ENERGY AUDIT

STUDY PERIOD (TWO YEARS) 2020-2021 AND 2021-2022

Sustainability study

AUDIT REPORT

Studied for

Shri Vile Parle Kelavani Mandal's

Pravin Gandhi College of Law

8th Floor, Mithibai College Campus,

Bhaktivedanta Swami Marg, Vile Parle (W), Mumbai-400056

Studied in the capacity of

An accredited & Certified Green Building Professional

Studied by

Greenvio Solutions

Valid till January 2024

Background reference image Janko Ferlic on pexels

Disclaimer

The Audit Team has prepared this report for the **Shri Vile Parle Kelavani Mandal's Pravin Gandhi College of Law** located at *8th Floor, Mithibai College Campus, Bhaktivedanta Swami Marg, Vile Parle (W), Mumbai-400056* based on input data submitted by the Institute and analyzed 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 a comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

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

The audit is a thorough study based on the inspection and investigation of data collected over a while 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 an Accredited and Certified Green Building Professional-Architect; I.A.(IMS) 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 incapacity of an Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

Palghar District, Maharashtra- 401208

sustainableacademe@gmail.com

Acknowledgment

The Audit Assessment Team thanks the **Shri Vile Parle Kelavani Mandal's Pravin Gandhi College of Law, Mumbai, India** for assigning this important work of Energy Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Hon. Amrish R. Pate**, Hon. President & Trustee; **Hon. Bhupesh R. Patel**, Hon. Joint President & Trustee; **Hon. Bharat M. Sanghvi**, Hon. Vice President & Trustee; **Hon. Chintan A. Patel**, Hon. Vice President & Trustee; **Hon. Amit B. Sheth**, Hon. Secretary; **Hon. Harshad H. Shah**, Hon. Treasurer; **Dr. Jayant P. Gandhi**, Hon. Joint Secretary; **Hon. Shalin S. Divatia**, Hon. Joint Secretary; **Hon. Harit Chitalia**, Hon. Joint Treasurer; **Hon. Jagdish Parikh**, Hon. Joint Treasurer and everyone from the Management.

Our heartfelt thanks to the Chairperson of the entire process **Dr. Navasikha Dura**, I/C Principal, for the valuable input.

We are also thankful to **Institute's Taskforce** who have been instrumental in the data collection - **Dr. Suman Kalani**, I/C Vice-Principal; **Ms. Apurva Thakur**, Assistant Professor *(Special mention for the excellent coordination)*; **Mr. Hemant Shetye**, Librarian; **Ms. Sarika Jayatkar**, Librarian.

We highly appreciate the assistance of **Mr. Santosh Rane**, Office Superintendent; **Mr. Shrikant Parab**, Head Clerk; **Mr. Kirti Bhatt**, Accountant; **Ms. Aarti Kale**, Junior Clerk; **Mr. Akbar**, Non-teaching staff member; **Ms. Manisha Solanki**, Non-teaching staff member and the **entire Teaching, Non-teaching, and Admin staff** for their support while collecting the data.

Sustainable Academe
Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About SVKM's Pravin Gandhi College of Law

The institution recognizes the fact that there lodges within the heart of every student that spark of creativity that is the essence of singularity in every individual. Beginning from this premise, the college structures its learning programme in order to identify, hone in on and unearth this reserve of creativity. To this effect the college harnesses modern methods of teaching which encourage students to learn inside and outside the classroom. This institution provides the students with varied platforms to develop their skills; by way of debates at the intra and inter collegiate levels; Seminars, workshops, trial advocacy through moot competitions, the Juris-cine club, L'avocat an in-house student's newsletter which enables students to air their passionate concerns on issues, topical or otherwise, and innovative interactive methods of study in the classroom create an ambience that fosters intellectual growth.

This methodology intersects a legal education with a contextualization that embraces social, political and economic systems. An excellent faculty serves as a facilitator in helping students materialize this vision. It is this holistic approach to education that justifies the claim SVKM's Pravin Gandhi College of Law makes, of being a law college with a DIFFERENCE. For at the end of their voyage of self-discovery students emerge confident, positive thinking individuals, ably equipped to discharge their assigned roles responsibly on a world stage.

The College Library, with its vast and eclectic collection of books and journals, satiates the thirst for knowledge of both staff and students and gives utmost attention to the overall development of the personality of students.

Students are also encouraged to participate in co-curricular activities and sports. While ensuring academic and co-curricular facilities to a vibrant student community, the institution is conscious of its role as a constructive and responsible component of the larger society. Its consistent and unstinting efforts in this direction are borne out by the fact that students enter the college, young, immature, uncertain, bewildered, but leave its portals still young, but much more mature, self-confident and focused, ready to lead rich lives of their own even while enriching that of society.

1.2 Mission Statement of the Institute

1.2.1 Vision

The College proposes *"To be an institution of excellence in imparting law education in the country, catering to the needs of society by bringing out students who are sensitive to the societal needs and be zealous in upholding the rule of law with social compassion."*

1.2.2 Mission

The College adheres and focuses

- *To formulate and implement a framework that is conducive to designing and conducting courses in legal subjects to meaningfully integrate, support and enhance professional knowledge of law.*
- *To employ multi-dimensional techniques to enhance legal information and awareness in order to facilitate exercise of choices for future legal careers.*
- *To inculcate a spirit of enquiry by promoting scientific research skills for advancement of knowledge in the field of law by integrating research, field action and capacity- building of teaching faculty.*
- *To transform conventional teaching-learning experience by adopting innovative pedagogy to develop cognitive abilities and nurture social sensitivity.*
- *To assimilate local and global standards for holistic advancement.*

1.2.2 Aim

The College has channelizes its efforts "*To impart holistic education aimed at creating well-rounded citizens.*

1.2.4 Objective

It is the objective of the College is

- *To provide quality education in law emphasizing the relationship between law and society.*
- *To inculcate the spirit of scientific enquiry and develop a problem-solving attitude.*

- *To sensitize students to equip them to address the changing needs of society.*
- *To create awareness among students towards sustainable development and to prepare them to be environmentally conscious citizens.*

1.3 Assessment of the Institute

1.3.1 Affiliations

The College is affiliated with the **University of Mumbai**, a collegiate, state-owned, public research university and is known as one of the largest universities in the world situated in the city of Mumbai, Maharashtra, India.

1.3.2 Approval

The Colleges has received its approvals to conduct Law courses through the statutory body established under the section 4 of Advocates Act 1961 that regulates the legal practice and legal education in India - **Bar Council of India (B.C.I)**

1.4 Achievements of the Institute

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

- ***Pravin Gandhi College of Law*** was awarded a Letter of Appreciation awarded by the Public Concern for Governance Trust, 2022.
- ***Pravin Gandhi College of Law*** was awarded **a Letter of Appreciation** by the Vidyabhavan, Nerul for outreach activities 2022.
- ***Pravin Gandhi College of Law*** was awarded **a Letter of Appreciation** by the Chatrapati Shivaji Kala, Krida, Krushi And Gramin Vikas, Yavatmal for the outreach activities 2021.
- ***Pravin Gandhi College of Law*** was awarded **a Letter of Appreciation** by the Central Vigilance Commission, 2021.
- ***Prof. Kavita Sharma*** received a Letter of Appreciation awarded by the City Civil

and Sessions Court, 2021.

- ***Pravin Gandhi College of Law*** was awarded **a Letter of Appreciation** by the Savitridevi Thirani High School for the Legal Awareness work, 2021.

- ***Pravin Gandhi College of Law*** was awarded a Letter of Appreciation awarded by the Sulochanadevi Singhania School for the Legal Awareness work, 2021.

- ***Pravin Gandhi College of Law*** was awarded **a Letter of Appreciation** by the Central Vigilance Commission, 2020.

- ***Dr. Suman Kalani*** received the **Best Research Paper at the 7th Innovation Summit and International Research Conference** on "Flexibility in Business: Opportunities, Issues, and Challenges" organized by Aditya Institute of Management Studies and Research, 25 February 2019.

- ***Ms. Apurva Thakur*** received the **Best paper Award at KC College Gender and Disability**, 2019.

- ***Mrs. Kavita Sharma*** received the **Letter of Appreciation for Mumbai suburban District Legal service authority**, 2019.

- ***Ms. Anju Singh*** received **Recognition for the Minor Research Project: Noise Levels in and Around Educational institutions in Juhu Vile Parle West: Legal and Educational Fallouts,** 2019.

- ***Ms. Apurva Thakur*** received **Recognition for the Minor Research Project: Shifting Research Focus from Legislation to Empathy While Defining Disability**, 2019.

- ***Pravin Gandhi College of Law*** was awarded the **Best Street Play Award** by University of Mumbai's Department of Lifelong Learning & Extension (D.L.L.E), 2018-19.

1.5 Academic status of the College

The College provides a wide range of professional courses related to law; the details are documented below:

- **Graduation** – It offers the Bachelor of Legal Studies B.L.S, LL.B program.
- **Post-Graduation –** It offers the Master of Laws (LL.M.) - One-year LL.M. Degree Programme for students committed to make career in law teaching.
- **Certificate Programmes and Courses** - It offers the Course in Cyber Law and Information Technology.

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

1.6 Facilities

The College emphasizes on latest technological advancement through its educational initiatives. Our interaction with the staff members and team showed that they are keen for further upgrading and use of sustainable features. Some of the current key facilities are listed below.

- State of the art infrastructure
- Digital class set-up with latest smart boards
- Air-conditioned spaces for all areas
- Regular and frequent updated facilities for fires safety
- Social welfare activities
- Library (Computerized) with separate reading room for students and staff.
- Clean drinking water facility
- Lifts for vertical circulation

2. Institution overview

2.1 Populace analysis for the Academic year 2021-22

2.1.1 Students data

The student data (shared by the Institute) shows there were **a total of 213 Boys and 388 Girl students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin Staff	04	04	**08**
Teaching Staff	02	11	**13**
Non-Teaching Staff	05	02	**07**
Total Staff Members	**11**	**17**	**28**

Table 1: Staff data of the Institution for 2021-22

The staff data shows the premises had a total of **28** Staff Members.

2.2 Populace analysis for the Academic year 2020-21

2.2.1 Students data

The student data (shared by the Institute) shows there were **a total of 221 Boys and 369 Girl students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin Staff	04	04	**08**
Teaching Staff	02	12	**14**
Non-Teaching Staff	04	02	**06**
Total Staff Members	**10**	**18**	**28**

Table 2: Staff data of the Institution for 2020-21

The staff data shows the premises had a total of **28** Staff Members.

2.3 Total Institute Area & Institute Building Spread Area

The **total site area is 0.69 acres** and the **total Built-up area of the Institute is 21,804 sq. ft.** for **a total of 629 footfalls.**

2.4 Institute Infrastructure

2.4.1 Establishment

The Institute was established in 2004.

2.4.2 Spatial Organisation

The overall ambiance of the Institute is warm and inviting. The Architectural style of exposed bricks provides a soothing and contrasting feel to the built-form. The colour palate of earthy colours in the facades helps the building stand out positively.

There are provisions for lifts and a staircase for accessibility on the premises, whereas there are amenities such as CCTV, a first aid room, etc. The Institute is located pretty close to nature and hence has a very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building.

2.5 Operation and Maintenance of the premises

The interview session was held with the staff regarding the operation and working hours. The Institution is open from Monday to Saturday. The schedule is mentioned below.

- **Main Institutional areas for lectures** - 8:00 am to 2:00 pm for around 250 days (Approximate).
- **General areas for office purpose** – 9:00 am to 5:00 pm for around 320 days (Approximate)

3. Green Building Study as a Research based technical 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 premises for its inhabitants.

3.2 Analysis of 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 premises

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Rainwater harvesting and Wastewater treatment on the premises.
- 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 the premises
- Analysis of the flora and fauna of the premises
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

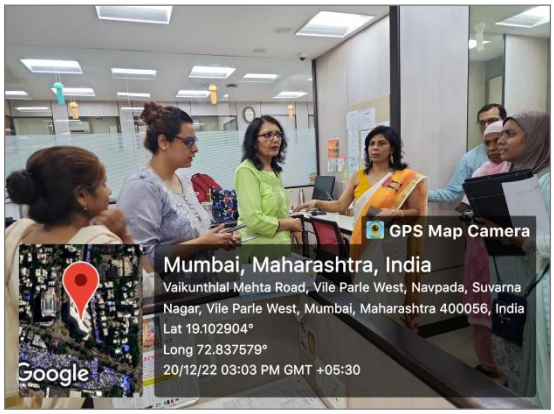
3.3 Strategy adopted for Green Building Study Audit

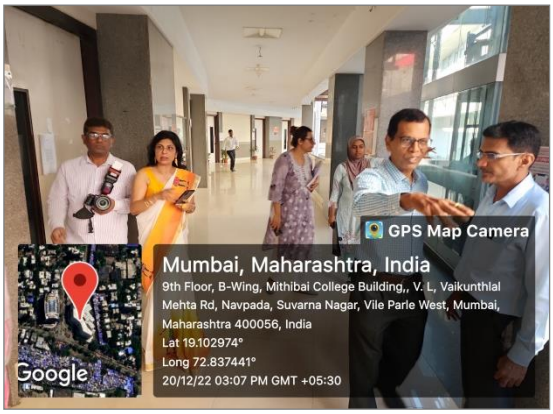
The strategies included data collection from the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

3.4 Activities undertaken for the Green Building Study Audit

- 7 September 2022 - Allotment and Initiation by the Institute
- 8 September 2022 - Induction Meeting
- 16 September 2022 - Survey of students and staff completed
- 20 December 2022 - Site visit at the Institute
- 24 December 2022 - Data submitted by Institute

Discussion with the Core Team





On-site review with the team for site management, green wall and other features

Tree plantation activity with students and staff members

4. Energy Audit

4.1 Sources of Energy consumption

The sources of energy consumption in a building comprise Lighting, Refrigeration, Ventilation, Cooling, Computers, Office equipment, cooking, space-eating, water heating, and others. For study purposes, the sources are divided into primary and secondary sources, where the primary is considered for the generation and consumption purposes and secondary sources are additional sources used as an alternative backup. The study emphasizes the consumption patterns, strategies adopted at present, and recommendations that can be implemented to improve the power consumption and utilization pattern. The following mentioned are sources of consumption and production.

4.1.1 Primary sources

- **Electrical (Metered)** – This source studies the elements which are connected through a metered system of electrical consumption. Light, fans, air conditioners, equipment, and pumps are the consumers that comprise this category.
- **Renewable (Solar)** – There are no sources of renewable energy available at present.

4.1.2 Secondary sources

UPS and Batteries– These are utilized in the administrative and academic areas the Institute spend a huge amount towards the same every year.

4.2 Site investigation analysis

The data investigated and collected through interviews are summarised below:

4.2.1 General overview

This analysis is based on the general parameters of the external audit team.

- The **Maintenance Staff, Lab Attendants switches off all equipment** regularly after their appropriate usage.
- All the **computers are shut off after use** and also put on power-saving mode.

4.2.2 On-site overview

This analysis is based on the specific parameters which were observed during the visit for physical investigation and the induction meeting (offline).

- The computer laboratories use backup systems for power and data.
- **There were no serious discrepancies found in aspects related to energy management.**
- The Institute is located in an urban area; it has no power cuts and the alternative sources of energy which are present are sufficient for current practice.

4.3 Utility bill audit

4.3.1 General observations as per discussion

The solar panels are not installed and there no significant improvement in terms of energy management. Similarly, no other alternative sources are used at present. Overall the College is spending a huge amount on electricity bills. The College is spread over one floor of the shared premises and is completely air-conditioned, this further adds to the ecological and economical baggage. However, this is an important feature since the College emphasis on 'State of art infrastructure with latest technological advancement for the students and staff members'

4.3.2 Documentation of the data

The admin department had shared the bills for Meter which is connected to all Buildings and is main source of energy supply. The details of meter wise unit consumption of the electricity generated are as follows.

S. No	Month	Year	Units consumed	Billing Amount (Rs.)
1	April	2021	1,678	19,614
2	May	2021	1,322	15,977
3	June	2021	2,309	25,411
4	July	2021	3,164	33,794

5	August	2021	3,322	35,264
6	September	2021	3,526	39,169
7	October	2021	4,174	44,626
8	November	2021	4,337	48,263
9	December	2021	2,14,439	47,509
10	January	2022	2,22,645	30,327
11	February	2022	2,24,528	49,732
12	March	2022	2,28,734	92,237
13	April	2022	2,29,063	94,991
14	May	2022	2,26,615	71,720
15	June	2022	2,26,368	67,847
16	July	2022	7,114	83,542
17	August	2022	7,535	88,164
18	September	2022	2,28,609	99,900

Table 3: Details of the electricity bills summary

4.3.3 Inferences based on the data

The analysis of actual electrical energy consumption is summarised below.

- The average consumption varies for each month.
- At present the Institute is spending a huge amount every month on the electricity bills.
- Some appropriate renewable energy planning should be adopted.
- Similarly, a schedule-wise detail documentation of daily energy consumption should be maintained.
- Since it is a shared campus with multiple Colleges the Management should undertake certain appropriate measures to improvise the energy management scenario so that it will set a benchmark for the Colleges and improvise the existing features.

4.4 Survey Results

An online survey was conducted to analyse the student and staff views about the Energy management practices adopted in Institute, following is the result received.

4.4.1 Participation

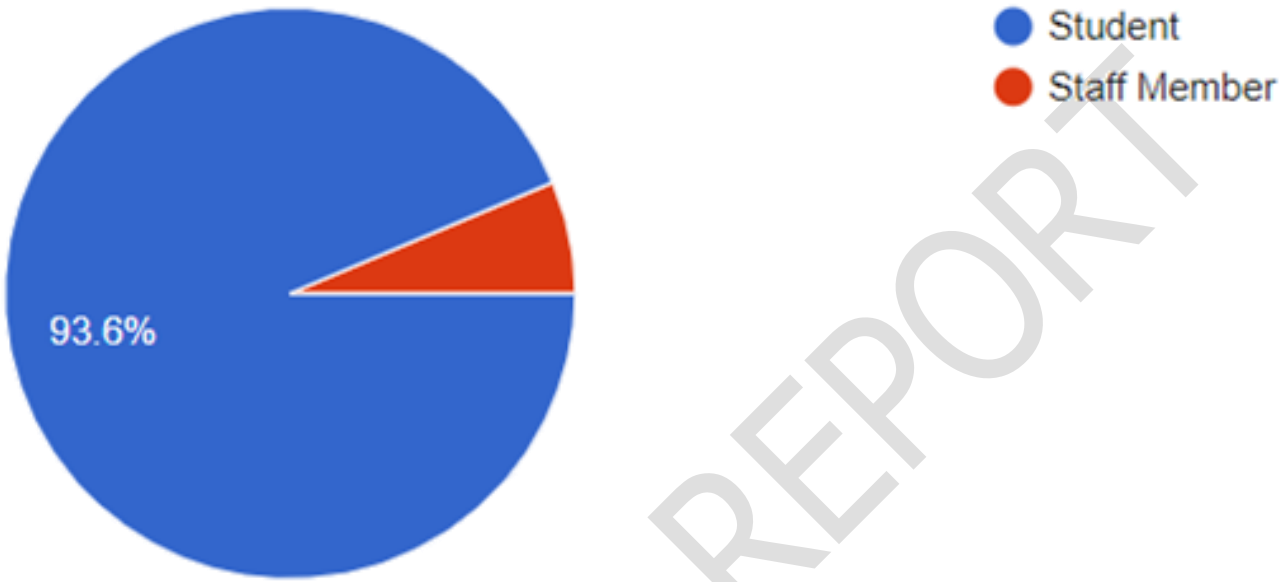


Figure 1: Participation analysis in the survey

A total of **236 responses** were received out of which 94% were students.

4.4.2 Review of the Energy management practices in the premises

Note: The Participants were asked to review the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor
- Scale 2 – Satisfactory
- Scale 3 – Good
- Scale 4 – Very good
- Scale 5 – Excellent

The figures in each of the columns of the graph depict the Number of participant's responses in numerical (Percentage of the participant response) – For example 101 responses (44.5%)

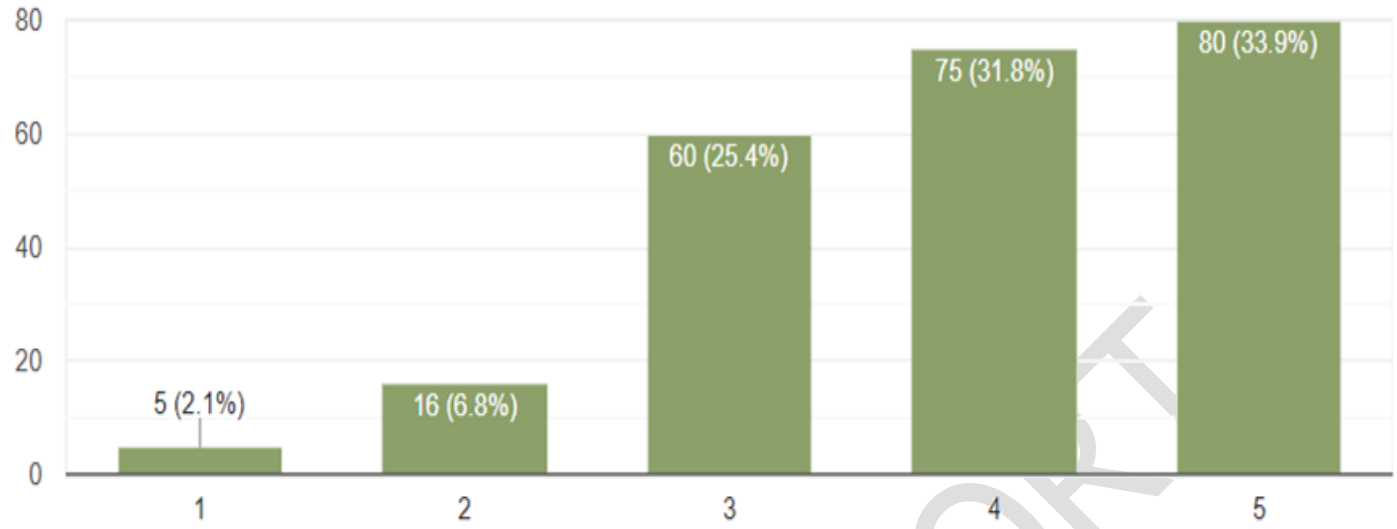


Figure 2: Energy management practices in Institute

Observation: The students and staff *almost 34% of the respondents which are 487 participants* found the practices to be Excellent (Rating of 5); whereas *almost 32% of the respondents which are 75 participants* found the practices to be Very Good (Rating of 4); and *25% of the respondents which is 60 participants found the practices to be Good (Rating of 3).*

Inference: Though the majority responses received is less than 50% which has been given to 'Rating of 5' thus given the populace of the Institute this section requires a lot of improvement.

4.5 Calculated Electrical Consumption as per study

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

Note: The following analysis is combined for the entire premise taking into consideration the duration before the pandemic to understand the consumption pattern on a regular day.

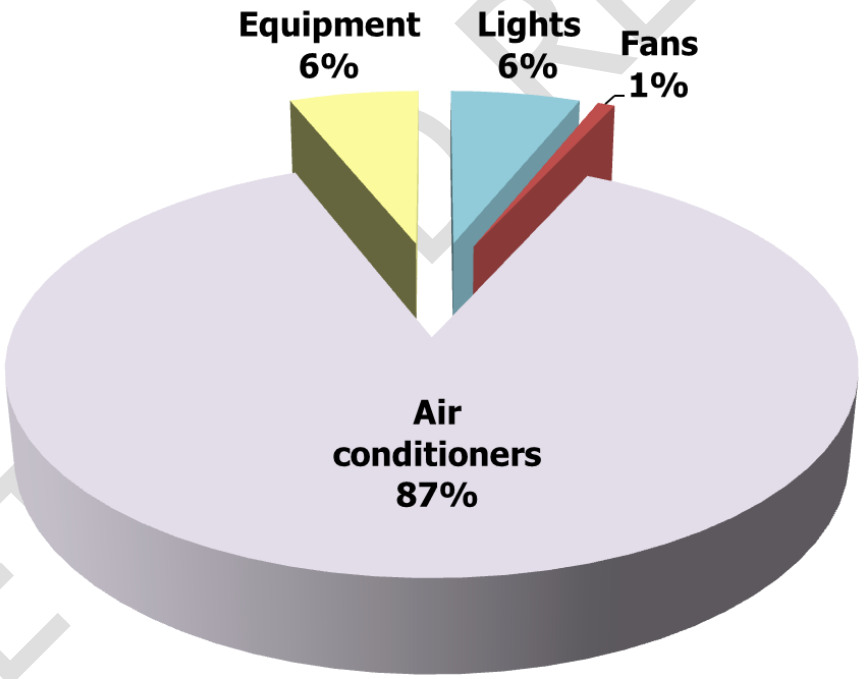


Figure 3: Summary of the calculated electrical consumption as per inventory

The above graph shows that air conditioners consume 87% while the lights and equipment consume 6% each and the fans consume 1% of the total calculated electrical energy.

4.6 Electromechanical systems - Lights

4.6.1 Types of lights based on the numbers

There are a total of **369 LED lights on the premises;** the following table shows the various types of lights on the premises.

4.6.2 Types of lights based on the power consumption

The energy consumption of lights is **13,826 kWh** of energy and the **LED lights consume 100%** of the same.

4.6.3 Requirement of NAAC

4.6.3.1 Alternative energy initiative

Percentage of power requirement met by renewable energy sources – The College does not have solar or any suitable alternative source of energy. The College is shared by multiple colleges and thus the decision should be taken by the Management to improvise the current energy management practices.

4.6.3.2 Percentage of lighting power requirement met through LED lights

The premise has LED Lights to contribute to 100% in terms of number and **100% of the power requirement** is met through the same. As per our study, we could conclude that both of these are the highest contributions among all the types of lights.

4.6.4 Site investigation observations

- All lights are in working conditions.
- There was no fuse defect observed.

4.6.5 Section-wise recommendation related to 'lights'

Since all the lights are LED, the recommendations are excluded for this section.

4.7 Electromechanical systems – Fans

4.7.1 Types of fans based on the numbers

There are a total of **67 fans** on the premises as follows:

S. No.	Type	Nos.
1	Ceiling fan	64
2	Exhaust fan	3

Table 4: Summary of the types of fans in the premises

4.7.2 Types of fans based on the power consumption

The energy consumption of fans is **1,863 kWh** of the energy.

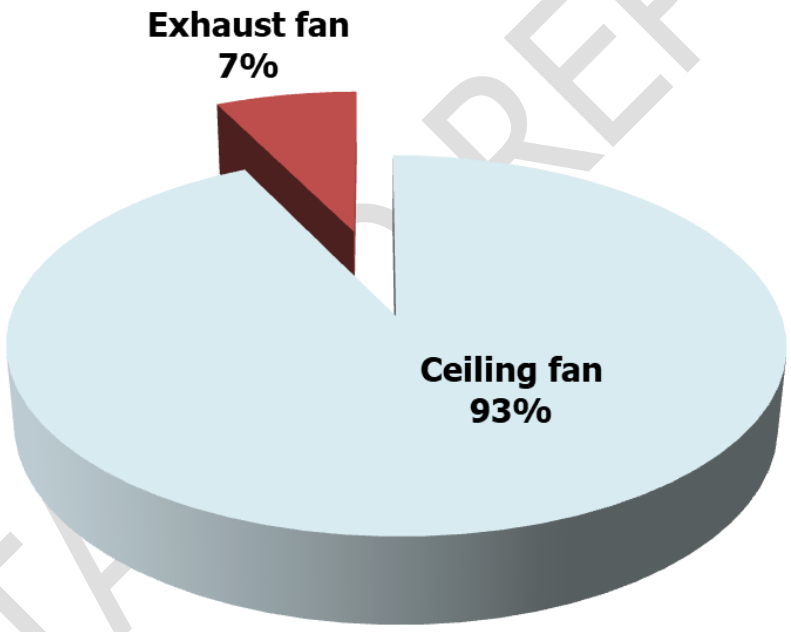


Figure 4: Types of fans based on power consumption

The above analysis shows the **Ceiling fans consume 93%** whereas the **exhaust fans consume 7%** of the total power.

4.7.3 Space-wise consumption analysis

4.7.3.1 Observations

- The maximum types of fans in terms of numbers and power consumption are ceiling fans.
- All fans are in working conditions.

- Windows do not have cracks and are caulked appropriately.
- Space wise the maximum energy is consumed by Class no. 2, 5, 6, 7, 8 the reason is numbers of fans is more in these spaces.

4.7.3.2 Inferences

- The recommendations shall be checked as follows.
- Since the building is very oriented climatically and geographically there is very fresh air inside the premises and hence there are fewer requirements of fans in the spaces.

4.7.4 Section-wise recommendation related to 'Fans'

*To be considered as **first priority but first in sequence** for implementation under section wise study. It should be noted the premises at present there are 5% energy efficient fans.*

Our detailed study states that is all the **ceiling fans in all spaces** if replaced with star rated appliance results in a 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.

4.8 Electromechanical systems – Air conditioners

4.8.1 Types of air conditioners based on the numbers

There are **44 air conditioners** on the entire premises**.**

4.8.2 Types of air conditioners based on the power consumption

The energy consumption of air conditioners is **1,97,786 kWh** of energy.

4.8.3 Space-wise consumption analysis

4.8.3.1 Observations

- The College has maximum energy consumed by air conditioners in premises.
- There is a major economical expense w.r.t. air conditioners however this adding to the electricity bills.
- The Outdoor units are cleaned properly and do not possess dust collection problems.

4.8.3.2 Inferences

- There is availability of fans in the premises.
- The College should discuss with Management and check out for alternative solutions by using fans to a major extent or check for alternative sources of energy.

4.8.4 About the replacement of current air conditioners

Though there is not an immediate requirement for replacement however, whenever the Institute undergoes redevelopment or a new Block is constructed there can be provisions for replacement with energy-efficient appliances that require less power consumption.

4.9 Electromechanical systems – Equipment

The equipment study plays an important role in the analysis of the electrical consumption. These when considered from the Green building perspective are essential to understand their consumption patterns, in order to determine their inputs towards the power generation contribution.

As an educational institute, it has general equipment with a regular power contribution pattern. During the visit it was observes that utmost measures are taken for the safety and proper handling of the equipment.

4.9.1 Types of equipment based on the numbers

There are **57 nos. of equipment** in the Educational sector.

4.9.2 Types of equipment as per their energy contribution

The energy consumption of equipment is **13,769 kWh** of energy.

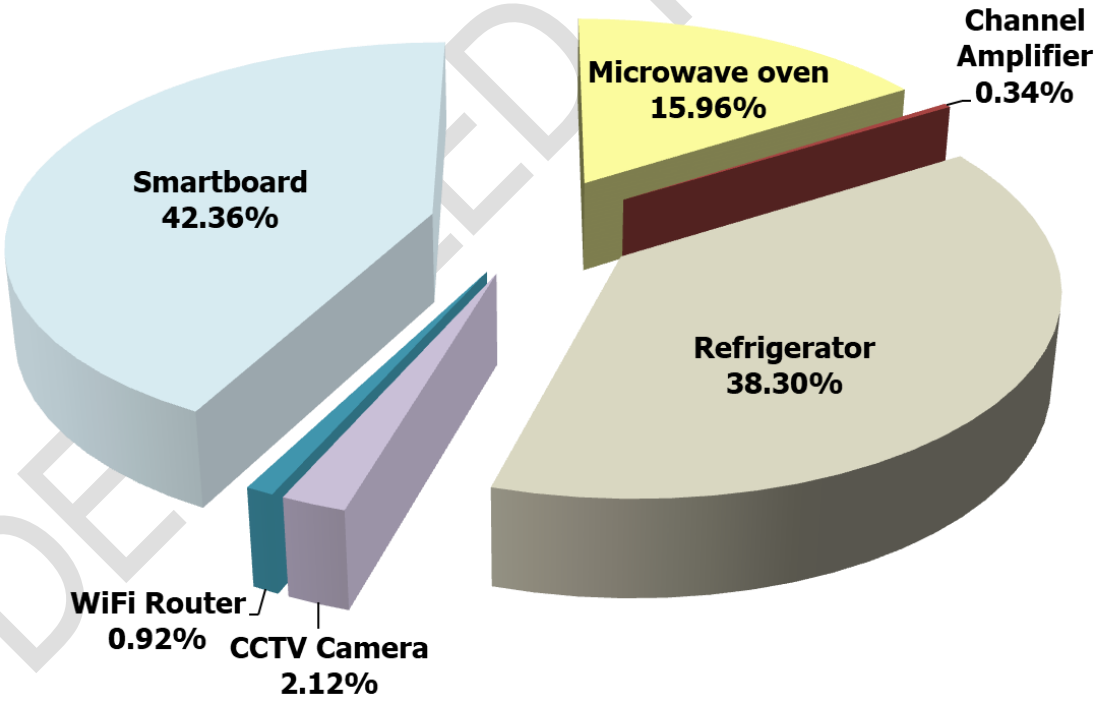


Figure 5: Energy consumed by types of equipment in the educational sector based on the usage study

The above summary shows that the **smart board consumes more energy at 42.36%** while the **refrigerator consumes 38.30%** the **microwave oven consumes 15.96%** and the **CCTV camera consumes 2.12%** these are the maximum consumers as compared to other equipment.

4.9.3 Site investigation observations

Some of the points noticed are as follows:

1. No unnecessary electronic devices are plugged in.
2. During vacations all electrical devices unplugged.
3. All types of equipment are in working conditions and daily monitoring and check are done by the maintenance staff and admin staff skilfully.
4. No defect was found in any equipment of electrical consumption.

4.9.4 Section-wise recommendation related to 'Equipment'

*To be considered as **first priority but first in sequence** for implementation under section wise study*

4.9.4.1 Desktop computers to laptops

Among all equipment, it suggested replacing the desktop computers with laptops as this would be energy efficient. A normal desktop computer consumes an average of 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 that lasts up to 4 hours.

There is **an average 84% reduction** in energy consumption if replaced with an energy-efficient appliance which is a laptop in all the areas. This replacement is however dependent on a variety of factors as follows.

- **Some of the senior staff** members may be more convenient with computers; replacement with a laptop might result in a change of the working patterns and hours which may affect the productivity.
- **Laptops** in case are not handled with care such as if dropped unintentionally might result in data imbalance.
- **Depending on the recent pandemic situation** in case it might be possible due to irregular usage the device might have issues while functioning.

Thus the Institute should analyze the above points and then devise a strategy for the replacement, when the devices get damaged or are not in working condition.

4.9.4.2 Other equipment

The following recommendations are for the other equipment in the premises.

- Replace the Non-LED (Regular) TV Monitors with LED equipment.
- Backup computer files during vacations.
- Refrigerators and all electronic equipments should be cleaned out completely including system check up with AMC during vacations, this should be a periodic activity and the same should be documented every year.

4.10 Consolidated study recommendations related to 'entire Institute'

These are to be considered as ***second priority*** for implementation, once the section wise recommendations are implemented. The following recommendations should be **implemented within the next 2.5 years from the date of the Report submission.** The Institute can execute a plan of action after discussion with Project Head.

4.10.1 Facility management systems, controls (Smart premises)

(Includes electromechanical systems – Electrical, Water)

Over time energy-efficient appliances have been a boon not only to the energy-saving parameters they adhere to but also to the eco-friendly habits it helps to inculcate. An institution such as Schools and Institutes is 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.

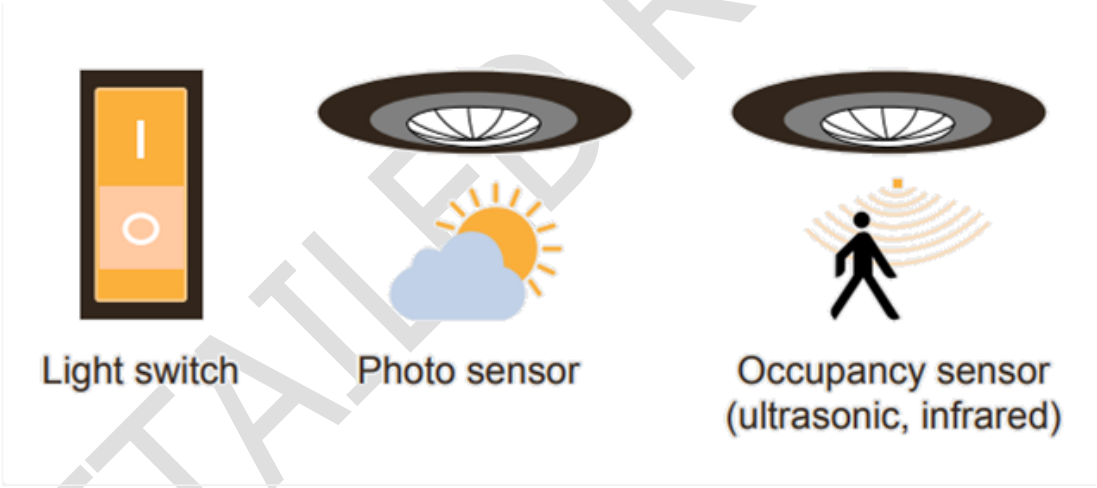


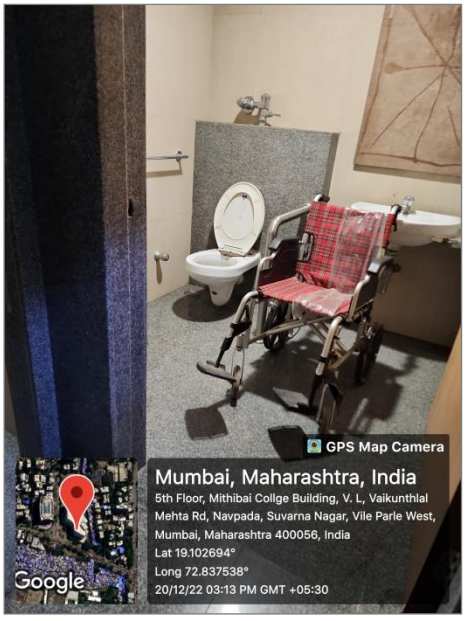
Plate 1: Understanding the lighting concepts

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

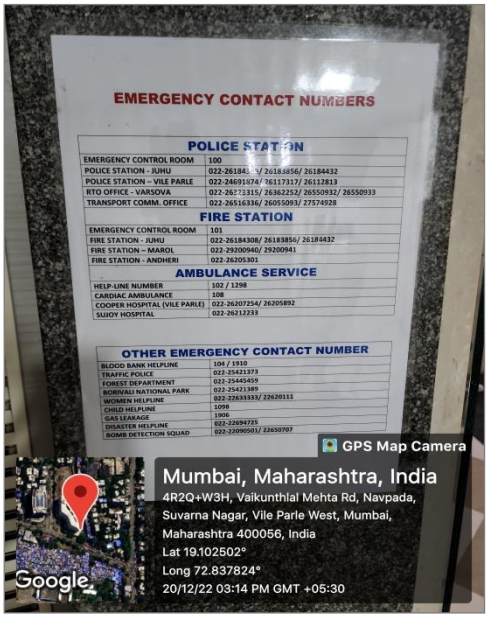
The above diagram provides a detailed study of how the system controls should be incorporated in the premises as fare as lighting systems are considered. The suggesting for this sub-section is listed below.

- Install PIR control of the lighting in the toilet areas.
- Install low flow taps with automatic shut off in the toilets.
- Install push button timer control in all rooms lighting and ceiling fans.
- Install Power Electronics control of the Foyer notice board lighting.

Water systems in the premises



Fire, life safety and universal accessibility (Wheelchair, toilet) facilities in the premises



Recreational and emergency facilities in the premises

5. References

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
- Energy efficiency measures in buildings, Energy efficiency in electrical utilities, Bureau of energy efficiency, India.
- Energy Efficient lighting for sustainable development, Writing team: Carmen Dienst, Willington Ortiz, Julia Pfaff, Dieter Seifried. Wuppertal Institute for Climate, Environment and Energy

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