ENERGY AUDIT
2022 – 23

NAGAON G.N.D.G. COMMERCE COLLEGE,
NAGAON, ASSAM

DEPARTMENT OF PHYSICS
DHING COLLEGE
P.O.: Dhing, Pin: 782123 :: Nagaon :: Assam

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Head of the Department

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Ref. No.: DC/PHY/EA/06 *Date:* 24/05/2023.

CERTIFICATE OF ENERGY AUDIT

This is to certify that Nagaon G.N.D.G. Commerce College, Nagaon has conducted a detailed **Energy Audit** of the College for the session 2022-23, including the whole campus, and has shown exemplary efforts in energy management. The audit report confirms that there is no excess consumption of energy in the campus, and the College authorities and stakeholders are fully aware of the measures to conserve energy. Currently, Solar panels are installed in the College Campus and are using as backup power source to the campus in power break down times.

The techniques and strategies adopted by the College authorities and other stakeholders for consuming minimum energy in the campus are satisfactory and commendable. The College has demonstrated its commitment to sustainable practices, which is evident from the efficient use of energy resources.

The Certificate is presented to Nagaon G.N.D.G. Commerce College as an acknowledgment of their dedication to energy management and sustainable practices.

External Auditor,
Energy Audit

24/5/2023.

(Debabrata Debnath)
HoD & Associate Professor,
Department of Physics,
Dhing College, Dhing

Head of the Department
Physics, Dhing College
Dhing, Nagaon

ENERGY AUDIT REPORT

SUBMITTED TO

THE PRINCIPAL

NAGAON G.N.D.G. COMMERCE COLLEGE, NAGAON, ASSAM

SUBMITTED BY

AUDIT TEAM

SL. No.	Name	Nature of appointment	Signature
1	Mr. Debabrata Debnath, Associate Prof., Dept. of Physics, Dhing College	External Member	Head of the Department Physics, Dhing College Dhing-Nagaon
2	Miss. Koushiki Saikia, Guest Lecturer, Dept. of Physics, Dhing College	External Member	
3	Mr. Rupjyoti Kar, Electrical Supervisor, Electrical Licensing Board, Govt of Assam. License No- 17765	External Member	Electrical Supervisor License No - 17765
4	Mr. Kajimuddin Ahmed, Assistant Professor, Dept. of Physics, Nagaon G.N.D.G. Commerce College	Internal Member	
5	Mr. Nayan Jyoti Bora, Junior Assistant Nagaon G.N.D.G. Commerce College	Internal Member	

ACKNOWLEDGEMENT

We express our sincere gratitude to the authorities of NAGAON GNDG COMMERCE COLLEGE, Nagaon for entrusting and offering the opportunity of energy performance assessment assignment.

- Dr. MrigankaSaikia– Principal
- Mr. P.K. Hazarika- Vice Principal
- Dr. S.K. Pandey- Coordinator, IQAC

We are thankful to NAGAON GNDG COMMERCE COLLEGE , Nagaon 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.

We are pleased to submit this Detailed Energy Audit Report to Hon. Principal**Dr. MrigankaSaikia**with energy conservation opportunity as well as recommendations after sincere study & observations.

For Audit Team

(DebabrataDebnath)

Head of the Department
Physics, Dhing College
Dhing, Nagaon

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(Debabrata Debnath)
HoD & Associate Professor,
Department of Physics,
Dhing College, Dhing

Head of the Department
Physics, Dhing College
Dhing, Nagaon

ENERGY AUDIT TEAM

NAME	DEPARTMENT	DESIGNATION
Debabrata Debnath	Physics, Dhing College	HOD & Associate Professor
Miss. Koushiki Saikia	Physics, Dhing College	Guest Lecturer, Physics
Rupjyoti Kar	Santi Electrical Works, Dhing	Electrical Supervisor, Electrical Licensing Board, Govt. of Assam, L. No.: 17765
Kajimuddin Ahmed	Physics, NAGAON GNDG COMMERCE COLLEGE	Assistant Professor
Nayan Jyoti Bora	Junior Assistant, NAGAON GNDG COMMERCE COLLEGE	Junior Assistant

PREFACE

An energy audit is a study of a 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 exist provide the most hopeful prospects for the future. The opportunities lie in the use of existing renewable energy technologies, greater efforts at energy efficiency and the dissemination of these technologies and options.

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

The Energy Conservation Act, 2001, defines Energy auditing as the verification, monitoring analysis of 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 a systematic approach to the energy management in a system, trying to balance the total energy input with its use. It identifies all the energy streams in a system and quantifies the use of energy according to its discrete functions.

The energy audit of NAGAON GNDG COMMERCE COLLEGE was carried out by Energy Audit team for the period 2021-22. Here data have been collected by dividing a year into two periods namely summer period and winter period. This report is our mite in contributing to the larger picture of effective energy management and conservation. As is known, energy auditing is an on-going process, a part of a larger procedure to ensure long-term sustainable development.

Contents

INTRODUCTION

Nagaon Gopinath Dev Goswami Commerce College is a premier institution of higher education in commerce and science in the Central Assam region. The College came into existence on 24th September, 1984 in the premises of Sankardev Natya Chora under the name of Nagaon Commerce College. It was renamed as Nagaon NAGAON GNDG COMMERCE COLLEGE after the name of Late Gopinath Dev Goswami, an illustrious son of Nagaon and was shifted to its present site at Panigaon, Nagaon in1989. The College owes its existence to the pioneering and tireless work of its founder president Late Ratnakanta Bora, Rtd. I.A.S. and the founder-Principal Sjt. Kamal Chandra Goswami and the generous donations of the family of Late Gopinath Dev Goswami along with the guidance and assistance of the local people. Starting with only 139 students in the year of its inception, the College has blossomed into a premier institution for commerce education with a sizable number of students in its rolls every year. The College has maintained a consistently good academic record at different levels of university and council examinations and has thus, created a niche for itself in the field of commerce education. The College with a dedicated teaching faculty and an efficient administrative staff under the guidance of an able principal makes a sincere attempt to prepare the students for a good career in commerce and industry and helps them to build up character and personality as becoming of responsible citizens. The College offers ample opportunities to the students to develop their finer faculties in art, culture and literature and their individual potential in sports and athletics through competition and participation in various events throughout the year. The idea behind all these is to help and guide the students in the achievement of knowledge as reflected in the motto ‘Vidyaya Sadhayet’ enshrined in the College emblem. The College has been maintaining a uniformly good record of results in all the university and the council examinations reflecting the quality of education. On several occasions our students have secured distinctions and positions in the UG and PG examinations.

Scope of Energy Audit

The task of energy audit undertaken by NAGAON GNDG COMMERCE 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 APDCL are verified & worked out 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, bathrooms to influence & guide to user to arrest misuse & wastage of power.

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 MSEDCL 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 & saving opportunities are identified during round & measurement for implementation.

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

Data analysis

The gathered data was then quantified and separated according to the following criteria:

- Energy consumption by end use
- Estimated energy use block-wise
- Consumption equipment-wise

Table 1: Building/Department wise electrical/electronic appliances and equipment

Sl. No	Classroom/ Building	Tube light	LED bulb	Fan	AC	Computer+ Printer+ Xerox	Inverter/ Motor	Others
1	Commerce Building (Ground Floor)	24	49	39	02	0+1+0	0/2	Smart board: 1 CCTV :06 Projector:02 Calling bell: 01 Speaker : 01 Wi-Fi: 1
2	Commerce Building (First Floor)	34	5	38+2 wall fan	6	10+0+0	-	100W bulb: 1 Projector:01 CCTV: 05 Wi-Fi: 1
3	Commerce Building (2nd Floor)	42	03	35+5 exhaust fan	04	41+0+0	-	Smart board : 03 Smart TV:01 CCTV : 10 Projector : 02 Microphone : 01 100 W bulb : 02 Fire Alarm : 06
4	Administrative Building`	11	86	31+4 Exhaust fan	06	7+4+2	2/0	Lithograph Machine: 01 TV: 03 CCTV : 2 Refrigerator: 01 Wi-Fi: 1

								Attendant machine : 1 Speaker: 01 Calling bell: 04 Fire alarm: 01
5	Mini Auditorium & Classroom Building (Ground Floor)	0	22	8	-	-	-	Projector: 01 Smart TV:01 Aqua guard: 01 Speaker : 02 Amplifier: 01 Microphone: 01
6	Indoor stadium building	0	15	6+ 9 wall fan+ 10 exhaust fan	0	0	0	Stage light : 16 Speaker : 06
7	Science Building (Ground and 1st Floor)	11	59	48+ 6 exhaust fan	01	-	0/1	Smart TV:01
8	Warden Quarter Building	01	08	06	-	-	-	
9	Principal Quarter Building	05	06	04	01	-	-	Aqua guard: 01 Smart TV:01 Dim bulb: 02
10	Girls Hostel Building (Ground and 1st floor)	11	59	26	-	-	-	Smart TV:01
11	Old Assam Type Building (NCC store & medical room)	-	02	02	-	-	-	
12	Street light	-	5	-	-	-	-	
13	College Campus	-	-	-	-	-	-	Water fountain:1 RGB LED light: 06 Dim light: 01 Fire Alarm: 01 CCTV: 01 100 W bulb: 01 DG Set: 01
14	College gate	-	05	-	-	-	-	LED spot light: 02
15	Solar Street Light	-	04	-	-	-	-	-

Table 2: Estimated energy consumption in KWH during summer

Block	Items	Number	Power in W/item	TIME consumed (In hours)	Days	TOTAL Power consumption in KWH
COMMERCE BUILDING	Ceiling Fan	112 (90 used)	60W	5	26	702
	Wall Fan	2	100W	5	26	26
	Exhaust Fan	5	35W	1	26	4.55
	Tube light	100 (60 used)	20W	2	26	62.4
	LED Bulb	57 (22 used)	9W	2	26	10.296
	Water Pump (Motor)	2	746W	0.5	26	19.396
	Desktop	63 (10 used)	300W	2	26	156
	Printer	2	30W	0.5	26	0.78
	AC	12	1500W	5	20	1800
	Smart TV	01	40W	0.5	15	0.3
	Smart Board	4 (2 used)	150W	0.5	26	3.9
	CCTV	21	23W	24	26	301.392
	Calling bell	01	5W	0.5	26	0.065
	100W bulb	3	100W	1	26	7.8
	Wi-Fi	2	20W	6	26	6.240
	Speaker	1	15W	0.5	26	0.195
	Projector	5	250W	0.5	10	6.25
	Microphone	1	2W	0.5	10	0.01
	Total					**3107.574**
ADMINISTRATIVE BUILDING	Ceiling Fan	31(15 used)	60W	6	26	140.4
	Tube light	11(5 used)	20W	6	26	15.6
	LED Bulb	86(30 used)	9W	1	26	7.02
	Exhaust fan	4 (2 used)	35W	1	26	1.82
	AC	6	1500W	6	26	1404
	Inverter	02	1500W	6	26	468
	Desktop	7(4 used)	300	6	26	187.2
	Printer	4(3 used)	30W	2	26	4.68
	Xerox	02	2000W	3	26	312
	Lithograph machine	01		-	26	-
	TV	03 (2 used)	40W	6	26	12.48
	CCTV	02	23W	24	26	28.704
	Refrigerator	01	60W	6	26	9.360
	Wi-Fi	01	20W	6	26	3.12
	Attendant machine	01	20W	10	26	5.2
	Speaker	01	15W	0.5	26	0.195
	Calling Bell	04	5W	2	26	1.040
	Fire Alarm	01	45W	24	26	28.080
	Total					**2628.899**
Mini Auditorium & Classroom Building (Ground Floor)	Ceiling Fan	08	60W	1	5	2.4
	LED Bulb	22(10 used)	9W	1	5	0.45
	Aqua guard	01	100W	1	5	0.5
	Projector	01	250W	0.5	5	0.625
	Smart TV	01	40W	0.5	15	0.3
	Speaker	02	500W	0.5	5	2.5
	Amplifier	01	100	0.5	5	0.25
	Microphone	01	2W	0.5	5	0.005
	Total					**7.03**
Indoor Stadium Building	Ceiling Fan	06(4 used)	60W	1	12	2.88
	Wall fan	09(5 used)	100W	1	12	6
	Exhaust Fan	10	35W	1	12	4.2
	LED Bulb	15(10 used)	9W	1	12	1.08
	Stage Light	16	20W	0.5	12	1.92
	Speaker	06	500W	0.5	12	18
	Total					**34.08**

SCIENCE BUILDING (GROUND AND 1ST FLOOR)	Ceiling Fan	48(24 used)	60W	5	26	187.2
	Exhaust fan	06	35W	1	12	2.52
	Smart TV	01	40W	0.5	02	0.04
	AC	02	1500W	1	02	6
	Tube light	11(5 used)	20W	1	26	2.6
	LED Bulb	59(10 used)	9W	1	26	2.34
	Water Pump	01	746W	0.50	26	9.698
	Total					**210.398**
WARDEN QUARTER BUILDING	Ceiling Fan	06(4 used)	60W	8	30	57.6
	Tube light	01	20W	6	30	3.6
	LED Bulb	08(5 used)	9W	6	30	6.750
	Total					**67.95**
PRINCIPAL QUARTER BUILDING	Ceiling Fan	04	60W	8	10	19.2
	Tube light	05	20W	5	10	5
	AC	01	1500W	5	08	60
	Smart TV	01	40W	1	08	0.32
	LED Bulb	06	9W	5	10	2.7
	Aqua guard	01	100W	2	10	2
	Dim Bulb	02	1W	6	10	0.12
	Total					**89.34**
GIRLS HOSTEL BUILDING	Ceiling Fan	26 (20 used)	60W	8	30	288
	LED bulb	59(35 used)	9W	6	30	56.7
	Smart TV	01	40W	1	30	1.2
	Tube light	11(5 used)	20W	6	30	18
	Total					**363.9**
STREET LIGHT/COLLEGE CAMPUS/ COLLEGE GATE	LED Bulb	10	9W	10	30	27
	Water fountain	01	9W	1	30	0.27
	RGB LED light	06	20W	1	30	3.6
	CCTV	01	23W	24	30	16.56
	Dim Light	01	1W	10	30	0.3
	Fire Alarm	01	45W	24	30	32.4
	100W Bulb	01	100W	10	30	30
	DG set	01			30	
	LED Spot Light	02	20	10	30	12
	Total					**122.13**
OLD ASSAM TYPE BUILDING	Ceiling Fan	02	60W	4	26	12.48
	LED Bulb	02	9W	1	26	0.468
	Total					**12.948**
All total						**6644.249**

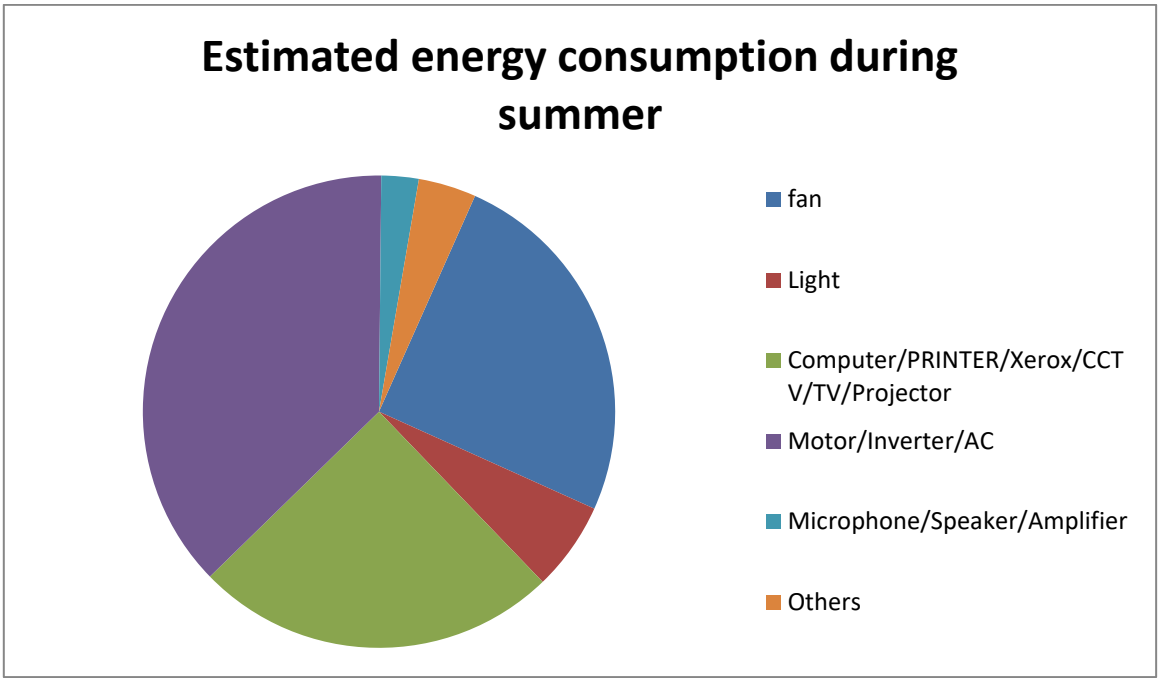

Fig 1: Energy consumption by and use (summer)

Table 3: Estimated energy consumption in KWH during winter

Block	Items	Number	Power in W/item	TIME consumed (In hours)	Days	TOTAL Power consumption in KWH
COMMERCE BUILDING	Ceiling Fan	112 (90 used)	60W	0	26	0
	Wall Fan	2	100W	0	26	0
	Exhaust Fan	5	35W	1	26	4.55
	Tube light	100 (60 used)	20W	2	26	62.4
	LED Bulb	57 (22 used)	9W	2	26	10.296
	Water Pump (Motor)	2	746W	0.5	26	19.396
	Desktop	63 (10 used)	300W	2	26	156
	Printer	2	30W	0.5	26	0.78
	AC	10	1500W	0	20	0
	Smart Board	4 (2 used)	150W	0.5	26	3.9
	CCTV	21	23W	24	26	301.392
	Calling bell	01	5W	0.5	26	0.065
	100W bulb	3	100W	1	26	7.8
	Wi-Fi	2	20W	6	26	6.240
	Speaker	1	15W	0.5	26	0.195
	Projector	2	250W	0.5	10	2.5
	Microphone	1	2W	0.5	10	0.01
	Total					**575.524**
ADMINISTRATIVE BUILDING	Ceiling Fan	31(15 used)	60W	0	26	0
	Tube light	11(5 used)	20W	6	26	15.6
	LED Bulb	86(30 used)	9W	1	26	7.02
	Exhaust fan	4 (2 used)	35W	1	26	1.82
	AC	4	1500W	0	26	0
	Inverter	02	1500W	6	26	468
	Desktop	7(4 used)	300	6	26	187.2
	Printer	4(3 used)	30W	2	26	4.68
	Xerox	02	2000W	3	26	312
	Lithograph machine	01		-	26	-
	TV	03 (2 used)	40W	6	26	12.48
	CCTV	02	23W	24	26	28.704
	Refrigerator	01	60W	0	26	9.360
	Wi-Fi	01	20W	6	26	3.12
	Attendant machine	01	20W	10	26	5.2
	Speaker	01	15W	0.5	26	0.195
	Calling Bell	04	5W	2	26	1.040
	Fire Alarm	01	45W	24	26	28.080
	Total					**1084.499**
Mini Auditorium & Classroom Building (Ground Floor)	Ceiling Fan	08	60W	0	5	0
	LED Bulb	22(10 used)	9W	1	5	0.45
	Aqua guard	01	100W	1	5	0.5
	Projector	01	250W	0.5	5	0.625
	Speaker	02	500W	0.5	5	2.5
	Amplifier	01	100	0.5	5	0.25
	Microphone	01	2W	0.5	5	0.005
	Total					**4.33**
Indoor Stadium Building	Ceiling Fan	06(4 used)	60W	0	12	0
	Wall fan	09(5 used)	100W	0	12	0
	Exhaust Fan	10	35W	1	12	4.2
	LED Bulb	15(10 used)	9W	1	12	1.08
	Stage Light	16	20W	0.5	12	1.92
	Speaker	06	500W	0.5	12	18
	Total					**25.2**
SCIENCE BUILDING	Ceiling Fan	48(24 used)	60W	0	26	0

(GROUND AND 1ST FLOOR)	Exhaust fan	06	35W	1	12	2.52
	Tube light	11(5 used)	20W	1	26	2.6
	LED Bulb	59(10 used)	9W	1	26	2.34
	Water Pump	01	746W	0.50	26	9.698
	Total					**17.158**
WARDEN QUARTER BUILDING	Ceiling Fan	06(4 used)	60W	0	30	0
	Tube light	01	20W	6	30	3.6
	LED Bulb	08(5 used)	9W	6	30	6.750
	Total					**10.35**
PRINCIPAL QUARTER BUILDING	Ceiling Fan	04	60W	0	10	0
	Tube light	05	20W	5	10	5
	LED Bulb	06	9W	5	10	2.7
	Aqua guard	01	100W	2	10	2
	Dim Bulb	02	1W	6	10	0.12
	Total					**9.82**
GIRLS HOSTEL BUILDING	Ceiling Fan	26 (20 used)	60W	0	30	0
	LED bulb	59(35 used)	9W	6	30	56.7
	Tube light	11(5 used)	20W	6	30	18
	Total					**74.7**
STREET LIGHT/COLLEGE CAMPUS/ COLLEGE GATE	LED Bulb	10	9W	10	30	27
	Water fountain	01	9W	1	30	0.27
	RGB LED light	06	20W	1	30	3.6
	CCTV	01	23W	24	30	16.56
	Dim Light	01	1W	10	30	0.3
	Fire Alarm	01	45W	24	30	32.4
	100W Bulb	01	100W	10	30	30
	DG set	01			30	
	LED Spot Light	02	20	10	30	12
	Total					**122.13**
OLD ASSAM TYPE BUILDING	Ceiling Fan	02	60W	0	26	0
	LED Bulb	02	9W	1	26	0.468
	Total					**0.468**
All total						**1924.179**

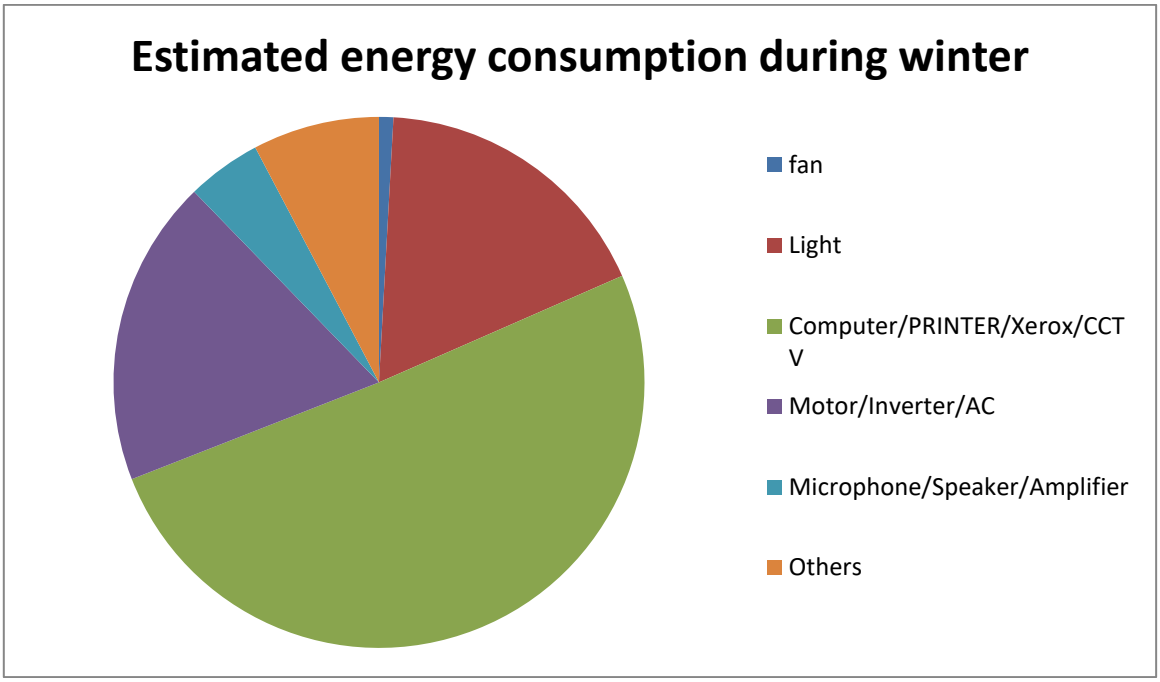

Fig 2: Energy consumption by and use (winter)

Table 4: The consumption of energy block-wise

S. No	Block	Estimated Energy Consume per month during summer (KWH)	Estimated Energy Consume per month during winter(KWH)
1	Commerce Building	3107.574	575.524
2	Administrative Building	2628.899	1084.499
3	Mini Auditorium & Classroom Building	7.03	4.33
4	Indoor Stadium	34.08	25.2
5	Science Building	210.398	17.158
6	Warden Quarter Building	67.95	10.35
7	Principal Quarter Building	89.34	9.82
8	Girls Hostel Buyilding	363.9	74.7
9	Street Light/ College campus/ College Gate	122.13	122.13
10	Old Assam Type Building	12.948	0.486
TOTAL		**6644.249**	**1924.179**

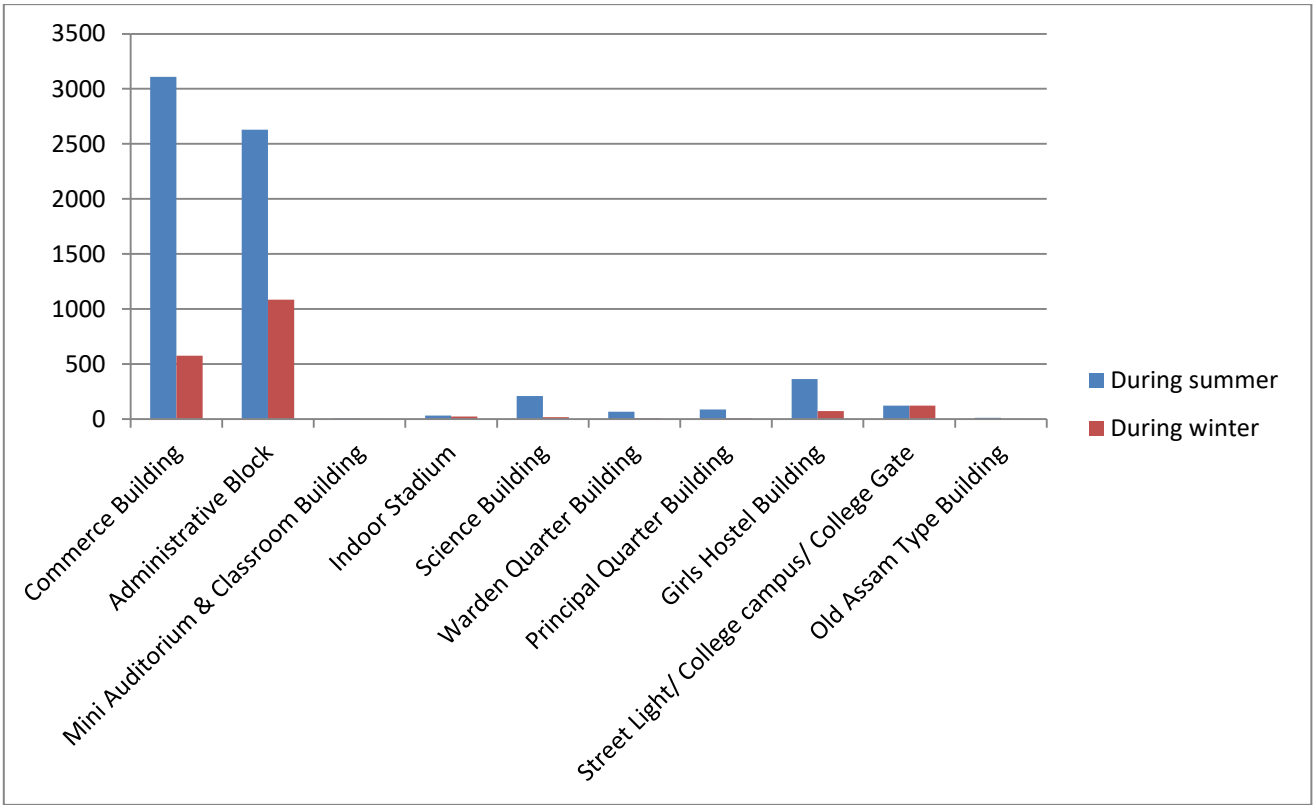

Fig 3: Block wise energy consumption

Some Electrical Equipments of Nagaon G.N.D.G. Commerce College :-

Transformer

DG set

Street Light

Water Fountain

SOLAR ENERGY, NAGAON G.N.D.G. COMMERCE COLLEGE

The Institution has facilities for alternate sources of energy and energy conservation measures:

Nagaon G.N.D.G. Commerce College is committed to energy conservation and use of renewable energy, thus contributing in the sustainable utilization or energy resource. In this context the college has taken an initiative by applying for **Solar Rooftop PV System** in RESCO Mode on Sep'2019 through the project of 7 MV Rooftop Power Plant implemented by APDCL under the subsidy scheme of MNRE. The installation is Grid connected Rooftop Solar Power Plant with battery backup in EXIM metering system. The Power Plant was installed with 40 Solar Panel and 40 rechargeable batteries. The plant will minimize the power utilization from ASEB thus reducing in the revenue expenses in power and also provide a backup power source to the college in power break down times. The Physical installation process is completed and is at the last stage of completion

Currently the Solar panels are installed only in administrative building and it is used as a backup source of energy. Till now we are not able to export the power to APDCL, as the EXIM metering system is not installed.

The capacity of the system is 11 kWp.

FINDING AND RECOMMENDATION OF THE AUDIT

Findings	Recommendation
The electrical wiring of many building was found to be old and inefficient	Replace old electrical cables with the new ones
There seem 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 working mode in many rooms, without a single person present.	Students and staffs should be exhorted constantly to use energy judiciously. Posters and pamphlets should be distributed and notices about saving energy should be posted at major points of use.
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 equipments should be repaired and/or replaced with latest ones to save energy(five star)
It is noticed that resistive regulators are used.	Resistive regulators should be replaced by electronic regulator.
It is noticed that maximum numbers of desktops are used.	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.
- Use of Solar panels which was functioning till July 2020as a main source of lighting, especially common areas.

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.
- Desktop must be replaced by laptops for saving power.
- 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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