ENERGY AUDIT

STUDY PERIOD (TWO YEARS) 2021 – 2022 & 2022 - 2023

Sustainability study

AUDIT REPORT

Studied for

Government Degree College, Pattikonda

Main road, Kotha Peta, Pattikonda,
Kurnool (District), Pattikonda – 518380,
Andhra Pradesh, India

Studied in the capacity of

Accredited and Certified
Green Building Professional

Studied by

Website: https://thegreenviosolutions.co.in/
Email: greenviosolutions@gmail.com

Background reference image Janko Ferlic on pexels

Disclaimer

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The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

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The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh who is as an Accredited and Certified Green Building Professional-Architect. Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

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Contents

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1.3.1 Affiliations

The Institute is affiliated to **Rayalaseema University,** a state University in Pasupula, Andhra Pradesh, India.

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The Institute has received the following Certifications

- **ISO 9001** – Quality Management Systems
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The College is due to enter its next cycle of NAAC.

2. Overview

2.1 Summarised Populace analysis for 2022-2023

2.1.1 Students data

The data (shared by the Institute) shows there were **460 male and 265 female students.**

2.1.2 Staff data

S. No.	Type	Male	Female	Total
1	Teaching staff	19	03	**22**
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Total Staff Members		**25**	**04**	**29**

Table 2: Staff data of the Institution for 2022-2023

The staff data shows the Institute premises had a total of **29 Staff Members.**

2.2 Summarised Populace analysis for 2021-2022

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2.3 Institute area

The **site area is 6.5 acres** for an approximately **754 footfalls.**

2.4 Institute Infrastructure

2.4.1 Establishment

The Institute was established in **1988**.

2.4.2 Spatial Organisation

There are provisions for staircase for accessibility on the premises, whereas there are amenities such as CCTV, a first aid room, etc.

The Institute is located prettyclose to nature and hence has a very fresh environment which is absolutely pollution free and healthy.

The Building is a Reinforced Cement Concrete (RCC) framework building.

2.5 Operation and Maintenance of premises

The interview session was held with the staff regarding the operation and working hours. The Institution is open from Monday to Saturday with the timings being 10:00 am to 17:00 hours.

3. Research

3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution sustainable and healthy premises for its inhabitants.

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification as follows:

- Investigation
- Technical discussion with team
- Observations
- Inferences

3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

3.4 Activities undertaken for the Green Building Study Audit

- Discussion with the Institute
- Allotment and Initiation by the Institute
- Data collection
- Submission of the files

4. Observation

The section showcases the facilities available in the premises

Plate 1: Ground mounted solar power plant in the premises

Plate 2: Electrical systems in the premises

5. Documentation

The premise uses following sources of energy consumption.

5.1 Primary sources of energy consumption

- **Electrical (Metered) –** Light, Fans, Equipments, Pumps comprise these sources.
- **Renewable energy –** There are sources to harness solar energy available in the form of **'SOLAR PANELS'.**

5.2 Secondary sources of energy consumption

The premise uses batteries, inverters & UPS as backup for administrative purposes. The details of the existing sources are documented below:

S. No.	Name	Nos.
1	UPS	6
2	Inverters	1
3	Batteries	3
4	Gas cylinders	1
5	Induction stove	1

Table 4: Details of secondary sources of energy consumption

5.3 Actual Electrical Consumption as per Bills

The Institute has alternate sources of energy but in substantially low quantity; however it spends a certain sum of money towards electrical expenses on a monthly basis. We would suggest increasing the alternate sources of energy to meet the required demand.

S. No.	Month	Amount	(A) Total units consumed	(B) Solar units generated	(C = A-B) Gross units consumed after deduction
Academic year 2021-2022					
1	June	8,925	357	50	307
2	July	5,131	208	60	148

3	August	2,799	337	65	272
4	September	6,204	360	58	302
5	October	8,841	366	60	306
6	November	3,249	390	0	390
7	December	7,159	473	62	411
8	January	11,133	482	63	419
9	February	14,225	357	0	357
10	March	17,776	420	66	354
11	April	-158	556	80	476
12	May	5,059	529	70	459
Academic year 2022-2023					
13	June	8,862	333	0	333
14	July	4,636	463	0	463
15	August	10,336	576	0	576
16	September	15,804	610	0	610
17	October	22,173	754	0	754
18	November	0	555	0	555
19	December	-80	409	0	409
20	January	5,379	521	0	521
21	February	-80	458	0	458
22	March	-80	501	0	501
23	April	5,125	561	0	561
24	May	9,829	584	0	584

Table 5: Details of electricity bill consumption

5.4 Calculated Electrical Consumption as per inventory

The electricity bills provide actual consumption data. The following is the calculated consumption. It is done to understand the percentage of energy usage in the premises by various applications. It is based on the inventory collected and interviews with the staff.

The additional data such as wattage is taken from market research. In terms of electrical consumption, the main sources are lights, fans, air conditioner, and equipment. The inventory and data collection for sources of energy consumed in the premise in summarised in the following sections.

The following documentation is based on the consumption practice of the premises on a regular working day.

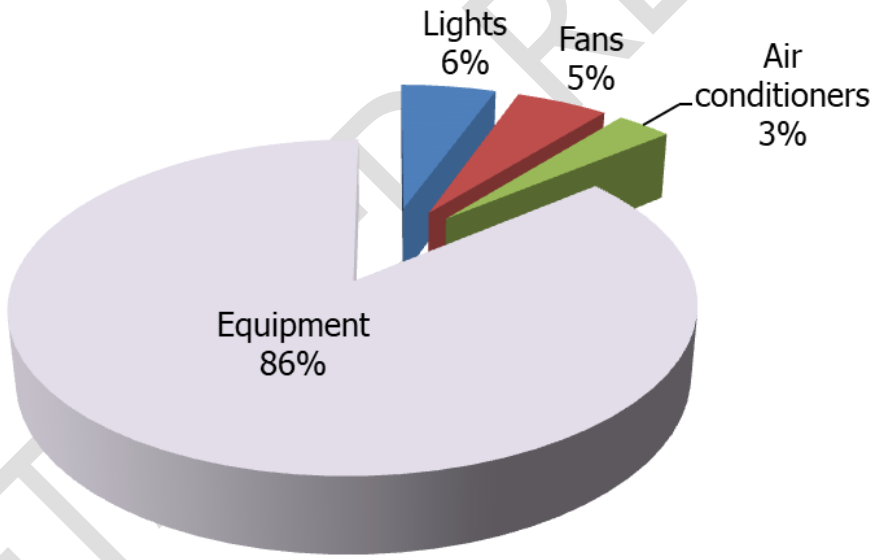

Figure 1: Summary of the calculated electrical consumption as per inventory

The above graph shows that equipment consumes 86% whereas the lights consume 6% while the fans consume 5% and the air conditioners consume 3% each of the total calculated electrical energy.

5.5 Lights

5.5.1 Types of lights based on the numbers

There are a total of **80 numbers of lights on the premises;** the following table shows the various types of lights on the premises.

S. No.	Type	Nos.
1	**LED lights** *(Energy efficient appliance)*	10
2	**Non-LED** *(Non-Energy efficient appliance)*	70

Table 6: Summary of the types of lights on-premise

5.5.2 Types of lights based on the power consumption

The energy consumption of lights is **6,195 kWh** of energy.

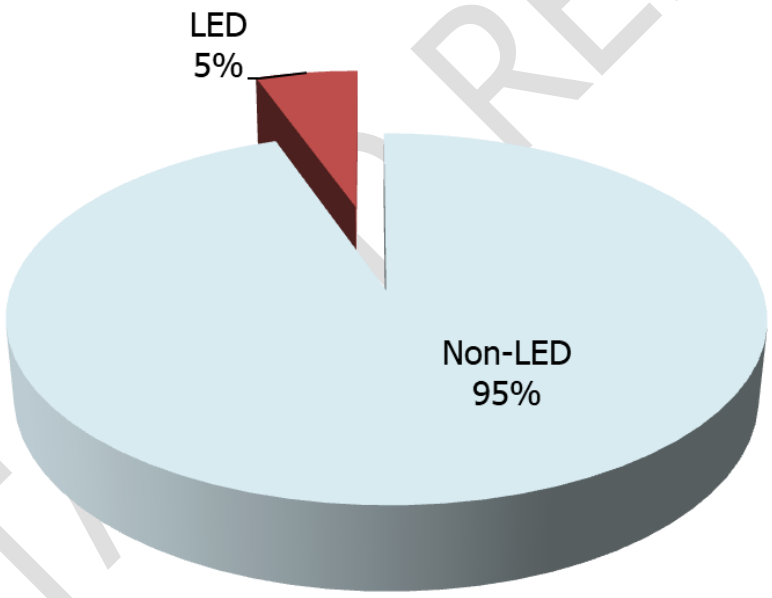

Figure 2: Energy consumed by types of lights in the premise based on the usage study

The analysis of the types of Lights on-premises shows **Non-LED lights consume 95%** whereas the **LED lights consume 5%** of the total power consumed by lights.

5.6 Fans

5.6.1 Types of fans based on the numbers

There are a total of **70 nos. of fans** on the premises as follows:

S. No.	Type	Nos.
1	Ceiling fans	62
2	Wall Mounted fans	08

Table 7: Summary of the types of fans in the premises

5.6.2 Types of fans based on the power consumption

The energy consumption of fans is **6,035 kWh** of the energy.

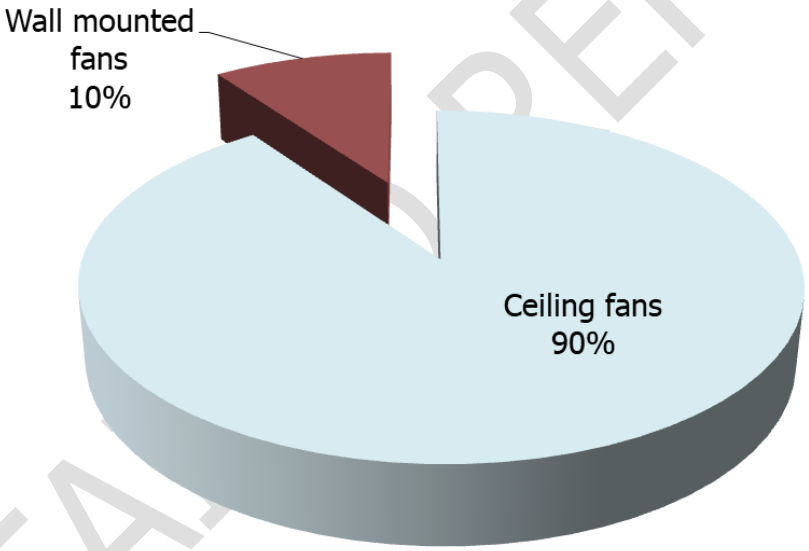

Figure 3: Types of fans based on power consumption

The above analysis shows the **Ceiling fans consume 90%** whereas the **wall mounted fans consume 10%** of total power consumed by fans.

5.7 Air conditioners

The main purposes of a Heating, Ventilation and Air-Conditioning (HVAC) system are to help maintain good indoor air quality (IAQ) through adequate ventilation with filtration and provide thermal comfort. A well-functioning HVAC system can improve air circulation and reduce the risk of airborne illnesses in commercial buildings, scientific labs, and Institutes.

The importance of indoor air quality frequently goes unnoticed despite its profound impact on our daily lives. While individuals may notice uncomfortable temperatures or unpleasant odours, the quality of indoor air are frequently neglected HVAC systems are present in all buildings. While we commonly associate heating and cooling systems with adjusting temperatures in households and offices, refrigeration and HVAC systems serve a multitude of critical roles beyond these contexts. For instance, refrigeration systems are indispensable in preserving food freshness in grocery stores and restaurants, while HVAC systems promote energy efficiency in large commercial and industrial establishments. Additionally, HVAC systems play a critical role in establishing and maintaining a healthy indoor environment in sensitive spaces.

HVAC systems maintain a comfortable and healthy indoor environment by bringing in fresh, outside air and circulating it. This exchange of air is a crucial factor in maintaining healthy oxygen levels and reducing indoor air pollutants in indoor work environments.

5.7.1 Types of air conditioners based on the numbers

There are **4 air conditioners, out of which 2 are not in working conditions; hence the study is done for 2 units only.**

5.7.1 Building-wise consumption analysis

The energy consumption of air conditioners is **3,600 kWh** of energy.

5.7.2 About the replacement of current air conditioners

- The current air conditioners are well maintained.
- Though there is not an immediate requirement for replacement.
- Whenever the Institute undergoes redevelopment there can be provisions for replacement with energy-efficient appliances or new air conditioners that require less power consumption.

5.8 Equipment

5.8.1 Types of Equipment

There are **51 nos. of equipment** in the Educational sector.

5.8.2 Types of equipment as per their energy contribution

The energy consumption of equipment is **97,276 kWh** of energy.

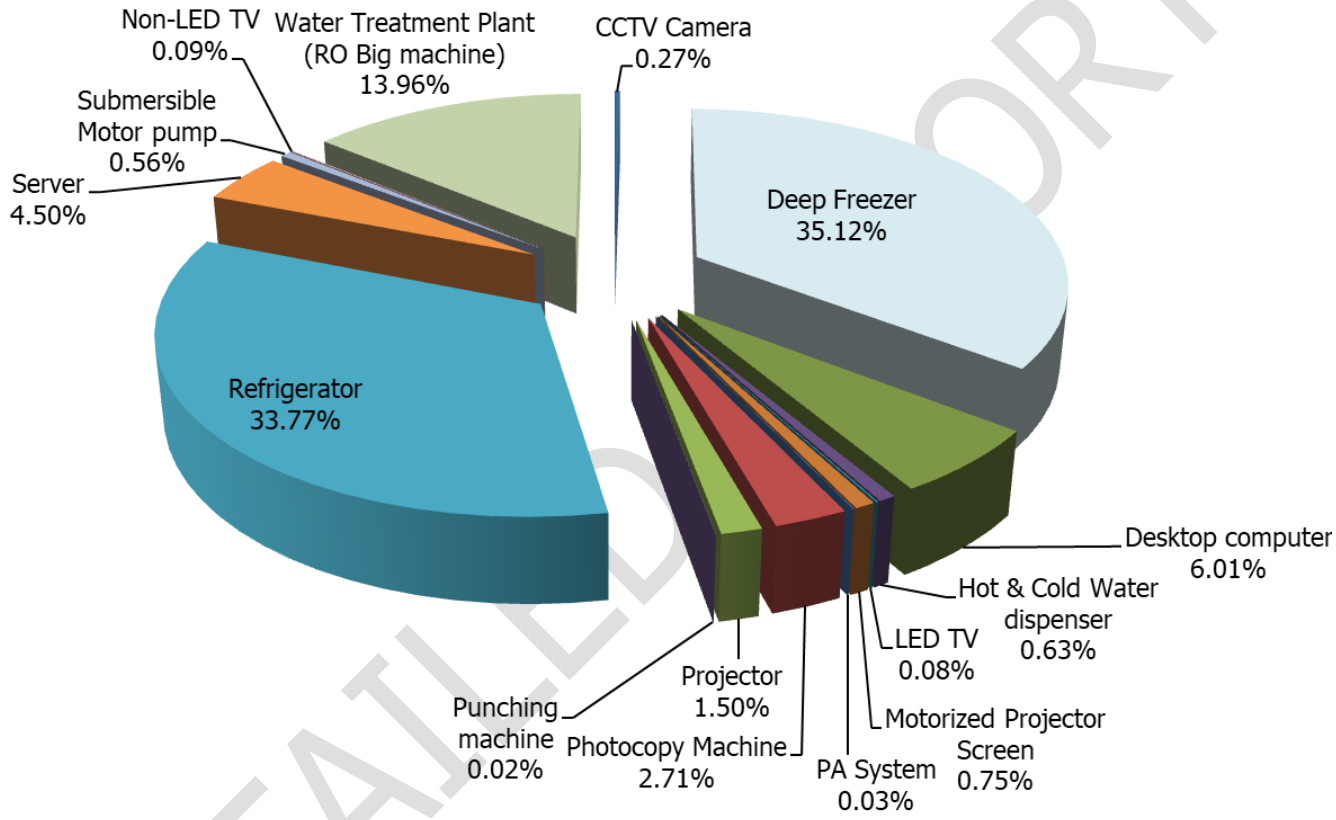

Figure 4: Energy consumed by types of equipment in the educational sector based on the usage study

The above summary shows that the **deep freezer consumes more energy at 35.12%** while the **refrigerator consumes 33.77%** the **water treatment plant (RO big machine) consume 13.96%** and the **desktop computer consumes 6.01%** these are the maximum consumers as compared to other equipment.

6. Suggestion

6.1 Section-wise suggestions

The following suggestions are to be considered as a ***first priority*** for implementation. These **should be executed within the next 1.5 to 2.5 years from the date of the Report submission.** The Institute can execute a plan after discussion with Project Head.

5.1.1 Electromechanical systems - Electrical and Lighting

Sub-section 1 – Non - LED Lights

The current light analysis shows that the College has Non-LED lights in majority areas, these should be replaced with LED lights which consume on an average 16-20W when in use.

Our technical analysis shows that there would be a reduction of an average of **60% reduction** in energy consumption through lights specifically as a part of the electro-mechanical system if all **Non-LED lights** are replaced on all floors and buildings with an energy-efficient appliance whenever the College undergoes renovation.

Sub-section 2 – Ceiling Fans

The current Fans are in proper working conditions and maintained well. The ceiling fans are in more quantity and consume at least 60W when in use. These should be replaced with energy efficient fans consuming 35W when in use.

Our detailed study states that is all the **ceiling fans on all floors** if replaced with star rated appliance results in a reduction of average of **42% reduction** in energy consumption if replaced with energy efficient appliance. It will be suggested to either replace these now if College can have certain plans else the replacement can be done when fans get damaged or are not in working condition.

6.2 General suggestions

The following details are consolidated study recommendations related to 'entire Institute' and should be considered as ***second priority*** for implementation, once the section wise recommendations are implemented. The following recommendations should be ***implemented within 2.5 to 3.5 years from the date of the Report submission.***

6.2.1 Alternatives to increase renewable energy

6.2.1.1 Solar farms

This option can be explored with due discussion with the surrounding and adjacent farmland owners. This will serve as a noble project and will provide dual benefits to farm land and University w.r.t to electricity bill power reduction.

Plate 3: Solar farm concept for the Institute (For reference purpose only)

Image source: Zsuzsa Bóka from Pixabay

6.2.2 Alternatives towards Smart premises mechanisms

6.2.2.1 Facility management systems, controls

(Includes electromechanical systems – Electrical, Water)

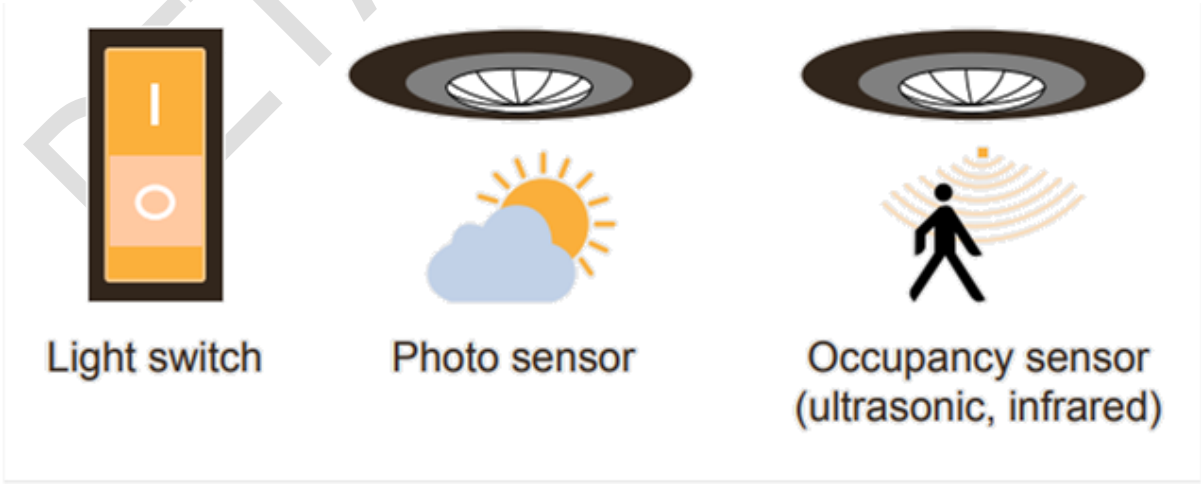

Plate 4: Understanding the lighting concepts

Source: https://seors.unfccc.int/applications/seors/attachments/get_attachment?code=NG125PFE4WHMWSYAK8TCAKIHMWX0F4QD

The above diagram provides a detailed study of how the system controls should be incorporated in the premises as fare as lighting systems are considered. The suggestions for this sub-section are listed below.

- Install PIR control of the lighting in the toilet areas.
- Install low flow taps with automatic shut off in the toilets.
- Install push button timer control in all rooms lighting and ceiling fans.
- Install Power Electronics control of the Foyer notice board lighting.
- Installation of intelligent lighting controller will help in controlling the lighting energy.
- Use of photo sensor switch for street light controlling helps in conserving the lighting energy.

7. Compilation

The study is based on the data collected, analyzed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below. However, no direct references have been used anywhere. These are used as a base to analyze and study the data collected.

Specific references for study related to energy

- https://www.energy.gov/eere/buildings/zero-energy-buildings
- https://www.dsaarch.com/zero-net-positive-energy
- U.S. Energy Information Administration
- https://www.happysprout.com/inspiration/what-is-smart-gardening/
- https://housing.com/news/smart-gardening/
- Inference study reference image - Zsuzsa Bóka from Pixabay
- Inference study reference image - https://solarpowerproject.in/solar-panels-for-parking-lots.php

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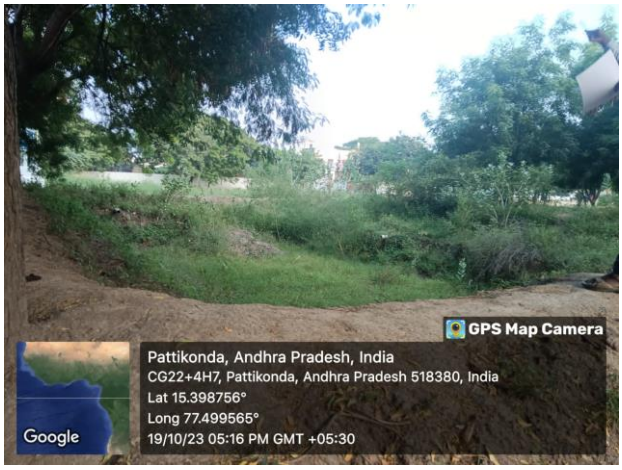


Plate 1: Open spaces in and around the premises

5. Documentation

5.1 Site beautification

5.1.1 Open Spaces

There are multiple green zones equipped with extensive ecological cover. These areas also facilitate the outdoor game areas with the prevailing **natural and potted plantations the beauty of the space has been well enhanced.**

5.1.2 Flora audit

A survey was carried out to identify ecological footprint of site as documented below.

The data has been compiled by the Internal team and further analysed by the external team. The uses of the plantations are termed under 'Greenery and ambience'

S. No.	Plant name	Type	Nos.
1	*Neem*	Tree	50
2	*Teak*	Tree	25
3	*Coconut*	Tree	10
4	*Ashoka Sal*	Tree	20
5	*Tamarins*	Tree	5
6	*Beech*	Tree	45
7	*Henna Tree*	Tree	10
8	*Leucaena*	Tree	70
9	*Jamorn*	Tree	10
10	*Billa Gannera*	Shrub	40
11	*Delonix*	Tree	25
12	*Nerium*	Shrub	10

Table 4: Details of the Flora in the premises

At present there are 320 nos. of plantations and innumerable herbs in premises.

All of these are planted by the on various occasions and some have grown naturally; timely maintenance with sufficient care has resulted in positive benefits for the surroundings.

5.1.3 Fauna audit

The details of the fauna available in the premises are documented below:

Fauna available	Names
Birds	Parrots, Crows
Insects	Spiders, Scorpions, Cockroaches
Invertebrates	Earth worms, Leaches
Reptiles	Snakes, Lizards, Calottes, Varanus
Amphibians	Frogs, Toads
Mammals	Cows, Buffalos, Monkeys

Table 5: Details of the fauna in the premises

The premise has a beautiful and rich fauna; it enhances the co-existence and provides a fresh environment for the premises.

5.2 Heat island reduction

The external temperature is well under control owing to shaded walkways and huge nos. of plantations all over the premises.

5.3 Life safety

Fire and life safety are an important consideration of the National Building Code 2016.

This aspect is touched upon as part of this study in the capacity of an Architect registered with the Council of Architecture. As part of the research, fire safety audit was considered from the 'Building systems' perspective. The current provisions can be improved.

5.4 Pollution Control

5.4.1 Noise Audit

On a macro level the Institute is surrounded by educational and residential blocks **thus there is a peaceful and noise free arena observed within the premises.**

5.4.2 Eco-friendly Commuting Practices

- The site is located in a rural locality.
- Overall, the carbon footprint is well under control.
- Students and staff members commute using public transport.
- There are no major fossil fuels used inside the premises.

5.4.3 Outdoor Light Pollution Study

The Institute compound lights are not upward looking thus, these do not cause light pollution.

6. Suggestions

The following points are related to 'entire Institute' and should be implemented ***within 3.5 to 5.5 years from date of the Report submission.***

6.1 Site beautification

- **Beautification of the entrance pathway -** The existing bricks (waste from the existing new construction going on) can be used or upgraded the pathway through an appropriate Landscape Architecture design.

- **Bird house/ Feeders -** At appropriate locations there can be provisions for drinking water and some grains for birds as they visit the site much frequently.

- **Nutrition pits -** Certain pits can be demarcated as 'Nutrition pits' where the organic food from the kitchen and Canteen fruit peels and fruits or vegetables can be degraded for making nutrition-rich soil.

- **Xeriscaping** – This practice involves designing the open spaces and planning to use xeriscaping plants which require less water and beautify the premises equally. This type of practice should be implemented in areas where there is water shortage.

- **Garden development -** The existing open space should be designed as an Architectural landscape.

  - *Nursery documentation, expansion and beautification* – The premises should have a nursery, details can be decided as per the landscape beautification.

  - *Scientific name plates and QR codes* – The team should undertake a project to have name plates with QR codes on every plant of the premises.

  - *The landscape redesign and ecological redesign* – This should be done to increase the shade cover in the entire premises.

  - *Introduce various types of gardens inside the premises* – The examples such as Flower gardens, Woodland gardens, Rock gardens, Water gardens, Vegetable and herb gardens, Roof gardens, Scented gardens, Medicinal gardens and Botanical gardens can be practiced.

6.2 Heat island reduction

- **Cool rooftops** - The Terrace rooftops should be painted with Cooltop – reflective materials to reflect the harsh sun rays and reduce the heat absorption in the top most floor and surrounding areas of the building.

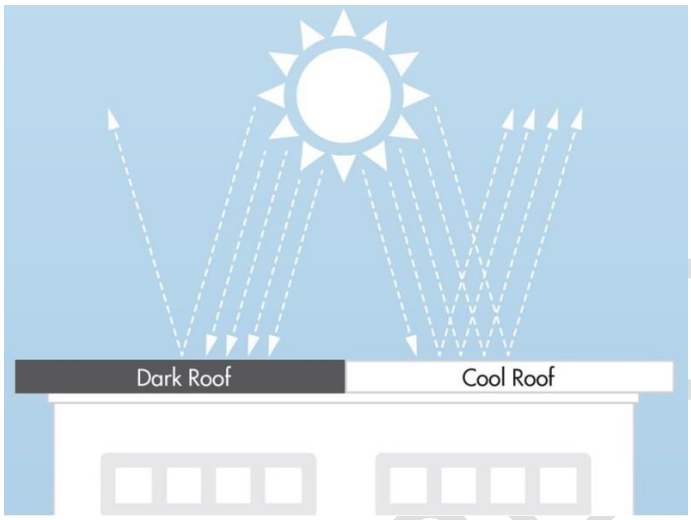
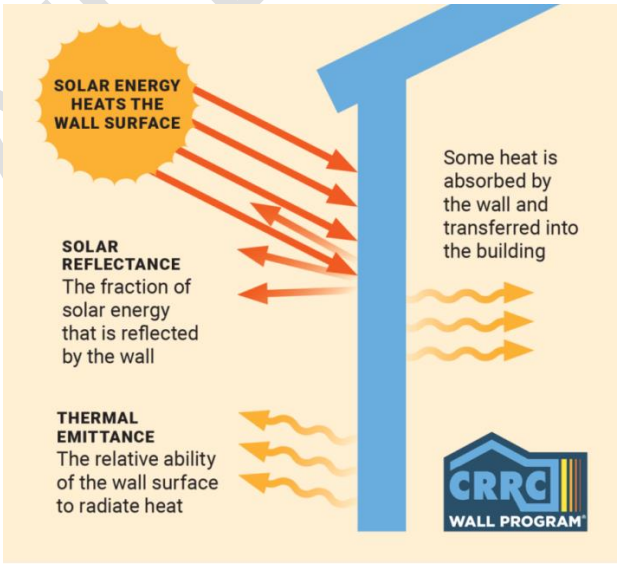


Plate 2: Cool roof comparative analysis (For reference purpose only)

Source: Image by https://www.gaf.com/en-us/blog/six-truths-about-cool-roofs-281474980105387

- **Cool walls/ Solar reflective exterior wall surface** – The exterior walls of the building can be painted in light colors as this will help in reflecting solar radiation. Thus, less heat will be absorbed in the interiors and cool temperature will be maintained.



This illustration describes the flow of radiant energy as heat between the sun, wall surface, building interior, and surroundings. The higher the solar reflectance, the more solar energy is reflected away from the wall surface. Some of the solar energy is absorbed by the wall as heat. The higher the thermal emittance, the more absorbed heat is radiated away from the wall surface. IMAGE CREDIT: COOL ROOF RATING COUNCIL.

Plate 3: Cool wall physics analysis (For reference purpose only)

Source: Image by https://coolroofs.org/resources/what-is-a-solar-reflective-wall

- **Light colour flooring for cooler walkways** – The internal walkways in the outdoor areas should be painted in cool and reflective colours; if there is a need to use paver blocks they should be of light toned colour and less absorptive/ radiating materials.

Plate 4: Cool walkways (For reference purpose only)

Source: Image by https://www.dutchiesstoneworks.com/outdoor-living-spaces/stone-walkways-and-stairs/

6.3 Life safety

- **Mandate fire extinguisher in spaces** - One fire extinguisher should mandatorily be there in every space which has an air conditioner/ gas cylinder.

- **Sensitization programs** - Regular seminars/ webinars by experts such as Architects, Govt. Fire department on subjects related to fire and life safety should be organized and the outputs should be adopted and documented.

6.4 Pollution Control

- **Bicycles as a gift -** As an appreciation gesture maybe the student's toppers/ staff best performers can be awarded a bicycle occasionally.

- **Avoid using plastic in premise -** There should be a provision for a ban on the use of plastic bags or products on the Premise.

- **Avoid paper wastage through books -** The Institute can collect all old semester notebooks; these can either be converted to reusable paper on premises through a workshop or using a shredder or handed over to a vendor for making fresh paper. Additionally, Students can undertake similar practices on an individual note.

7. Compilation

The study is based on the data collected, analyzed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below. However, no direct references have been used anywhere. These are used as a base to analyze and study the data collected.

National references

- Uniform Plumbing Code – India, 2008
- IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- IGBC Green Landscape Rating system, March 2013

International references

- BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
- Used only for understanding Universal design - Universal Accessibility Guidelines for Pedestrian, Non-motorized vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National center for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation and www.umassd.edu
- The city of Cheyenne, Streetscape/ Urban Design elements - Wyoming Planning Association, Gillette, Wyoming, United States
- Streetscape elements – Chapter 6 on San Francisco
- American lung association https://www.lung.org/
- Study related to air pollution https://www.airgle.com/
- Exploring the light pollution https://education.nationalgeographic.org/
- Accessibility study https://www.washington.edu/
- Urban heat island effect https://www.epa.gov/heatislands/what-you-can-do-reduce-heat-islands

GREEN AUDIT

STUDY PERIOD (TWO YEARS) 2021 – 2022 & 2022 - 2023

Sustainability study

AUDIT REPORT

Studied for

Government Degree College, Pattikonda

Main road, Kotha Peta, Pattikonda,
Kurnool (District), Pattikonda – 518380,
Andhra Pradesh, India

Studied in the capacity of

Accredited and Certified
Green Building Professional

Studied by

Greenvio Solutions

Website: https://thegreenviosolutions.co.in/
Email: greenviosolutions@gmail.com

Background reference image Sasin Tipchai on unsplash

Disclaimer

The Audit Team has prepared this report for the **Government Degree College, Pattikonda** located at *Main road, Kotha Peta, Pattikonda, Kurnool (District), Pattikonda – 518380, Andhra Pradesh, India* based on input data submitted by the Institute analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the Hon'ble Management and Institute. The warranty or undertaking, expressed or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

The audit is a thorough study based on the inspection and investigation of data collected over a period of time and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied or regenerated in any form.

The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh who is as an Accredited and Certified Green Building Professional-Architect. Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

The Study is conducted in capacity of Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

Palghar District, Maharashtra- 401208

sustainableacademe@gmail.com

Acknowledgement

The Audit Assessment Team thanks the **Government Degree College, Pattikonda, Andhra Pradesh** for assigning this important work of Green Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are extended are due to **everyone from the Governing body.**

Our heartfelt thanks are extended to the Chairperson of the entire process **Dr. R. Madhuri** (Principal) for the valuable inputs.

We are also thankful to Institute's Task force who have played a major role in data collection - **Dr. Md. Osman Ahmed,** IQAC Coordinator; **Ms. Vasantha** and **Mr. Rajesh**

We highly appreciate the assistance of the **entire Teaching, Non-teaching, and Admin staff** for their support while collecting the data.

Sustainable Academe

Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About the Institution

The Government Degree College, Pattikonda, Kurnool Dist. was established with an initial strength of 88 students with B.A., & B.Com courses in 1988 in Government Junior College. Since its inception, it has been striving hard to impart quality and job oriented education to the students of socially and economically backward area of Kurnool district.

Innovative teaching and learning methods are adopted which include student centered learning, seminars, G.Ds and assignments. Besides Mana T.V. Guest lectures and invited lectures enhance the quality of education with values and latest concepts. Field trips are arranged to broaden the outlook of the students. Academically backward students are identified and special care is taken to sharpen their skills by conducting remedial coaching

Cerment cell is making relentless efforts to address the problems of the girl students. Apart form conducting various competitions for the girls, if instils confidence to face the challenges of the society bravely. Grievance Redressal cell is taking all steps to solve the issues of the students. Students are given freedom to express their grievances without hesitancy.

Eco club is at its best in maintaining greenery in the campus. On the games and sports front, physical education department deserves great appreciation as it is putting untiring efforts in shaping students into bright and talented.

Being a socially responsive organization, the institution is putting all its endeavours to improve the lot of the stake holders through value based education and relevant community development activities. **The College anticipates a good number of its students will become socially responsible citizens who can make society a better place to live in.**

1.2 About the statements of the Institute

1.2.1 Vision

The Institute proposes *"To provide quality education to the students of poor, down trodden and privileged of rural, backward and side-lined area of Pattikonda and achieve academic excellence."*

1.2.2 Mission

The Institute adheres and focuses towards:

- *To provide quality education through effective curriculum design and implementation.*
- *To emancipate from legal, socio and economic restrictions.*
- *To help the students in the development of their personality, life skills, communicative skills for acquiring better and fruitful employment.*
- *To encourage staff to utilize ICT enabled methods in teaching and learning process to make it effective.*
- *To sensitize the students towards social concern human rights gender quality and environmental issues.*

1.3 Assessment of the Institute

1.3.1 Affiliations

The Institute is affiliated to **Rayalaseema University,** a state University in Pasupula, Andhra Pradesh, India.

1.3.2 Certification

The Institute has received the following Certifications

- **ISO 9001** – Quality Management Systems
- **ISO 50001** – Energy Management Systems
- **All India Survey of Higher Education** (AISHE) - wherein the code is C-26248.

1.3.3 Recognitions

The courses provided and the Institute are recognised under the **section 2(f) and 12 (B) of the University Grants Council Act, 1956.**

1.3.4 Accreditation

The following are details of the accreditation awarded by the National Assessment & Accreditation Council (NAAC) to the College.

Cycle	First	Second
CGPA	70	2.3
Grade	B	B
Year	2007	2015

Table 1: NAAC Accreditation details of the Institute

The College is due to enter its next cycle of NAAC.

2. Overview

2.1 Summarised Populace analysis for 2022-2023

2.1.1 Students data

The data (shared by the Institute) shows there were **460 male and 265 female students.**

2.1.2 Staff data

S. No.	Type	Male	Female	Total
1	Teaching staff	19	03	**22**
2	Non-Teaching staff	06	01	**07**
Total Staff Members		**25**	**04**	**29**

Table 2: Staff data of the Institution for 2022-2023

The staff data shows the Institute premises had a total of **29 Staff Members.**

2.2 Summarised Populace analysis for 2021-2022

2.2.1 Students data

The data (shared by the Institute) shows there were **222 male and 135 female students.**

2.2.2 Staff data

S. No.	Type	Male	Female	Total
1	Teaching staff	19	03	**22**
2	Non-Teaching staff	06	01	**07**
Total Staff Members		**25**	**04**	**29**

Table 3: Staff data of the Institution for 2021-2022

The staff data shows the Institute premises had a total of **29 Staff Members.**

2.3 Institute area

The **site area is 6.5 acres** for an approximately **754 footfalls.**

2.4 Institute Infrastructure

2.4.1 Establishment

The Institute was established in **1988**.

2.4.2 Spatial Organisation

There are provisions for staircase for accessibility on the premises, whereas there are amenities such as CCTV, a first aid room, etc.

The Institute is located prettyclose to nature and hence has a very fresh environment which is absolutely pollution free and healthy.

The Building is a Reinforced Cement Concrete (RCC) framework building.

2.5 Operation and Maintenance of premises

The interview session was held with the staff regarding the operation and working hours. The Institution is open from Monday to Saturday with the timings being 10:00 am to 17:00 hours.

3. Research

3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution sustainable and healthy premises for its inhabitants.

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification as follows:

- Investigation
- Technical discussion with team
- Observations
- Inferences

3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

3.4 Activities undertaken for the Green Building Study Audit

- Discussion with the Institute
- Allotment and Initiation by the Institute
- Data collection
- Submission of the files

4. Observation

The section showcases the facilities available in the premises

Plate 1: Building facilities in the premises

5. Documentation

5.1 Green Practices Audit

The increasing global warming and climate change have made us realise that apart from the enormous strategies the individual small efforts need to be taken by individuals and Educational Institutes as the younger generations are the future of the world and once they are taught about these practices only then can we assume a better future.

5.1.1 Green practices

We observed the following points during the process.

- **Fresh environment** – *The College provides an eco-friendly ambience with fresh air and soothing environment which helps to maintain a physical and mental balance. This kind of a space it a must for an educational specially technical institute which is inviting and gives the stakeholders an opportunity to explore indoor and outdoor learning to a great extent.*

- **Team work** – *The best quality of the College which sets it apart is its coordinating, cooperative staff members; for a building the foundation plays the most important role for its future similarly for an educational institute its staff members do.*

5.1.2 Community development

The details of ***extension initiatives*** under various heads in Institute are documented below:

S. No.	Type	Coordinator name
1	National Service Scheme (NSS)	S. Soma Sekhar
2	National Cadet Corps (NCC)	Y. Sasidhar
5	Jawahar Kala Kendra (JKC)	P. Surya Chandra
6	Employability Skills centre	A. K. Althaf

Table 4: Details of the extension initiatives by the Institute

Some of ***environmental activities*** conducted as extension initiatives are below:

S. No.	Name of the event	Date
1	Clean & green programme	03-04-2022
2	World wild life day	03-03-2022
3	Clean & green programme	25-7-2022
4	World forest day	21-03-2022
5	Clean & green programme	08-05-2022
6	Plantation of the trees	21-03-2022
7	Mothers earth day	22-04-2022
8	Bio diversity conservation seminar	03-03-2023

Table 5: Details of the environmental activities

5.2 Waste Audit

Waste is an inevitable part of our lives. Over the years the awareness about waste management techniques has given a rise to rethink how the waste can be avoided being sent to the landfills.

The audit provides an approximation of the types of waste generated, location of waste collections, disposal techniques used, waste segregation methodologies adopted. It provides realistic inputs about the waste management strategies that are implemented in addition to the newer ways that can be adopted aiming to make the premise clean and sustainable.

5.2.1 Waste produced

S. No.	Type of waste	Source	Current Disposal	Can be retreated?	Methodology
1	Solid waste	Toilets– Biodegradable waste	Soak pit connected for solid-liquid waste management	Yes	TREATED – Biogas plant can be initiated
2	Liquid waste	Toilets, washbasins		Yes	TREATED - Sewage treatment plant can be initiated
3	Paper waste	Newspaper and other paper	Given to vendor	Yes	TREATED – A recycling plant can be initiated
4	E-waste	Computers - Non-biodegradable waste		Yes	CONTINUE with the current practice
5	Plastic waste	Bottles, wrappers		Yes	
6	Dry waste in form of leaves	Open space & plantations, papers - Non biodegradable waste	Dustbins	Yes	TREATED – Composting can be undertaken
7	Organic regular waste	Dust, dirt dust waste from indoor spaces			
8	Bio-waste	Sanitary waste	Dustbins	Yes	TREATED – Bio-waste management can be undertaken
9	Lab waste	Laboratories	Well handled	Yes	CONTINUE with the current practice

Table 6: Details of the waste management practices adopted by the team

There are 20 dustbins in the outdoor areas of the premises.

5.3 Water Audit

Water is one of the basic needs. Pure drinking water is a resource that needs to be preserved efficiently. A water audit helps to identify the sources of water consumption, and the water requirement by the premises is met by these sources. The effective usage of water without any wastage should be a mandatory practice. Understanding the techniques as per site context to increase water conservation in terms of awareness and practice can be identified and executed as part of this exercise.

5.3.1 Water availability and consumption

5.3.1.1 Source of Primary water supply

The College uses drinking water for daily consumption through **four 'OVERHEAD' water tanks** bifurcated and used for primary and secondary purposes. In addition, there is **one large R. O. water plant.**

5.3.1.2 Source of Secondary water supply

The College uses the secondary sources of water supply for general usages such as watering plants, kitchen, toilets, and wash basins connected to the labs and other spaces. **At present, there is one bore wells used as secondary uses.**

5.1.3.3 Source of Tertiary water supply

The tertiary source of water is the additional source of water harvesting. **The project is under practice with availability of one pit in the campus.**

5.1.3.4 Source of Reusing waste water

The initiative is not under practice at present completely only the chemicals are neutralized before letting it down in the drains. **However, certain measures w.r.t. academics and equipment are practiced in the laboratories.** *We have suggested to under practices of green chemistry as per discussion to treat the waste water from the laboratories and reuse after filtering for watering the plants and the trees in the premises.*

5.3.2 Areas of water usage

Based on the inventory done and data shared by the staff it was found that the premise has the following facilities:

Particulars
General toilet for students
General toilet for staff
Urinals
Taps in laboratories
Taps in wash basins in toilets
Taps in Canteen

Table 7: Details of the water usages in the premises

5.4 Health and Hygiene Audit

The hygiene is a part and parcel of our daily life. It is extremely essential to keep the surroundings clean in the same manner as we would want our houses to be.

Educational Institutes have a bigger role to play in order to affect the young minds in the positive manner through better hygienic practices.

5.4.1 Facilities available

The Institution has washroom facility, hand wash, drinking water and dustbin facilities.

5.4.2 Hygiene aspects

There was no major hygiene issue observed anywhere in the premises, however there is scope for improvement.

6. Suggestions

Section-wise suggestions related to premises

The following suggestions **should be executed within the next 2.5 to 3.5 years from the date of the Report submission.**

6.1 Green practices Audit

- **Increase the plantations on the premise -** There can be provision for more plantations on the premise maybe even a Kitchen garden facility.

- **Environmental awareness -** There can be various slogans in local and national lanuage on the compound wall giving the message of saving the environment through the joint efforts of the students and staff thereby making the student socially and environmentally responsible citizens.

- **Signages on the plants mentioning scientific names -** The practice of having the names of each plant and tree will provide awareness among the staff and students.

- **Increase the green awareness practice** – This should be in terms of the physical and virtual events which will be beneficial for all stakeholders in the shared premises. (Basically the frequency of the lectures should be increased)

- **Documentation** – Improve and increase the documentation and visibility/ reflectance of the environment related events on the website, social media handles

- **Undertake environment study of local areas** – This aspect is w.r.t. environmental parameters and submits the same to local municipality for further up gradations.

- **Increase the organic farming practices -** The premises can have an organic farming facility in terms of farms, kitchen, terrace gardens the produce can be directly utilised in the premises.

6.2 Waste Audit

- **Twin Dual Litter Dustbin Bins -** There should be more number of dual litter dustbins at various locations in areas such as Canteen, and open spaces. This would inculcate the awareness of waste segregation among students.

- **Signages -** Messages about avoiding wastage should be placed at appropriate locations.

- **Dustbins at every 100m -** There should be a dustbin at every 50-100m in open spaces

- **Material of dustbin -** The plastic dustbins should be replaced with eco-friendly material.

- **Organic compost pit maintenance methodology -** The Institute can recheck the current methodology as it can yield better results in terms of quantity if it is well maintained with the following strategies:

  - The sanitary pad incineration dust can be sent to the compost pit
  - There should be a balance of brown and green waste material
  - Shred the materials before adding them to pit
  - Add twigs
  - Stir occasionally
  - Add water in less quantity to avoid the smell
  - Keep ample air circulation to avoid the smell
  - Regular monitoring and maintenance.

- Join hands for **'Trash to Treasure' initiative** as a Donor or Beneficiary Institute through which any type of building or material waste shall be collected from your Institution, recycled and given to an NGO or Organization for reuse.

- Tie up with **Bisleri International regarding their 'Bottles for change program'** also with **'Thereco'** for their waste management.

- Invite companies such as **'Thaely'** and **'Recharkha'** to undertake skill development workshops.

- Write to NGOs such as *Adar Poonawala Foundation* for twin litter dustbins and beautification projects.

6.3 Water Audit

- **Wastewater from toilets -** This should be collected and a wastewater treatment plant can be installed in the open space wherein this water can be treated and reused for gardening and toilet flushing.

- **Signages -** Messages about avoiding water wastage should be placed at appropriate locations.

- **Waterless urinals -** There can be the provision of waterless urinals as a Green Building initiative in the premise, either the existing ones can be replaced with such a facility or new toilets can be constructed in this manner.

- **Rain water bunds –** There should be landscape beautification project undertaken to appropriate channelize the rain water through bunds and similar facilities.

6.4 Health and Hygiene Audit

- **Health related provisions** – There should be provisions for a dedicated health centre and 24x7 available ambulance services inside the premises.

- **Avoid burning waste -** The waste produced on the premises should not be burned as it is dangerous to the health of students and staff

- **Pest control program -** The Institute should practice pest control programs with appropriate sanitation facilities through an appropriate agency.

- **Sanitary vending and incinerator -** There should be provision for sanitary vending, incinerator machine and incinerator in every ladies common room, and toilet on the premises.

- **Compound wall** – The compound wall should have awareness messages about 'No Smoking' and 'No Tobacco'

7. Compilation

The study is based on the data collected, analysed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below. However, no direct references have been used anywhere. These are used as a base to analyse and study the data collected.

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- Images on site by Coordinators of the both teams
- Icon images used by https://www.vecteezy.com/free-vector/security-camera-icon and https://www.vecteezy.com/free-vector/electric-car-icon