

7.1.6

1. Energy Audit Report
2. Environment Audit Report

ENERGY AUDIT

STUDY PERIOD (TWO YEARS) 2021 - 2022 & 2022 - 2023

Sustainability study
AUDIT REPORT

Studied for
Smt. Durgadevi Sharma Charitable Trust's
**Chandrabhan Sharma College of Arts,
Commerce & Science**
Adi Shankaracharya Marg, Powai Vihar Complex,
Powai, Mumbai – 400076, Maharashtra, India

Studied in the capacity of
Accredited and Certified
Green Building Professional



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Valid till **April 2024**

Disclaimer

The Audit Team has prepared this report for the **Smt. Durgadevi Sharma Charitable Trust's Chandrabhan Sharma College of Arts, Commerce & Science** located Adi Shankaracharya Marg, Powai Vihar Complex, Powai, Mumbai – 400076, Maharashtra, India 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 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.

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 thanks the **Smt. Durgadevi Sharma Charitable Trust's Chandrabhan Sharma College of Arts, Commerce & Science, Maharashtra, 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 **Mr. Prashant G. Sharma**, President; **Mr. Himanshu P. Sharma**, Vice President; **Dr. Manju P. Sharma**, Treasurer; **Mr. Diksthan G. Sharma**, Secretary and everyone from the Management.

Our heartfelt thanks to Chairpersons of the entire process **Dr. Pratima Singh**, Principal for the valuable inputs.

We are also thankful to **College's Task force the faculty members** who have collected data required - **Ms. Manali Naik**, Convenor - Placements & Career Guidance Cell & Cordinator - Department of Multimedia & Mass communication; **Mr. Vicky Kukreja**, Assistant Professor.

We highly appreciate the assistance of **Mr. Sainath Sawant, Technical staff** 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

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DETAILED REPORT

Evidence documents for Site visit of external audit team

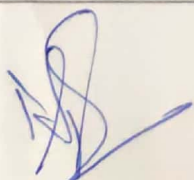
Audit team headed by external expert - Ar. Nahida Abdulla
 Accredited & Certified Green Building Professional, ISO IA (IMS)
 Audit objective: Green Building up gradation of the premises

Audits covered: Green audit Energy audit Environment audit

Institute: Chandrabhan Sharma College of Arts, Commerce & Science Date: 3rd May, 2023

Document objective: Inferences of the Site visit

| Observations (Positive aspects) | Suggestions (Improvement aspects) |
|--|--|
| Green Audit | |
| <ul style="list-style-type: none"> - Rain water harvesting practiced - E-waste management practiced. | <ul style="list-style-type: none"> - Undertake organic waste management |
| Energy Audit | |
| <ul style="list-style-type: none"> - Sensor based lights used | <ul style="list-style-type: none"> - Undertake alternate source of energy. |
| Environment Audit | |
| <ul style="list-style-type: none"> - Tree undertaken on rooftop (under process) | <ul style="list-style-type: none"> - Undertake measures to increase green cover on vertical front |



Signature & round seal

Name:

Designation:

For the said Institute




Signature & round seal

Name: Mr. F. A. Shaikh

Designation: Project Coordinator

For The Greenvio Solutions



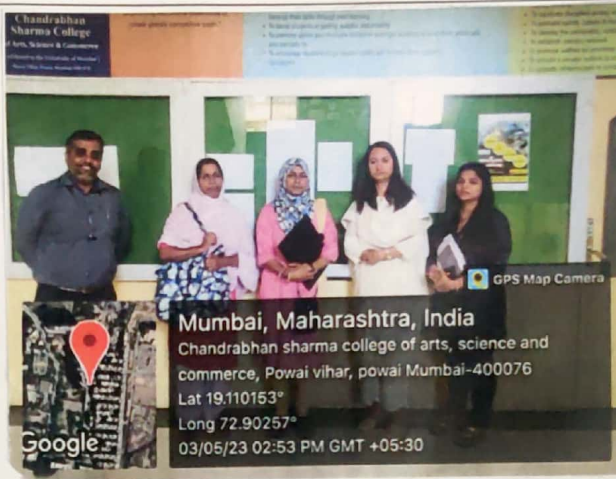
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Institute: Chandrabhan Sharma College of Arts, Commerce & Science Date: 3rd May, 2023

Document objective: Proof of the Site visit



Meeting with the core team



Investigation of the systems

Signature & round seal
Name: Dr Pratima Singh
Designation:
For the said Institute



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



1. Introduction

1.1 About the Trust

Charitable purpose including relief of poverty, distress, education, medical relief and advancement or other objects of general public utility and on conduct, maintain or assist schools, colleges, dispensaries, hospitals, orphanages, home for destitute and other institutions and activities of charitable nature are undertaken. The works revolve around the following:

- *Setting up Schools and colleges or other educational institutions and donation to other charitable institution/trust or institution of similar objects/nature*
- *Aid to deprived people*
- *Scholarships to brilliant and deserving students of Mumbai*
- *Medical aid*
- *Donation and contributions to other charitable trust and institution of similar objects*

1.2 About the Institution

The Chandrabhan Sharma College of Arts, Science and Commerce was established to serve the ever-growing need for higher education in the vicinity of Powai. The degree College started in 2008 is affiliated to the University of Mumbai and offers various professional courses like B.M.S, B.M.M, BSc. IT, etc. The College got affiliation from YCMOU in 2015 and conducts courses like BCA, BIS etc.

The first successful batch of graduates passed out in the year 2011. The College had a very modest beginning with around 100 students, but with the vision of the Trustees, the Principal and a team of qualified and dedicated staff members it has grown to strength of 2,000+ students.

The College lays emphasis on building values, nurturing talent and developing the intellectual faculty of the students.

1.3 Statements of the Institution

1.3.1 Vision

The College proposes " *To be an academy of excellence, which will provide transformative and empowering educational experiences to generate globally competitive youth.*"

1.3.2 Mission

The College adheres and focuses

- ➔ *To provide quality education that aims at preparing students for the challenges of life.*
- ➔ *To bring about an all-round development in the personality of the students.*
- ➔ *To encourage students to participate in inter-collegiate events and help them acquire and hone up their skills through peer learning.*
- ➔ *To assist students in getting suitable placements.*
- ➔ *To promote sports and inculcate discipline amongst the students and help them to be physically and mentally fit.*
- ➔ *To encourage students to go beyond books and to make them globally competent.*

1.3.3 Aim

The College has formulated the following aim *To be an academy of excellence, which will provide transformative and empowering educational experiences to generate globally competitive youth.*"

1.3.4 Objective

It is the objective of the College

- ➔ *To impart value based education.*
- ➔ *To emphasis on subject to make them responsible of concept to facilitates logical thinking.*
- ➔ *To inculcate discipline among students to make them responsible citizen.*

- To promote sport, cultural & fine arts.
- To develop the personality, confidence & Communication skills of the students.
- To establish industry network.
- To promote welfare by providing relief to the needy and deserving students.
- To Provide a secular outlook to students which will help them adapt globally
- To upgrade infrastructure to compete with global standards

The commitment of the Institute is towards continuous improvement and democratic functioning, as is reflected in its vision and mission statements, which in turns become the guiding principles for the governance of the Institute.

1.4 Assessment of the Institute

1.4.1 Affiliations

The Institute is affiliated to **Mumbai University**, a collegiate state-owned public university in Mumbai and one of the largest university systems in the world.

1.4.2 Certification

The College submits its academic records every year to the **All India Survey of Higher Education (AISHE)** Govt. of India through its registered allocated code which is C - 34088.

1.4.3 Accreditation

The College received a **B+ Grade with a CGPA 2.57 in the First cycle of accreditation** in the year 2017 awarded by the National Assessment & Accreditation Council (NAAC) to the College.

2. Overview

2.1 Summarised Populace analysis for 2022-2023

2.1.1 Students data

The data (shared by the Institute) shows there were a total of **950 male and 479 female students.**

2.1.2 Staff data

| S. No. | Type | Male | Female | Total |
|----------------------------|--------------------|-----------|-----------|-----------|
| 1 | Admin staff | 05 | 01 | 06 |
| 2 | Teaching staff | 14 | 10 | 24 |
| 3 | Non-Teaching staff | 22 | 18 | 40 |
| Total Staff Members | | 41 | 29 | 70 |

Table 1: Staff data of the Institution for 2022-2023

The staff data shows the College premises had a total of **70 Staff Members.**

2.2 Summarised Populace analysis for 2021-2022

2.2.1 Students data

The data (shared by the Institute) shows there were a total of **914 male and 496 female students.**

2.2.2 Staff data

| S. No. | Type | Male | Female | Total |
|----------------------------|--------------------|-----------|-----------|-----------|
| 1 | Admin staff | 05 | 01 | 06 |
| 2 | Teaching staff | 11 | 12 | 23 |
| 3 | Non-Teaching staff | 14 | 08 | 22 |
| Total Staff Members | | 30 | 21 | 51 |

Table 2: Staff data of the Institution for 2021-2022

The staff data shows the College premises had a total of **51 Staff Members.**

2.2 Total College Area & College Building Spread Area

The **total site area is 0.75 acres** and the **total Built-up area of the Institute is 1,29,166.93 sq. ft.** for an **approximately 1,499 footfalls.**

2.3 Institute Infrastructure

2.3.1 Establishment

The Institute was established in **2008.**

2.3.2 Spatial Organisation

There are provisions for 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.

2.4 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 from 10:00 hours to 17:00 hours.

3. Research

3.1 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.

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification as follows:

- ➔ Investigation
- ➔ Technical discussion with team
- ➔ Observations
- ➔ Inferences

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

- ➔ Discussion with the Institute
- ➔ Allotment and Initiation by the Institute
- ➔ Data collection
- ➔ Submission of the files

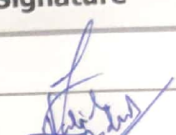
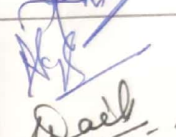
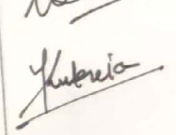

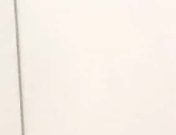
Evidence documents for Site visit of external audit team

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: Chandrabhan Sharma College of Arts, Commerce & Science Date: 3rd May, 2023

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. Pratima Singh | | Principal |  |
| 4. | Ms. Manali Nait | | IGAC member |  |
| 5. | Mr. Vicky Kukreja | | IGAC member |  |

Signature & round seal

Name:

Designation:

For the said Institute

Signature & round seal

Name: Mrs. F. A. Shaikh

Designation: Project Coordinator

For The Greenvio Solutions

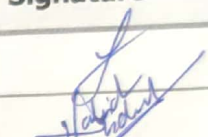
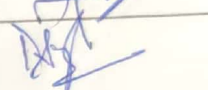
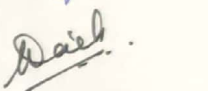
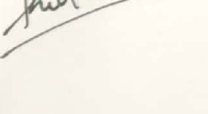




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Audit objective: Green Building up gradation of the premises

Audits covered: Green audit Energy audit Environment audit

Institute: Chandrabhan Sharma College Date: 3rd May, 2023
of Arts, Commerce & Science
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. Pratima Singh | | Principal |  |
| 4. | Ms. Manali Naik | | IQAC member |  |
| 5. | Mr. Vicky. Kulkreja | | IQAC member |  |

Signature & round seal

Name: Dr. Pratima Singh

Designation:

For the said Institute



Signature & round seal

Name: Mrs. F. A. Shaikh

Designation: Project Coordinator

For The Greenvio Solutions



4. Investigation

4.1 Sources analysis

The primary and secondary sources of energy consumption are based on the electrical supply through the local government.

4.2 Energy efficiency analysis

4.2.1 Energy efficient practices for alternative sources

- Additional provisions such as solar hot water heaters, solar parking etc., should be introduced in the near future.
- The premise has LED Lights contribute to 46% in terms of number and **62% of the power requirement** is met through the same. As per our study we could conclude that both of these numbers should improve.
- There are sensor based smart lights in the premises.

4.2.2 Energy efficient equipment

- The premise has LED Lights in multiple spaces.
- The air conditioners are BEE star labelled appliances and new.
- There are no energy efficient fans in the premises.

5. Documentation

5.1 Primary sources of energy consumption

- **Electrical (Metered)** – Light, Fans, Equipments, Pumps comprise these sources.
- **Renewable energy** – There sources to harness solar energy in the premises are under process and will be implemented soon.

5.2 Secondary sources of energy consumption

The premise uses batteries, inverters & UPS as backup for administrative purposes.

5.3 Actual Electrical Consumption as per Bills

The College spends a substantial amount on electricity bills every month. However, we would like to recommend the use of alternate sources of energy to harness the electrical loads and reduce the monetary expenses.

| S. No. | Month | Year | Amount | Units consumed |
|----------------------------------|-----------|------|--------|----------------|
| Academic year 2021 - 2022 | | | | |
| 1 | June | 2021 | 45,690 | 4,269 |
| 2 | July | 2021 | 68,470 | 6,414 |
| 3 | August | 2021 | 31,500 | 4,086 |
| 4 | September | 2021 | 34,240 | 3,489 |
| 5 | October | 2021 | 61,210 | 6,242 |
| 6 | November | 2021 | 58,370 | 5,953 |
| 7 | December | 2021 | 68790 | 7,014 |
| 8 | January | 2022 | 36100 | 3,681 |
| 9 | February | 2022 | 41540 | 4,236 |
| 10 | March | 2022 | 80,900 | 8,227 |
| 11 | April | 2022 | 74,060 | 7,453 |
| 12 | May | 2022 | 60,310 | 5,953 |

| Academic year 2022 - 2023 | | | | |
|----------------------------------|-----------|------|----------|-------|
| 13 | June | 2022 | 74,840 | 7,596 |
| 14 | July | 2022 | 95,020 | 8,727 |
| 15 | August | 2022 | 1,01,640 | 9,286 |
| 16 | September | 2022 | 1,07,360 | 9,775 |
| 17 | October | 2022 | 93,930 | 8,236 |
| 18 | November | 2022 | | 8,795 |
| 19 | December | 2022 | 1,10,480 | 9,647 |
| 20 | January | 2023 | 77,053 | 6,550 |
| 21 | February | 2023 | 81,250 | 6,997 |
| 22 | March | 2023 | 1,04,740 | 9,195 |
| 23 | April | 2023 | 1,09,820 | 9,588 |

Table 3: Details of the electrical consumption

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.

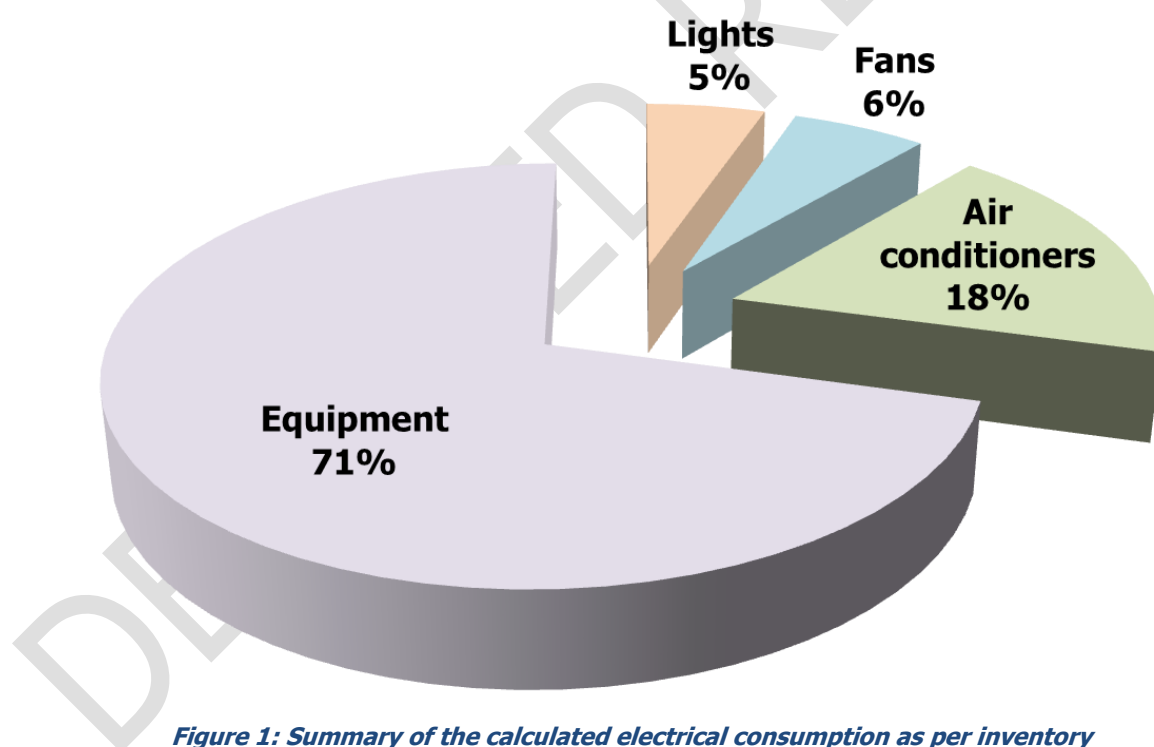


Figure 1: Summary of the calculated electrical consumption as per inventory

The above graph shows that equipment consumes 71% whereas the air conditioners consume 18% while the fans consume 6% and the lights consume 5% of the total calculated electrical energy.

5.5 Lights

5.5.1 Types of lights based on the numbers

There are a total of **555 nos. of lights on the premises**; the following table shows the various types of lights on the premises.

| S. No. | Type | Nos. |
|--------|--|------|
| 1 | LED (Energy-efficient lights) | 343 |
| 2 | Non-LED (Non Energy-efficient lights) | 100 |
| 3 | CFL (Non Energy-efficient lights) | 94 |
| 4 | Halogen (Non Energy-efficient lights) | 18 |

Table 4: 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 **25,556 kWh** of energy.

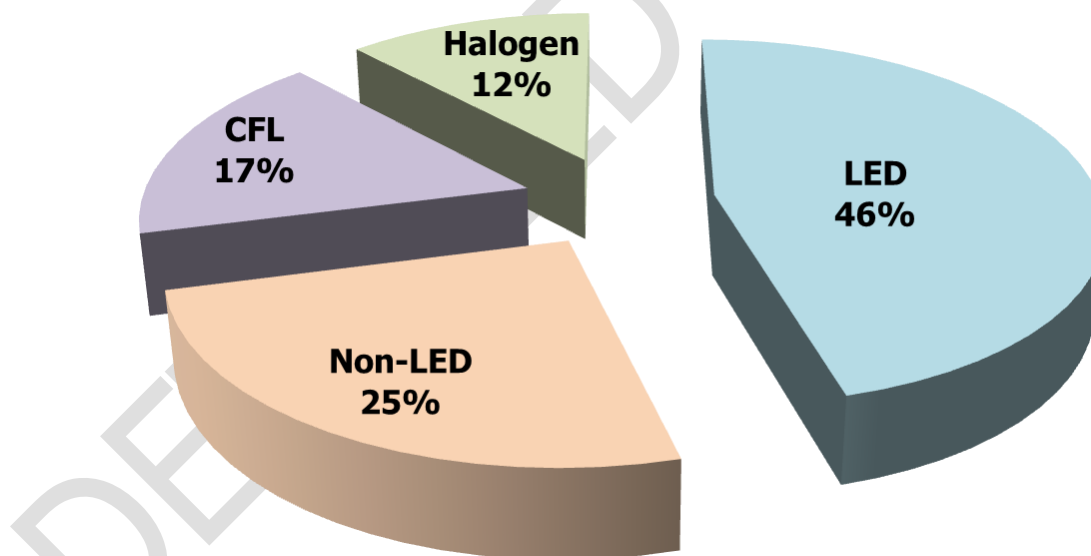


Figure 2: Energy consumed by types of lights in the premise based on the usage study

The analysis of the types of Lights on the premises shows that the **LED lights consume 46%** while the **Non-LED lights consume 25%** whereas the **CFL lights consume 17%** and the **Halogen lights consume 12%** of the total power consumed by lights.

5.6 Fans

5.6.1 Types of fans based on the numbers

There are a total of **381 fans** on the premises as follows:

| S. No. | Type | Nos. |
|--------|--------------------------|------|
| 1 | Ceiling fans | 340 |
| 2 | Small motor exhaust fans | 14 |
| 3 | Wall mounted fans | 27 |

Table 5: Summary of the types of fans in the premises

5.6.2 Types of fans based on the power consumption

The energy consumption of fans is **28,981 kWh** of the energy.

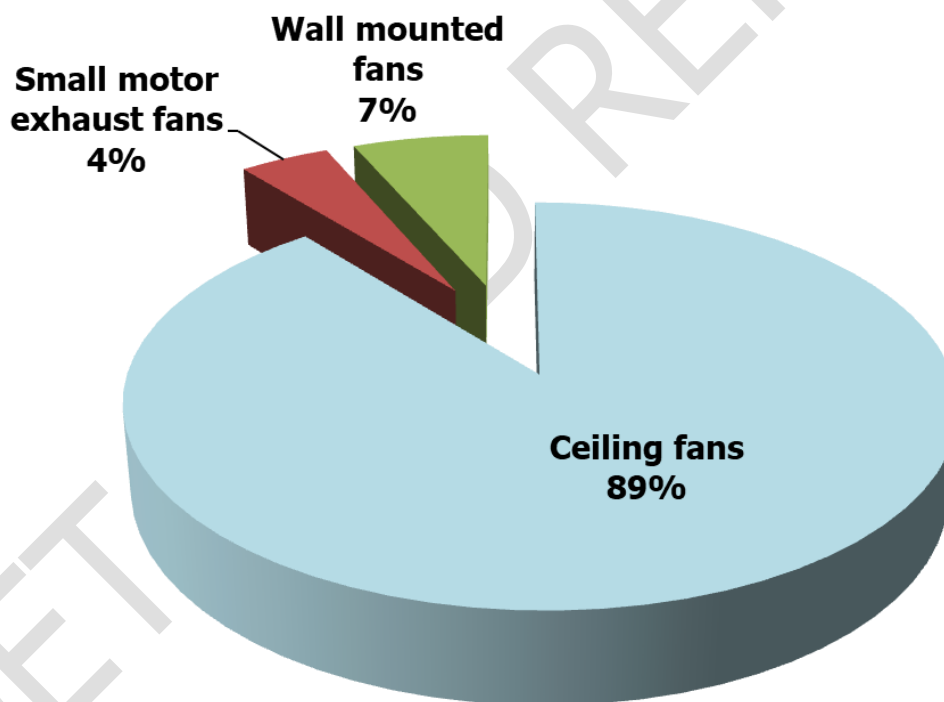


Figure 3: Types of fans based on power consumption

The above analysis shows the **Ceiling fans consume 89%** whereas the **wall mounted fans consume 7%** while the **small motor exhaust fans consume 4%** of the total power.

5.7 Air conditioners

5.7.1 Types of air conditioners based on the numbers

There are **40 air conditioners** on the entire premises.

5.7.2 Building-wise consumption analysis

The energy consumption of air conditioners is **87,000 kWh** of energy.

5.7.3 Site investigation observations

- The major consumption is in the Conference room, Library and IT laboratory as the usage is maximum in these spaces.
- Nearly equal consumption takes place in the rest of the areas wherever there are air conditioners.
- While the least energy is consumed by the air conditioners in the Cabins and the Exam room.

5.7.4 About the replacement of current air conditioners

The current air conditioners are well maintained, though there is not an immediate requirement for replacement however, whenever the College undergoes redevelopment there can be provisions for replacement with energy-efficient appliances or new air conditioners that require less power consumption.

5.8 Equipment

5.8.1 Types of Equipment

There are **319 nos. of equipment** in the Educational sector.

5.8.2 Types of equipment as per their energy contribution

The energy consumption of equipment is **3,42,802 kWh** of energy.

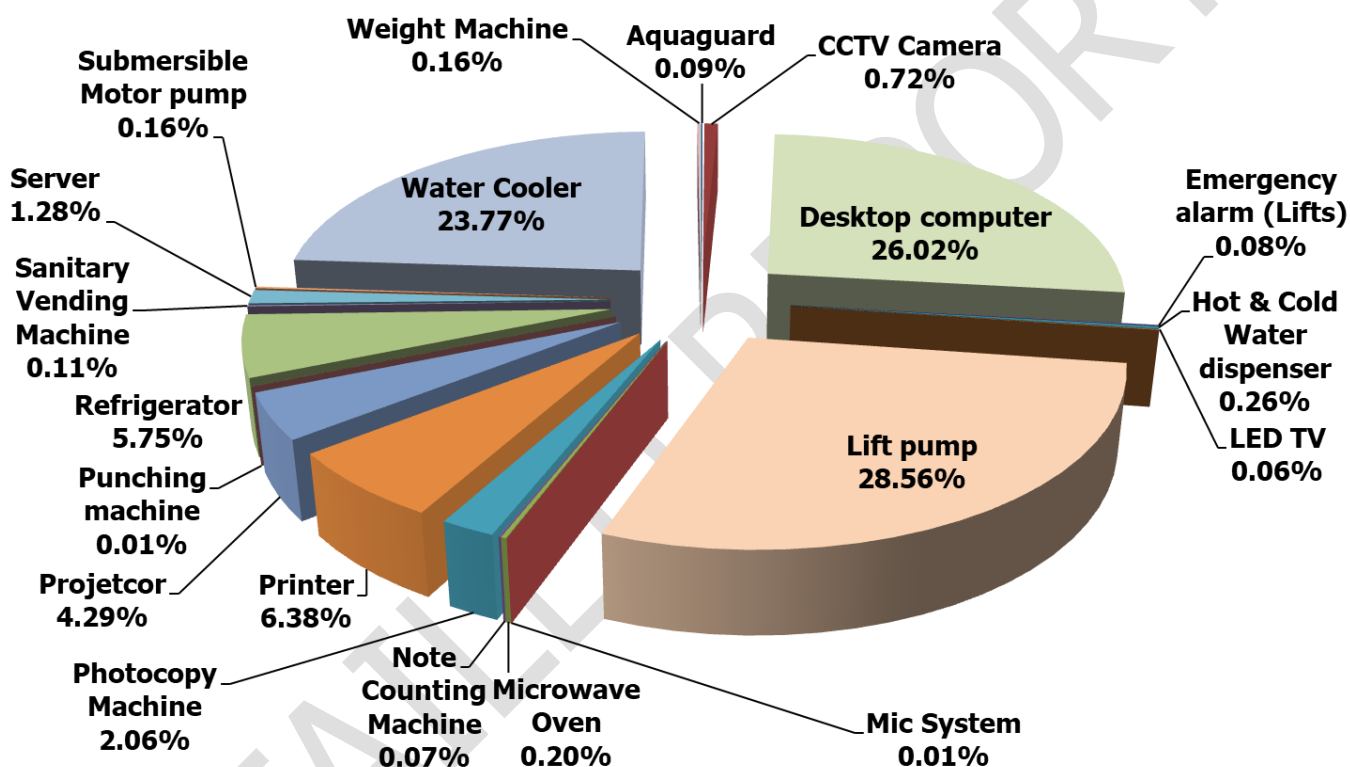


Figure 4: Energy consumed by types of equipment in the educational sector based on the usage study

The above summary shows that the **lift pump** consumes more energy at **28.56%** while the **desktop computer** consumes **26.02%** the **water cooler** consumes **23.77%** and the **printer** consumes **6.38%** these are the maximum consumers as compared to other equipment.

6. Suggestion

6.1 Section-wise suggestions

The following suggestions are to be considered as a **first priority** for implementation. These **should be executed within the next 1.5 to 2.5 years from the date of the Report submission.** The Institute can execute a plan after discussion with Project Head.

6.1.1 Electromechanical systems - Electrical and Lighting

Section 1 - Non-LED lights

The current light analysis shows that Non-LED lights consume anywhere between 50W to 54W and even more when in use; these should be replaced with LED lights which consume on an average 12-16W when in use. Our technical analysis shows that there would be a reduction of an average of **67% reduction** in energy consumption through lights specifically as a part of the electro -mechanical system if all **Non-LED lights on all floors** are replaced with an energy efficient appliance whenever the College undergoes renovation.

Section 2 - Ceiling fans

The current Fans are in proper working conditions and maintained well. The ceiling fans are in more quantity and consume at least 45W when in use. These should be replaced with energy efficient fans consuming 14W when in use. Our detailed study states that is all the **ceiling fans on all floors** if replaced with star rated appliance results in a reduction of average of **69% 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.

6.2 General suggestions

The following details are consolidated study recommendations related to 'entire Institute' and should be considered as **second priority** and should be **implemented within 2.5 to 3.5 years from the date of the Report submission.**

6.2.1 Alternatives to increase renewable energy – Solar parking

The College can turn its existing parking areas into solar panel powered parking areas. This will provide shade and renewable energy benefit to the College.



Plate 1: Solar parking concept for the Institute (For reference purpose only)

Source: Image by <https://solarpowerproject.in/solar-panels-for-parking-lots.php>

6.2.2 Alternatives towards Smart premises – Smart gardening

The College can undertake a Smart Gardening system using IoT Technology. This will result in saving time by scheduling time for watering; saving money through automated water schedules tracking dampness of soil to know when, how much water garden needs.



Plate 2: Solar farm concept for the Institute (For reference purpose only)

Image source: <https://housing.com/news/smart-gardening/>

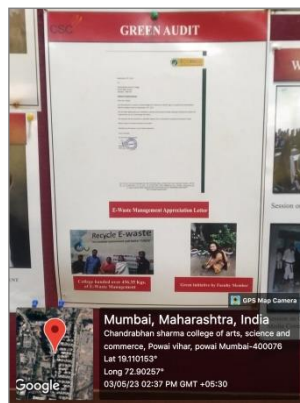
Data source: <https://www.happysprout.com/inspiration/what-is-smart-gardening/>



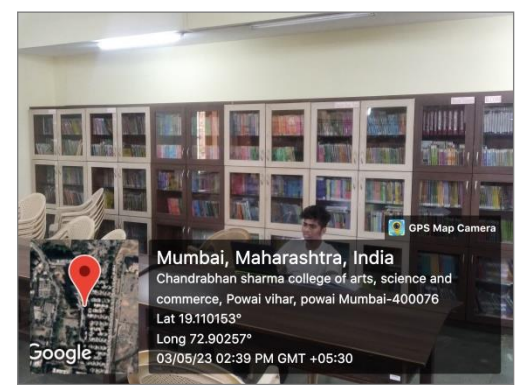
Discussion with the core team



Investigative parameters – Energy Management – Appliances, awareness posters



Investigative parameters – Water Management – E-waste certificate, Dustbins in the premises



Investigative parameters – Fire & Life safety; General areas in the premises

7. 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
- ➔ <https://www.happysprout.com/inspiration/what-is-smart-gardening/>
- ➔ <https://housing.com/news/smart-gardening/>
- ➔ Inference study reference image - Zsuzsa Bóka from Pixabay
- ➔ Inference study reference image - <https://solarpowerproject.in/solar-panels-for-parking-lots.php>



ENVIRONMENT AUDIT

STUDY PERIOD (TWO YEARS) 2021 – 2022 & 2022 - 2023

Sustainability study
AUDIT REPORT

Studied for
Smt. Durgadevi Sharma Charitable Trust's
**Chandrabhan Sharma College of Arts,
Commerce & Science**
Adi Shankaracharya Marg, Powai Vihar Complex,
Powai, Mumbai – 400076, Maharashtra, India

Studied in the capacity of
Accredited and Certified
Green Building Professional



Website: <https://thegreenviosolutions.co.in/>

Email: greenviosolutions@gmail.com

Valid till **April 2024**

Disclaimer

The Audit Team has prepared this report for the **Smt. Durgadevi Sharma Charitable Trust's Chandrabhan Sharma College of Arts, Commerce & Science** located Adi Shankaracharya Marg, Powai Vihar Complex, Powai, Mumbai – 400076, Maharashtra, India 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 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.

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 thanks the **Smt. Durgadevi Sharma Charitable Trust's Chandrabhan Sharma College of Arts, Commerce & Science, Maharashtra, India** for assigning this important work of Environment Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Mr. Prashant G. Sharma**, President; **Mr. Himanshu P. Sharma**, Vice President; **Dr. Manju P. Sharma**, Treasurer; **Mr. Diksthan G. Sharma**, Secretary and everyone from the Management.

Our heartfelt thanks to Chairpersons of the entire process **Dr. Pratima Singh**, Principal for the valuable inputs.

We are also thankful to **College's Task force the faculty members** who have collected data required - **Ms. Manali Naik**, Convenor - Placements & Career Guidance Cell & Cordinator - Department of Multimedia & Mass communication; **Mr. Vicky Kukreja**, Assistant Professor.

We highly appreciate the assistance of **Mr. Sainath Sawant, Technical staff** 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

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DETAILED REPORT

Evidence documents for Site visit of external audit team

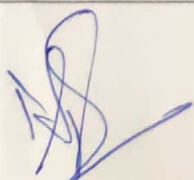
Audit team headed by external expert - Ar. Nahida Abdulla
 Accredited & Certified Green Building Professional, ISO IA (IMS)
 Audit objective: Green Building up gradation of the premises

Audits covered: Green audit Energy audit Environment audit

Institute: Chandrabhan Sharma College of Arts, Commerce & Science Date: 3rd May, 2023

Document objective: Inferences of the Site visit

| Observations (Positive aspects) | Suggestions (Improvement aspects) |
|--|--|
| Green Audit | |
| <ul style="list-style-type: none"> - Rain water harvesting practiced - E-waste management practiced. | <ul style="list-style-type: none"> - Undertake organic waste management |
| Energy Audit | |
| <ul style="list-style-type: none"> - Sensor based lights used | <ul style="list-style-type: none"> - Undertake alternate source of energy. |
| Environment Audit | |
| <ul style="list-style-type: none"> - Tree undertaken on rooftop (under process) | <ul style="list-style-type: none"> - Undertake measures to increase green cover on vertical front |



Signature & round seal

Name:

Designation:

For the said Institute




Signature & round seal

Name: Mr. F. A. Shaikh

Designation: Project Coordinator

For The Greenvio Solutions



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Institute: Chandrabhan Sharma College of Arts, Commerce & Science Date: 3rd May, 2023

Document objective: Proof of the Site visit



Meeting with the core team



Investigation of the systems

Signature & round seal
Name: Dr Pratima Singh
Designation:
For the said Institute



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



1. Introduction

1.1 About the Trust

Charitable purpose including relief of poverty, distress, education, medical relief and advancement or other objects of general public utility and on conduct, maintain or assist schools, colleges, dispensaries, hospitals, orphanages, home for destitute and other institutions and activities of charitable nature are undertaken. The works revolve around the following:

- *Setting up Schools and colleges or other educational institutions and donation to other charitable institution/trust or institution of similar objects/nature*
- *Aid to deprived people*
- *Scholarships to brilliant and deserving students of Mumbai*
- *Medical aid*
- *Donation and contributions to other charitable trust and institution of similar objects*

1.2 About the Institution

The Chandrabhan Sharma College of Arts, Science and Commerce was established to serve the ever-growing need for higher education in the vicinity of Powai. The degree College started in 2008 is affiliated to the University of Mumbai and offers various professional courses like B.M.S, B.M.M, BSc. IT, etc. The College got affiliation from YCMOU in 2015 and conducts courses like BCA, BIS etc.

The first successful batch of graduates passed out in the year 2011. The College had a very modest beginning with around 100 students, but with the vision of the Trustees, the Principal and a team of qualified and dedicated staff members it has grown to strength of 2,000+ students.

The College lays emphasis on building values, nurturing talent and developing the intellectual faculty of the students.

1.3 Statements of the Institution

1.3.1 Vision

The College proposes " *To be an academy of excellence, which will provide transformative and empowering educational experiences to generate globally competitive youth.*"

1.3.2 Mission

The College adheres and focuses

- ➔ *To provide quality education that aims at preparing students for the challenges of life.*
- ➔ *To bring about an all-round development in the personality of the students.*
- ➔ *To encourage students to participate in inter-collegiate events and help them acquire and hone up their skills through peer learning.*
- ➔ *To assist students in getting suitable placements.*
- ➔ *To promote sports and inculcate discipline amongst the students and help them to be physically and mentally fit.*
- ➔ *To encourage students to go beyond books and to make them globally competent.*

1.3.3 Aim

The College has formulated the following aim *To be an academy of excellence, which will provide transformative and empowering educational experiences to generate globally competitive youth.*"

1.3.4 Objective

It is the objective of the College

- ➔ *To impart value based education.*
- ➔ *To emphasis on subject to make them responsible of concept to facilitates logical thinking.*
- ➔ *To inculcate discipline among students to make them responsible citizen.*

- To promote sport, cultural & fine arts.
- To develop the personality, confidence & Communication skills of the students.
- To establish industry network.
- To promote welfare by providing relief to the needy and deserving students.
- To Provide a secular outlook to students which will help them adapt globally
- To upgrade infrastructure to compete with global standards

The commitment of the Institute is towards continuous improvement and democratic functioning, as is reflected in its vision and mission statements, which in turns become the guiding principles for the governance of the Institute.

1.4 Assessment of the Institute

1.4.1 Affiliations

The Institute is affiliated to **Mumbai University**, a collegiate state-owned public university in Mumbai and one of the largest university systems in the world.

1.4.2 Certification

The College submits its academic records every year to the **All India Survey of Higher Education (AISHE)** Govt. of India through its registered allocated code which is C - 34088.

1.4.3 Accreditation

The College received a **B+ Grade with a CGPA 2.57 in the First cycle of accreditation** in the year 2017 awarded by the National Assessment & Accreditation Council (NAAC) to the College.

2. Overview

2.1 Summarised Populace analysis for 2022-2023

2.1.1 Students data

The data (shared by the Institute) shows there were a total of **950 male and 479 female students.**

2.1.2 Staff data

| S. No. | Type | Male | Female | Total |
|----------------------------|--------------------|-----------|-----------|-----------|
| 1 | Admin staff | 05 | 01 | 06 |
| 2 | Teaching staff | 14 | 10 | 24 |
| 3 | Non-Teaching staff | 22 | 18 | 40 |
| Total Staff Members | | 41 | 29 | 70 |

Table 1: Staff data of the Institution for 2022-2023

The staff data shows the College premises had a total of **70 Staff Members.**

2.2 Summarised Populace analysis for 2021-2022

2.2.1 Students data

The data (shared by the Institute) shows there were a total of **914 male and 496 female students.**

2.2.2 Staff data

| S. No. | Type | Male | Female | Total |
|----------------------------|--------------------|-----------|-----------|-----------|
| 1 | Admin staff | 05 | 01 | 06 |
| 2 | Teaching staff | 11 | 12 | 23 |
| 3 | Non-Teaching staff | 14 | 08 | 22 |
| Total Staff Members | | 30 | 21 | 51 |

Table 2: Staff data of the Institution for 2021-2022

The staff data shows the College premises had a total of **51 Staff Members.**

2.2 Total College Area & College Building Spread Area

The **total site area is 0.75 acres** and the **total Built-up area of the Institute is 1,29,166.93 sq. ft.** for an **approximately 1,499 footfalls.**

2.3 Institute Infrastructure

2.3.1 Establishment

The Institute was established in **2008**.

2.3.2 Spatial Organisation

There are provisions for 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.

2.4 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 from 10:00 hours to 17:00 hours.

3. Research

3.1 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.

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification as follows:

- ➔ Investigation
- ➔ Technical discussion with team
- ➔ Observations
- ➔ Inferences

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

- ➔ Discussion with the Institute
- ➔ Allotment and Initiation by the Institute
- ➔ Data collection
- ➔ Submission of the files

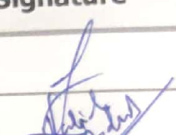
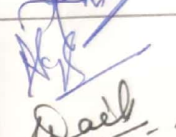
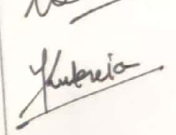

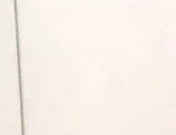
Evidence documents for Site visit of external audit team

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: Chandrabhan Sharma College of Arts, Commerce & Science Date: 3rd May, 2023

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. Pratima Singh | | Principal |  |
| 4. | Ms. Manali Nait | | IGAC member |  |
| 5. | Mr. Vicky Kukreja | | IGAC member |  |

Signature & round seal

Name:

Designation:

For the said Institute

Signature & round seal

Name: Mrs. F. A. Shaikh

Designation: Project Coordinator

For The Greenvio Solutions

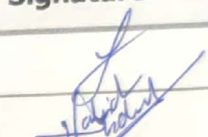
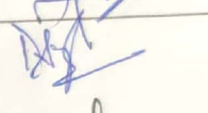
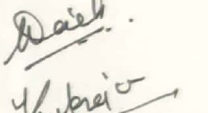
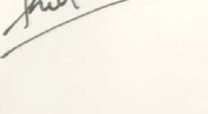




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Audit objective: Green Building up gradation of the premises

Audits covered: Green audit Energy audit Environment audit

Institute: Chandrabhan Sharma College Date: 3rd May, 2023
of Arts, Commerce & Science
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. Pratima Singh | | Principal |  |
| 4. | Ms. Manali Naik | | IQAC member |  |
| 5. | Mr. Vicky. Kukreja | | IQAC member |  |

Signature & round seal

Name: Dr. Pratima Singh

Designation:

For the said Institute



Signature & round seal

Name: Mrs. F. A. Shaikh

Designation: Project Coordinator

For The Greenvio Solutions



4. Investigation

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 premises. 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.

4.1 Open Spaces

There is an open space opposite to the premises used by students at present for sports and cultural gatherings. **There are provisions for natural plantations which have enhanced the beauty of the space.**

4.2 Flora audit

4.2.1 Flora audit

The College campus is located in a shared campus with multiple Institutes; however the building for the College is a standalone building. The plants in the premises are documented through a survey by the internal team and refined further as follows:

| S. No. | Plant name | Type | Nos. | Planted by |
|--------|------------|-------|------|------------------|
| 1 | Tulsi | Plant | 3 | Mr. Umesh Kabadi |
| 2 | Areca Palm | Plant | 26 | Management |
| 3 | Bamboo | Plant | 6 | Mr. Tushar. Shah |
| 4 | Periwinkle | Shrub | 3 | Manali Naik |
| 5 | Aloe Vera | Plant | 1 | Ravi Vishwakarma |

Table 3: Details of the Flora in the premises

At present, there are 39 nos. plantations on the premises. The overall ambience of premises has lots of plants.

4.3 Noise Audit

On a macro level the College is surrounded by huge farms and minimal residential blocks **thus there is a peaceful and noise free arena observed inside the premises.**

4.4 Carbon Footprint Audit

4.4.1 Eco-friendly Commuting Practices

- The site is located in an urban locality.
- Overall, the carbon footprint is well under control.
- Students and staff members commute using public transport.
- There are no major fossil fuels used inside the premises.
- No kind of garbage burning activity is undertaken.

4.4.2 Heat Island Reduction

The external temperature is well under control owing to shaded walkways and huge nos. of plantations all over the premises.

4.4.3 Outdoor Light Pollution Study

The College compound lights are not upward looking thus, these do not cause light pollution.

4.5 Universally accessible premises

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 following facilities are available on the premises for the specially-abled as part of universally accessible premises initiatives.

- Low height risers in the staircases
- Non-slippery floor surfaces
- Lifts for user friendly accessibility

The design of the premises is highly appropriate for access with passages and corridors being wide enough in size and naturally ventilated.

4.6 Fire Safety

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.

All provisions such as extinguishers, sand buckets, dedicated fire zone safety and exit signages have been undertaken.

DETAILED REPORT

5. Inferences

5.1 Section-wise suggestions related to premises

The following suggestions are to be considered as a **first priority** for implementation. These **should be executed within the next 1.5 to 2.5 years from the date of the Report submission.** The Institute can execute a plan after discussion with Project Head.

5.1.1 Site beautification

- ➔ **Bird house/ Feeders** - At appropriate locations there can be provisions for drinking water and some grains for birds as they visit the site much frequently.
- ➔ **Child area** - There can be one provision where if student's or staff relative who are toddlers or senior citizens can rest and this area could have facilities accordingly.

5.1.2 Universally accessible premises

- ➔ **Provisions for visually impaired - Signages** – In addition to the signages being in regular language there should be additional signages in braille language for the specially-abled students.
- ➔ **Provisions for visually impaired - Tactile flooring** – The indoor and outdoor of the premises should have dedicated tactile flooring for the visually impaired.

5.1.3 Life safety

NO recommendations suggested for this section.

5.1.4 Pollution Control

- ➔ **Internal circulation** – (applicable only to large campuses) – There could be an e-vehicle for public transportation that can be used by the stakeholders for internal circulation.

- ➔ **Battery charging points for Eco-friendly vehicles** - There can be provision for battery charge points, this would inspire students to change their mode of transportation and adopt sustainable practices.
- ➔ **Bicycles as a gift** - As an appreciation gesture maybe the student's toppers/ staff best performers can be awarded a bicycle occasionally.
- ➔ **Paperless technologies for offices** - The Institute can go technology-friendly and go paperless in the functioning of the Premise to a certain extent maybe not fully.
- ➔ **Avoid paper wastage through books** - The Institute can collect all old semester notebooks; these can either be converted to reusable paper on the premises through a workshop or using a shredder machine or handed over to a vendor for making fresh paper. Additionally, the Students can be motivated to undertake similar practices on an individual note.

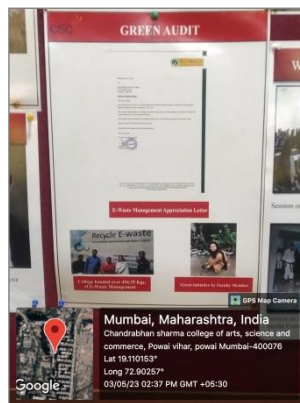
DETAILED REPORT



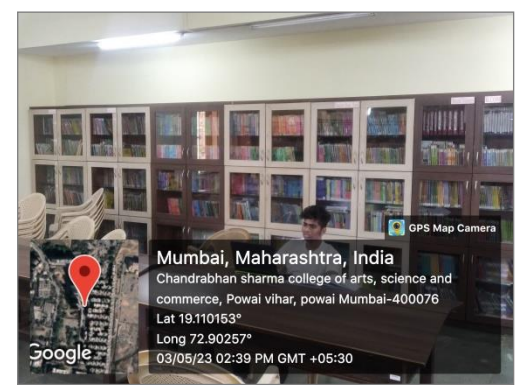
Discussion with the core team



Investigative parameters – Energy Management – Appliances, awareness posters



Investigative parameters – Water Management – E-waste certificate, Dustbins in the premises



Investigative parameters – Fire & Life safety; General areas in the premises

6. 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.

- ➔ Uniform Plumbing Code – India, 2008
- ➔ IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- ➔ IGBC Green Landscape Rating system, March 2013
- ➔ BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
- ➔ 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.

