ENERGY AUDIT REPORT (2023-2024) HEM CHANDRA DEV GOSWAMI COLLEGE NITAIPUKHURI, SIVASAGAR



Conducted by

IQAC and Green Audit Team

Hem Chandra Dev Goswami College, Nitaipukhuri

PIN- 785671

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> Dr.Tarun Gogoi Coordinator, IQAC Hem Chandra Dev Goswami College

1.0 Introduction

1.1 Energy Audit

The objective of the Energy Audit is to examine energy-efficient practices within the college campus creating an eco-friendly impact on the environment. An "Energy audit" is the methodical and quantitative identification, measurement, documentation, reporting, and analysis of an institution's surroundings. It is started with the analysis of energy flows for energy conservation in a building or institution. The Energy Audit provides guidance on how to adopt further energy conservative initiatives and takes into account a number of aspects that have influenced its expansion.

An Energy Audit is an essential tool for energy management. It is known that educational institutions consume energy at an extensive scale and there arises a need to determine how much energy the institution is utilizing on a regular basis. Thus, there is a need of an investigation and detailed analysis of the energy in the institution. It also involves the analysis and identification of the ways to reduce energy consumption for the better good of the institution. Conducting an institution-wise Energy Audit is crucial in determining how well educational institutions are functioning in terms of energy cost optimization, safety aspects, maintenance practices and pursuing comprehensive energy management programmes. Moreover, it will help in identifying energy-saving opportunities thereby creating a sustainable environmental impact. It is also necessary to identify future potential liabilities.

1.2 About the college:

The H.C.D.G. College is an Arts college, basically imparting higher education in Social Sciences and Humanities. Set in the sylvan surrounding expansive paddy fields, Nitaipukhuri, historically an important place in Assam, offers a great visual treat of natural beauty. The Dehing River flows quietly to the south, and to the north where there is the National Highway-37, connecting it with all major towns in Assam. Ever since 1960, the need for a college has been felt by the conscious masses of this area, who wanted to shape the future of the younger generation by providing them an opportunity to pursue higher education without having to travel

far and spend an unaffordable amount. In 1965, as a result of the blood sweating and sincere efforts of a few educationists in this area, the H.C.D.G. College was established. In 1988 the college got registered under 2(f) and 12(b) clause of University Grant Commission. In 2003, the college also got the permanent affiliation of the Assam Higher Secondary Education Council, Guwahati. In consonance with its Vision and Mission, the college has embarked on creating opportunities for unprivileged students in this remote area. At present the college offers six undergraduate programmes in regular mode besides 07 post graduate, B.Com and BSW programmes under Krishna Kanta Handique State Open University. Besides, the college runs Higher Secondary Course in arts. The college has also offered certificate and value-added courses. In 2022-23 the college introduced add-on courses affiliated to Dibrugarh University. There are 20 teachers out of which 12 teachers have PhD degree, 4 have M. Phil Degree. The infrastructure facilities include ICT enabled classroom, auditorium, conference room, and computer lab. The college library is automated with SOUL 2.0 and D-Space user software. It is well equipped with 10,000 books along with subscriptions to various journals and e-resources. The institution has benefited from funding from RUSA.

The college will enter its Diamond jubilee year very soon. In 2017, NAAC visited H.C.D.G. College and awarded Grade B (CGPS 2.06).

The total land area of H.C.D.G. College is 14715.83520 Sq. m out of which built up area is 6486.794 Sq. m.

2.0 Mission and Vision

2.1 Vision of the college

The college was established with the basic aim of providing an opportunity to pursue higher education to the inhabitants of this remote and backward area so that the youth of this area can compete and establish themselves as able citizens of this country. Besides emboldening physical, moral, and spiritual development, the college also emphasises preparing the students for the challenges of the present-day competition. Moreover, the college also emphasises acquainting the students with the present socio-political and economic aspects and building them into good citizens as well as human resources for the country. Our institution is very much aware of the need to implant the capacity in its students to transform society into a holistic one by combating all social nuisances. Simultaneously, the students are also made aware of issues like gender sensitivity and environmental degradation. After all, the college has an august vision to build a quality society by producing highly accomplished, morally strong, and dutiful citizens through its different institutional programs.

2.2 Mission of the college

H.C.D.G. College as a rural center of higher education aims at:

a) Imbibing a sense of self-belief among students to shape themselves as individuals contributing to the well-being and progress of the society

b) Inculcating in them a sense of belonging to the country and thereby spread the message of national integration

c) Developing their personality so that they can find themselves fit to compete with others in the struggle of life

d) Innovating and achieving excellence in teaching- learning/pedagogy, training and research extension activities, to realize regional needs from the perspective of national goals

e) Facilitating optimum use of human and natural resources for sustainable development, and involving all the stakeholders of the institution in the development of the college and the region.

f) Ensuring inclusive growth with knowledge output for human development

g) Ensuring the knowledge output for human development

h) Disseminating literacy, technology and other such knowledge to the society through outreach programme

i) Ensuring gender sensitivity within and the outside the college campus

j) Providing special assistance to Divyangjan

k) Utilizing youth potential in a constructive way

3.0 Strength and Structure

3.1 Student and Faculty Strength:

No. of Teaching Staff	20
No. of Non-teaching Staff	10
No. of Students	622

3.2 Physical Structure:

The college has following physical structure:

Sl. No.	Classrooms	26
1	Administrative building	1
2	Laboratories (Computer lab/ Psychological lab	2
3	Conference Hall	3
4	Library	1
5	Auditorium	1
6	Open Stage	1
7	Girls' Hostel	1
8	Canteen	1
9	Cycle Stand	3
10	Car Parking	1
11	Girls' Common room (Toilet attached)	1
12	Boys' Common room	1
13	Washroom 1	1
14	Toilet (Boys)	1
15	KKHOU Study Centre	1

4.0 Audit Preparation

4.1 Objectives of Energy Audit:

The primary goal of the Energy Audit at H.C.D.G. College is to promote conservation of energy and to identify ways to reduce energy consumption in the college campus. The Audit also aims to identify the measures taken, described, and prioritized in the framework of energy conservation and environmental sustainability in accordance with the laws, rules, and guidelines that may be relevant. It also tends to improve energy efficiency in the various buildings of the Institution by adopting desirable measures.

The main objectives of conducting an Energy Audit are:

- To educate students about the sustainable ways of energy consumption and usage.
- To conserve energy resources and in a way protect the environment through the judicial use of the sources of energy.
- To identify the quality and cost of various energy inputs.
- To identify potential areas of electrical energy economy.
- To relate energy inputs and production outputs.
- To implement measures of energy conservation and realisation of savings.
- To reduce the cost of energy bills and have an estimate of the Cost involved in it.
- To monitor the degree of energy consumption in the college campus.
- To determine and be aware of the wastage of energy usage in the institution.
- To provide recommendations for energy efficiency improvements in the college campus.
- To identify safety concerns from any hazardous incident due to failure in energy maintenance.
- To release energy status report.
- To ensure regular and frequent energy maintenance practices for smooth functioning of college academic and administrative activities.
- To reduce unnecessary usage of energy equipments and to aware the students regarding it.

4.2 Methodology Adopted:

The methodology involves the use of a variety of instruments to conduct the energy audit, i.e., physically inspecting the campus, observing, evaluating, testing, and reviewing the documentation, speaking with the focus group, conducting data analysis, measurements, and providing suggestions and efficiency recommendations.

5.0 Energy Use and Conservation

5.1 Energy Use and Conservation:

The energy sources utilised by the college is electricity only. The total energy consumption on campus per month is an average 592 units. The college has installed energy-saving lighting and ventilation systems in its labs and classrooms. To stop current leakage and safeguard other electrical systems, earth leakage circuit breakers have been installed at a number of sites throughout campus. The college has set up notice boards encouraging staff and students to turn off the lights and fans when not in use.

Light-emitting diode (LED) and Compact Fluorescent Lights (CFL) bulbs are used on campus to ensure low electricity consumption. There are 85 bulbs, 104 ceiling fans, 9 wall fans, 1 stand fan, 4 air conditioners, 4 audio tracks, 3 inverters, 7 CCTV cameras, 1 CCTV monitor, 7 sound boxes, and 10 projectors. The electricity was shut down after occupancy time as one of the practices for energy conservation. The college also adopts a one-hour complete shutdown of power supply once a month.

5.2 Use of Solar Energy:

Solar Energy is one of the efficient and recommended ways to ensure sustainable use of energy in any institution. To accomplish the objective in view, solar panels are installed in certain parts of the college premises as an alternative source of electricity. There are a total number of eighteen solar panels installed across the college campus, specifically on the terrace of College Library. It mainly provides electricity for consumption in library. Moreover, ten Solar Lamps are also installed in the college premises to ensure sustainable consumption of energy and reduce energy consumption cost.

6.0 Status Report of the Number of Energy Equipments

Sl. No.	Name of the Equipments	Quantity
1.	Ceiling Fan	104
2.	Bulbs (LED bulbs, tube lights)	85
3.	Stand Fan	01
4.	Sound Box	07
5.	Television	02
6.	Projector	10
7.	Board Stand	02
8.	Projector Screen	03
9.	Wall Fan	09
10.	Air Conditioner	04
11.	UPS	01
12.	Laptops and Desktop Computers	31
13.	CCTV Camera	07
14.	CCTV Monitor	01
15.	Inverter	03
16.	Audio Track	04
17.	Xerox Machine	02
18.	Printer	03
19.	Router	01
20.	LCD Projector	02

6.1 Number of Energy Equipments in the Academic and Administrative Building:

6.2 Number of Energy Equipments in the Library Building:

Sl. No.	Name of the Equipments	Quantity
1.	Desktop	05
2.	Laptop	01
3.	Scanner	02
4.	Printer	01
5.	Xerox Machine	01
6.	Ceiling Fan	08
7.	Wall Fan	04
8.	Stand Fan	01
9.	Solar Inverter	02
10.	CCTV Camera	04
11.	CCTV Monitor	01

7.0 Conclusion and Recommendations

7.1 Recommendations:

The Energy audit brings to light that the college has taken the necessary measures to maintain a sustainable energy usage in the campus. However, the committee would take the opportunity to offer the following suggestions and recommendations to be executed with the utmost care:

- 1. Installation of more solar panels and solar lamps.
- 2. Frequent repair and maintenance of energy consuming equipments.
- Sensitize and aware the students and other members to make judicial and efficient use of energy sources in the college premises.
- 4. Buying energy efficient electrical appliances.
- 5. Adoption of more energy efficient techniques and strategies in future.
- 6. Avoiding idling operation of AC units.
- 7. Efficient use of daylight when possible.

7.2 Conclusion:

An Energy Audit serves as a tool to improve energy efficiency and is a comprehensive review of possibilities for energy conservation optimization. With an Energy audit, we attempt to create a plan, adopt strategies and implement techniques that would enable systematic achievement of energy savings and cost reduction. This audit would serve as a foundation for an efficient upgrade of an energy management system and enable to adopt further measures for having quality energy-saving approach.

Energy audit is the best means to opt for energy conservation and determining when, where, why and how the energy is consumed in the institution. It gives an overview of the cost involved in energy usage and helps in identifying the reasons for any energy lapses. Thus, energy audit is an apparatus for analysing the overall energy consumption and determining ways to improve the efficiency of the energy management system.

Annexure

Annexure I: Energy Bill Payment Statement (2018-2020)

Energy Bill Payment Statement Con No: 195000017548 Con Name H C D G COLLEGE NITAL DESD Year: 2018-2020						
BILLDATE	BILL NO	UNIT CONSUMPTION	NET BILL AMOUNT	DUE DATE AMOUNT	PAYMENT DATE	PAID
10-04-18	1716607	950	9816	9816	23-04-18	2770
08-05-18	1730995	1840	23715	23715		0
08-05-18	1760615	0	26544	26544		0
07-08-18	1813696	645	37167	37167		0
12-09-18	1848729	328	42708	42708	24-09-18	42708
08-10-18	1875783	317	4838	4838		0
07-11-18	1900833	328	9913	9913	29-11-18	9910
07-12-18	1929990	317	4989	4989	29-12-18	4990
10-01-19	1966874	328	5247	5247		0
08-02-19	1995883	328	10501	10501		0
11-03-19	2031291	296	15330	15330		0
12-04-19	2075765	328	20731	20731	26-04-19	20731
09-05-19	2094342	317	4896	4896	27-05-19	4896
07-06-19	2128351	328	5136	5136	25-06-19	5136
06-07-19	2160571	69D	7771	7771	26-07-19	7770
09-08-19	2201007	713	8066	8066		0
09-09-19	2237276	713	16135	16135	24-09-19	16135
10-10-19	2270545	690	7695	7695	24-10-19	7695
08-11-19	2306027	713	7608	7608	25-11-19	7605
07-12-19	2326180	690	7485	7485	27-12-19	7480
10-01-20	2364987	713	7724	7724	27-01-20	7720
10-02-20	2408685	713	7726	7726	26-02-20	7726
07-03-20	2439333	667	4767	4767		0

SUB-DIVISIONAL ENGINEER DEMOW ELECTRICAL SUB-DIVISION APDCL, DEMOVI

APDEL Demow Energy Bill Payment Statement Consumer No: 195000017548 Consumer Name : H C D G COLLEGE NITAI Year: 2023-2024								
SI.	nill Date	Dill No	UNIT	Net Bill Amstunt	Rebate Availed	Payment Date	Poid Amount	B.II Type
1	05-03-24	901844020	691	2185	0	21-03-24	9185	Inergy fall
3	05.02.22	901810665	474	7415	0	78-07-24	7419	Energy ##
2	02.01.24	901763089	613	19184	0	17-01-24	19181	Energy Hill
	13 13 23	001753051	705	10112	0	11/4	Ű	Energy Rill
	15-12-23	001704011	120	30712	0	28-11-23	20712	Energy Bill
3	12 10 12	10010701011	1071	17108	0	20-10-23	17395	Letergy Bill
0	12-10-23	Louisiones	1555	14537	0	22-09-23	16573	Energy Bill
1	13-09-23	1901830741	1003	7120	0	19 08-23	7379	Energy B.O
8	CS 08-23	901580003	303	193.19	0	18-07-23	19449	Energy NII
9	10-07-23	201543758	6.65	1523	0	N/A	0	Energy Ball
10	08-00-23	9010010-1	STR.	7054	0	23-05-23	706-1	Courge Hall
11	10-05-23	901460733	200	6006	0	25-04-23	6306	Inergy (%)
1	10.04-23	901422074	125	5948	Ø	21-03-23	9945	Emerge Gell
1	3 10-03-23	901380800	187	4625	0	11/A	0	Erergy Bat
1	1 09.02-23	00130104	311	5482	0	26-01-23	5482	inergy not
1	5 09-01-23	00116372	370	5817	0	27-12-22	5517	Loreres mit
-	6 10-12-22	01137794	496	4551	D	29-11-22	4551	Energy Bill
1	7 12-11-22	Inortist 330	\$86	9421	0	27-10-22	4421	LOUTEN B.B.
1	8 12-10-22	001154808	55.3	7358	0	30-09-77	2358	Lossey Br
1	1 27 05 22	901115891	872	1\$154	0	31 05-22	15151	Energy for
12	27.05.22	90105020	\$17	\$606	0	N/A	0	Inergy Bill
2	09.07.22	901018785	1533	17550	0	22-06-22	17580	Energy W.S.
2	08-00-22	900974781	104	\$790	0	N/A	0	Levergy Dalt
2	07 05 22	1900935746	104	7180	0	22-01-22	7150	Enorgy and
2	0900122	900900810	129	3579	0	N/A	0	Toesy hit
2	11-03-22	400548251	0	61	0	N/A	0	Loss of the
21	07-02-22	900521060	174	-5891	0	11/4	0	Corrige dist.
2	7 11-01-22	80074001-	3.85	3228	0	07-01-22	100000	Deerge hal
2	8 10 11 21	900740014	1 398	3228	U	02-12-21	8228	Treety and
2	9 10 11 21	1900595720	245	51.16	0	27-10-21	3446	Louigy Box
3	08 10 21		140	4663	Ð	23-09-21	46.0.2	Loonga

Annexure II: Energy Bill Payment Statement (2023-2024)



Annexure III: Snapshots of Solar Panel





Annexure IV: Photograph of Solar Lamp



Annexure V: Measure for Efficient Energy Consumption

Annexure VI: Auto Control Panel


