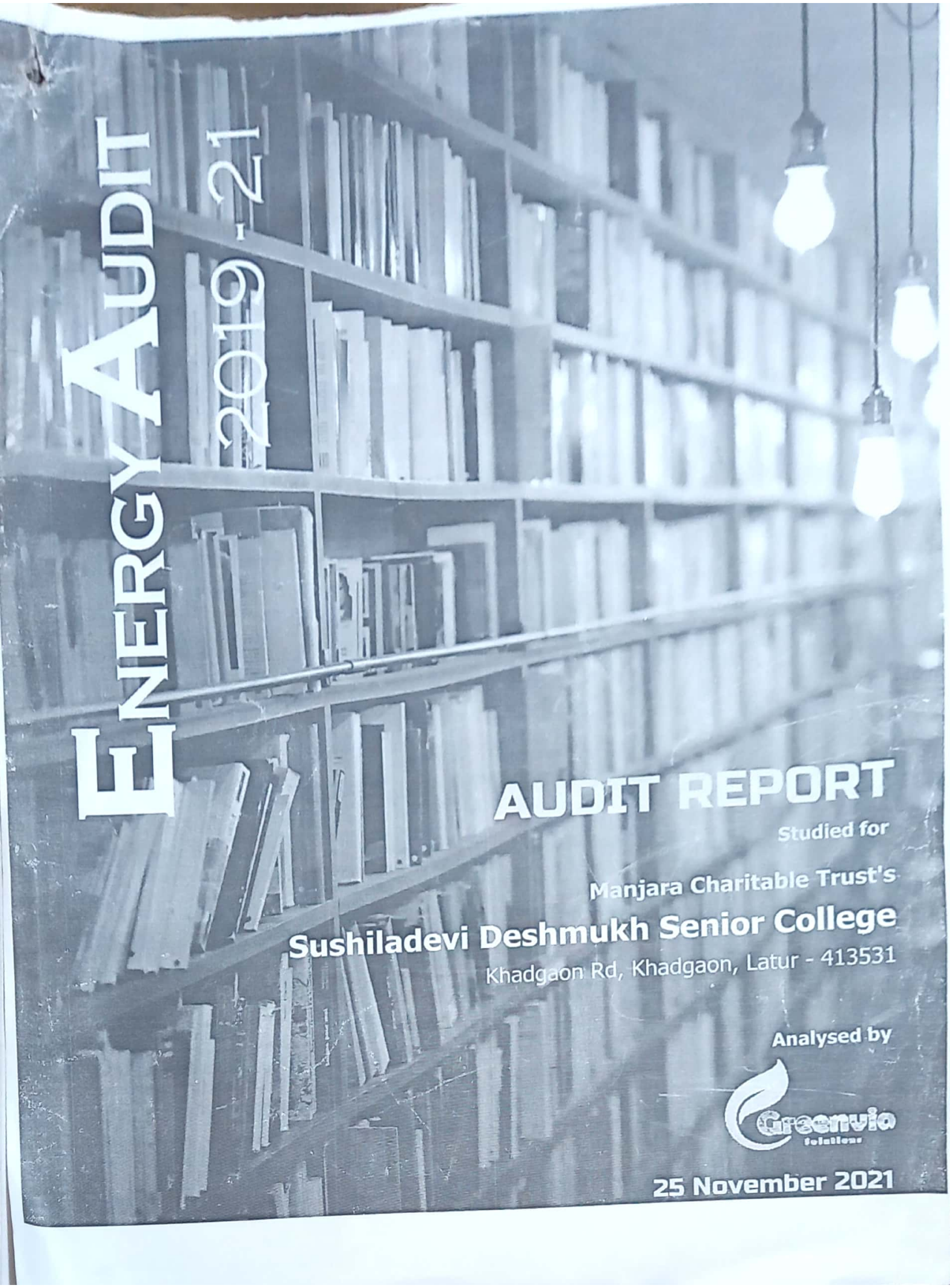

Disclaimer

Green Audit Team has prepared this report for the **Manjara Charitable Trust's Smt. Sushiladevi Deshmukh Senior College, Khadgaon Rd, Khadgaon, Latur - 413531** 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 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 College. 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 on-site 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 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 department for conducting Audits

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Acknowledgement

Green Audit Assessment Team thanks the **Manjara Charitable Trust's Smt. Sushiladevi Deshmukh Senior College, Latur** 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. Shri. Dilipraoji Deshmukh,** President; **Hon. Hon. Shri. Amitji Deshmukh,** Secretary; **Hon. Shri. Vijaymurti Shete, Hon. Shri. Najeer Ahemad M. Yaseen Sayyad, Hon. Shri. Shankarrao Chavan,** Trustee and everyone from the Management.

Our heartfelt thanks to Chairperson of the entire process **Dr. Ajay Patil, Principal,** Smt. **Sushiladevi Deshmukh Senior College** for his valuable inputs.

We are also thankful to **College's Task force the faculty members** who have collected data required **Dr. Mallikarjun Karajgi,** IQAC Coordinator and Teaching Staff Members **Dr. Kumar Bansode, Dr. Balu Kamble, Prof. Anita Gaikwad, Prof. Gurunath Deshmukh and Prof. Sanjayadevi Pawar**

The kind gesture for the inventory and data collection of the Non-Teahing Staff Members **Shri. Satyanarayan Bhutada, Smt. Chanda Kamble, Shri. Vikram Pathan, Shri. Balaji Kumbhar and Shri. Jivan Sable** is quite commendable.

We highly appreciate the assistance of the College Team for their support while collecting the data.

Sustainable Academe

Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About Manjra Charitable Trust

It was established twenty eight years ago, when the leading citizens from the different fields of life of Latur area, namely: **Late Hon. Shri. Vilasraoji Deshmukh** (Founder and Ex. Chief Minister of Maharashtra & Ex. Union Minister of India), **Late Adv. Shri. B. V. Kale** (Secretary), **Shri. Deelipraoji Deshmukh** (President, & MLC, Maharashtra), **Shri. Amitji Vilasrao Deshmukh** (Executive Trustee & MLA, Maharashtra), **Late Shri. Shivajirao Survase, Shri. Sayeed N. A. M. Yaseen, Shri. Shankarrao Chavan** and **Shri Vijaymurti Shete.** These honourable personalities with a great concern and a noble view established the college.

1.2 Vision and Mission Statement of College

Our Vision – Education for knowledge and Character building.

Our Mission – To provide opportunities of education to the students from rural area who are economically, socially and educationally weak.

1.3 Institution and the surrounding premises

Smt. Sushiladevi Deshmukh Senior College, Latur (MS), is unique single faculty college of the region, with 6.08 acres, pursuing excellence in education. Keeping in view the educational needs of the region, Manjra Charitable Trust, a local management committee, established Smt. Sushiladevi Deshmukh Senior College, Latur in the year 1991. It is a grant–in–aid institution formerly affiliated to Marathwada University, Aurangabad and is at present affiliated to S.R.T.M. University, Nanded since its formation. The U.G.C. has accorded status of 2(f) and 12 (b) to the college on 21st March 2005.

Out of 18 faculty of the college, 09 faculty members are Ph. D. holders and 08 faculty members are Recognised Research Guides. The college promotes and motivates the faculty for research and publication activities. The faculties of college have to their credit 227 different publications with an average of 40.86 per faculty during last four years. The college is also active in community and extension services through NSS unit. The college feels proud to mention here that the NSS unit has adopted

crematorium (Smashanbhumi) of Khadgaon village.

To keep pace with over changing global scenario, the college is taking co-operation of the Management, UGC, University, Teachers, Students, Parents and all stakeholders involved in the process and imparting education with its mission statement Education for knowledge and Character building.

The Premises is situated amidst the landscape serene of **Latur district of Maharashtra State** with immense peace and calmness in the surroundings. The college is surrounded by Residential areas on all sides. There is a frontal approach which provides quite a beautiful appreciation space while approaching the premise. The location of college is feasible to the nearby essential amenities such as Public Health Center, Fire Station, Civic body-Public administrative buildings, Recreational gardens and Police Station.

The College was established with an aim to educate the girl students in the vicinity for their social, economic and cultural enlistments, is to continuously enhance the teaching methods in order to provide students with an opportunity for their all-round development. It 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 life.

The institution offers the following courses affiliated to Swami Ramanand Teerth Marathwada University, Nanded.

- **Graduation**
  - Bachelor of Arts (B.A.)
  - ~~Bachelor of Commerce (B. Com)~~
  - XXXXXXX
- **Post-Graduation** –
  - XXXXXX
- **Ph. D** – XXXXX
- **Extension** – XXXXXX
- **Certificate Courses** – Industry linked courses as follows.
  - XXXXX

- **Centre for Distance Education, S.R.T.M. University, Nanded - XXXX**

The College aspires at training young women to be competent, committed and compassionate and lead in all walks of life. It has the following objectives.

- To motivate students for creativity and innovation.
- To provide quality higher education for holistic development of the students.
- To promote ethical and moral values.
- To inculcate scientific temper among the students.
- To create research aptitude of the students.
- To mould the students as responsible and respectable citizens of the society and nation, by inculcating in them, perfect discipline in terms of regularity, sincerity and punctuality.

1.4 Assessment of the College

Below mentioned are the administrative details of the Institute.

Affiliations - The institution is affiliated to Swami Ramanand Teerth Marathwada University, Nanded.

Recognitions – The College has received the following recognitions

- University Grant Commission (UGC) by 2(f), XXXXXX
- University Grant Commission (UGC) by 12(b), XXXXXX

Accreditation - The following are details of the reaccreditation of the Institute.

Cycle	First
CGPA	78.00
Grade	B+
Year	2004

second
2.80
B++
2017.

Table 1: NAAC Accreditation details of the Institute

The college is due to enter its Second cycle of NAAC soon.
Third

1.5 Achievements of the College

The college has a tremendous track record of excellence in Built form and educational services provided, below are some of the achievements of the prestigious Institute.

Name of the award	By whom	When was it received	For what

Table 2: Details of the Awards received

2. Institution overview

2.1 Populace analysis for Academic year 2019-20

2.1.1 Students data

The student data (shared by the College) shows there are total of **XX Girl and XX Boys** students.

2.1.2 Staff data

Type	Male	Female	Total
Admin staff			
Teaching staff			
Non-Teaching staff			
Total			

Table 3: Staff data of the Institution for 2019-20

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

2.2 Populace analysis for Academic year 2020-21

2.2.1 Students data

The student data (shared by the College) shows there are total of **XX Girl and XX Boys** students.

2.2.2 Staff data

Type	Male	Female	Total
Admin staff			
Teaching staff			
Non-Teaching staff			
Total			

Table 4: Staff data of the Institution for 2020-21

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

2.3 Total Institute Area & College Building Spread Area

The total site area is 6.08 acres and total built-up area is 15,525+ sq. ft. for approx. 885 footfalls.

2.4 Institute Infrastructure

2.4.1 Establishment

The College is run by Manjra Charitable Trust, Latur. It is established in 1991. The Sanstha has rich tradition of Quality education of many years. The Building is a Reinforced Cement Concrete (RCC) framework building. **Overall the Infrastructure of the Building is excellent in terms of the Architecture Design and Green Building Design. The Premise covers quite a few of the requirements for a Green Habitat.**

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 colour palette not just helps the building to stand out but also provides an Institutional arena. It balances with the local architecture with the natural landscapes of huge trees all around. The design emphasis on providing calmness to the built form and gradually merges with the serene landscape.

The floor to floor height is more than 10 feet. There is no provision for lifts in the premise, there are with CCTV, Fire extinguishers, first aid box and amenities such as

2.4.2.1 Room-wise details

The room-wise details are mentioned below:

S. No	Room Name	Floor No
1	Principal Cabin	Ground Floor
2	Management Office	Ground Floor
3	Administrative Office	Ground Floor

4	Store Room	Ground Floor
5	Office	Ground Floor
6	Classroom	First Floor
7	Exam. Department.	First Floor
8	Language Department	First Floor
9	Social Science Department	First Floor
10	Computer Lab	First Floor
11	Geography Department and Lab	First Floor
12	IQAC, Cell and Department of English	First Floor
13	Ladies Room	First Floor
14	Wash Room	First Floor
15	Library	Second Floor
16	Reading Room	Second Floor
17	YCMOU, Centre	Second Floor
18	Canteen	Ground Floor
19	Indoor Sports Hall	Ground Floor

Table 5: Room-wise space details

2.4.4 Operation and Maintenance of the premises

The interview session with the staff regarding the operation and working hours is summarized in the table. The Institutions are open Monday to Saturday for full day. Sunday is an off for all. Below mentioned in the table are the average working hours. The detail wise timing for each is mentioned below the table.

S. No.	Section	Spaces	Time	Hours / day	Days in a year
1	Main Institutional College	Student areas and Teaching faculty	7:50 a.m. to 3:40 p.m.	7.7	200
2	General areas	Admin areas and library, Passage, staircase, toilet	9:00 a.m. to 4:00 p.m.	7	240

Table 6: Schedule of the timings of the premises

3. Green Building Study Audit

3.1 About the Green Building Study 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 Building Study Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the Lights, Fans, AC, Equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the campus

Green Audit

- Green initiatives
- Hygiene audit
- 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 Green Building Study 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 Building Study Audit

- 25 August 2021 – Discussion with the College
- 2 November 2021 – Survey of the Student and staff submitted
- 23 November 2021 – Data submitted by College
- 25 November 2021 – Submission of draft Report

4. Energy Audit

4.1 Sources of Energy consumption

The premise uses following sources of energy consumption.

4.1.1 Primary sources

1. **Electrical (Metered)** – Light, Fans, AC, Equipments, Pumps consume on an average XXXXX units monthly.

4.1.2 Secondary sources

1. **Diesel Generator – There is 1 Diesel Generator in the premise.**
2. **Invertor –** There is 3 Invertors of XXX kVa and XXXXX kVa in the premise used mainly for admin purpose.
3. **UPS –** There are 2 UPS of XX kVa and XX kVa
4. **Generator** – There is 1 Generator in the premise.

On an average Rs. 2,000/- is spent on a monthly basis for the Invertors, UPS and Batteries.

4.2 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 **inbuilt power saving mode** in every Computer is functioning.
- There are **no Ultra-violet lights and any other harmful lights used** in the premise.
- All class rooms and office are **ventilated using natural light.**

4.3 Actual Electrical Consumption as per Bills

The admin department had shared some of the bills for Meters as this is the main source of energy supply. The supplier is Maharashtra State Electricity Distribution Limited. The type of supply is **XXXX.** The details of unit consumption meter wise are as follows:

Month-Year	Units Consumed
Jul-20	
Aug-20	
Sep-20	
Oct-20	
Nov-20	
Dec-20	
Jan-21	
Feb-21	
Mar-21	
Apr-21	
May-21	
Jun-21	
Total	

Table 7: Study of the electricity consumption of the meters in premise

The summary of the above study shows the average consumption varies each month.

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

Note: The following analysis is combined for entire premise taking into considerations the duration before pandemic to understand the consumption pattern as post pandemic the premise is used only for a few hours.

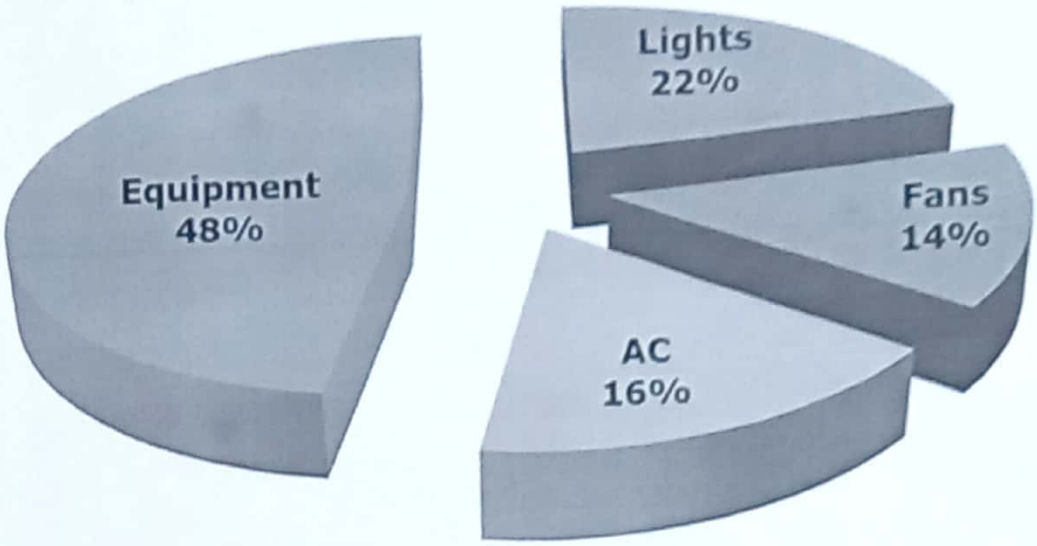

Figure 1: Summary of the Calculated Electrical Consumption as per inventory

The above graph shows that Equipment consumes 48% followed by Light at 22% AC at 16% and Fans at 14% of the total calculated electrical energy.

4.5 Survey Results

An online survey was conducted to analyse the views about the premise, following are some of the reviews.

4.5.1 Participation

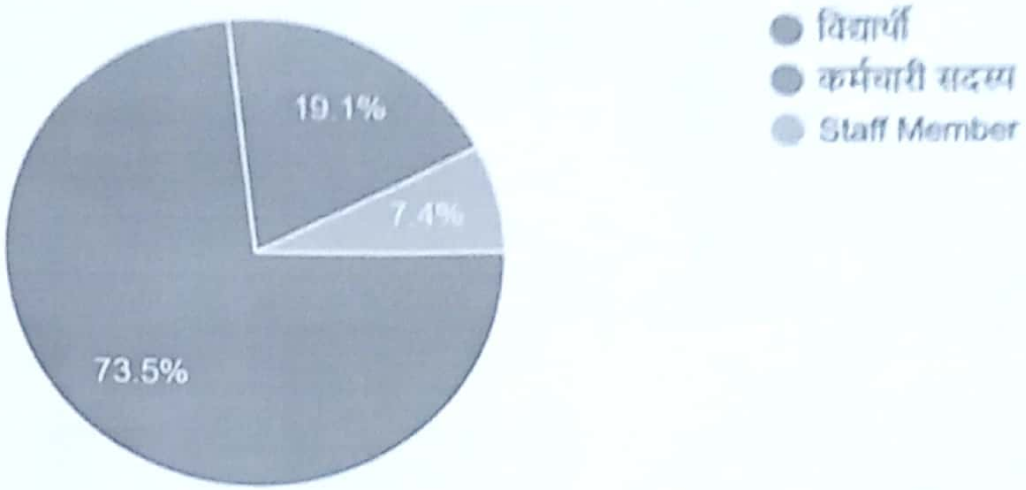

Figure 2: Participation analysis in the survey

A total of **68 responses** were received out of which 73.5% were students.

4.5.2 Energy management practices adopted in College

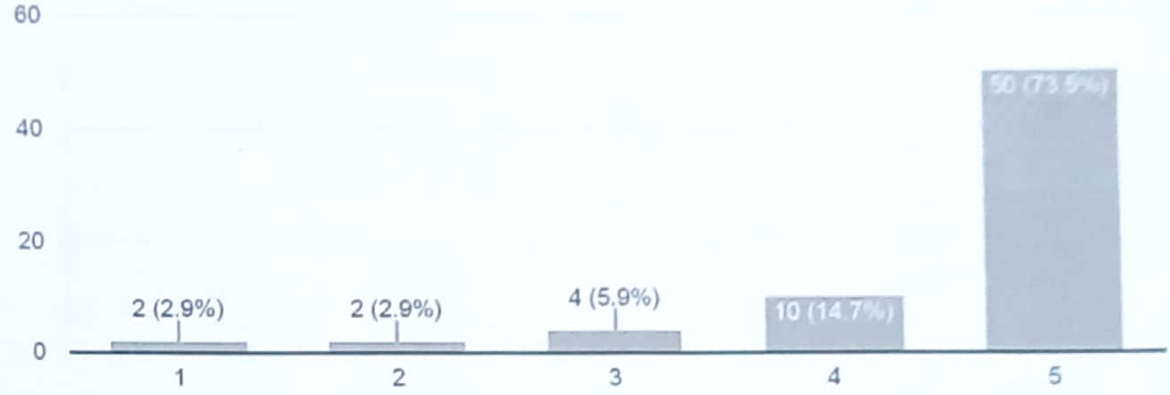

Figure 3: Energy Management practices in College

There were mixed responses received the equal also the highest was for **rating 5 (Excellent) at 73.5% and rating 4 (Very Good) at 14.7%**

4.6 Lights

4.6.1 Types of lights

There are a total of **103 lights in the premises;** the following table shows the various types of lights in the premises.

S. No.	Type	Nos.
1	CFL	60
2	Non-LED	25
3	LED	18
Total		**103**

Table 8: Summary of the types of Lights in premise

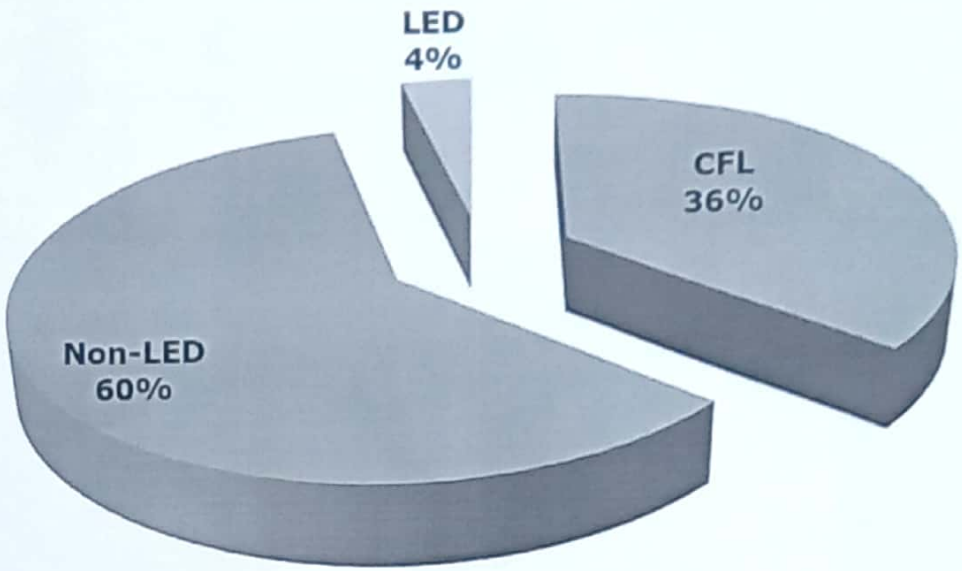

Figure 4: Types of Lights in the premise

The analysis of the types of lights in premises shows **Non-LED Tubelights consume 4,500 kWh at 60%** followed by **CFL lights consume 2,737 kWh at 36%** and the **CFL consumes 263 kWh at 4%**

4.6.2 Floor-wise consumption analysis

The energy consumption of Lights is **7,500 kWh** of energy; the following graph shows the floor wise consumption. This section analysis constitutes all buildings as a single entity.

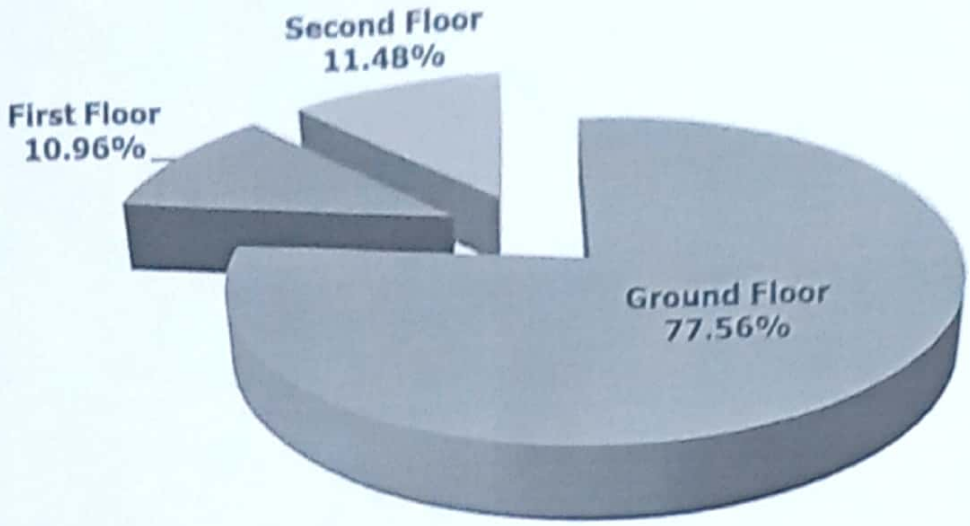

Figure 5: Energy consumed by Lights floor wise

The above analysis shows the equipment in the **Ground floor consumes the highest amount of energy of 5,817 kWh at 78%** while the **Second floor consumes 861 kWh at 11.48%** and the **First floor consumes 822 kWh at 10.96%**

4.6.3 Requirement of NAAC

4.6.41 Alternative Energy Initiative

Percentage of power requirement met by renewable energy sources – There are solar panels available in premise at present and 100% energy is utilised in Premise.

4.6.2 Percentage of lighting power requirement met through LED bulbs

The premise has 17% LED Lights and **60% of the power requirement** is met through the same.

4.6.4 Site investigation observations

Some of the points noticed are as follows:

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

4.7 Fans

4.7.1 Types of fans

There are a total of **57 fans** in the premise. The following table shows the various types of fans in the premises.

S. No.	Type	Nos.
1	Ceiling fan	56
2	Table fan	1
Total		**57**

Table 9: Summary of the types of fans in premise

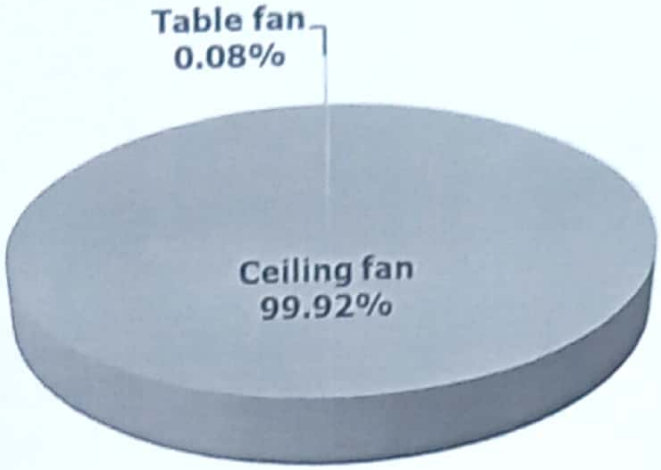

Figure 6: Types of Fans in the premise

The analysis of the types of fans in premises shows **Ceiling fans consume 4,747 kWh at 99.92%** the **Table fans consume 4 kWh at 0.08%**

4.7.2 Floor-wise consumption analysis

The energy consumption of Fans is **4,751 kWh** of energy; the following graph shows the floor wise consumption. This section analysis constitutes all buildings as a single entity.

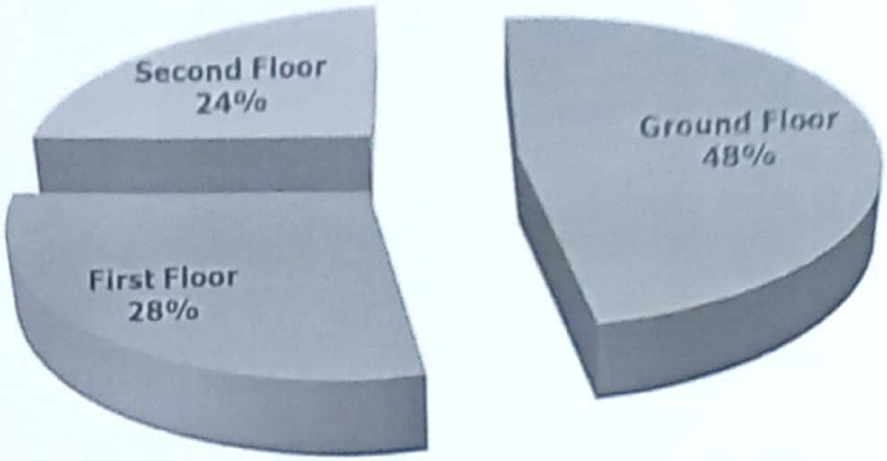

Figure 7: Energy consumed by Fans floor wise

The above analysis shows the equipment in the **Ground floor consumes the highest amount of energy of 2,261 kWh at 48%** while the **First floor consumes 1,342 kWh at 28% and the Second floor consumes 1,142 kWh at 24%**

4.7.3 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.

4.8 AC

4.8.1 Types of AC

There are **only 2 air conditioners** in the entire premise. The details of the same are as follows.

Sr. No.	Room Name	Floor	AC. Nos.
1	Principal Cabin	Ground Floor	1
2	Management Office	Ground Floor	1
Total			2

Table 10: Details of the air-conditioner in premise

4.8.2 Site investigation observations

Some of the points noticed are as follows:

1. Daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.
2. The Outdoor Unit is properly cleaned and maintained well.
3. The Outdoor Unit does not have any dust collection problem.
4. The current Air-conditioners need not be replaced.

4.9 Equipment

4.9.1 Types of Equipment

There are a total of **7 types of equipment totalling to 49 in number** in the premise. The various types are mentioned in the table below.

S. No.	Name	Nos.
1	Desktop Computer	37
2	Printer	5
3	Refigerator	1
4	Water Cooler	2
5	Sanitary Machine	1
6	RO Filter	1
7	Xerox Machine	2
Total		**49**

Table 11: Types of equipment in the premise

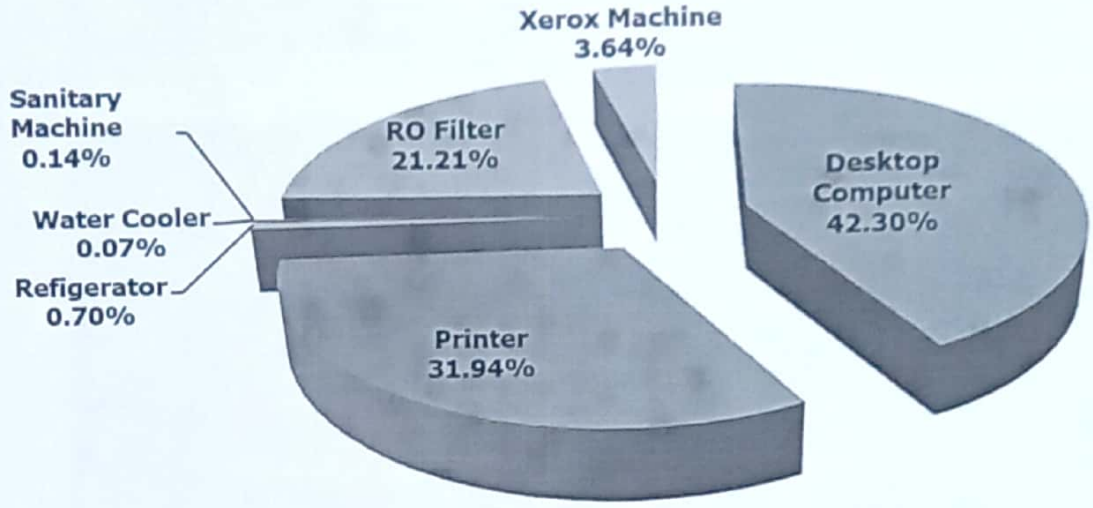

Figure 8: Summary of Energy consumed by Equipment

The above summary shows that **Desktop Computer consumes more energy at 42.30%** while **Printer at 31.94%** the **RO filter consumes 21.21%** and the **Xerox machine consumes 3.64%** these are maximum consumers as compared to other equipment. UPS and Inverter (when used for electrical consumption else it is a battery backup and does not require electricity as an equipment) are also one of the equipment but are excluded in this calculation.

4.9.2 Floor-wise consumption analysis

The energy consumption of Equipment is **16,075 kWh** of energy; the following graph shows the floor wise consumption. This section analysis constitutes all buildings as a single entity.

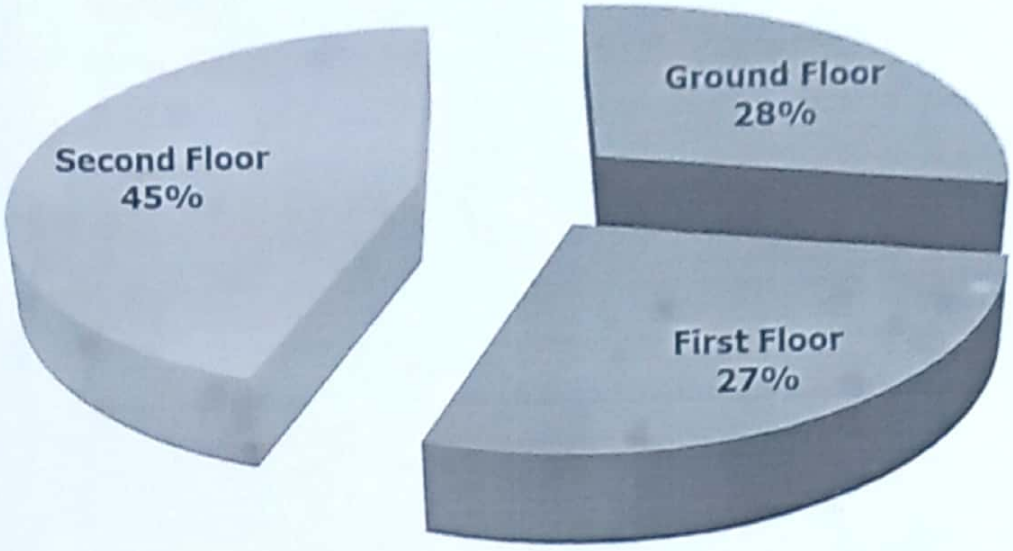

Figure 9: Energy consumed by Equipment floor wise

The above analysis shows the equipment in the **Second floor consumes 7,172 kWh at 45%** while the **Ground floor consumes 4,548 kWh at 28% and the First floor consumes 4,355 kWh at 27%**

4.9.3 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.

4.10 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.

4.10.1 Non-LED Tubelights and CFL

The current light analysis shows that Non-LED Tubelights lights consume anywhere between 24W, 36W and 40W when in use and these should be replaced with LED lights which consume on an average 16-20W when in use.

The following graph shows a comparison of the current consumption and consumption of all **25 Non-LED and CFL Lights on all floors** if replaced with LED lights.

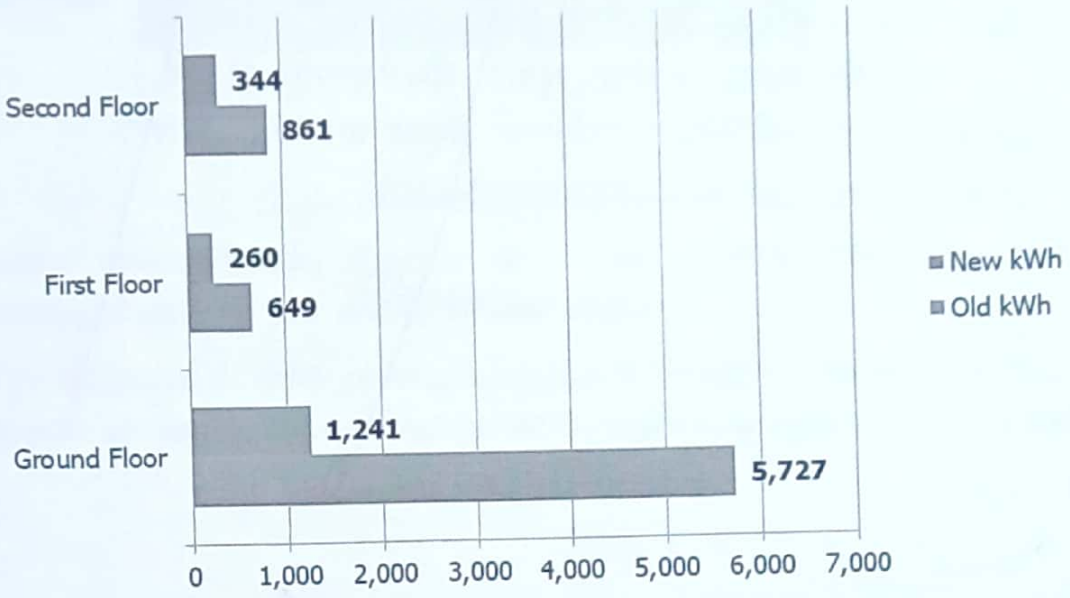

Figure 10: Analysis of current and new fans

The above analysis shows reduction of average of **66% reduction** in energy consumption if replaced with energy efficient appliance.

4.10.2 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 **56 ceiling fans on all floors** if replaced with star rated appliance.

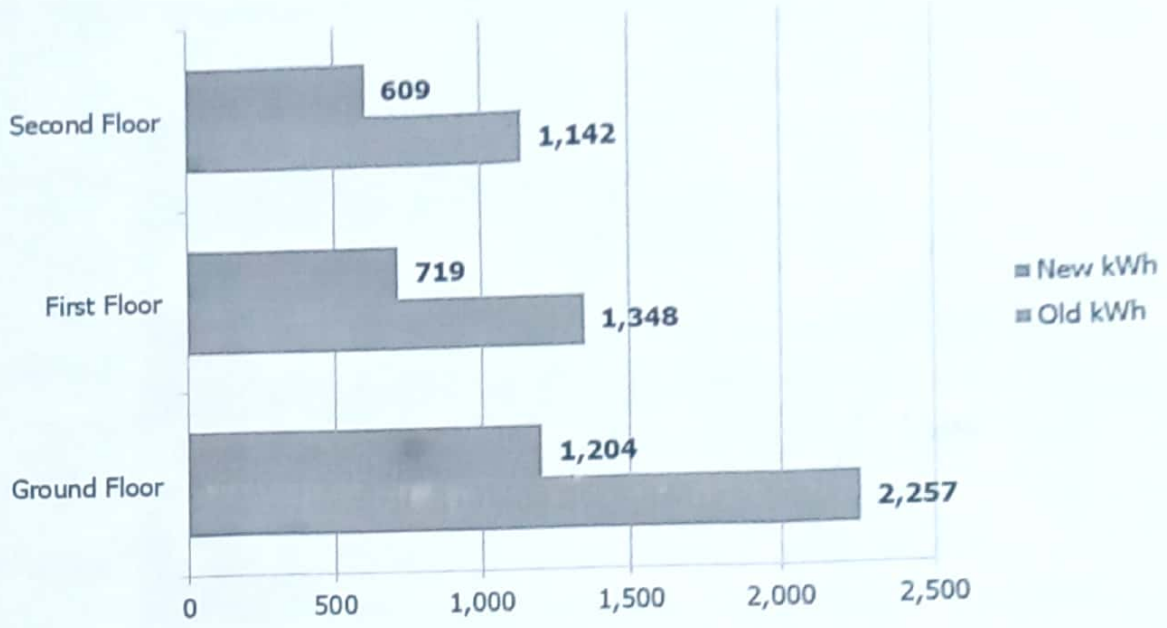

Figure 11: Analysis of current and new fans

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

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.

4.10.3 Equipment

Among all equipment it suggested to replace the desktop computers with laptops as this would be energy efficient. A normal desktop 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 up to 4 hours.

The following table shows a comparison of the current consumption and consumption of the **37 desktop computers** if replaced with laptops.

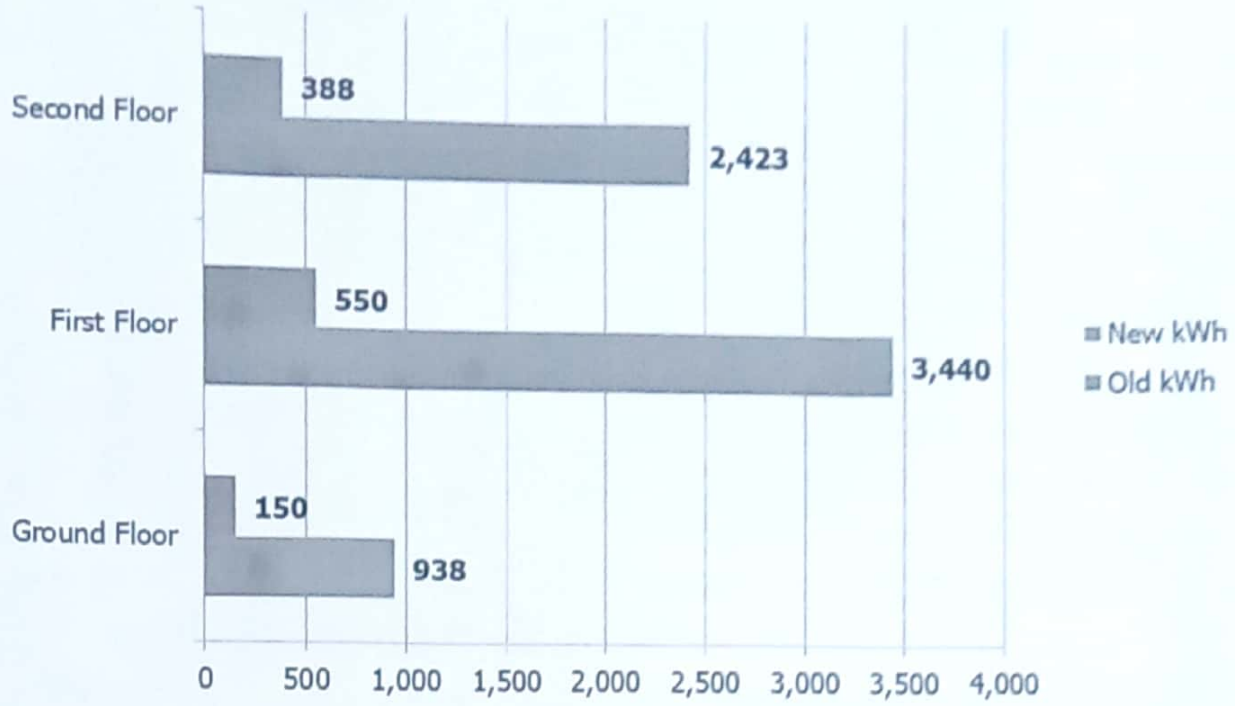

Figure 12: Analysis of current computers and new laptops

The above analysis shows reduction of average of **87% 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 the devices get damaged or are not in working condition.

5. Towards a Healthy & Sustainable Institution

5.1 Inputs by Greenvio Solutions

Based on the analysis of the study of premises in addition to the recommendations provided in each section of Ecological, Water, Waste and Energy Audit the College can adopt the following strategies towards a Healthy and Sustainable Institution practices.

a) **Kitchen garden -** There can be provision of kitchen garden practices in a designated area of the open space this would enhance the biodiversity and be useful in training students and staff about the healthy practices and vegetables grown which would be used in Canteen. It helps in capacity building. The smaller steps taken have huge impacts when each student would adopt these practices in their homes or societies and grow kitchen garden, terrace garden there will be a long term benefit for the environment as a whole.

b) **Cutlery in the Canteen –** The regular plastic and steel plates, spoons used in Canteen can be replaced with eco-friendly and organic leaves, paper straw, disposable plates, edible spoons and tables made out of sugarcane waste or bamboo. This will be first of its kind initiative to be adopted and practiced thus also inculcating the healthy practices in students.

c) **Signages –** In addition to the signages being in regular language there can be additional signages in braille language for the specially abled students.

d) **Additional fire safety -** There should be fire extinguisher minimum two per floor.

5.2 Survey Results

An online survey was conducted to analyse the student and staff views about what changes according to you can be undertaken for Green audit improvement in College premise and activity, some of the key responses are listed below. Whereas many responses **stated there were no changes requires because the present practices are excellent.**

- Its well planned in college.
- It already good.
- Its already beautiful.

Some of the suggestions by the Students and staff are listed below:

- Planting of trees by classification.
- Recording of trees from time to time
- Maintaining of trees planted by micro-cameras in places .
- Compulsory of one tree per group per year keeping in view the number of students.

However, it should be noted that the College has taken up multiple initiatives and because of Pandemic the students have not practically visited the campus so many of these points are not mandatory at the moment.

6. 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. Used only for understanding Universal design - Universal accessibility Guidelines for Pedestrian, Non-motorizes vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National centre for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation.