ENERGY AUDIT

STUDY PERIOD (TWO YEARS) 2022 – 2023 & 2023 - 2024

Sustainability study

AUDIT REPORT

Studied for

Ashoka Education Foundation's

Ashoka Business School

Rane Nagar, Nashik,
Maharashtra 422009

Studied in the capacity of

Accredited and Certified GBP

Studied by

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

Background reference image Janko Ferlic on pexels

Disclaimer

The Audit Team has prepared this report for the **Ashoka Education Foundation's Ashoka Business School** located *Rane Nagar, Nashik, Maharashtra 422009* based on input data submitted by the Institute analysed by the team to the best of their abilities.

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

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

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

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

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

Ar. Nahida Abdulla
Greenvio Solutions
Developing Healthy and Sustainable Environments
We are an Environmental and Architectural Design Consultancy firm
Sustainable Academe is our department for conducting Audits
Palghar District, Maharashtra- 401208
sustainableacademe@gmail.com

Acknowledgement

The Audit Assessment Team extends its appreciation to the **Ashoka Education Foundation's Ashoka Business School, Maharashtra** for assigning this important work of Energy Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are extended are due to everyone from the Management.

Our heartfelt thanks are extended to the Chairperson of the entire process **Dr. Sarita Dhawale,** (I/c Director) for the valuable inputs.

We are also thankful to Institute's Task force who have played a major role in data collection.

- Teaching staff member – ***Dr. Leena Gorhe,*** *Assistant Professor*
- Non-teaching staff member – ***Mr. Sachin Lokhande***
- Admin staff member - ***Mr. Vishal Sonkamble***

Sustainable Academe

Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About statements of the Institute

1.1.1 Vision

The Institute proposes *"To be a premiere educational center of excellence fostering managerial competencies of global standards for holistic advancement of students and create professional leaders contributing to the socio-economic development of the nation."*

1.1.2 Mission

The Institute adheres *"To provide a platform for learners to hone their competencies through experiential learning by imparting professional leadership skills driven by committed educators."*

1.2 Assessment of the Institute

The Institute was established in 2012.

1.2.1 Affiliations

The courses provided by Institute have received affiliation through **Savitribai Phule Pune University**

1.2.2 Certification

The Institute has received the following Certifications

- **AISHE** – The All India Survey of Higher Education code is C-41439
- **ISO** – Received the ISO 9001:2015 Certification

1.2.3 Approval

The courses by the Institute have received approval through **All India Council for Technical Education (AICTE), New Delhi** and the Institute is a NAAC accredited campus.

2. Overview

2.1 Summarised Populace analysis for 2023-2024

2.1.1 Students data

The data (shared by the Institute) shows there were **246 students.**

2.1.2 Staff data

S. No.	Type	Male	Female	Total
1	Admin staff	07	04	**11**
2	Teaching staff	05	06	**11**
3	Non-Teaching staff	06	07	**13**
Total Staff Members		**18**	**17**	**35**

Table 1: Staff data of the Institution for 2023-2024

The staff data shows the Institute premises had **35 Staff Members.**

2.2 Summarised Populace analysis for 2022-2023

2.2.1 Students data

The data (shared by the Institute) shows there were **240 students.**

2.2.2 Staff data

S. No.	Type	Male	Female	Total
1	Admin staff	07	04	**11**
2	Teaching staff	05	07	**12**
3	Non-Teaching staff	06	07	**13**
Total Staff Members		**18**	**18**	**36**

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

The staff data shows the Institute premises had **36 Staff Members.**

3. Research

3.1 Campus area

The **site spread over 0.5 acres of land.**

3.2 About the Green Building Study Audit

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

3.3 Analysis of the Green Building Study Audit

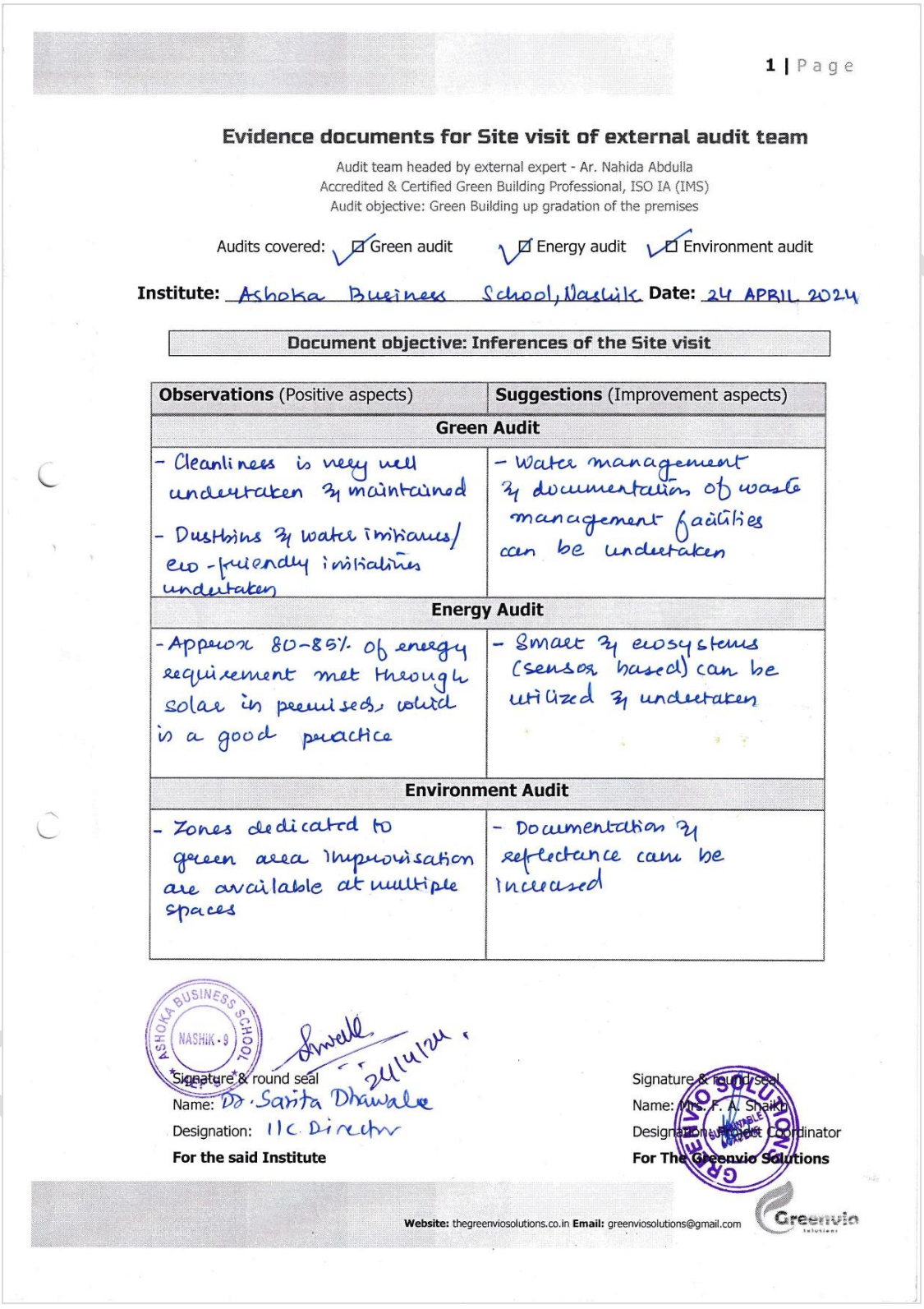
The procedure included detailed verification as follows:

- Investigation
- Technical
- Observations
- Inferences

3.4 Strategy adopted for Green Building Study Audit

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

4. Investigation



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Evidence documents for Site visit of external audit team

Audit team headed by external expert - Ar. Nahida Abdulla
Accredited & Certified Green Building Professional, ISO IA (IMS)
Audit objective: Green Building up gradation of the premises

Audits covered: ☑ Green audit ☑ Energy audit ☑ Environment audit

Institute: Ashoka Business School, Nashik **Date:** 24 APRIL 2024

Document objective: Inferences of the Site visit

Observations (Positive aspects)	**Suggestions** (Improvement aspects)
Green Audit	
- Cleanliness is very well undertaken & maintained - Dustbins & water initiaves/ eco-friendly initiatives undertaken	- Water management & documentation of waste management facilities can be undertaken
Energy Audit	
- Approx 80-85% of energy requirement met through solar in premises, which is a good practice	- Smart & ecosystems (sensor based) can be utilized & undertaken
Environment Audit	
- Zones dedicated to green area improvisation are available at multiple spaces	- Documentation & reflectance can be increased

ASHOKA BUSINESS SCHOOL NASHIK-9

Signature & round seal
Name: Dr. Sarita Dhawale
Designation: IIC Director
For the said Institute

Signature & round seal
Name: Mrs. F. A. Shaikh
Designation: Project Coordinator
For The Greenvio Solutions

Website: thegreenviosolutions.co.in **Email:** greenviosolutions@gmail.com

Plate 1: Evidence files related to inferences of the site visit

Evidence documents for Site visit of external audit team

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Audits covered: ☐ Green audit ☑ Energy audit ☑ Environment audit

Institute: Ashoka Business school. **Date:** 24 APRIL 2024

Document objective: Proof of the Site visit

Meeting with the core team

Investigation of the systems

ASHOKA BUSINESS SCHOOL NASHIK-9 AEF'S

Signature & round seal
Name: Dr. Sarita Dhawale
Designation: IIC Director
For the said Institute

24/4/24

Signature & round seal
Name: Mrs. F. A. Shaikh
Designation: Project Coordinator
For The Greenvio Solutions

Plate 2: Evidence files related to the site visit

Evidence documents for Site visit of external audit team

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Audit objective: Green Building up gradation of the premises

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Institute: Ashoka Business School. **Date:** 24 APRIL 2024

Document objective: Induction Meeting attendance sheet

S. No.	Name	Committee	Designation	Signature
1.	Mrs. F. A. Shaikh	External	Project Coordinator	
2.	Ar. Nahida Abdulla	External	Project Head	
3.	Dr. Sarita Dhawale	Internal	I/C Director, ABS	
4.	Dr. Mahesh Wagh	Internal	Aca. coordinator.	
5.	Dr. Leena Gorhe	Internal	ISR Cell coordinator	
6.	Dr Pooja Gholap	Internal	Research Cell coordinator	
7.	Mr. Vishal Sonkamble.	Internal	SG. Admin Officer	

ASHOKA BUSINESS SCHOOL NASHIK-9 AEE'S

Signature & round seal
Name: Dr. Sarita Dhawale
Designation: I/C Director.
For the said Institute

Signature & round seal
Name: Mrs. F. A. Shaikh
Designation: Project Coordinator
For The Greenvio Solutions

Plate 3: Evidence file related to induction meeting attendance record

Evidence documents for Site visit of external audit team

Audit team headed by external expert - Ar. Nahida Abdulla
Accredited & Certified Green Building Professional, ISO IA (IMS)
Audit objective: Green Building up gradation of the premises

Audits covered: ☑ Green audit ☑ Energy audit ☑ Environment audit

Institute: Ashoka Business School **Date:** 24 APRIL 2024

Document objective: Exit Meeting attendance sheet

S. No.	Name	Committee	Designation	Signature
1.	Mrs. F. A. Shaikh	External	Project Coordinator	
2.	Ar. Nahida Abdulla	External	Project Head	
3.	Dr. Sarita Dhawale	Internal	I/c Director, ABS	
4.	Dr. Mahesh Wagh	Internal	Academic coordinator, ABS.	24.4.24
5.	Dr. Leena Gorhe	Internal	ISR cell coordinator, ABS.	
6.	Mr. Vishal Sonkamble	Internal	Sr. Admin officer	
7.	Dr. Pooja Gholap	Internal	Research cell coordinator.	

ASHOKA BUSINESS SCHOOL NASHIK-9 AFF'S

Signature & round seal: 24/4/24
Name: Dr. Sarita Dhawale
Designation: I/c Director
For the said Institute

Signature & round seal
Name: Mrs. F. A. Shaikh
Designation: Project Coordinator
For The Greenvio Solutions

Plate 4: Evidence file related to exit meeting attendance record

5. Documentation

Section 1 – Energy management

5.1 Primary sources of energy consumption

- **Electrical (Metered) –** Light, Fans, Equipments, Pumps comprise these sources.
- **Alternate sources of energy consumption–** There are nine solar panels available.

5.2 Secondary sources of energy consumption

The premise uses following facilities as backup for administrative purposes. The details of the existing sources are documented below:

S. No.	Name	Nos.
1	UPS	1
2	Inverters	1
3	Batteries	30
4	Gas cylinders	1
5	Induction stove	1
6	Sensor based taps	18

Table 3: Details of secondary sources of energy consumption

5.3 Actual electrical consumption as per bills

The information shared for the meter available in the premises.

S. No.	Month	Year	Amount	(A) Total units consumed	(B) Solar units generated	(C = A-B) Gross units consumed after deduction
Academic year 1 (2022-2023)						
1	June	2022	34,132	2,781	2,136	645

2	July	2022	26,794	2,013	1,337	676
3	August	2022	17,560	1,095	1,514	-419
4	September	2022	18,555	1,213	1,528	-315
5	October	2022	13,593	670	1,786	-1,116
6	November	2022	19,658	1,316	1,737	-421
7	December	2022	29,426	2,342	1,436	906
8	January	2023	25,159	1,898	1,552	346
9	February	2023	23,248	1,723	2,136	-413
10	March	2023	16,407	1,003	1,337	-334
11	April	2023	41,299	2,875	2,093	782
12	May	2023	66,495	4,561	2,511	2,050
Academic year 2 (2023-2024)						
13	June	2023	34,132	4,255	2,136	2,119
14	July	2023	26,794	1,848	1,337	511
15	August	2023	17,560	1,128	1,514	-386
16	September	2023	18,555	2,059	1,528	531
17	October	2023	13,593	3,320	1,786	1,534
18	November	2023	19,658	2,344	1,737	607
19	December	2023	29,426	1,629	1,436	193
20	January	2024	25,159	1,866	1,552	314
21	February	2024	23,248	1,366	2,136	-770
22	March	2024	16,407	1,652	1,337	315

Table 4: Details of the electrical consumption

Note: Two years refers to data submitted for past twenty-two months

The observation related to above information states:

- The **total amount** spent in past two years is **Rs. 5,56,858/-**
- The **average amount** spent every month are **Rs. 25,312/-**
- The **total units** consumed in past two years **~ 44,957 units (Electrical + solar)**
- The **average units** consumed every month are **~ 2,044 units (Electrical + solar)**
- The **total units** consumed in past two years is **~ 37,602 units (Only solar)**
- The **average units** consumed every month are **~ 1,709 units (Only solar)**
- **Alternate source of energy is available in form of nine nos. of rooftop solar panels and solar streetlights.**
- **Percentage of energy met by alternate (solar (renewable)) source is 84%**

Plate 5: Rooftop solar panels in the premises

5.4 Calculated Electrical Consumption as per inventory

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

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

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

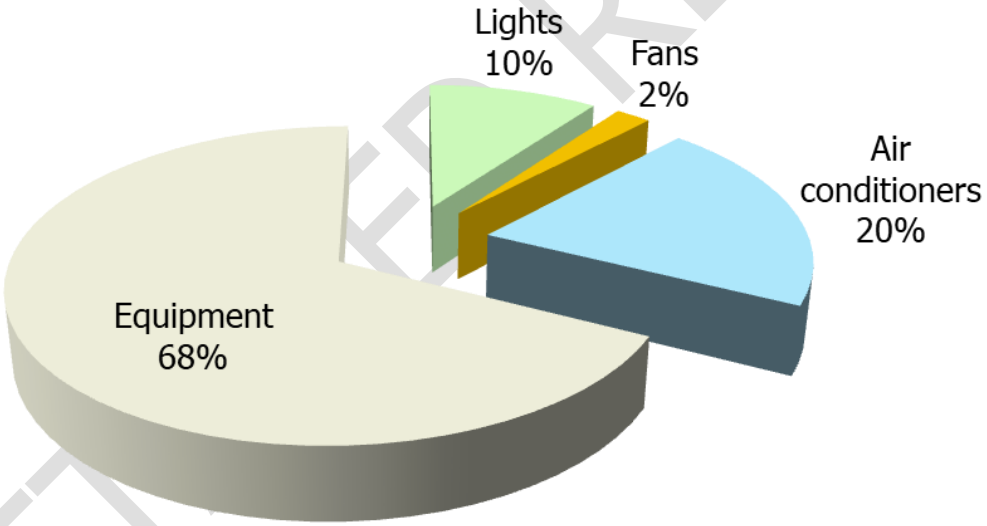

Figure 1: Summary of the calculated electrical consumption as per inventory

The above graph shows that equipment consume 68% whereas the air conditioners consume 20% while the lights consume 10% and the fans consume 2% of the total calculated electrical energy.

5.5 Lights

5.5.1 Types of lights based on the numbers

There are **539 lights on the premises;** the following table shows the various types of lights on the premises.

S. No.	Type	Nos.
1	**LED lights** *(Energy efficient appliance)*	365
2	**CFL lights** *(Non-Energy efficient appliance)*	174

Table 5: Summary of the types of lights on-premise

5.5.2 Types of lights based on the power consumption

The energy consumption of lights is **14,170 kWh** of energy.

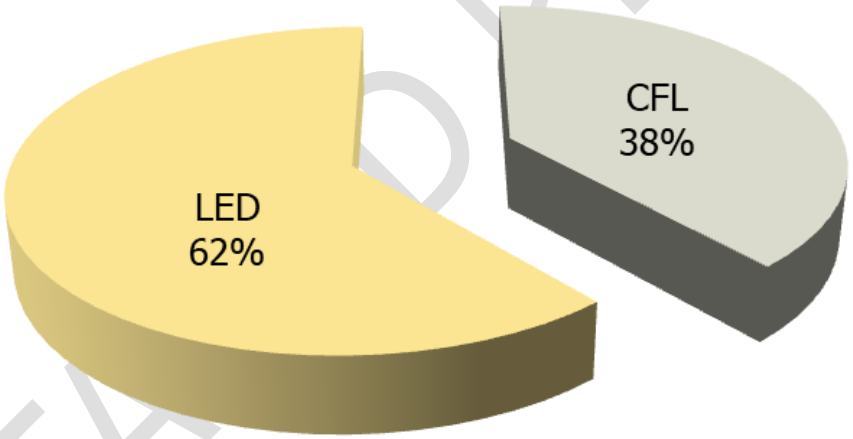

Figure 2: Energy consumed by types of lights in the premise based on the usage study

The analysis of the types of Lights on-premises shows **LED lights consume 62%** whereas the **CFL lights consume 38%** of the total power consumed by lights.

5.6 Fans

5.6.1 Types of fans based on the numbers

There are **76 fans** on the premises as follows:

S. No.	Type	Nos.
1	Ceiling fans	53
2	Large motor exhaust fan	1
3	Pedestal fans	8
4	Small motor exhaust fans	8
5	Wall mounted fans	6

Table 6: Summary of the types of fans in the premises

5.6 Types of fans based on the power consumption

The energy consumption of fans is **2,939 kWh** of the energy.

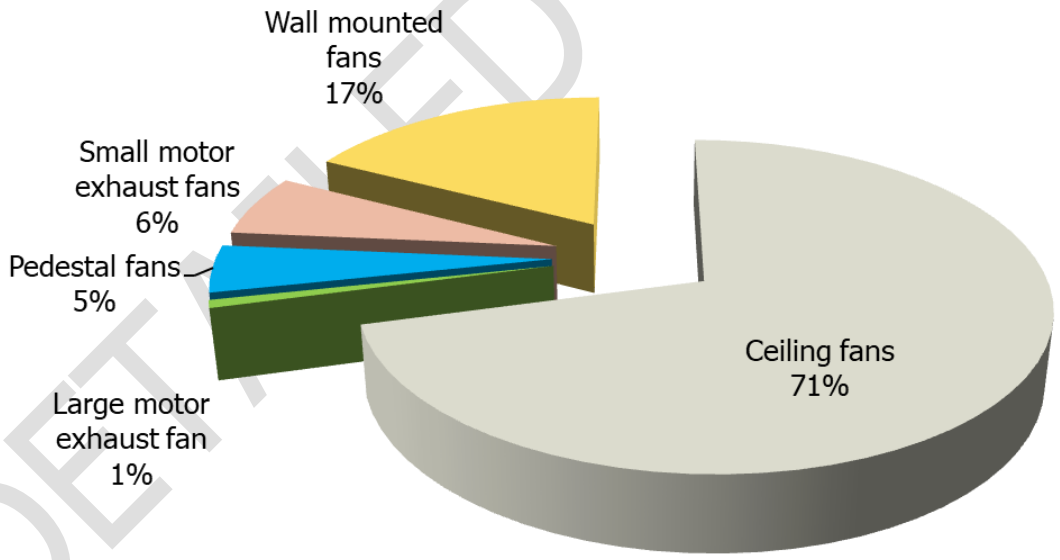

Figure 3: Types of fans based on power consumption

The above analysis shows that the **ceiling fans consume 71%** whereas the **wall mounted fans consume 17%** while the **small motor exhaust fans consume 6%** whereas the **pedestal fans consume 5%** and the **large motor exhaust fans consume 1%** of total power consumed by fans.

5.7 Air conditioners

5.7.1 Types of air conditioners based on the numbers

There are **42 air conditioners** on the entire premises**.**

5.7.2 Building-wise consumption analysis

The energy consumption of air conditioners is **28,800 kWh** of energy.

5.8 Equipment

5.8.1 Types of Equipment

There are **234 nos. of equipment** in the Educational sector.

5.8.2 Types of equipment as per their energy contribution

The energy consumption of equipment is **1,03,228 kWh** of energy.

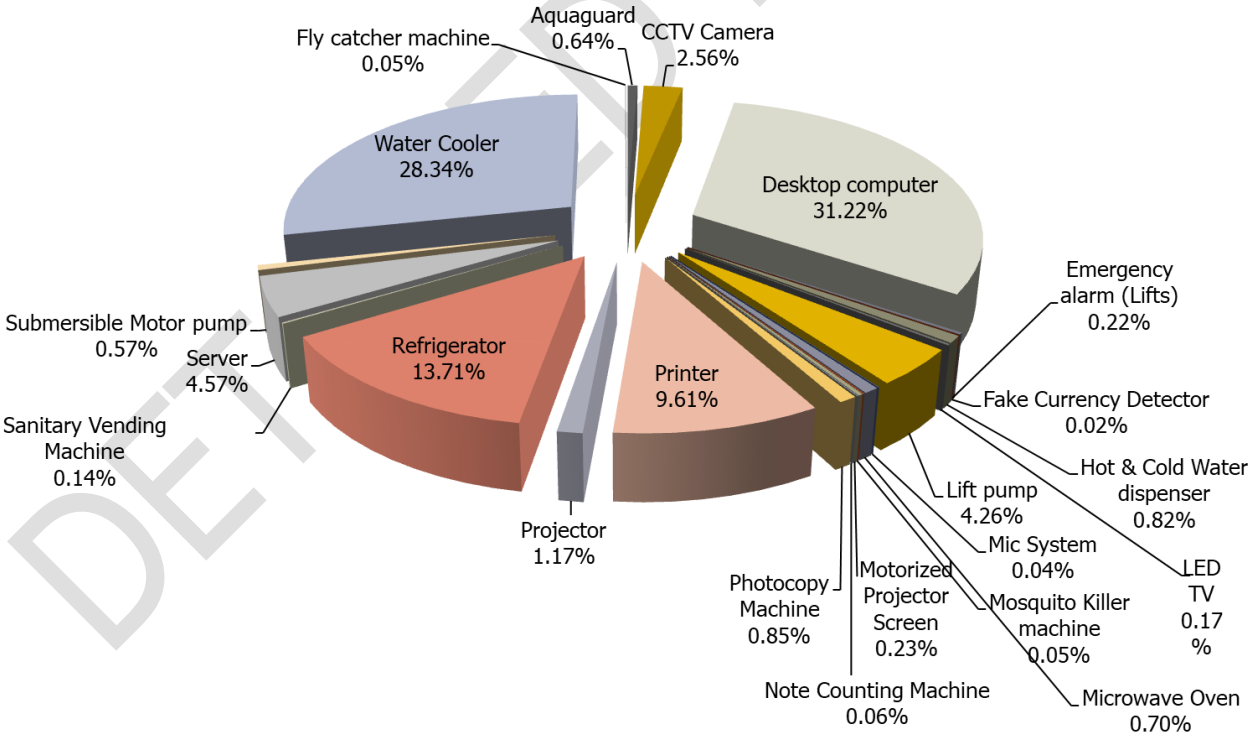

Figure 4: Energy consumed by types of equipment in the educational sector based on the usage study

Above summary shows **desktop computer consumes more energy at 31.22%** while **water cooler consumes 28.34%** whereas **refrigerator consumes 13.71%** & **printer consumes 9.61%** these are maximum consumers as compared to other equipment.

Section 2 – Life safety management

Fire and life safety are an important consideration of the National Building Code 2016. This aspect is touched upon as part of this study in the capacity of an Architect registered with the Council of Architecture. As part of the research, fire safety audit was considered from the 'Building systems' perspective. ***The study suggests that there is scope for certain improvements such as***

- ***There should be documentations of the switchboards and main boards such as SB1, MB1 further the switches should be documented appropriately.***
- ***The study suggests that the floor should have a 'FIRE ESCAPE ROUTE LAYOUT' that highlights the position of stakeholders and nearest passage as well as staircase.***

Plate 6: Fire fighting system in the premises

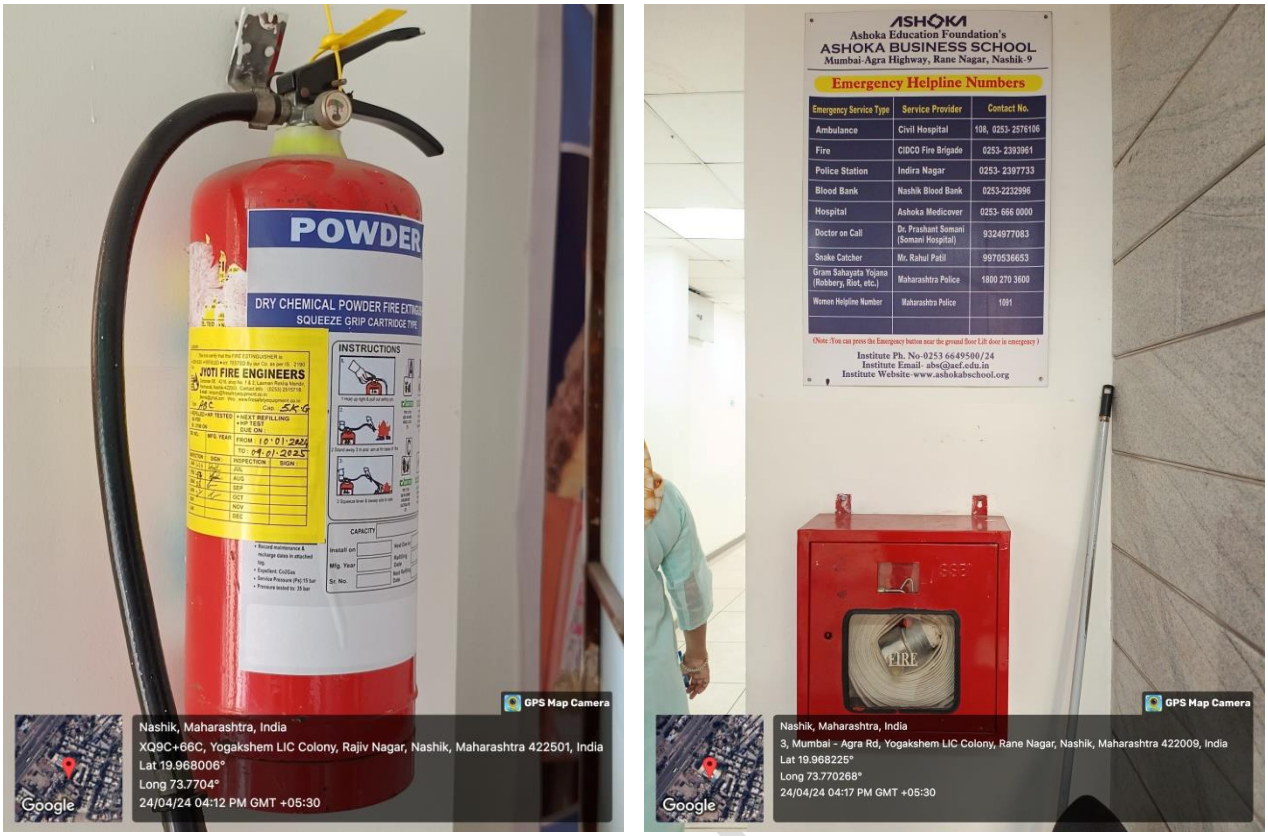

Plate 7: Fire extinguisher, Hydrant cabinet and emergency contact nos. display

Plate 8: Signages and safety precautions in the premises

The study suggests that the nos. and size of Fire and life safety signages should be increased.

6. Inferences

The suggestion (inference) would act as a 'PLAN OF ACTION' to implement all the suggestions in a detailed manner. The same has been identified in two phases for a total duration of three years.

- **Phase 1**
  - *Duration: One year from the date of Report submission – Shared currently*
  - These are first hand suggestions
  - They are easy and quick to implement
  - They involve close very less or almost no expenses
  - They can serve as a foundation for the entire plan of action

Section 1 – Energy management

- **Awareness and vigilance**
  - *Seminars/ Webinars/ Workshops* for stakeholders on energy preservation, use of e-vehicles
  - *Conduct visits and monitoring by authority* for check of appliances/ their working conditions/ energy usage etc. every fifteen to twenty days
- **Facilities intervention to reduce electrical load**
  - *Demarcate the areas as 'DANGER'* and do not allow any other stakeholder except the skilled or expertise staff member
  - *Cover the rooftop of outdoor air conditioner units* to avoid any direct sun exposure on the top area as this may lead to increased electrical consumption and reduce the duration of quick cooling
- **Display information about the technical facilities**
  - *Any space that has any source of renewable energy in the block certain information as follows should be displayed on a board near the entrance or foyer area of the block for sensitization*

i. 'DANGER ZONE' and 'NO SMOKING ZONE' boards
ii. Do and Don't for the specific type of plant
iii. Plant name
iv. Capacity
v. Location
vi. Type of renewable energy system
vii. Nos. of units
viii. Installation date, month and year
ix. Energy generated per day and annually
x. Energy consumption actual requirement per day and annually
xi. Energy saved per day and annually
xii. Last maintenance date and vendor
xiii. Revenue generation (if any) per day and annually
xiv. Institute name and logo

Section 2 – Energy generation

Recommendations are excluded for this section owing to site constrains.

Section 3 – Life safety management

- **Display boards for awareness**
  - *All fire and life safety exit signages* as per NBC norms should be displayed at every nook and corner including assembly point, exit points
  - *A RACE Board* at the location of extreme populace/ footfalls.
  - There should be *a PASS Board* alongside every fire extinguisher

Reference suggestions 1: PASS Board display

- **Fire and life safety measures**
  - Every space that has a gas cylinder/ air conditioner/ combustible appliance/ more than ten electrical or electronic appliance and Server rooms there should be EITHER sand bucket/ fire ball/ fire extinguisher
- **Earth pit zones**
  - Add signboard about 'Outdoor Electrical area'
  - Code the earthing pits in the courtyard.
- **DG and Transformer area**
  - Add safety signages such as 'Danger-do not touch' etc.
  - Add signboards about the usage such as 'Transformer areas' and 'Diesel Generator area' etc.
  - Every user in this space should compulsorily jacket, helmet, gloves, boots while working and being a part of this space.
  - Code the earthing pits in the courtyard.
  - Add additional fire extinguishers

7. Compilation

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

Specific references for study related to energy

- https://www.energy.gov/eere/buildings/zero-energy-buildings
- https://www.dsaarch.com/zero-net-positive-energy
- U.S. Energy Information Administration
- https://www.happysprout.com/inspiration/what-is-smart-gardening/
- https://ieeexplore.ieee.org/document/6779316
- https://www.murata.com/en-global/apps/industry/security/entranceandexitsystem
- https://www.energuide.be/en/questions-answers/what-are-the-alternatives-to-air-conditioning/2121/
- IGBC Green Campus rating system Abridged Reference Guide
- GEM Sustainability Certification Rating Program