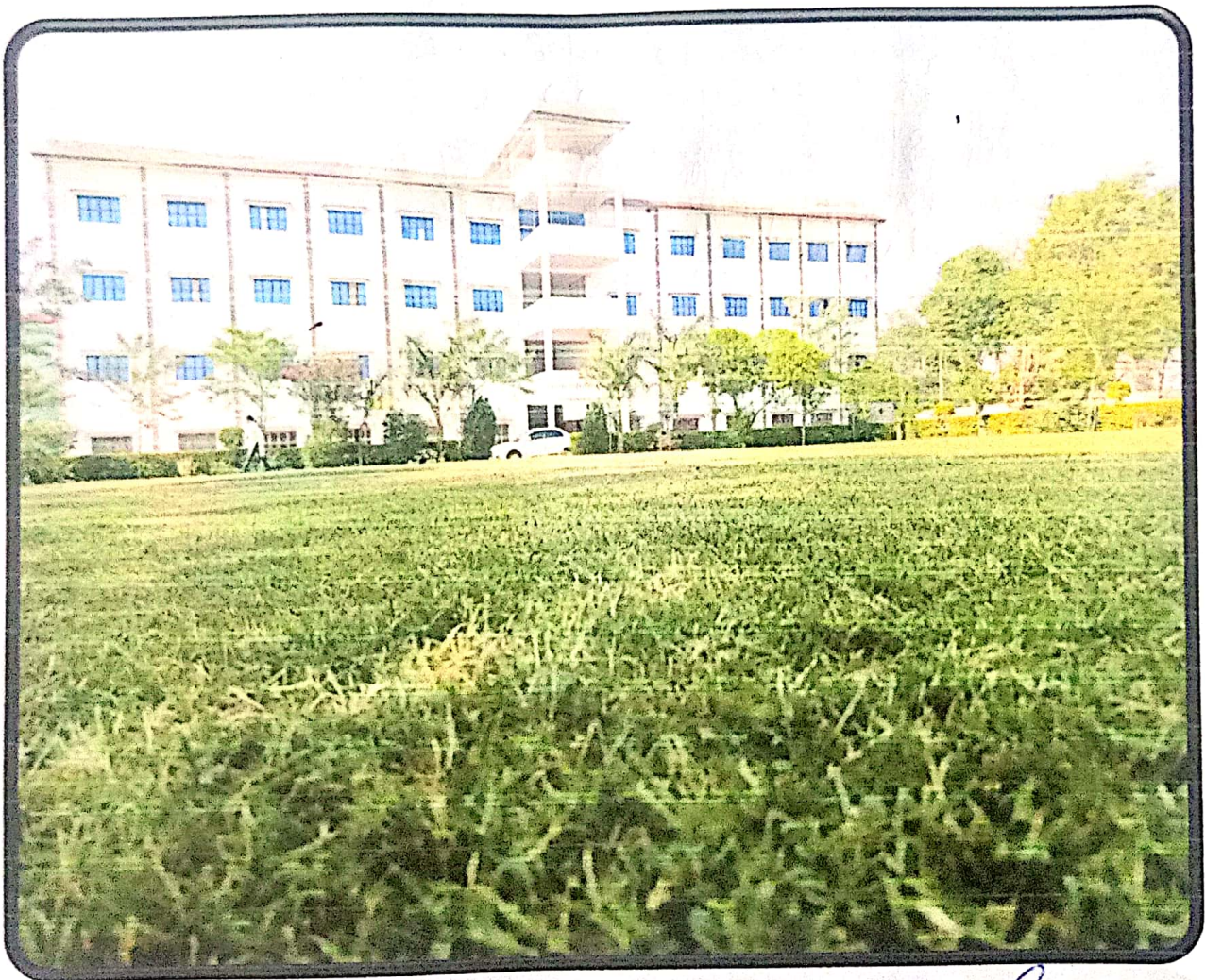




PAHALWAN GURUDEEM
PRASIKSHAN MAHAVIDYALAYA

GREEN AUDIT REPORT

2022-2023



Page 1 of 20


Er SUMIT PRIYA JHA
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INTRODUCTION:

The green audit aims of Pahalwan Gurudeen Prasikshan Mahavidyalaya to analyze environmental practices within and outside the campuses that has an impact on the eco-friendly atmosphere. Green audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of college environment and diversity. It was initiated with the motive of inspecting the effort within the institutions whose exercises can cause threat to the health of inhabitants and the environment.

Green audit is a valuable means for a college to determine how and where they are using the most energy or water or other resources; the college can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric CO₂ from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all the Higher Educational Institutions should submit an Annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through carbon footprint reduction measures.

OBJECTIVES:

In recent time, the Green Audit of an Institution has been becoming a paramount important for self-assessment of the Institution which reflects the role of the Institution in mitigating the present environmental problems. The college has been putting efforts to keep our environment clean since its inception. Therefore, the purpose of the present green audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Green Audit are:

- To map the Geographical Location of the college
- To document the floral and faunal diversity of the college
- To record the meteorological parameter where colleges situated
- To document the ambient environmental condition of weather, air, water and noise of the college
- To document the waste disposal system
- To estimate the Energy requirements of the college
- To report the expenditure on green initiatives during the last five year

BENEFITS OF GREEN AUDIT TO EDUCATIONAL INSTITUTIONS

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

1. Helps protect the environment in and around the campus.
2. Recognize the cost saving methods through waste minimization and energy conservation.
3. Empowers the organization to improve the existing environmental performance.
4. Portrays good image of institution through its clean and green campus.
5. Help to build positive impression through green initiatives

METHODOLOGY:

The purpose of the green audit of PGPM is to ensure that the practices followed in the campus are in accordance with the Green Policy of the country. The methodology includes: collection of data, physical inspection of the campus, observation and review of documentation and data analysis

ABOUT THE COLLEGE

1. Name of institution : - Pahalwan Gurudeen Prasikshan Mahavidyalaya, Panari, Lalitpur
2. No. of department :- UG- 4, PG-6
3. No. of student -1460
4. No. of faculty member :- 40
5. No. of non-teaching member ; -17
6. Total Campus area:- 3.0 acre

Ever on its onward journey of excellence, our efforts are ceaseless to explore new possibilities, and to trap the limitless opportunities in empowering the women of today for a better tomorrow.

Our Vision

To empower students with innovative life skill and social values for global competency.

Our Mission

Pahalwan Gurudeen Prasikshan mahavidyalaya to make clean and healthy environmental knowledge.

GREEN AUDITING:

The green audit practically involves **energy conservation, use of renewable sources, rain water harvesting, planting of trees, hazardous waste management and E-waste management**. Finally, Green audit is a requirement of NACC assessment to the Colleges and Universities. The college has adopted the 'Green Campus' system for environmental conservation and sustainability. The main three pillars i.e., zero environmental foot print, positive impact on occupant health and performance and 100% graduates demonstrating environmental literacy. The goal is to reduce CO2 emission, energy and water use, while creating atmosphere where students can learn and be healthy.

TREE DIVERSITY OF PGPM:

The area is immensely diverse with a variety of tree species performing a variety of functions. Most of these tree species are planted in different periods of time through various plantation programmes organized by the authority and have become an integral part of the College. The trees of the college have increased the quality of life, not only the college fraternity but also the people around of the college in terms of contributing to our environment by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, and supporting wildlife, controlling climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer. Many species of birds are dependent on these trees mainly for food and shelter. Nectar of flowers and plants is a favorite of birds and many insects. Leaf – covered branches keep many animals, such as birds and squirrels, out of reach of predators. Different species display a seemingly endless variety of shapes, forms, texture and vibrant colors. Even individual trees vary their appearance throughout the course of the year as the seasons change. The strength, long lifespan and regal stature of trees give them a monument – like quality. They also remind us the glorious history of our institution in particular. We often make an emotional connection with these trees and sometime become personally attached to the ones that we see every day. A thick belt of large shady trees in the periphery of the college have found to be bringing down noise and cut down dust and storms. Thus, the college has been playing a significant role in maintaining the environment of the entire areas. The following are the tree species with whom we are being attached:

HERBS SHRUBS AND FLOWER DIVERSITY IN PGPM

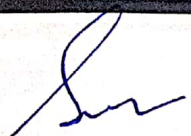
Floral diversity can be termed as a diversity of plants occurring in a specific region during a particular period. Flora by definition consists of all plant forms, it includes vascular as well as non-vascular plants. Among all plant forms, Angiosperms are the most diverse and dominant living group exhibiting a variety of habits such as herbs, shrubs, trees, climbers, epiphytes. Flora of any given region can be studied by simple methods like survey, quadrant method, etc. Survey and documentation of floral diversity are important from an identification point of view and it also helps in maintaining and conserving vegetation. The present study shows that the campus has managed to maintain floral diversity. This has been possible due to restricted entry inside PGPM campus and proper maintenance of plants. A total of 200 herbs and shrubs of different 42 species belonging to plant families were observed.

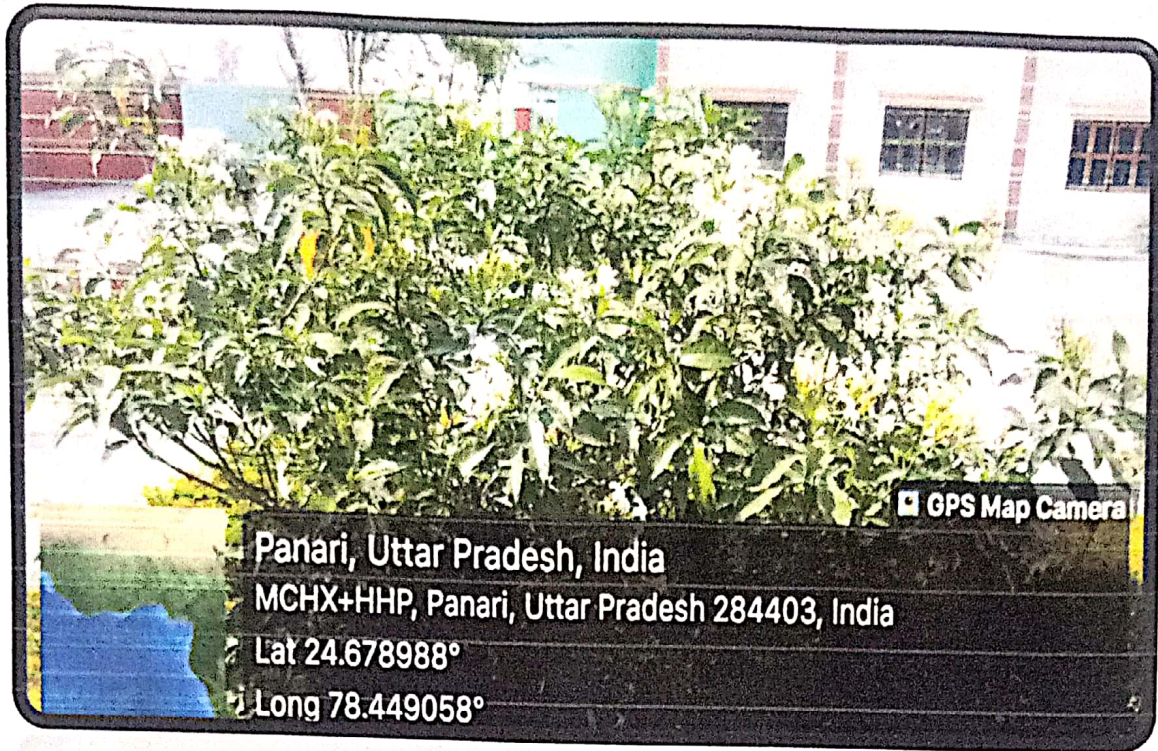
S.No.	Plants name	Botanical name	Family
1.	Mango	Mangifera indica	Amacardiaceal
2.	Lemon	Citrus Limon	rutaceae
3.	Teak	Tactona grandis	liniaceae
4.	Neem	Azadirachta indica	meliaceae
5.	Ashoka	Saraca Indica	Fabaceae
6.	Guava	Psidium guagava	Myrtle family
7.	Amla	Emblica officinalis	phyllanthaceae
8.	Rose wood	Dalbergia sisso	Pedaliaceae
9.	Banyan tree	Phycus bengalnesis	Moraceae
10.	Chiraul	Holoptelea integrifolia	Ulmaceae
11.	Gulmohar	Delanix regia	Fabaceae
12.	Jack fruit tree	Artocarpus communis	moracea
13.	Indian beech	Pongamia pinnta	legumes
14.	Stone apple	Aegle marmelos Rutaceae	rutaceae
15.	Peepal tree	Ficus religiosa	Moracea
16.	White fig	Ficus virens	Mulberry
17.	Plum	Jigiphus jijuba	Rhamnacea
18.	Gum Arabic	Acacia nilotica	legumes
19.	Pomegranate	Punica granatum	lytharceae
20.	kachnar	Bauhinia variegata fabaceae	Fabaceae
21.	Rose	Rosa indica	Rosaceae
22.	Money plant	Epipremnum	Araceae
23.	Tulsi	Ocimum sanctum	lamiaceae
24.	Hibiscus	Hibiscus rosa	moluaceae
25.	Oleander	Cascabela thevetia	Dogbans
26.	Oriental arbor-vitae	Platy cladus orientalis	Cupressaceae
27.	Mogra	Jasminum sambac	oleaceae
28.	Marigold	Tagetes erecta	Asteraceae
29.	Chrysanthemum	Chrysanthemum	Asteraceae
30.	Jasmine	Jasminum	Oleaceae

31.	Aloe vera	Aloe barbadensis miller	Meliaceae
32.	Snake plant	Dracaen trifasciata	Asparagaceae
33.	Date plant	Phoenix roebelenie	Arecaceae
34.	frangipani	Michelia	Magnoliaceae
35.	Baby rubber plant	Peperomia obtusifolia	Piperaceae
36.	Agave	Agave	Agavaceae
37.	Arabian jasmine	Jasminum sambac	Oleaceae
38.	Areca palm	Dypsis lutescens	Arecaceae
39.	Dieffenbachia	Diffenbachia	Araceae
40.	China fan palm	Livistona chinensis	arecaceae






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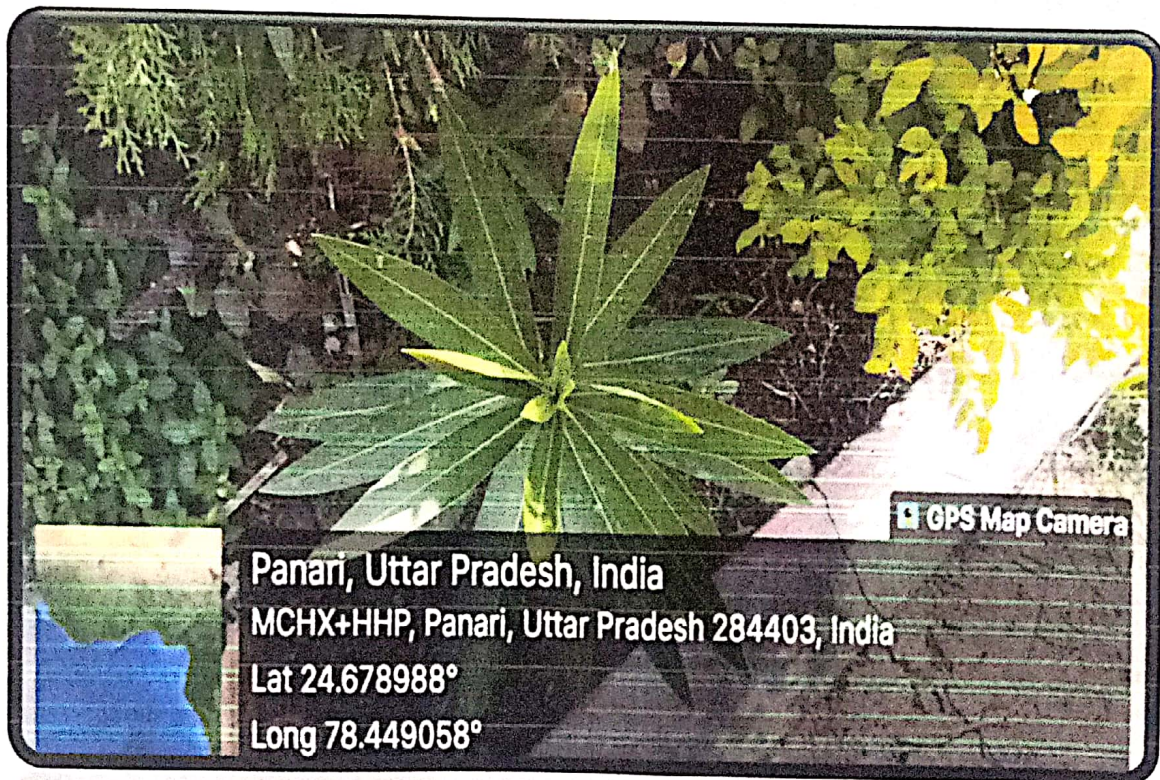
Panari, Uttar Pradesh, India

MCHX+HHP, Panari, Uttar Pradesh 284403, India

Lat 24.678988°

Long 78.449058°

GPS Map Camera



Panari, Uttar Pradesh, India

MCHX+HHP, Panari, Uttar Pradesh 284403, India

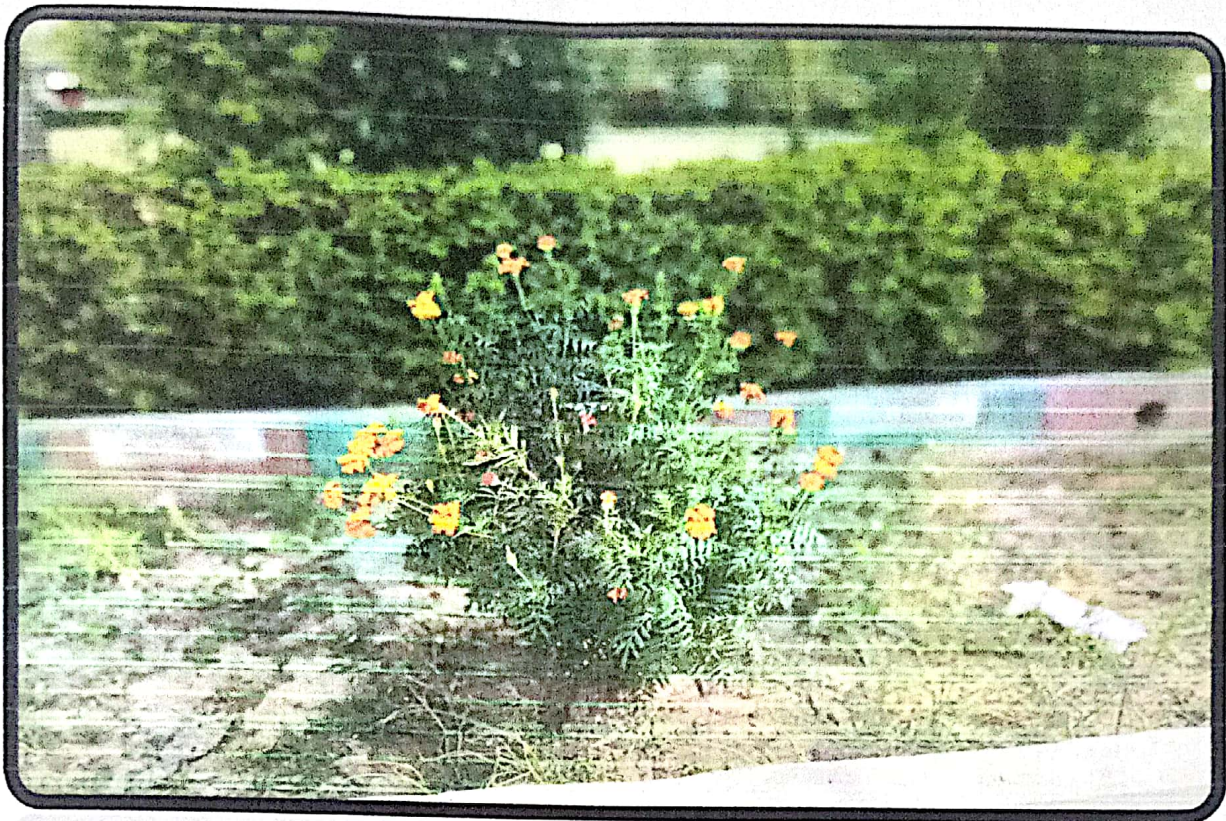
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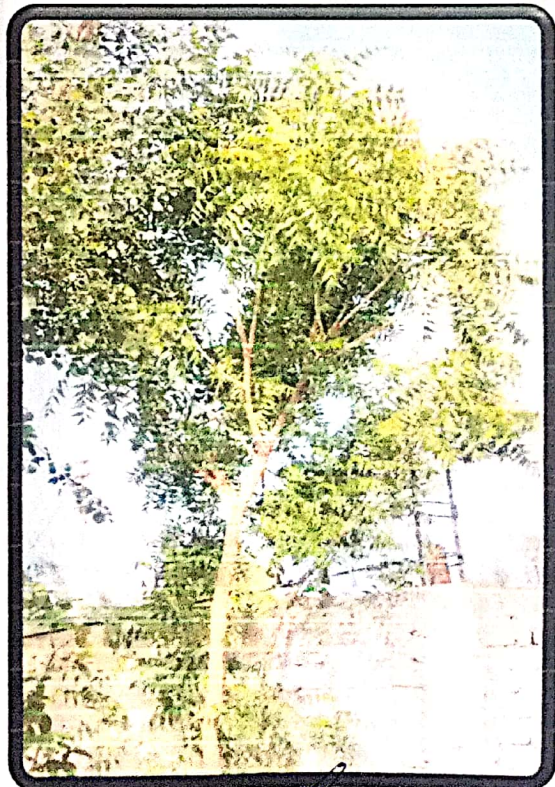
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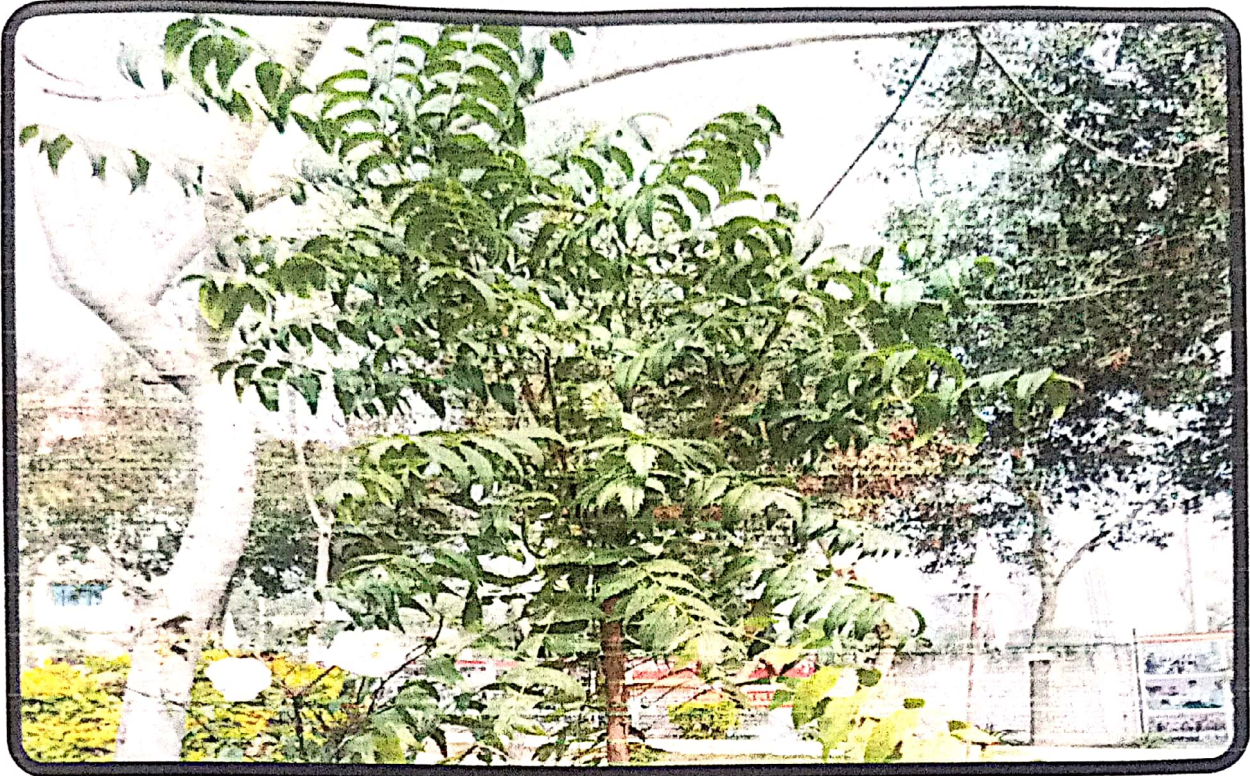
GPS Map Camera











FAUNAL DIVERSITY IN PGPM CAMPUS

The faunal diversity of the PGPM campus has been studied and documented as below:

Table: Common and scientific names of and animas

S. No.	Common name	Scientific name
1	Crow	Corvus
2	Sparrow	Passeridae
3	Pigeon	Columbalivia
4	Cow	bostarrus
5	Rabbit	Oryctolagus cuniculus
6	Horse	Eguus
7	Dog	Canislupas familiaris
8	Cat	Feliscatus
9	Rat	Rattus
10	Butterfly	rhopalocere
11	grasshopper	caelifera
12	squirrel	sciuridae
13	Honey bee	Apis meellifera

Result and Discussion

Increasing population and changing lifestyles lead to extensive commercial exploitation of natural biodiversity. Therefore, documentation of biodiversity is mandatory to develop the strategies of conservation and management.

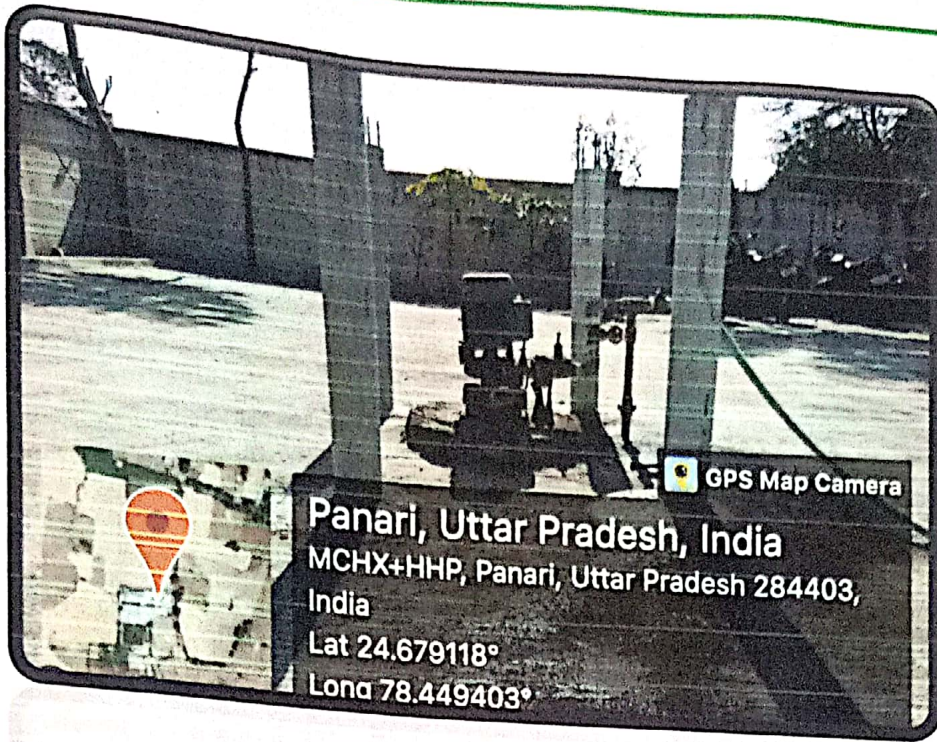
WATER MANAGEMENT

Water conservation is a key activity as water availability effects on the development of the campus as well as on all area of development such as farming, industries, etc. Keeping this view water conservation activity is carried out.

SOURCES OF WATER

- Bore water
- Hand pump

A Main source of water is Ground water is extracted to full the requirement. there are present 04 bore wells and 1 Hand pump. The college stores the water in overhead tank. The source of wastewater is Domestic Waste Water i.e., Sewage water. The Sewage water mainly comes from Toilets of college, kitchen and canteen Waste degradable material are use as a fertilizer in plant.



RO PLANT

RO plant is provided inside the campus to supply water to the entire campus.



RAINWATER HARVESTING

The rainwater harvesting strengthens the water supply to the campus lakes as well as enhance water level of wells in the campus through ground water recharging process.

WASTE MANAGEMENT

PGPM strives to have a minimal impact on the environment and is dedicated to reduce and manage the waste generated by the college campus. The following specific procedure will be undertaken to ensure its contribution in protecting the environment. We use dustbin for waste material they are use two types of dustbin

- For Bio degradable
- For Non-bio degradable

E-WASTE MANAGEMENT

E-waste generated in the campus is disposed in scientific and eco-friendly manner. E-waste generated is disposed in an eco-friendly manner. The college adopts most scientific and eco-friendly e-waste disposal mechanisms such as: AMC is maintained to periodically review the effective functioning of CPU's and monitors and expert recommendations are followed to dispose the same in the market. All electronic waste CPU's, hard disks, Laboratory Equipment scrap is sent periodically to the market for sale. Obsolete workable computers, printers and other equipment discarded by departments are sold as scrap. The cartridges of printers are refilled, outside the college campus. UPS batteries are recharged and repaired by the suppliers.

SUMMARY

Environment auditing is a systematic, documented, periodic, and objective process in assessing an organization's activities and service in relation to accessing compliance with relevant statutory and internal requirement. Facilitating management control of environmental practice.

CONCLUSION

- Considering the fact that the institution is mostly an un graduate as well as post graduate college, there is significant environment awareness both by faculty and students and initiative taken by them substantial.
- The installation of solar panels, paperless work system, composting and besides, environmental awareness course initiated by the administration shows how the campus is going to be a green. Few recommendations are added to curb the menace of waste management using eco friendly and scientific techniques.
- As part of green audit of campus, we carried out the environmental monitoring of campus where includes Illumination, Noise level, Ventilation and Indoor Air quality of the class room. It was observed that Illumination and Ventilation is adequate considering natural light and air velocity present. Noise level in the campus is well within the limit Canteen water was also analyzed and found to be potable.

RECOMMENDATIONS


- Periodically review the list of trees planted in the garden. Give scientific names to the trees.
- Promote environmental awareness as a part of course work in various curricular areas, independent research projects and community service.
- Create awareness of environmental sustainability and take actions to ensure environmental sustainability.
- Establish a College Environmental Committee that will hold responsibility for
- The enactment, enforcement and review of the Environmental Policy. The Environmental Committee shall be the source of advice and guidance to staff and students on how to implement this Policy.

**PAHALWAN GURUDEEN PRASIKSHAN MAHAVIDYALAYA
PANARI, LALITPUR**



ENERGY AUDIT

Page 1 of 17


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Contents

1. INTRODUCTION.....	
2. OBJECTIVE.....	
3. NEED OF ENERGY AUDIT.....	
4. INTERPRETATION.....	
5. SUMMARY OF RECOMMENDATIONS.....	
Description of building.....	
Findings.....	
6. HISTORICAL DATA ANALYSIS.....	
Energy Balance.....	
Appendix A: Power Consumption Data.....	
Appendix B – Energy saving for Air Conditioner.....	
Appendix C - Inventories for Lightings, Air conditioners and other appliances.....	
Appendix D – Additional photos.....	
7. CONCLUSION.....	

1. INTRODUCTION

- In energy audit is an assessment and analysis of energy flow in a process or system, aimed at reducing the amount the energy input in to the system without negatively affective the output.
- Energy audit is a systematic study or survey to identify how energy is been used in a building or plant and identifies energy saving opportunities.
- Using proper audits methods and equipments, energy audits provides the energy manager with essential information on how much, where and how energy is used within an organization.

2. Objectives

- The Energy Audit was defined to meet the following objectives:
- Conduct a simple Walk-Through audit or observation of the energy consumption of electrical appliances within the college building.
- Review and analyze energy usage history to create a baseline for which savings can be measured in the audited building.
- Determine what can be done to reduce energy consumption throughout the buildings and what options are available for system improvements if funding is available.
- Identify and evaluate measures that could improve the environmental performance of the buildings/wards and provide recommendations.

3. Need of energy audit

- The three top operating expenses are energy (both electrical and thermal), labor and materials.
- Energy would emerge as a top ranker for cost reduction.
- Objective of Energy Audit is to determine ways to reduce energy consumption per unit of product output or to lower operating costs.
- Energy Audit provides a "bench-mark" (Reference point) for managing energy in the organization.
- Energy Audit will help to understand more about the ways energy and fuel are used in any industry, and help in identifying the areas where waste can occur and where scope for improvement exists.
- The Energy Audit would give a positive orientation to the energy cost reduction, preventive maintenance and quality control programmes which are vital for production and utility activities.
- Audit programme will help to keep focus on variations which occur in the energy costs, availability and reliability of supply of energy, decide on appropriate energy mix, identify energy conservation technologies, retrofit for energy conservation equipment etc.

4. INTERPRETATION

In this report, unless the contrary intention appears;

Energy Conservation means steps taken to reduce and to use as much energy as necessary through changing energy consumption behavior, e.g. switching off lights when not in use.

Energy Efficiency means using less energy to provide the same service/output, e.g. Replacing inefficient light bulbs with efficient ones.

Faulty means equipment not working or made correctly; having defects.

Potential savings means the actual reduction in operating expenses from the improved energy efficiency generated by an energy conservation or efficiency activity.

Retrofitting means upgrading an existing system to improve energy efficiency.

Tariff means the amount of money charge by the supplier (utility) per kWh for the use of electrical energy.

Vampire Load means the way power is consumed by electronic and electrical appliances while they are switched off or in standby mode (consuming electricity at a cost but not doing any work).

5. SUMMARY OF RECOMMENDATIONS

Below are some recommendations based on general observations carried out throughout the College building.

The recommendations are categorized with

A being the most urgent where immediate actions are needed to be executed (first or second week of receiving this report).

B can be 1 to 2 months after receiving this report, while

C will depend on the availability of funds.

Recommendations		
Category A	Category B	Category C
Apply energy conservation measures. Isolate or unplug vampire loads from power when not in use (i.e. re-chargeable equipment, computer and any other electronic devices with standby modes).	Establish Energy Efficiency and Conservation steering committee to take lead with EE&C initiatives and management within the college building.	Where applicable, replace all Double Frame light fittings (double tube) with single frame (single tube) throughout the building. Also remove unnecessary lights or reduce the number of lights per location.
Remove faulty light holders and bulbs or remove live wire from socket inside the light holder.	Renovate or improve the lighting control, i.e. add more switches to existing rooms/spaces where only one switch controls more than 10 lights, especially the lights in the Conference/meeting room.	Replace all lights with energy efficient light bulbs, i.e. Replace T8 and T12 (36 watt) Fluorescent tubes with T5 (15 watt) retrofits.

Remove any faulty appliances located in the building.	Use fans in places where possible (especially in unsealed room, indoor corridor, conference room, etc.).	The conservation and efficiency mechanisms are tools for reducing the energy consumption.
Isolate or unplug faulty air conditioners if found within the building (working but no cold air coming out) and, OR service the air Conditioner units quarterly.	Remove air conditioner if the room is very poorly sealed (i.e. if the room has no seals on the door and frequently open at times).	Replace old existing out- door air conditioner units with efficient ones (if funding is available).

Description of building

Observation: the building is quite old which suggests that its electrical system (wiring, equipment) is also old. Arrangement of rooms and electrical appliances have huge impaction monthly Bill.

Suggestion: old systems are less efficient and may result in unnecessary power consumption.

Add few pictures of building



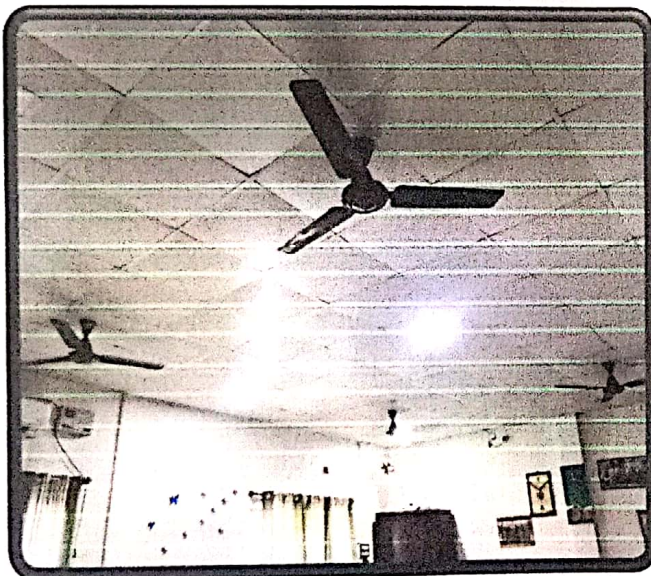
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SOLAR PENAL



BATTRIES



FANS



LIGHTS


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Findings

Vampire Loads Findings

I. Issue/Observation(s)

- Electronics appliances (computer, printer, etc.) are still ON even though they are turned off.
- Appliances on STANBY MODE are draining power even though they are not doing any use full task.
- Faulty light fittings which are left without bulb and faulty bulb which is intact are also vampire loads.

Lighting

Lighting is the most common load which is used in all the rooms and outdoors. Here are some of the aspects and faults that were discovered:

I. Findings of lightings

a) Observation(s)/Issue(s):

- It has been observed there are a lot of unnecessary lights in one single room (see Figure 2)
- Too many lights are assigned to 1 switch.

b) Recommendation:

- Turn OFF lights when not used.
- Reduce the number of lights per switch, to better manage lighting.

Figure 2: Example of lack of proper lighting management

i) **Faulty lights**

a. Observation(s)/Issue(s):

Ballast of faulty light will draw power when the lights are ON even though it is not working.

b. Recommendation(s):

Disconnect the live wire connected to the faulty light bulb (s) to avoid leakage of energy.

Figure 3: Faulty Lightings (vampire loads)

Air conditioners

i. **Air Conditioning Management**

a. Observation(s)/Issue(s):

Brand & model not consistent throughout the building which is expensive for maintenance.

Officers leaving the door open when entering and exiting the room where the air conditioner is located.

Air conditioning contributes to about 62% of the overall power consumption of the buildings. Windows and doors of the air conditioned rooms not sealed properly i.e. using louvers is 'Highly not recommended'.

b. Recommendation(s)

Use same brand throughout (cheap for maintenance cost)

It is recommended that the air conditioners be serviced quarterly.

Use sealed glass windows and sealed glass doors.

Always close door when entering/exiting an air-conditioned room (put a notice on the front and back of the door as a reminder).

Keep and maintain the temperature at 23 °C during summer and occasionally used in winter.

Switch OFF when not in use but avoid reducing to a lower temperature and leave it ON

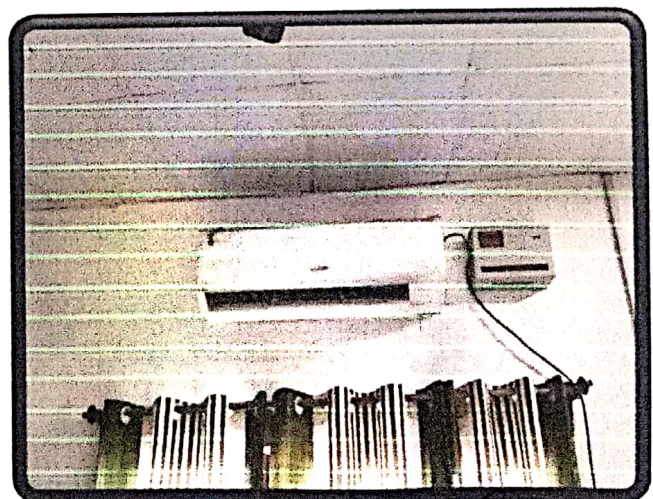
Use electric fan whenever possible.

Use outside breeze when possible, should the air conditioner be turned off completely to minimize the cost of electricity.

Installation of correct sizing of air conditioner in the rooms.

All installed air conditioners should be service at least twice or three times a year.

Figure 4: Air conditioners used



Office Equipment (Computers, printers and network accessories)

i. Findings of Office Equipment

a. Issue(s)/Observation(s):

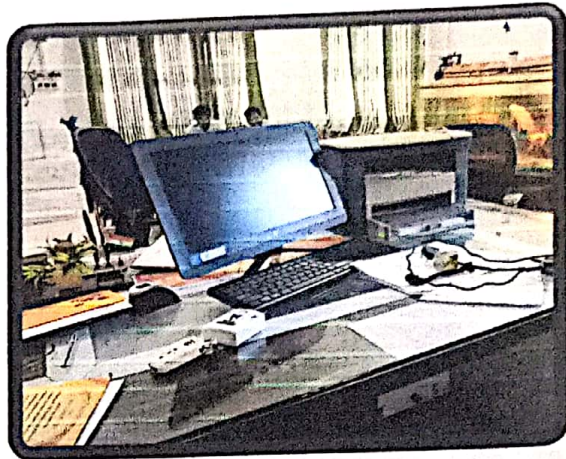
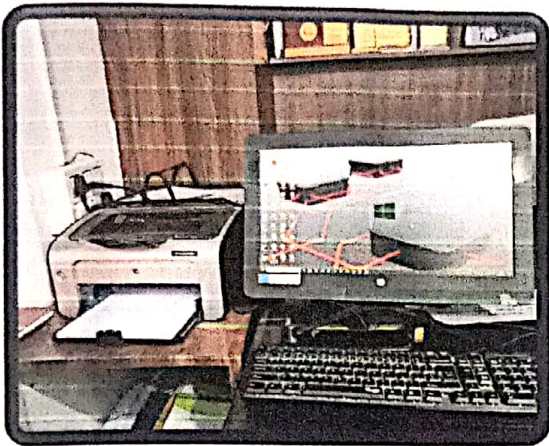
- Most of the office equipment is usually left without turning them off after working hours and are using electricity as Vampire loads.
- Electronics appliances (computer, printer, etc.) are still ON when connected to power
Point even though they are turned off.

b. Recommendation(s)

- all office equipment such as printers, computers i.e. PC, monitor, etc. must be turned off on the power point or unplug from the power point
- Avoid putting equipment on 'STANDBY MODE'

Figure 5: Sample Office Equipment

Electronics Appliances




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6. HISTORICAL DATA ANALYSIS

a. Energy Balance

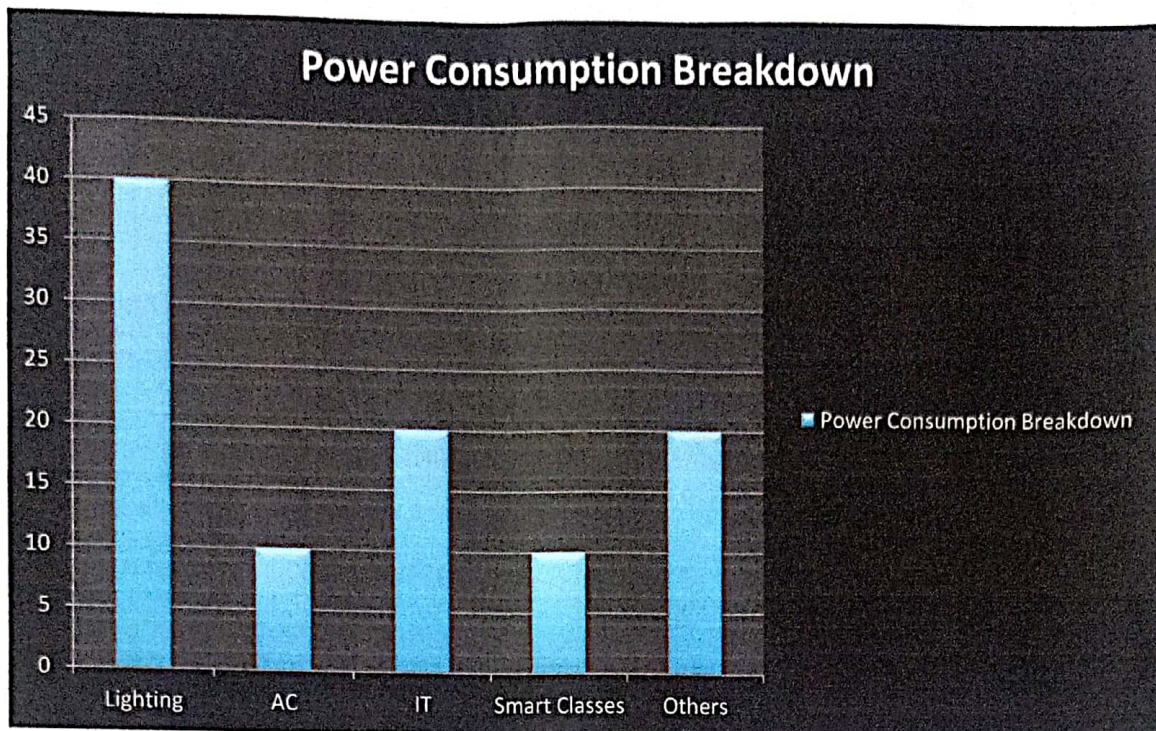
Table 2 shows the electricity consumption of Customs department (both offices combined) for a 1-year period. Raw data was not provided accordingly; hence an average estimated power consumption was calculated

Sr.No.	MONTH	YEAR	KWH	AMOUNT (RS.)	KVA	AMOUNT (RS.)	TOTAL (RS.)
1.	JANUARY	2021	43.266	519.192	51.91	-	519.192
2.	FEBRUARY	2021	55.8	669.6	66.96	-	669.6
3.	MARCH	2021	60.00	720.00	72	-	720.00
4.	APRIL	2021	62.8	753.6	75.36	-	753.6
5.	MAY	2021	69.3	831.6	83.16	-	831.6
6.	JUNE	2021	80.1	961.2	96.12	-	961.2
7.	JULY	2021	70.1	841.2	84.12	-	841.2

From Table 2, the average cost of the monthly consumption is calculated to be: **62,938 VT.**

Thus, the cost of the yearly consumption is **755,258 VT**

Figure 3: Power Consumption breakdown for CUSTOMS DEPARTMENT building



Analysis of the chart in Figure 3.

- Air conditioning is responsible for high significant proportion of the total energy consumption followed by lightings.
- There is variation among the appliance due to their arrangement within the building, the hours in which they operate and the rate at which they consume electricity.
- There is variation among the appliance due to their arrangement within the building, the hours in which they operate and the rate at which they consume electricity.
- It is evident that avenues need to be utilized to better managed electricity consumption of such appliances.

Appendix A: Power Consumption Data

Power consumption data for 2020-21

Appendix B – Energy saving for Air Conditioner within the College

Savings for Air Conditioner Savings with proper management
effective.

Appendix C - Inventories for Lightings, Air conditioners and other appliances.

i. Air conditioner and Fan inventory for CUSTOMS DEPARTMENT buildings

Brand	Type	Quantity	Rated Power Consumption (W)	Temp.Setting	Hours/Day
Air conditioner					
Havells	Split type	2	780	21	8
Whirlpool	Window Type	1	2050	24	8
Fan					
Brand - Normal	Ceiling Type	2	78	-	2

7. CONCLUSION -

Considering the fact that the organization is a well-established, long time run establishment with good reputation, there is significant scope for conserving energy and make the campus as self-sustained in it. The energy conservation initiatives taken up by the institution are substantial.

Energy efficient lighting schemes, awareness created among stakeholders and necessary power backups are being practiced by the institution.

There are some best Practices followed on Energy Audit in the Organization like Transformers, Generators and UPS are protected properly with fencing and kept awareness boards on 'Dangers' and 'Warnings'. It is observed that the most of places, sign board of 'Switch ON' and 'Switch OFF' are kept towards saving energy measures to the stakeholders. Electrical wires, switch boxes and stabilizers are properly covered without any damage which will cause any problems to the staff and student members. Adaptations of sprinkler irrigation in the campus to minimize the energy potential are well appreciated. Few recommendations, in addition, can further improve the energy savings of the Organization.

This may lead to the prosperous future in context of Energy Efficiency Campus and thus sustainable environment and community development to the stakeholders in coming years to come.