

Disclaimer

Green Audit Team has prepared this report for **Sahyadri Parisar Shikshan Prasarak Mandal's Shri. Manohar Hari Khapane College of Arts & Commerce**, Pachal – Raipatan, Post Raipatan, Tal. Rajapur, Dist. Ratnagiri – 416704 based on input data submitted by the College 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 Standards, the report has thereby been generated based on comparative analysis of the existing facilities and the benchmarks. The suggestions derived as a result of the inspection and research as per inputs which would further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole warranty or undertaking, express 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.

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The Report is prepared by the Team of Greenvio Solutions under their brand – Sustainable Academe as Consultancy firm along with Ar. Nahida Shaikh as an Accredited Green Building Professional.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our brand for conducting Audits

Palghar District, Maharashtra- 401208

sustainablecademe@gmail.com

Acknowledgement

Green Audit Assessment Team thanks the **Sahyadri Parisar Shikshan Prasarak Mandal's Shri. Manohar Hari Khapane College of Arts & Commerce** for assigning this important work of Green Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Hon. President, Hon. Vice President, Managing Director, Secretary of Sahyadri Parisar Shikshan Prasarak Mandal** and everyone from the Management.

Our heartfelt thanks to **Dr. P. S. Meshram Sir**, I/C Shri. Manohar Hari Khapane College of Arts & Commerce

We are also thankful to Faculty Members (Assistant Professors) – **Mr. Sanjay Nimbalkar, Dr. Vikas Patil, Dr. Ashok Patil, Dr. Balwant Dabhade, Mr. Subhash Dhongade, Mr. Nandkumar Devan**, for the inventory and data collection.

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Sustainable Academe

Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

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DRAFT REPORT

1. Introduction

1.1 About Sahyadri Parisar Shikshan Prasarak Mandal

The trust was formed with an objectives to create social awareness among the students in order to equip their minds for the feeling of secularism and uplift the underprivileged culturally and socially. The other important objectives are as follows:

- To impart higher education to the students of economically weak and backward sections of society.
- To create the sense of discipline in terms of regularity, sincerity and punctuality among the students and make them responsible and respectable citizens of India.
- To aim at overall personality development of the students through various co-curricular and extra-curricular activities.
- To prepare the students to face the challenges created by the emerging global situation.
- To create the feeling of corporate life among the students.

1.2 Vision and Mission Statement of College

Our Vision - The college has strong conviction that, it is its responsibility as well as privilege to render a high quality service to the students' community and the society at large in the field of education and its development.

Our Mission - To motivate the youth of remote and backward area by developing their talents and preparing them for employment and self-employment by means of higher education and striving for development of Konkan and ultimately the nation".

1.3 Institutions in the premises

The Premises is situated in the rural location of Ratnagiri with close proximity recreational and amenities such Hospital and much more. During the entire day schedule with smooth transition of internal student traffic management which is highly commendable.

Pachal is a commercial centre and is situated on the State High Way No. 111 Oni-Pachal-Anuskura. It is connected by S. T. buses to all important places in the Taluka of Rajapur, Lanja, Shahuwadi and Vaibhavwadi. Pachal occupies a place of great importance in the educational, social and political life.

The premise houses the Shri. Manohar Hari Khapane College of Arts & Commerce and Cultural Hall. It was established in the year 1994. The Motto of the College is "Vidya Amrutam Ashnute Dnyan Ganga Gharoghari" It received the Best NSS Unit Awards at University level for the year 2017-2018.

The aim of the college is to continuously enhance the teaching methods in order to provide students with an opportunity for their all-round development. It also strives for excellence in academics and makes an effort to induce passion for learning along with the inspiration for decisive thinking and assessment, thereby helping them to become the best professionals in their chosen careers.

The institution offers the following courses:

- Bachelor of Arts
- Bachelor of Commerce

The College aims at training young women and men to be competent, committed and compassionate, and lead in all walks of life.

1.4 Assessment of the College

- The College is NAAC Accredited Grade C++ (2004) and NAAC Re-Accredited Grade 'B' (2016)
- It is recognised under section 2(f) & 12(b) of the UGC Act 1956
- The college is ISO Certified by Globus Certification Pvt. Ltd.
- It is permanently affiliated with University of Mumbai from the year 2015-2016

2. Institution overview

2.1 Populace analysis for Academic year 2019-21

2.1.1 Students data for 2020-21

The student data (shared by the College) shows there are total of **251** students occupying the premises out of which Boys form the majority of **140** in numbers.

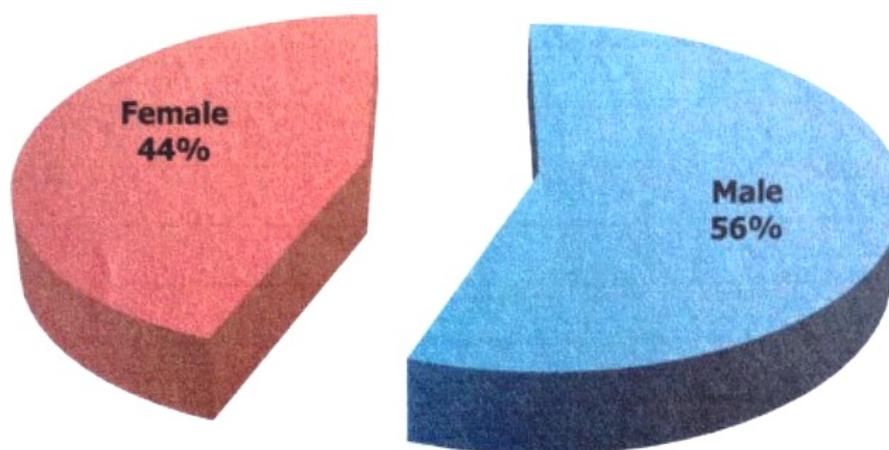


Figure 1: Summary of the students in Academic year 2020-21

The above graph shows **boys occupied 56%** as compared to **girls 44%**

2.1.2 Students data for 2019-20

The student data (shared by the College) shows there are total of **239** students occupying the premises out of which Boys form the majority of **132** in numbers.

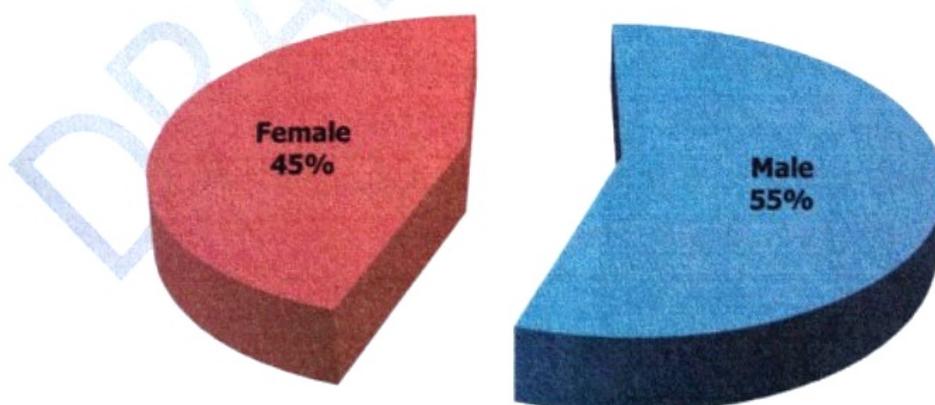


Figure 2: Summary of the students in Academic year 2019-20

The above graph shows **boys occupied 55%** as compared to **girls 45%**

2.1.3 Staff data for 2020-21

Type	Male	Female	Total
Teaching Staff	12	0	12
Non-Teaching Staff	7	1	8
Total	19	1	20

Table 1: Staff data of the Institution

The staff data shows the premise has a total of **20** staff members.

2.2 Site analysis

The following listed are some of the positive site elements which are beneficial to the college in terms of tangible and intangible benefits.

- **Location** - The Sahyadri Parisar Shikshan Prasarak Mandal's Shri. Manohar Hari Khapane College of Arts & Commerce is located in the Village Pachal – Raipatan, Post Raipatan, Tal. Rajapur, Dist. Ratnagiri – 416 704 and falls under the Raipatan Village Gram Panchayat.
- **Neighbourhood context** - The premise is situated amidst the lush greens of Pachal village and is surrounded by huge jungles on all sides.
- **Natural physical features** – The premise includes a rich biodiversity and huge number of plants in the adjacent open space. RURAL
- **Manmade features** – The premise is situated in an urban area amidst residential societies with close proximity to all necessary amenities. The materials used for construction are RCC and the landscaping includes natural trees as well as potted plants. वर्ग
- **Circulation** – There is a smooth transition of pedestrian traffic inside the premises due to the large entrance gate and the huge open space where vehicles of students and staff is parked.
- **Climate** – Ratnagiri city has a tropical climate. Rainfall is significant most months of the year, and the short dry season has little effect. According to Köppen and Geiger, this climate is classified as Am. The temperature here averages 26.4 °C | 79.5 °F. The rainfall here is around 2599 mm | 102.3 inch per year.

(Source: <https://en.climate-data.org/asia/india/maharashtra/ratnagiri-24258/>)

2.3 Total Institute Area & College Building Spread Area

The total site area is 15.5 acres and total built-up area is 11,513 sq. ft. for approx. 271 footfalls.

2.4 Institute Infrastructure

2.4.1 Establishment

The building was established in 1994 and renovated in 2016. The Building is a Reinforced Cement Concrete (RCC) framework building. It has sloping roof with Mangalore tiles. Overall the Infrastructure of the Building is good.

2.4.2 Spatial Organisation

The overall ambience of the College is warm and inviting. The classrooms and other spaces have ample natural ventilation in the form of clear glass windows with fresh air ventilation. The architecture of the building is quite well designed. The color palette not just helps the building to stand out but also provides an Institutional arena. It balances with the local architecture and the brown sloping roof merges with the natural landscapes of huge coconut trees all around.

There are 2 Buildings in the Campus with Building A being College and Building B being Cultural Hall. Both the buildings are of Ground floor level only. There are no false ceilings in the campus. The total height of each building is 4.33m. There are no lifts in the premise. There are provisions for CCTV in addition to amenities such as library. There is only 1 meter in the Campus. the details of the spaces are as follows.

Room No.	Room Name
1	Office
2	Library
3	Computer
4	Class Room F.Y.B.Com.
5	Class Room F.Y.B.A.
6	Class Room S.Y.B.A.
7	Class Room S.Y.B.Com.

8	Class Room T.Y.B.Com.
9	Gents Common Room
10	Head of Department
11	Canteen
12 & 13	Parking Shed (Students & Staff)
14	Ladies Common Room
15	Cultural Hall
16	Class Room T.Y.B.A. (History)
17	Class Room T.Y.B.A. (Marathi)
18	Class Room T.Y.B.A. (Hindi)
19	Management Office Room
20	Gents Urinal & Toilet
21	Ladies Urinal & Toilet

Table 2: Spaces in the College

2.4.3 Fire Safety

When the building was constructed Fire fighting norms and permission from Chief Fire Officer was not in practice. However, the Institution has taken care for adequate fire safety measures to be adopted.

The windows in each classroom are at a low height with fresh air and natural light thereby adding to ample ventilation throughout the day. There are fire extinguishers in the premise. We suggest the College to adopt additional fire safety practices such as fire hydrant and others. The current facilities though are quite well maintained. There are 2 fire extinguishers in the premise, both are of Foam dry powder and provided in the Office and Library.

2.5.4 Operation and Maintenance of the premises

The interview session with the staff regarding the operation and working hours is summarised in the table. The Institutions are open Monday to Friday for full day and Saturday is a half day. Sunday is an off for all.

S. No.	Section	Spaces	Time	Hours / day	Days in a year
1	Degree College	Student areas and Teaching faculty	8:30 a.m. to 12:30 p.m.	4	280
2	General areas	Admin areas and library, Passage, staircase, toilet, Trust office, Outdoor Compound lights, Outdoor - Pumps	8:30 a.m. to 5:30 p.m.	9	290

Table 3: Schedule of the timings of the premises

DRAFT REPORT

3. Green Audit

3.1 About the Green Audit

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

3.2 Analysis for the Green Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the lights, fans, A, equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the campus

Water Audit

- Analysis of the current water consumption of campus
- Scope to include Rain water harvesting and Waste water treatment in campus

Waste Audit

- Current waste produced, its segregation and usage
- Strategies to be adopted for waste management and awareness

Environmental Audit

- Analysis of the current landscape + hardscape of campus
- Analysis of the flora and fauna of campus
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of campus

3.3 Strategy adopted for conducting Green Audit

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

3.4 Timeline of the activities for Green Audit

- 5 June 2021 – Discussion with the College
- 15 June 2021 – Initiation by the College to conduct Audit
- 28 July 2021 – Data collection completed and submitted
- 1 August 2021 – Submission of draft Report

Ecological (Environment) Audit



4. Ecological (Environmental) Audit

Environment is an essential part for human survival. We co-exist with the environment and it cannot be termed as a separate entity. The Ecological audit helps to understand the flora, fauna that exists and steps that can be taken to improve the same. To denote if there are problems related to sound in and around the surrounding. In terms of the carbon footprint it helps in keeping a tab on the eco-friendly habits incorporated by the inhabitants of the premise. Health today is the topmost priority, a general understanding of the initiatives undertaken along with sufficient hygiene practices adopted. Universal design is applicable to all built and unbuilt spaces. The premise needs to have facilities for students who are specially abled alike.

As part of our study we could state that the Institution has developed eco-friendly practices and sustainable solutions which are well reflected in the rich biodiversity of the Premises. The college has huge open space admeasuring approximately 345 sq.m of area which includes basketball court and open space used by staff and students.

4.1 Open spaces

More than 97% of the site is available as open space in the form of garden area, garbage dump, compost pit and playground. Around an approximate area of 1610 sq. m is a made available to general public.

Students utilise the space for sports, cultural, NSS and WDC activities. There are dedicated 4 staff members for open space who maintain the site pretty well including 2 staff members who monitor the site. The space is watered twice daily. The open space provides an arena of open learning environment.

4.2 Flora and Fauna Audit

4.2.1 Flora analysis

The landscape area in form of the open space adjacent to the ground is 1,04,480 sq. ft. with a variety of plantations as follows:

S. No.	Name	Nos.
1	Mango	1
2	Coconut	55

3	<i>Chiku</i>	10
4	Beetle Nut	10
5	Leman	3
6	Cashews	1
7	<i>Amla</i>	1
8	Almonds	3
9	<i>Ratamba</i>	5
10	<i>Sheevage</i>	2
11	Guava	2
12	Jam	2
13	Jackfruit	6
14	<i>Shevanti</i>	3
15	<i>Chafa</i>	12
16	<i>Sonchafa</i>	7
17	Gulmohar	1
18	Palm tree	4
19	Sag	2
Total		130

Table 4: List of the Trees in the Campus

The above summary shows there are 19 varieties of Trees totalling to 130 numbers in the campus. The Mango, Coconut and Beetle nut trees are near the compound of the premise whereas the Gulmohar and Palm tree are found near entrance and all other trees are in the garden. All of these are planted by students and staff during Tree Plantation Programme.

S. No.	Name	Nos.
1	Saicus	1
2	Rose	1
3	<i>Jasvandi</i>	7
Total		9

Table 5: List of the Shrubs in the Campus

The above summary shows there are 3 varieties of shrubs totalling to 9 numbers in the campus. All of these are present in garden and are planted by students and staff during specific events.

4.2.2 Fauna analysis

The following are varieties of fauna found in the campus.

S. No.	Name	Nos.
1	Butterfly	Bird
2	Sparrow	Bird
3	Crows	Bird
4	Peacock	Bird
5	Squirrel	Bird
6	Honey Bees	Bird
7	Kokil	Bird
8	Lizard	Animal
9	Snake	Animal
10	Chameleon	Animal
11	Rabbit	Animal

Table 6: List of the Shrubs in the Campus

As the premise is surrounded by lush greens there are immense types of fauna found which is one of the good points for an Educational Institute as it helps in being connected with nature.

4.2.3 Green practices

We observed the following points during the Site investigation:

- The Institution does uses organic and green manure thereby making efforts to maintain and increase ecology. The ample vegetation provides shade thereby benefiting the users.
- A Nature club is organised every year as part of the Nature trip.

4.2.4 Eco-friendly initiatives undertaken

The Institution has undertaken the following initiatives:

- World Environment Day
- Vruksha Dindi
- Plastic Free Awareness Rally

- Save Tree Abhiyan
- Vanava Pratibhandhak Rally
- Wild Animal Conservation organised as part of awareness Programme

4.3 Noise Audit

4.3.1 Macro level

On a macro level there are zero settlements or any other type of built form close to the site. The approach road too has balanced traffic. As the college is oriented between the jungle there is bare minimum noise from the surrounding areas. The Market place is 3 km and public hall is 4 km away from the premise. The nearest bus stand is 150 ft. away. **Overall the noise level is low and less noise Pollution as College falls under silent zone as per our analysis.**

4.3.2 Micro level

The college has huge open space covered with greens which absorb the sound and help in keeping noise levels low and students, staff do not have any disturbance in academics majorly. However there is provision for staff parking which causes some noise. The college does not have generator and there is no sound problem caused due to the same. There are no particular equipments which cause any effect. **Overall the noise levels inside the premises are low which is a good approach.**

4.4 Carbon Footprint Audit

4.4.1 Eco-friendly Commuting Practices

The premise is close to City Bus Stand by few mins by walking distance of 1.5 km and nearest railway station Rajapur road but it is far from college situated 25.2km away. This acts as a major benefit in reducing air pollution and land development impacts from personal automobile use as most of College Student and Staff use public transportation facility to commute.

Based on data collection and discussion with staff the following points were noted:

- **Ease of commuting** – Almost 80% of the students use bus and travel by foot from main bust stand which is 1.5km away from college in city area. Some of the students (a very small percentage) use bikes to commute. *village*

- **Parent's commute** - There is 1 Parent-teacher meetings held in a year.
- **Visitors vehicles** – These is no such provision.
- **Parking details** – The students commute from nearby vicinity and there is provision for 30 bikes parking in the College. The college does not provide any public transport facility to the students. The other details of vehicles are summarised in tabular format below.

Total Number of vehicles used by stakeholders of College (per day) excluding parking provisions				
S. No.	Vehicles	Nos.	Average distance travelled	Approximate quantity of fuel
1	Cycle	No	No	No
2	Bike	No	No	No
3	Cars	2	5	500 ml
4	Bus	No	No	No
5	Common (public) transportation	No	No	No

Table 7: Vehicles usage by stakeholder of campus

4.4.2 Heat Island Reduction

The Institution has adopted the following practices which are yielding positive results in terms of Urban Heat Island Effect which refers to increase in temperature of the surrounding because of ineffective strategies.

Exposed roof areas – Both buildings have sloping roofs with mangalore tiles suitable to micro climate of the area as it is surrounded by trees in large numbers in addition to ample rainfall, this is however useful in rainy season however in summer season too since mangalore tiles are made up of clay there is cool microclimate maintained in the interior spaces.

Exposed non-roof hardscape areas - There are huge open spaces with lush greens these help in maintaining the micro climate of the surrounding to a major extent, moreover the pathways are minimal and are mostly made up of natural materials.

4.4.3 No Outdoor Light Pollution

The college compound lights are not upward looking there not causing light pollution.

4.5 Health & Hygiene Audit

4.5.1 Smoke Exposure

As per the data collected the following analysis has a positive impact on premises.

- Canteen uses Gas cylinders for cooking, there is no utilisation of fire wood. Thus there is no smoke from burning of fire wood and any health issues related to the same.
- The garbage in campus is not burnt and sent to compost pit which is a good practice adopted by College recently.
- The Institution is a tobacco and smoke free campus which helps in adapting to a Healthy Institution
- There is a huge open space in campus which is allowed for social gathering among students. It is also used for sports, outdoor games, annual days, cultural functions. The open space is used for physical activities by the students. It is also provided to district scout and guide as a recreation facility.
- There is parking provision inside the campus hence there is minimal dust or air pollution but that is balanced by the lush greens prevailing in the campus.

4.5.2 Hygiene

- For overall hygiene of the students and staff there are facilities such as Washroom, hand wash and drinking water facility.
- The hygiene of toilet areas is well maintained and the entire campus is cleaned on a daily basis.

4.6 Universal Campus

As per World Report on Disability, 2011 there are 180 million approx. Persons with Disabilities that makes it 15% of total population of India.

The design of the premises is appropriate for access with passages and corridors being wide. The single loaded corridors are safe from fire safety as there are staircases and fire extinguishers provided on every floor. There are 5 ramps in premise.

4.7 Recommendations for a Sustainable Habitat

a) Promote the use of Eco-friendly vehicles

There can be provision for cycle and battery operated vehicles/ low emission vehicles such as electrically driven vehicles parking in open space along with battery charge points, this would inspire students to change mode of transportation and adopt sustainable practices.

b) Low VOC Paints and Adhesives

Whenever the College undergoes repairs or renovations there should be use of materials with low emissions so as to reduce the adverse health impacts on workmen and the students occupying the space thereafter.

c) Grass pavers in the setback areas

The college can have grass pavers for in replacement to existing paving for further heat island reduction on exposed non-roof areas

d) Scientific names/ Name plates

There can be names plates for each plant and tree in premises with regular and scientific name to increase awareness.

e) Resting places

There should be increased provision for resting places in premises in outdoor and indoor.

f) Waterless urinals

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

g) Designated staff for maintenance

There should a designated Hygiene specialist and Maintenance staff who can keep a regular check about the operation and maintenance of the toilet areas and the equipments, lights and all facilities.

h) Government initiatives

The college can take up initiatives such as Swachh Bharat Abhiyan, cleanliness drives in college and surrounding villages also activities such as capacity building of locals in

surrounding villages by college students.

i) Pest control program

The college should practice pest control programs with appropriate sanitation facilities through an appropriate agency.

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Educational Building and Cultural block



Site investigation and data collection

Flora in the premise



Open spaces in the premise



Parking provision in the premise



Ramp and drinking water facility in premise



Tree Plantation Report by college

Tree Plantation on 31/08/2019



Tree Plantation Report by college

Medicine Tree Plantation Dated on 08/08/2019



Medicine Tree Plantation Dated on 07/09/2019



Tree Plantation

Tree Plantation Awareness Rally Date: 05/06/2019



Tree Plantation on 07/06/2021



Tree Plantation Report by college

Medicine Plantation on the occasion of College Foundation Day on dated 22/07/2021



Waste Audit

DRAFT REPORT

Background reference image by iStockphoto on pixels



5. Waste Audit

Waste is an inevitable part of our lives. Over the years as the awareness about waste management techniques has given a rise to rethink how the waste can be avoided from 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, waste management strategies that are and implemented in addition to the newer ways the can be adopted aiming to make the premise clean and sustainable. Here sustainable refers to a broader aspect to analyse whether the current techniques are having positive or negative effect on the stakeholders of the premises.

5.1 Waste produced

5.1.1 Types and disposal of waste in Premise

The types of waste collected in the campus are as follows:

S. No.	Type of waste	Source and quantity	Current disposal method	Can be treated?	Methodology
1	Solid waste	Toilets and others – Biodegradable waste of 10kg per week	Drain	Yes	TREATED - Small biogas plant can be proposed in open space
2	Liquid waste	Toilets, wash basin, urinals, taps approx. 50 litres per week	Drain	Yes	TREATED - Waste water treatment plant so that treated water can be reused for gardening
3	Dry waste	Open space & plantations, papers - Biodegradable waste of 12 kg per week	Treated in the Compost pit	Yes	TREATED – Compost pit
4	Organic waste and Other waste	Biodegradable waste of 1 kg per week	Treated in the Compost pit	Yes	TREATED – Compost pit

Table 8: Summary of the types of waste produced in the premises

5.1.2 Bins summary

There are 10 Portable plastic dustbins in the premise. Each dustbin has a capacity of 5 litres. All of these are placed in Indoors. Out of these 6 are made of Metal and the rest are Plastic dustbins. The analysis of dustbins based on the quantity of waste collected is presented below.

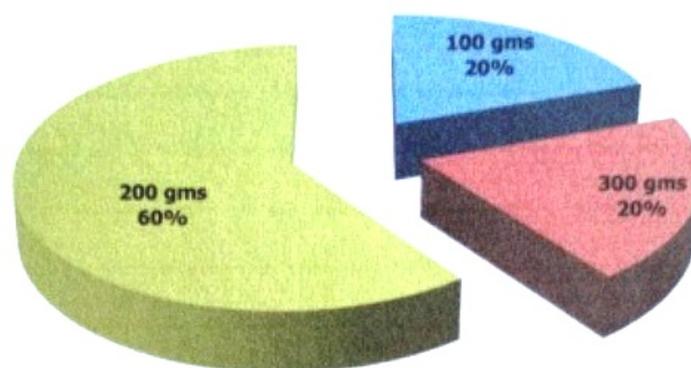


Figure 3: Analysis of dustbins in the premise

The above analysis shows that among the dustbins **60%** collect around **200 gms** of waste per week followed by equal distribution for **100 and 300 gms**.

5.2 Waste handling

Quantification wise as per analysis it was found that dry waste and organic waste collected is approximately 23 kg per week. The waste is collated in large bins (at present in the open space) and then put in compost pit.

5.3 Waste management

The Waste disposal takes place on a daily basis (For bio-degradable and non-biodegradable waste). The campus is cleaned. The college has recently undertaken waste management practices undertakes such as composting which is quite beneficial and shall be useful. Ample measures are taken to maintain hygiene. No smell problem or health related issues due to the waste are there. There are adequate numbers of bins present in all parts of building. The waste does not pollute the ground or surface water. There is no problem of air pollution from waste as informed.

The wastes from toilets are discharged to main drains through underground covered channels thus avoiding any incident.

5.4 Recommendations for a Sustainable Habitat

a) Provision for Sanitary Vending Machine and disposal facility

There should be compulsory provision of sanitary vending machine in the college for hygiene and girl students. This should be provided with a disposal facility as well.

b) Zero Organic Waste compost

The college can undertake a zero organic waste protocol. The following practices can be adopted as part of the same.

- The existing dumping pit can be converted into compost pit.
- The food waste generated by the students and staffs are taken by them to their own home so that, minimum waste is generated inside the premises.
- The organic waste generated in the canteen is used as feed for a biogas plant and the biogas is used as fuel in college canteen.
- Vegetable waste and other leaf litters can be used to feed in the vermi-compost pit and the resulting vermin-cast is used as manure in the garden.
- Waste water treatment plant can be set up for the liquid waste so that treated water can be reused for gardening.

As part of the above there will be a requirement for a Biogas plant, vermin-compost pit, awareness signages.

c) Organic Compost

As we have suggested in the Ecological Audit the provision for sustainable practices such as Kitchen garden and Terrace Garden there can be an organic compost pit in the open space in premises.

d) Twin Dual Litter Dustbin Bins

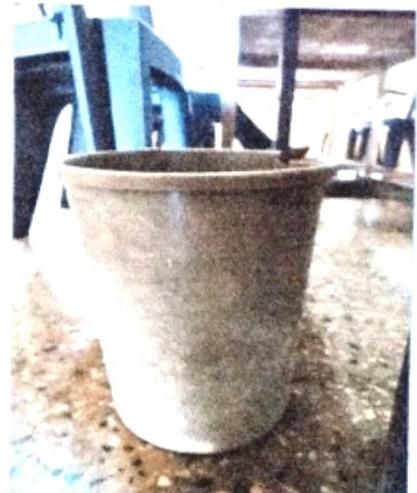
There should be more number of dual litter dustbins at various locations in areas such as Canteen, open spaces. This would inculcate the awareness of waste segregation among students.

Site investigation and data collection

The recently built up compost pit in the premise



Store room and various systems in the premise



Water Audit

WATER REPORT

Background reference image: Wlad Chetani on pixels



6. Water Audit

Water is one of the basic needs. Pure drinking water is a resource which needs to be preserved efficiently. Water audit helps to identify the sources of water consumption, the water requirement by the campus met by these sources. The points and effective usage of without any wastage. Understanding the techniques which are best suited to the site to increase water conservation in terms of awareness and practice.

6.1 Water availability and consumption

The main source of water is through the **Well** as an underground water facility it is available in the open space. The water is pumped using submersible pump of 3 HP for about 2 hours a day. Around 1,800 litres of water is pumped everyday from the well. The actual depth of well is 9m and present depth is around 7m. Usually, in summer season it is used for more hours, in rainy season and winter season it is used comparatively for lesser duration depending on the quantity of water availability and requirement. The hygiene of this area is well maintained and there are no leakages. There is an automatic ground water recharge and daily water is pumped for toilets and general usage.

The total water consumption through the tanks on site is as follows.

S. No.	Type of tank	Nos.	Location	Capacity in litres
1	Overhead Tank	1	Staff Room	1,000
2	Overhead Tank	1	Hindi Department	300
3	Overhead Tank	1	Toilet	1,000
4	Overhead Tank	1	Play Ground	2,000
5	Overhead Tank	1	Near Staff Parking	2,000
Total				6,300

Table 9: Tanks in the premise

6.2 Water requirement

The main areas of water requirement and type of usage is as follows

- **Drinking water** – General water required for drinking purpose, there are 2 Aquaguard in the premise of 10 litres capacity each. Thus, the total availability is of 20 litres but on an average daily only 15 litres of water is used.

- **Toilet blocks** – General usage by occupants in toilets, urinals, bathrooms, wash basins.
- **Garden and surrounding open space** – Cleaning, watering the plants on a daily basis in winter season and about 2-3 times a day in summer season.
- **Canteen** – Approximately 100 and more people can be occupied at one time in the Canteen admeasuring 27.50 sq. m, there are 2 water taps which are connected to water tank. It requires on an average 200 litres of daily water consumption. The waste water is drained to the plants after recycling.

6.3 Areas of water usage

Based on the inventory done and data shared by the staff it was found that the premise has a total of 4 lavatories (including urinals), 12 taps (2 taps in the Canten) and 2 flush tanks.

6.4 Site investigation about water management.

There is no water leakage in the entire premise, the pipes are well maintained with adequate hygiene. The premise has an efficient water management in terms of operations and maintenance. The toilets are kept very tidy and are cleaned. The waste water from Canteen is reused in garden.

6.5 Recommendations for a Sustainable Habitat

Below mentioned are few suggestions for better water management practices in the premise.

- At least 1 toilet should be made for specially abled as per universal design norms.
- The waste water from toilets should be collected and a waste water treatment plant can be installed in the open space wherein this water can be treated and reused for gardening and toilet flushing.
- Increase the number of taps and flush tanks in premise.
- Include signages for awareness on water conservation.
- Install Rainwater Harvesting system.

Site investigation and data collection

Water tanks in the premise

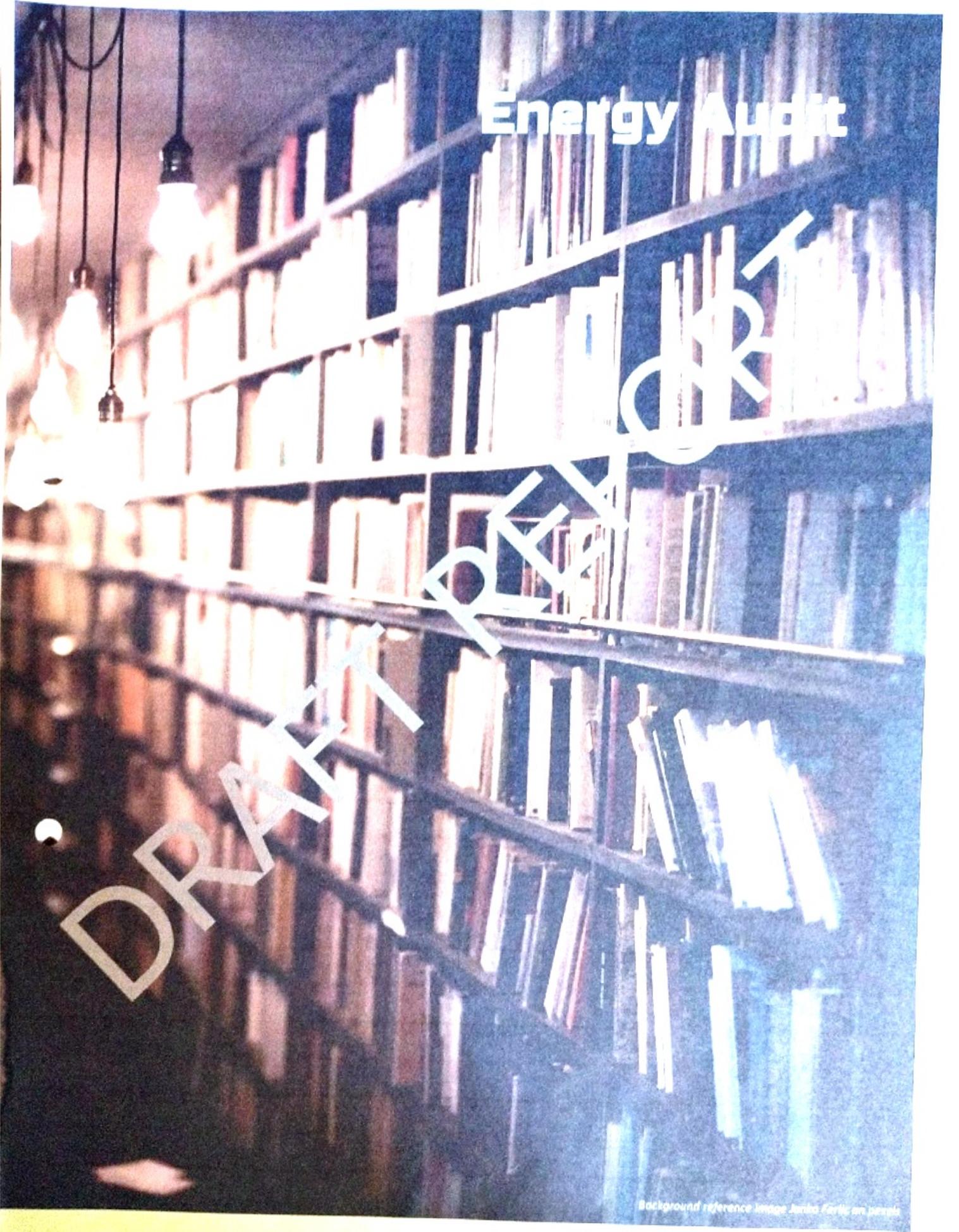


Site investigation and data collection

Sources of water consumption in premise



Energy Audit



Background reference image Janta Fertic on jezika

7. Energy Audit

7.1 Sources of Energy consumption

The premise uses following sources of energy consumption.

- 1. Electrical (Metered)** – Light, Fans, AC, Equipments, Pumps consuming approximately 32 kWh of units from 1 meter costing approximately more than Rs. 730/- per month on an average.
- 2. LPG** – There is 1 Gas cylinders used in the premise costing Rs. 820/- per cylinder per month.

There is a UPS used in the Campus occasionally.

7.2 Site investigation analysis

The Site investigation observations and interviews with the Maintenance staff, Electrical department in charge are summarised below:

- The switch-off drills are practised at present.
- The computers are shut-off after use and also put on power saving mode.
- There are display boards encouraging to save energy.

7.3 Actual Electrical Consumption as per Bills

The admin department had shared the bills for Meter which is connected to all floors and is main source of energy supply. The supplier is Maharashtra State Electricity Distribution Limited. The type of supply is 37/ **LT – Low Tension (V B I)**. The analysis of actual electrical energy consumption before and after lockdown is summarised below.

Month	Energy consumed in kW	Amount spent
May, 2020	3	22
April, 2020	3	22
March, 2020	0	221
February, 2020	0	441
January, 2020	0	441
December, 2019	0	441
November, 2019	0	441
October, 2019	0	441

September, 2019	0	441
August, 2019	29	683
July, 2019	41	773
June, 2019	30	761
May, 2019	30	702
April, 2019	0	441
March, 2019	0	350
February, 2019	0	350
January, 2019	0	350
Total	136	7,321

Table 10: Summary of the Bills data

7.4 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, equipment. The inventory and data collection for sources of energy consumed in the premise is summarised in the following sections.

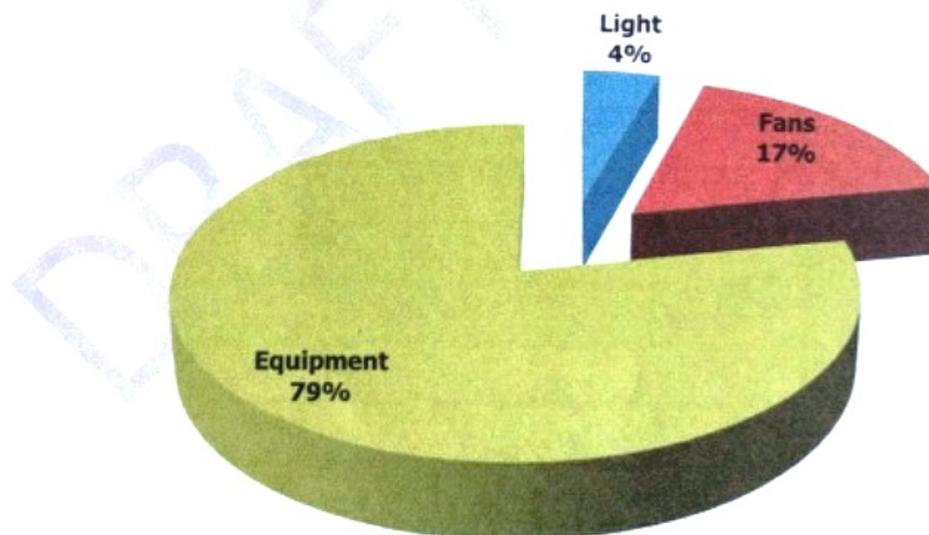


Figure 4: Summary of the Calculated Electrical Consumption as per inventory

The above graph shows that **Equipment consumes 79%** followed **Fans consuming 17%** and **Lights consume 4%** of the total calculated electrical energy.

7.5 Lights

7.5.1 Types of lights

There are a total of **41 lights** all of these are **LED** in the premise consuming **867 kWh** of energy.

S. No.	Room Name	Type	kWh
1	Porch	Led - 12	2
2	Boys Room	Led - 1	22
3	All Departments	Led - 6	134
4	Library	Led - 4	186
5	Office	Led - 9	209

Table 11: Brief summary of the types of lights in the premise

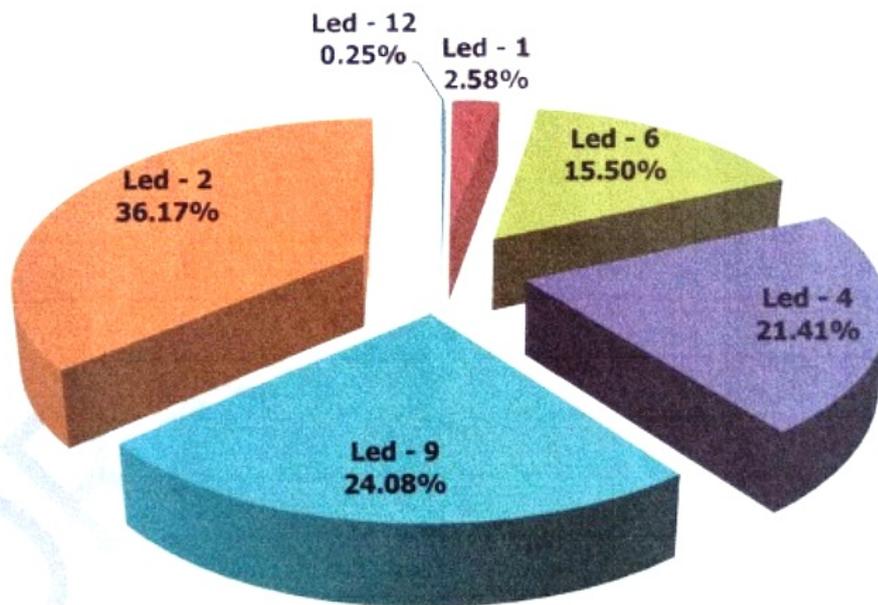


Figure 5: Types of Lights in the campus

The above analysis shows that **Led - 2** consumes the maximum energy of **36.17% at 314kWh** whereas the least energy is consumed by **Led - 12** of only **0.25% at 2 kWh**.

7.5.2 Requirement of NAAC

7.5.2.1 Alternative Energy Initiative

Percentage of power requirement met by renewable energy sources – There are no solar panels available in premise at present.

7.5.2.2 Percentage of lighting power requirement met through LED bulbs

Percentage of lighting power requirement met through LED bulbs

The entire campus has LED lights in form of bulbs and Tubelights.

Hence the 100% of the lighting requirement is met through LED.

7.5.3 Site investigation observations

Some of the points noticed are as follows:

1. All of the lights are led
2. All lights are in working conditions
3. Daily monitoring and check is done by the maintenance staff.
4. There was no fuse defect observed.

7.6 Fans

7.6.1 Types of fans

There are a total of **44 fans** in the premise consuming **3,463 kWh** of energy. The following table shows the various types of fans in the premises.

S. No.	Type	Nos.
1	Ceiling fan	40
2	Wall mounted fan	2
3	Table Fan	2
Total		44

Table 12: Summary of the types of fans in premise

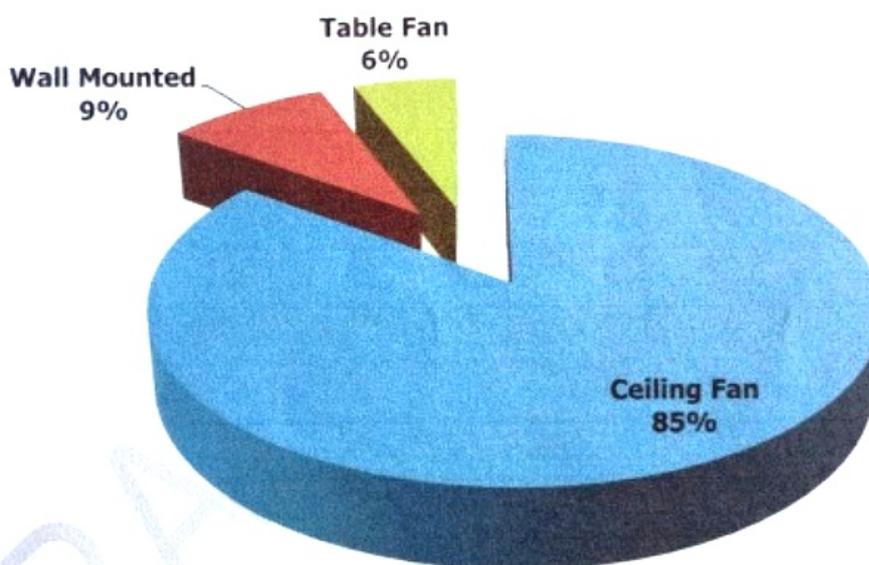


Figure 6: Types of Fans in the premise

The analysis of the types of fans in premises shows **Ceiling fans consume 2,956 kWh at 85%** the **Wall Mounted fans consume 309 kWh at 9%** and **Table fans consume 198 kWh at 6%**

7.6.3 Site investigation observations

Some of the points noticed are as follows:

1. All fans are in working conditions
2. Daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.

7.8 Equipment

7.8.1 Types of Equipment

There are a total of **14 types of equipment totalling to 45 in number and consuming 15,788 kWh** in the premise. The various types are mentioned in the table below.

S. No.	Name	Nos.
1	Computers	13
2	Printer	3
3	Wifi-router	2
4	Speaker	2
5	Projector	1
6	TV	1
7	Aquaguard	2
8	Scanner	2
9	Landline phone	1
10	Xerox machine	1
11	Refrigerator	1
12	Submersible Pump	1
13	Bell	3
14	CCTV	12
Total		45

Table 13: Types of equipment in the premise

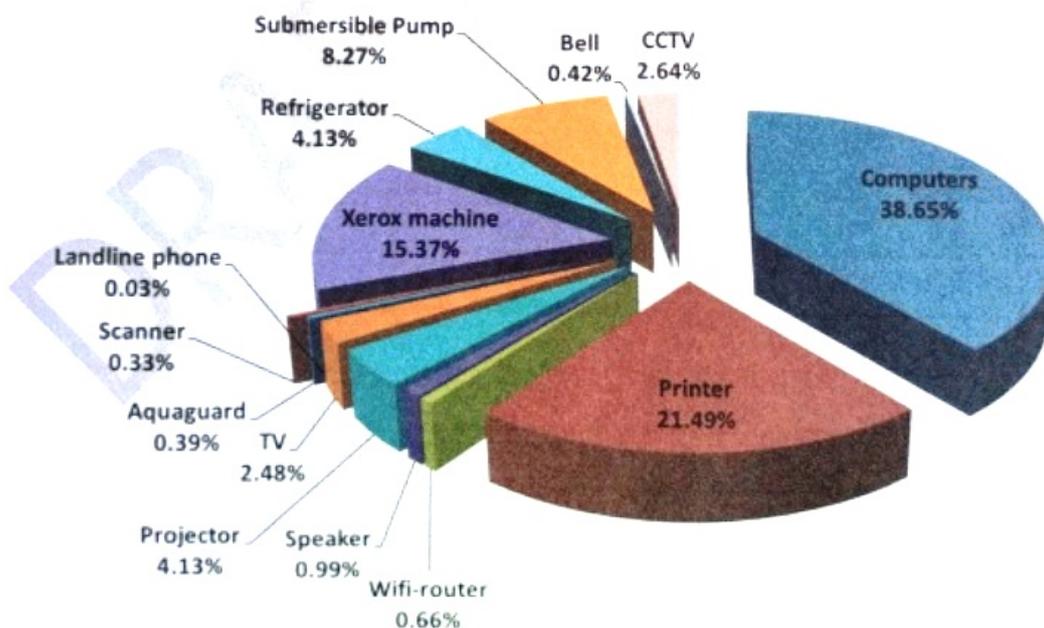


Figure 7: Summary Energy consumed by Equipment

The above summary shows that **Computer consumes more energy at 38.65%** while **Printer at 21.49%** the **Xerox machine consumes 15.37%** and **Submersible Pumps consume 8.27%** these are maximum consumers as compared to other equipment.

7.8.1 Indoor-outdoor consumption study

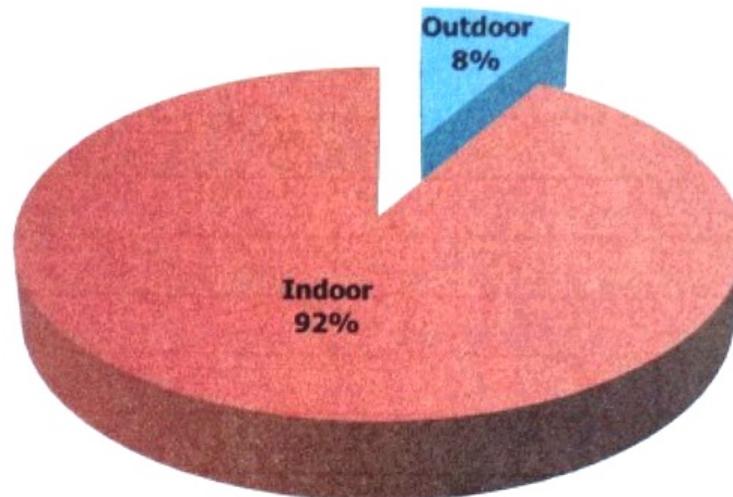


Figure 8: Consumption study of the Equipments

The above analysis shows that **Indoor spaces consume maximum energy at 92%** as compared to energy consumed by submersible pump in **the outdoors at 8%**

7.8.3 Site investigation observations

Some of the points noticed are as follows:

1. All Equipments are in working conditions and Daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.
2. No defect was found in any equipment of electrical consumption.

7.9 Recommendations for a Sustainable Habitat

Over the time energy efficient appliances have been a boon not only to the energy saving parameters they adhere to but also the eco-friendly habits it helps to inculcate. The Institution such as Schools and Colleges are the best way to implement these initiatives. It creates awareness among the students at a young age. The Institutions also act as a symbol and representative of being an energy efficient premise.

Following the analysis we found are some of the suggestions which can be implemented for an energy efficient Institution. This would help in reduction of the current electrical consumption by a major percentage.

7.9.1 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 32W when in use.

The following graph shows a comparison of the current consumption and consumption of all **40 ceiling fans on all floors** if replaced with star rated appliance.

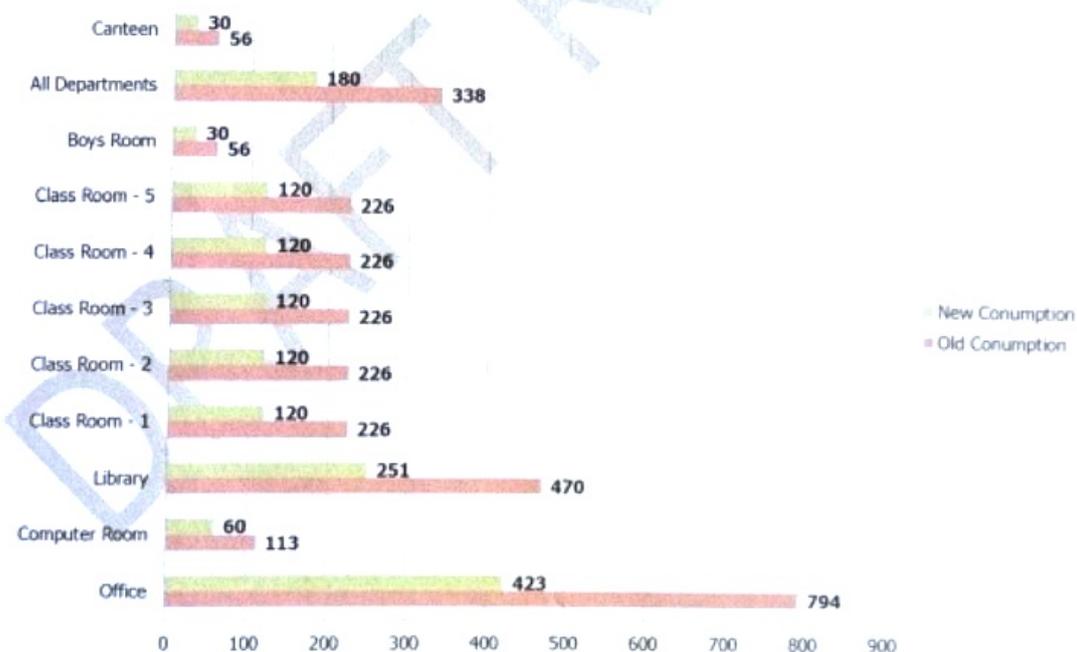


Figure 9: Analysis of current and new fans

The above analysis shows reduction of average of **47% reduction** in energy consumption if replaced with energy efficient appliance.

7.9.2 Equipment

Among all equipment the computers are in maximum number and suggested to be replaced with laptops as this would be energy efficient. A normal computer consumes on an average 250W and it is to be connected all time when it has to be used. On the contrary a laptop consumes 40W and has a battery backup which lasts upto 4 hours.

The following table shows a comparison of the current consumption and consumption of the **13 desktop computers** if replaced with star rated appliance.

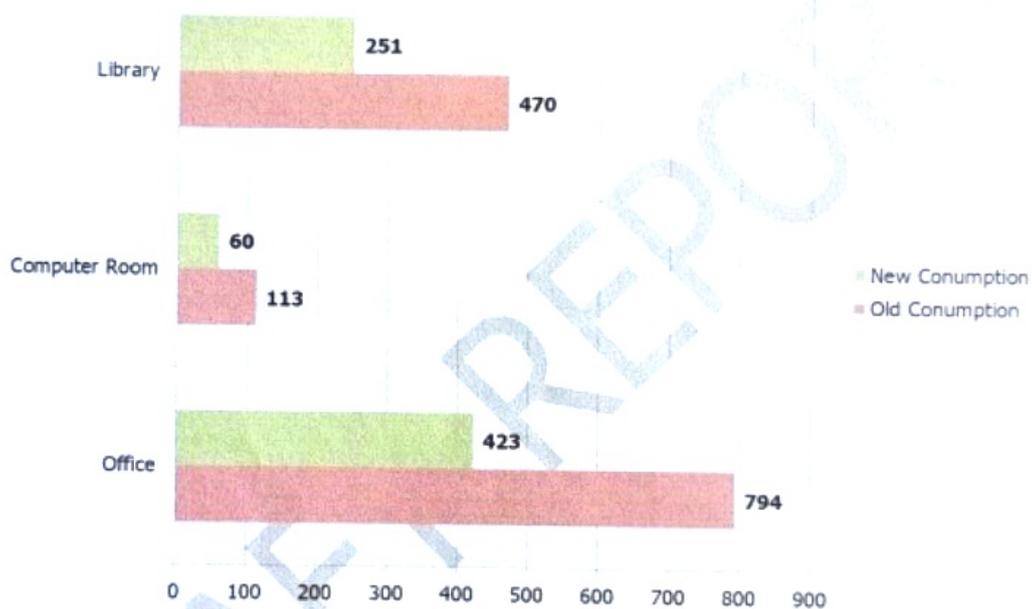
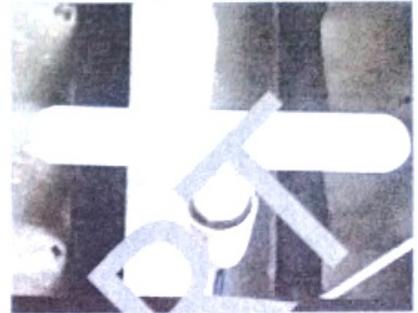
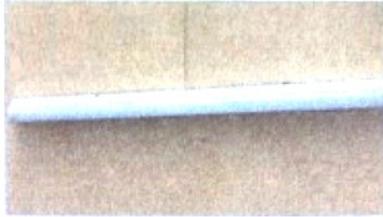


Figure 10: Analysis of current computers and new laptops

The above analysis shows reduction of average of **84% reduction** in energy consumption if replaced with energy efficient appliance.

Site investigation and data collection

Lights in the premise



Pumps and well in the premise



Signage, LPG cylinder and UPS batteries as other source of consumption



8. References

1. Uniform Plumbing Code – India, 2008
2. IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
3. IGBC Green Landscape Rating system, March 2013
4. BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST - Canada
5. Climate data <https://en.climate-data.org/asia/india/maharashtra/ratnagiri-24258/>
6. Used only for understanding Universal design - **Universal accessibility Guidelines for Pedestrian, Non-motorized vehicle and Public Transport Infrastructure** – Report guidelines by Samarthyam (National centre for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation.

DRAFT REVIEW

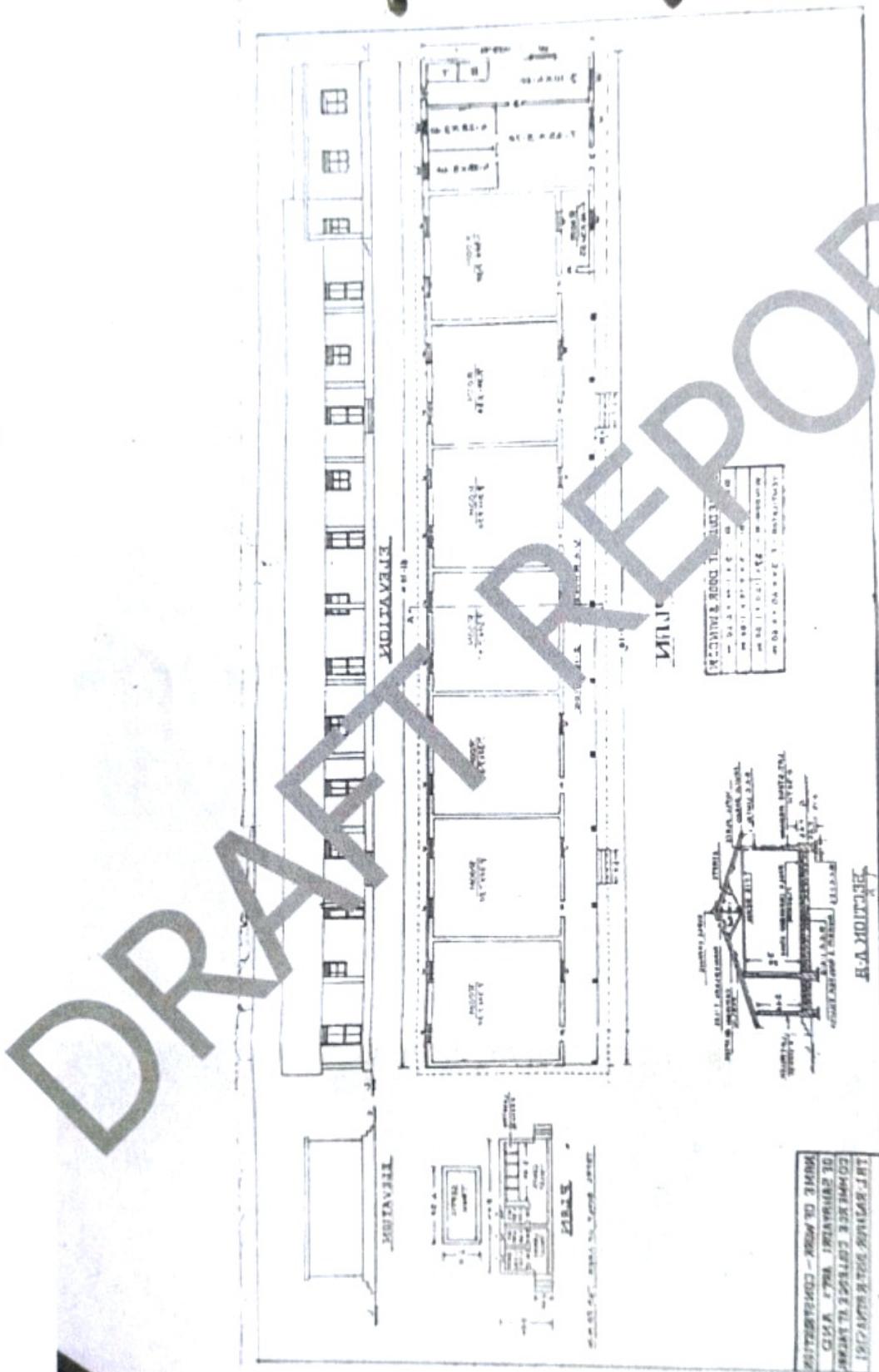
9. Towards a Healthy & Sustainable Institution

This is a unique USP of College and will be included in the Final Report.

DRAFT REPORT

10. Annexure

DRAFT REPORT



Handwritten notes in Tamil and English, including a circular stamp and a signature.

Handwritten text: *Handwritten notes in Tamil and English, including a circular stamp and a signature.*

Annexure – Gas cylinder bill

HP GAS श्री M. H. Kulkarni
PARSHWA HP GAS
DURGAM KSHETRIYA VITRAK
 14.2 (HSN:27111900)

HP GAS 94 20 34 56
 Just Dial 88 8 34 56
 24 Hours FILL 8 34 56
 FOR EMERGENCY: 7 20 70 44 98
 HP GAS TOLL FREE: 00 233 3559

COST OF: 606138
 CONSUMER NO: 1421142774
 DGCC BOOK NO: खन्डेराव महदु कोतवाल
 NAME: राजापुर
 ADDRESS: राजापुर

KG CYL. RS: 700.00
 CASH MEMO: 05417-23/01/21
 ORDER NO./ DATE: 9421142774
 DELIVERY DATE/TIME: 17-23/01/21
 SUBSIDY CONSUMED: 65

(Tax Value+CGST 2.50%+SGST/UTGST 50%)
 DBC
 जहाँ

RECEIVER'S SIGNATURE
 We confirm that the fresh refill cylinder was checked for the correct weight & connected in my own presence. The equipment was tested for leakage to our satisfaction and no leakage takes while the equipment is in use with us.

DEALER COPY
 I received full cylinder in sealed condition, checked/connected in my presence.
 GOVERNMENT OF RAJASTHAN
 GOVT. ENGINEERING & COM. FACIAL
 Rajasthan, Raj. Raipur Dist. Raipur-410

Scanned with CamScanner

Annexure – One of the Electricity bill



Maharashtra State Electricity Distribution Co. Ltd.

BILL OF SUPPLY FOR THE MONTH OF

GSTIN: 27AAECM2033K125

www.mahadis.com.in CODE: 27180000

Consumer No.		BILL DATE	
Consumer Name		DUE DATE	
Address		IF PAID UP TO	
Village		Last Receipt No. / Date	
Pin Code		Last Month Payment	
E-mail		Scale / Sector	
Mobile No.		Meter No.	
Sanctioned Load (KW)		Connected Load (KW)	
Contract Demand (KVA)		50% of Con. Demand (KVA)	
Tariff		Category	
Date of Connection		Elec. Duty	
Supply at		Prev. Highest Bill Demand (KW)	
rev. Highest (MWh)		Security Deposit / Fee	
Bank Guarantee No.		Billing History	

Bill Month	Units	Bill Demand (KVA)	Bill Amount
Dec-2018	0		
Nov-2018	0		
Oct-2018	0		
Sep-2018	0		
Aug-2018	29		
Jul-2018	31		
Jun-2018	30		
May-2018	30		
Apr-2018	0		
Mar-2018	0		
Feb-2018	0		
Jan-19	0		350.00

Maintain Harmonic distortion within limit as prescribed by IEEE STANDARD 519-1992 to avoid penalty

Avail Power factor incentive up to 3.5% maintaining power factor above 95% to 100%

Avail load factor Incentive up to 15% by maintaining constant load profile.

Avail 1% prompt payment discount by paying bills within prompt payment date.

DRAFT REPORT

U.C. Bank Branch - PAC

24 FEB 2019

आता नवीन
मैत्री गेक वीज जोडणी
अधिक सुलभतेने

Ease of doing business
संबंधित बीज जोडणीसाठी
राज्य केबल वोल्टेज इन्फ्रास्ट्रक्चरची
मालकी हक्क / बाहिबाटीचा पुरावा
जिल्हा उद्योग केंद्राचे प्रमाणपत्र
सर्व प्रक्रिया ऑनलाईन (जर्न भरणे, डिमांड नोटचा भरणा)

महा वितरण
संपर्क :
महावितरणचा www.mahadis.com.in
या संकेतस्थळावरील टाहक वेब म्युचुअल
किंवा महावितरण मोबाईल जेय वा चानर वरचा

Important Message

- Consumers can pay online using Net banking, Credit/Debit cards at <https://www.mahadis.com.in/wws/wws> after registration
- Submit / update your E-mail id and mobile number to Circle Office for receiving prompt alerts through SMS
- Submit / update your PAN & GSTIN to circle office with copies of PAN & GSTIN for verification.
- Special desk is operational for HT Consumers, please contact: htconsumer@mahadis.com.in for any clarification / query or grievance
- This Electricity Bill should not be used for the address proof and as a proof of property ownership.
- For any payment to MSEDCL, ENSURE & INSIST for computerized receipt with unique system generated receipt number. Do not accept hand written receipt. Pay online to avoid any inconvenience

