are hired to satisfy the needs of campus activities. The total quantity of water required for drinking is assessed for a population of 5000 students is assessed as 25000 liters per day. For hygienic drinking water, RO plants are installed in each block. In order to provide portable drinking water there are 10 RO's at various locations in the campus. Civil Engineering department tests the water every month. Once in six months the water is tested by Iota Laboratories, Hyderabad. The committee inspects the working of filters monthly and the quality of water is verify for suitability once in three months.

2.6 Recycling of waste water:

(The wastewater developed in college campus is treated in campus and is used for watering of garden. The institute does not have a Sewage Treatment Plant (STP). It is suggested to install a STP with the capacity of 2, 10,000 liters capacity per day.) Transferred to suggestion.

The quantity of wastewater generated in the campus should be assessed as per IS standards (**IS 9868/1981**) are given below

The Demand of Water for Anwarul Uloom College Campus

S. No.	Location	Student strength	IS demand	Water Quantity
1	Canteen	1000	180 lpcd	180000 lpcd
2	Institute	5000	45 lpcd	225000 lpcd
			Total	**405000 lpcd**

The sewage treatment plant is not available may be considered by the college authorities for installation. Their services include viz.,

a) They shall provide skilled operators for all three shifts to operate monitor and ensureconsistent performance of the STP.

b) They shall monitor activities of STP and report the same to his Plant Engineer regularly with all the necessary supporting documents like plant Log sheet, checklist etc.

c) They shall provide all necessary chemicals.

d) They shall carry out the cleaning of tanks, Sludge drying beds as and when required.

e) They shall provide the lubricants and consumables required during operation and maintenance of the STP.

f) They shall carry out preventive maintenance of the equipment as per schedule.

g) All repairs like rewinding of motors, repair of gear boxes, pumps spares and blower, accessories, bearings, lobes will be carried out by you. However the spares required will be provided by NMIT.

h) It will be their responsibility to maintain clean and tidy environment surrounding STP area.

i) It shall be their responsibility to test the treated water sample (only one sample in a month) in a KSPCB approved Lab and get the report for monthly report to KSPCB.

j) It shall be their responsibility to prepare and submit the Consent Application for water, Air and Hazardous waste every year. (Consent fees and other KSPCB Expenses will be met by Client).

k) Their personnel who stay in the campus shall take security clearance and shall abide by the college rules and discipline.

Even though the firm tests the water sample every month, the department of Civil Engineering will analyze the water once in six months to oversee the activities of the contractperson.

CHAPTER- 3
RAIN WATER HARVESTING SYSTEM

3.1. Rain water harvesting systems

The rainwater harvesting is a technique to capture the rainwater when it precipitates, store that water for direct use or charge the groundwater and use it later.

There are typically four components in a rainwater harvesting system:

- Roof Catchment.
- Collection.
- Transport.
- Infiltration or storage tank and use.

If rainwater is not harvested and channelized its runoffs quickly and flow out through storm-water drains. For storm-water management the recharge pits, percolation pits and porous trenches are constructed to allow storm water to infiltrate inside the soil.

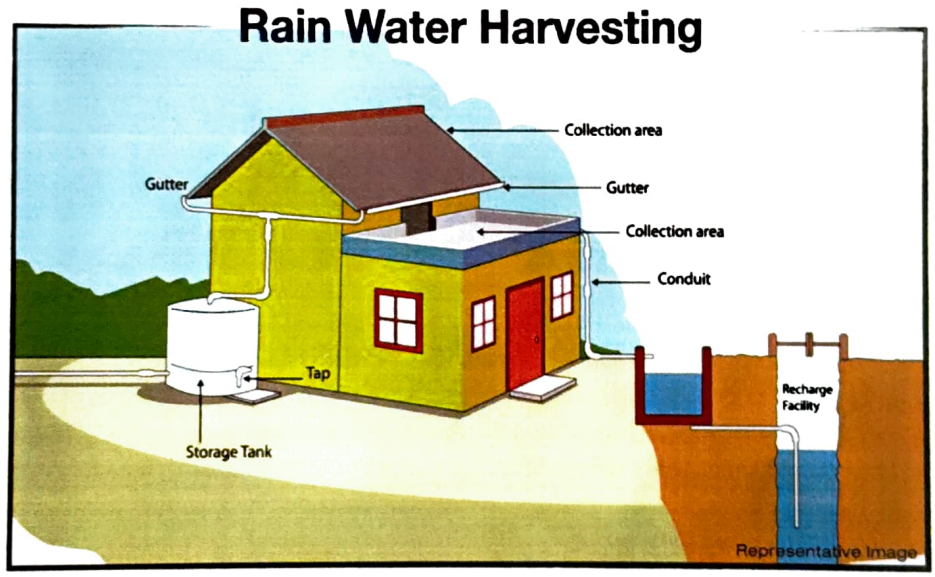
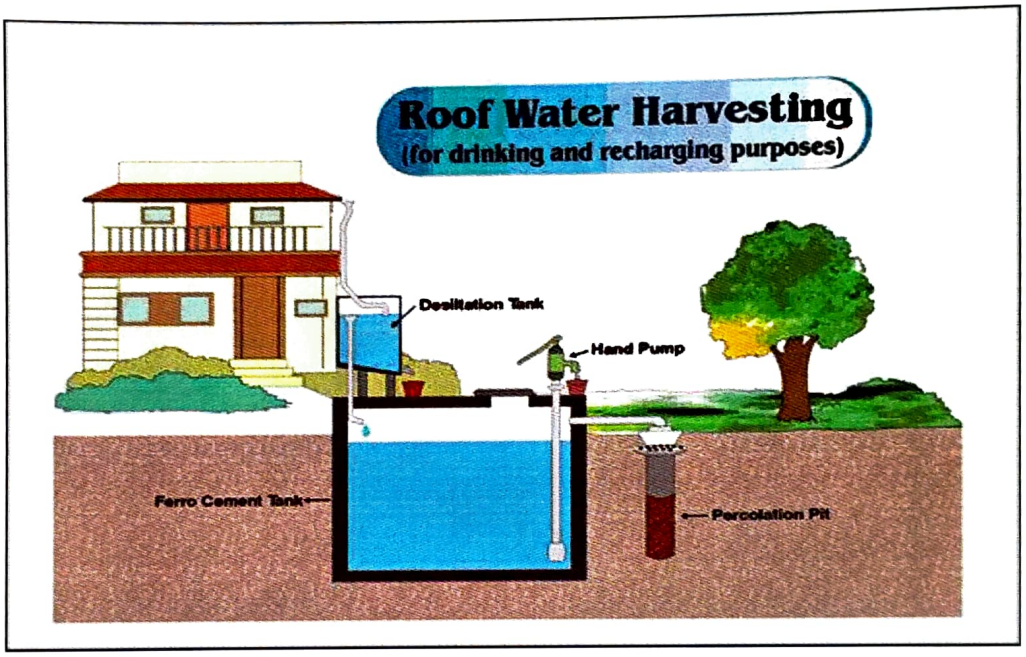


Figure: - 3.1 Components of a rooftop rainwater harvesting system

3.2 Rainwater Harvesting Potential of the college:

The college has total build-up area is about 3,221 m^2.The average annual rain 2.07 m and runoff coefficient 0.88 is considered for commercial building. Accordingly, above figures and consideration, estimated rainwater harvesting potential for the college is about **5,867 m^3/year**. The following Mathematical Equation is used for the calculation.

RWH Potential = Rainfall (m) x Area of catchment (rainfall m^2) x Runoff coefficient



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End of the Report

Thanks