7.1.6 Quality audits on environmental and energy regularly undertaken by the Institution.

INDEX

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY SURAMPALEM

Principal
PRINCIPAL
Aditya College of Engineering
& Technology
SURAMPALEM-533437

GREEN AUDIT REPORT

2020-2021

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY (ACET)

Prepared BY

Global Green Solutionz

Global Green Solutionz
509, Block A, Emerald Heights, Annojiguda, Hyderabad-500088
Tel: +91-7331134789;
Email: globalgreensolutionz@gmail.com;
www.globalgreensolutionz.in

CONTENTS

Acknowledgement

Global Green Solutionz (GGS) is thankful to the management and staff of Aditya College of Engineering& Technology for awarding Green Audit for their college at Surampalem, East Godavari, Andhra Pradesh.

The Study team members of Global Green Solutionz would sincerely like to thank all the Department Heads and support staff members of Aditya College of Engineering & Technology for providing the necessary support in order complete the green audit.

For Global Green Solutionz

M. Srikanth

GLOBAL GREEN SOLUTIONZ HYDERABAD

Srikanth Meesa,
CEO, Global Green Solutionz

INTRODUCTION

The term "Green" means eco-friendly or not damaging the environment. This can acronymic ally is called as "Global Readiness in Ensuring Ecological Neutrality" (GREEN). Green audit was initiated in the beginning of 1970s with the motive of inspecting the work conducted with in the organizations whose exercises can cause risks to the health of inhabitants and the environment. It exposes the authenticity of the proclamations made by multi-national companies, armies and national governments with the concern of health issues as the consequence of environmental pollution Green Audit is one of the systematic audits to assess the impact of the institutions on the environment with respect to land, air, water, solid waste, noise etc. In order to conduct the green audit a systematic identification, recording, reporting and analysis is essential. The objective is to analyze environmental practices within and outside of the concerned facilities, which will have an impact on the eco-friendly ambience. Green audit is one of the useful tools for a college to determine how and where they are using the vital resources such as energy, water etc. Thus, it provides the opportunity to identify the potential options to conserve these precious natural resources. the college can then consider how to implement changes and make savings. It also includes the determination of various types of wastes and how to manage them effectively without polluting the environment. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding and encourages them to cultivate the green practices in the campus. It is the need of the hour for the colleges to evaluate its own contributions toward a sustainable future. Environmental sustainability has become one of the pressing issues for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological impacts. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric carbon-di-oxide from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report.

OBJECTIVES:

The main objective of the green audit is to promote the Environment Management and Conservation in the College Campus. In recent time, the Green Audit of an institution has been becoming a paramount important for self-assessment of the institution which reflects the role of the institution in mitigating the present environmental problems. The college has been putting efforts to keep our environment clean since its inception. But the auditing of this non-scholastic effort of the college has not been documented. Therefore, the purpose of the present green audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

The main objectives of carrying out Green Audit are:

- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use of the campus
- To map the Geographical Location of the college
- To record the meteorological parameter of Surampalem where college is situated.
- To estimate the Energy and water requirements of the college
- To document the Waste disposal system
- To document the ambient environmental condition of air, water and noise of the college
- To introduce and aware students to real concerns of environment and its Sustainability.

METHODOLOGY:

It is the duty of the originations to carry out the green audits of their on-going process for various reasons such as; to make sure whether they are performing in accordance with relevant rules and regulations, to improve the procedure and ability of materials, to analyze the potential duties and to determine a way in which can lower the costs and add to the revenue. Through, green audit, one gets a direction as to how to improve the condition of the environment and there are various factors that have determined the growth of carrying the green audit.

Green audit is assigned to the criteria 7 of NAAC, National Assessment and Accreditation council which is a self-governing organization of India that declares institutions as Grade A, Grade B and Grade C, according to the scores assigned at the time of accreditation.

The Intention of Green Audit is to upgrade the environment condition in and around the institutes, colleges, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn it into better environmentally friendly institute.

<u>Step Under Green Audit</u>:

- **Plan the audit:** Green auditing related data was collected during November 2021
- **Select the audit team:** ACET has hired Global Green Solutionz (GGS) to conduct the green audit. GGS has appointed a is well qualified team that has good knowledge in the field of environment.
- **Schedule the audit facility:** The audit facility is the ACET campus including the connected hostels.
- **Acquire the background information:** GGS team has interviewed the appointed green audit coordinators from ACET college. They have submitted the relevant data related to landscaping, built up area, energy and water related data which are part of the report.

Benefits of Green Audit:

- To Shield the environment
- To recognize the cost saving methods through waste minimizing and managing
- To point out the prevailing and forthcoming complications
- Authenticate conformity with implemented laws
- Empower the organizations to frame the better environmental performance
- It portrays the good image of the institution which helps building better relationships with group of stakeholders

ABOUT THE COLLEGE

Aditya College of Engineering& Technology was founded as the premier promoter of quality education in coastal districts of Andhra Pradesh in 2008 under Sarojini Educational Society. Sri N. Sesha Reddy, as a founder chairman, promoted the educational institution, with a mission, to offer the best engineering education with unmatched innovations in the process of teaching and learning by aiming at the all-round development of the students.

The College is situated in an eco-friendly area of 10 acres with thick greenery at Surampalem, Gandepalli Mandal, East Godavari District, Andhra Pradesh. The College is 15 KM away from Samalkot Railway Station on Howrah-Chennai Railway line in South Central Railway. The College is 35 Km away from Kakinada and Rajahmundry on ADB Road.

The College has three academic blocks with a total carpet area of 44,524 Sq. Mts. apart from a boys hostel. The particulars of academic buildings and the departments / offices accommodated are as follows.

S.No	Building Name	Department/Office
1	Vishweswarayya Bhavan	Administrative Office, Examination Cell, Accounts, Admission Office, ECE, CSE, IT, MBA, M.Tech, MCA and Transport Office.
2	CV Raman Bhavan	EEE, Mechanical, Civil and M.Tech

The college proudly offers 6 UG and 8 PG programmes in engineering, MCA, MBA with 15 years of rich standing in the educational era. Besides, the college has added many feathers in its cap which include AA+ Grade by Careers 360, South India 4th rank by Digital Mailers, South India 6th rank by Silicon India, 13th rank out of top 25 engineering colleges by 4Ps, a niche in Asia top 100 colleges by WCRC leaders, Best Placement Award by ASSOCHAM, All India 98th rank-DQ CMR top T-School survey by DATA Quest and 13th position in Top 20 colleges of India by the Sunday Indian. These districts recognitions speak volumes of the institute's objective to promote engineering excellence. The total student strength is 3080 with faculty strength of 212 thus giving rise to healthy faculty student ratio.

It is approved by AICTE, recognized by Govt. of Andhra Pradesh, Permanently affiliated to Jawaharlal Nehru Technological University Kakinada (JNTUK). The college also

received UGC recognition under Sections 2(f) & 12(B) of the UGC Act.

Aditya College of Engineering& Technology will do its best to offer an innovative environment wherein your dreams will be realized: dreams for higher knowledge, dreams for scientific inquiry, dreams for technology creation, dreams for co-curricular activities, and dreams to change the world.

Under Graduate Courses:

- B.Tech Civil engineering
- B.Tech Electrical and Electronics Engineering
- B.Tech Mechanical Engineering
- B.Tech Electronics and Communication Engineering
- B.Tech Computer Science and Engineering
- B.Tech Information Technology

Post Graduate Courses:

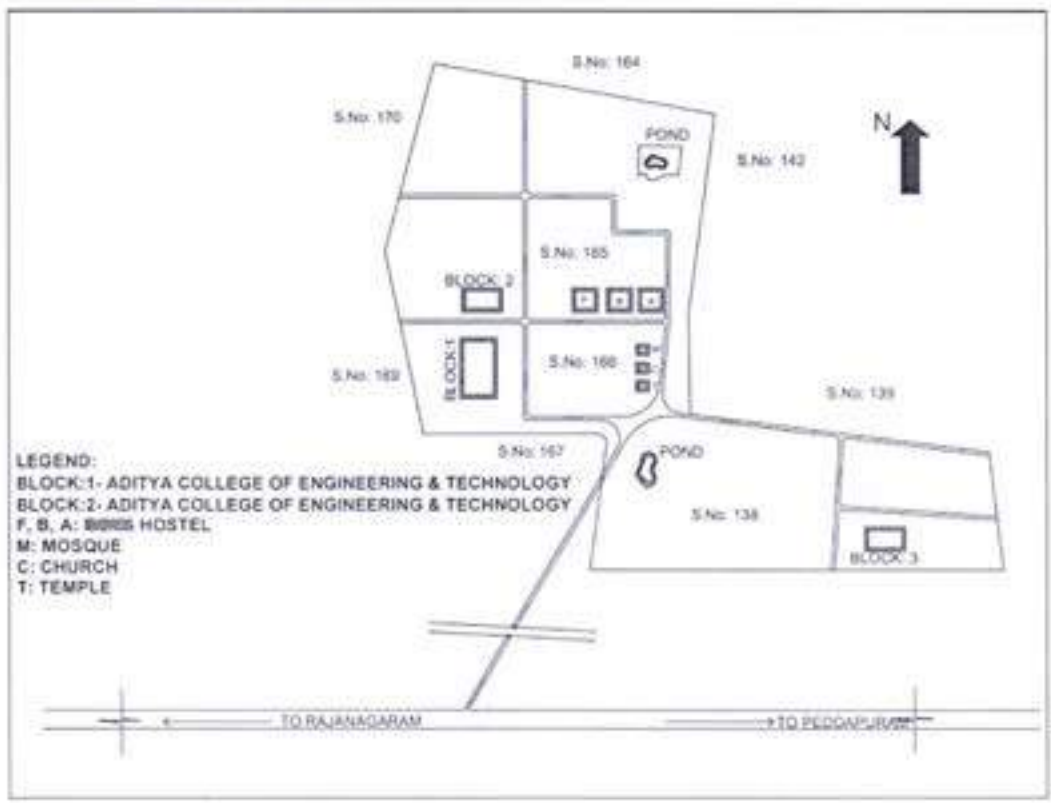
- M.Tech Embedded Systems
- M.Tech Computer Science & Engineering
- M.Tech Power Electronics
- M.Tech Thermal Engineering
- M.B.A Master of Business Administration
- M.C.A Master of Computer Application

LAND USE ANALYSIS, ACET COLLEGE, SURAMPALEM, ANDHARA PARADESH (2021)

GENERAL OVERVIEW OF THE CONCEPT OF LANDUSE:

Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. It refers the activities and the various uses which are carried on and derived from land. Viewing the earth from space, it is now very crucial in man's activities on natural resource. In situations of rapid changes in land use, observations of the Earth from space give the information of human activities and utilization of the landscape (Howarth 1981).

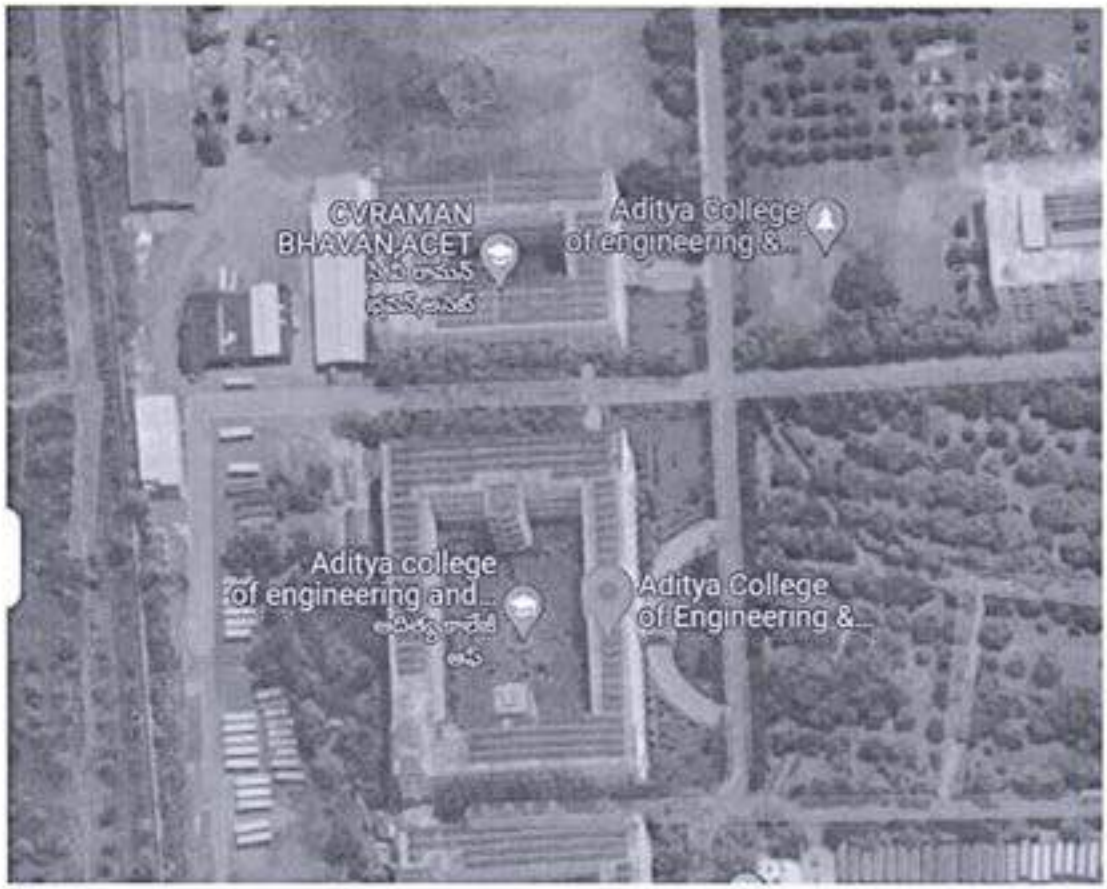
The collection of remotely sensed data facilitates the synoptic analyses of earth system, functions, patterning, and change in the local, regional as well as at global scales over time. Satellite imagery particularly is a valuable tool for generating land use map using google maps.



Site layout map of Aditya College of Engineering&Technology (ACET)

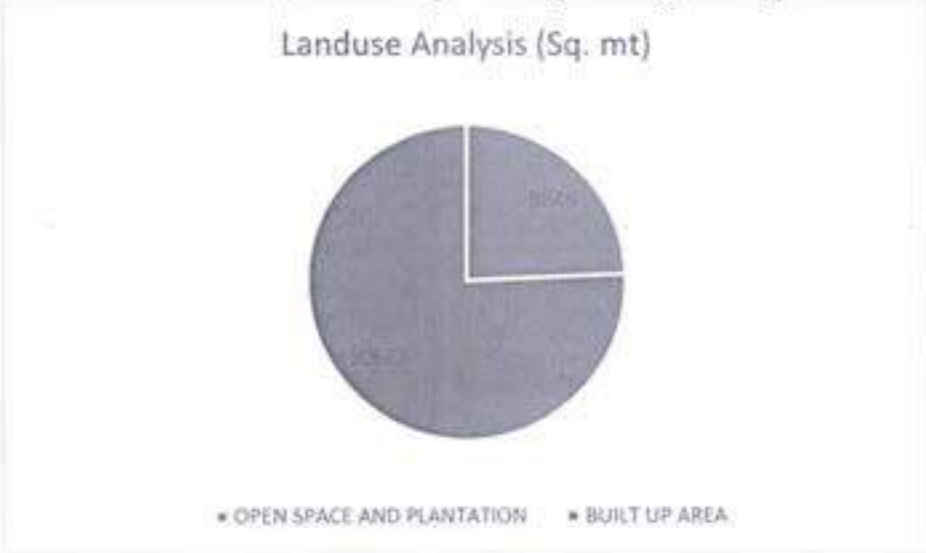
METHODOLOGY ADOPTED FOR LAND USE MAPPING

Three types of data that are GPS points, field survey data and Google earth data for Georeferencing have been used in this study. Land use map of the study area have been prepared using the above three types of data with the help of google maps.



LAND USE DATA OF ACET COLLEGE, Surampalem

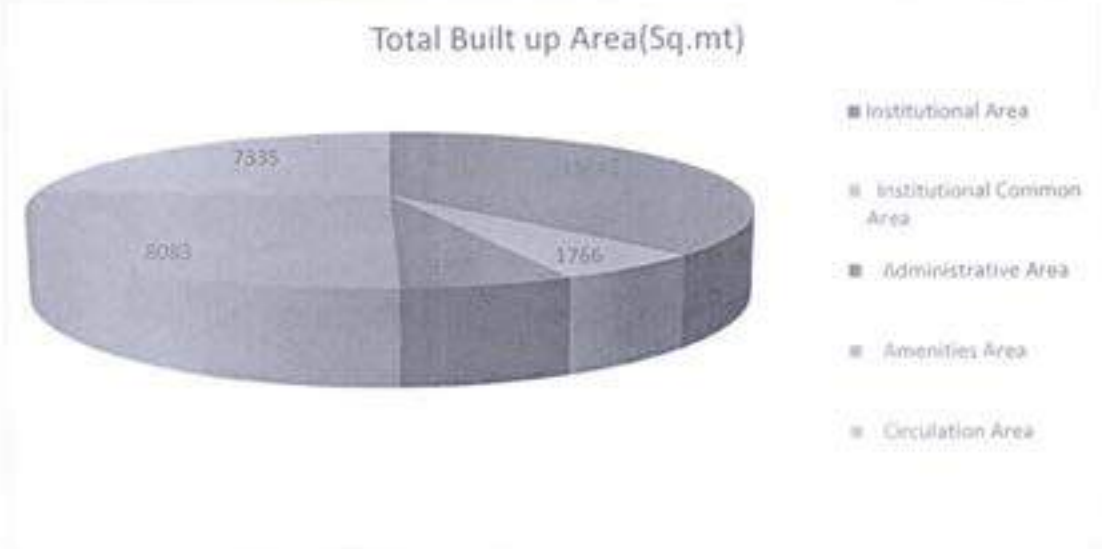
CATEGORIES OF LAND USE	AREA IN SQ METRES
OPEN SPACE AND PLANTATION	9846
BUILT UP AREA	30622
TOTAL AREA	40468



The total area of ACET College is 40,468 sq. meters out of which the built-up area is 76% (i.e., 30622 sq. meters) and open space & plantation area is 24% (i.e., 9846 sq. meters).

LAND USE (BUILT UP AREA) ANALYSIS:

CATEGORIES OF LAND USE (BUILT UP AREA)	AREA IN SQ METRES
Institutional Area	11443
Institutional Common Area	1766
Administrative Area	1995
Amenities Area	8083
Circulation Area	7335
TOTAL AREA	**30622**



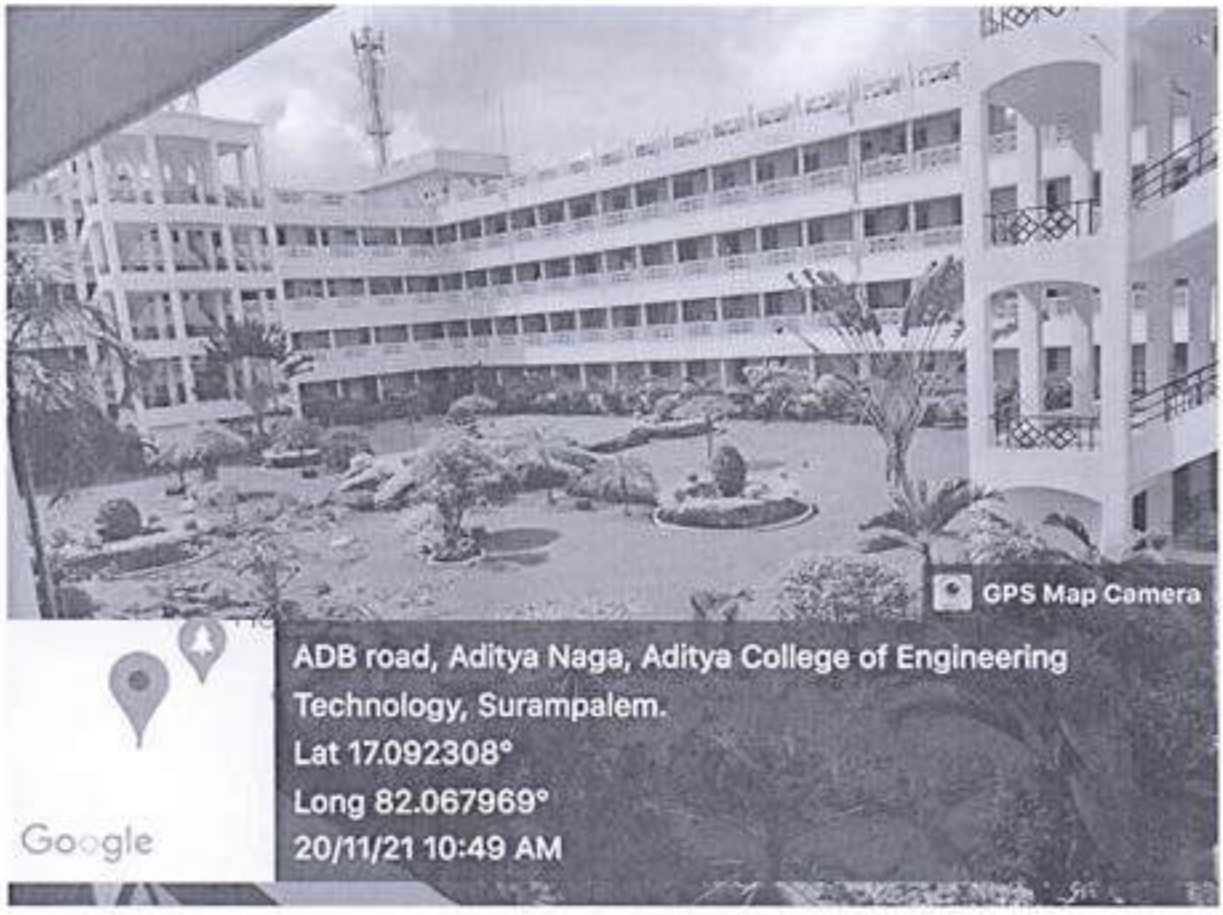
The institutional area sums up to 11443 sq. meters, followed by institutional common area is 1766 sq. meters. Administrative Area is 1995 sq. meters. The amenities occupy about 8083 sq, meters and circulation area is about 733 sq. meters.

ACET College, which was established in the year 2008, has an eco-friendly environment. It has a long legacy of healthy environmental practices including periodic plantation, their preservation and maintenance. Its land use is such that about 24 % of the total area is occupied by open land and plantation that generates a better and sustainable campus environment.

TREE DIVERSITY OF ACET COLLEGE, Surampalem

ACET College is within the geo-position between latitude 17° 5' 26" N, and longitude 82° 4' 1" E at Surampalem, 30 Km from Kakinada city India. It encompasses an area of about 180 acres of greenery in Surampalem. The area is immensely diverse with a variety of tree species performing a variety of functions. Most of these tree species are planted in different periods of time through various plantation programmes organized by the college management and have become an integral part of the college.

The trees of the college have increased the quality of life, not only the college fraternity but also the people around of the college in terms of contributing to our environment by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, controlling climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer. We often make an emotional connection with these trees and sometime become personally attached to the ones that we see every day. Thus, the college has been playing a significant role in maintaining the environment and its surrounding areas.



ACET campus is having total green area of **9846 m²**

S.No.	component	Area in m²
1	Lawn	3265

2	Tree cover	2148
3	Potted plants	2188
4	Shrubs and hedges	2245

Below stated information is provided by the college management team:

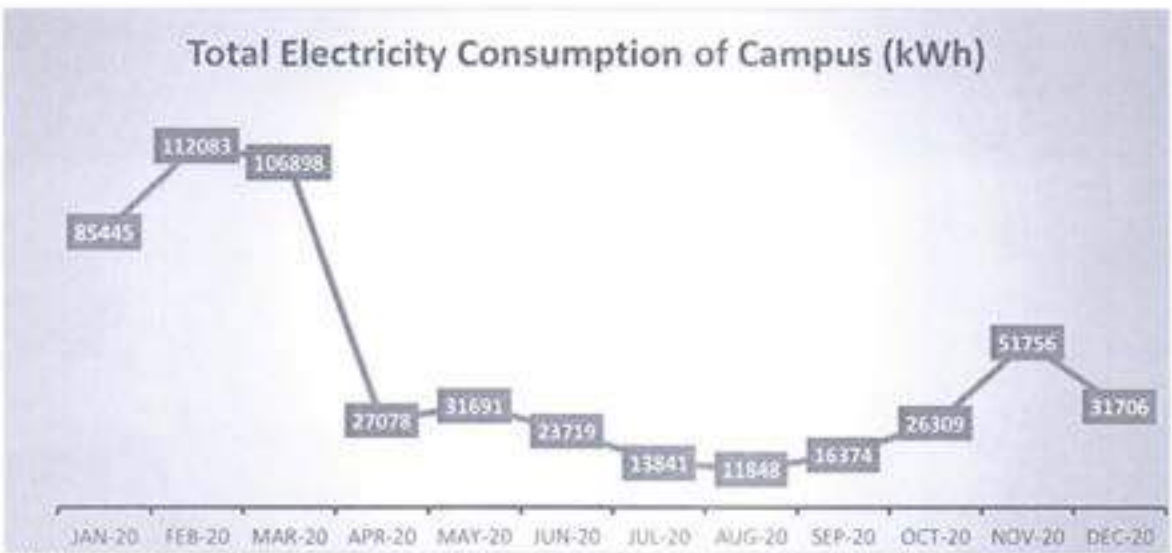
- ACET campus has a beautiful garden area. The garden has different sections in which specific types of plants are planted with respect to their medicinal importance and Vedic reference. Boards are displayed for each section and plants names. Sprinkler system is provided in herbal garden.
- Large trees and potted plants were seen in the campus. Plantation improves aesthetics and helps as buffer in reducing noise level, maintaining temperatures of the area. As informed by the garden supervisor, around 80 trees are present in the campus.
- Garden is managed by gardener. Organic fertilizers and pesticides are used for plants if necessary.

ELECTRICAL POWER CONSUMPTION AT ACET COLLEGE

Total Energy consumption: At ACET College, being one of the reputed colleges in the Andhra Pradesh consumed on an average 44895 kWh (units) of electricity per month which turns out to be 538748 kwh during 2020.

Monthly Power Demand:

Total power consumption graph during the last calendar is provided below:



Variation in the grid power consumption per month is provided in the below graph:

Renewable energy: There is a Rooftop solar PV System of 500 KW capacity has been installed to cater to the energy needs of the college.

The college has also started using clean energy since 2018 from the 500 KW solar power plant installed near the college. It has produced 657408 units of clean energy during 2020.

WEATHER DATA OF Kakinada: ACET COLLEGE

Month-wise weather data of Kakinada City (30 Km from Surampalem ACET) For the year 2020

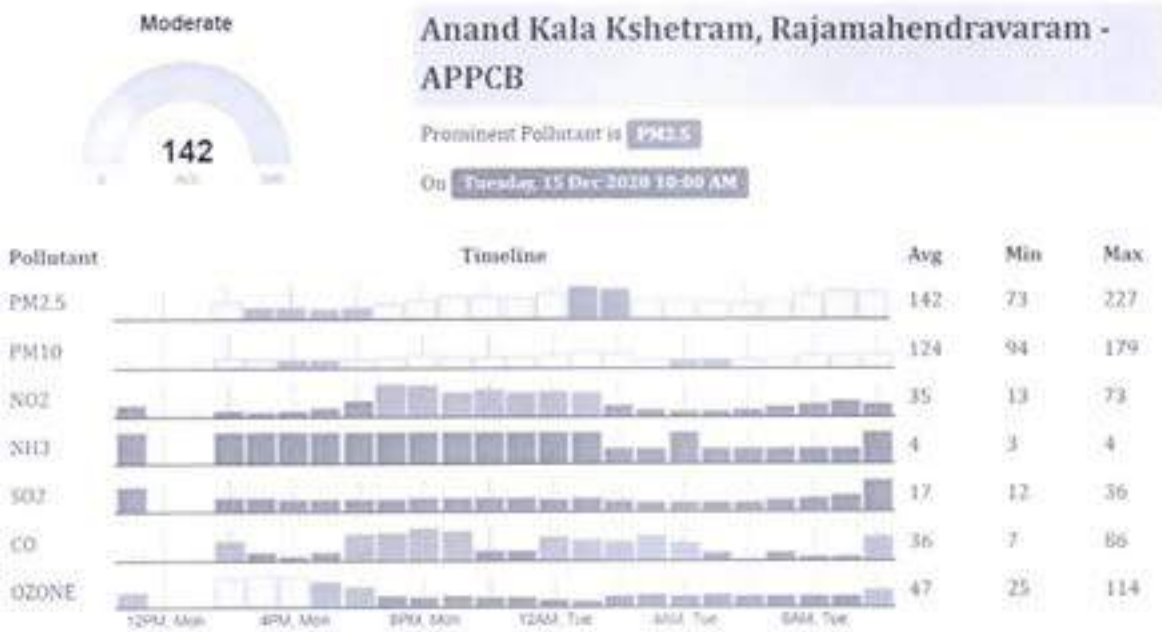
Month	Max Temp (C^0)	Min Temp (C^0)	Precipitation (mm)
January	34.6	20.3	12.6
February	37.8	21.7	10.3
March	40.0	24	7.5
April	42.8	26.2	16.4
May	46.9	27.8	42.3
June	47.4	27.3	122.8
July	41.7	26.2	175.4
August	38.4	25.9	176.9
September	37.9	25.9	199.4
October	37	24.8	243.
November	35.9	22.5	98.8
December	34	20.3	10.7

From the above table, it is evident the temperature is high in the month of June and low in the month of December. The rain fall is high during the month of September and low in the month of February.

AIR QUALITY IN KAKINADA: ACET COLLEGE

The climate of ACET college campus located at Surampalem near Kakinada city outskirts. It was noticed the college is away from the bustling city Kakinada and the campus is fully green with many trees and plantations.

Air Quality determination
Satisfactory: Air quality index (OVERALL 62) in **Rajamahendravaram weather station (34 km from Surampalem), India**



The air quality index is found 142 as per the publicly available data for the month December 2020. This indicates moderate air quality. However, as the ACET campus is surrounded by greenery and plantation the air quality is of much better quality.

Indoor Air Quality:

The interviews with the college staff have revealed the below:

- During day- time Air Quality Index (AQI) of 45-60 because of campus greenery
- In kitchens present in Cafeteria, LPG is used for cooking which is a clean fuel.
- In classrooms the mode of ventilation is natural draft (through windows) and is enhanced by fans. Large windows and cross-ventilation are observed in corridors. Air conditioners are used in some offices, computer laboratories and computer server room.
- Exhaust fans are provided in chemistry laboratory and all kitchens.

WATER ANALYSIS REPORT OF ACET COLLEGE

ACET consumes the ground water which is stored in the overhead tanks. The campus 120 KL and 40 KL overhead tanks to meet the water needs of the institute. Further, the A and B hostels have 35 KL and 10 KL overhead tanks.

It was informed that there is 2000 Liters per hour of Reverse Osmosis plant. It was observed the RO plant is working efficiently.

Green audit team noticed that the drinking water quality was found good and potable.

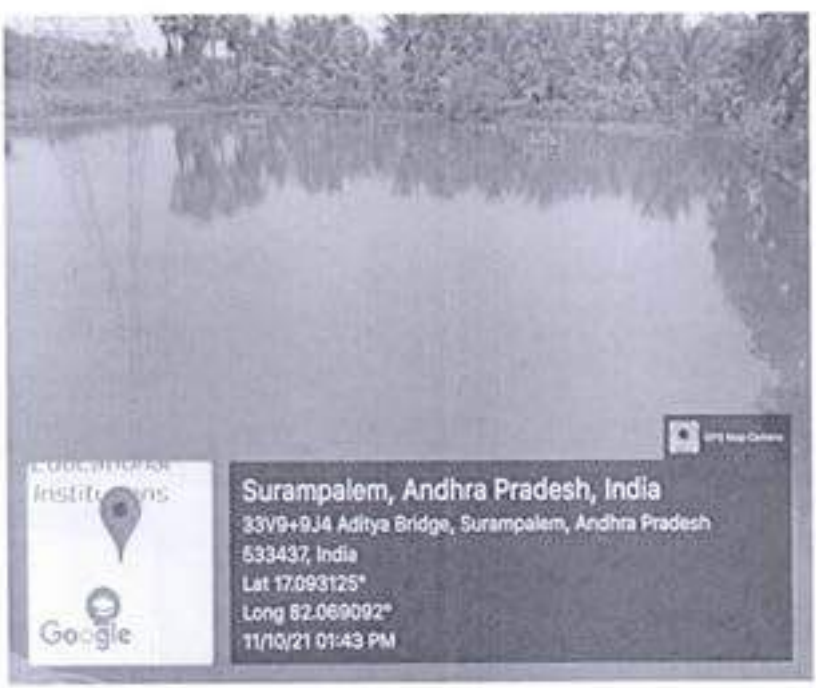
Green audit team has noticed that there is a water harvesting pit where the RO reject is used to recharge the ground water. Approximately 40% of the water entering the RO water gets rejected which is used to recharge the ground water.

Wastewater: Wastewater is mainly generated from toilet flushing and kitchens. Wastewater generated from academic blocks as well as hostels is collected in septic tanks and passed to surrounding trees and plants through canals.

Rainwater harvesting:

Rainwater collected from building roofs is gathered in the building blocks' interior gardens. Some rainwater is directly absorbed into the ground, while some is used for vegetation development. The majority of the precipitated water was channeled to the inner garden area's outlet, where it entered the combined drainage system. The drained water was sent to the campus's open ponds, while precipitation that fell near the ponds was also transported through drains and gathered in the ponds.

The rainwater is fed into the surface pond nearby the college. The picture of the pond is provided below.



The pond water is used for gardening needs of the college.

Liquid Waste Management:

The liquid wastes generated in the campus include Sewage, Laboratory, Laundry, hostel and canteen effluent waste. The above waste is treated through Pond setup in the institute with a capacity of 24000 KLD (Kilo Liters per Day). The entire treated water is used for watering the gardens and lawns maintained in the campus. Therefore, the entire waste water generated in the campus is treated and reused. The laboratory waste water does not contain hazardous chemicals and periodical monitoring is done by the maintenance team.

NOISE LEVEL IN THE SURROUNDING OF ACET COLLEGE

Our site visit observations, revealed that the noise levels were found satisfactory and within the permissible limits.

WASTE MANAGEMENT AT ACET COLLEGE

Management of solid waste is an important driver in Green Audit. Solid waste not properly managed leads to the degradation of the environment which, in turn, affects the flora and fauna. Keeping this in mind, the College has been strictly implementing scientific solid waste management to maintain the green status of the campus.

The present Prime Minister of India Sri Narendra Modi launched 'Swachh Bharat Abhiyan' (Clean India Mission) on 2nd October, 2014. In this mission, the proper use of dust/waste bins is one of the major priorities. For the implementation of this mission, collective mass effort is necessary. For proper segregation and management, proper use of waste bins is the only solution for waste management purpose in the college campuses.

Waste Management includes the management and handling of all types of wastes. This waste types include the following:

Wet Waste: Wet waste includes the organic waste such a food waste, kitchen waste after peeling the vegetables and garden waste etc.

Dry Waste: Dry waste can be categorized into different wastes such as plastic waste, E- Waste, bio-medical waste, Construction & demolition waste and hazardous waste.

Paper Waste:

In order to reduce the paper waste, the management started digitization. It has implemented good practices such as prints and photocopies are taken on both sides of the pages. Further, the campus has E-book facility since 2018 all the book are available on the college website for the students at any time. Further, records of books and e-books are well kept and were available for review.

Internal notices and communications are through E-mail/SMS. AIET has Learning Management System (LMS) where notices are sent, exam results are displayed and attendance is recorded digitally.

Other good practices followed by ACET are provided below:

- Biometric attendance is provided for ACET staff.
- Paper notices are displayed on the notice boards. The dissertation reports, journals, and answer papers are stored as per the University rules.
- Around 10 kg paper waste is being generated by ACET each year. Old papers and books are given to the recycler Aditya Notebooks
- ACET encourage students to use eco-friendly material and recycle old papers/ scrap for decoration purpose during college festivals.

Solid Waste:

Being an institute with residential facility, considerable quantity of wet (food/ organic) waste is generated in the premises.

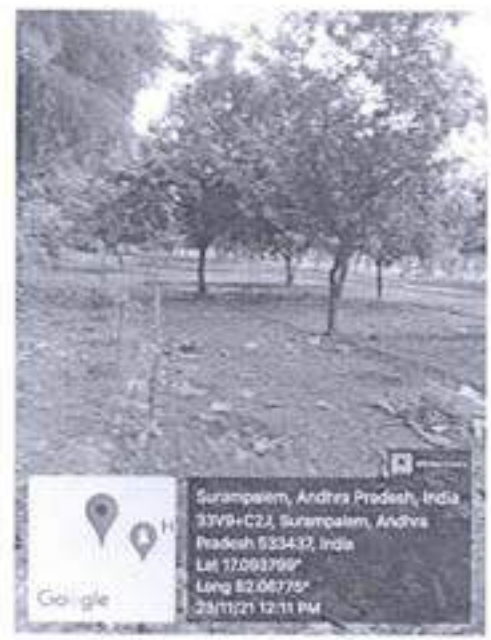
Below information is obtained from the college:

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. It is a great concern relating to environment and society Aditya College of Engineering and Technology took major steps to manage the waste to protect and create a clean and pleasant environment. The departments as well as administrative offices generates some waste and put in two bins for wet waste and dry waste kept in departments and corridors. Each building has several dust bins from where the housekeeping staff collects the trash. In the same manner waste from canteens, residential quarters, Hostel and guest houses is collected. The collected waste is dumped in big containers (wet and dry) by the housekeeping staffs regularly. The whole waste is then segregated and then the waste that can be used for composting is dumped for vermicomposting. Vermicomposting unit converts the biodegradable waste to fertilizer. This fertilizer is used to promote the lemon orchard located in the ACET campus. ACET discourages use of plastic; particularly single use plastics in campus. Paper wastes from departments, Library, Administrative offices, Hostels, are disposed through vendors. The wastes are properly stacked in designated place and later disposed through vendors for proper waste management. Aditya promotes digital platform to reduce the usage of paper for communication and sharing documents.


Surampalem, Andhra Pradesh, India
33V9+C2J, Surampalem, Andhra Pradesh 533437, India
Lat 17.093592°
Long 82.06765°
23/11/21 12:12 PM
Google


Surampalem, Andhra Pradesh, India
33V9+C2J, Surampalem, Andhra Pradesh 533437, India
Lat 17.093696°
Long 82.067535°
23/11/21 12:09 PM
Google


Surampalem, Andhra Pradesh, India
Google


Surampalem, Andhra Pradesh, India
33V9+C2J, Surampalem, Andhra Pradesh 533437, India
Lat 17.093799°
Long 82.067775°
23/11/21 12:11 PM
Google

E-Waste:

Being one of the progressive colleges in India, ACET has also moved to on-line learning system through it's e-courses. This includes classrooms, library, internal mails etc. All the classrooms are digitized. It also has an E-library, student & staff portal for academic work, biometric attendance system for staff, etc.

Electronic goods are put to optimum use; the minor repairs are set right by the Laboratory assistants and teaching staff; and the major repairs are handled by the Technical Assistant and are reused. ACET has entered MoU with ELECTROPRO SYSTEMS which buys our damaged computers and other non-reparable e-waste and issues a Recycling certificate. ELECTROPRO procures the equipment which cannot be refurbished for re-use is dismantled and remanufactured into raw materials (i.e. metals, plastics, glass) to be marketed as recyclable. The waste compact discs and other disposable non-hazardous items are used by students for decoration during college fests as a creative means of showcasing the waste management practice that has been induced in the minds of the students.

Old computers are given to a Local vendor (Pavan computers) in Kakinada with whom MOU was made for AMC, while purchasing new computers at discounted price.

Transportation

ACET is located in surampalem, which is 35 km from Kakinada and 35 km from Rajahmundry. ACET provides buses and cars for transportation for students/ staff. Most of the staff pool buses and cars and a few staff members travel by private vehicles. ACET management encourage students and staff to use the college buses (40) or public transport system to reduce carbon emissions.

Green Initiatives

Due to minimum consideration for environment & sustainability, the world is facing problems of ozone depletion, climate change, water scarcity and sustainable resource management. ACET organizes guest lectures on Environmental conservation, biodiversity, etc. every year.

ACET has a demonstrated consistent commitment towards nature and environment. ACET started Haritha eco green club, which offers wide spectrum of environmental and nature activities and platforms to enhance awareness and exhibit the relationship with nature. Various activities organized by 'Haritha 'involved guest lectures, nature visits, workshops and competitions.

NSS groups of ACET organized the green activities and awareness campaigns such as plantation camps in college, rally in nearby villages.

Recommendations/ Suggestions

For Indoor Air Quality

- Indoor plants can be chosen in such a way that they give aesthetic appearance as well as health benefits.
- Information on sources, impacts and mitigation of indoor air pollution to be displayed within ACET for increasing awareness about indoor air pollution. E.g. Signage can be put in chemistry laboratory for handling fuming chemicals.

Water Conservation

- Provide information on water usage and savings to students/ staff through notices, screen savers in computer laboratories, and encourage reduction/ wastage of water.
- Replace all old water faucets with water saving faucets, aerator taps, jet sprays etc. Installation of such faucets can save water and help in minimizing the water footprint.
- Dual flushing system can be installed for toilet flushing, with appropriate instructions, which will save considerable amount of water.
- Grey water/ sewage recycling system can be installed for flushing toilets. This will reduce the fresh water footprint.
- Signage/ posters should be posted in high water consumption areas in Academic Blocks to increase awareness regarding water conservation.
- As the source of water is borewell, ACET can install water meter on borewell line to monitor daily borewell withdrawal.
- Implementation of the STP could reduce the dependency on the ground water.

Energy Audit Study

of

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY

(Permanently Affiliated to JNTUK, Kakinada, Approved by AICTE, New Delhi)
Recognized by UGC under Sec 2(f) and 12 (B) of the UGC Act 1956
Aditya Nagar, ADB Road, Surampalem- 533437

February 2021

Study Conducted and Prepared by:

KR Energy Consultants
Flat No.103, SS Ajay Arcade, Doctors Colony,
Saroor nagar, Hyderabad-500035
Email: krenergy@rediffmail.com, Mobile: +91-9440234294
www.krenergyconsultants.com

Contents

Acknowledgement

KR Energy Consultants (called "KR Energy" hereafter) places on record, its sincere gratitude to the Management of **M/s *Aditya College of Engineering & Technology***, for entrusting the prestigious project of Energy Audit of their College located at Surampalem, ADB Road, East Godavari District, AP State.

We also wish to thank the officers/ Executives & staff of the institute for providing necessary support extended during energy audit study.

T KRISHNA
BEE Certified Energy Auditor no.3398
KR Energy Consultants
Hyderabad
Date: 13/11/2021

Table 1: Summary of Suggested Energy Saving Measures with Cost-Benefit Analysis

Energy Conservation Measure	Energy savings (kWh/ year)	Monetary savings (Rs. / year)	Investment (Rs.)	Payback period (months)
Replace old fans with Energy efficient/Super fans(100nos)	6,000	60,000	180,000	36
Install energy savers for ACs	3,456	34,560	80,000	28
Replace conventional CFLs with LED lights	6,068	60,675	80,900	16
Replace old pumps with new efficient pumps(1 no's)	1,800	18,000	50,000	36
Total	**17,324**	**1,73,235**	**3,90,900**	**27**

- *As can be observed from the above Table, the total electrical energy savings are estimated at 17,324 kWh/year and the corresponding monetary savings are Rs.1.73 lakh/year. The investment required is Rs.3.90 lakhs which will be paid back in* **27** *months.*
- *Equivalent CO2 reductions due to energy savings would be 14 tCO2/ yr*
- *Initially, the fans, ACs and tube lights operated for more hours in a day/year can be selected for replacement for maximum benefit.*

Executive Summary

M/s KR Energy Consultants has conducted a Detailed Energy Audit of M/s Aditya College of Engineering & Technology, Aditya Nagar, Surampalem, EG District, AP in February 2021 to identify energy savings measures for reducing energy consumption and electricity bill.

Electricity and HSD are main energy sources for the institute. Grid electricity supply by APEPDCL is the main source of electrical energy, which is augmented with power generation from DG Sets during load shedding:

The institute has also solar power plant of 500 kW capacity for captive use for the entire campus requirement

a) Electrical Energy

Table A: Profile of Electrical Energy Consumption

S. No.	Item	Value
1	Contract Maximum Demand (CMD) kVA	300
2	Average recorded demand , kVA	135
3	Average billed demand, kVA	240
4	Demand variation, kVA	70 to 258
5	Solar power plant capacity of the campus, kW	500
6	Solar power generated, kWh	535,520
7	Solar power used for captive requirement, kWh	149,529
8	Solar power export to grid, kWh	385,991
9	Annual billed grid electricity consumption, kVAh /year	389,219
	Total electricity consumption of the campus, kWh	538,748
10	Total annual electricity bill, Rs. lakhs/year	30.71
11	Power factor	0.99
12	Average cost of electricity, Rs/kWh (only grid power)	10.1

b) Summary of Recommendations

The Tables below presents the summary of recommended energy saving projects, anticipated energy savings, and monetary savings, investment required, and simple payback period:

CHAPTER 1
Introduction

1.1 About Aditya College of Engineering & Technology

Aditya, the premier promoter of quality education in the coastal districts of Andhra Pradesh for the past two decades, leads various institutions ranging from K.G to P.G besides professional colleges like Engineering, Pharmacy and Nursing. Sri Nallamilli Sesha Reddy as a founder chairman, promoted the educational society in the name and style of Aditya Academy at Kakinada in the year 1984, with a vision and mission to create a platform for holistic growth and success to students at all levels.

Aditya has made its entry into the educational arena with a public school to meet the needs of primary and secondary education. In succession and with rapid strides, the academy established several Junior Colleges, Degree Colleges, PG Colleges, Engineering Colleges, Pharmacy Colleges, Nursing Colleges, Teacher Training Institutions.

The silver-jubilee educational group with 50,000+ students in 50+ institutions with 5000+ staff across three districts in Andhra Pradesh has become the standard bearer for quality education. In every stream, Aditya has become a spring-board for success through its powered vision, constant innovation, and professional excellence.

The College is situated in an eco-friendly area of 180 acres with thick greenery at Surampalem, Gandepalli Mandal, East Godavari District, Andhra Pradesh. The College is 15 KM away from Samalkot Railway Station on Howrah-Chennai Railway line in South Central Railway. The College is 35 Km away from Kakinada and Rajahmundry on ADB Road.
The College has four academic Buildings with a total carpet area of 44,524 Sq. Mts. apart from two boy's hostels and one girls hostel buildings. The particulars of academic buildings and the departments / offices accommodated are as follows.
The dreams of its bounding fathers took shape in 2004 in the form of Sri Sai Aditya Institute of Science and Technology which is now renamed as Aditya College of Engineering and Technology under G.O.RT.NO.92 with approval of AICTE in the aegis of Sarojini Educational Society, Kakinada and permanently affiliated to JNTU Kakinada. The college has two academic buildings apart from two boy's hostels and one girl's hostel buildings.
The campus is centrally located between Kakinada and Rajahmundry. It is situated in a eco-friendly area with thick greenery at Surampalem, Gandepalli Mandal, East Godavari District, AP. ACET offers various under graduate and post graduate courses in engineering, science and management and has state of laboratories and well stocked library and one of the best computing facilities. With an ideal teacher-taught ratio we strive for academic excellence

through personalized attention. Since its inception ACET has achieved national standing in terms of academic performance, co-curricular and extracurricular activities. Known for its creative dynamism and flexibility the college offers varied programs blending skill development and value orientation to shape the career of students.

S.No	Building Name	Department/Office
1	Visweswarayya Bhavan	Administrative Office, Examination Cell, Admission Office, CSE, ECE,IT ,M.B.A, M.Tech, MCA, and Transport Office.
2	CV Raman Bhavan	EEE, MECHANICAL, CIVIL, and M.Tech.

The college is approved by AICTE, recognized by Govt. of Andhra Pradesh, permanently affiliated to Jawaharlal Nehru Technological University Kakinada (JNTUK). The college also received UGC recognition under Sections 2(f) & 12(B) of the UGC Act.

The following courses are offered in the college for under graduation and graduation courses:

Under Graduate Courses:

- B.Tech Civil engineering
- B.Tech Electrical and Electronics Engineering
- B.Tech Mechanical Engineering
- B.Tech Electronics and Communication Engineering
- B.Tech Computer Science and Engineering
- B.Tech Information Technology

Post Graduate Courses:

- M.Tech -- Thermal Engineering
- M.Tech -- Embedded Systems
- M.Tech -- Computer Science & Engineering
- M.Tech -- Power Electronics
- M.B.A -- (Master of Business Administration
- M.C.A – (Master of Computer Application)

1.2 Energy Conservation Efforts made by the Management

The committee of the institute recognizes its responsibility to conserve and manage energy in all its operations.

- ✓ Make every effort to commit organizational resources towards energy management
- ✓ Minimize energy costs and give priority to energy efficiency (EE) by utilizing available resources more efficiently

Towards this objective, the management has installed LED lighting and Solar Power Plant of 500 kW for captive use of power for the entire campus covering for all colleges of the group institutions. The solar hot water systems of 12000 LPD capacity also installed for the hostel blocks.

The management wants to explore further scope for energy conservation and energy cost reduction in the campus and thus entrusted the job of Energy audit to KR Energy Consultants.

1.3 Objectives of the Energy Audit

The key objectives of the Energy audit is to identify, prioritize, and recommend a set of proven, customized, low-cost, and implementable measures for reducing the consumption of electrical energy in the campus and emission reductions.

1.4 Scope of Work

The Energy audit has laid emphasis on performance assessment of electrical utilities comprising the following equipment/ areas for identification of cost-effective energy saving solutions:

1) Energy Consumption and Analysis
2) Pumps (Utility)
3) Air Conditioners
4) Fans
5) Lighting
6) DG sets

1.5 Methodology Adopted for conducting the Energy Audit study

KR Energy Consulting has conducted Energy audit field studies at the institute on October 13th to 15th, 2021. As a part of the Energy audit KR Energy Consulting audit team has visited campus for data collection, on-site measurements, and performance monitoring of various equipment using portable Energy audit instruments. KR Energy Consulting has adopted the following methodology for conducting the Energy audit:

- Kick-off meeting with the concerned personnel to finalize field action plan
- Inventory of all the electrical appliances installed by physical verification like air conditioners, luminaries, computers, and others. Physical inspection of the electrical distribution system.
- Monitoring of electrical parameters such as voltage, amps, kW, power factor etc. for individual equipment's and feeders
- Monitoring of harmonics at the identified DB's, feeders UPS with power and harmonic analyzer
- Collection of photocopies of monthly electricity bills for the past one year
- Critical analysis of data collected/ measured and assessment of energy efficiency and energy losses
- Identification of energy saving measures and assessment of energy saving potential
- Submission of the report

The approach/ methodology adopted for Energy audit is presented pictorially below in Figure 1.

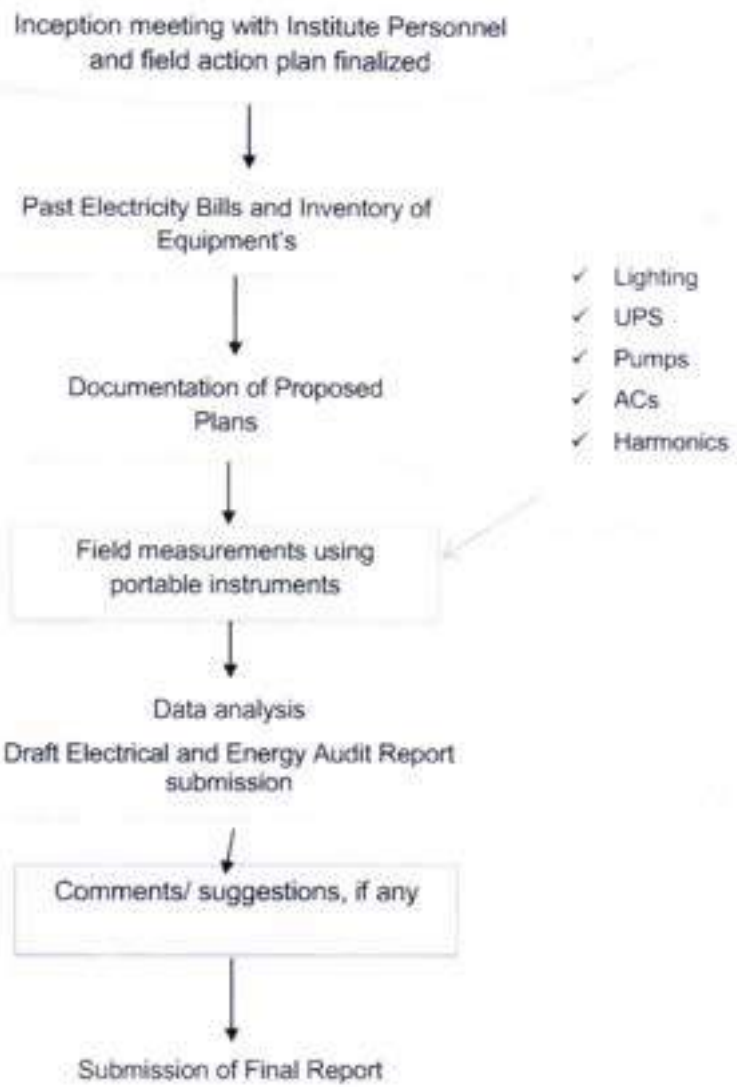


Figure 1: *Approach/ methodology adopted for conducting Energy Audit of Aditya College of Engineering & Technology, Surampalem, ADB Road, East Godavari District, AP State*

1.6 Measuring Instruments used for the Electrical and Energy Audit

KR Energy Consulting has used portable, micro-processor based, state-of-the-art, calibrated instruments for on-field monitoring of equipment performance during Energy audit. The list of portable instruments used in the study is as follows:

- Nanovip Plus Load Manager
- Harmonic Analyzer
- Lux meter
- Temperature measuring instruments
- Thermal Imager

CHAPTER 2

Energy Consumption & Analysis

The chapter presents the description of various energy inputs used in the Institute, their consumption trends & analysis, annual energy costs, and share of different energy inputs in total energy cost.

2.1 Energy Inputs

Energy sources for the hotel utilities are:

- Electricity
- HSD

Electricity is major energy source for the institute for lighting, fans, motors etc.

DG Sets are used as standby to grid power and will run during load shedding. HSD is the fuel for DG Sets.

The campus has a roof top solar power plant also of 500 kW and electricity generated is used for captive purpose for the entire campus and all colleges power requirement.

2.2 Electrical Energy Analysis

Grid electricity is supplied by the AP Eastern Power Distribution Company Limited (APEPDCL) voltage of 11kV. The connection meets the entire campus electricity requirement including all colleges of the group in the campus. During grid power shortage/ failure, DG Sets supply the required electricity. The institution has a Contract Maximum Demand (CMD) is 300 kVA for the entire campus and colleges in the name of "Sarojini Devi Educational Society

Data on monthly CMD, recorded MD, billed units, and bill amount for period year from January 2020 to December 2020 is collected, analyzed, and presented in Table 2.1 below:

Table 2.1: *Month-wise CMD, Recorded MD, Billed MD, Billed Units, and Bill Amount (Jan 2020 to December 2020)*

S.NO	MONTH	APSEB CONSUMED UNITS (A)	BILL UNITS	BILL AMOUNT	SOLAR EXPORT UNITS (B)	COLLEGE SOLAR CONSUMPTION E= (D-B)	TOTAL COLLEGE UNITS CONSUMPTION (A+E)	RMD KVA	BILL KVA
1	JAN	63787	46217	490124	21055	21658	**85445**	230	240
2	FEB	81414	66109	650380	16261	30669	**112083**	243	240
3	MAR	67959	42717	473295	20628	38939	**106898**	258	258
4	APR	16330	6000	168131	38655	10748	**27078**	97.7	208
5	MAY	18508	6000	169107	45537	13183	**31691**	92	240
6	JUN	14658	6000	167183	29929	9061	**23719**	80	240
7	JUL	12688	6000	166371	39177	1153	**13841**	76	240
8	AUG	11847	6000	165809	38539	1	**11848**	70	240
9	SEP	16374	6000	166872	38864	0	**16374**	124	240
10	OCT	21554	6000	168881	26925	4755	**26309**	122	240
11	NOV	33798	6000	112619	28592	17958	51756	118	240
12	DEC	30302	6000	172499	41829	1404	31706	109	240
		389219	**209043**	**3071271**	**385991**	**149529**	**538748**		
		32435	**17420**	**255939**	**32166**	**12461**	**44896**	**135**	**239**

The variation of electricity consumption, recorded demand, billed demand, solar power, and power factor demand is graphically furnished in fig 2.1, 2.2, 2.3, 2.4 and 2.5

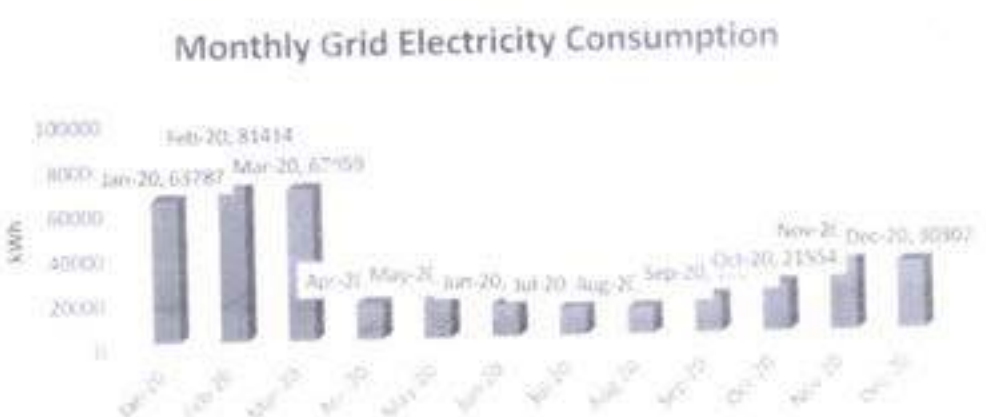


Fig 2.1: Monthly Grid Power Energy Consumption

Fig 2.2: Monthly Grid Electricity Bill

Fig 2.3: Monthly Recorded Demand Variation

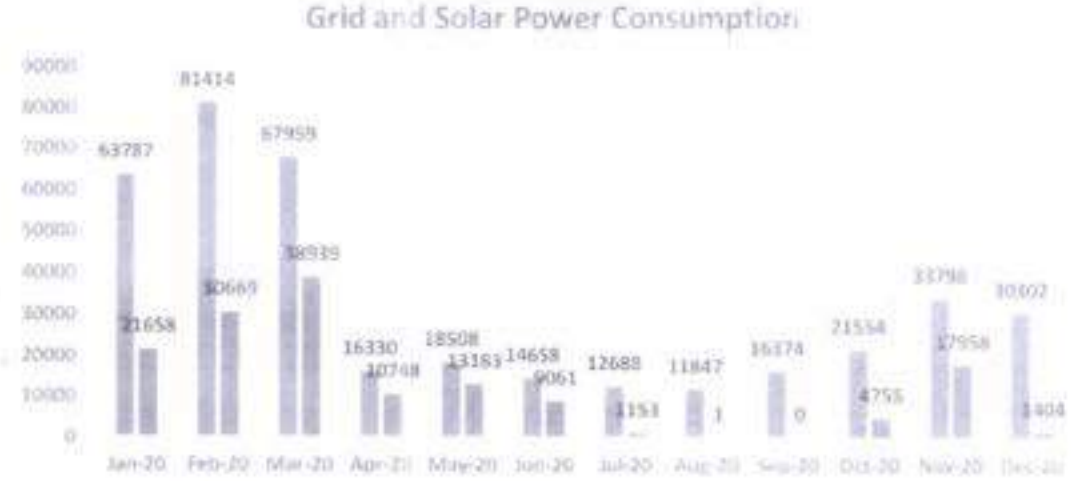


Fig 2.4: Monthly Grid and Solar Power Consumed

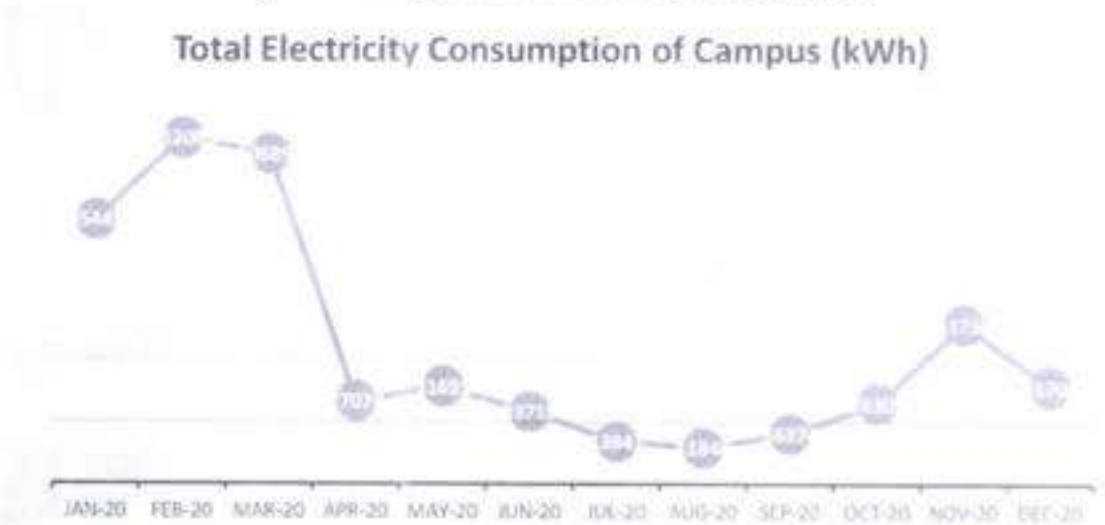


Fig 2.4: Monthly total electricity consumption of the campus

The key observations made from the analysis of the above data are furnished in Table 2.2 below:

Table 2.2: *Summary of Electrical Energy Consumption Data of the entire campus and colleges (Sarojini Educational Society) – January 2020 – December 2020*

S. No.	Item	Value
1	Contract Maximum Demand (CMD) kVA	300
2	Average recorded demand , kVA	135
3	Average billed demand, kVA	240
4	Demand variation, kVA	70 to 258
5	Solar power plant capacity of the campus, kW	500
6	Solar power generated, kWh	535,520
7	Solar power used for captive requirement, kWh	149,529
8	Solar power export to grid, kWh	385,991
9	Annual billed grid electricity consumption, kVAh /year	389,219
	Total electricity consumption of the campus, kWh	538,748
10	Total annual electricity bill, Rs. lakhs/year	30.71
11	Power factor	0.99
12	Average cost of electricity, Rs/kWh (only grid power)	10.1

Considered Rs 10.00/kWh for electrical energy savings in the report

The electricity consumption of the campus is low, as the college was not fully operating due to Covid.

2.3 GHG Emissions

The major energy form used for the institute is grid electricity supplied by AP Eastern Power Distribution Company Ltd (APEPDCL). The emission factor for grid electricity is 0.82 kgs of CO2/kWh and is calculated month wise and is furnished below in Table 2.3

Table 2.3: *GHG emissions due to grid electricity use*

Month & Year	Monthly units (kWH)	Monthly GHG Emissions (tCO2)
Jan-20	63787	52.3
Feb-20	81414	66.8
Mar-20	67959	55.7
Apr-20	16330	13.4
May-20	18508	15.2
Jun-20	14658	12.0
Jul-20	12688	10.4
Aug-20	11847	9.7
Sep-20	16374	13.4
Oct-20	21554	17.7
Nov-20	33798	27.7
Dec-20	30302	24.8
Total	**389219**	**319.2**

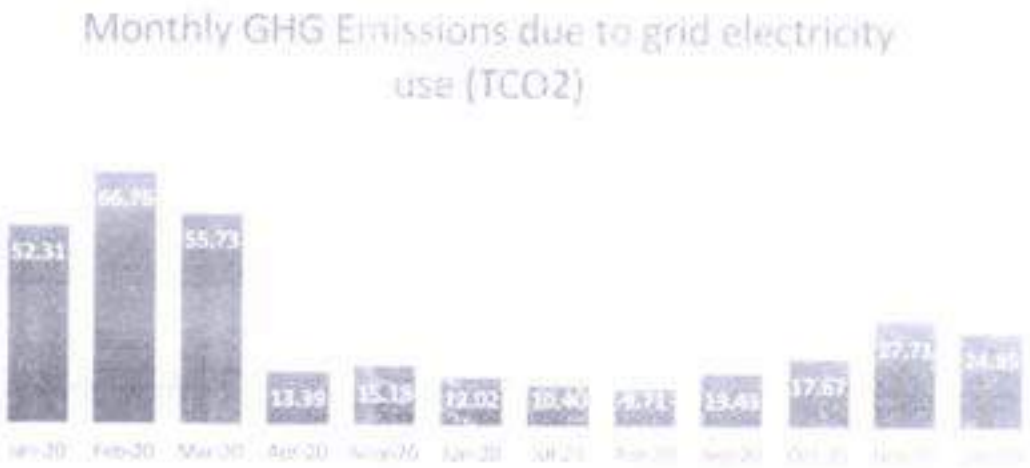


Fig 2.6: Monthly Carbon dioxide Emissions due to grid electricity use

2.4 Solar Power Plant GHG Emissions Reduction

The management has installed a roof top SPV Power plant as an initiative to offset GHG emissions to the world. The capacity of the SPV power plant is 500 kW with net metering facility.

So far, about 535.5 MWh has been generated from January 2020 to December 2020, the solar power is used for captive requirement for the campus, the power is also exported to grid during holidays and is about 386 MWh. Due to solar power plant, about 439 tons of CO_2 is avoided to the climate every year and is almost offset of the grid power used during the same period.

2.5 Power Factor and Maximum Demand

Power factor, billing demand and recorded MD for period from January 2020 to December 2020 is collected and presented in Table 2.4 below:

Table 2.4: *Monthly Power Factor and Recorded Maximum Demand*

Month	CMD (kVA)	Recorded Demand (kVA)
Jan-19	300	230
Feb-19	300	243
Mar-19	300	258
Apr-19	300	97.7
May-19	300	92
Jun-19	300	80
Jul-19	300	76
Aug-19	300	70
Sep-19	300	124
Oct-19	300	122
Nov-19	300	118
Dec-19	300	109
Average		**135**

(a) Contract Demand

- Contract Maximum Demand is 300 kVA and average recorded demand is 135 kVA, the RMD is low, as the college is not in operation due to COVID Problem

- The highest maximum demand recorded during the last 12 months is 258 kVA.
- The maximum demand is OK for the present utilization and is satisfa
- The minimum billing demand is 80% of the CMD and is 240 kVA

(b) Power Factor

The average monthly power factor was 0.99 as noted and as per electric bills. The power factor is well maintained and is OK.

2.7 Harmonics

This term refers to a wide variety of electromagnetic phenomena that characterize the voltage and current at a given location of a power system any power problem manifested in voltages, current, or frequency deviations those results in failure or malfunctioning of customer equipment. Power quality has become increasingly important for industrial and commercial electric power customers, particularly as today control processes rely on computerized equipment which is sensitive to power system interruptions and disturbances.

As harmonic levels increase, the likelihood of experiencing problems also increases. Typical problems include:

- Malfunctioning of microprocessor-based equipment by disruptions of operations.
- Heating effects in power handling equipment's such as motors, transformers, overheating in neutral conductors. There by reduces the operating life
- Deterioration or failure of power factor correction capacitors.
- Erratic operation of breakers and relays.
- Pronounced magnetic fields near transformers and switchgear.

The harmonics were measured for the selected panels and UPS. The Voltage & Current harmonics are ranged as below:

Table 2.4 *Harmonics Measurements values for Panel by Harmonic Analyzer*

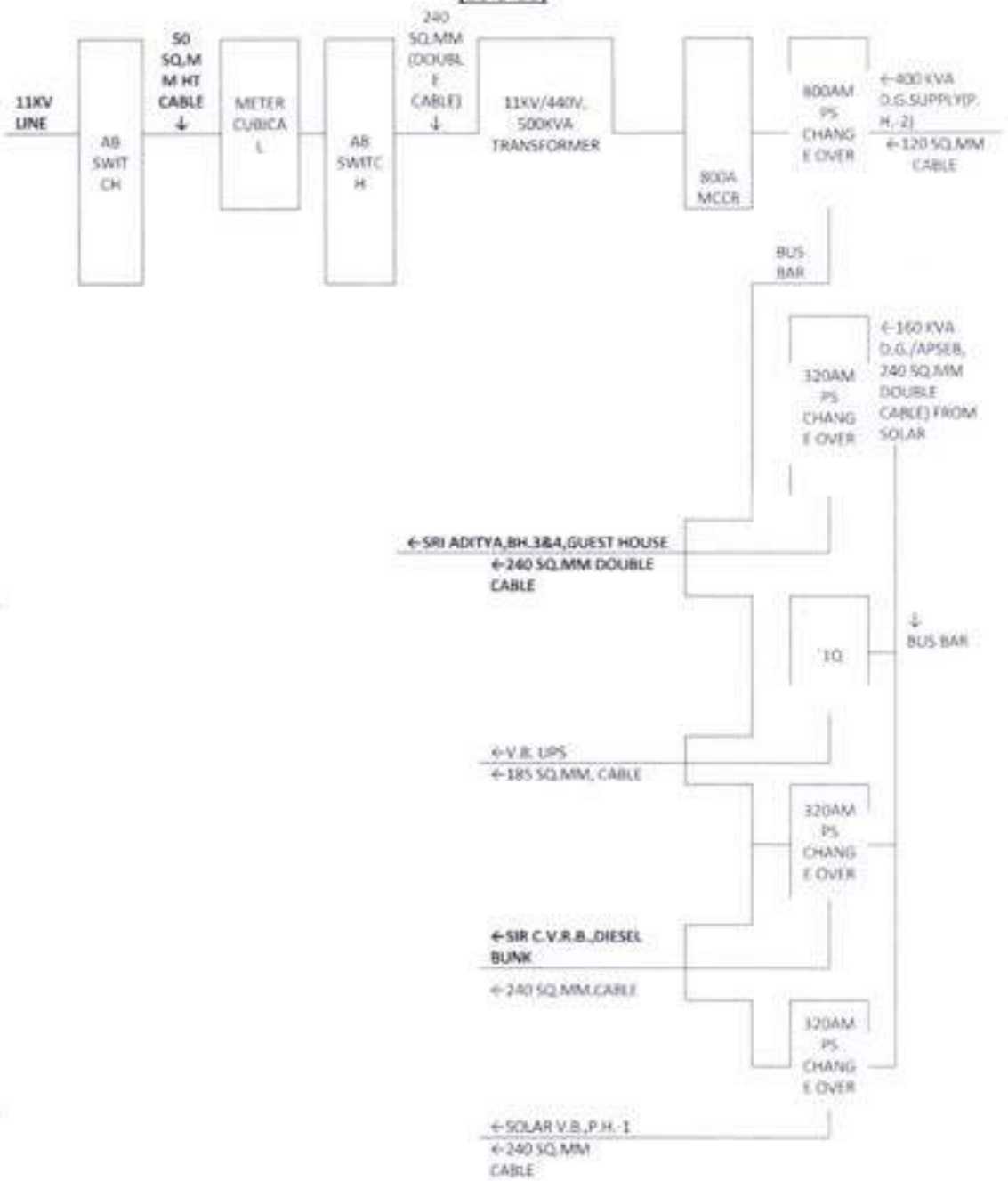
Reference	***$THD_{rms,v}$***	***$THD_{rms,i}$***

Main panel	0.65% to 1.48% Voltage Harmonics within the limits	5.04% to 14.5% 5th Harmonic - 6.5% 7th Harmonic - 7.4% 5th and 7th harmonics are predominant.
Recommendation	No Harmonics exists and harmonics are within the limits	

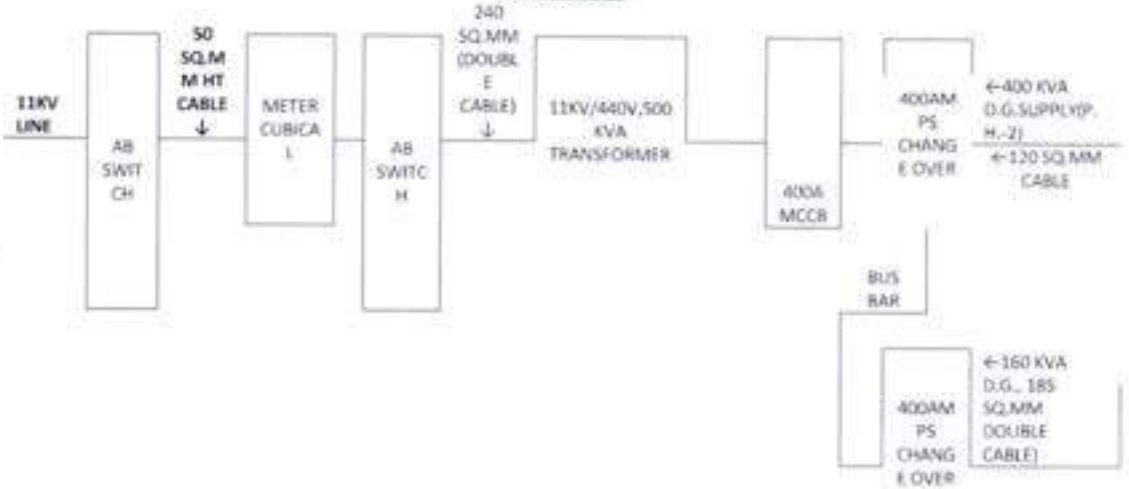
2.6 DG Sets

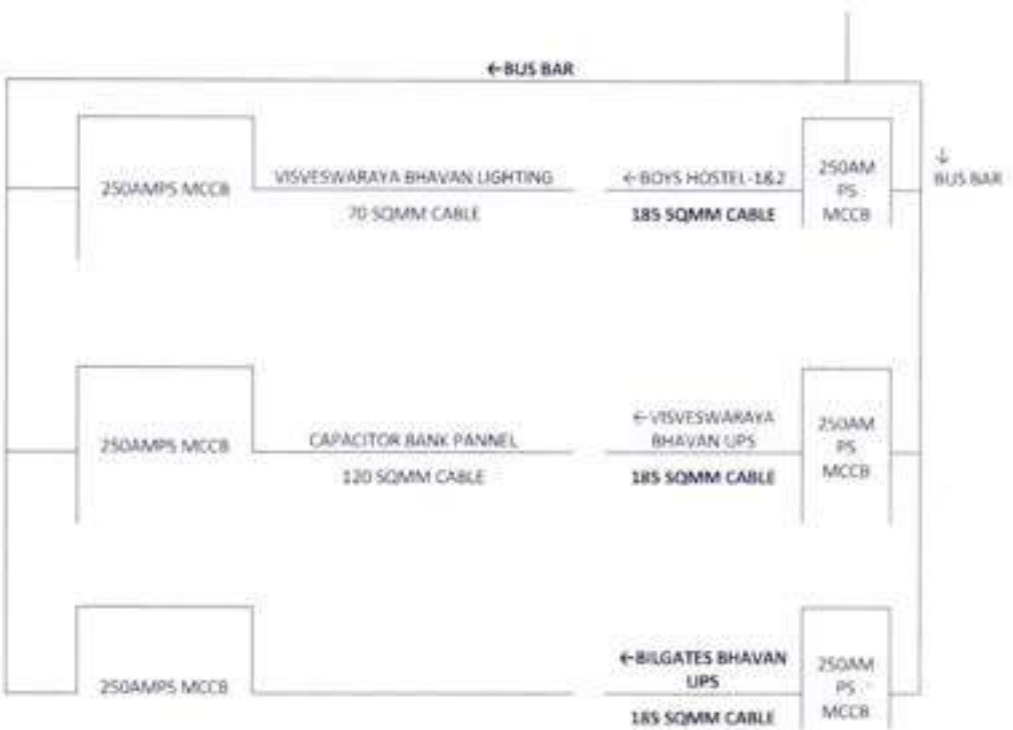
The institution has three DG sets for total campus load of 400 kVA (1 no's) and 160 kVA (1 no's). The DG sets are operated as per the requirement and during grid power failures. The total DG sets capacity is 560kVA, which is sufficient to cater the load of the entire campus loads.

POWERHOUSE-2 NEW PANNEL CABLE SIZE&BUILDINGS CABLE CONNECTIOS SINGLE LINE DIAGRAM (10-9-20)



POWERHOUSE-2 OLD PANNEL CABLE SIZE&BUILDINGS CABLE CONNECTIONS SINGLE LINE DIAGRAM





CHAPTER 3

Fans & Air conditioners

This chapter presents the type of air conditioners and fans used, their energy performance, and cost-effective energy conservation measures for reducing energy consumption in air conditioners and fans.

Hostels

The institution has three hostel blocks for boys and girls separately.

S.No	Hostel Block	Rooms	Students	Fans	C.F.L	Tube Lights	LED
1.	**Block A**	**143**	**273**	**546**	**580**	**546**	8
2.	**Block B**	**138**	**279**	**558**	**613**	**558**	--
3.	**Block F**	**89**	**71**	**142**	**142**	**142**	42

There are 370 rooms in the hostel and residing 623 students in the hostels. The main electrical equipment's/gadgets used are fans. Tube lights, geysers, ACs and others etc.

3.1 Details of Fans

The ceiling fans are installed, and the inventory of the fans and connected load is given below in Table 3.1:

Table 3.1: *No. of Fans installed and Wattage*

S.No.	Name of the Building	Fans each 50Watt
1	Block A	546
2	Block B	613
3	Block F	142
4	Vishwesarayya Bhavan	28
5	CV Raman Bhavan	323
	Total	**1652**
	Connected Load	**82.6**

3.2 Fans- Observations & recommendations

- ✓ Fans are provided with fixed and running capacitor. The speed drops if the value deteriorates with time. Timely replacement of capacitor is necessary.
- ✓ Presently, in many rooms conventional electrical regulators are installed and it is suggested to replace old conventional regulators with new electronic type regulators.
- ✓ In majority of the rooms, the fans are consuming more power than rated.

a) Cost benefit Analysis of Replacing old Ceiling Fans with new efficient fans

Energy savings can be achieved by replacing the existing old ceiling fans with 5 Star Rating (BEE) energy efficient ceiling fans:

- Option 1: 5 Star rated Fans
- Option 2: Super Fans

Initially, it is recommended to replace old fans of 100 nos. and after successfully achieving the savings, other fans can be replaced in a phased manner. The cost benefit analysis made for a sample of replacement of 100 fans under two Options are furnished below:

i) Option (1) Replace old fans with 5 Star Rated Fans

Star Rating	Min. Air Delivery (AD) m^3/ min	Input Power in Watts	Service Factor (SV=AD/ Power) m3/min/Watt	Cost (Rs)
5 Star	215-225	50-53	>=4	1,850-2,200

A few good brands of the 5 Star rated Fans are Ortem, Relaxo, Orient, Usha, Crompton Greaves, Bajaj, and Havells. Normally, these fans come with a warranty of two years.

ii) Option 2: Super-Efficient Ceiling Fans

Features of Super-Efficient Ceiling fans are:

- Energy savings, more than 50% savings, lower electricity bill
- Remote control, no regulator needed, saves space on switchboard
- High air delivery
- Inverter/UPS friendly – Runs twice longer, no extra noise, no speed drop
- No speed change due to supply variations or low voltage
- Power factor better than 0.9
- Service value of more than 6 - more air per watt
- BLDC Motor runs cool - No heat generated

- LED Indication for remote operation
- Attractive colors and designer leaves
- 5 years warranty
- Cost Around Rs 3,200 per Fan

Presently, Super fan is the company, which manufactures these types of fans.

The comparison of ordinary fan, 5 star fan, and super fan in terms of design and operational aspects are furnished below in Table 3.2:

Table 3.2: *Comparison between Ordinary Fan, 5 Star Rated fan & Super Fan (1200mm)*

S.No	Parameter	Ordinary fan	5 Star rated Fan	Super fan
1	Rated Power, Watt	60-90	40	30
2	Min. Air Delivery, m^3/min	210-215-220	215-220	220
3	Service Factor, m^3/min/Watt	3.35-3.73	4.0-5.0	6.28
4	Cost, Rs/Fan	1200-1300	1800	2500
5	Life, Years	10-12	10-15	15
6	Warranty, Years	1	2	3-5

The cost-benefit analysis of replacing the existing ordinary fans with (i) 5 star rated fans and (ii) super-efficient fans is provided in Table 3.3:

Table 3.3: *Cost Benefit Analysis of Replacing Fans with 5 Star Rated & Super-Efficient Fans*

Description	Unit	Option1: 5 Star Rated Fans	Option2: Super-Efficient Fans
Number of Fans (*Considered 100 Nos. as sample for case study*)	Nos.	100	100
Actual power consumed	Watts	70	70
Power consumption of new Fan	Watts	40	30
Average operation	hours/day	8	8
	Days/year	250	250
Annual energy savings	kWh/yr.	6,000	10,000
Cost of energy	Rs/kWh	10	10
Total Annual saving	Rs	60,000	1,00,000
Cost of new Efficient fans	Rs/Fan	1,800	2,500
Investment	Rs	1,80,000	2,50,000
Simple Payback period	Months	36	30

Note. Price is subjective and be further reduced if taken on bulk quantity. The average life of fans is 10 years.

Initially, the management can replace 50 no's in first phase and after successfully achieving savings and recurring savings, all the fans can be replaced for power savings.

3.3 Air conditioners

The air-conditioning systems available at Institute are of split air conditioners. There are total of 16 air conditioners in the hostel and college administration block. The rated capacity of AC's are 1 TR,2.0TR, and 1.5 TR and total capacity is 24 TR.

S.No.	Name of the Building	AC
1	Visvesvaraya Bhavan	**13**-1.5Ton, **1**-1 Ton, **1**- 2Ton **(TOTAL 15)**
2	C V Raman Bhavan	**1**

3.4 Air conditioners -Observations & Recommendations

(a) Observations

- It is beneficial to install 5 Star rated ACs in future as 5 star rated ACs will consume less power than 3 star rated, and additional investment is less as compared to the savings. Air conditioners over 10 years can be replaced with new 5 star rated ACs.

(b) Recommendations

(i) Install Energy Saver for ACs

Airtron is the most advanced AC SAVER with all the controls of a Precision AC.

Airtron's dual sensors reference the Room and Coil Temperature and working in tandem with its multiple algorithms in a "closed -loop circuit" ensure the high savings and adapts your AC to Ambient Temperatures and Climatic changes, by maintaining room temperature while compressor run time is substantially reduced.

Airtron allows to program the AC to climate & geographical locations and automatically adjusts itself to change the ambient conditions to save electricity. AIRTRON is available with a Remote for setting the Room Temperature and in Non-Flammable Polycarbonate Enclosure with SMPS Power Supply, to tolerate wide Voltage and Current fluctuations, Surges, Spikes and Sags.

Airtron has been validated on all ACs- Inverters, 5 Star, Splits, Multi-Splits, Packages, Ductable, Windows, Cassettes from 1.0 - 20.0 TR.

The salient features of Airtron AC saver are:

- ✓ Most advanced AC saver
- ✓ Display Room & Coil Temperature
- ✓ Automatically adapts AC to changes in ambient temperature & Climate
- ✓ Easy to install
- ✓ Applicable on ACs from 1.0 to 20TR, saves equally on inverters & 5 Star/ 1-Star AC's
- ✓ Energy saving up to 15 to 20%

Table 3.5: *Cost-benefit Analysis - Installation of AC Saver*

Description	Unit	Value
Total number of ACs	Nos.	16
Total AC load	kW	19.2
No. of hours of operation/ day	Hours/day	6
No. of days per annum	Days/year	200
Annual Energy Consumption	kWh/year	23,040
Power saving due to AC Saver @15%	kWh/year	3,456
Annual monetary savings(@*Rs.10.0 per kWh*)	Rs.	34,560
Investment for AC Savers *(@Rs.5,000 x 16 no's*	Rs.	80,000
Payback period	**Months**	**27.8**

3.4.1 Best Practices for Efficient Operation Air Conditioners

- *False ceiling*: good quality false ceiling must be maintained in the air conditioned rooms by keeping all doors and windows closed properly to prevent cool air go out and hot air come in.
- *Curtains*: Always keep curtains on windows to prevent direct sunlight inside the room to avoid heating of cooled air. This reduces AC load significantly.
- *Maintenance*: Proper maintenance and cleaning of ACs is required at regular intervals to make it work at highest efficiency. Any dirt in filter may reduce efficiency of ACs very significantly.
- *Operation*: ACs should be switched on 15 minutes before actual use and should be switched off before leaving the room
- Outdoor units need to be kept under shady area and direct expose to sunlight will increase the power consumption of the compressor

- AC false ceiling to be provided for the AC rooms, for better air conditioning and reduction of room area and reducing heat losses

By adopting the above measures, a minimum of 10% to 15% of electricity consumption by ACs can be reduced.

CHAPTER 4

Lighting

4.1 Details of Lighting

Lighting system was assessed through visual observation and technical specification data were noted. The inventory data of the luminaries was provided by the department. The total lighting load of the unit is considerable of the total electrical load of the unit and hence, lighting needs equal emphasis along with other energy consuming areas. The plant has the following types of luminaries as under:

- LED Tube Lights
- LED Street Lights
- CFLs

Table 4.1: *Lighting load details*

S.No.	Name of the Building	C.F.L (10 W)	Tube Lights (20 W)	LED Lights
1	Visvesvaraya Bhavan	29	489	--
2	C V Raman Bhavan	58	237	--
3	Block A	580	546	8
4	Block B	613	558	--
5	Block F	142	142	42
	Total	1422	1972	50
	Load	14.22	39.44	0.75

Majority of the tube lights LED tube lights in the institution, and some are CFLs. The total connected load of lighting is 54.41 kW. It is suggested to replace the CFLS with LEDs bulbs or lights. The cost benefit analysis is furnished below:

Table 4.1: *Cost benefit Analysis of replacing CFLs with LEDs.*

Description	Unit	CFLS
Total number of CFLs	Nos.	1422
Wattage	W	10
No. of hours of operation/ day	Hours/day	6
No. of days per annum	Days/year	250
Annual Energy Consumption	kWh/year	21,330
Power saving due to LEDs @50%	kWh/year	10,665
Annual monetary savings(@*Rs.10.0 per kWh*)	Rs.	1,06,650
Investment for AC Savers *(@Rs.100/- per bulb or light*	Rs.	1,42,200
Payback period	Months	16

CHAPTER 5

Miscellaneous

5.1 Pumps-Observations & recommendations

There 4 no's of pumps of catering to water requirements of the Institute, all pumps are non-star rated and it is suggested to replace the non-star rated pumps with 5 star rated pumps for energy savings. These pumps can be replaced on phase wise, as and when required when pumps will be problem.

Cost benefit analysis of replacing existing old pumps with new efficient star rated pumps provided in table 5.1 below for a 7.5 HP Pump:

Table 5.1: *Cost benefit analysis of replacing old Pumps with EE pumps*

Description	Unit	Value
Capacity of the pump	kW	5.6
Efficiency	%	45
Efficiency of 5 star rated pump	%	60
Savings	%	30
Power savings	kW	1.5
No. of hours of operation/ day	Hours/ day	4
No. of days per annum	Days/ year	300
Power saving due to Energy efficient 5 star rated Pumps	kWh/ year	1800
Annual monetary savings (@Rs.10 per unit)	Rs	18,000
Investment for pump	Rs	50,000
Payback	Months	36

5.2 General Observations

All Class Rooms, hostel rooms and laboratories to have Display Messages or Posters regarding optimum use of electrical appliances in the room like, lights, fans, computers, and projectors. Few sample posters is furnished below:

(a) Sample Posters for Awareness towards Energy Conservation

Also have stickers/labels of slogans/lines for energy saving in Class rooms/ Common areas

- Energy saved is energy produced.
- Switch of Lights/ Fans if not used
- Conservation: It doesn't cost. It saves.
- Spare a Watt; Save a Lot
- Save Today. Survive Tomorrow
- Energy misused cannot be excused

(b) Safety posters

ENVIRONMENTAL AUDIT REPORT
2020-2021

ADITYA COLLEGE OF ENGINEERING&TECHNOLOGY (ACET)

Prepared BY

Global Green Solutionz
D.No: 509, Block A, Emerald Heights, Annojiguda, Hyderabad-500088
Tel: +91-7331134789;
Email: globalgreensolutionz@gmail.com;
www.globalgreensolutionz.in

CONTENTS

Acknowledgement

Global Green Solutionz (GGS) is thankful to the management and staff of Aditya College of Engineering& Technology for awarding Environmental Audit for their college at Surampalem, East Godavari, Andhra Pradesh.

The Study team members of Global Green Solutionz would sincerely like to thank all the Department Heads and support staff members of Aditya College of Engineering& Technology for providing the necessary support in order complete the Environmental audit.

For Global Green Solutionz

M. Srikanth

GLOBAL GREEN SOLUTIONZ HYDERABAD

Srikanth Meesa,
CEO, Global Green Solutionz

ABOUT THE COLLEGE

Aditya College of Engineering& Technology was founded as the premier promoter of quality education in coastal districts of Andhra Pradesh in 2008 under Sarojini Educational Society. Sri N. Sesha Reddy, as a founder chairman, promoted the educational institution, with a mission, to offer the best engineering education with unmatched innovations in the process of teaching and learning by aiming at the all-round development of the students.

The College is situated in an eco-friendly area of 10 acres with thick greenery at Surampalem, Gandepalli Mandal, East Godavari District, Andhra Pradesh. The College is 15 KM away from Samalkot Railway Station on Howrah-Chennai Railway line in South Central Railway. The College is 35 Km away from Kakinada and Rajahmundry on ADB Road.

The College has three academic blocks with a total carpet area of 44,524 Sq. Mts. apart from a boys hostel. The particulars of academic buildings and the departments / offices accommodated are as follows.

S.No	Building Name	Department/Office
1	Vishweswarayya Bhavan	Administrative Office, Examination Cell, Accounts, Admission Office, ECE, CSE, IT, MBA, M.Tech, MCA and Transport Office.
2	CV Raman Bhavan	EEE, Mechanical, Civil and M.Tech

The college proudly offers 6 UG and 4 PG programmes in engineering, MCA, MBA with 15 years of rich standing in the educational era. Besides, the college has added many feathers in its cap which include AA+ Grade by Careers 360, South India 4th rank by Digital Mailers, South India 6th rank by Silicon India, 13th rank out of top 25 engineering colleges by 4Ps, a niche in Asia top 100 colleges by WCRC leaders, Best Placement Award by ASSOCHAM, All India 98th rank-DQ CMR top T-School survey by DATA Quest and 13th position in Top 20 colleges of India by the Sunday Indian. These districts recognitions speak volumes of the institute's objective to promote engineering excellence. The total student strength is 3080 with faculty strength of 212 thus giving rise to healthy faculty student ratio.

It is approved by AICTE, recognized by Govt. of Andhra Pradesh, permanently affiliated to Jawaharlal Nehru Technological University Kakinada (JNTUK). The college also received UGC recognition under Sections 2(f) & 12(B) of the UGC Act.

Aditya College of Engineering& Technology will do its best to offer an innovative environment wherein your dreams will be realized: dreams for higher knowledge, dreams for scientific inquiry, dreams for technology creation, dreams for co-curricular activities, and dreams to change the world.

Under Graduate Courses:

- B.Tech Civil engineering
- B.Tech Electrical and Electronics Engineering
- B.Tech Mechanical Engineering
- B.Tech Electronics and Communication Engineering
- B.Tech Computer Science and Engineering
- B.Tech Information Technology

Post Graduate Courses:

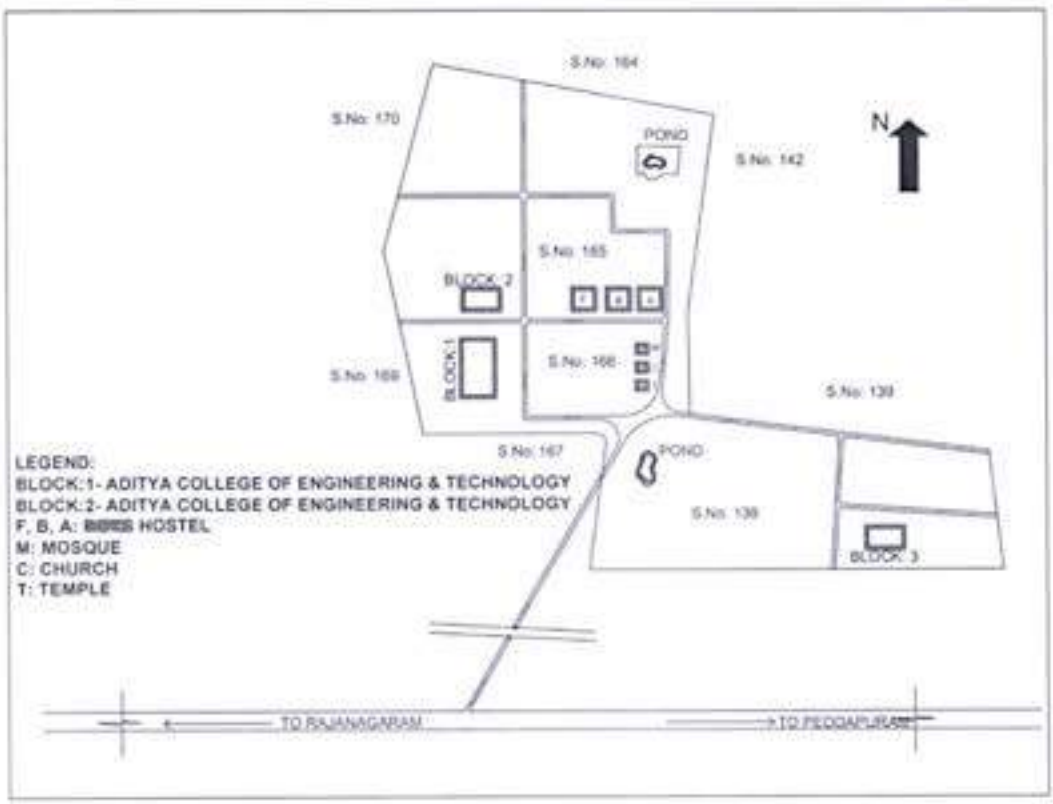
- M.Tech Embedded Systems
- M.Tech Computer Science & Engineering
- M.Tech Power Electronics
- M.Tech Thermal Engineering
- M.B.A Master of Business Administration
- M.C.A Master of Computer Application

LAND USE ANALYSIS, ACET COLLEGE, SURAMPALEM, ANDHARA PARADESH (2021)

GENERAL OVERVIEW OF THE CONCEPT OF LANDUSE:

Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. It refers the activities and the various uses which are carried on and derived from land. Viewing the earth from space, it is now very crucial in man's activities on natural resource. In situations of rapid changes in land use, observations of the Earth from space give the information of human activities and utilization of the landscape (Howarth 1981).

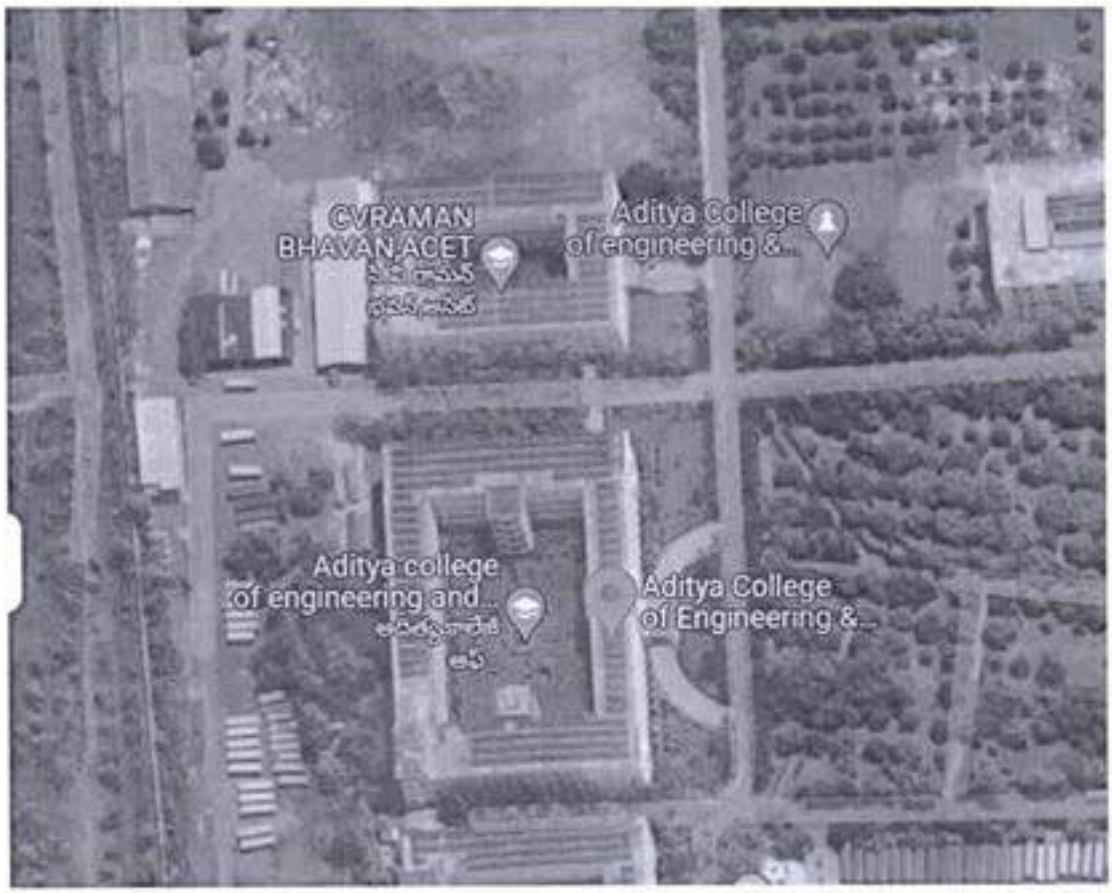
The collection of remotely sensed data facilitates the synoptic analyses of earth system, functions, patterning, and change in the local, regional as well as at global scales over time. Satellite imagery particularly is a valuable tool for generating land use map using google maps.



Site layout map of Aditya College of Engineering&Technology (ACET)

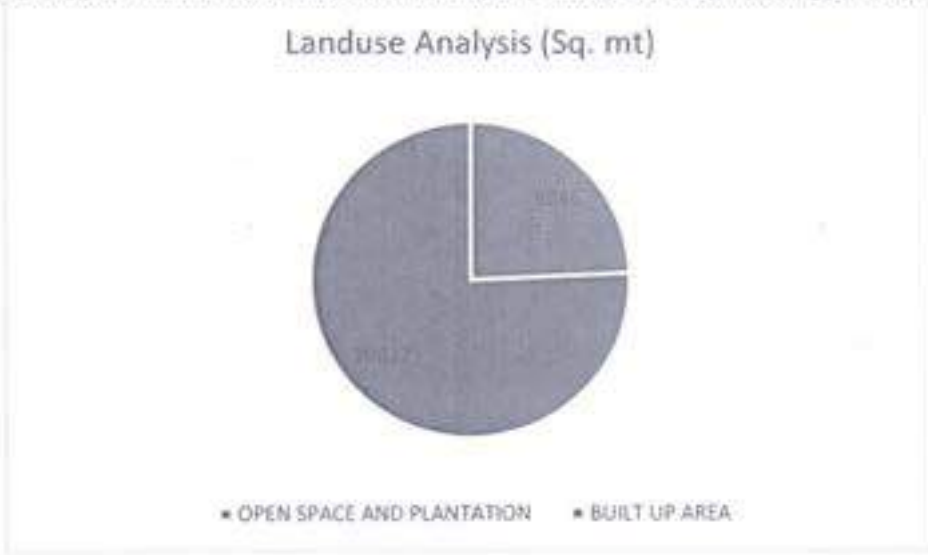
METHODOLOGY ADOPTED FOR LAND USE MAPPING

Three types of data that are GPS points, field survey data and Google earth data for Georeferencing have been used in this study. Land use map of the study area have been prepared using the above three types of data with the help of google maps.



LAND USE DATA OF ACET COLLEGE, Surampalem

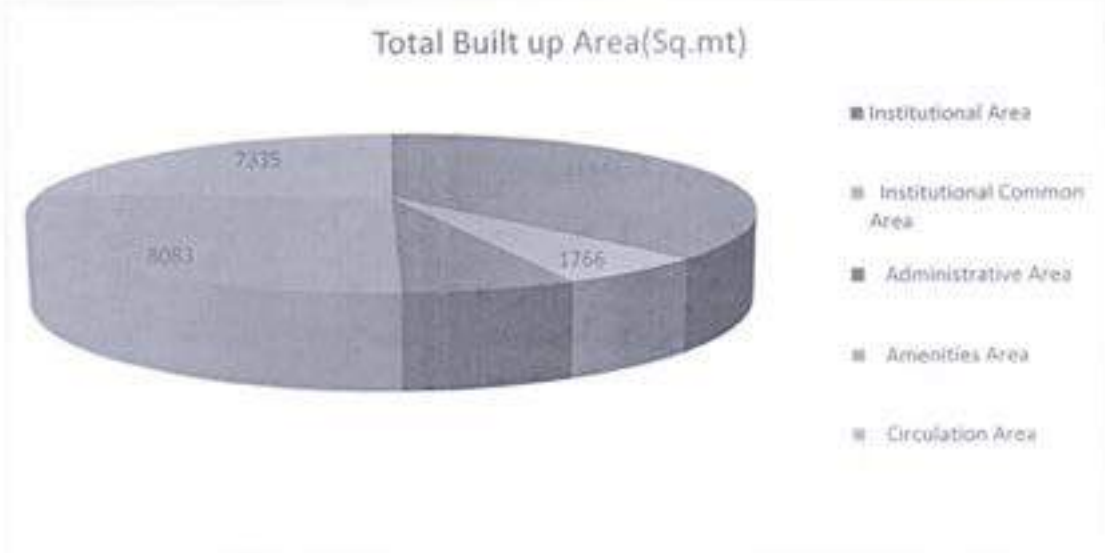
CATEGORIES OF LAND USE	AREA IN SQ METRES
OPEN SPACE AND PLANTATION	9846
BUILT UP AREA	30622
TOTAL AREA	40468



The total area of ACET College is 40,468 sq. meters out of which the built-up area is 76% (i.e., 30622 sq. meters) and open space & plantation area is 24% (i.e., 9846 sq. meters).

LAND USE (BUILT UP AREA) ANALYSIS:

CATEGORIES OF LAND USE (BUILT UP AREA)	AREA IN SQ METRES
Institutional Area	11443
Institutional Common Area	1766
Administrative Area	1995
Amenities Area	8083
Circulation Area	7335
TOTAL AREA	**30622**



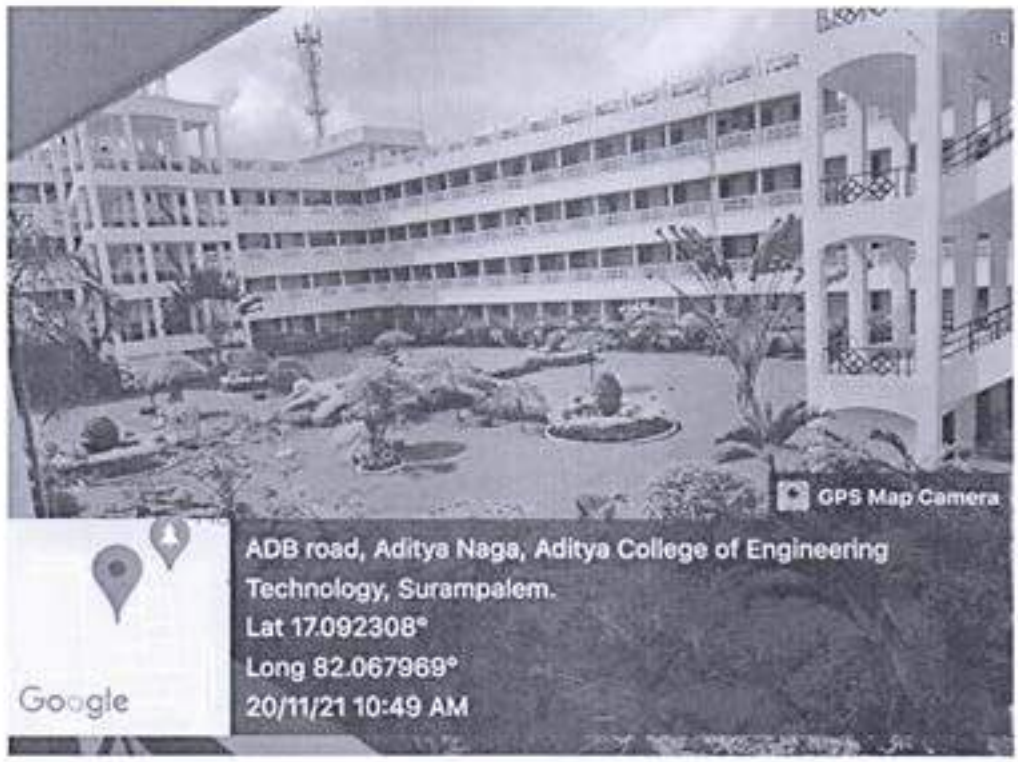
The institutional area sums up to 11443 sq. meters, followed by institutional common area is 1766 sq. meters. Administrative Area is 1995 sq. meters. The amenities occupy about 8083 sq, meters and circulation area is about 733 sq. meters.

ACET College, which was established in the year 2008, has an eco-friendly environment. It has a long legacy of healthy environmental practices including periodic plantation, their preservation and maintenance. Its land use is such that about 24 % of the total area is occupied by open land and plantation that generates a better and sustainable campus environment.

TREE DIVERSITY OF ACET COLLEGE, Surampalem

ACET College is within the geo-position between latitude 17° 5' 26" N, and longitude 82° 4' 1" E at Surampalem, 30 Km from Kakinada city India. It encompasses an area of about 180 acres of greenery in Surampalem. The area is immensely diverse with a variety of tree species performing a variety of functions. Most of these tree species are planted in different periods of time through various plantation programmes organized by the college management and have become an integral part of the college.

The trees of the college have increased the quality of life, not only the college fraternity but also the people around of the college in terms of contributing to our environment by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, controlling climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer. We often make an emotional connection with these trees and sometime become personally attached to the ones that we see every day. Thus, the college has been playing a significant role in maintaining the environment and its surrounding areas.



ACET campus is having total green area of **9846 m²**

S.No.	component	Area in m²
1	Lawn	3265
2	Tree cover	2148
3	Potted plants	2188
4	Shrubs and hedges	2245

Below stated information is provided by the college management team:

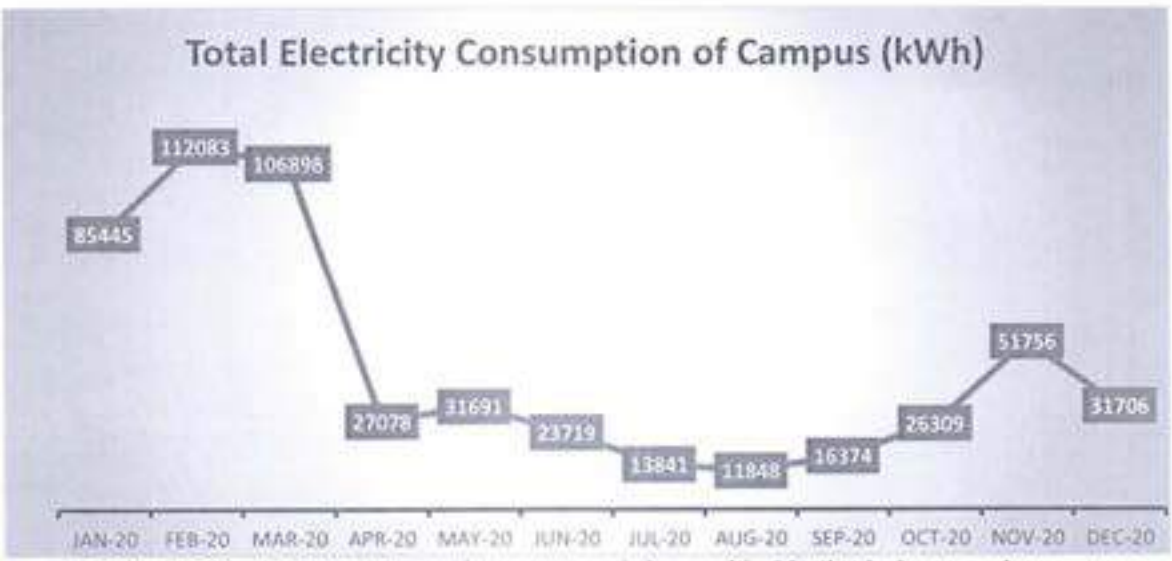
- ACET campus has a beautiful garden area. The garden has different sections in which specific types of plants are planted with respect to their medicinal importance and Vedic reference. Boards are displayed for each section and plants names. Sprinkler system is provided in herbal garden.
- Large trees and potted plants were seen in the campus. Plantation improves aesthetics and helps as buffer in reducing noise level, maintaining temperatures of the area. As informed by the garden supervisor, around 80 trees are present in the campus.
- Garden is managed by gardener. Organic fertilizers and pesticides are used for plants if necessary.

ELECTRICAL POWER CONSUMPTION AT ACET COLLEGE

Total Energy consumption: At ACET College, being one of the reputed colleges in the Andhra Pradesh consumed on an average 44895 kWh (units) of electricity per month which turns out to be 538748 kwh during 2020.

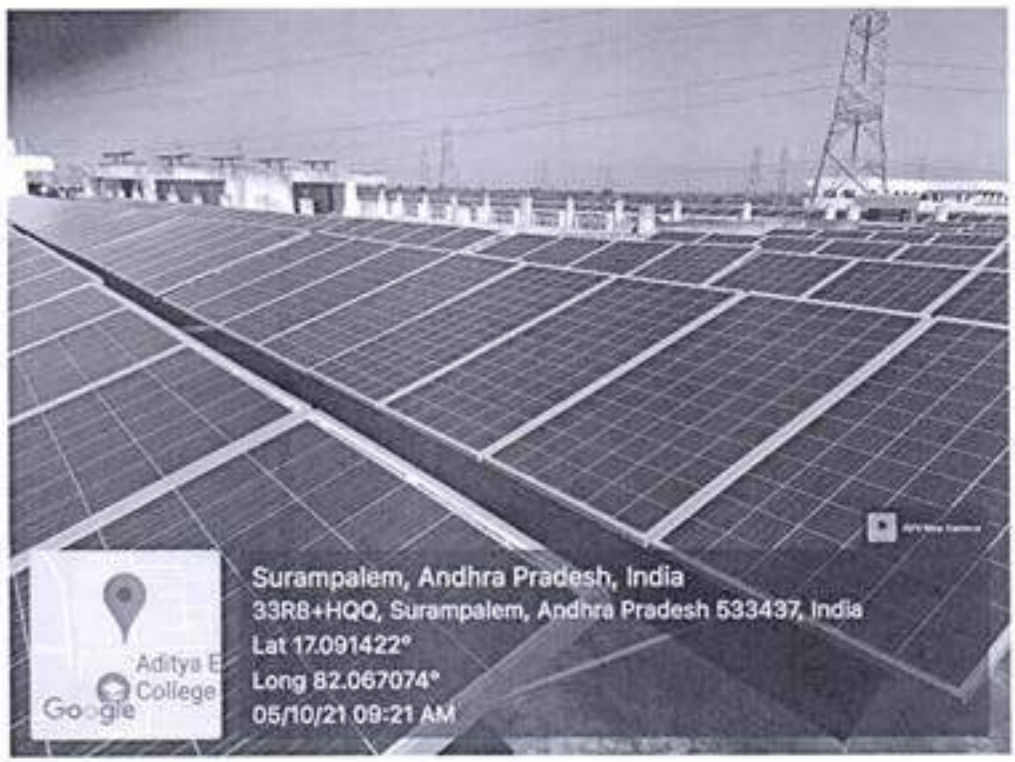
Monthly Power Demand:

Total power consumption graph during the last calendar is provided below:



Variation in the grid power consumption per month is provided in the below graph:

Renewable energy: There is a Rooftop solar PV System of 500 KW capacity has been installed to cater to the energy needs of the college.



The college has also started using clean energy since 2018 from the 500 KW solar power plant installed near the college. It has produced 657408 units of clean energy during 2020.

WEATHER DATA OF Kakinada: ACET COLLEGE

Month-wise weather data of Kakinada City (30 Km from Surampalem ACET) For the year 2020

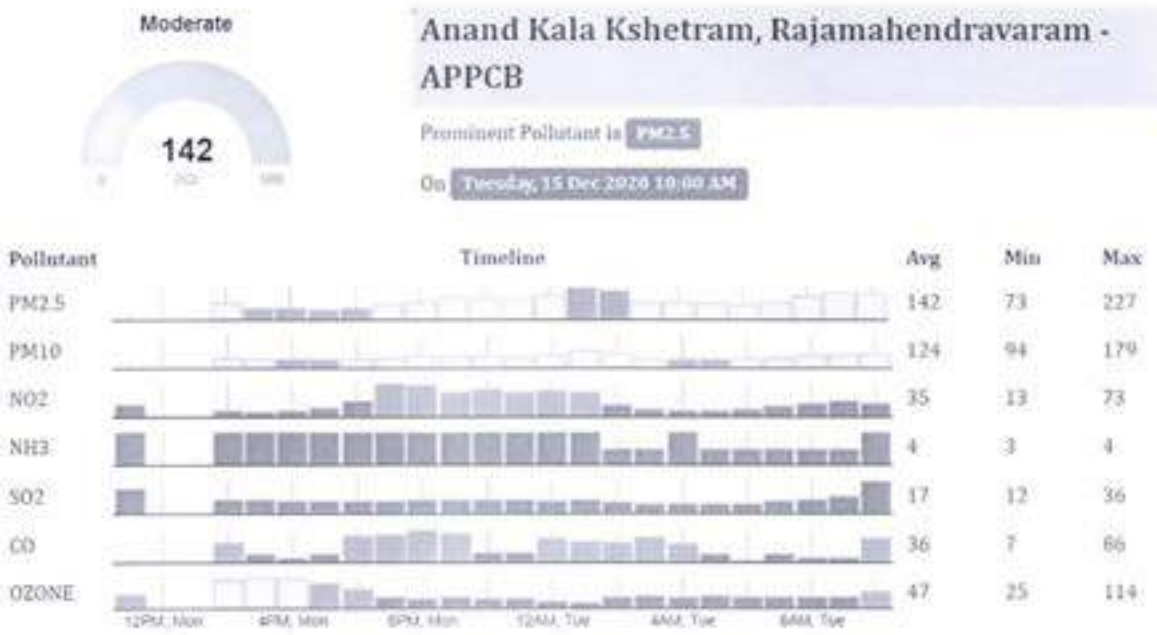
Month	Max Temp (C°)	Min Temp (C°)	Precipitation (mm)
January	34.6	20.3	12.6
February	37.8	21.7	10.3
March	40.0	24	7.5
April	42.8	26.2	16.4
May	46.9	27.8	42.3
June	47.4	27.3	122.8
July	41.7	26.2	175.4
August	38.4	25.9	176.9
September	37.9	25.9	199.4
October	37	24.8	243.
November	35.9	22.5	98.8
December	34	20.3	10.7

From the above table, it is evident the temperature is high in the month of June and low in the month of December. The rain fall is high during the month of September and low in the month of February.

AIR QUALITY IN KAKINADA: ACET COLLEGE

The climate of ACET college campus located at Surampalem near Kakinada city outskirts. It was noticed the college is away from the bustling city Kakinada and the campus is fully green with many trees and plantations.

Air Quality determination
Satisfactory: Air quality index (OVERALL 62) in **Rajamahendravaram weather station (34 km from Surampalem), India**



The air quality index is found 142 as per the publicly available data for the month December 2020. This indicates moderate air quality. However, as the ACET campus is surrounded by greenery and plantation the air quality is of much better quality.

Indoor Air Quality:

The interviews with the college staff have revealed the below:

- During day- time Air Quality Index (AQI) of 45-60 because of campus greenery
- In kitchens present in Cafeteria, LPG is used for cooking which is a clean fuel.
- In classrooms the mode of ventilation is natural draft (through windows) and is enhanced by fans. Large windows and cross-ventilation are observed in corridors. Air conditioners are used in some offices, computer laboratories and computer server room.
- Exhaust fans are provided in chemistry laboratory and all kitchens.

WATER ANALYSIS REPORT OF ACET COLLEGE

ACET consumes the ground water which is stored in the overhead tanks. The campus 120 KL and 40 KL overhead tanks to meet the water needs of the institute. Further, the A and B hostels have 35 KL and 10 KL overhead tanks.

It was informed that there is 2000 Liters per hour of Reverse Osmosis plant. It was observed the RO plant is working efficiently.

Green audit team noticed that the drinking water quality was found good and potable.

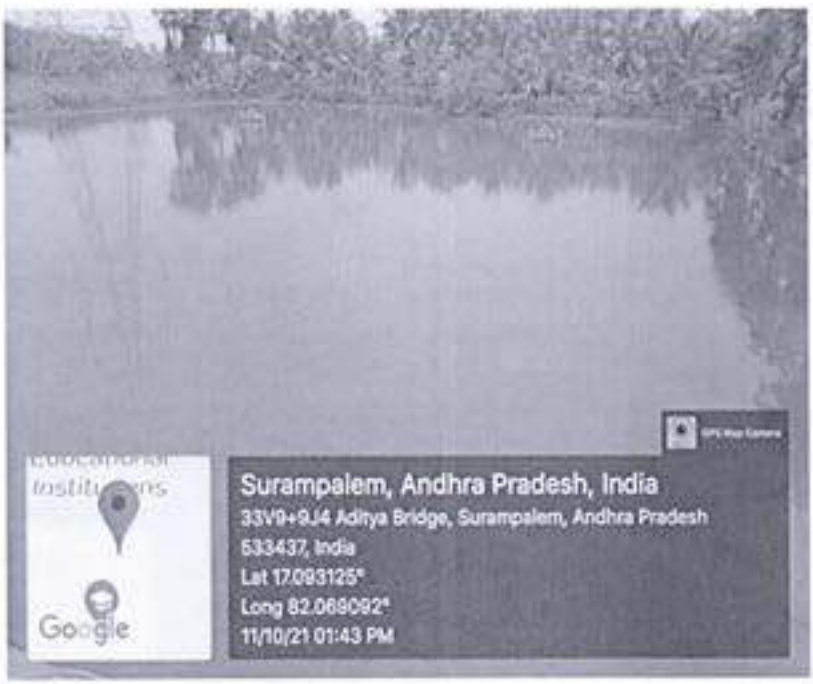
Green audit team has noticed that there is a water harvesting pit where the RO reject is used to recharge the ground water. Approximately 40% of the water entering the RO water gets rejected which is used to recharge the ground water.

Wastewater: Wastewater is mainly generated from toilet flushing and kitchens. Wastewater generated from academic blocks as well as hostels is collected in septic tanks and passed to surrounding trees and plants through canals.

Rainwater harvesting:

Rainwater collected from building roofs is gathered in the building blocks' interior gardens. Some rainwater is directly absorbed into the ground, while some is used for vegetation development. The majority of the precipitated water was channeled to the inner garden area's outlet, where it entered the combined drainage system. The drained water was sent to the campus's open ponds, while precipitation that fell near the ponds was also transported through drains and gathered in the ponds.

The rainwater is fed into the surface pond nearby the college. The picture of the pond is provided below.



The pond water is used for gardening needs of the college.

Liquid Waste Management:

The liquid wastes generated in the campus include Sewage, Laboratory, Laundry, hostel and canteen effluent waste. The above waste is treated through Pond setup in the institute with a capacity of 24000 KLD (Kilo Liters per Day). The entire treated water is used for watering the gardens and lawns maintained in the campus. Therefore, the entire waste water generated in the campus is treated and reused. The laboratory waste water does not contain hazardous chemicals and periodical monitoring is done by the maintenance team.

NOISE LEVEL IN THE SURROUNDING OF ACET COLLEGE

Our site visit observations, revealed that the noise levels were found satisfactory and within the permissible limits.

WASTE MANAGEMENT AT ACET COLLEGE

Management of solid waste is an important driver in Green Audit. Solid waste not properly managed leads to the degradation of the environment which, in turn, affects the flora and fauna. Keeping this in mind, the College has been strictly implementing scientific solid waste management to maintain the green status of the campus.

The present Prime Minister of India Sri Narendra Modi launched 'Swachh Bharat Abhiyan' (Clean India Mission) on 2nd October, 2014. In this mission, the proper use of dust/waste bins is one of the major priorities. For the implementation of this mission, collective mass effort is necessary. For proper segregation and management. proper use of waste bins is the only solution for waste management purpose in the college campuses.

Waste Management includes the management and handling of all types of wastes. This waste types include the following:

Wet Waste: Wet waste includes the organic waste such a food waste, kitchen waste after peeling the vegetables and garden waste etc.

Dry Waste: Dry waste can be categorized into different wastes such as plastic

waste, E- Waste, bio-medical waste, Construction & demolition waste and hazardous waste.

Paper Waste:

In order to reduce the paper waste, the management started digitization. It has implemented good practices such as prints and photocopies are taken on both sides of the pages. Further, the campus has E-book facility since 2018 all the book are available on the college website for the students at any time. Further, records of books and e-books are well kept and were available for review.

Internal notices and communications are through E-mail/SMS. AIET has Learning Management System (LMS) where notices are sent, exam results are displayed and attendance is recorded digitally.

Other good practices followed by ACET are provided below:

- Biometric attendance is provided for ACET staff.
- Paper notices are displayed on the notice boards. The dissertation reports, journals, and answer papers are stored as per the University rules.
- Around 10 kg paper waste is being generated by ACET each year. Old papers and books are given to the recycler Aditya Notebooks
- ACET encourage students to use eco-friendly material and recycle old papers/ scrap for decoration purpose during college festivals.

Solid Waste:

Being an institute with residential facility, considerable quantity of wet (food/ organic) waste is generated in the premises.

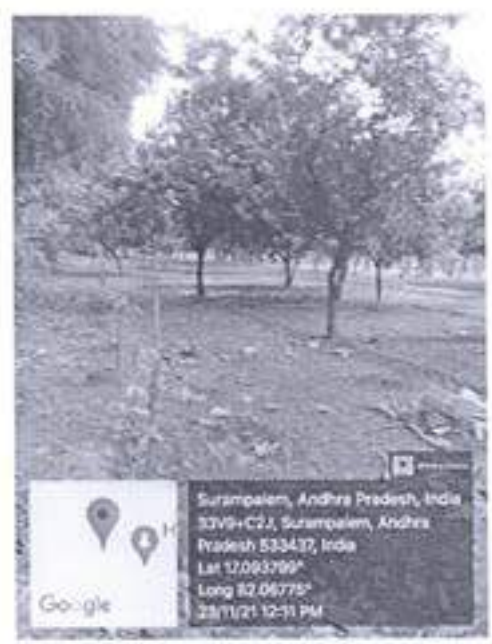
Below information is obtained from the college:

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. It is a great concern relating to environment and society Aditya College of Engineering and Technology took major steps to manage the waste to protect and create a clean and pleasant environment. The departments as well as administrative offices generates some waste and put in two bins for wet waste and dry waste kept in departments and corridors. Each building has several dust bins from where the housekeeping staff collects the trash. In the same manner waste from canteens, residential quarters, Hostel and guest houses is collected. The collected waste is dumped in big containers (wet and dry) by the housekeeping staffs regularly. The whole waste is then segregated and then the waste that can be used for composting is dumped for vermicomposting. Vermicomposting unit converts the biodegradable waste to fertilizer. This fertilizer is used to promote the lemon orchard located in the ACET campus. ACET discourages use of plastic; particularly single use plastics in campus. Paper wastes from departments, Library, Administrative offices, Hostels, are disposed through vendors. The wastes are properly stacked in designated place and later disposed through vendors for proper waste management. Aditya promotes digital platform to reduce the usage of paper for communication and sharing documents.


Surampalem, Andhra Pradesh, India
33V9+C2J, Surampalem, Andhra Pradesh 533437, India
Lat 17.093592°
Long 82.06765°
23/11/21 12:12 PM
Google


Surampalem, Andhra Pradesh, India
33V9+C2J, Surampalem, Andhra Pradesh 533437, India
Lat 17.093696°
Long 82.067539°
23/11/21 12:09 PM
Google


Surampalem, Andhra Pradesh, India
Google


Surampalem, Andhra Pradesh, India
33V9+C2J, Surampalem, Andhra Pradesh 533437, India
Lat 17.093799°
Long 82.06775°
23/11/21 12:11 PM
Google

E-Waste:

Being one of the progressive colleges in India, ACET has also moved to on-line learning system through it's e-courses. This includes classrooms, library, internal mails etc. All the classrooms are digitized. It also has an E-library, student & staff portal for academic work, biometric attendance system for staff, etc.

Electronic goods are put to optimum use; the minor repairs are set right by the Laboratory assistants and teaching staff; and the major repairs are handled by the Technical Assistant and are reused. ACET has entered MoU with ELECTROPRO SYSTEMS which buys our damaged computers and other non-reparable e-waste and issues a Recycling certificate. ELECTROPRO procures the equipment which cannot be refurbished for re-use is dismantled and remanufactured into raw materials (i.e. metals, plastics, glass) to be marketed as recyclable. The waste compact discs and other disposable non-hazardous items are used by students for decoration during college fests as a creative means of showcasing the waste management practice that has been induced in the minds of the students.

Old computers are given to a Local vendor (Pavan computers) in Kakinada with whom MOU was made for AMC, while purchasing new computers at discounted price.

Transportation

ACET is located in surampalem, which is 35 km from Kakinada and 35 km from Rajahmundry. ACET provides buses and cars for transportation for students/ staff. Most of the staff pool buses and cars and a few staff members travel by private vehicles. ACET management encourage students and staff to use the college buses (40) or public transport system to reduce carbon emissions.

Sustainable Initiatives

Due to minimum consideration for environment & sustainability, the world is facing problems of ozone depletion, climate change, water scarcity and sustainable resource management. ACET organizes guest lectures on Environmental conservation, biodiversity, etc. every year.

ACET has a demonstrated consistent commitment towards nature and environment. ACET started Haritha eco green club, which offers wide spectrum of environmental and nature activities and platforms to enhance awareness and exhibit the relationship with nature. Various activities organized by 'Haritha 'involved guest lectures, nature visits, workshops and competitions.

Recommendations/ Suggestions

For Indoor Air Quality

- Indoor plants can be chosen in such a way that they give aesthetic appearance as well as health benefits.
- Information on sources, impacts and mitigation of indoor air pollution to be displayed within ACET for increasing awareness about indoor air pollution. E.g. Signage can be put in chemistry laboratory for handling fuming chemicals.

Water Conservation

- Provide information on water usage and savings to students/ staff through notices, screen savers in computer laboratories, and encourage reduction/ wastage of water.
- Replace all old water faucets with water saving faucets taps, aerator taps, jet sprays etc. Installation of such faucets can save water and help in minimizing the water footprint.
- Dual flushing system can be installed for toilet flushing, with appropriate instructions, which will save considerable amount of water.
- Grey water/ sewage recycling system can be installed for flushing toilets. This will reduce the fresh water footprint.
- Signage/ posters should be posted in high water consumption areas in Academic Blocks to increase awareness regarding water conservation.
- As the source of water is borewell, ACET can install water meter on borewell line to monitor daily borewell withdrawal.
- Implementation of the STP could reduce the dependency on the ground water.

Global Green Solutionz
Greening the globe

Global Green Solutionz

509, Block A, Emerald Heights, Annojiguda, Hyderabad-500088
Tel: +91-7331134789; Email: globalgreensolutionz@gmail.com

November, 2021

TO WHOMSOEVER IT MAY CONCERN

This is to certify that, we have conducted green audit at M/s Aditya College of Engineering& Technology, Aditya Nagar, Surampalem, East Godavari District to identify various green measures to conserve various resources in the institution operations. Green Audit Report is submitted to the management.

For Global Green Solutionz

M. Srikanth

GLOBAL GREEN SOLUTIONZ GREIGHAM

PRINCIPAL
Aditya College of Engineering
& Technology
SURAMPALEM-533437

Srikanth Meesa,

CEO, Global Green Solutionz

KR Energy Consultants

February 15, 2021

TO WHOMSOEVER IT MAY CONCERN

This is to certify that, we have conducted energy audit at M/s Aditya College of Engineering & Technology, Aditya Nagar, Surampalem, East Godavari District to identify various energy saving measures and to reduce GHG emissions in the institution operations. A copy of the report is submitted to the management.

For KR Energy Consultants

T. Krishna
Authorised Signatory
BEE Certified Energy Auditor No.3398
Registrar of Firms Certificate
No.1086 of 2002, dated 27/08/2002

KR Energy Consultants
Flat No.103, SS Ajay Arcade, Doctors Colony, Saroornagar, Hyderabad, AP- 500035
Mobile: 9440234294
E-Mail: krenergy@rediffmail.com

Global Green Solutionz
Greening the globe

Global Green Solutionz

509, Block A, Emerald Heights, Annojiguda, Hyderabad-500088
Tel: +91-7331134789; Email: globalgreensolutionz@gmail.com

November, 2021

TO WHOMSOEVER IT MAY CONCERN

This is to certify that, we have conducted environmental audit at M/s Aditya College of Engineering& Technology, Aditya Nagar, Surampalem, East Godavari District to identify various sustainable measures to conserve various resources in the institution operations. Environmental Audit Report is submitted to the management.

For Global Green Solutionz

M. Srikanth

GLOBAL GREEN SOLUTIONZ HYDERABAD

Srikanth Meesa,

CEO, Global Green Solutionz

PRINCIPAL
Aditya College of Engineering
& Technology
SURAMPALEM-533437

Bharath Talents Association

Magic House, Ryali, A.P., India. Regd No. 565/2016

Certificate of Appreciation

is awarded to

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY

For their momentous contribution in Maintaining Green, Eco-Friendly campus on June 2021

PRINCIPAL
Aditya College of Engineering & Technology
SURAMPALEM-533437

(Ch.Mohith Krishna)
Brand Amabassdor

(K,Annapurna)
Founder & President

Date: 12th July2021

Bharath Talents Association

ISO 9001

www.bharathtalentsbookofworldrecord.com Email: bharathtalentsworldrecords@gmail.com

YouTube Bharath Talents 9866372645 8886765179

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY
Aditya Nagar, ADB Road, Surampalem.

ECOCORPS: ACET ECO-CLUB

Ref: ACET / Eco / 2020-21 / CO

About the committee:

Aditya College of Engineering and Technology is dedicated to advancing society. It developed a proactive approach to environmental protection, entrusting students with the obligation to safeguard the environment on and off-campus. It organizes public awareness campaigns to encourage people to participate in environmental activities and initiatives. It's called ECO CORPS, and it's a group of students that reach out to their parents and community to encourage them to be more environmentally conscious.

Objectives:

- To educate the students about the importance and desideratum of the environment.
- To instil clean and green conscience in students through many inventive approaches.
- To involve students in environmental preservation activities.
- To encourage students to adopt the waste-reduction, reuse and recycle behaviour and lifestyle.

Procedure:

1. **Circulars-** The committee coordinator should submit a request to the Principal for club approval for the academic year.
2. **Registrations-** Club may sign up the student members any time based on the students' interest and activeness, and this can be done with senior active student members in the club.
3. **Faculty Coordinator-** Central coordinator will involve in conducting meetings and planning for the events for the academic year. Faculty committee members will look into implementing the events as per the schedule. Before conducting any program, the faculty committee should take the Principal's permission and get the facilities and budget required for the program.
4. **Meetings-** Club members must meet at least thrice in an academic year and follow the rules and regulations for running the activities/events.
5. **Student coordinator-** The following points are to be followed by the student coordinator:

- Should follow-up the registration of a student in the club.

M. Satish Kumar
ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of
Engineering & Technology
SURAMPALEM-533 437

Principal

- Selection of student volunteers for the events/activities and make names available with the head committee.
- Should be taken care of the student volunteers who participated in the activities/events.

6. **Responsibilities of coordinators**

- Should conduct meetings to set an agenda for the programs to be organized or conducted.
- Assign the responsibilities to the club members to conduct programs and maintain relevant documentation.
- The coordinator should make necessary arrangements for the smooth conduct of the programme.
- Maintain student mentors to coordinate with college students to conduct the programme.
- Should have good contact with the other welfare organizations to collaborate and execute the tasks

Activities:

1) Environmental awareness programs such as Air Pollution, Plastic-free Society, Water Conservation, Tree Plantations, and Rallies
2) Adopting Schools to grow trees and planting tree saplings
3) We conduct awareness drives regarding the cleanliness of surroundings inside and out of the campus, like schools and public areas.
4) We are providing recycling bins on the campus.
5) We are celebrating commemorative days by plantation and distribution of plants.
6) We are conducting activities for staff and students to inculcate the habit of a green environment.
7) We are encouraging the usage of Bicycle and Battery vehicles for transportation inside the campus.
8) Landscaping empty plots with plants and trees on the campus.

M. [illegible]
ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of
Engineering & Technology
SURAMPALEM- 533 437

Principal

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY

Aditya Nagar, ADB Road, Surampalem.

Ref: ACET / Eco / 2020-21 / CO

Date: 06-01-2021

Eco Club — Convening Order

Academic Year 2020-2021

Notice

The Principal is pleased to constitute the college Eco Club with the following members for the academic year 2020-21 to make necessary arrangements to create awareness about the importance of eco-friendliness.

S No	Name of the Committee Members	Designation	Role
1	Dr. T K Rama Krishna Rao	Principal	Chairman
2	Mr. Mummidivarapu Satish Kumar	Asst. Professor	Coordinator-1
3	Mr. Gandham Venkata Vinod	Asst. Professor	Coordinator-2
4	Dr. Jillella M Kanthi Thilaka	Professor	Member
5	Mrs. Gadi Mounica	Asst. Professor	Member
6	Mr. K Ramakrishna 20P31D5804	Student	Member
7	Ms. Krityatirtha Paul 18P31A0319	Student	Member
8	Mr. Reddi Sridhar 20P35A0132	Student	Member
9	Ms. Bokka Sirisha 19P35F0007	Student	Member

Copy to:

1. All members of the committee

2. IQAC

M. Satish Kr.

ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of
Engineering & Technology
SURAMPALEM-533 437
Principal

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY

Aditya Nagar, ADB Road, Surampalem.

Ref: ACET / Eco / 2020-21 / CO

Date: 09-01-2021

CIRCULAR

This is to inform all the Eco-Club Committee Members that there will be a meeting in Principal's Chamber at 3.00 Pm on 10th January 2021 with the following agenda and to discuss the finalized schedule of Activities for the Academic year 2020-2021 and decide a plan of action for further course of action. All the members are requested to attend the meeting without fail.

Agenda:

1. Approval of existing S.O.P.
2. To discuss and plan Eco-Club Activities
3. Any other issue with the permission of the chair.

Copy to Members of CC

Office A.O.

M. [illegible]

ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of
Engineering & Technology
SURAMPALEM- 533 437

Principal

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY
Aditya Nagar, ADB Road, Surampalem.

Ref: ACET / Eco / 2020-21 / CO

Date: 10-01-2021

Minutes of Eco-Club Committee Meeting

A Meeting was held on 10th January 2021 with the Members of the Eco-Club Committee in the Principal's Chamber with the following agenda. Principal Dr T.K. Ramakrishna Rao chaired the meeting.

AGENDA:

1. Approval of existing S.O.P.
2. To discuss and plan Eco-Club Activities
3. Any other issue with the permission of the chairman.

The convener welcomed all the members, presented the agenda, requested the chairman to preside over the meeting with the intended agenda, and started the discussion. The agenda points were discussed, and the subsequent resolutions were made. The chairman appreciated everyone for their enthusiasm and readiness. Further, the chairman reviewed and discussed all the points of the agenda.

The committee made the following resolutions:

1. The chair instructed H.O.D.'s and faculty members to encourage the students to participate in the Eco-Club Activities Scheduled.
2. An Existing Standard Operating Procedure (S.O.P.) is put forward for approval, and the chairman approves the same.
3. Various Activities and events from Eco-Club are identified for the academic year 2020-2021, and the chair promised to release necessary grants for conducting the events successfully.
4. The chair urged the committee members to schedule the events without disturbing their regular academics.
5. The chair also agreed to give attendance to the students who are participating in the events.
6. The meeting got concluded with a note of thanks to the chair.

ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of
Engineering & Technology
SURAMPALEM-533 437

Principal

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY

Aditya Nagar, ADB Road, Surampalem.

Ref: ACET / Eco / 2020-21 / CO

The following members attended the meeting

S No	Name of the Committee Members	Designation	Role	Signature
1	Dr. T K Rama Krishna Rao	Principal	Chairman	
2	Mr. Mummidivarapu Satish Kumar	Asst. Professor	Coordinator-1	
3	Mr. Gandham Venkata Vinod	Asst. Professor	Coordinator-2	
4	Dr. Jillella M Kanthi Thilaka	Professor	Member	
5	Ms. Gadi Mounica	Asst. Professor	Member	G. Mounica
6	Mr. K Ramakrishna 20P31D5804	Student	Member	K. Ramakrishna
7	Ms. Krityatirtha Paul 18P31A0319	Student	Member	
8	Mr. Reddi Sridhar 20P35A0132	Student	Member	R. Sridhar
9	Ms. Bokka Sirisha 19P35F0007	Student	Member	B. Sirisha

M.

ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of
Engineering & Technology
SURAMPALEM- 533 437

Principal

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY

Aditya Nagar, ADB Road, Surampalem.

Activities conducted in the year 2020-21

S No	Name of the activity	Date	No of participants		Location
			students	faculty	
1	Saplings plantation	22-04-2021	30	7	Inner garden of vishweshwaraya block & Outer garden of C.V. Raman block (Inside campus)
2	Clay Idols- Go Eco Friendly	9-9-2021	25	10	Inner garden of vishweshwaraya block (Inside campus)
3	Pledge on "Save and restore our beloved mother earth."	23-10-2021 to 26-10-2021	120	2	C.V. Raman block
4	Awareness program on Reduce, Reuse, Recycle(R.R.R.) of waste for pollution-free Environment	23-11-2021	60	4	Z.P.P. High school, Nayakampalli (outside campus)
5	Plantation and distribution of saplings at Nayakampalli	23-11-2021	60	4	Nayakampalli village (outside campus)

M. Lalith K.,
ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of
Engineering & Technology
SURAMPALEM-533 437

Principal

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY

Aditya Nagar, ADB Road, Surampalem.

Report on "Saplings plantation."

Date: 22-04-2021

Location: Inner garden of vishweshwaraya block & Outer garden of C.V. Raman block

No. of students participated: 30

No. of faculty participated: 6

Name of the Chief Guest: Dr. T.K. Rama Krishna Rao

Our planet is a beautiful gift, one of a kind in the cosmos that makes life possible by providing a healthy environment for all living creatures. On the occasion of World Earth Day, 22nd April 2021, the ACET Eco-Club – Eco Corps organized a planting drive on campus. Our college's Principal, Dr.T.K Ramakrishna Rao, addressed the event and spoke on the value of our beloved earth. THE CHIEF GUEST, Dr. A. Ramakrishna, encouraged the students to protect the environment by planting more trees throughout their lives. This event drew 30 students, five faculty members, and the chief guest and Principal. Together with the students, the chief guest planted trees in the inner garden area of Vishweshwaraya block, and the Civil and Mechanical department H.O.D.s planted saplings in the outer garden of C.V. Raman block.

Photo with Principal & chief guest | Plantation by civil and mechanical HOD's

Giving sapling to chief guest | Plantation by students & faculty

M. Satish Kumar.

ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of
Engineering & Technology
SURAMPALEM-533 437

Principal

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY

Aditya Nagar, ADB Road, Surampalem.

Report on "Clay Idols- Go Eco Friendly".

Date: 09-09-2021
Location: Inner garden of vishweshwaraya block
No. of students participated: 25
No. of faculty participated: 10

ACET Eco-Club – Eco Corps held a "Clay Idols- Go Eco Friendly" program to commemorate the Vinayaka chavithi. Vinayaka chavithi is an Indian religious celebration during which people worship Ganesh idols for a length of time before releasing them into the river. This is a tradition that dates back many years. However, due to modernization, idols were created using plaster of paris, which poses the greatest environmental risk. The ACET Eco-Club – Eco Corps held a programme on making Ganesh idols from natural clay to reduce chemicals in the environment. The Principal and senior professors attended the occasion and spoke to the students about the importance of using clay idols for the Ganesh celebration. The clay Ganesh idols were made by Eco Corps and other faculty members and handed to the faculty. The celebration took place in the Vishweshwaraya's inner garden with ten faculty members and 30 students.

Students preparing clay idols

Senior Faculty participation in the event

Lady faculty participation in the event

Distribution of the Ganesh clay idols

M. Satish Kumar,
ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of
Engineering & Technology
SURAMPALEM- 533 437

Principal

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY

Aditya Nagar, ADB Road, Surampalem.

Report on "Save and restore our beloved mother earth" pledge event

Date: 23-10-2021 to 26-10-2021

Location: C.V. Raman block room no 307 & vishweshwaraya block room no 218

No. of students participated: 120

No. of faculty participated: 4

To create awareness and responsibility towards the earth, ACET Eco-Club – Eco Corps had conducted a pledge on "Save and restore our beloved mother earth". The pledge was taken on the first day, 23rd October, 2021, in room 307 of the C.V. Raman building, and on the second day, 24th October, 2021, in room 218 of the Vishweshwaraya block. On day 1, 70 students and four faculty members took part, with the rest taking part on day 2. The following is the pledge taken by the students:

As a responsible citizen

- I pledge to save and restore our beloved mother earth in the interest of humanity and help protect human lives.
- I shall try to stop anyone who acts against the environment and thus damaging the tranquility and balance of the mother earth in all possible manners.
- I dedicate myself to ensure that the future generation receives a habitable planet.

Students taking pledge

Students taking pledge

Faculty taking pledge

Certificate for completion of pledge

M. Sathish Kumar,
ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of
Engineering & Technology
SURAMPALEM-533 437

Principal

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY

Aditya Nagar, ADB Road, Surampalem.

Report on "Awareness program on Reduce, Reuse, Recycle (R.R.R.) of waste for pollution-free Environment."

Date: 23-11-2021
Location: Z.P.P. High school, Nayakampalli. (Outside campus)
No. of students participated: 80
No. of faculty participated: 4
Name of the Chief Guest: Mr S. Siva Charan

Pollution was growing as a result of industrialization and population growth. Pollution levels would be lowered if created garbage was reduced, reused, and recycled. The ACET Eco-Club – Eco Corps held an "Awareness programme on Reduce, Reuse, and Recycle (R.R.R.) of wastes for pollution-free Environment" at Z.P.P. High School, Nayakampalli, to raise awareness among the society's roots, namely school kids. Mr S. Siva Charan (H.O.D. of civil department) served as a resource person for the programme, explaining and motivating the students about waste reduction via Reduce, Reuse, and Recycling (R.R.R.). This programme comprised 46 high school students, 34 college students, and four faculty members. At the conclusion of the session, the school's headmaster spoke to the kids about the program's significance and provided valuable comments on the event.

Resource person explaining to students

Group photo with school head master

School students listening to the resource person

Group photo of college students and faculty at school

M. Satish Kumar,
ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of Engineering & Technology
SURAMPALEM

Principal

ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY

Aditya Nagar, ADB Road, Surampalem.

Report on "Plantation and distribution of saplings at Nayakampalli."

Date: 23-11-2021
Location: Nayakampalli village. (Outside campus)
No. of students participated: 60
No. of faculty participated: 4

To protect the environment by planting and distributing the saplings outside the campus. ACET The plantation and distribution of the sapling drive were conducted by Eco-Club – Eco Corps at nayakampalli village. Eco Corps went to the village and located the spots for the plantation. A total of 34 students was involved in this event and planted around 20 tree saplings at different locations in the village. Here the students interacted with the village people and requested to take responsibility for the planted saplings. And also, around 25 saplings are distributed to the village people. During this event, students have interacted with the village people and explained, motivated them about the importance of the plants and plantation.

Planting a sapling at village

Interaction of students with village people

Distribution of saplings

Distribution of saplings

M. [illegible]
ACET ECO-CLUB Coordinator

PRINCIPAL
Aditya College of
Engineering & Technology
SURAMPALEM- 533 437
Principal