

ENERGY AUDIT REPORT (2022-23)



Haji Anfar Ali College, Doboka Nagaon , Assam
Conducted and prepared by
Committee constituted by the
Principal Hajji Anfar Ali College


ENERGY AUDIT REPORT

SUBMITTED TO
Haji Anfar Ali College
Doboka, NAGAON, ASSAM

SUBMITTED BY AUDIT TEAM

- | | |
|--|---------------------------|
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This is for your kind information and necessary action.


With regards
Principal
Haji Anfar Ali College
Doboka : Nagaon : Assam

ACKNOWLEDGEMENT

We express our sincere gratitude to the authorities of Haji Anfar Ali College, Doboka, Nagaon for entrusting and offering the opportunity of energy performance assessment assignment

Dr. Mamun Azam Barbhuiya-Principal
Mr. Mojaharul Islam-Vice Principal
Adidur Rahman – Co-ordinator IQAC

We are thankful to Haji Anfar Ali College College, Hojai, for their positive support in undertaking the task of system mapping and energy efficiency assessment of all electrical system, air conditioners, utilities and other equipment. The field studies would not have been completed on time without their interaction and guidance. We are grateful to their cooperation during field studies and providing necessary data for the study.

We are also thankful to all field staff and agencies working with whom we interacted during the field studies for their wholehearted support in undertaking measurements and eagerness to assess the system / equipment performance and saving potential. Also thankful to all concerned staff interacted during the conduct of this exercise for completing official documentations.

Energy Audit of system is key instrument in knowing the present level of efficiency of various components and establishing the areas of shortfall for improvement.

This report made with sincere effort gives details of the relevant data collected during energy audit study, observation, analysis & recommendations made pertaining to different facilities in campus.

Several Energy Conservation Opportunities(Measures) have been identified & proposed in course of our study & these options when implemented, are expected to bring in lasting benefits (saving) in term of energy as well as cost saving to the management.

Debabrata Debnath We are pleased to submit this Detailed Energy Audit Report to Hon. Principal Dr. Mamun Azam Barbhuiya, with energy conservation opportunity as well as recommendations after sincere study & observations.



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Haji Anfar Ali College
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For Audit team

Debabrata Debnath
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ENERGY AUDIT TEAM

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2	Mr .Debrabrata Debnath	Physics,Dhing College	Associate Professor
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PREFACE

An energy audit is a study of plant or facility to determine how and where energy is used and to identify methods for energy savings. There is now a universal recognition of the fact that new technologies and much greater use of some that already exists provide the most hopeful prospect of the future. The opportunities lie in the use of existing renewable energy technologies, greater effort of energy efficiency and dissemination of these technologies and options.

Energy have been identified as a crucial and balancing factor in the indices for the sustainable development since the Earth Summit 1992. Especially in the contemporary scenario, it is acknowledged the heavy and unbalanced energy consumption adversely affect energy price and economic growth, and most country now gives priority to energy consumption methods.

Energy consumption act, 2001 , defines energy auditing as the verification, monitoring analysis of the use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption. It facilitates to a systematic approach to the energy management in a system, trying to balance the total energy input with its use. It identified all the energy streams in a system and quantifies the use of energy according to its discrete functions

The energy audit of Haji Anfar Ali College was carried out by energy audit team. This report is our mite in contributing to the larger picture of effective energy management and conservation. As is known energy auditing is an ongoing process, a part of larger procedure to ensure long-term sustainable development.



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INTRODUCTION

Haji Anfar Ali College, the premier seat of higher learning was put on a firm foundation in the mid 80s of the twentieth century at Daboka, the newly formed Hojai District in Assam. It is an irony that even after the passage of four decades of independence, there had been no institution of higher learning until 1986 in such a place of historical significance. Though late, the thought of setting up an institution of higher education took shape in the minds of the intelligentsia and Haji Anfar Ali College is the ultimate fruition of the hopes and aspirations of the people at large of this area. Formerly known as 'Daboka College', the institution was formally initiated with a few students in the TDC classes in the year 1986 with due permission from the Gauhati University. The first building of the college was donated by the famous Anfar family of Hojai. In kind consideration to the long-felt need of a college and paying tribute to their generosity, the sponsoring body of the college renamed it as 'Haji Anfar Ali College' after the name of their heavenly father. The philanthropic donors of Anfar family have never turned a blind eye to the needs of the college. They contributed a handsome amount for the construction of a central library cum administrative building of the college. Acknowledging their generous contribution, the college authority also named the two blocks of the building after the names of their mothers as Samsun Nehar Begum Library and Juhra Begum Administrative Block. However, the college has built up a New Administrative Building with the grants offered by the State Govt. capacitating in it the office of the Principal and the different Departments and classrooms. Haji Anfar Ali College, Doboka was granted recognition by the University Grants Commission under section 2(f) and 12(B) of the UGC Act, 1956 in the year 2009 and since then the college has been getting financial assistance from UGC under its different schemes such as Indoor Stadium, UGC Network Resource Centre, Extension of Classrooms, Computer lab etc. and of late a Women's Hostel with Warden's Quarter.

The College has been consistently maintaining high academic standards and good institutional social responsibilities. The college is permanently affiliated to the Gauhati University, Assam and it had gone for the NAAC assessment and accredited with a prestigious C++ Grade in the year 2005 for the first time. The IQAC of the college has been taking initiatives for accreditation measure to carry out and implement the initiatives and responsibilities of the college. The IQAC


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has been acting effectively in compliance with the recommendations of the Peer Team, NAAC in implementing the diverse quality enhancing measures during the Post-accreditation period and thus brought the institution to the stage for 2nd Cycle of Assessment and Accreditation by the NAAC. In that stage of assessment, the college is able to achieve a prestigious grade "B" from NAAC, Bengaluru in 2016. This grade is the outcome of the collective and continuous efforts of the stakeholders of the college. Now we are working hard for the future course of actions planned by the IQAC of the college to make it an ideal institution in the field of higher education.


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SCOPE OF ENERGY AUDIT

The task of energy audit undertaken by Haji Anfar Ali College has objective to identify energy saving & conservation opportunity with electrical network & equipment load study with measurement & to recommend action plan with saving & financial calculation for implementation to materialize energy saving conservation opportunity to save input energy cost.

- 1) Inventory of various electrical load
- 2) Electricity bill study & working out average cost of power.
- 3) identification of various energy conservation measures & saving opportunity.
- 4) Review of Awareness program if any for optimum use of electricity & water as well as its saving.
- 5) Review of implemented non-conventional energy installation & applications in college campus & its quantification.

SYSTEMS STUDIED DURING ENERGY AUDIT

- 1) Lighting fixtures have been physically in various campuses verified & recorded.
- 2) Reviewed implemented non-conventional energy installation & applications in college for use.
- 3) Electricity bills served by the APDCL are verified and worked out the cost of power.
- 4) It is reviewed about awareness program if any for optimum use of electricity as well as its saving undertaken at college level. There is tremendous scope to create awareness among user about efficient & optimum use of energy to save. Instruction cum Request Sign board shall be displayed near each switch-board & toilet block, bathroom to influence & guide to user to arrest misuse of power.


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METHODOLOGY

The audit involves visiting physical position of load & carry out inventory of load. Due measurement of electrical load of equipment & circuit is carried out. Energy bill received from APDCL is audited & studied for KWH requirement & how efficiently energy is used. Various positions are interacted, familiarized with energy audit & involved for successful & result oriented energy audit. Energy conservation and saving opportunities are identified during round and measurement for implementation.


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H.M. Srinivas College
M. Srinivasam

Data collection

- For the purpose of this audit, audit groups for specific areas were formed. Data was collected through
- Inspection and observation
- Identification of energy consumption
- Calculations, analysis
- Validation

Table 1: Department wise electrical/electronic appliances and equipment

SL No	Room / Building	Lights		Fans		Equipment							Other electrical / electronic equipment
		Tube	LED	Ceiling	Wall mount	AC	Computer	Printer	Xerox	Motor	Inverter	CCTV.	
1	Class room (1 to 9)	1	14	37	-							8	
2	IQAC Room	4	-	4		1	1	1	1				
3	ICT Class room-1	2		4			1						Overhead projector-1
4	Department of Economics	2		3			1					1	REFRIGERATOR-1
5	Central Library Library	11	6	19		2	7	1			1	16	CCTV MONITOR-1
6	Auditorium	8	-	14	2							2	Amplifier medium=6, amplifier big=2, speaker = 1,mic set =1
7	Indoor Stadium	-	14	16									
8	College Canteen	2	1	4									
9	KKHSOU OFFICE Room	1		3			1	1				8	CCTV MONITOR-1
10	Education Laboratory	2		2									
11	Language Lab& ICT Class-2	-	10	4			10						
12	Bamboo Workshop	1		2									
13	Department of Assamese	1	-	2			1					1	
14	Department of English	1		2			1					1	


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15	Department of Mathematics	1		2			1					1	
16	Department of Education	1		2			1					1	WATER FILTER-1
17	Department of Political Science	1		2			1	1				1	
18	Department of History	1		2			1					1	
19	Office of the Principal	5		6		1	1	1			1	1	CCTV MONITOR-2, BIOMETRIC ATTENDANCE-1
20	Office of the Head Assistant	2		1			1	1				1	
21	Office room	4		4	1		1	1	1		1	1	WATER FILTER-1
22	Digital Class room		20	8									Smart Board-1
23	Girls' common room		2	4									Napkins destroyer-1, RO -1
24	Office of the Computer Lab		6	2			1	1					
25	Computer Lab		30	10		4	54						Projector-1
26	College Campus with Varandah	2	15										1 HP Jetpump-1 , Water cooler-1
Total		53	116	154	3	8	85	8	2		3	44	


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DATA ANALYSIS

Table 2: Estimated energy consumption in KWH during summer

Items	Number	Power in W/item	TIME consumed (In hours)	Days	TOTAL Power consumption in KWH
Tube light	39+10 used	20	4	24	19.2
LED	66+39 used	12	2	24	20.96
Ceiling Fan	80+70 used	60	3	24	302.4
Wall mount Fan	8	50	3	24	28.8
AC	8	1000	4	24	768
Freeze	1+2	250	0.5	24	6
Computer	34+40 +10 used	200	2	24	435
Printer	8	30	0.5	24	2.88
Xerox machine	2	2000	0.5	24	48
CCTV Monitor	4	40	1	24	3.84
Aqua guard	3	100	0.5	24	3.6
Inverter	3	1500	1	24	108
Water Motor	3	746	0.5	24	26.85
CCTV	42	50	24	30	1512
Projector	2	200	10	30	120
Total					3405.53


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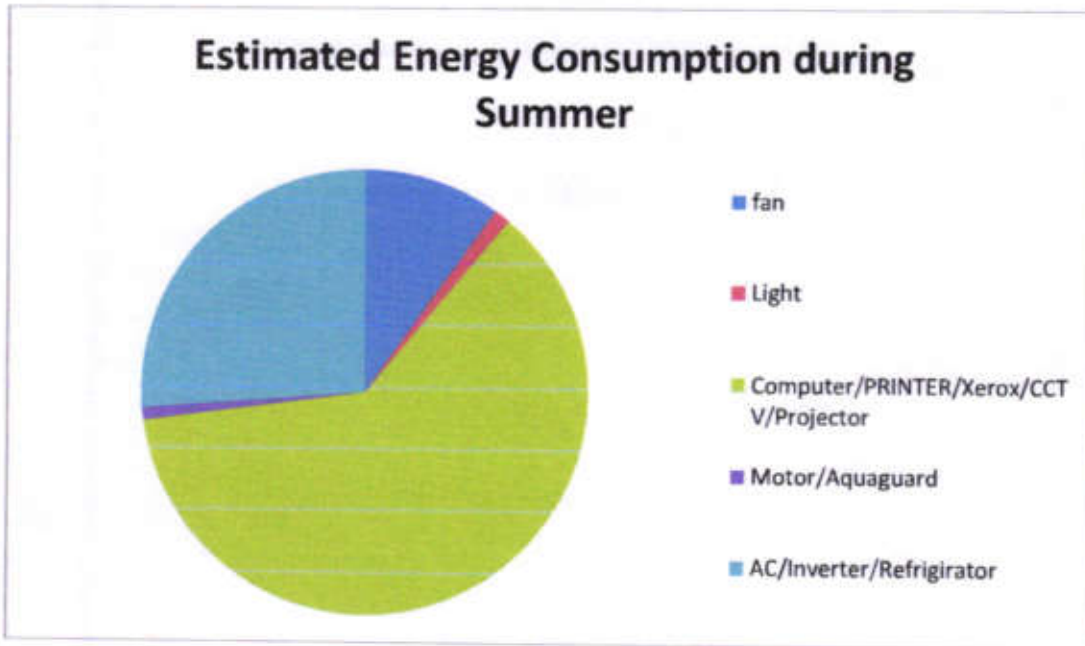


Fig 1: Energy consumption use (summer)


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Table 3: Estimated energy consumption in KWH during winter

Items	Number	Power in W/item	TIME consumed (In hours)	Days	TOTAL Power consumption in KWH
Tube light	39+10 used	20	4	24	19.2
LED	66+35 used	12	2	24	20.16
Ceiling Fan	80+70 used	60	0	24	0
Wall mount Fan	8	50	0	24	0
AC	8	1000	0	24	0
Freeze	1	250	0.5	24	3
Computer	34+40+10 used	200	2	24	435
Printer	8	30	0.5	24	2.88
Xerox machine	2	2000	0.5	24	48
CCTV Monitor	4	40	1	24	3.84
Aqua guard	3	100	0.5	24	3.6
Inverter	3	1500	1	24	108
Water Motor	3	746	0.5	24	26.85
CCTV	42	50	24	30	1512
Projector	2	200	10	30	120
Total					2303.42


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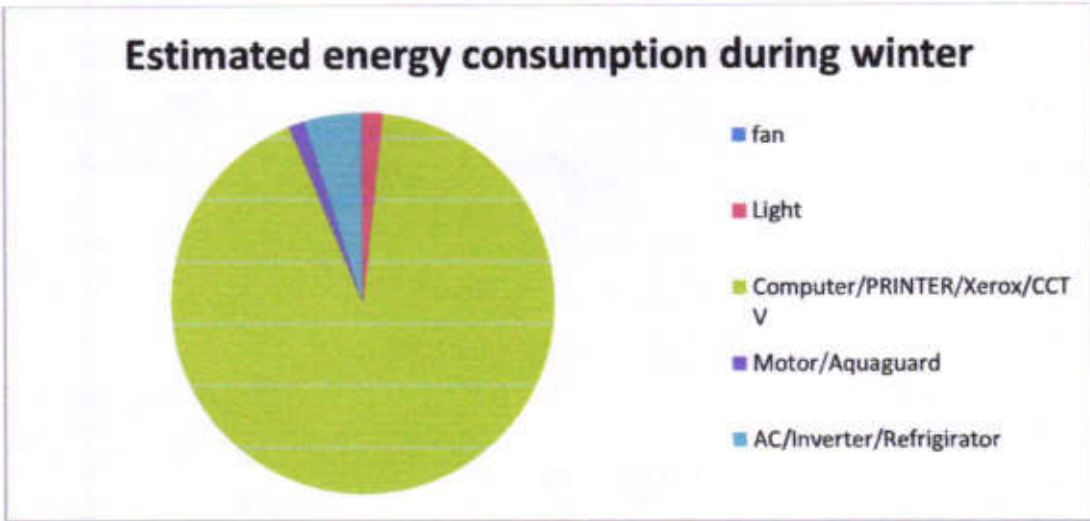


Fig 2: Energy consumption by and use (winter)


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FINDINGS AND RECOMMENDATION OF THE AUDIT

Findings	Recommendation
The electrical wirings of many buildings were found to be old and inefficient	Need to replace old electrical cables with newer alternatives.
There seems to be a lack of judicious use of power among students and staff. During the study, it was found that lights, fans and computers were kept on in vacant rooms.	Students and staffs should be encouraged constantly to use energy judiciously. Posters and pamphlets should be distributed and notices about saving energy should be posted in notice boards throughout the campus.
Many departments still use bulbs causing heavy power loss.	Filament bulbs and CFLs should be replaced with LEDs.
AC, Refrigerators and freezers used in many departments use obsolete technology and hence cause power loss.	Gadgets and equipment should be repaired and/or replaced with latest ones to save energy (with five-star rating).
It is noticed that resistive regulators are used in many rooms of the college.	Resistive regulators should be replaced by electronic regulators.
It is noticed that desktops are mostly used in the college.	Desktops must be replaced by laptops to save energy.

Identify easiest areas of attention

Based on the physical observation and the analysis of data collected, certain areas have been identified as areas of attention.

1. Old wiring cables in many parts of the campus leading to loss of energy.
2. Use of tubes in certain rooms.
3. There is no use of solar panels.
4. Use of old equipment in laboratories.
5. Use of large numbers of indicators on boards.
6. Lighting facilities in classrooms are available.
7. Awareness among students and bearers.

Estimate the Scope for Saving

The study could identify a large scope for saving energy in the campus, including

- Updating of technologies in laboratory equipment.
- Replacing old electrical cables.
- Replacing tubes with LEDs.
- Ensuring even lighting facilities in rooms.
- Turn off electrical equipments when not in use.
- False ceilings in classroom for maintaining optimum room temperature
- Use computers and electronic equipments in power saving mode.
- Establishment of solar panels.


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Identify immediate areas of improvement

Based on the study, certain areas were identified as requiring immediate improvement. These are

1. Replacing tubes with LEDs
2. Repairing and updating laboratory equipment
3. Encouraging students and staff to switch off electrical instrument.

CONCLUSION

- ✓ A master switch located at a prominent place which can be directly supervised by the HOD/supervising staff would help avoid power wastage in closed rooms.
- ✓ A well-prepared electrical wiring plan for the campus, which would help to identify unused points and re-wiring.
- ✓ A training /lecture for both students and staff to awareness for the need of energy conservation. If everyone ensures switching off lights, fans and electrical instrument that are not in use, roughly 10% of energy saving is possible.
- ✓ Instruction cum Request Sign board shall be displayed near each switch-board, toilet block & bathrooms to influence & guide to user to arrest misuse & wastage of power.
- ✓ The scope for non-conventional energy should be utilized.
- ✓ Power capacitors shall be provided to motor-pump set in campus as below for reducing electrical demand & improving power factor.


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