Punjab Association's

ANNA ADARSH COLLEGE FOR WOMEN

(Affiliated to University of Madras)

ANNA NAGAR, CHENNAI 600040

CRITERION 7

7.1.3 Quality Audits on Environment & Energy

Punjab Association's

ANNA ADARSH COLLEGE FOR WOMEN

(Affiliated to University of Madras)

Chennai - 600040,Tamil Nadu.

Verified & Certified Documents

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Punjab Association's

ANNA ADARSH COLLEGE FOR WOMEN

(Affiliated to University of Madras)

ANNA NAGAR, CHENNAI 600040

CRITERION 7

Green Audit

ANNA ADARSH COLLEGE FOR WOMEN
ANNA NAGAR, CHENNAI-40

GREEN AUDIT REPORT
2019-2020 & 2020-2021

ANNA ADARSH COLLEGE FOR WOMEN

REPORT OF THE GREEN AUDIT 2019-2020 & 2020- 2021

COLLEGE :ANNA ADARSH COLLEGE FOR WOMEN

DATE:30 th September 2021

EXTERNAL EXPERT: Mr. M.B.NIRMAL

DESIGNATION : FOUNDER AND CHAIRMAN OF EXNORA INTERNATIONAL

a) **STRENGTH:** (i) Sensibising the students to use more eco-friendly products in their day to day life.
(ii) Observed green consciousness awareness among students and faculty in their team work.

b) **WEAKNESS:** Big Green dream but not enough space.

c) **OPPORTUNITIES:** Every department encourages their students to maintain go green corner in their respective notice boards on current affairs related to environment

d) **CHALLENGES :** Planning for 100% waste recycling campus.

SIGNATURE:

EXNORA INTERNATIONAL CHENNAI-600 017

ANNA ADARSH COLLEGE FOR WOMEN
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GREEN AUDIT REPORT 2019-2020 & 2020-2021

The Anna Adarsh College for Women opened its gates for the first time in 1985. Established in the fond memory of the legendary leader and charismatic statesman of Tamil Nadu, Arignar Anna, the college has taken his renowned motto as its inspiration – Duty, Discipline and Dignity. Beginning with a small core team of 300 students, 22 faculty members and 6 Undergraduate programmes, the college has grown by leaps and bounds with every passing year.

Today, the college boasts of student strength of 4938 with a 215 strong teaching force offering 28 programmes that include the Undergraduate, Postgraduate and Research streams.

Established in the year 1985 by the Punjab Association of MADRAS "Registered logo", "Anna Adarsh College for Women" is a premier centre of higher learning committed to the exclusive cause of women's education. Situated in Anna Nagar, a strategic and easily accessible hub of Chennai and spread across 4.683 acres, the college transforms aspiring young learners into energetic empowered women of integrity.

The accomplished faculty motivate and spur the students to excel in their interests and several co-curricular activities, clubs and excellent sports facilities ensure that students discover their latent potential. Learning interspersed abundantly with guest lectures, international and national level workshops, seminars and conferences are imbibed in a verdant space equipped with the latest technology. All this makes learning at Anna Adarsh an empowering enriching and enduring experience.

The confident young women emerging from these portals are secure in the unique way they are made and nothing can take away or dim the light that shines in each one of them. In order to improve the overall skills of the students the college enrolls the students in various clubs and provides opportunities to shine themselves.

The Career Guidance Cell, National Service Scheme NSS, The Drama Club, and The Music Club serve as training grounds for the students to identify and work on their forte. The NSS, The Rotaract Club, The Business Line Club, The Youth Red Cross , The Road Safety Club, The Red Ribbon Club , The Enviro Club, Soft skill club, Entrepreneurial Development Cell (EDC-AIC), The Red Ribbon Club, Fine Arts provide the students a platform to reach out to the less privileged sections of the society and to create awareness on social issues. The NSS unit of our college has adopted 3villages, Vaniyanchavadi,Padur and Kazhipadur. A number of service activities have been conducted in the villages including awareness campaigns relating to disease prevention, competitions for school children highlighting issues of civic sense, distribution of clothes and bed sheets to old age homes, and health checkups.

Educational institutions are in a unique position to be leaders in pursuing environmentally sustainable solutions. Anna Adarsh College for Women expresses its commitment to sustainability in many ways. Green Audit is conducted and steps are taken for energy Conservation, Protection and Promotion of Environment. This report serves to highlight the ecofriendly accomplishments of the college and recommends for improving the

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environmental sustainability of the institution. The institution takes special efforts to develop ecological consciousness among the students by organizing wide range of activities such as campaigns, rally, exhibitions, screening of films, field visits, workshops and seminars.

The college undertakes various activities through Enviro Club,Rotaract Club and N.S.S. like water and power management and greening the campus. The biodegradable and non-biodegradable waste are segregated by using different coloured dustbins and disposed. To create eco-friendly awareness among the students college organises seminars and workshops by inviting environmentalists. Students are encouraged to participate in eco-friendly activities by making the activities which are a part of the curriculum.

To maintain eco-friendly ambience a 10 point programme is followed :

- Know green and think green is promoted on the campus through tree plantation. Thus carbon dioxide neutrality is maintained .
- Water conservation and prevention of water wastage through rain water harvesting
- Installation of Solar Panels
- Use of CFL bulbs instead of florescent bulbs in the computer labs and smart classrooms.
- Small generators are substituted with 540KV generators to save diesel.
- Safe disposal of biodegradable and non-biodegradable waste using different coloured bins. Recycling of waste is promoted among students by displaying boards like 'Say No to Plastic'
- Micro scale analysis of all the experiments in the Chemistry Laboratory.
- Turning off electronic system after usage .UPS facility for the computer labs with a three hour backup is available.
- Avoiding the use of plastics in serving food in the canteen
- A paper on Environmental studies is incorporated in the curriculum for all the undergraduate students.

The sustainable initiatives taken by the college to make the campus Eco-friendly:

Energy Conversation

- Energy saving bulbs are used in the college campus. Lights were replaced by CFL and LED lights to conserve energy.
- Architectural design for our college is based upon the use of natural lighting and ventilation, to save extra power for bulbs and fans in the classroom.
- The college has a canopy of green trees and plants that reduces the effect of global warming and maintain health of all the students. The garden has neem trees and other trees, which provide shade and beautiful ambience.
- Organizing lectures on energy conservation in order to give awareness to the students.
- Solar panels are installed which utilizes renewable energy. 25% of electricity consumption is met by this installation.
- The consumption for computer usage is reduced to a large extent by turning off the computers to sleep mode.
- Rain water harvesting is done in the campus.
- Composting of garden waste and canteen kitchen waste

Waste Management

E-Waste Management is being carried out in the college periodically by donating working computers which cannot be upgraded to the orphanage run by our management. The useful hardware spare parts are retained in e-waste collection area and put to use later .Practical learning of hardware is done through computers which are not in usage. The condemned parts are scrapped and written off from the stock register.

Segregation of bio-degradable waste and non-biodegradable waste are carried out in the college campus.

Efforts for carbon neutrality

Improving energy conservation and increasing energy efficiency by using renewable energy can reduce carbon emission.

Other Measures:

Guests greeted with saplings

Printing done on both sides of paper

Usage of papers is reduced by sending information through whatsapp, mail and intercom.

Enviro club in collaboration with Nutrition department has planned for terrace garden in the campus.

FUTURE PLANS:

To develop a small garden of medicinal plants.

To empower students to take up meaningful environmental activities and projects.

To promote sound environmental behaviour with our best weapons (Students) by engaging their parents and neighbourhood communities

SNO	Date	Event	Guest/ Judge
1	12 August 2019	The NSS volunteers of Anna Adarsh College organized rally depicting various messages of cleanliness to create awareness among the public for CLEAN INDIA.	No Guest
2	15 August 2019	The National Service Scheme celebrated Independence Day. Our then college principal Dr.Jayashree Ghosh addressed the NSS Volunteers and the students. She discussed the future plans of sustaining cleanliness in and around the area and also declared the institution as "Clean Institution".	No Guest
3	16 August 2019	Department of Tourism and Travel Mangement in association with Be Postive Training Academy organised tree plantation drive in Govt girls Hr Sec Schools, as community service, Extension Acitivity	No Guest
4	31 August 2019	Department Of Commerce Honors – Shift II organized a Skill Based Program on Eco-Friendly Go Green Ganesha	No Guest
5	23 September 2019	NSS day was celebrated The NSS volunteers as part of their culturals organized mime to illustrate the ill effects of irrational usage of mobile phones and it's effect on health. The month of September being the 'Poshon Maah', the NSS volunteers also organized street play to demonstrate the consequences of malnutrition, to the school children. There was also a yoga demonstration by a NSS volunteer.	No Guest

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6	24 November 2019	Department of English Cleaning up St. Fort George as community service	No Guest
7	05 February 2020	The NSS Volunteers attended an Awareness Programme "Bottles For Change" organized by NSS Cell in Collaboration with Bisleri Company.	No Guest
8	06 February 2020	As a Part of "Bottles for Change" programme, the NSS Volunteers Started the Collection Of Plastic Materials in the Campus for Recycling.	No Guest
9	9 May 2020	Department of Home science organized a workshop on Cloth Mask Making by Hand Stitch Method	Mrs.U.Kabira Assistant Professor Department of Home Science
10	20-May-2020	Enviro Club of college organized a Webinar on 'Sustainable Living the way Forward: Post Covid 19 Lockdown'	Dr Sultan Ahmed Ismail, Soil Biologist, Director Eco Science Research Foundation
11	22/02/2021	Department of Chemistry organized a workshop on Preparation of Hand Sanitizer for technical assistant of the college by II PG students	Department of Chemistry.
12	6/5/2021	Post Graduate and Research Department of Public Administration organised a webinar on Solid Waste Management- Reimagine reuse restore to celebrate the World Environment day and as student awareness programme	Mrs. Srividya, Consultant & Trainer M.S Chellamuthu Research Foundation Madurai

MBN.9C

External Green Auditor

EXNORA INTERNATIONAL CHENNAI-600 017.

ANNA ADARSH COLLEGE FOR WOMEN 9th Main Road, Anna Nagar CHENNAI

R. Shanthi 30/9/21

Principal

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Certificate

Of

Green Audit

This is to certify that **Anna Adarsh College for women, Chennai** has conducted a detailed **Green Audit** of their campus for the academic year 2021 – 2022 and has submitted the necessary data and credentials for scrutiny. The activities and measures carried out by the College have been verified based on the field visit and reports submitted and were found to be **Good**. The efforts taken by the faculty and students towards Green environment and sustainability are highly appreciated and commendable.

LAKSHMANAKUMARAN S, B.Tech., M.Sc. (Env. Science), MBA
CQI IRCA Certified Lead Auditor ISO 14001:2015 EMS (UID: 351851)

C.JEBARAJ, B.Tech., PGDEM
EA- 9847 – BEE Certified Energy Auditor & Manager
IRCA Certified Lead Auditor - OHSMS
Internal Auditor – QMS
CII Certified Carbon footprint Professional

Alcheme Green Energy Company
Madurai Office: 6, Jawahar Nagar, 8th Street, Tirumangalam, Madurai - 625706 .
Coimbatore Office: #70, Race course Road, Gopalapuram, Coimbatore - 641018
Chennai Office: Plot #21B, 5th Cross Street, South Phase Industrial Estate, Guindy, Chennai - 600032

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(Affliated to University of Madras)
(Reaccredited by NAAC with A+ Grade)
A1, II street, 9th Main Road, Anna Nagar ,
Chennai-600 040

GREEN AUDIT REPORT 2021-2022

AUDIT / REPORT BY

ALCHEME GREEN ENERGY COMPANY
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ANNA NAGAR CHENNAI 600 04

ACKNOWLEDGEMENT

We at Alcheme Green Energy Company, Madurai are thankful to the Principal for giving us the opportunity to carry out Green audit at Anna Adarsh College for women Chennai-600 040. Alcheme Green Energy Company team is also thankful to all other supporting Officers / Staffs of the above institute for their wholehearted support, hospitality and the courtesy extended to the Audit team during the course of the visit.

The following officers from Alcheme Green Energy Company under the guidance of Mr. C. Jebaraj, B.Tech., have carried out the Green Audit.

Name	Qualifications	Certification Number
Mr. C. Jebaraj	B.Tech., PDGEM., DIS., BEE Certificated Energy Auditor, IRCA Certified Lead Auditor - OHSMS Internal Auditor-QMS CII Certified Carbon footprint Professional	EA-9847
Mr. S. Lakhsmana Kumaran	B.Tech., MSc.,(Env. Science), MBA., IRCA Certified Lead Auditor ISO 14001 EMS	UID - 351851

The following staff from the Institution participated in the audit process

Name	Designation
Dr. R. Shanthi	Principal
Dr. Anita Raman	Vice Principal Shift I & Dean (Academics)
Dr. Shirline David	Associate Professor IQAC Coordinator Head, Department of Accounting & Finance
Dr. V. Suganthi	Associate Professor Head, Home Science -N,FSM &D
Dr. Hannah Vijaykumar	Associate Professor Dean (Computational skills) Head ,Department of Computer Science
Mr. Ramalingam	Senior Administrative Officer
Mr. D. Rayappan	Property Manager
Dr. Annie George Raphael	Assistant Professor Department of English Shift II

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I. Summary of the Green Audit

Green audit at Anna Adarsh College and its Hostel was carried by Alcheme Green Energy Company. The green audit reports assist in the process of attaining an eco-friendly approach to the sustainable development of the College. Green audit report is a very powerful and valuable communications tool to use when working with various stakeholders who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur.

A few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques. This will lead to a prosperous future in context of Green Campus leading to sustainable environment and community development. It has been proved frequently that the practical suggestions, alternatives and observations that have resulted from audits have added positive value to the audited organisation. It is hoped that the results presented in the Green Audit Report will serve as a guide for educating Anna Adarsh College, on the existing environment related practices and resource usage and spawn new activities and innovative practices.

Noteworthy activities

- Clean , Green and plastic free campus
- Excellent Rainwater harvest system to recharge the ground level
- Effective utilisation of Solar Energy from Solar Power plant

The audit outputs and recommendations are summarised as follows:

- Total water consumption for Anna Adarsh College and Hostel –24 KL/Day
- Electrical Energy consumption from TNEB GRID alone –2,39,068 units
- Diesel Generator electrical energy consumption - 2,175 units
- Solar Power Plant electrical energy consumption-1,05,000 units
- Total Electrical Energy consumption is 3,46,243 units
- Total Green House Gas Emission is 288.46 t CO_2e
- Green House gas avoided due to renewable energy utilisation-86.39 t CO_2 e
- Green House gas offset by grown up trees is 1.32 t CO_2 e

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- Net Green House Gas emission is 281.14 t CO_2 e

We are happy to submit this detailed green audit report to the Anna Adarsh College

For Alcheme Green Energy Company

Madurai

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1.1 Green Policy

Anna Adarsh College has formulated a Green Policy to guide all its green initiatives. Cleanliness in the campus is maintained through proper disposal of wastes, utilization of eco-friendly supplies and effective recycling program. The concept of eco-friendly culture is disseminated among the students through various seminars/workshops and community-oriented programs. Institution strictly follows reduce, reuse and recycle method to limit energy usages

The main objectives are as follows:

- Adopt and promote the water management measures like rain water harvesting and display water management instruction in the relevant locations in the campus.
- To use the energy efficient appliances and solar energy to conserve conventional energy.
- To reduce the consumption of plastics and collect the e-waste & hazardous waste appropriately.
- Creating awareness with stakeholders on the need for maintaining greenery in the campus for sustainable ambience.
- To give periodical training in energy and water conservation.
- Conduct of green audit at regular intervals and implement the suggestions towards creating green campus.

The Institution vouchsafes:

- Its commitment to sustainability and environmental management
- It reiterates the stand that managing environmental issues is a high priority for the College
- Its commitment to prevent pollution and to continuously improve upon environmental protection.

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1.2 Total Campus Area & Building Spread Area

- Campus area – 18951.429 Sqmt (**4.683 Acres)**
- Total Build up area – **3770.26** Sq. Mts.

1.3 NAAC Grading

The College was re-accredited with 'A+' Grade (CGPA 3.54 out of 4.00) by NAAC in September 2017 (II Cycle up to September 2022)

1.4 Campus Infrastructure

Anna Adarsh College is located in calm and quiet surroundings that are conducive to learning. It helps to stimulate both personal and professional growth of the students..

Class Room

Spread over 4.63 acres, the college is complemented by a spacious ground for sports and events, 67 class rooms including E-Learning enabled class rooms, Libraries, Seminar halls, Science labs and computer centres.

Laboratories

Anna Adarsh College has set up highly advanced science and computer laboratories attached to different departments. These are adequately equipped with the latest gadgets, instruments and apparatus with the aim of providing students conceptual as well as practical understanding of the subject through hands-on training.

Chemistry Lab

The Department of Chemistry lab caters the need of UG and PG labs, physical chemistry lab, Chemistry – Research labs I & II,

Physics Lab

The Physics department lab is equipped with experimental setups related to General Physics lab, Optics lab, Electronic lab, Allied Physics lab, Ballistic Galvanometer room, Physics – Research lab kindle the interest in science and encourage the spirit of research inquiry in the students.

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Home Science

The food science management lab, Biochemistry, and nutrition lab, Physiology and Microbiology lab, textile lab and Interior decoration lab help the students of Home Science augment classroom learning with hands-on experience.

Computer Lab

The Computer labs have been equipped with the updated systems and the latest software packages. There is a Microprocessor and Digital Electronics lab exclusively for the Computer Science students.

Language Lab

A state-of-the-art language lab offers two modules for learning –One of the general proficiency in English through Orel technologies, the other specifically on communication skills through Linguaphone21, a UK-based company. Smartboard classrooms have been installed to keep pace with digitally advanced modes of teaching pedagogies. All the labs have been upgraded in tune with the current requirements.

Auditorium, Conference hall

A centrally air-conditioned auditorium with a capacity of around 1300 holds a place of pride in our hearts. The conference hall, with a seating capacity of 300 members, acts as the venue for guest talks and seminars. Two board rooms with a capacity of 30 each which serves as the venue for the important meetings

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Sports and Games

The Physical Education department of Anna Adarsh College provides full facilities for overall development and competition among the students. Opportunity is provided to all students for practice and participation in various sport events in accordance with their interest. Good players are encouraged to represent in the intercollegiate, Southern zone inter-university, and in all India interuniversity competitions. The best players of the college participate in the district level, state level, and national level sports. The teams of Athletics, Volleyball, Badminton, Table Tennis, Kabaddi, Chess, etc. of the college participates every year in the intercollegiate sports of the University of Madras. Full facilities for training are made available for the teams. The annual sports event is held every year and various

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competitions are organized among the faculties for both students and staff. College hosts intercollegiate tournaments *SPORTEN* for women colleges in the city.

College field is available for Kabaddi, Ball badminton, and Throwball. Well-maintained volleyball court, Throwball, Ball badminton, etc courts are also available. College is also opening doors for indoor games like table tennis, Carom chess, and gym equipment also available. For practice and training, all the sports materials are provided by the college.

A weight training facility is available for increasing the strength of our players. For training of teams for major sports events, daily practice is incorporated in the college field, Special Counselling is given to those students desiring to take up physical education or sports as a career. Students can practice Athletics at J.N. Stadium.

F&B Outlet

Realizing the need for having hygienic, nutritious food at reasonable rates on the campus, we have a well-furnished AC canteen and a coffee-day stall.

Hostel

The Anna Adarsh College Hostel is situated right next to the college campus. With a capacity to accommodate 250 students, the hostel is managed by a dedicated staff that ensures safety, discipline and hygiene for the students staying there.

CCTV Cameras, a dedicated kitchen ensure that our students have the highest standards of accommodation.
All essential services that are required are situated very close to the hostel vicinity.

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2.0 Pre-Audit Stage

A pre-audit meeting provided an opportunity to reinforce the scope and objectives of the audit and discussions were held on the practicalities associated with the audit. This meeting is an important prerequisite for the green audit because it is the first opportunity to meet the auditee and deal with any concerns.

The meeting was an opportunity to gather information that the audit team can study before arriving on the site. The audit protocol and audit plan was handed over at this meeting and discussed in advance the audit itself.

In Anna Adarsh College pre-audit meeting was conducted successfully and necessary documents were collected directly from the College before the initiation of the audit processes. Actual planning of audit processes was discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the College management.

The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself. The audit team worked together, under the leadership of the lead auditor, to ensure completion within the brief and scope of the audit.

2.1 Management's Commitment

The Management of the College has shown the commitment towards the green auditing during the pre-audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environment friendly and planting more trees on the campus etc., after the green auditing.

2.2 Scope and Goals of Green Auditing

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues.

Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of economic, financial, social, environmental factor. It is necessary to conduct green audit in the College campus because students become aware of the green audit, its advantages to save the planet and they become good citizens of our country.

A very simple indigenized system has been devised to monitor the environmental performance of Anna Adarsh College, Chennai. It comes with a series of questions to be answered. This innovative scheme is user friendly. The aim of this is to help the Institution to set environmental examples for the community and to educate the young learners.

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2 .3 Benefits of the Green Auditing

- More efficient resource management
- To create a green campus
- To enable waste management through reduction of waste generation, solid-waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing and management
- Point out the prevailing and forthcoming complications
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmental management approach and Improving environmental standards
- Benchmarking for environmental protection initiatives
- Financial savings through a reduction in resource use
- Development of ownership, personal and social responsibility for the College and its environment
- Developing an environmental ethic and value systems in youngsters.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the College.

2.4 Target Areas of Green Auditing

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

Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency. All these indicators are assessed in process of "Green Auditing of educational institute". Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, reduce the institute's energy and water consumption, reduce wastes to landfill and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.

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Auditing for Water Management

Water is a natural resource; all living matters depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. We need to use water wisely to ensure that drinkable water is available for all, now and in future. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible Institution should examine its water use practices.

Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water. It is therefore essential that any environmentally responsible Institution examine its water use practices.

Auditing for Energy Management

Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent bulb uses approximately 60 W while an energy efficient light emitting diode (LED) uses only less than 10 W. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.

Auditing for Waste Management

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. This indicator addresses waste production and disposal of plastic waste, paper waste, food waste, and recycling.

Solid waste can be divided into two categories: general waste and hazardous waste. General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and used oils.

Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair, and reuse. Thus the minimization of solid waste is essential to a sustainable College. It is therefore essential that any environmentally responsible institution examine its waste processing practices.

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Auditing for Green Campus Management

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's balance and our quality of life. Without this variability in the living world, ecological systems and functions would break down, with detrimental consequences for all forms of life, including human beings.

Newly planted and existing trees decrease the amount of carbon dioxide in the atmosphere. Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. The amount of oxygen that a single tree produces is enough to provide one day's supply of oxygen for people. So while the students are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner.

Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which the students feel.

Auditing for Carbon Footprint

Commutation of stakeholders has an impact on the environment through the emission of greenhouse gases into the atmosphere consequent to burning of fossil fuels (such as petrol). The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising around 420 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions.

An important aspect of doing an audit is to be able to measure your impact so that we can determine better ways to manage the impact. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created. One aspect is to consider the distance and method travelled between home and College every day. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is necessary to know how much the organization is contributing towards sustainable development. It is therefore essential that any environmentally responsible institution examine its carbon footprint.

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3. Audit Stage

In Anna Adarsh College green auditing was done with the help of Alcheme Green Energy Company involving different student groups, teaching and non-teaching staff. The green audit began with the teams walking through all the different facilities at the College, determining the different types of appliances and utilities as well as measuring the usage per item and identifying the relevant consumption patterns and their impacts.

The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified to clarify the data received through survey and discussions.

3.1 Student Clubs and Forums Involved

- Enviro Club, National Service Scheme(NSS)

3.2 Comments on Site Tour

Site inspection was done along with students and staff. Questionnaires were answered during the site tour. Students and staff took much interest in the data collection processes. It was quite interesting and fascinating. It was an environmental awareness program for the students who participated in the green auditing. The experience of green auditing was totally a new experience for most of the students. They have shared their expectations about a green campus and gave suggestions for the audit recommendations.

3.3 Review of Documents and Records

Documents such as electricity and water charge remittance, laboratory equipment registers, audited statements and office registers were examined and data were collected. College calendars, College magazines, annual report of the College and NAAC self-assessment reports, UGC report etc. were also verified as a part of data collection.

3.4 Review of Policies

Discussions were made with the College management regarding their policies on environmental management. Future plans of the College were also discussed. The management would formulate an environment /green policy for the College in the light of green auditing. The purpose of the green audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the Institution.

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3.5 Interviews

In order to collect information for green auditing different audit groups interviewed teaching and non-teaching staff, students and other stakeholders of the College.

3.6 Site inspection

College and its premises were visited and analysed by the audit-teams several times to gather information. Campus trees were counted and identified. Medicinal /Herbal plants garden, play grounds, canteen, library, office rooms and parking grounds were also visited to collect data. Number and type of vehicles used by the stakeholders were counted. Number of LPG cylinders used in labs, canteen and hostel kitchen were also counted.

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4. Post Audit Stage

The base of any green audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events, and procedures to ensure that they are carried out according to systems requirements and in the correct manner.

Green audits form a part of a process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Although green audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit.

The essence of any green audit is to find out how well the environmental organisation, environmental management and environmental equipment are performing. Each of the three components is crucial in ensuring that the organisation's environmental performance meets the goals set in its green policy. The individual functioning and the success of integration will all play a role in the degree of success or failure of the organisation's environmental performance.

4.1 Key Findings, Observations and Evaluations

a) Water Usage at Anna Adarsh College

Total number of students studied during the academic year 2021-2022: 5209

Teaching & non-Teaching staff available during the academic year 2021-2022: 274

Total number of stakeholders: 5483

Drinking water: Domestic RO water systems are installed in all required places

Analysis of Drinking water and bore well water samples are done periodically

The quality of Drinking water is within the norms

Water usage at college and Hostel

Corporation water- 20,000 litres/day

Borewell water-4,000 litres/day

Total water usage -24, 000 litres/day

College

Main water uses in the College campus are Drinking, Rest broom, Canteen and Lab

Water usage in the College- 20 KL / Day

Water usage per day per stakeholder in the college – 3.65 litres

Waste water generation in the college – 15 KL/day

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Water usage at college

Sl. No	Place	Water usage Quantity Litres / Day
1	Drinking	4500
2	Rest room	10,000
3	Canteen	4000
4	Lab	1000
5	Garden	500
	Total	**20,000**

Hostel

Number of students and staff residing in the hostel in the year 2021-2022: 40

Main water uses in the Hostel are Drinking, Washing of clothes, Cooking & Vessel cleaning and for Rest room

Water usage at Hostel – 4 KL / Day

Water consumption per day per stakeholder in the hostel – 100 litres

Waste water generation in the Hostel – 3.5 KL /day

Water usage at Hostel

Sl. No	Place	Water usage Quantity Litres / Day
1	Drinking	100
2	Cooking	400
3	Rest room	1000
4	Bathing	800
5	Clothes washing	1200
6	Vessel Cleaning	500
	Total	4000

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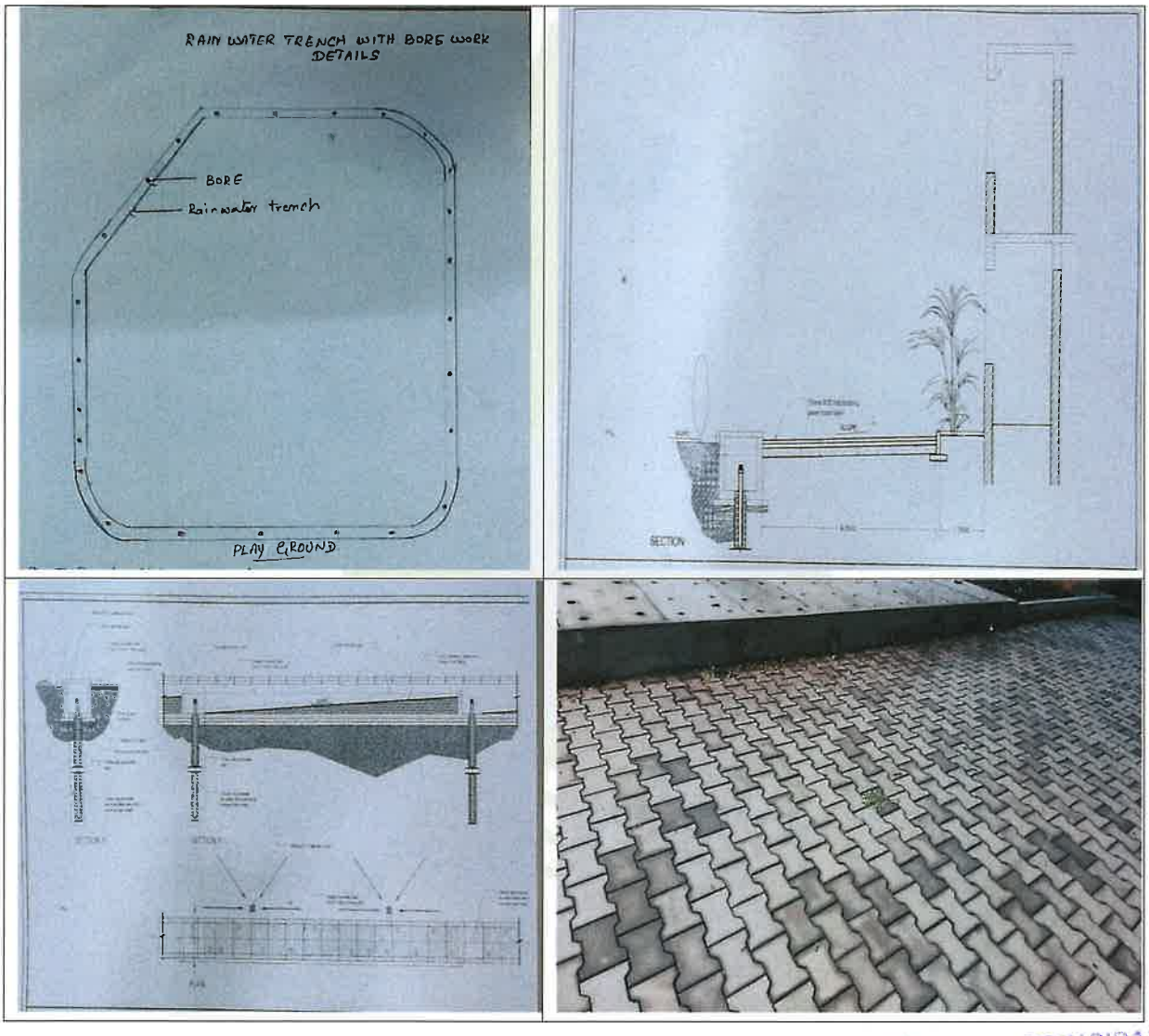
Rainwater Harvesting

At Anna Adarsh College, rainwater harvesting is done effectively to enhance the ground water. Rainwater from all the buildings are directed to the rainwater collection trench & recharge pits and all rainwater is effectively utilised for recharging the ground

Trench width-0.9 m, depth 0.9 m,
No of rainwater collection bore-25 Nos, Depth of Bore-9 m, Diameter of bore -0.3 m



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Water Conservation initiatives

- Waste water from bath, kitchen and utensil washings are used for gardening
- RO Plant water rejects are used for garden and greenery development
- Periodical preventive maintenance are carried out to avoid leakages of water

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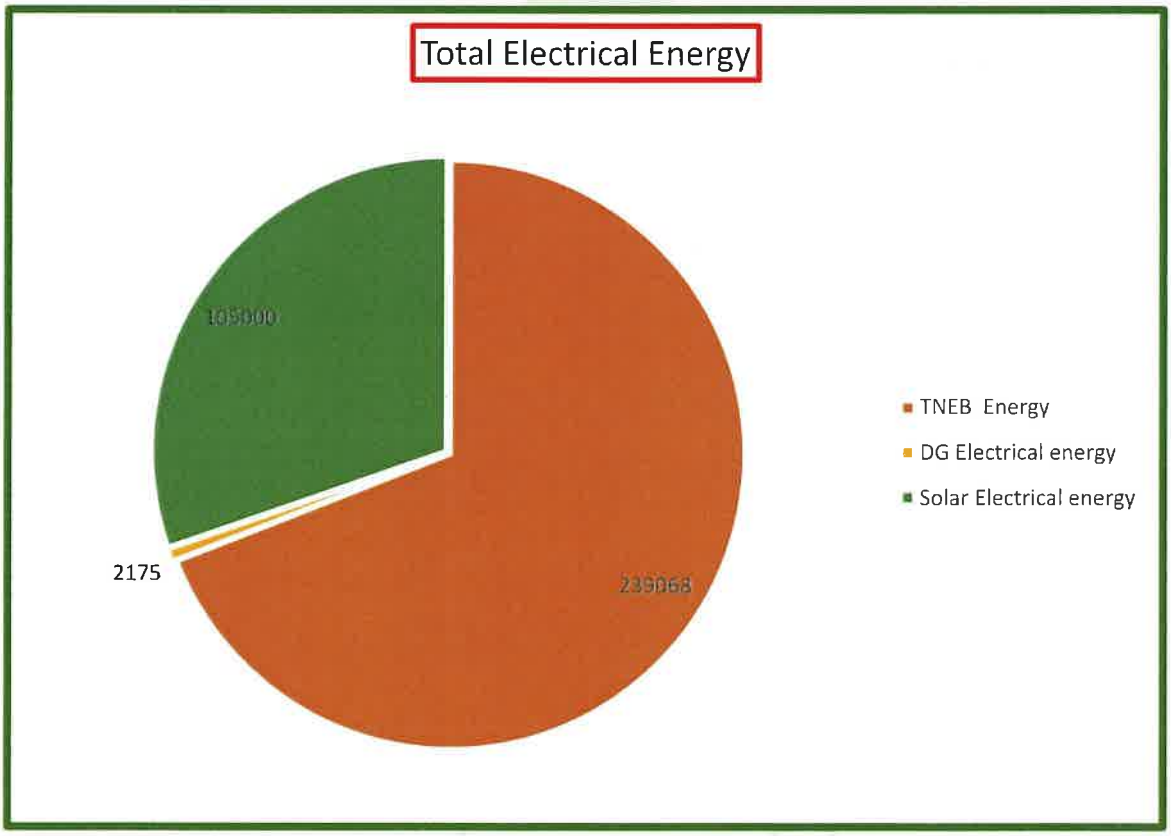
b)Energy

Total Electrical Energy Consumption -Conventional and Renewable

S.L. No	Source	units	Percentage
1	TNEB	239068	69.05
2	DG	2175	0.63
3	Solar	105000	30.33
	Total	346243	100.00



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Solar Electrical Energy

Total solar power plant installed capacity-70 KW (20+50)

Total Solar energy generation from solar power plant-1,05,000 units

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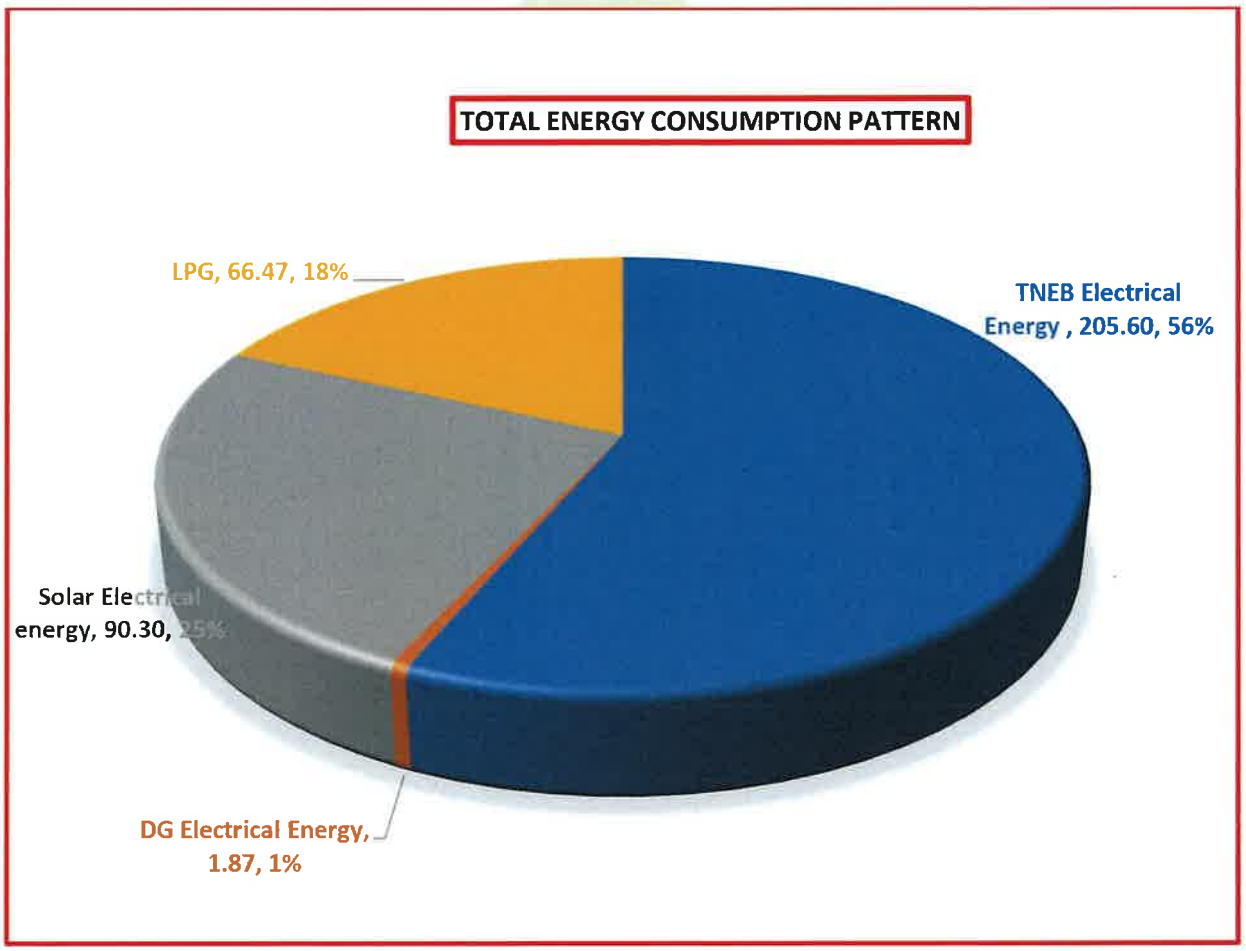
Total Energy consumption

Electrical (Conventional & Renewable) and Thermal(Conventional)

SL.NO	TYPE OF ENERGY	ENERGY -GCAL	Percentage
1	TNEB Electrical Energy	205.60	56.45
2	DG Electrical Energy	1.87	0.51
3	Solar Electrical energy	90.30	24.79
4	LPG	66.47	18.25
	Total	364.2	100



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The energy conservation measures followed

- Regular monitoring of air conditioners is done in order to maintain a temperature of 24°C in all the places
- Replacing conventional electrical light fittings with energy efficient Light-Emitting Diode (LED) bulbs is going on as continuous process.
- Switching off the fans and tube lights in the classroom and faculty rooms are done after the working hours
- Staff and Students are made aware of using public transport and individual vehicle usage is reduced to the maximum.
- Periodical maintenance and overhauling of generators is being carried out.
- Periodical maintenance of UPS and Battery systems are carried out.
- The air-conditioners and other electronic and electrical equipments are switched off when not in use.
- Computers are switched to sleep mode or hibernate mode automatically when not in use.
- At the end of every practical session, Computer monitors and UPS are switched off.
- Soft copies are maintained instead of hard copies, to reduce power consumption and paper.
- Work supervisor and electrician regularly check the usage of lights, fans and all other energy sources during and out of the College hours.
- Lights and fans are switched off by the students whenever they are out of hostel rooms

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c) WASTE

Quantity of waste generated:-

- Waste water generation in the College and Hostel - 18.5 KL /day

College

- Biodegradable---<1 kg/day

Office

- Non-biodegradable –< 0.1kg/day

Hostel

- Biodegradable(Food waste) - 2-5 kgs / day
- Non-biodegradable – <0.5kg / day

Open area

- Biodegradable (Dry leaves)- 0.5-1 kgs / day

Plastic waste

- **Less than** <0.1kg / day

e-Waste

- **Less than 50 kgs / year**

Waste Management

Liquid waste Management

- RO plant reject is used for gardening
- Waste water generated from canteen, kitchen and bath room are used for gardening

Solid Waste Management

A solid waste management system includes the generation of waste, storage, collection, transportation, processing and final disposal. The hierarchy of waste management recognizes that reducing the use of materials and reusing them to be the most environmentally friendly practices. Reduction begins with reducing the amount of waste generated and reusing the materials to prevent them from entering the stream of waste.

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Bio-degradable waste management

Food waste is one of the most challenging issues humankind is currently facing worldwide. When every time food is wasted, the water, energy, time, manpower, fertilizer, fuel, packaging and money put into growing, preparing, storing, transporting, cooking the food is wasted

- ❖ Bio-Degradable and non-biodegradable waste are collected in separate Two - bins system
- ❖ Food waste and Leaf-litter waste collected from the campus is used for composting and the compost is used further for the garden developments within the College

Plastic Waste Management

- The College has been declared as a 'Plastic Free' zone
- Plastic covers are collected separately and disposed properly
- Use of polythene bags, Plastic cups/ straws/ cover/ plates/ are prohibited within the campus
- Students and staff are advised to bring cloth bags
- All the Stakeholders are motivated to use stainless steel plates.
- Tea/Coffee being served in Stainless steel tumblers
- Plastic waste that comes in through lab equipment's package, empty chemical containers etc. are collected separately and disposed periodically for recycling.

Used Battery Management

- Used batteries are disposed through Buy back method

e-Waste Management

- All electronic machineries are purchased under Buy-Back agreement for proper disposal of e waste to recycler

Other Solid Waste Management

- Solid wastes are generated from damaged furniture are sent to waste wood collection centre. Useful furniture and other wooden materials are made from the waste

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- Glass wastes are disposed periodically through corporation waste collection system.

Waste Reduction

- ❖ Students are instructed not to waste paper while writing examinations.
- ❖ Reusing one side paper where ever possible, printing on both sides of papers
- ❖ In order to reduce the use of paper the following initiative were taken by E - Governance
    - Attendance and fees payments through Educational Resource Management System (ERMS)
    - Submission of e-assignment through email and Google classroom
    - Digitalisation of Staff profiles and details about students
- Online Admission Process – Printing of applications reduced & submission of applications through admission portal of ERMS
- All inter department communications are through intranet and mobile app.
- Online exams and Optical Mark Recognition(OMR sheet) are conducted to reduce the paper usage.

Waste Recycling

- The answer scripts after the publication of results are sent for recycling.
- e wastes are collected and sent to authorised recycler.

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d) Green Campus

Anna Adarsh College, Chennai is overwhelmed with the atmosphere of greenery. The Institution too take meticulous efforts to maintain and retain the Nature given atmosphere with planting of new saplings

The eco-friendly ambience of the campus is a noteworthy feature of Anna Adarsh College

- Green belt is developed in all possible open area are being converted into greenery
- The Green campus drive is an initiative of the College to protect the environment.
- Environmental awareness rallies are conducted regularly to spread the message of environment preservation.
- All the plant specimens in the campus are identified, recorded and labelled

Awareness program conducted

To create awareness about the significance of water, environment, forest and wildlife various awareness programs/ workshop were conducted both inside and outside the College campus.

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Inside the campus

1.World water day on 22nd March
2.Environmental Day on 5th June
3.International Biological Diversity was observed
4.Celebrated Earth Day in the month of April

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GREEN BELT DEVELOPMENT

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List of trees inside the College campus

S.no	Name of the Plant	Botanical Name	Location
1	Cluster Fig	Ficus racemosa	Opposite to the canteen (1st Tree)
2	Copper-Pod	Peltophorum pterocarpum	Opposite to the canteen (2nd Tree)
3	Indian Beech	Pongamia or Millettia Pinnatu	Opposite to Adarsh Student counselling center
4	Cluster Fig	Ficus racemosa	Opposite to Adarsh Student counselling center(2nd tree)
5	Neem Tree	Azadirachta Indica	Opposite to the gallery(1st tree)
6	Peepal Tree	Ficus religiosa	Opposite to the gallery (2nd tree)
7	Neem tree	Azadirachta Indica	Opposite to the gallery (3rd tree)
8	Indian Beech	Pongamia Pinnata	Opposite to the gallery (last tree)
9	Bankok - Teak	Tectona grandis	Opposite to the gallery (last tree- Back side)
10	Bankok - Teak	Tectona grandis	Opposite to the vinayagar temple (5th tree)
11	Indian Beech	Pongamia pinnata	Opposite to the vinayagar temple (3rd tree)
12	Neem tree	Azadirachta Indica	Opposite to the vinayagar temple (4th tree)
13	Indian Beech	Pongamia Pinnata	Opposite to the vinayagar temple (2nd tree)
14	Neem tree	Azadirachta Indica	Opposite to the vinayagar temple (1st tree)
15	Neem tree	Azadirachta Indica	Back side to the vinayagar temple (1st tree)
16	Indian Beech	Pongamia Pinnata	Opposite to Adarsh School(Room 13)
17	Indian Beech	Pongamia Pinnata	Opposite to Adarsh School(Room 15)

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18	Indian Beech	Pongamia Pinnata	Opposite to Adarsh School(Room 15)
19	Indian Beech	Pongamia Pinnata	Left to the open stage
20	Indian Beech	Pongamia Pinnata	Right to the open stage(1st Tree)
21	Indian Beech	Pongamia Pinnata	Right to the open stage(2nd Tree)
22	Indian Beech	Pongamia Pinnata	Right to the open stage(1st Tree)
23	Gulmohar	Delonix Regia (hooh)	Right to the open stage(4th Tree)
24	Indian Beech	Pongamia Pinnata	Right to the open stage(5th Tree)
25	Indian Beech	Pongamia Pinnata	Right to the open stage(6th Tree)
26	Spindle palm	Hyophorbe verschaffeltii	Entrance left side(3rd tree)
27	Night Jasmine	Cestrum nocturnum	Opposite to entrance gate
28	Indian Beech	Pongamia Pinnata	Opposite to entrance
29	Neem tree	Azadirachta Indica	Next to the generator
30	Rain tree	Samanea saman	Close to chemistry lab
31	Indian Beech	Pongamia Pinnata	Opposite Room No 12, Chemistry lab
32	Indian Beech	Pongamia Pinnata	Opposite Room No 12, Chemistry lab
33	Indian Beech	Pongamia Pinnata	Opposite Room No 12, Chemistry lab
34	Neem Tree	Azadirachta Indica	Opposite Room No 11, Next to MSc Chemistry lab
35	Rain Tree	Samanea saman	Opposite Bank
36	Neem Tree	Azadirachta Indica	Near Mca Block
37	Indian Beech	Azadirachta Indica	Opposite Room No 16
38	Ashoka Tree	Polyalthia Longifolia	Opposite Room No 18,Near Bank
39	Neem Tree	Azadirachta Indica	Opposite Room No 17
40	Ashoka Tree	Polyalthia Longifolia	Opposite Room No 11, Next to MSC

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			Chemistry Lab
41	Ashoka Tree	Polyalthia Longifolia	Opposite Room No 11, Next to MSC Chemistry Lab
42	Ashoka Tree	Polyalthia Longifolia	Opposite Room No 11, Next to MSC Chemistry Lab
43	Ashoka Tree	Polyalthia Longifolia	Opposite Room No 11, Next to MSC Chemistry Lab
44	Mirracle Berry	Synsepalaum Ducificum	Opposite Room No 11, Next to MSC Chemistry Lab
45	Bastard Cedar	Guazuma Ulonifolia Lam	Opposite to Department of Chemistry near Washbasin
46	Bastard Cedar	Guazuma Ulonifolia Lam	Opposite Room No 12
47	Ashoka Tree	Polyalthia Longifolia	Opposite Room No 12,Bsc Chemistry lab,Near Step Ist tree
48	Ashoka Tree	Polyalthia Longifolia	Back Side of Open Stage
49	Spindle Palm	Hyophorde Verschaffeltii	Opposite to the Administrative Block
50	Ashoka Tree	Polyalthia Longifolia	Opposite to Anna Adarsh School
51	Ashoka Tree	Polyalthia Longifolia	Opposite to Anna Adarsh School
52	Ashoka Tree	Polyalthia Longifolia	Opposite to Anna Adarsh School
53	Ashoka Tree	Polyalthia Longifolia	Opposite to Anna Adarsh School
54	Ashoka Tree	Polyalthia Longifolia	Opposite to Anna Adarsh School
55	Ashoka Tree	Polyalthia Longifolia	Opposite to Anna Adarsh School
56	Ashoka Tree	Polyalthia Longifolia	Opposite to Anna Adarsh School
57	Ashoka Tree	Polyalthia Longifolia	Back Side Vinayagar Temple (to Anna Adarsh School side)
58	Ashoka Tree	Polyalthia Longifolia	Back Side Vinayagar Temple (to Anna Adarsh School side
59	Ashoka Tree	Polyalthia Longifolia	Back Side Vinayagar Temple (to Anna Adarsh School side
60	Neem Tree	Azardirachta Indica	Entrance Right Side

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e) Carbon Footprint

Release of carbon dioxide into the atmosphere is contributes to the global warming and increasing the pace of climate change. More trees inside the campus will make a source of sink for the carbon dioxide and for other greenhouse gases.

Electrical and Thermal Energy consumption in the year 2021-2022

• No of students and staff stayed in the hostel	40
• Diesel consumption by DG in the Hostel & College	2,175 L
• Average distance travelled by Four wheeler per day	30 Km
• Average distance travelled by two wheeler per day	20 Km
• No of Four wheelers being used by students and staff	36
• No of Two wheelers being used by students and staff	313
• Average Fuel efficiency of four wheelers	20 Km/ L
• Average Fuel efficiency of Two Wheelers	60 Km/ L
• Average Petrol consumption by four wheelers	10,800 L
• Average Petrol consumption by two wheelers	20,867 L
• Total Petrol consumption	31,667 L
• Total LPG consumption(College & Hostel)	5,586 Kgs
• Total electrical power consumed from Grid-	2,39,068 units

Green House Gas -Emission

• Green House Gas emission due to diesel	1935.75 Kg CO_2 e
• Green House Gas emission due to petrol	74733.33 Kg CO_2 e
• Green House Gas emission due to LPG	16925.58 Kg CO_2 e
• Green House Gas emission due to Grid power	188863.72 Kg CO_2 e
• Total GHG emission	282458.38 Kg CO_2 e 282.46 t CO_2 e

Green House Gas-Avoided

• Total Solar power generation -	105000 units
• GHG emission avoided due to solar power generation	82.95 t CO_2 e
• Paper waste Recycled	800 Kg
• GHG emission avoided due to recycling of paper waste	3.44 t CO_2 e
Total GHG emission avoided	86.39 t CO_2 e

Green House Gas-captured

• No of fully grown up tress	60
• Green House Gas absorbed by trees	1.32 t CO_2 e
• Net Green House Gas emission-	(282.46-1.32) 281.14 t CO_2 e

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4.2 Consolidation of Audit Findings

We hope that students would have developed a greater appreciation and understanding of the impact of their actions on the environment. They have successfully been able to determine the impacts on the environment through the various auditing exercises. Participating in this green auditing procedure they have gained knowledge about the need of sustainability of the College campus. It will create awareness on the use of the Earth's resources in their home, College, local community and beyond.

General

- Green Policy is stated and objectives are reflected very well in the functioning of the College and Hostel
- Campus is declared plastic free and lot of initiatives and innovative actions are taken to maintain the green policy.

Water

- Total water consumption -24 KL/day

Water Conservation

- Periodical Maintenance of water taps are carried out to avoid leakages

Rain water Harvest system

- Appreciable work has been carried out for harvesting the rainwater both from College buildings & hostel for charging the ground water level and usage.

Energy

- Total electrical energy consumption from TNEB Grid alone is 2,39,068 units
- More number of conventional tube lights are replaced with LED lights
- 70 KW Solar plant installation is highly appreciable.

Waste to Wealth

Waste Recycle

- The used papers collected from the departments and centres were recycled Paper disposed for recycling is 800 Kgs
- E - wastes are collected and kept separately to send to authorised recycler
- Plastic wastes generated from packing materials are collected separately and disposed properly to recycler

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Green Campus

- Tree cover of the College within the available space is good
- Regular planting of trees inside campus are to be continued
- Usage of water for gardens are to be measured

Carbon Foot Print

- Yearly Greenhouse gas emission is around 282.46 t CO_2e
- 70 KW Solar PV Power plant installed to reduce the conventional EB power

Reduce Vehicle Emission

- Usage of bicycles shall be encouraged to the College community.

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4.3 Preparation of Action Plan

Policies referring to College's management and approach towards the use of resources need to be considered. The College green policy for its sustainable development to be monitored consciously.

4.4 Follow-up Action and Plans

Green Audits are exercises which generate considerable quantities of valuable management information. The time, effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and that action plans and implementation programs result from the findings. Audit follow up is part of the wider process of continuous improvement.

4.5 Environmental Education

The following environmental education program may be implemented in the College:-

- Training programs in Water & Waste management , Solids and e-Waste Management, Carbon footprint concepts, Awareness on Global warming
- Increase the number of display boards on environmental awareness such as no wastage of food/water, switch off light and fan after use, plastic free campus etc.

Awareness on Carbon Emission

- Students and Staff members are made totally aware of pollution caused by use of vehicles.
- The awareness programs on carbon emission at individual as well as social level will help to avoid air and noise pollution due to vehicles.

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4.6 Recommendations

Common Recommendations

- Targets for Green policy shall be fixed

Criteria Wise Recommendations

Water

- Water consumption monitoring system has to be implemented in the College campus and hostel
- Water Flow meter to be introduced to measure the quantity of water used
- More awareness programs on water conservation to be conducted.
- More display on water conservation shall be displayed

Energy

- Target for more percentage of Renewable Energy contribution
- Remaining old Tube lights shall be replaced with LED tube lights.
- Conventional fans shall be replaced with BLDC fan
- Conduct more awareness programs on importance of energy saving for students and staff
- More display on energy conservation shall be displayed
- Five star rated energy efficient appliances to be procured in the future

Waste

- Conduct exhibition of recyclable waste products
- Every six months e-waste to be disposed as per e-waste Management rules 2016.
- Register to be maintained for collection, storage and disposal of E waste & used batteries
- Biodiesel project shall be given to students from used cooking oil

Green Campus

- Keep continuously encouraging students for making the campus green
- Roof garden for building shall be planned in future
- Training/awareness on Global warming, Climate Change shall be given to students

Carbon footprint

- Fix a target to reduce Green House Gas emission

- Present Net Green House gas emission per year is 281.14 t CO_2 e
- Aim for Net Zero emission from the institution in the coming years
- Training/ awareness on Carbon foot print concepts to be given to students and staffs

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CRITERION 7

Environmental Audit

Certificate

Of

Environmental Audit

This is to certify that **Anna Adarsh College for women, Chennai** has conducted a detailed Environmental Audit of their campus for the academic year 2020 – 2021 and has submitted the necessary data and credentials for scrutiny. The activities and measures carried out by the College have been verified based on the field visit and reports submitted and were found to be **Good**. The efforts taken by the Management, faculty and students for the care of Environment, Water conservation, Waste water & Plastic waste Management and Recycling & Reuse of waste are highly appreciated and commendable.

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ANNA ADARSH COLLEGE FOR WOMEN

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(Reaccredited by NAAC with A+ Grade)
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ENVIRONMENTAL AUDIT REPORT 2021-2022

AUDIT/REPORT BY

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ACKNOWLEDGEMENT

We at Alcheme Green Energy Company, Madurai are thankful to the Principal for giving us the opportunity to carry out Environmental audit at Anna Adarsh College for women, Chennai -600 040. Alcheme Green Energy Company team is also thankful to all other supporting Officers / Staffs of the above institute for their wholehearted support, hospitality and the courtesy extended to the Audit team during the course of the visit.

The following officers from Alcheme Green Energy Company under the guidance of Mr. C. Jebaraj, B.Tech., have carried out the Environmental Audit.

Name	Qualifications	Certification Number
Mr. C. Jebaraj	B.Tech., PDGEM., DIS., BEE Certificated Energy Auditor, IRCA Certified Lead Auditor - OHSMS Internal Auditor-QMS CII Certified Carbon footprint Professional	EA-9847
Mr. S. Lakhsmana Kumaran	B.Tech., MSc.,(Env. Science), MBA., IRCA Certified Lead Auditor ISO 14001 EMS	UID - 351851

The following staff from the Institution were participated in the audit process

Name	Designation
Dr. R. Shanthi	Principal
Dr. Anita Raman	Vice Principal Shift I & Dean (Academics)
Dr. Shirline David	Associate Professor IQAC Coordinator Head, Department of Accounting & Finance
Dr. V. Suganthi	Associate Professor Head, Home Science -N,FSM &D
Dr. Hannah Vijaykumar	Associate Professor Dean (Computational skills) Head ,Department of Computer Science
Mr. Ramalingam	Senior Administrative Officer
Mr. D. Rayappan	Property Manager
Dr. Annie George Raphael	Assistant Professor Department of English Shift II

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Summary of Environment Audit

Environment audit of Anna Adarsh College and its Hostel was carried by Alcheme Green Energy Company. Audit team has gone through the data related to Water and Electrical Energy, Waste generation, Waste Management, Waste Recycling and Reuse, Green Belt Development in and around Anna Adarsh College campus. The team also carried out the study of Pollution abatement measures, Rainwater harvesting, Water and Energy Conservation measures taken to reduce the pollution, noise level, Greenhouse gas emission and maintain Ambient Air quality.

During the visit, it is observed that cleanliness in the campus is well maintained through proper disposal of wastes, utilization of eco-friendly supplies and effective recycling program. The concept of eco-friendly culture is disseminated among the students through various seminars/workshops and community-oriented programs. The Institution strictly follows reduce, reuse and recycle method to limit energy usage and partially replace non-renewable energy sources with renewable energy resources.

The environment audit report is a very powerful and valuable communications tool to use while working with various stakeholders who need to be convinced that systems and procedures in place are suited to cope with natural changes and modifications.

It is hoped that the results presented in the environment audit report will serve as a guide for educating the college community on the existing environment related practices and resource usage at the college as well as spawn new activities and innovative practices.

The audit outputs and recommendations are summarised as follows:

Noteworthy activities

- Clean, Green and plastic free campus
- Micro analysis at Chemistry lab to reduce pollution load at the waste water
- Renewable energy utilisation from 70 KW Solar Power Plant

The audit outputs and recommendations are summarised as follows:

- Air pollution impact on Ambient Air quality is negligible since the quantity of fuel used for combustion in the institution is very less
- Noise levels inside the campus are within the prescribed limit
- Very good initiative is taken by the institution for rainwater harvesting
- Lot of initiatives are taken to conserve Water and Energy by the Institution.
- Flow meters are to be provided for better water management
- Total water consumption for Anna Adarsh College and Hostel –24 KL/Day

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- Electrical Energy consumption from TNEB GRID alone –2,39,068 units
- Diesel Generator electrical energy consumption- 2,175 units
- Solar Power electrical energy consumption-1,05,000 units
- Total Electrical Energy consumption is 3,46,243 units
- Total Green House Gas Emission is 282.46 t CO_2e
- Green House gas avoided due to renewable energy utilisation is 86.79 t CO_2 e
- Green House gas offset due to grown up trees is 1.32 t CO_2 e
- Net Green House Gas emission is 281.14 t CO_2 e

We are happy to submit this detailed Environmental audit report to the Anna Adarsh College

For Alcheme Green Energy Company

Madurai

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1. Introduction

1.1Environmental Policy

Anna Adarsh College has well formulated Environmental Policy to guide all its activities.

The main objectives are as follows:

- To promote sound environmental management policies and practices throughout the College activities
- To create awareness among the stake holders about the conservation of natural resources and preserve them at their best.
- To enhance the quality of natural resources and development of sustainable environments by various promotional activities for national prosperity.
- To establish a baseline information about the available faunal and floral composition and their environment within college premises.
- To implement sustainable resource management practices, based on reduce, reuse and recycle principles
- To adopt fair, ethical and eco-friendly approaches, this incorporates everything from implementation to training of students in the college activities.

The Institution vouchsafes:

- Establishing environment programs that are consistent with commitment to the continual improvement of the environment management system.
- Compliance with applicable environmental policies and prevention of pollution by applying the best available practices

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2. WATER

2.1 Water usage at College & Hostel

Total number of students studied during the academic year 2021-2022: 5209

Teaching & non-Teaching staff available during the academic year 2021-2022: 274

Total number of stakeholders: 5483

College

Main water uses in the College campus are Drinking, Rest broom, Canteen and Lab

Water usage in the College- 20 KL / Day

Water usage per day per stakeholder in the college – 3.65 litres

Waste water generation in the college – 15 KL/day

Water usage at college

Sl. No	Place	Water usage Quantity Litres / Day
1	Drinking	4500
2	Rest room	10,000
3	Canteen	4000
4	Lab	1000
5	Garden	500
	Total	**20,000**

Hostel

Number of students and staff residing in the hostel in the year 2021-2022: 40

Main water uses in the Hostel are Drinking, Washing of clothes, Cooking & Vessel cleaning and for Rest room

Water usage at Hostel – 4 KL / Day

Water consumption per day per stakeholder in the hostel – 100 litres

Waste water generation in the Hostel – 3.5 KL /day

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Water usage at Hostel

Sl. No	Place	Water usage Quantity Litres / Day
1	Drinking	100
2	Cooking	400
3	Rest room	1000
4	Bathing	800
5	Clothes washing	1200
6	Vessel Cleaning	500
	Total	4000

3. Electrical Energy

Electrical Energy Consumption from TNEB and DG in the year 2021-2022

Sl. NO	Source	Consumption in Units
1	TNEB	239068
2	DG	2175
	Total	241243

Total Electrical Energy consumption from TNEB grid and DG in the College and Hostel 1,47,592 units

Electrical Energy consumption per stakeholder per year – 44 units/year

4. FUEL CONSUMPTION

4.1 LPG

LPG gas is used in the hostel and college canteen for cooking and used in the college lab for doing scientific practical & Experiments

LPG cylinders used- commercial cylinders of 19 kgs capacity

Total LPG consumption during the year 2021-2022- 5586 KGs

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5. Waste Generations and Management

5.1 Liquid and Solid Waste Generation

Quantity of liquid waste generated:-

- Waste water generation in the College and Hostel - 18.5 KL /day

Quantity of Solid waste generated

College

- Biodegradable—<1 kg/day

Office

- Non-biodegradable –< 0.1kg/day

Hostel

- Biodegradable(Food waste) - 2-5 kgs / day
- Non-biodegradable – <0.5kg / day

Open area

- Biodegradable (Dry leaves)- 0.5-1 kgs / day

Plastic waste

- **Less than** <0.1kg / day

e-Waste

- **Less than 50 kgs / year**

5.2 Waste Management

5.2.1 Liquid waste Management

- RO plant reject is used for gardening
- Waste water generated from canteen, kitchen and bath room are used for gardening

5.2.2 Bio-degradable waste management

Food waste is one of the most challenging issues humankind is currently facing worldwide. When every time food is wasted, the water, energy, time, manpower, fertilizer, fuel, packaging and money put into growing, preparing, storing, transporting, cooking the food is wasted

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- ❖ Bio-Degradable and non-biodegradable waste are collected in separate Two - bins system
- ❖ Food waste and Leaf-litter waste collected from the campus is used for composting and the compost is used further for the garden developments within the College

5.2.3 Plastic Waste Management

- The College has been declared as a 'Plastic Free' zone
- Plastic covers are collected separately and disposed properly
- Use of polythene bags, Plastic cups/ straws/ cover/ plates/ are prohibited within the campus
- Students and staff are advised to bring cloth bags
- All the Stakeholders are motivated to use stainless steel plates.
- Tea/Coffee being served in Stainless steel tumblers
- Plastic waste that comes in through lab equipment's package, empty chemical containers etc. are collected separately and disposed periodically for recycling.

5.2.4 Used Battery Management

- Used batteries are disposed through Buy back method

5.2.5 e-Waste Management

- All electronic machineries are purchased under Buy-Back agreement for proper disposal of e waste to recycler

5.2.6 Other Solid Waste Management

- Solid wastes are generated from damaged furniture are sent to waste wood collection centre. Useful furniture and other wooden materials are made from the waste
- Glass wastes are disposed periodically through corporation waste collection system.

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6. Pollution abatement measures

6.1 Waste Reduction

- ❖ Students are instructed not to waste paper while writing examinations.
- ❖ Reusing one side paper where ever possible, printing on both sides of papers
- ❖ In order to reduce the use of paper the following initiative were taken by E - Governance
    - Attendance and fees payments through Educational Resource Management System (ERMS)
    - Submission of e-assignment through email and Google classroom
- Digitalisation of Staff profiles and details about students
- Online Admission Process – Printing of applications reduced & submission of applications through admission portal of ERMS
- All inter department communications are through intranet and mobile app.
- Online exams and Optical Mark Recognition(OMR sheet) are conducted to reduce the paper usage.

6.2 Waste Recycling

- The answer scripts after the publication of results are sent for recycling.
- e wastes are collected and sent to authorised recycler.

6.3 Waste Reuse

- Reuse one sided paper
- Reuse Envelopes

6.4 Waste to wealth

- Compost from dry leaves and food wastes are used as manure for trees

6.5 Water Conservation initiatives

- RO Plant water rejects are used for garden and greenery development
- Periodical preventive maintenance are carried out to avoid leakages of water in tap

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6.6 Energy conservation activities followed

- Regular monitoring of air conditioners is done in order to maintain a temperature of 24°C in all the places that they are installed in
- Replacing conventional electrical light fittings with energy efficient Light-Emitting Diode (LED) bulbs is going on as continuous process.
- Switching off the fans and tube lights in the classroom and faculty rooms are done after the working hours
- Periodical maintenance and overhauling of generators is being carried out.
- Periodical maintenance of UPS and Battery systems are carried out.
- The air-conditioners and other electronic and electrical equipments are switched off when not in use.
- Computers are switched to sleep mode or hibernate mode automatically when not in use.
- At the end of every practical session, Computer monitors and UPS are switched off.
- Soft copies are maintained instead of hard copies, to reduce power consumption and paper.
- Work supervisor and electrician regularly check the usage of lights, fans and all other energy sources during and out of the college hours.
- Lights and fans are switched off by the students whenever they are out of hostel rooms

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7.Green Belt Development

Anna Adarsh College for women, Chennai is overwhelmed with the atmosphere of greenery.The Institution too take meticulous efforts to maintain and retain the Nature given atmosphere with planting of new saplings

The eco-friendly ambience of the campus is a noteworthy feature of Anna Adarsh College

- Green belt is developed in all possible open area are being converted into greenery
- The Green campus drive is an initiative of the College to protect the environment.
- Environmental awareness rallies are conducted regularly to spread the message of environment preservation.
- All the plant specimens in the campus are identified, recorded and labelled
- Also created faunal database within the College campus digitally and printed materials
- In the College campus, 60 numbers fully grown trees are there.

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GREEN BELT DEVELOPMENT

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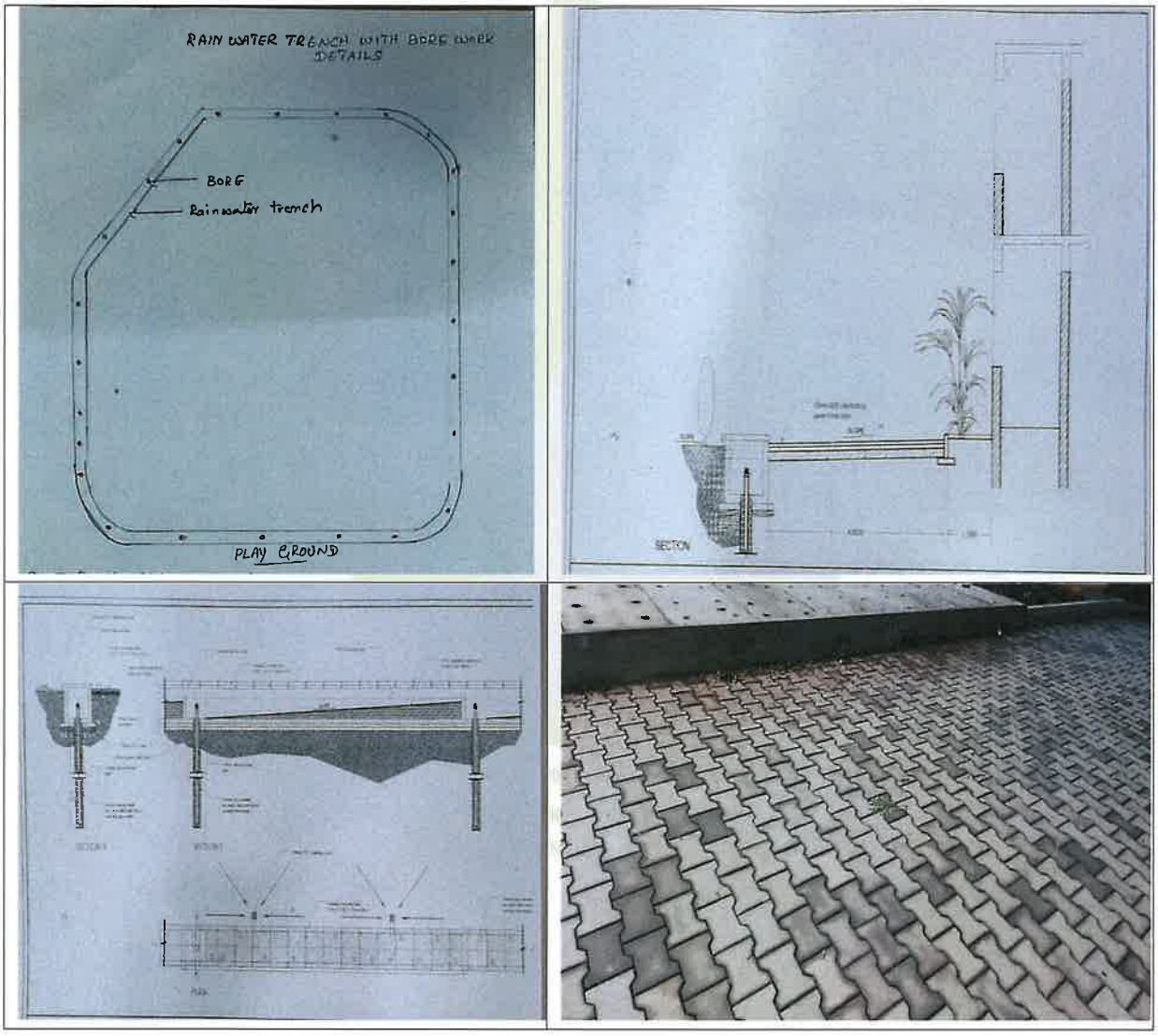
8.Rainwater Harvesting

At Anna Adarsh College, rainwater harvesting is done effectively to enhance the ground water. Rainwater from all the buildings are directed to the rainwater collection trench & recharge pits and all rainwater is effectively utilised for recharging the ground

Trench width-0.9 m, depth 0.9 m,
No of rainwater collection bore-25 Nos, Depth of Bore-9 m, Diameter of bore -0.3 m



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9. AMBIENT AIR

9.1 Green House Gas Emission

Release of carbon dioxide into the atmosphere is contributes to the global warming and increasing the pace of climate change. More trees in the campus will make a source of sink for the carbon dioxide and for other greenhouse gases

Emission during the year 2021-2022 at Anna Adarsh College

Green House Gas -Emission

- Green House Gas emission due to diesel — 1935.75 Kg CO_2 e
- Green House Gas emission due to petrol — 74733.33 Kg CO_2 e
- Green House Gas emission due to LPG — 16925.58 Kg CO_2 e
- Green House Gas emission due to Grid power — 188863.72 Kg CO_2 e
- Total GHG emission — 282458.38 Kg CO_2 e / 282.46 t CO_2 e

9.2 Ambient Air Quality

Flue gas emission sources

- LPG combustion at hostel and laboratory
- Diesel generator at College and Hostel

Fuel consumption per year

- LPG -5586 Kgs
- Diesel for generator –725 litres

Fuel consumption per day

- College workings days -180
- Hostel occupied with students -100 days
- Average LPG consumption per day- 31 kgs
- Average Diesel consumption per day-4.02 litres

Combustion of LPG is NOT CONTINUOUS process

DIESEL Generator will run only when TNEB grid power fails

Considering the above situation, the quantity of flue gas emission and the impact on ambient air quality from the above combustions are negligible

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9.3 Noise level

Noise level inside the campus

Sl. No	Location	Max value in dB	Average Value in dB
1	Main Entrance	73	69
2	Near MCA Block	64	57
3	Near Library	66	54
4	Near stadium	74	69
5	Near Canteen	73	65
6	Main Office	68	61

- Diesel Generators (DG) sets do not run on a continuous basis. Only during power failure, DG sets are operated during the working hours of the College.
- Generally Power failure occurs for a very short time period.
- During planned shutdown hours, DGs run continuously based on the load
- Noise disturbance due to DG set is negligible.

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10. Audit Findings & Recommendations

Noteworthy activities

- Clean, Green and plastic free campus
- Maximum utilisation of renewable energy -Solar Energy

The audit outputs and recommendations are summarised as follows:

- Air pollution impact on Ambient Air quality is negligible since the quantity of fuel used for combustion in the institution is very less
- Noise levels inside the campus are within the prescribed limit
- Lot of initiatives are taken to conserve Water and Energy by the Institution.
- Flow meters are to be provided for better water management
- Total water consumption for Anna Adarsh College and Hostel – 24 KL/Day
- Electrical Energy consumption from TNEB GRID alone –2,39,068 units
- Diesel Generator electrical energy consumption- 2,175 units
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- Green House gas offset due to grown up trees is 1.32 t CO_2 e
- Net Green House Gas emission is 281.14 t CO_2 e

Recommendations

- More Electrical Energy reduction through Solar PV Power Plant Shall be planned
- Flow meter to be installed to know the exact usage of water.
- Training programs in Carbon footprint concepts, Awareness on Global warming & Climate change, E -vehicle usage , Alternative Fuel usage , Renewable Energy shall be given
- Increase the number of display boards on environmental awareness such as no wastage of food, switch off light and fan after use etc
- Register to be maintained for collection, storage and disposal of E waste & used batteries

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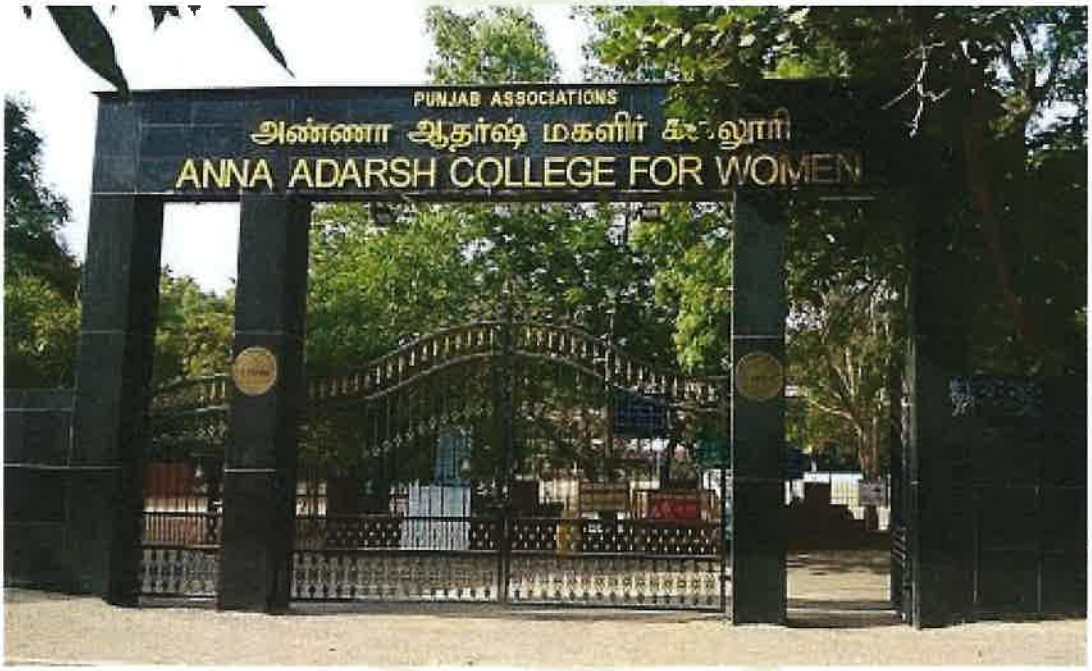
ENERGY AUDIT REPORT 2021-2022



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Energy Audit - Methodology

Energy audit consists of survey, analysis and inspection of the energy flow in the system. Its aim is to find the scope of energy conservation by implementing energy saving procedures without affecting the outputs of the system. Energy audit plays a significant role in finding opportunities to save energy and reduce electricity bills / carbon emissions. Energy audit recommends ways to implement renewable energy systems & energy efficiency enhancement technologies thereby reducing the overall carbon footprint and to achieve carbon "net zero" emissions.

Step 1: Pre-audit data collection

The main purpose of this step is to evaluate the characteristics of the energy systems and the energy use. Some of the tasks that can be performed in this step are presented below, with the key goals expected from each task:

- Identify the energy consumption
- Determine the consumption patterns of energy
- Understand utility rate structure (energy and demand)

Step 2: Walk-Through Survey

In this step we should identify potential for energy savings measures. The results of this step are important since they determine if it requires any further energy auditing work. Some of the tasks involved in this step are

- Identify the customer's concerns and needs
- Check the current operating and maintenance procedures
- Determine the existing operating conditions of major energy use equipment
- Estimate the occupancy, equipment, and lighting (energy use density and hours of operation)

Step 3: Baseline for Building Energy Use

The main purpose of this step is to develop a base model that represents the existing energy use and operating conditions. This will be used as a reference to estimate the energy savings due to appropriately selected energy conservation measures. The major tasks to be performed during this step are

- Inspect, test, and evaluate equipment for efficiency, performance, and reliability
- Obtain all energy consuming equipment (including lighting, fans, HVAC systems, motors, pumps etc.,)

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Step 4: Evaluation of Energy-Saving Measures

In this step, a list of cost-effective energy conservation measures is determined using both energy savings and economic analysis. To achieve this goal, the following tasks are recommended:

Prepare a comprehensive list of energy conservation measures (using the information collected in the walk-through survey)

Evaluate the cost-effectiveness of each energy conservation measure using an economic analysis method (simple payback or life-cycle cost analysis) The outcome of this audit can recommend for a detail audit with clear evidence and easily implementable suggestions/solutions can be given to reduce energy consumption.

Energy audit consists of:

- Scout energy consumption in the organization
- Find the scope for saving
- Identify the most likely areas for attention
- Identify areas of improvements/ savings
- Set a 'reference point

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Summary of Audit

Energy audit of Anna Adarsh College and Hostel was carried by Alcheme Green Energy Company. The Audit team has gone through the data related to TNEB GRID Electrical Energy, Renewable Energy, Diesel and LPG consumption. A study was also carried out on Renewable energy utilisation and Energy Conservation measures to reduce energy consumption.

During the visit it was observed that Anna Adarsh College strictly follows reduce, reuse and recycle policy to limit energy usage. The concept of energy conservation is disseminated among the students and staffs through various seminars/workshops and training programs.

We hope that the results presented in the energy auditing report will serve as a guide for the institution on the existing energy related practices and resource usage.

Noteworthy

- Renewable energy (Green Energy) usage is 24.8 % on total energy consumption
- **Installation of Solar power plant at College(20KW) and Hostel (50KW)**

The audit outputs and recommendations are summarised as follows

- Electrical Energy consumption from TNEB during the year 2021-2022 –2,39,068 units.
- Electrical Energy consumption from Diesel Generator –2,175 units.
- Solar Power Electrical energy consumption from 70(20+50) KW Power Plants – 1,05,000 units
- Total Electrical Energy consumption from TNEB,DG and Solar –3,46,243 units.
- LPG consumption -5,586 Kgs
- Diesel consumption -725 litres
- Lot of Energy conservation initiatives are taken. Energy efficient appliances are installed
- More Renewable energy utilisation shall be planned in the coming years
- Periodical Cleaning of Solar Power plants to be carried out.

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ENERGY SAVING POTENTIALS

1.**Conventional tube lights shall be replaced with LED tube lights**

Replacement cost for 100 LED tube lights-Rs 180x100= RS 18,000 **Payback period-6.6 months** **Cost savings for 100 LED tube lights-Rs 32,400 / year** **Energy savings for 100 LED tube lights-3,600 units/ year**

2.**Conventional fans shall be replaced with energy efficient fans**

Replacement cost for 100 Nos. ENERGY EFFICIENT FAN-Rs 2,800x100= RS 2,80,000 **Cost savings for 100 Nos. ENERGY EFFICIENT FAN -Rs 76,500 / year** **Energy savings for 100 Nos. ENERGY EFFICIENT FAN -8,500 units/ year** **Payback period 44 months**

- Remaining Conventional Tube lights shall be replaced with LED tube lights in a phased manner
- 5 Star rated Energy efficient electrical equipments shall be procured in future

We are happy to submit this detailed energy audit report to the Anna Adarsh College

Alcheme Green Energy Company
Madurai

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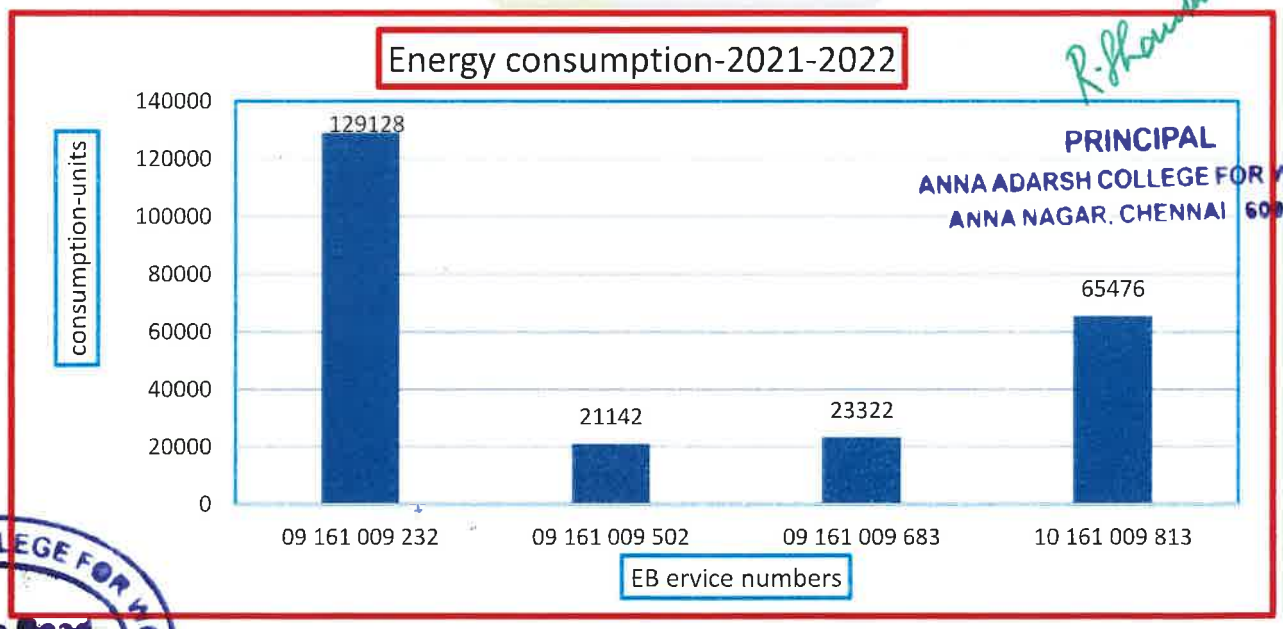
1. TNEB LT Service connection number, Tariff, Sanctioned Load, unit energy cost and fixed cost details

EB Service number details					
Sl. No	SERVICE NO	TARIFF	Sanctioned load in KW	Unit cost -Rs	Fixed cost for two months-Rs
1	09 161 009 232	LM 2B2	75	8.5	650
2	09 161 009 502	LM 2B2	111	8.5	650
3	09 161 009 683	LM 2B2	110	8.5	650
4	10 161 009 813	LM 51	61	9.5	650
	Total		357		

TNEB ENERGY CONSUMPTION DDETAILS					
Sl. No	SERVICE NO	TARIFF	Units Consumed	Bill Amount - Rs	Average Unit cost-Rs
1	09 161 009 232	LM 2B2	129128	1272411	9.85
2	09 161 009 502	LM 2B2	21142	246909	11.68
3	09 161 009 683	LM 2B2	23322	265102	11.37
4	10 161 009 813	LM 51	65476	533433	9.18
	Total		239068	2317855	



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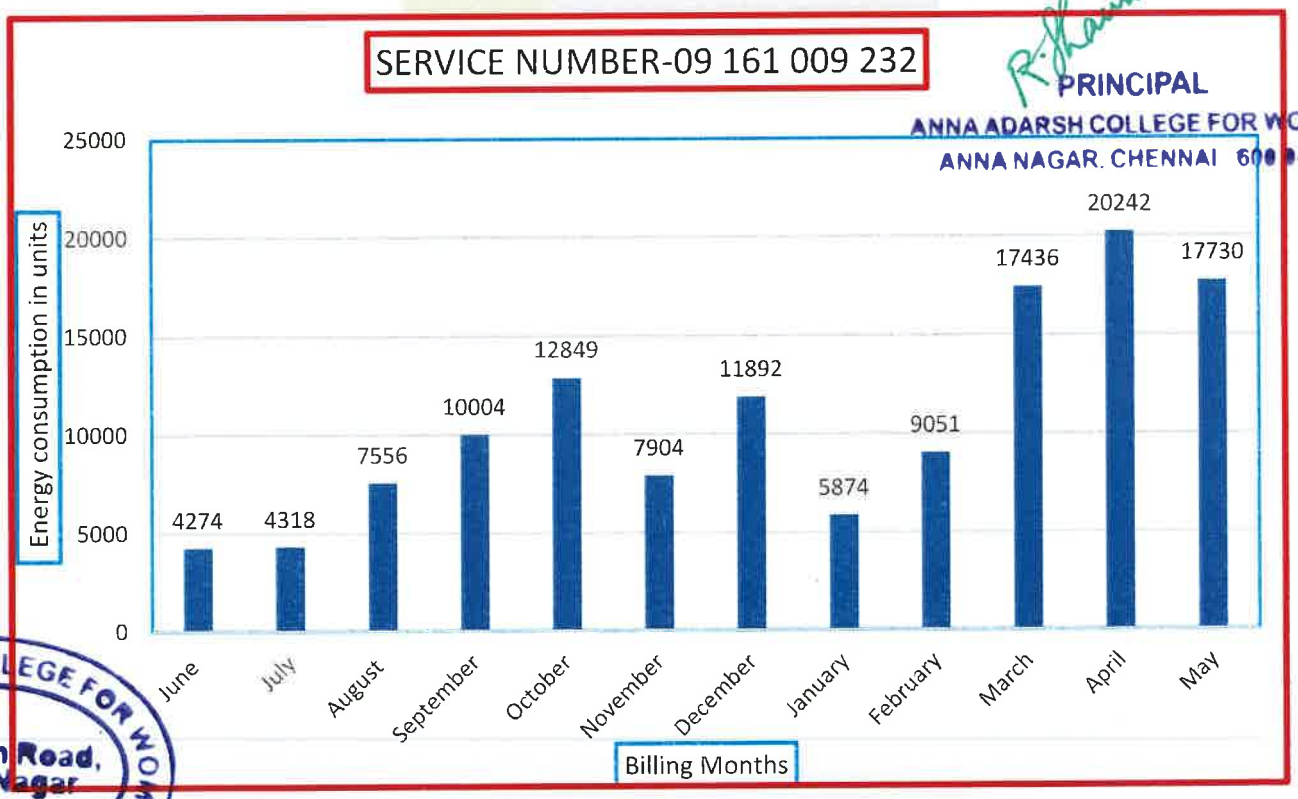
2.Service Number 09 161 009 232 Energy consumption details

Service No 09 161 009 232 75 KW 3 Phase Tariff LM2B2					
Sl. No.	Assessment Date	Months	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	30-06-2021	June	4274	38233	8.95
2	30-07-2021	July	4318	38612	8.94
3	31-08-2021	August	7556	64162	8.49
4	28-09-2021	September	10004	83402	8.34
5	30-10-2021	October	12849	105801	8.23
6	30.11.2021	November	7904	73377	9.28
7	30.12.2021	December	11892	113409	9.54
8	31.01.2022	January	5874	50974	8.68
9	28.02.2022	February	9051	81088	8.96
10	30.03.2022	March	17436	147456	8.46
11	29.04.2022	April	20242	261990	12.94
12	31.05.2022	May	17730	213907	12.06
	Total		129128	1272411	9.85



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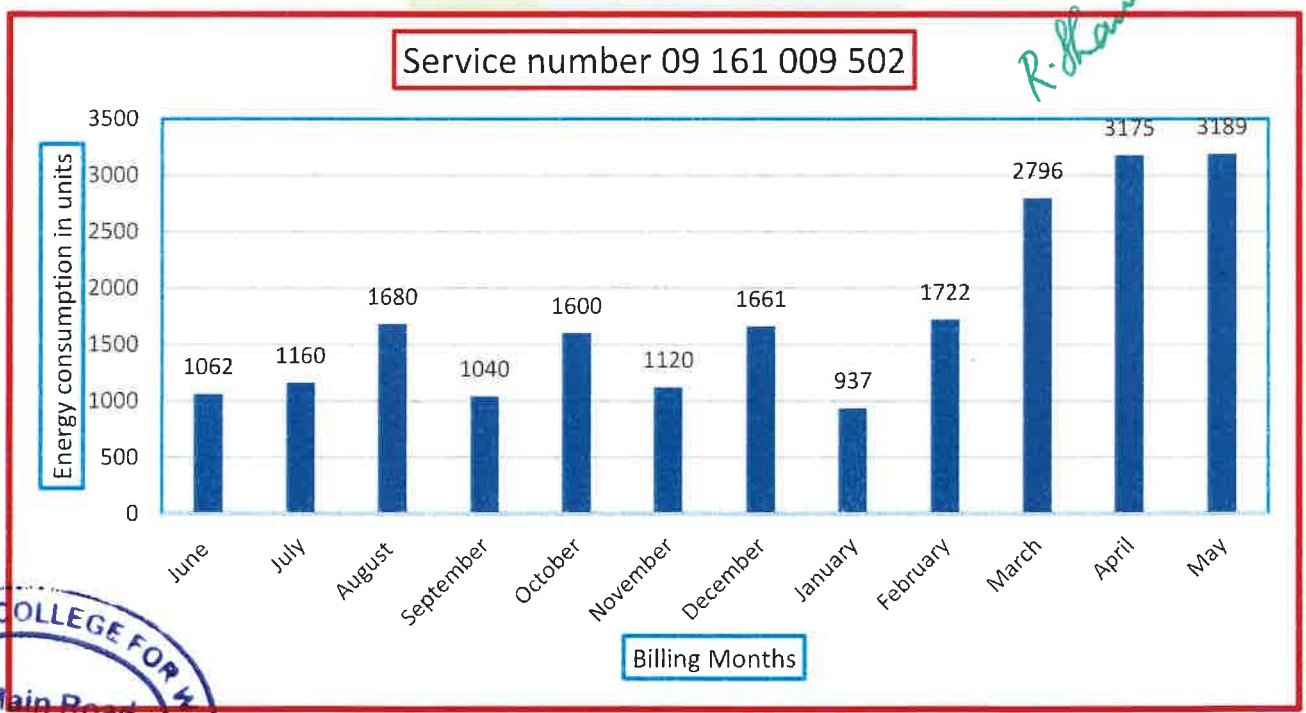
3.Service Number 09 161 009 502 Energy consumption details

Service No 09 161 009 502 111 KW 3 Phase Tariff LM2B2					
Sl. No.	Assessment Date	Months	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	30-06-2021	June	1062	15038	14.16
2	30-07-2021	July	1160	15813	13.63
3	31-08-2021	August	1680	19911	11.85
4	28-09-2021	September	1040	14874	14.30
5	30-10-2021	October	1600	19287	12.05
6	30.11.2021	November	1120	15513	13.85
7	30.12.2021	December	1661	19784	11.91
8	31.01.2022	January	937	14061	15.00
9	28.02.2022	February	1722	20290	11.79
10	30.03.2022	March	2796	28772	10.29
11	29.04.2022	April	3175	31737	10.00
12	31.05.2022	May	3189	31829	9.98
	Total		21142	246909	11.68



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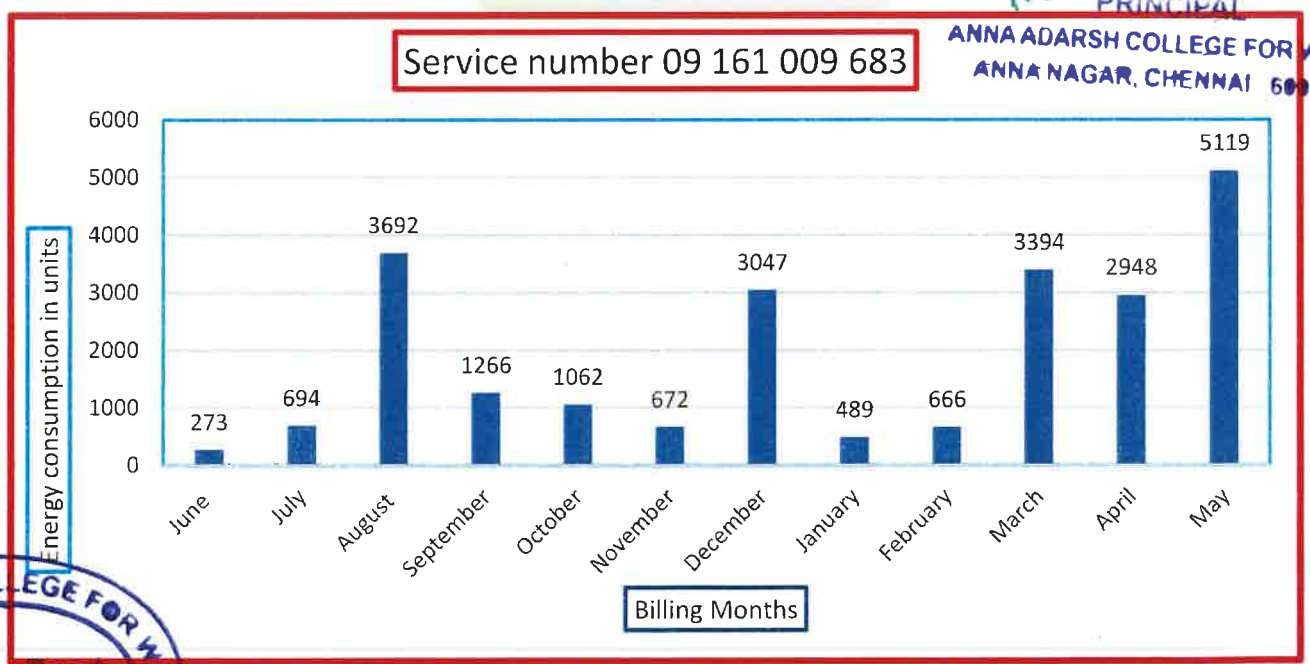
4.Service Number 09 161 009 683 Energy consumption details

Service No 09 161 009 683 110 KW 3 Phase Tariff LM2B2					
Sl. No	Assessment Date	Months	Units Consumed	Bill Amount - Rs	Unit cost- Rs
1	30-06-2021	June	273	8778	32.18
2	30-07-2021	July	694	12233	17.64
3	31-08-2021	August	3692	35864	9.71
4	28-09-2021	September	1266	16738	13.23
5	30-10-2021	October	1062	15140	14.25
6	30.11.2021	November	672	12051	17.93
7	30.12.2021	December	3047	30780	10.10
8	31.01.2022	January	489	10629	21.73
9	28.02.2022	February	666	12019	18.06
10	30.03.2022	March	3394	33586	9.89
11	29.04.2022	April	2948	30079	10.20
12	31.05.2022	May	5119	47205	9.22
	Total		23322	265102	11.37



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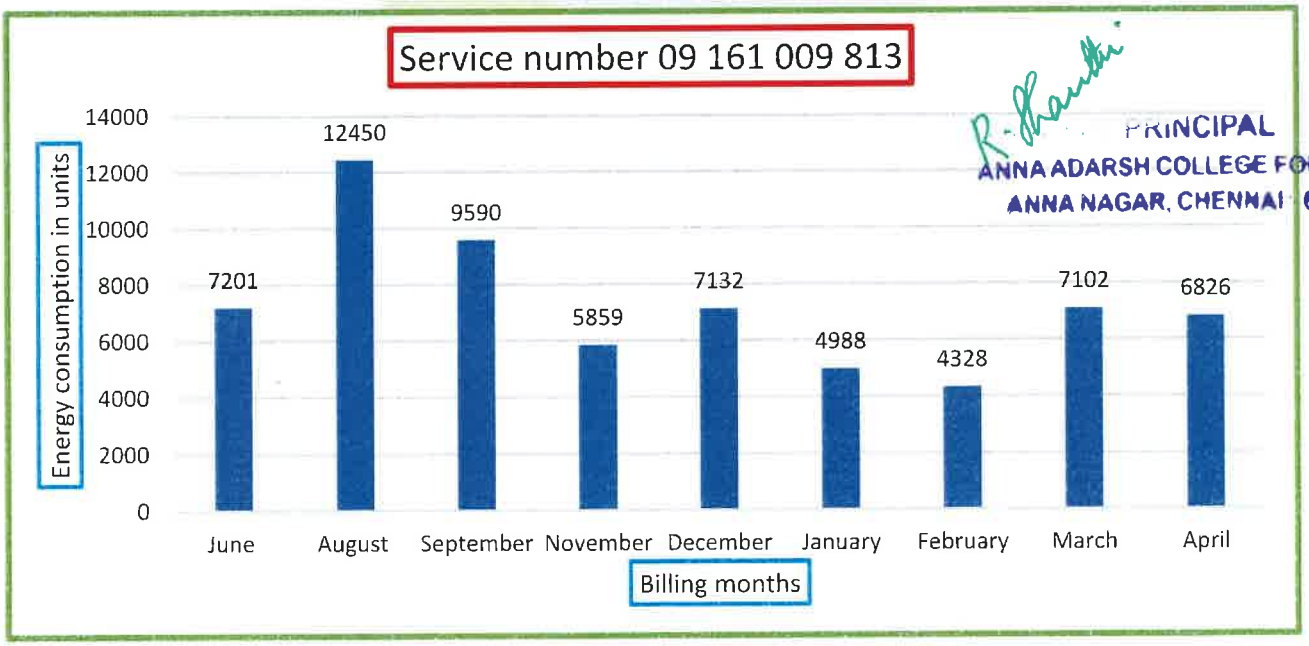
5.Service Number 09 161 009 813 Energy consumption details

Service No 09 161 009 813 61 KW 3 Phase Tariff LM51					
Sl. No	Assessment Date	Months	Units Consumed	Bill Amount - Rs	Unit cost- Rs
1	10-06-2021	June	7201	65262	9.06
2	10-08-2021	August	12450	48890	3.93
3	30-09-2021	September	9590	86802	9.05
4	30.11.2021	November	5859	53895	9.20
5	30.12.2021	December	7132	64673	9.07
6	31.01.2022	January	4988	46515	9.33
7	28.02.2022	February	4328	40946	9.46
8	30.03.2022	March	7102	64385	9.07
9	30.04.2022	April	6826	62065	9.09
	Total		65476	533433	9.18



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6.DG set Electrical Energy consumption

No of DG sets -Two

DG set 1- College

DG set 2- Hostel

Electrical Energy Consumption from DG sets-2,175 units

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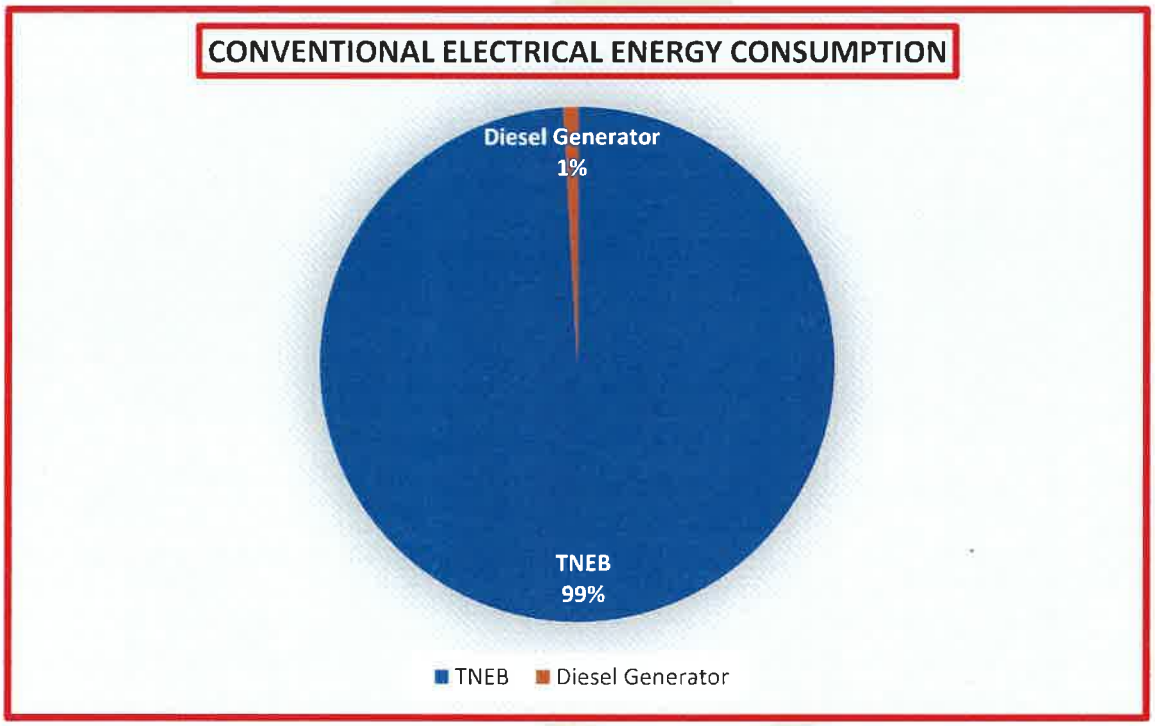
7.Total Conventional Electrical Energy Consumption details

Sl. No	Source	Units consumed	Percentage
1	TNEB	239068	99.1
2	Diesel Generator	2175	0.9
	Total	241243	100



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8. Renewable Energy-Solar Electrical energy consumption

Total solar power plant installed capacity-70 KW (20+50)

Total Solar energy generation from solar power plant-1,05,000 units

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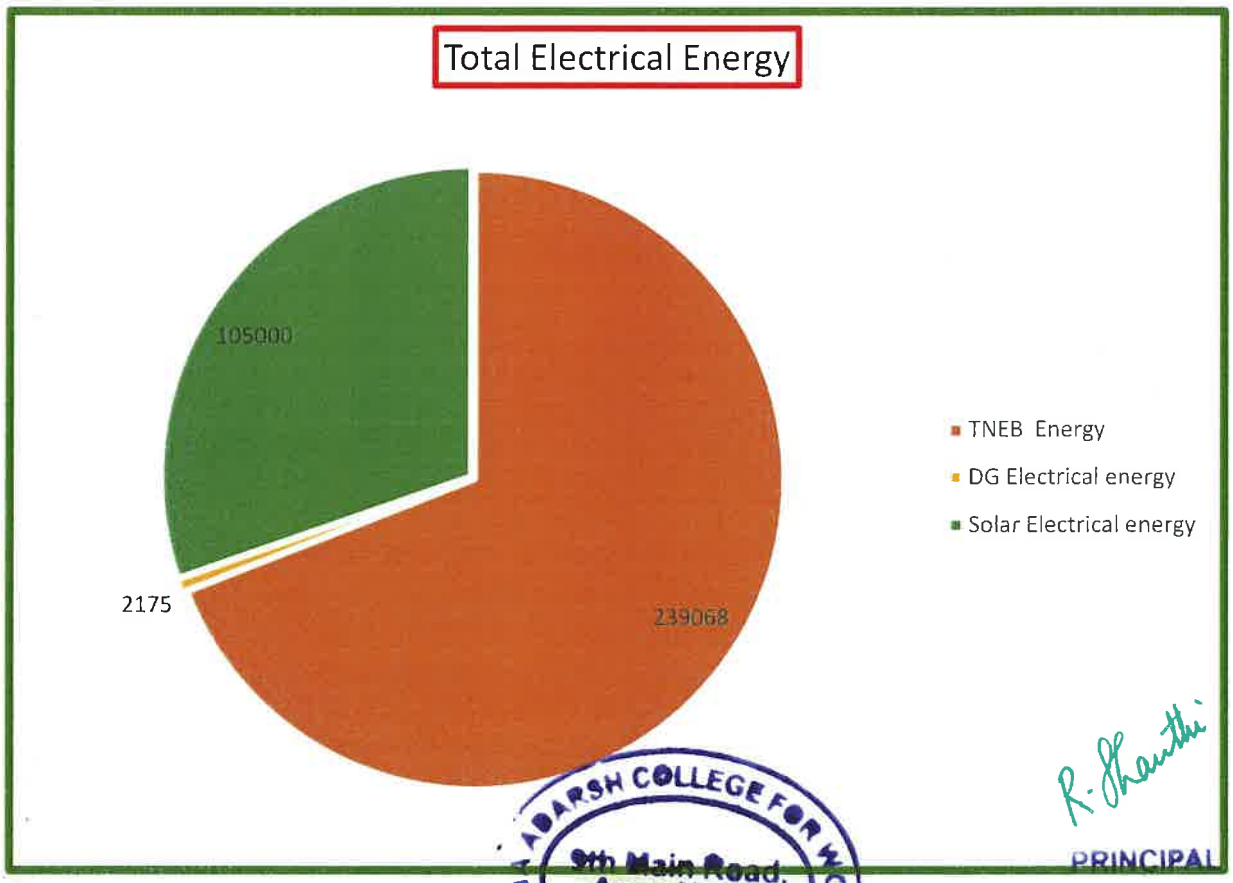
9.Total Electrical Energy Consumption-Conventional and Renewable

S.L. No	Source	units	Percentage
1	TNEB	239068	69.05
2	DG	2175	0.63
3	Solar	105000	30.33
	Total	346243	100.00



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10.Conventional Thermal Energy consumption -Liquified Petroleum Gas (LPG)

LPG cylinders used- commercial

LPG cylinders consumed in the college during the year 2021-2022-20 Nos

LPG cylinders consumed in the Hostel Kitchen during the year 2021-2022-34 Nos

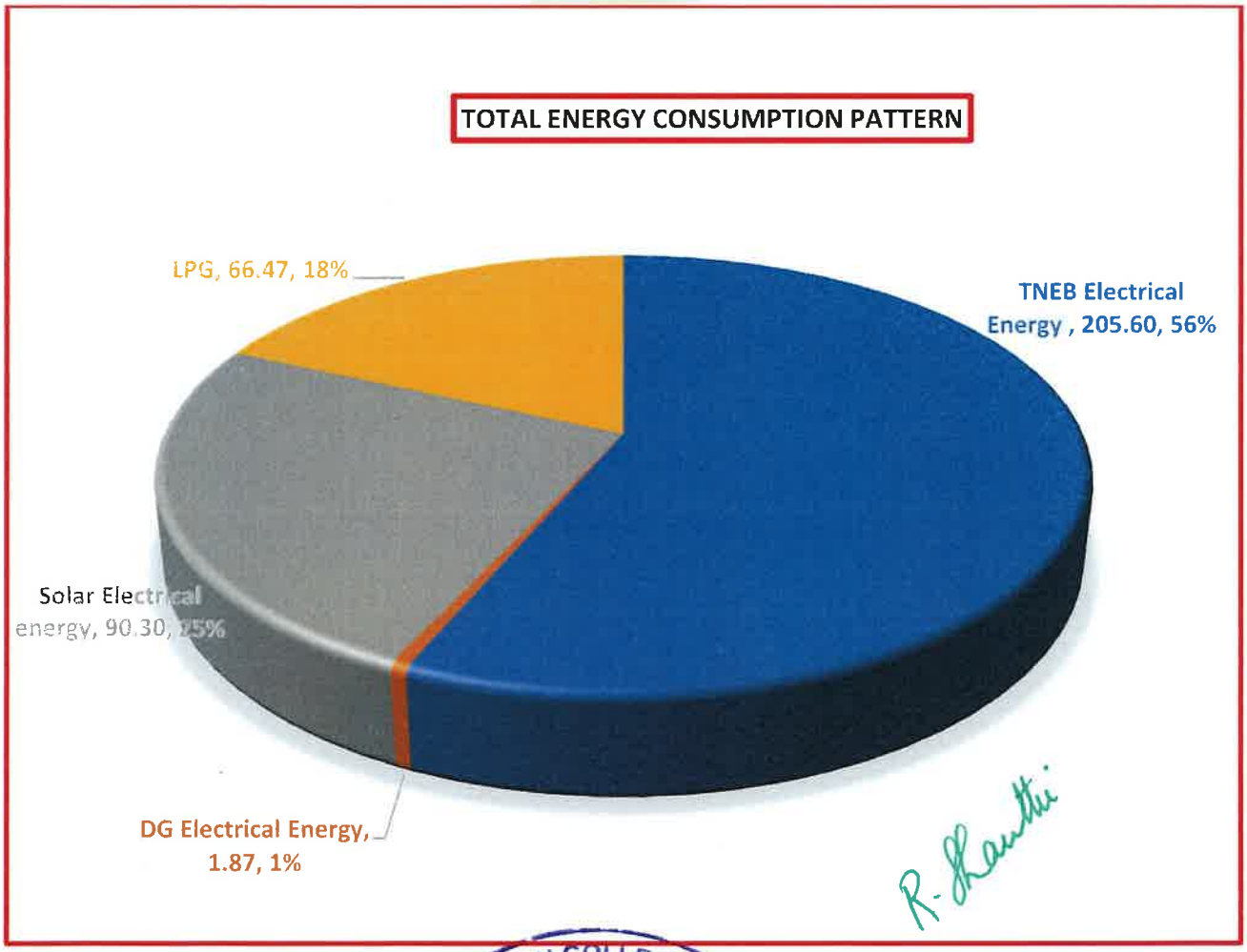
LPG cylinders consumed in the canteen during the year 2021-2022-240

Total LPG consumption during the year 2021-2022- 5586 Kgs

11.Total Energy consumption

Electrical (Conventional & Renewable) and Thermal(Conventional)

SL.NO	TYPE OF ENERGY	ENERGY -GCAL	Percentage
1	TNEB Electrical Energy	205.60	56.45
2	DG Electrical Energy	1.87	0.51
3	Solar Electrical energy	90.30	24.79
4	LPG	66.47	18.25
	Total	364.2	100



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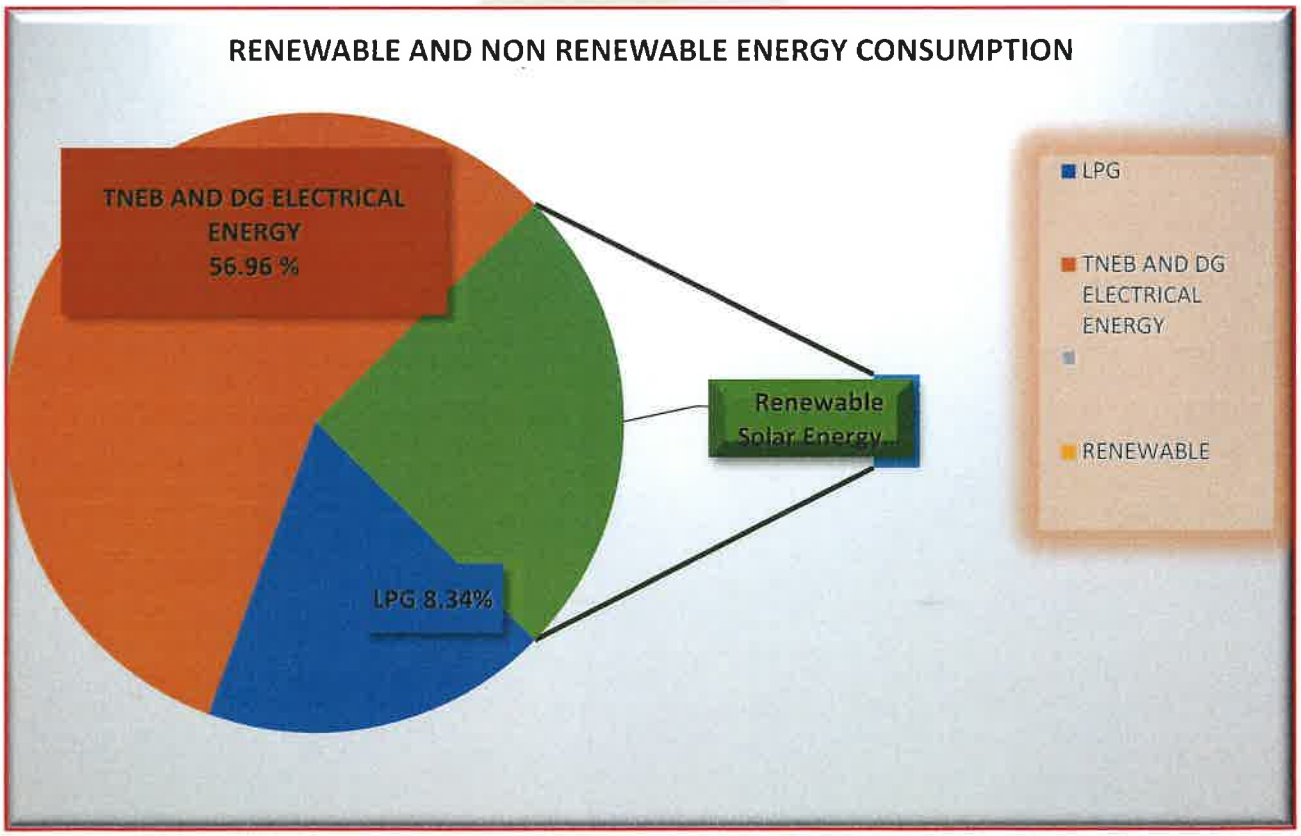
12.Non Renewable (Conventional) and Renewable energy distribution

ENERGY CONSUMPTION	PERCENTAGE
NON RENEWABLE	
LPG	18.25
TNEB AND DG	56.96
RENEWABLE	
SOLAR Electrical	24.79



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13.The energy conservation measures followed

- Regular monitoring of air conditioners is done in order to maintain a temperature of 24°C in all the places that they are installed in
- Replacing conventional electrical light fittings with energy efficient Light-Emitting Diode (LED) bulbs is going on as continuous process.
- Switching off the fans and tube lights in the classroom and faculty rooms are done after the working hours
- Periodical maintenance and overhauling of generators is being carried out.
- Periodical maintenance of UPS and Battery systems are carried out.
- The air-conditioners and other electronic and electrical equipments are switched off when not in use.
- Computers are switched to sleep mode or hibernate mode automatically when not in use.
- At the end of every practical session, Computer monitors and UPS are switched off.
- Soft copies are maintained instead of hard copies, to reduce power consumption and paper.
- Work supervisor and electrician regularly check the usage of lights, fans and all other energy sources during and out of the college hours.
- Lights and fans are switched off by the students whenever they are out of hostel rooms

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14.Major Electrical loads

- ACs-129 TR
- Fans-56.175 KW
- Online UPS/inverter- 75 KVA
- Batteries-80 Nos
- Computers -40.65 KW
- Tube Lights Conventional-41.8 KW
- Tube Lights LED-12.2 KW
- Water Coolers-6KW
- Pumps-12HP
- Oven-3KW

Lighting Load

- Max Demand Permitted – 111 +110+75+61= 357KW
- LED power- 20 watts
- LED lighting load- 12.2 KW
- Conventional Tube Lights power-40 watts
- Conventional Tube light Load- 41.8 KW
- Total Lighting Load- 54 KW
- Lighting load on total load -15 %
- LED lighting load on total Lighting load -22.6 %
- LED lighting load on total load-3.4 %

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15.COMMON OBSERVATION AND FEEDBACK

1. Good Housekeeping and Hygiene are maintained at Kitchen and hostel mess
2. Lightning arrestor was provided at the highest point of the college campus.
3. Solar Power Plant solar PV panels to be cleaned periodically.
4. Earth pits maintenance to be carried out periodically
5. In Power room, unwanted materials not to be kept inside .
6. Rubber matt to be provided in all power rooms
7. All Fire Extinguishers are in good condition
8. Fire Extinguishers kept on college walls are easily accessible and operable
9. Easy operability of Fire Hose reels to be ensured
10. Trial operation of Fire hydrant systems to be carried out on a periodical manner
11. Hands on training to operate Fire Extinguishers shall be given to all teaching and non- teaching staffs on periodical manner
12. Battery Purchase details, Warranty periods to be maintained
13. Unwanted/non-related materials from UPS and Battery rooms shall be removed
14. Sign board for Water & Energy conservation to be increased

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16.AUDIT FINDINGS & ENERGY SAVING POTENIAL

16.1 Findings

- Electrical Energy consumption from TNEB during the year 2021-2022 –2,39,068 units.
- Electrical Energy consumption from Diesel Generator –2,175 units.
- Solar Power Electrical energy consumption – 1,05,000 units
- Total Electrical Energy consumption from EB,DG and Solar –3,46,243 units.
- LPG consumption -5586 Kgs
- Lot of Energy conservation initiatives are taken.
- Conduct more awareness programs on importance of energy saving for students and staff
- Remaining Conventional Tube lights shall be replaced with LED tube lights in a phased manner
- 5 Star rated Energy efficient electrical equipments shall be procured in future
- In total Lighting loads, 36 % lighting loads are converted into LED lighting system. Remaining Conventional Tube lights shall be replaced with LED tube lights in a phased manner
- Flow meter shall be planned to know the correct quantity of Biogas generation

16.2 Renewable Energy

- Solar Electrical Energy contribution on total Electrical energy is 24.8%
- **Installation of Solar power plant at College(20KW) and Hostel (50KW)**
- Periodical Cleaning of Solar Power plants to be carried out
- Additional Solar power plant shall be planned in future in a phased manner to achieve net zero emission

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16.3 Energy saving potentials

1.Conventional tube lights shall be replaced with LED tube lights

Conventional tube light (with electronic choke) energy consumption-40 watts/hr

LED Tube lights energy consumption-20 watts/ hr

Savings per tube light -20 watts/hr

No of hours usage per day in the college – 10 hrs (5 hrs per shift)

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No of college days per year -180 days

Energy savings per tube light per year -180 x10x20= 36,000wh=36 units

Average energy cost- Rs 9 /unit

Cost saving per year per tube light-36 x 9 = Rs 324

Cost savings per month-Rs 27

Approximate Cost of LED tube light -Rs 180

Payback period-6.6 months

Replacement cost for 100 LED tube lights-Rs 180x100= RS 18,000

Cost savings for 100 LED tube lights-Rs 32,400 / year

Energy savings for 100 LED tube lights-3,600 units/ year

Payback period-6.6 months

2. Conventional fans shall be replaced with energy efficient fans

Conventional FAN energy consumption-75 watts/hr

ENERGY efficient fan energy consumption-28 watts/ hr

Savings per fan -47 watts/hr

No of hours usage per day in the college– 10 hrs

No of college working days -180 days

Energy savings per fan per year -180x10x47= 84,600wh=85 units

Average energy cost- Rs 9 /unit

Cost saving per year per FAN-85 units x 9 = Rs 765

Cost saving per month-Rs 64

Cost of ENERGY EFFICIENT FAN -Rs 2800

Payback period 44 months

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Replacement cost for 100 Nos. ENERGY EFFICIENT FAN-Rs 2,800x100= RS 2,80,000

Cost savings for 100 Nos. ENERGY EFFICIENT FAN -Rs 76,500/ year

Energy savings for 100 Nos. ENERGY EFFICIENT FAN -8,500 units/ year

Payback period 44 months

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