

ENERGY AUDIT

STUDY PERIOD (TWO YEARS) 2020 – 2021 & 2021 – 2022

Sustainability study

AUDIT REPORT

Studied for
Haldia Government College

Debhog, Haldia, Purba Medinipur,
West Bengal 721657, India

Studied in the capacity of

Accredited with IGBC and Certified with ASSOCHAM GEM

Registered Architect & Green Building Professional



Studied by

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

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Valid till **March 2024**

Inferences of the Site visit

Audit conducted by : Nahida Shaikh, IGBC AP, GEM CP, Architect

Accredited and Certified Green Building Professional

ASSOCHAM GEM Certified Professional Registration number 22/718

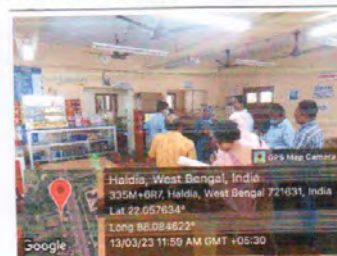
Link for the Verification website https://www.green-assochem.com/manage_gem_cp.php?page=12

Institute: HALDIA GOVERNMENT COLLEGE Date: 13 MARCH 2023

Audits covered: GREEN, ENERGY & ENVIRONMENT Day: MONDAY

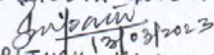
Observations (POSITIVE)	Inferences
- Ramp in ladies toilet; sanitary machines - Farming (Organic garden) - Bamboo zone - Aquatic pond - collective team work	- undertake rain water harvesting; waste management

Evidence of the site visit




Signature of Ar. Nahida Shaikh,
ASSOCHAM GEM CP 22/718
13/03/2023

College Name: HALDIA GOVERNMENT COLLEGE

Signature: 

Name: DR. PITUSH KANTI TRIPATHI

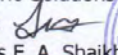
Designation: OFFICER-IN-CHARGE

Date: 13.03.2023

Officer-in-charge
Haldia Government College
P.O.-Debhog, Dist.- Purba Medinipur



For Greenvio Solutions

Signature: 

Name: Mrs F. A. Shaikh

Designation: Manager

Date: 13/03/2023



Disclaimer

The Audit Team has prepared this report for the **Haldia Government College** located at Debhog, Haldia, Purba Medinipur, West Bengal 721657, 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 **Haldia Government College, West Bengal, 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 **of Higher Education Department, Government of West Bengal.**

Our heartfelt thanks to Chairperson of the entire process **Dr. Pijush Kanti Tripathi**, Officer-in-Charge for the valuable inputs.

We are also thankful to **College's Task force the faculty members** who have collected data required **Dr. Dipankar Sadhukhan**, Co-ordinator, IQAC; **Prof. Tanmay Kumar Maity**, Convener, NAAC Committee; **Dr. Dipankar Pramanik**, Jt. Convener, NAAC Committee; **Dr. Uday Sankar Midya**, Convener, DATA Management Committee; **Ms. Lakshmi Narayan Maity**, Member, NAAC Committee; **Prof. Kamala Kanta Kar**, Member, NAAC Committee; **Prof. Sarbeswar Halder**, Member, NAAC Committee; **Prof. Samit Ganguly**, Member, NAAC Committee; **Prof. Yogita Dutta**, Member, NAAC Committee and **Dr. Debolina Das**, Member, NAAC Committee.

We highly appreciate the assistance of 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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1. Introduction

1.1 About the Institute and its history

Haldia is a famous river-port town and is an expanding industrial belt in eastern India. **The Department of Higher Education, Government of West Bengal, realizing the educational needs of this rapidly growing town and its adjoining areas, decided to establish the second government college in the erstwhile district of Medinipur in 1988.**

As a result Haldia Government College was instituted. Under the affiliation of Vidyasagar University, the college came into being in 1988 and was inaugurated by the former Chief Minister of West Bengal, Shri Jyoti Basu, on 20th November. Since then it is continuously catering to students' need of higher education.

The College is located beside the broad four-lane highway between Rani Chak and City Centre bus stop. It is well connected with NH-41 and also the South-Eastern Railways. NH-6 is also not too far from the college. As a co-educational institute, the college offers degree courses in Arts and Science and also has a Vocational course on Tourism and Travel Management (TTM).

The College has been accredited by the National Assessment and Accreditation Council (NAAC) with a Grade "B+" (CGPA 2.52) in 2017. The College has good infrastructure at different levels of the B.A. and B.Sc. courses. In 2015 two Post Graduate courses were introduced in the College, in the departments of Geography and Chemistry.

1.2 Statements of the Institution

1.2.1 Vision

The College proposes

- To create opportunities of holistic education for a large section of the youth to enable them to evolve as proper citizens of modern India, thereby ensuring their role as nation builders.
- To provide the necessary knowledge and knowhow to help them in their

endeavours to enhance their skills.

- ➔ To evolve as a Centre of Higher Education and provide research opportunities.
- ➔ To ensure an environment that will stimulate intellectual growth and allow free exchange of ideas between members of different communities and social strata.

1.2.2 Mission

The College adheres and focuses

- ➔ To secure equal opportunities for students of all sections of society so that they are free from the pressures of discrimination imposed by social and monetary constraints.
- ➔ To encourage the youth to attain academic excellence overcoming the problems faced by backward and underprivileged sections of society.
- ➔ To create an atmosphere conducive to proper grooming of girl students who are often deprived of the same facilities as boy students.
- ➔ To generate interests among students in subjects ranging from the liberal arts, core science subjects to the social sciences and physical education.
- ➔ To equip students to seek jobs in future by providing vocational education like Tourism and Travel Management.
- ➔ To make students aware of their environment and help them to preserve ecological balance.
- ➔ To inculcate in them the spirit of curiosity and eagerness to seek knowledge to pave the way for sustained academic research in the sciences, social sciences and liberal arts.
- ➔ To give them information on issues of national and global significance so that they are able to play a larger role in nation building.

- To enable and initiate them to handle the challenges of life in the context of the present scenario of increased competition and demanding levels of commitment.

1.2.3 Aim

As a government general degree college the main aim is to provide quality education with a very nominal cost.

1.2.4 Objective

It is the objective of the College is:

- Spread of value based education among different sections of society irrespective of caste, creed and gender.
- Encourage and promote higher education and research among the youth for more meaningful roles in social development.

1.3 Assessment of the Institute

1.3.1 Affiliations

The Institute is affiliated to **Vidyasagar University**, established by an Act of the West Bengal legislature which was notified in the Calcutta Gazette on 24 June 1981 it is an affiliating university in Paschim Medinipur district of southern West Bengal, India.

1.3.2 Accreditation

The following are details awarded by the National Assessment & Accreditation Council.

Cycle	First	Second
CGPA	71.2	2.52
Grade	B	B+
Year	2007	2017

Table 1: NAAC Accreditation details of the Institute

The College is due to enter its Third cycle of NAAC.

1.3.3 Certification

The College has received the following Certifications

- ➡ NIRF – Participated in the National Institutional Ranking Framework.
- ➡ AISHE – The All India Survey of Higher Education code is C- 19049.

1.3.4 Recognitions

The College has upgraded in the teaching level – Under graduate to Post graduate in the **section 2(f) and 12 (B) of the University Grants Council Act, 1956.**

2. Institution overview

2.1 Populace analysis for Academic year 2021 - 2022

2.1.1 Students data

The student data (shared by the College) shows there were a total of **614 male and 825 female students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin staff	1	0	1
Teaching staff	36	12	48
Non-Teaching staff	3	13	16
Total Staff Members	40	25	65

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

The staff data shows the premises had a total of **65** Staff Members.

2.2 Populace analysis for Academic year 2020 - 2021

2.2.1 Students data

The student data (shared by the College) shows there were a total of **623 male and 817 female students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin staff	1	0	1
Teaching staff	35	12	47
Non-Teaching staff	3	14	17
Total Staff Members	39	26	65

Table 3: Staff data of the Institution for 2020 - 2021

The staff data shows the premises had a total of **65** Staff Members.

2.3 Total College Area & College Building Spread Area

The **total site area is 19.33 acres & total Built-up area of College is 25,990 sq. ft. for around 1,504 populace footfalls.**

2.4 College Infrastructure

2.4.1 Establishment

The College was established in 1988.

2.4.2 Spatial Organisation

The College has ample and wide open classes with facilities appropriate for an educational space. There are open spaces with a beautiful entrance approach. The balance of hardscape and softscape provides a landscape serene ambience. **Overall the Infrastructure of the Building is excellent in terms of the Architecture Design.**

2.4.3 Operation and maintenance of the premises

The data collection session was held with the staff regarding the operation and working hours. The schedule is mentions that the College is working Monday to Saturday from 10:00 hours to 17:00 hours.

3. Green Building research approach

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:

- ➔ Analysis of the data
- ➔ Observations
- ➔ Inferences
- ➔ Way forward

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

- ➔ Allotment and Initiation by the Institute
- ➔ Survey of students and staff completed
- ➔ Site visit at the Institute
- ➔ Submission of the Certificate

Induction Meeting

Institute: HALDIA GOVERNMENT COLLEGE Date: 13 MARCH 2023

Audits covered: GREEN ENERGY ENVIRONMENT Day: MONDAY

S. No	Name	Designation	Signature
1.	MRS. F. A. SHAIKH [EXTERNAL]	CO-ORDINATOR	<i>[Signature]</i>
2.	AR. NAHIDA ABDULLA [EXTERNAL]	PROJECHEAD	<i>[Signature]</i>
3.	DR. PIJUSH KANTI TRIPATHI	OFFICER-IN-CHARGE	<i>[Signature]</i>
4.	TANMA KR. MAITY	NAAC COORDINATOR	<i>[Signature]</i>
5.	DR. DIPANKAR SADHUKHAN	ISAC COORDINATOR	<i>[Signature]</i>
6.	DR. SHYAMSUNDAR SAHOO	NAAC MEMBER	<i>[Signature]</i>
7.	KAMALA KANTA KAR	Asst. Professor	<i>[Signature]</i>
8.	DR. ANANYA CHATTERJEE	Asst. Professor NAAC Member	<i>[Signature]</i>
9.	DR. UDAY SANKAR MIDYA	Convener, Data Management Committee	<i>[Signature]</i>
10.	MR. LAKSHMINARAYAN MAITY	Librarian (S.G.)	<i>[Signature]</i>
11.	DR. DIPANKAR PRAMANIK	NAAC JT. CO-ORDINATOR	<i>[Signature]</i>
12.	SARBESWAR HALDAR	HEAD, DEPT. OF CHEM.	<i>[Signature]</i>
13.	Mrs. YOGITA DUTTA	Asst. Professor	<i>[Signature]</i>

College Name: HALDIA GOVERNMENT COLLEGE
Signature: *[Signature]*
Name: DR. PIJUSH KANTI TRIPATHI
Designation: OFFICER-IN-CHARGE
Date: 13.03.2023
Officer-in-charge
Haldia Government College
P.O.-Debhog, Dist.- Purba Medinipur



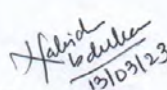
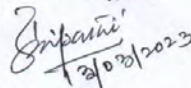
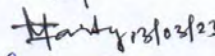
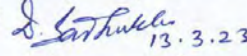
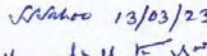
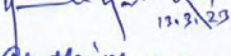
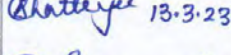
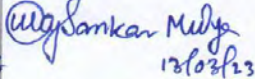
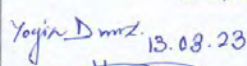
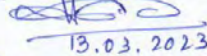
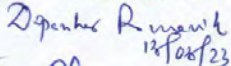
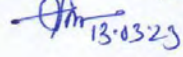
For Greenvio Solutions
Signature: *[Signature]*
Name: Mrs F. A. Shaikh
Designation: Manager
Date: 13/03/2023

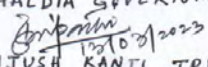


Exit Meeting

Institute: HALDIA GOVERNMENT COLLEGE Date: 13 MARCH 2023

Audits covered: GREEN, ENERGY & ENVIRONMENT Day: MONDAY

S. No	Name	Designation	Signature
1.	MRS. F.A. SHAIKH [EXTERNAL]	CO-ORDINATOR	
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12.	DR. DIPANKAR PRAMANIK	HEAD, DEPT. OF CHEM.	
13.	SARBESWAR HALDAR	Assistant Professor	

College Name: HALDIA GOVERNMENT COLLEGE
Signature: 
Name: DR. PIJUSH KANTI TRIPATHI
Designation: OFFICER-IN-CHARGE
Date: 13.03.2023

Officer-in-charge
Haldia Government College
P.O.-Debhog, Dist.- Purba Medinipur



For Greenvio Solutions
Signature: 
Name: Mrs F. A. Shaikh
Designation: Manager
Date: 13/03/2023



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-heating, 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

The premise uses following sources of energy consumption.

- **Electrical (Metered)** – Light, Fans, Equipments, Pumps comprise these sources.
- **Renewable energy** – There are no sources to harness solar energy in the premises.

4.1.2 Secondary sources

These are available in the form of Gas cylinders, Inverters, Diesel generator for general and backup purposes.

4.2 Site investigation analysis

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

- The **switch-off drills are practised at present**, the maintenance staff and Lab Attendants put off switches of all equipments regularly.
- All the **computers are shut-off after use** and also put on power saving mode.

4.3 Actual Electrical Consumption as per Bills

4.3.1 Consumption study

The admin department had shared the bills for Meter which is connected to the Building and is the main source of energy supply. The details are documented below.

S.I. no.	Month	Unit Consumed (kW)	Amount (Rs)
1	Jan'2023	15,177	1,04,446
2	Dec'2022	14,580	1,05,856
3	Nov'2022	15,144	1,09,247
4	Oct,2022	13,692	99,673
5	Sep'2022	19,810	1,36,472
6	Aug'2022	20,021	1,37,742
7	July,2022	19,527	1,34,701
8	Jun,2022	20,874	1,42,872
9	May'2022	17,320	1,06,972
10	April'2022	19,467	2,45,632
11	March'2022	14,855	1,07,713
12	Feb'2022	10,702	82,687
13	Jan'2022	10,268	80,071
14	Dec'2021	11,719	88,815
15	Nov'2021	10,445	81,199
16	Oct'2021	9,169	73,445
17	Sep'2021	9,385	74,751
18	Aug'2021	9,665	76,437
19	July'2021	9,087	72,932
20	Jun'2021	8,092	68,028

21	May'2021	7,841	1,23,599
22	Apr'2021	8,796	1,45,860
23	Mar'2021	9,131	73,197
24	Feb'2021	8,630	70,200
25	Jan'2021	9,767	75,570
26	Dec'2020	9,426	74,952
27	Nov'2020	9,537	75,642
28	Oct'2020	9,826	77,179
29	Sep'2020	9,730	76,656
30	Aug'2020	8,974	72,118
31	July'2020	9,115	72,800
32	Jun'2020	8,685	71,640

Table 4: Details of the electricity bill information

The above information shows that a huge amount is spent towards energy consumption in terms of units on a monthly basis.

4.4 Energy efficiency analysis

4.4.1 Energy efficient practices for alternative sources

- There are no alternative sources such as solar panels on rooftop/ solar parking/ solar farms/ solar parking/ geothermal energy sources etc..

4.4.2 Energy efficient equipment

- The premise has LED Lights to contribute to 100% in terms of number and **100% of the power requirement** is met through the same.
- The air conditioners are BEE star labelled appliances and new.
- The fans are not energy efficient but in good working conditions.
- Sensitization programs can be increased w.r.t this aspect.

4.5 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 is summarised in the following sections.

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

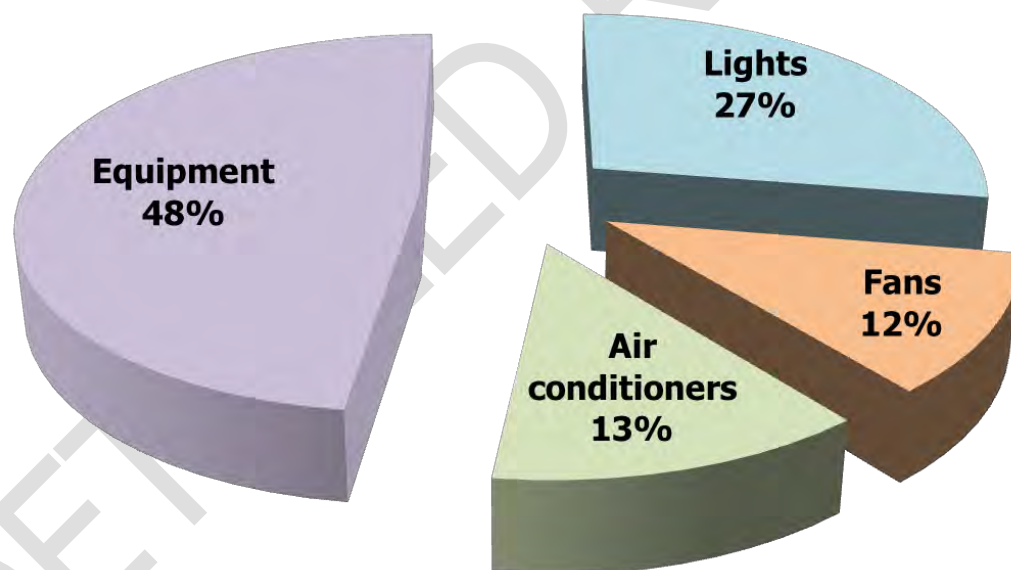


Figure 1: Summary of the calculated electrical consumption as per inventory

The above graph shows that equipment consumes 48% whereas the lights consume 27% while the air conditioners consume 13% and the fans consume 12% of the total calculated electrical energy.

4.6 Lights

4.6.1 Types of lights based on the numbers

There are a total of **1,705 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 **42,198 kWh** of energy and the **LED lights consume 100%** of the same.

4.6.4 Site investigation observations

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

4.7 Fans

4.7.1 Types of fans based on the numbers

There are a total of **626 fans** on the premises as follows:

S. No.	Type	Nos.
1	Ceiling fans	537
2	Exhaust fans	38
3	Pedestal fan	1
4	Wall mounted fans	50

Table 5: 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 **17,778 kWh** of the energy.

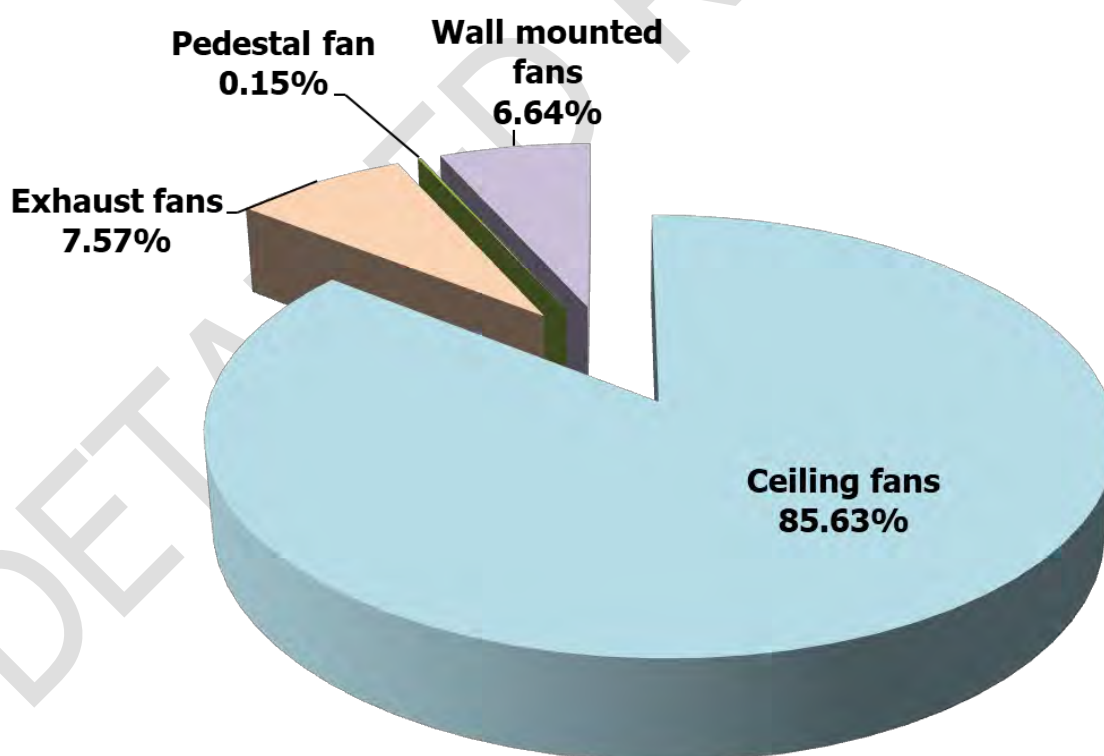


Figure 2: Types of fans based on power consumption

The above analysis shows the **Ceiling fans consume 85.63%** whereas the **Exhaust fans consume 7.57%** while the **Wall mounted fans consume 6.64%** and the **Pedestal fan consumes 0.15%** of the total power.

4.7.3 Energy efficiency-wise consumption analysis

There are no energy efficient fans in the premises.

4.7.4 Site investigation observations

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

DETAILED REPORT

4.8 Air conditioners

4.8.1 Types of air conditioners based on the numbers

There are **49 air conditioners** on the entire premises.

4.8.2 Building-wise consumption analysis

The energy consumption of air conditioners is **19,638 kWh** of energy.

4.8.3 Site investigation observations

The Outdoor units are properly cleaned, maintained and had no dust collection problems.

4.8.4 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.

4.9 Equipment

4.9.1 Types of Equipment

There are **224 nos. of equipment** in the Educational sector.

4.9.2 Types of equipment as per their energy contribution

The energy consumption of equipment is **73,546 kWh** of energy. (Only the general equipment have been considered for the study; the scientific equipment have been excluded for their nominal usage)

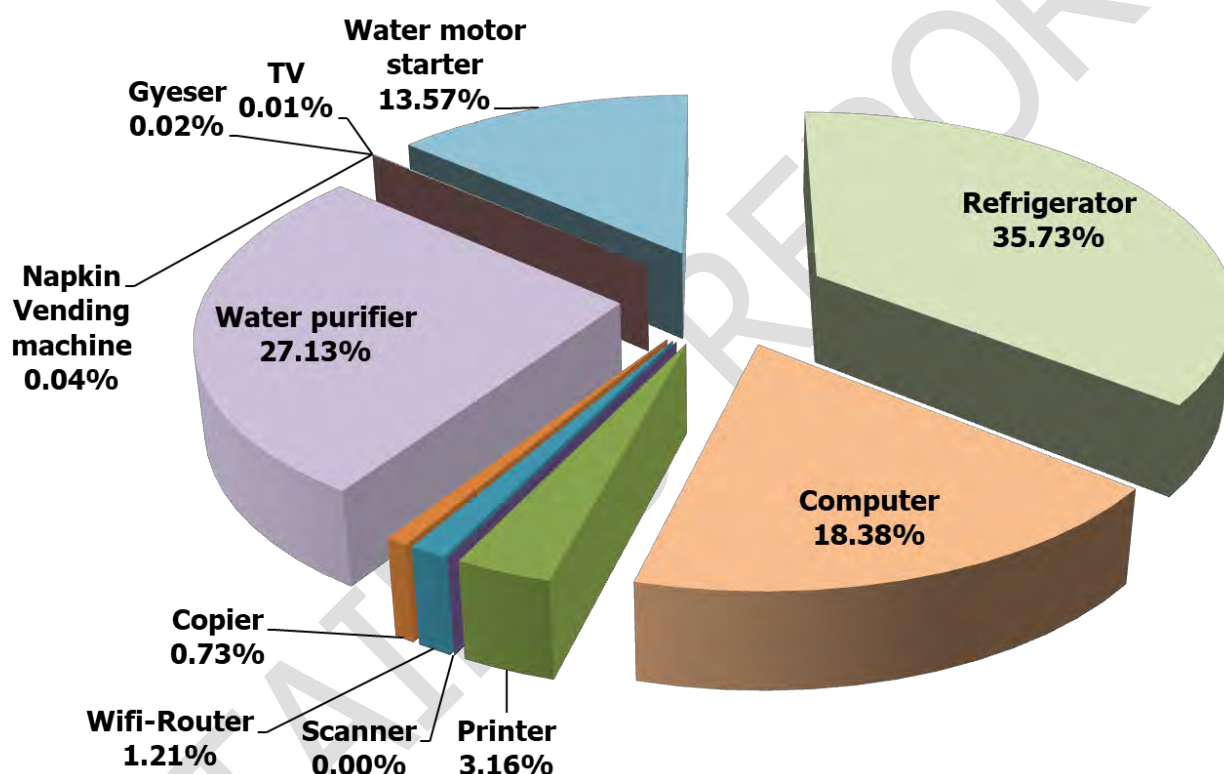


Figure 3: Energy consumed by types of equipment in the educational sector based on the usage study

The above summary shows that the **refrigerator consumes more energy at 35.73%** while the **water purifier consumes 27.13%** the **desktop computers consume 18.38%** and the **water motor starter machine consumes 13.57%** these are the maximum consumers as compared to other equipment.

4.9.3 Site investigation observations

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

4.10 Recommendations for a Sustainable Habitat

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.

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.

Section 3 - Equipment

- ➡ Replace the Non-LED (Regular) TV Monitors with LED equipment.
- ➡ Backup computer files during vacations.
- ➡ 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.

5. Inferences as consolidated study

(Based on the site visit)

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 – 3.5 years** from the date of the Report submission.

- ➔ **Solar farms** - This option can be explored with due discussion with the surrounding and adjacent farmland owners. This will serve as a noble project being one of its kind in the locality and will provide dual benefits to the farm land and the College w.r.t to electricity bill power reduction.
- ➔ **Solar tree** – Since there are certain space and structural constraints the option of providing an aesthetic beauty to the premises and benefit w.r.t to energy reduction can be provided with installation of solar tree in multiple places in the site.
- ➔ **Structural audit** – There is scope for undertaking structural audits in a few blocks to identify the structural stability as the premises is more than 50 years old.
- ➔ **Roofing study** – The roofs of certain blocks will have to be redesigned in such a manner that either they are converted into sloping roofs with better stability or flat roofs with better sunlight feasibility. The volume and height of the building will have to be worked upon. A sample of solar panels on sloping roofs is attached below, this can be shown to local municipality for approval, the redesign project can be undertaken by the project head and solar consultant in a joint manner.



Plate 1: Understanding the lighting concepts

Source: <https://www.archiexpo.com/prod/sunset-energietechnik-gmbh/product-74430-1179445.html>

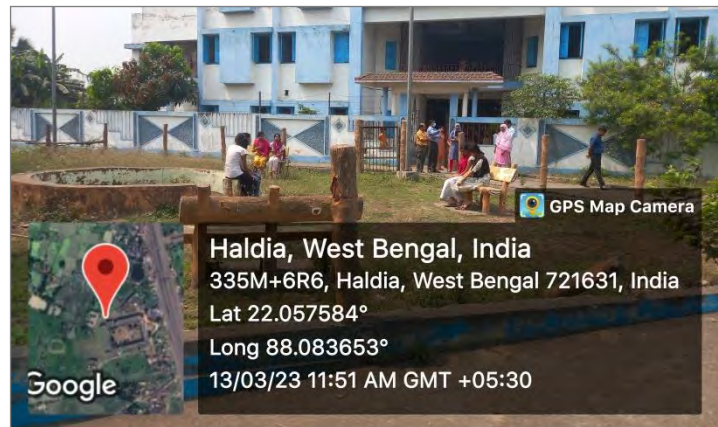
On-site investigation and physical verification
Audit Team during the visit on Monday, 13 March 2023



Discussion with the Core Team



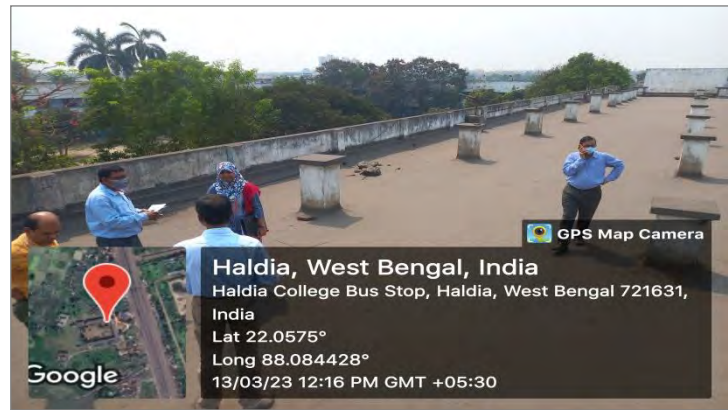
Site investigation of the indoor facilities



On-site discussion at the outdoors



Provision of open ground and site near the organic farm



Invetsigation of the terrace usage



Group photo with the team

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.

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=N G125PFE4WHMWSYAK8TCAKIHMWX0F4QD



ENVIRONMENT AUDIT

STUDY PERIOD (TWO YEARS) 2020 – 2021 & 2021 – 2022

Sustainability study
AUDIT REPORT

Studied for
Haldia Government College
Debhog, Haldia, Purba Medinipur,
West Bengal 721657, India

Studied in the capacity of
Accredited with IGBC and Certified with ASSOCHAM GEM
Registered Architect & Green Building Professional



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

Email: greenviosolutions@gmail.com

Valid till **March 2024**

Inferences of the Site visit

Audit conducted by : Nahida Shaikh, IGBC AP, GEM CP, Architect

Accredited and Certified Green Building Professional

ASSOCHAM GEM Certified Professional Registration number 22/718

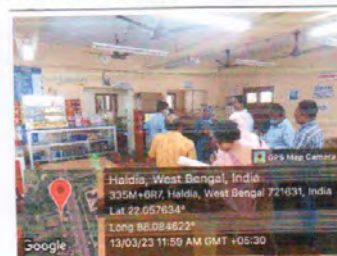
Link for the Verification website https://www.green-assochem.com/manage_gem_cp.php?page=12

Institute: HALDIA GOVERNMENT COLLEGE Date: 13 MARCH 2023

Audits covered: GREEN, ENERGY & ENVIRONMENT Day: MONDAY

Observations (POSITIVE)	Inferences
- Ramp in ladies toilet; sanitary machines - Farming (Organic garden) - Bamboo zone - Aquatic pond - collective team work	- undertake rain water harvesting; waste management

Evidence of the site visit



Signature of Ar. Nahida Shaikh,
ASSOCHAM GEM CP 22/718

College Name: HALDIA GOVERNMENT COLLEGE

Signature: [Signature]

Name: DR. PIJUSH KANTI TRIPATHI

Designation: OFFICER-IN-CHARGE

Date: 13.03.2023

Officer-in-charge
Haldia Government College
P.O.-Debhog, Dist.- Purba Medinipur



For Greenvio Solutions

Signature: [Signature]

Name: Mrs F. A. Shaikh

Designation: Manager

Date: 13/03/2023



Disclaimer

The Audit Team has prepared this report for the **Haldia Government College** located at Debhog, Haldia, Purba Medinipur, West Bengal 721657, 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 **Haldia Government College, West Bengal, 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 **of Higher Education Department, Government of West Bengal.**

Our heartfelt thanks to Chairperson of the entire process **Dr. Pijush Kanti Tripathi**, Officer-in-Charge for the valuable inputs.

We are also thankful to **College's Task force the faculty members** who have collected data required **Dr. Dipankar Sadhukhan**, Co-ordinator, IQAC; **Prof. Tanmay Kumar Maity**, Convener, NAAC Committee; **Dr. Dipankar Pramanik**, Jt. Convener, NAAC Committee; **Dr. Uday Sankar Midya**, Convener, DATA Management Committee; **Ms. Lakshmi Narayan Maity**, Member, NAAC Committee; **Prof. Kamala Kanta Kar**, Member, NAAC Committee; **Prof. Sarbeswar Halder**, Member, NAAC Committee; **Prof. Samit Ganguly**, Member, NAAC Committee; **Prof. Yogita Dutta**, Member, NAAC Committee and **Dr. Debolina Das**, Member, NAAC Committee.

We highly appreciate the assistance of 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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1. Introduction

1.1 About the Institute and its history

Haldia is a famous river-port town and is an expanding industrial belt in eastern India. **The Department of Higher Education, Government of West Bengal, realizing the educational needs of this rapidly growing town and its adjoining areas, decided to establish the second government college in the erstwhile district of Medinipur in 1988.**

As a result Haldia Government College was instituted. Under the affiliation of Vidyasagar University, the college came into being in 1988 and was inaugurated by the former Chief Minister of West Bengal, Shri Jyoti Basu, on 20th November. Since then it is continuously catering to students' need of higher education.

The College is located beside the broad four-lane highway between Rani Chak and City Centre bus stop. It is well connected with NH-41 and also the South-Eastern Railways. NH-6 is also not too far from the college. As a co-educational institute, the college offers degree courses in Arts and Science and also has a Vocational course on Tourism and Travel Management (TTM).

The College has been accredited by the National Assessment and Accreditation Council (NAAC) with a Grade "B+" (CGPA 2.52) in 2017. The College has good infrastructure at different levels of the B.A. and B.Sc. courses. In 2015 two Post Graduate courses were introduced in the College, in the departments of Geography and Chemistry.

1.2 Statements of the Institution

1.2.1 Vision

The College proposes

- To create opportunities of holistic education for a large section of the youth to enable them to evolve as proper citizens of modern India, thereby ensuring their role as nation builders.
- To provide the necessary knowledge and knowhow to help them in their

endeavours to enhance their skills.

- ➔ To evolve as a Centre of Higher Education and provide research opportunities.
- ➔ To ensure an environment that will stimulate intellectual growth and allow free exchange of ideas between members of different communities and social strata.

1.2.2 Mission

The College adheres and focuses

- ➔ To secure equal opportunities for students of all sections of society so that they are free from the pressures of discrimination imposed by social and monetary constraints.
- ➔ To encourage the youth to attain academic excellence overcoming the problems faced by backward and underprivileged sections of society.
- ➔ To create an atmosphere conducive to proper grooming of girl students who are often deprived of the same facilities as boy students.
- ➔ To generate interests among students in subjects ranging from the liberal arts, core science subjects to the social sciences and physical education.
- ➔ To equip students to seek jobs in future by providing vocational education like Tourism and Travel Management.
- ➔ To make students aware of their environment and help them to preserve ecological balance.
- ➔ To inculcate in them the spirit of curiosity and eagerness to seek knowledge to pave the way for sustained academic research in the sciences, social sciences and liberal arts.
- ➔ To give them information on issues of national and global significance so that they are able to play a larger role in nation building.

- To enable and initiate them to handle the challenges of life in the context of the present scenario of increased competition and demanding levels of commitment.

1.2.3 Aim

As a government general degree college the main aim is to provide quality education with a very nominal cost.

1.2.4 Objective

It is the objective of the College is:

- Spread of value based education among different sections of society irrespective of caste, creed and gender.
- Encourage and promote higher education and research among the youth for more meaningful roles in social development.

1.3 Assessment of the Institute

1.3.1 Affiliations

The Institute is affiliated to **Vidyasagar University**, established by an Act of the West Bengal legislature which was notified in the Calcutta Gazette on 24 June 1981 it is an affiliating university in Paschim Medinipur district of southern West Bengal, India.

1.3.2 Accreditation

The following are details awarded by the National Assessment & Accreditation Council.

Cycle	First	Second
CGPA	71.2	2.52
Grade	B	B+
Year	2007	2017

Table 1: NAAC Accreditation details of the Institute

The College is due to enter its Third cycle of NAAC.

1.3.3 Certification

The College has received the following Certifications

- ➡ NIRF – Participated in the National Institutional Ranking Framework.
- ➡ AISHE – The All India Survey of Higher Education code is C- 19049.

1.3.4 Recognitions

The College has upgraded in the teaching level – Under graduate to Post graduate in the **section 2(f) and 12 (B) of the University Grants Council Act, 1956.**

2. Institution overview

2.1 Populace analysis for Academic year 2021 - 2022

2.1.1 Students data

The student data (shared by the College) shows there were a total of **614 male and 825 female students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin staff	1	0	1
Teaching staff	36	12	48
Non-Teaching staff	3	13	16
Total Staff Members	40	25	65

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

The staff data shows the premises had a total of **65** Staff Members.

2.2 Populace analysis for Academic year 2020 - 2021

2.2.1 Students data

The student data (shared by the College) shows there were a total of **623 male and 817 female students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin staff	1	0	1
Teaching staff	35	12	47
Non-Teaching staff	3	14	17
Total Staff Members	39	26	65

Table 3: Staff data of the Institution for 2020 - 2021

The staff data shows the premises had a total of **65** Staff Members.

2.3 Total College Area & College Building Spread Area

The **total site area is 19.33 acres & total Built-up area of College is 25,990 sq. ft. for around 1,504 populace footfalls.**

2.4 College Infrastructure

2.4.1 Establishment

The College was established in 1988.

2.4.2 Spatial Organisation

The College has ample and wide open classes with facilities appropriate for an educational space. There are open spaces with a beautiful entrance approach. The balance of hardscape and softscape provides a landscape serene ambience. **Overall the Infrastructure of the Building is excellent in terms of the Architecture Design.**

2.4.3 Operation and maintenance of the premises

The data collection session was held with the staff regarding the operation and working hours. The schedule is mentions that the College is working Monday to Saturday from 10:00 hours to 17:00 hours.

3. Green Building research approach

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:

- ➔ Analysis of the data
- ➔ Observations
- ➔ Inferences
- ➔ Way forward

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

- ➔ Allotment and Initiation by the Institute
- ➔ Survey of students and staff completed
- ➔ Site visit at the Institute
- ➔ Submission of the Certificate

Induction Meeting

Institute: HALDIA GOVERNMENT COLLEGE Date: 13 MARCH 2023

Audits covered: GREEN ENERGY ENVIRONMENT Day: MONDAY

S. No	Name	Designation	Signature
1.	MRS. F. A. SHAIKH [EXTERNAL]	CO-ORDINATOR	<i>[Signature]</i>
2.	AR. NAHIDA ABDULLA [EXTERNAL]	PROJECHEAD	<i>[Signature]</i>
3.	DR. PIJUSH KANTI TRIPATHI	OFFICER-IN-CHARGE	<i>[Signature]</i>
4.	TANMA KR. MAITY	NAAC COORDINATOR	<i>[Signature]</i>
5.	DR. DIPANKAR SADHUKHAN	ISAC COORDINATOR	<i>[Signature]</i>
6.	DR. SHYAMSUNDAR SAHOO	NAAC MEMBER	<i>[Signature]</i>
7.	KAMALA KANTA KAR	Asst. Professor	<i>[Signature]</i>
8.	DR. ANANYA CHATTERJEE	Asst. Professor NAAC Member	<i>[Signature]</i>
9.	DR. UDAY SANKAR MIDYA	Convener, Data Management Committee	<i>[Signature]</i>
10.	MR. LAKSHMINARAYAN MAITY	Librarian (S.G.)	<i>[Signature]</i>
11.	DR. DIPANKAR PRAMANIK	NAAC JT. CO-ORDINATOR	<i>[Signature]</i>
12.	SARBESWAR HALDAR	HEAD, DEPT. OF CHEM.	<i>[Signature]</i>
13.	Mrs. YOGITA DUTTA	Asst. Professor	<i>[Signature]</i>

College Name: HALDIA GOVERNMENT COLLEGE
Signature: *[Signature]*
Name: DR. PIJUSH KANTI TRIPATHI
Designation: OFFICER-IN-CHARGE
Date: 13.03.2023
Officer-in-charge
Haldia Government College
P.O.-Debhog, Dist.- Purba Medinipur



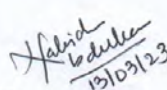
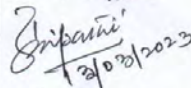
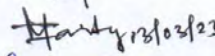
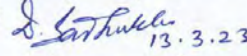
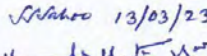
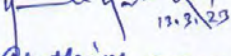
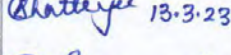
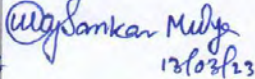
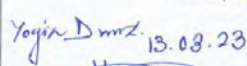
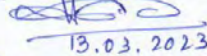
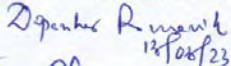
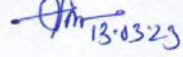
For Greenvio Solutions
Signature: *[Signature]*
Name: Mrs F. A. Shaikh
Designation: Manager
Date: 13/03/2023

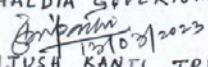


Exit Meeting

Institute: HALDIA GOVERNMENT COLLEGE Date: 13 MARCH 2023

Audits covered: GREEN, ENERGY & ENVIRONMENT Day: MONDAY

S. No	Name	Designation	Signature
1.	MRS. F.A. SHAIKH [EXTERNAL]	CO-ORDINATOR	
2.	AR. NAHIDA ABDULLA [EXTERNAL]	PROJECHEAD	
3.	DR. PIJUSH KANTI TRIPATHI	OFFICER-IN-CHARGE	
4.	TANMAY KR. MAITY	NAAC Coordinator	
5.	DR. DIPANKAR SADHUKHAN	ISAC COORDINATOR	
6.	DR. SHYAMSUNDAR SAHOO	NAAC MEMBER	
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11.	LAKSHMI NARAYAN MAITY	NAAC JT. CO-ORDINATOR	
12.	DR. DIPANKAR PRAMANIK	HEAD, DEPT. OF CHEM.	
13.	SARBESWAR HALDAR	Assistant Professor	

College Name: HALDIA GOVERNMENT COLLEGE
Signature: 
Name: DR. PIJUSH KANTI TRIPATHI
Designation: OFFICER-IN-CHARGE
Date: 13.03.2023

Officer-in-charge
Haldia Government College
P.O.-Debhog, Dist.- Purba Medinipur



For Greenvio Solutions
Signature: 
Name: Mrs F. A. Shaikh
Designation: Manager
Date: 13/03/2023



4. Site investigations

The following listed are the site elements observed during the site visit. These are documented with spaces-positive points-improvement areas as follows:

S. No.	Building/ Space	Positive points	Improvement areas
1.	Outdoor areas	➔ Wheelchair provisions ➔ Seating around the trees ➔ Pollution meter installed by the PWD ➔ Two separate pump houses ➔ Dedicated cycle stand provision ➔ Map of the site provided as accessibility route near the entrance of the premises	➔ Scientific name plates on some of plantations ➔ Ramps could be provided with signboards ➔ Write to the PWD to install a display board as well about pollution meter ➔ Paint the compound wall with awareness messages ➔ Provide appropriate fencing around the transformer area along with 'DANGER' and 'SAFETY' signboards ➔ Renovate the roof and structure of the drinking water area outside the canteen ➔ Label the same drinking water area as 'BREAKOUT ZONE 1' ➔ Provide appropriate brick linings to bifurcate the hardscape and softscape all through the site

			➤ Undertake water cleaning of the outdoor areas twice a day to avoid the dust accumulation due to roadside pollution ➤ The shed area outside parking could be improvised further to convert the same into 'BREAKOUT ZONE 2' ➤ Provide appropriate fencing around the water pumps with certain signages about safety and signboards ➤ Beautify and develop the kitchen garden into an organic farm – This can be done through ➤ <i>Fencing</i> ➤ <i>Signboard about the area</i> ➤ <i>Display board with information about the plants grown</i> ➤ <i>Organic compost pit close by so that the manure can be used in farm and the compost pit can be maintained with the waste from canteen.</i>
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2.	Corridor (Ground floor – Outside the Physical education dept.)	➔ Wide enough for populace ➔ Well connected	➔ Undertake a structural audit and carry the repairs work as the reinforcement is withering out – We were informed the PWD has been informed and work is under process
3.	Bengali dept. room (Ground floor)	➔ Sufficiently spaced class	➔ Can be equipped with smart board facilities
4.	Office (Ground floor)	➔ Well ventilated	➔ Clean the dust accumulated on the ceiling areas ➔ Remove the unwanted storage ➔ Chicken mesh Jalis could be used to cover the windows to avoid the dust accumulation inside the premises.
5.	Toilet (Ground floor)	➔ Ladies toilet has ramp facilities ➔ Drinking water facility is provided outside the toilets	➔ Electrical board areas should include a 'DANGER' sign in addition to 'DO NOT TOUCH' Safety signage
6.	Library (First floor)	➔ OPAC Software available for library management ➔ KOHA software available for data management ➔ Rich collection on local history of the region	➔ Remove the old unwanted electrical line running in one of the walls through PWD ➔ Check possibility of availing the ABRAR software

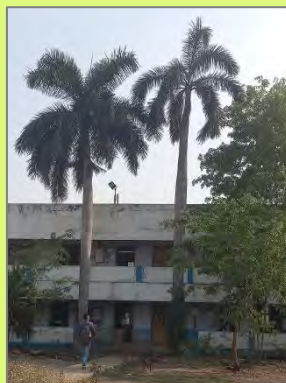
7.	Computer laboratory of the Geography dept.	➤ Availability of UPS	➤ Include Fire extinguisher
8.	Geography dept.	➤ Excellent facility for soil testing	➤ Undertake third party consultancy projects through local farmers and government departments as this will generate funds and provide testing facility as a practical work for the students and staff members
9.	Smart classroom (First floor)	➤ Cool atmosphere maintained inside the space	➤ Include fire extinguisher
10.	Environmental related materials	➤ There are around 5-10% of environment related materials in the form of books, journals etc.	➤ This number and percentage could be increased. ➤ Avail student membership facilities
11.	Dust pollution problem in entire premises	-	➤ Install chicken mesh jalis inside all rooms ➤ Plant huge size trees on the peripheries
12.	Green chemistry	-	➤ Neutralise the chemicals before letting them into storm water drains ➤ Undertake waste water management plant system in coordination with PWD/ CSR

Table 4: Site specific features documentation based on the physical investigation

There are huge varieties of trees and shrubs totaling to 500+ planted along the periphery of the premise. There is provision of Courtyard in the main Institutional Building which has vegetation this enhances the biodiversity, reduces noise pollution, mains micro climate and helps in urban heat island reduction.



Mapping study of the green cover



Open spaces and green cover in the campus

5. Site observations

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.

5.1 Open Spaces

There is an open space in 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.**

5.2 Biodiversity audit

5.2.1 Flora audit

A flora survey was carried out to identify the total numbers of plants and trees. The landscape area has a variety of plantations constituting hundreds of surveyed trees in premises documented below.

S. No.	Plant name	Type	Nos.	Planted by
1	<i>Palash</i>	Tree	10	Planted by staff and students
2	<i>Palm</i>	Tree	46	Planted by staff and students
3	<i>Taal-supari</i>	Tree	14	Planted by staff and students
4	<i>Debdaru</i>	Tree	42	Planted by staff and students

5	<i>Chhatim</i>	Tree	10	Planted by staff and students
6	<i>Sishu</i>	Tree	6	Planted by staff and students
7	<i>Supuri</i>	Tree	20	Planted by staff and students
8	<i>Mango</i>	Tree	15	Planted by staff and students
9	<i>Jaam</i>	Tree	7	Planted by staff and students
10	<i>Khejur</i>	Tree	19	Naturally
11	<i>Coconut</i>	Tree	17	Planted by staff and students
12	<i>Taal</i>	Tree	8	Naturally
13	<i>Jhau</i>	Herb	32	Planted by staff and students
14	<i>Sajne</i>	Tree	10	Planted by staff and students
15	<i>Banana</i>	Herb	25	Planted by staff and students
16	<i>Neem</i>	Tree	4	Naturally
17	<i>Bakul</i>	Tree	11	Planted by staff and students
18	<i>Akashmoni</i>	Tree	22	Planted by staff and students
19	<i>Guava</i>	Herb	8	Planted by staff and students
20	<i>Jackfruit</i>	Tree	3	Naturally
21	<i>Krishnachuda</i>	Tree	13	Naturally
22	<i>Kadam</i>	Tree	2	Naturally
23	<i>Siuli</i>	Herb	2	Planted by staff and students
24	<i>Amra</i>	Herb	2	Planted by staff and students
25	<i>Bat</i>	Tree	3	Naturally
26	<i>Kul</i>	Herb	2	Naturally
27	<i>Karpas</i>	Tree	2	Planted by staff and students

28	<i>Areka palm</i>	Herb	120	Planted by staff and students
29	<i>Tagar</i>	Herb	10	Planted by staff and students
30	<i>Gandharaj</i>	Herb	5	Planted by staff and students
31	<i>Karabi</i>	Herb	20	Planted by staff and students
32	<i>Jaba</i>	Herb	20	Planted by staff and students
33	<i>Farfaria</i>	Herb	10	Planted by staff and students

Table 5: Details of the Flora in the premises

At present, there are 540 nos. plantations on the premises. The overall ambience of premises has lots of plants.

5.2.2 Fauna audit

The details of the fauna available in the premises are documented as follows:

- ➔ *Cat*
- ➔ *Crow*
- ➔ *Dove*
- ➔ *Cuckoo*
- ➔ *Sparrow*
- ➔ *Kite*
- ➔ *Magpie Robin*
- ➔ *Heron*
- ➔ *Swallow*
- ➔ *Bat*
- ➔ *Kingfisher*
- ➔ *Hawk*
- ➔ *Dabchick*
- ➔ *Nightingale*
- ➔ *Carp Fish*
- ➔ *Rohu Fish*
- ➔ *Prawn*

- *Silver Carp*
- *Bata Fish*
- *Gas Carp*
- *Crab*
- *Common Tailorbird*
- *Common Myna*
- *Mongoose*
- *Olive Barb Fish*
- *Pangasius Fish*
- *Anabus Fish*
- *Rat*
- *Tengra Fish*
- *Tilapia*
- *Jackals and foxes (Occasionally)*

The premise has a beautiful and rich fauna; it enhances the co-existence and provides a fresh environment for the premises.

5.3 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.**

5.4 Carbon Footprint Audit

5.4.1 Eco-friendly Commuting Practices

- The College in a rural set-up amidst lush green farms on all sides.
- Additionally, the local government provides bus services to the students who reside outside the areas thereby the major reliance of the stakeholders are on shared commuting.
- The students and staff members who reside in and around the farms (villages) walk up to the premises or use bicycles. There are quite few nos. of staff members who

commute using the bikes and cars.

- ➔ **Thus, the carbon footprint owing to polluting vehicles is quite less. The surrounding has innumerable acres of land covered with agricultural farms thus providing a pollution free ambience for the stakeholders.**

5.4.2 Heat Island Reduction

The team was present for duration of almost 3 days on site; during this tenure the following observations and inferences were documented:

- ➔ The overall atmosphere is between cool and warm the reason being close proximity to the sea-side.
- ➔ The College enjoys proximity to natural river side areas and ports.
- ➔ However, since it is situated amidst an Industrial town side area adjacent to the busy road side there are innumerable dust related issues faced by the stakeholders.
- ➔ The problem is so severe that the terraces, internal walkways, plants and leaves, indoor flooring have all turned black due to the coal sand being washed off due to the transport activities.
- ➔ This problem is neither minor nor can it be ignored; an appropriate environmental report should be submitted to the governmental authorities to develop an ecological solution to this problem; if not resolved this can cause detrimental effects on the health of the stakeholders in future.

5.4.3 Outdoor Light Pollution Study

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

5.5 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.

- ➔ Ramps at the entrance area
- ➔ Low height risers in the staircases
- ➔ Drinking water accessible at appropriate height
- ➔ Non-slippery floor surfaces
- ➔ Internal doorways being around or more than 750mm wide

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

5.6 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.

We have observed that fire extinguishers are the only source of fire safety measures at present.

6. Site inferences

6.1 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.

6.1.1 Site beautification

- ➔ **Beautification of the entrance pathway** - The existing bricks (waste from the existing new construction going on) can be used or upgraded the pathway through an appropriate Landscape Architecture design.
- ➔ **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.
- ➔ **Garden development** - The existing open space should be designed as an Architectural landscape.
 - Nursery documentation, expansion and beautification – The premises should have a nursery, details can be decided as per the landscape beautification.
 - Scientific name plates and QR codes – The team should undertake a project to have name plates with QR codes on every plant of the premises.
 - The landscape redesign and ecological redesign – This should be done to increase the shade cover in the entire premises.
 - Introduce various types of gardens inside the premises – The examples such as Flower gardens, Woodland gardens, Rock gardens, Water gardens, Vegetable and herb gardens, Roof gardens, Scented gardens, Medicinal gardens and Botanical gardens can be practiced.

6.1.2 Heat island reduction

Cool rooftops - It is suggested that the Institute gets the Terrace roofs painted with Cooltop as it will help reduce the temperature of the spaces.

6.1.3 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 - Audio Visual Section** – There should be dedicated section for their visually impaired students to listen to the audio books; Abrar the audio book reader should be available.

6.1.4 Life safety

- ➔ **Mandate fire extinguisher in spaces** - One fire extinguisher should mandatorily be there in every space which has an air conditioner/ gas cylinder.
- ➔ **Combustible equipment** - Every space which has a gas cylinder or combustible equipment should have a provision for the barricade around the gas cylinders, appropriate safety board's mentioning 'danger sign' and 'Do not touch' with an additional small fire extinguisher close by.

6.1.5 Pollution Control

- ➔ **Specific area designated for E-vehicles** – There should be designated area dedicated to E-vehicles parking and charging and this zone should be demarcated as 'Eco-Zone'
- ➔ **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.

On-site investigation and physical verification
Audit Team during the visit on Monday, 13 March 2023



Discussion with the Core Team



Site investigation of the indoor facilities



On-site discussion at the outdoors



Provision of open ground and site near the organic farm



Invetsigation of the terrace usage



Group photo with the team

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.

- ➔ 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.



GREEN AUDIT

STUDY PERIOD (TWO YEARS) 2020 – 2021 & 2021 – 2022

Sustainability study
AUDIT REPORT

Studied for
Haldia Government College
Debhog, Haldia, Purba Medinipur,
West Bengal 721657, India

Studied in the capacity of
Accredited Green Building Professional
with the Indian Green Building Council



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

Email: greenenviosolutions@gmail.com

Valid till **March 2024**

Background reference image Sasin Tipchai on unsplash

Inferences of the Site visit

Audit conducted by : Nahida Shaikh, IGBC AP, GEM CP, Architect

Accredited and Certified Green Building Professional

ASSOCHAM GEM Certified Professional Registration number 22/718

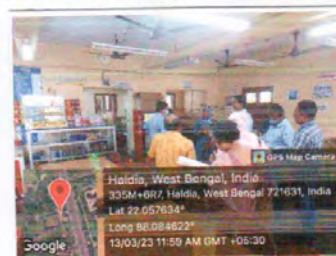
Link for the Verification website https://www.green-assochem.com/manage_gem_cp.php?page=12

Institute: HALDIA GOVERNMENT COLLEGE Date: 13 MARCH 2023

Audits covered: GREEN, ENERGY & ENVIRONMENT Day: MONDAY

Observations (POSITIVE)	Inferences
- Ramp in ladies toilet; sanitary machines - Farming (Organic garden) - Bamboo zone - Aquatic pond - collective team work	- undertake rain water harvesting; waste management

Evidence of the site visit



Signature of Ar. Nahida Shaikh,
ASSOCHAM GEM CP 22/718

College Name: HALDIA GOVERNMENT COLLEGE

Signature: [Signature]

Name: DR. PITUSH KANTI TRIPATHI

Designation: OFFICER-IN-CHARGE

Date: 13.03.2023

Officer-in-charge
Haldia Government College
P.O.-Debhog, Dist.- Purba Medinipur



For Greenvio Solutions

Signature: [Signature]

Name: Mrs F. A. Shaikh

Designation: Manager

Date: 13/03/2023



Disclaimer

The Audit Team has prepared this report for the **Haldia Government College** located at Debhog, Haldia, Purba Medinipur, West Bengal 721657, 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 **Haldia Government College, West Bengal, India** for assigning this important work of Green Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **of Higher Education Department, Government of West Bengal.**

Our heartfelt thanks to Chairperson of the entire process **Dr. Pijush Kanti Tripathi**, Officer-in-Charge for the valuable inputs.

We are also thankful to **College's Task force the faculty members** who have collected data required **Dr. Dipankar Sadhukhan**, Co-ordinator, IQAC; **Prof. Tanmay Kumar Maity**, Convener, NAAC Committee; **Dr. Dipankar Pramanik**, Jt. Convener, NAAC Committee; **Dr. Uday Sankar Midya**, Convener, DATA Management Committee; **Ms. Lakshmi Narayan Maity**, Member, NAAC Committee; **Prof. Kamala Kanta Kar**, Member, NAAC Committee; **Prof. Sarbeswar Halder**, Member, NAAC Committee; **Prof. Samit Ganguly**, Member, NAAC Committee; **Prof. Yogita Dutta**, Member, NAAC Committee and **Dr. Debolina Das**, Member, NAAC Committee.

We highly appreciate the assistance of 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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1. Introduction

1.1 About the Institute and its history

Haldia is a famous river-port town and is an expanding industrial belt in eastern India. **The Department of Higher Education, Government of West Bengal, realizing the educational needs of this rapidly growing town and its adjoining areas, decided to establish the second government college in the erstwhile district of Medinipur in 1988.**

As a result Haldia Government College was instituted. Under the affiliation of Vidyasagar University, the college came into being in 1988 and was inaugurated by the former Chief Minister of West Bengal, Shri Jyoti Basu, on 20th November. Since then it is continuously catering to students' need of higher education.

The College is located beside the broad four-lane highway between Rani Chak and City Centre bus stop. It is well connected with NH-41 and also the South-Eastern Railways. NH-6 is also not too far from the college. As a co-educational institute, the college offers degree courses in Arts and Science and also has a Vocational course on Tourism and Travel Management (TTM).

The College has been accredited by the National Assessment and Accreditation Council (NAAC) with a Grade "B+" (CGPA 2.52) in 2017. The College has good infrastructure at different levels of the B.A. and B.Sc. courses. In 2015 two Post Graduate courses were introduced in the College, in the departments of Geography and Chemistry.

1.2 Statements of the Institution

1.2.1 Vision

The College proposes

- To create opportunities of holistic education for a large section of the youth to enable them to evolve as proper citizens of modern India, thereby ensuring their role as nation builders.
- To provide the necessary knowledge and knowhow to help them in their

endeavours to enhance their skills.

- ➔ To evolve as a Centre of Higher Education and provide research opportunities.
- ➔ To ensure an environment that will stimulate intellectual growth and allow free exchange of ideas between members of different communities and social strata.

1.2.2 Mission

The College adheres and focuses

- ➔ To secure equal opportunities for students of all sections of society so that they are free from the pressures of discrimination imposed by social and monetary constraints.
- ➔ To encourage the youth to attain academic excellence overcoming the problems faced by backward and underprivileged sections of society.
- ➔ To create an atmosphere conducive to proper grooming of girl students who are often deprived of the same facilities as boy students.
- ➔ To generate interests among students in subjects ranging from the liberal arts, core science subjects to the social sciences and physical education.
- ➔ To equip students to seek jobs in future by providing vocational education like Tourism and Travel Management.
- ➔ To make students aware of their environment and help them to preserve ecological balance.
- ➔ To inculcate in them the spirit of curiosity and eagerness to seek knowledge to pave the way for sustained academic research in the sciences, social sciences and liberal arts.
- ➔ To give them information on issues of national and global significance so that they are able to play a larger role in nation building.

- To enable and initiate them to handle the challenges of life in the context of the present scenario of increased competition and demanding levels of commitment.

1.2.3 Aim

As a government general degree college the main aim is to provide quality education with a very nominal cost.

1.2.4 Objective

It is the objective of the College is:

- Spread of value based education among different sections of society irrespective of caste, creed and gender.
- Encourage and promote higher education and research among the youth for more meaningful roles in social development.

1.3 Assessment of the Institute

1.3.1 Affiliations

The Institute is affiliated to **Vidyasagar University**, established by an Act of the West Bengal legislature which was notified in the Calcutta Gazette on 24 June 1981 it is an affiliating university in Paschim Medinipur district of southern West Bengal, India.

1.3.2 Accreditation

The following are details awarded by the National Assessment & Accreditation Council.

Cycle	First	Second
CGPA	71.2	2.52
Grade	B	B+
Year	2007	2017

Table 1: NAAC Accreditation details of the Institute

The College is due to enter its Third cycle of NAAC.

1.3.3 Certification

The College has received the following Certifications

- ➡ NIRF – Participated in the National Institutional Ranking Framework.
- ➡ AISHE – The All India Survey of Higher Education code is C- 19049.

1.3.4 Recognitions

The College has upgraded in the teaching level – Under graduate to Post graduate in the **section 2(f) and 12 (B) of the University Grants Council Act, 1956.**

2. Institution overview

2.1 Populace analysis for Academic year 2021 - 2022

2.1.1 Students data

The student data (shared by the College) shows there were a total of **614 male and 825 female students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin staff	1	0	1
Teaching staff	36	12	48
Non-Teaching staff	3	13	16
Total Staff Members	40	25	65

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

The staff data shows the premises had a total of **65** Staff Members.

2.2 Populace analysis for Academic year 2020 - 2021

2.2.1 Students data

The student data (shared by the College) shows there were a total of **623 male and 817 female students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin staff	1	0	1
Teaching staff	35	12	47
Non-Teaching staff	3	14	17
Total Staff Members	39	26	65

Table 3: Staff data of the Institution for 2020 - 2021

The staff data shows the premises had a total of **65** Staff Members.

2.3 Total College Area & College Building Spread Area

The **total site area is 19.33 acres & total Built-up area of College is 25,990 sq. ft. for around 1,504 populace footfalls.**

2.4 College Infrastructure

2.4.1 Establishment

The College was established in 1988.

2.4.2 Spatial Organisation

The College has ample and wide open classes with facilities appropriate for an educational space. There are open spaces with a beautiful entrance approach. The balance of hardscape and softscape provides a landscape serene ambience. **Overall the Infrastructure of the Building is excellent in terms of the Architecture Design.**

2.4.3 Operation and maintenance of the premises

The data collection session was held with the staff regarding the operation and working hours. The schedule is mentions that the College is working Monday to Saturday from 10:00 hours to 17:00 hours.

3. Green Building research approach

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:

- ➔ Analysis of the data
- ➔ Observations
- ➔ Inferences
- ➔ Way forward

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.

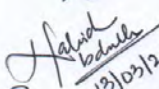
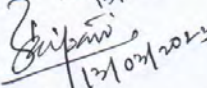
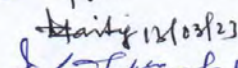
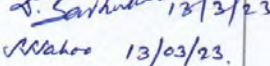
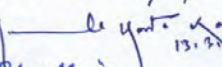
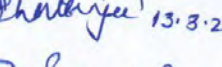
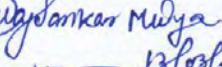
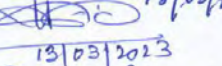
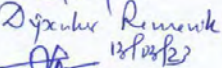
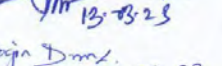
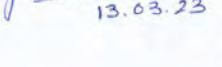
3.4 Activities undertaken for the Green Building Study Audit

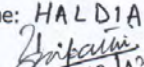
- ➔ Allotment and Initiation by the Institute
- ➔ Survey of students and staff completed
- ➔ Site visit at the Institute
- ➔ Submission of the Certificate

Induction Meeting

Institute: HALDIA GOVERNMENT COLLEGE Date: 13 MARCH 2023

Audits covered: GREEN ENERGY ENVIRONMENT Day: MONDAY

S. No	Name	Designation	Signature
1.	MRS. F. A. SHAIKH [EXTERNAL]	CO-ORDINATOR	
2.	AR. NAHIDA ABDULLA [EXTERNAL]	PROJECHEAD	
3.	DR. PIJUSH KANTI TRIPATHI	OFFICER-IN-CHARGE	
4.	TANMA KR. MAITY	NAAC COORDINATOR	
5.	DR. DIPANKAR SADHUKHAN	ISAC COORDINATOR	
6.	DR. SHYAMSUNDAR SAHOO	NAAC MEMBER	
7.	KAMALA KANTA KAR	Asst. Professor	
8.	DR. ANANYA CHATTERJEE	Asst. Professor NAAC Member	
9.	DR. UDAY SANKAR MIDYA	Convener, Data Management Committee	
10.	MR. LAKSHMINARAYAN MAITY	Librarian (S.G.)	
11.	DR. DIPANKAR PRAMANIK	NAAC JT. CO-ORDINATOR	
12.	SARBESWAR HALDAR	HEAD, DEPT. OF CHEM.	
13.	Mrs. YOGITA DUTTA	Asst. Professor	

College Name: HALDIA GOVERNMENT COLLEGE
Signature: 
Name: DR. PIJUSH KANTI TRIPATHI
Designation: OFFICER-IN-CHARGE
Date: 13.03.2023
Officer-in-charge
Haldia Government College
P.O.-Debhog, Dist.- Purba Medinipur



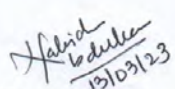
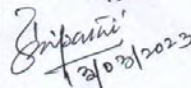
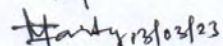
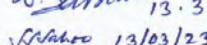
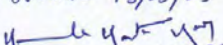
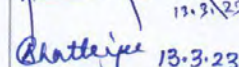
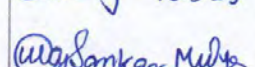
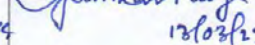
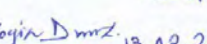
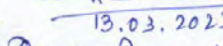
For Greenvio Solutions
Signature: 
Name: Mrs F. A. Shaikh
Designation: Manager
Date: 13/03/2023

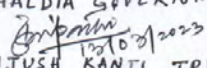


Exit Meeting

Institute: HALDIA GOVERNMENT COLLEGE Date: 13 MARCH 2023

Audits covered: GREEN, ENERGY & ENVIRONMENT Day: MONDAY

S. No	Name	Designation	Signature
1.	MRS. F.A. SHAIKH [EXTERNAL]	CO-ORDINATOR	
2.	AR. NAHIDA ABDULLA [EXTERNAL]	PROJECHEAD	
3.	DR. PIJUSH KANTI TRIPATHI	OFFICER-IN-CHARGE	
4.	TANMAY KR. MAITY	NAAC Coordinator	
5.	DR. DIPANKAR SADHUKHAN	ISAC COORDINATOR	
6.	DR. SHYAMSUNDAR SAHOO	NAAC MEMBER	
7.	KAMALA KANTA KAR	Asst. Professor	
8.	DR. ANANYA CHATTERJEE	Asst. Professor NAAC Member	
9.	DR. UDAY SANKAR MIDYA	Convener, Data Management Committee	
10.	Mrs. YOGIA DUTTA	Asst. Professor Librarian (S.G.)	
11.	LAKSHMI NARAYAN MAITY	NAAC JT. CO-ORDINATOR	
12.	DR. DIPANKAR PRAMANIK	HEAD, DEPT. OF CHEM.	
13.	SARBESWAR HALDAR	Assistant Professor	

College Name: HALDIA GOVERNMENT COLLEGE
Signature: 
Name: DR. PIJUSH KANTI TRIPATHI
Designation: OFFICER-IN-CHARGE
Date: 13.03.2023

Officer-in-charge
Haldia Government College
P.O.-Debhog, Dist.- Purba Medinipur



For Greenvio Solutions
Signature: 
Name: Mrs F. A. Shaikh
Designation: Manager
Date: 13/03/2023



4. Green Practices Audit

The increasing global warming and climate change have made us realise that apart from the enormous strategies the individual small efforts need to be taken by individuals and Educational Institutes as the younger generations are the future of the world and once they are taught about these practices only then can we assume a better future.

4.1 Green practices

We observed the following points during the Site investigation and data verification of the premises; these are common for all the Buildings on the premises.

- ➔ **Social awareness** - *The College has taken up awareness drives on various social issues for rural upliftment and regeneration in the College and surrounding villages.*
- ➔ **Fresh environment** – *The College provides an eco-friendly ambience with fresh air and soothing environment which helps to maintain a physical and mental balance. This kind of a space it a must for an educational specially technical institute which is inviting and gives the stakeholders an opportunity to explore indoor and outdoor learning to a great extent.*
- ➔ **Team work** – *The best quality of the College which sets it apart is its coordinating, cooperative staff members; for a building the foundation plays the most important role for its future similarly for an educational institute its staff members do.*

4.2 Community development

The College conducts environmental initiatives documented as follows:

S. No.	Name of the event	Date
1	Special Cleanness activities on the Riverside of Haldia Port area in observance of the International Coastal Cleaning Day	17-Sep-22
2	Puneet Sankalp	05-Dec-22

3	Puneet Sagar Aviyan at Haldia River side, Township	17-Sep-22
4	Campus cleaning	13-Aug-22
5	Haldia River site cleaning at Haldia River site, Township	12-Aug-22
6	Tree plantation at college campus	30-Jul-22
7	Special Tree plantation programme at College campus in Collaboration with Sabujer Abhijan	29-Jun-22
8	Tree plantation at college campus	29-Jun-22
9	Special Tree plantation programme at College campus in Collaboration with Sutahata Jeevandeep Voluntary Blood Donor's Association	15-Jun-22
10	State Level Webinar on 'Living Sustainability in Harmony with Nature' on the World Environment Day	05-Jun-22
11	World Environment Day Observation at Haldia River side in collaboration with West Bengal Waste Management Ltd., Sutahata	05-Jun-22
12	Bicycle Rally on the World Bicycle Day	03-Jun-22
13	Waste recycling plant visit and cleaning at West Bengal Waste Management Ltd., Sutahata	27-May-22
14	Campus cleaning	23-Apr-22
15	Fire and Safety Awareness Programme	20-Apr-22
16	Puneet Sagar Aviyan at Haldia River side, Township	15-Dec-21
17	Special Campus Cleaning Drive	11-Dec-21
18	Campus cleaning	02-Nov-21
19	National Webinar on "The Role of Chemistry in Environmental Protection"	28-Jun-21

Table 4: Details of the environment related events undertaken by the College

4.3 Section-wise recommendations related to 'Green practices'

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.

- ➔ **Increase the plantations on the premise** - There can be provision for more plantations on the premise maybe even a Kitchen garden facility.
- ➔ **Plant as a gift** - As a kind gesture, the guests visiting the premise can be asked to plant a small plant on the premise itself and they can be even given plants/bouquets from the flowers of the plants on the premise as a gift.
- ➔ **Signages on the plants mentioning scientific names** - The practice of having the names of each plant and tree will provide awareness among the staff and students.
- ➔ **Documentation** – Improve and increase the documentation and visibility/ reflectance of the environment related events on the website, social media handles
- ➔ **Undertake environment study of local areas** – This aspect is w.r.t. environmental parameters and submits the same to local municipality for further up gradations.
- ➔ **Increase the organic farming practices** - The premises can have an organic farming facility in terms of farms, kitchen, terrace gardens the produce can be directly utilised in the premises.

5. Waste Audit

Waste is an inevitable part of our lives. Over the years the awareness about waste management techniques has given a rise to rethink how the waste can be avoided being sent to the landfills. The audit provides an approximation of the types of waste generated, location of waste collections, disposal techniques used, waste segregation methodologies adopted, and waste management strategies that are implemented in addition to the newer ways that can be adopted aiming to make the premise clean and sustainable.

5.1 Waste produced

- ➔ **Solid waste** – The solid waste from the toilets is let into the storm water drains. We suggest undertaking a septic tank plant in the premises as there is availability of land and resources.
- ➔ **Liquid waste** – The black and grey water from the wash basin and kitchens, toilets is let into the storm water drains. We suggest undertaking a septic tank plant in the premises as there is availability of land and resources.
- ➔ **E-waste management** – We suggest practicing a dedicated Plastic collection drive and utilising the same for a best out of waste installation.
- ➔ **Plastic waste** – The current practices involve sensitization programs and awareness drives, however we suggest practicing a dedicated Plastic collection drive and utilising the same for a best out of waste installation.
- ➔ **Organic waste** – The day-to-day waste is handed over to local municipality; however we suggest undertaking 'Organic compost' management strategy.
- ➔ **Bio-waste** – The sanitary vending machine are in working conditions; however we suggest to install incinerator or have dedicated bins as substitutes for bio-waste management.

5.1.2 Bins summary

There are 195 dustbins inside the premises and 17 dustbins outside the premises; as per our study we feel this number is sufficient.

5.3 Section-wise recommendation related to 'waste audit'

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.

- ➔ **Dustbins at every 100m** - There should be a dustbin at every 50-100 in the open spaces
- ➔ **Include better plastic/ E-waste management measures** - The Institute can celebrate one day of every month as a 'Plastic/ E-waste awareness day' The stakeholders (Students and staff members) can be asked to bring plastic/ E-waste which can be further given to an NGO for recycling or better purpose.
- ➔ **Organic compost pit maintenance methodology** - The Institute can recheck the current methodology as it can yield better results in terms o quantity if it is well maintained with the following strategies:
 - The sanitary pad incineration dust can be sent to the compost pit
 - There should be a balance of brown and green waste material
 - Shred the materials before adding them to pit
 - Add twigs
 - Stir occasionally
 - Add water in less quantity to avoid the smell
 - Keep ample air circulation to avoid the smell
 - Regular monitoring and maintenance.

6. Water Audit

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

6.1 Water availability and consumption

6.1.1 Source of Primary water supply

The College requires water from the Local Municipality for drinking water purposes. There is water tanks equipped with an RO facility used for primary drinking water and connected to secondary usage as well.

6.1.2 Source of Secondary water supply

The College uses the secondary sources of water supply for general usages such as watering plants, kitchen, toilets, and wash basins connected to the labs and other spaces. At present, there are 3 water ponds available in the premises as secondary sources of water supply. Details of the same are documented below:

Location of Water Tank	No. of water tank	Capacity of each tank
College Building	08	2000 ltr
Boys Hostel	06	2000 ltr
Girls Hostel	06	2000 ltr
Teachers Hostel	02	2000 ltr
Principal Quarter	01	2000 ltr
Canteen	03	1000 ltr x 01 no; 500 ltr x 02 no
Other small houses	05	1000 ltr x 02 no; 500 ltr x 03 no

Table 5: Details of the water tanks in the premises

6.1.3 Source of Tertiary water supply

The tertiary source of water is the additional source of water harvesting. **We have suggested adopting practice of rain water bunds around every block and connecting the overflow pipes of the artificial water pond (farm pond) to the well for ground water recharge.**

6.1.4 Source of Reusing waste water

The initiative is not under practice at present completely only the chemicals are neutralized before letting it down in the drains. **We have suggested to under practices of green chemistry as per discussion during the induction and exit meeting on site to treat the waste water from the laboratories and reused the same after filtering for watering the plants and the trees in the premises.**

6.2 Areas of water usage

Based on the inventory done and data shared by the staff it was found that the premise has the following facilities:

- ➡ Urinals – 75 Nos.
- ➡ Toilets – 79 Nos.
- ➡ Washbasins – 71 Nos.
- ➡ Taps (Indoors) – 275 Nos.
- ➡ Taps (Outdoors) – 22 Nos.

As per the data shared by the College and on-site observation, it was noted that there is no water wastage of water in the form of Cleanliness of toilets.

6.3 Recommendations for a Sustainable Habitat

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.

- ➔ **Signages** - Messages about avoiding water wastage should be placed at appropriate locations.
- ➔ **Water flow stopper** - The water flow stopper should be installed to avoid overflow and smart use of the system. Install water-saving showerheads or flow restrictors. No leakage anywhere on-premises. Water lawn only when it needs it.
- ➔ **Waterless urinals** - There can be the provision of waterless urinals as a Green Building initiative in the premise, either the existing ones can be replaced with such a facility or new toilets can be constructed in this manner.
- ➔ **Rain water bunds** – There should be landscape beautification project undertaken to appropriate channelize the rain water through bunds and similar facilities.

7. Health and Hygiene Audit

The hygiene is a part and parcel of our daily life. It is extremely essential to keep the surroundings clean in the same manner as we would want our houses to be. Educational Institutes have a bigger role to play in order to affect the young minds in the positive manner through better hygienic practices.

7.1 Facilities available

The Institution has washroom facility, hand wash, drinking water and dustbin facilities in the premises.

7.2 Smoke Exposure

The Institution is a tobacco and smoke free premises which helps in adapting to a Healthy Institution

7.3 Hygiene

As per the Site visit the following analysis **has a positive impact on premises.**

- ➡ For overall hygiene of the students and staff there are facilities such as Washroom facility on hand wash.
- ➡ The staffs keep a regular check about the operation and maintenance of the equipments each floor.
- ➡ Water management initiative with appropriate hygiene is undertaken.
- ➡ The areas of water tanks in site on ground floor are clean

7.4 Section-wise recommendation related to 'Health and hygiene audit'

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.

- ➔ **Health related provisions** – There should be provisions for a dedicated health centre and 24x7 available ambulance services inside the premises.
- ➔ **Avoid burning waste** - The waste produced on the premises should not be burned as it is dangerous to the health of students and staff
- ➔ **Pest control program** - The Institute should practice pest control programs with appropriate sanitation facilities through an appropriate agency.
- ➔ **Signboards** – The Institute should have multiple signboards about 'No smoking' and 'Healthy premises' at every nook and corner of the Institute.
- ➔ **Compound wall** – The compound wall should have awareness messages about 'No Smoking' and 'No Tobacco'

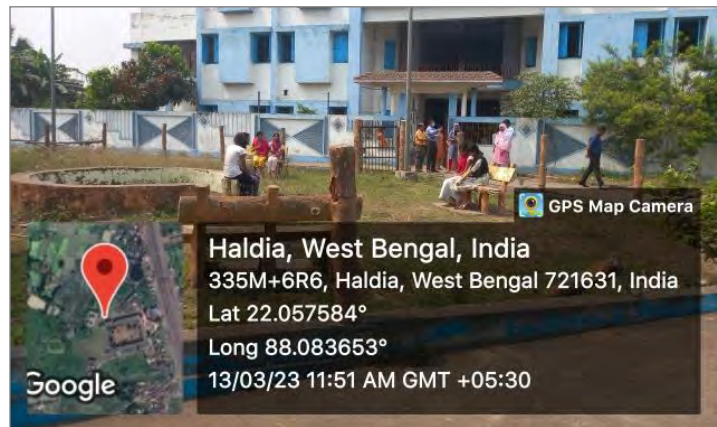
On-site investigation and physical verification
Audit Team during the visit on Monday, 13 March 2023



Discussion with the Core Team



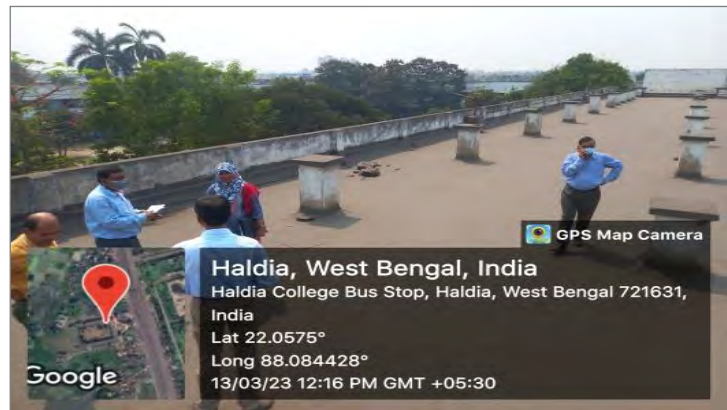
Site investigation of the indoor facilities



On-site discussion at the outdoors



Provision of open ground and site near the organic farm



Invetsigation of the terrace usage



Group photo with the team

8. 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.

