

GREEN AUDIT REPORT

2022-2023



Submitted To

The Principal
Jorhat Kendriya Mahavidyalaya
Kenduguri, Jorhat, Assam
785010

Submitted By



JKM Consultancy Service
Solution for Green Audit

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Our special thanks goes to Dr. Dulen Saikia, Principal, Jorhat Kendriya Mahavidyalaya, for giving us necessary inputs to carry out this vital exercise of Green Audit. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

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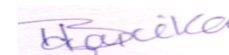

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GREEN AUDIT CERTIFICATE

This is to certify that a Green Audit for Jorhat Kendriya Mahavidyalaya, Assam has been conducted during the session 2022-23, to assess Environment cost and Environment Impact Assessment and Carbon credit with a view to take sustainable steps to reduce the carbon footprint left by the college and to make environment friendly model of administration.



Dr. Dulen Saikia

Chairperson



JKM Consultancy Service

Dr. Dulen Saikia
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INTRODUCTION

Green audit is also widely known as Environmental Audit. Green Audit can be better understood as: Compliance of Environmental Laws, Audit of Environment Cost and Environment Impact Assessment, and Carbon Credit. We believe that saving ‘Mother Earth’ is an integral part of education and that the carbon footprint left by the college is to be reduced by sustainable steps and an environment friendly model of administration. Green audit is a valuable means for a college to determine how and where they are using the most energy or water or other resources; the college can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values, and ethics. It provides staff and students better understanding of green impact on campus. Institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

In recent time, the Green Audit of an institution has been becoming important for self-assessment of the institution which reflects the role of the institution in mitigating the present environmental problems. Many institutions undertake lots of good measures to resolve these problems but are not documented due to lack of green documentation awareness. All these non-scholastic efforts of the administrations play an important role in ensuring the green quotient of the campus is intact. Therefore, the purpose of the present green audit is to identify, quantify, describe, and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

OBJECTIVES

The main objectives of carrying out Green Audit are:

- To map the Geographical Location of the college.
- To document the floral and faunal diversity of the college.
- To record the meteorological parameter of the college as well as Dibrugarh region where the college is situated.
- To document the waste disposal system.

METHODOLOGY

The purpose of the green audit of Jorhat Kendriya Mahavidyalaya, is to ensure that the practices followed in the campus are in accordance with the Green Policy of the country. The methodology includes:

- Collection of data.
- Physical inspection of the campus.
- Observation and review of the documentation and data analysis

ABOUT THE COLLEGE

Jorhat Kendriya Mahavidyalaya is a promising Co-educational premier institution in North- East India offering courses of study in both Arts and Science streams. The College is located at Kenduguri, 3 km. east of Jorhat city centre and is well linked by NH-37 as well as by the Assam Trunk Road.

The college was established in 1981 with the noble objective of meeting the needs of higher education of a large locality, quite a number of who belong to the rural and economically weak background.

The College is permanently affiliated to Dibrugarh University. The Arts Stream of the college was brought under the deficit grants-in-aid system from January 11, 1996. Spurred by the interest of students, the Science Stream was introduced from the academic session 1991-92. The College offers courses in Arts and Science at the undergraduate level and semester courses for fourteen subjects with thirteen options for Major. In parallel with the introduction of the Semester system by the University from 2011-2012, the College has introduced BA and M.A in the Distance mode to enable employed students or students who are unable to pursue regular courses for different reasons an opportunity for higher education.

The College also provides Vocational Courses and Skill development programmes from time to time in relevant areas. Catering to the development of students and keeping in mind the competitive scenario of the job market the College facilitates career guidance, personal counseling and coaching for entrance examinations. From the academic session 2015, the Tea Plantation and Management Course has been introduced under Community College Scheme sponsored by UGC and from the Academic Session 2018-19, the College introduced the UGC sponsored 3-year Bachelor of Vocational Course (B.Voc) in Small Tea Garden Management. During the academic session 2020-2021, two new courses under Community College (of UGC) were introduced.

There exists an atmosphere of cordial relationship between the students and teachers in the College. Apart from academic pursuits, stress is laid on co- curricular activities and all-round development of the students' personality. Special attention is paid to the students coming from backward and marginalized sections of society whose welfare was on the top of the agenda when the College was established.

The College has a well-equipped library, which is supervised and managed by a qualified Librarian. The library is fully digitalized. Photocopier machine and computers with Internet facilities are available in the College Library.

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The College has a well-equipped library, which is supervised and managed by a qualified Librarian. Set in a campus with greenery of trees, beautiful flower gardens, well positioned decorative flower pots, the College boasts of its scenic beauty and pleasing environment that provides a breather from the noisy atmosphere of the city.

VISION OF THE COLLEGE

We seek to provide quality education for all sections of society reaching out especially to the socially, economically, and educationally disadvantaged. We aspire to equip students for life, making them not only competent job seekers, but also socially committed citizens well equipped with a sense of tolerance and justice.

MISSION OF THE COLLEGE

The Mission of the College is to create confident, dedicated honest and upright individuals who become assets to the society. We are especially committed to students from economically, socially and educationally weaker backgrounds and are continually engaged in improving the quality of education.

OBSERVATIONS

The College is located at Kenduguri, 3 km. east of Jorhat city center and is well linked by NH-37 as well as by the Assam Trunk Road. The transportation system leading to the college is very convenient. It is worth-mentioning that the college is fully equipped with well-furnished buildings, a big playground and with other necessary civic amenities.

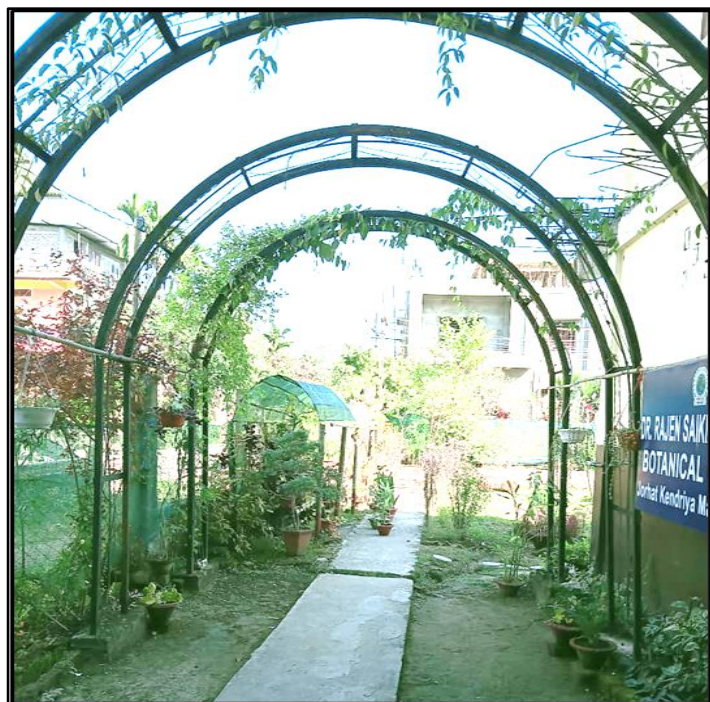
The college possesses many plantation areas which have a great diversity of plant species performing a variety of functions. The tree species are planted in different periods of time through various plantation programmes organized by the college authority and have become an integral part of the college. The trees of the college are prominent features that are planted to maintain the greenery and aesthetic values, store carbon and stabilize the soil. Many species of birds are dependent on these trees mainly for food and shelter. Nectar of flowers and plants is a favourite of birds and many insects. Leaf – covered branches keep many animals, such as birds and squirrels, out of reach of predators. Different species display a seemingly endless variety of shapes, forms, texture and vibrant colours. Even individual trees vary their appearance throughout the year as the season changes. They also remind us the glorious history of our institution in particular.

We often make an emotional connection with these trees and sometimes become personally attached to the ones that we see every day. Shady trees in the periphery of the college have found to be bringing down noise and cut down dust and storms.

Thus, Jorhat Kendriya Mahavidyalaya has been playing a significant role in maintaining the environment of the entire surrounding areas. The various Plantation Plots and Plant Diversity of that maintains the greenery in the campus has been given in the report.

PLANTATION AREAS OF JORHAT KENDRIYA MAHAVIDYALAYA

1. BOTANICAL GARDEN



Some indigenous Plants in Botanical Garden

2. ROOF TOP GARDEN (GREEN HOUSE KNOWLEDGE HUB NURSERY)



3. EXPERIMENTAL TEA PLANTATION AREA



OTHER GARDEN AREA OF THE COLLEGE CAMPUS



TREE DIVERSITY OF JKM, JORHAT

Jorhat Kendriya Mahavidyalaya is within the geo-position between 26.7703⁰ N latitude and 94.2435⁰ E longitude Jorhat, Assam, India. It surrounds an area of about 6 Acres. The area has a great diversity of tree species that are planted in different periods of time through various plantation programmes organised by the college authority and have become an integral part of the college. The trees of the college maintain the greenery and aesthetic values, store carbon and stabilize the soil and have increased the quality of life of not only the college fraternity but also the people of the area around the college by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, and supporting wildlife, controlling climate by moderating the effects of the sun, rain and wind. Many species of birds are dependent on these trees mainly for food and shelter. Nectar of flowers and plants is a favourite of birds and many insects. Leaf –covered branches keep many animals, such as birds and squirrels, out of reach of predators. Different species display a seemingly endless variety of shapes, forms, texture and vibrant colours. Even individual trees vary their appearance throughout the course of the year as the seasons change. They also remind us the glorious history of our institution in particular. We often make an emotional connection with these trees and sometime become personally attached to the ones that we see every day. Thus, the college has been playing a significant role in maintaining the environment of the entire Kenduguri area. The following are the tree species with whom we are being attached-

A. List of Plants in Botanical Garden

Sl. No.	Common Name	Scientific Name	Family
1	Sarpagandha	<i>Rauwolfia serpentina</i>	Apocynaceae
2	Dupor tenga	<i>Bryophyllum pinnatum</i>	Crassulaceae
3	Masundari	<i>Houttuynia cordata</i>	Saururaceae
4	Manimuni	<i>Centella asiatica</i>	Apiaceae
5	Bose goss	<i>Acorus calamus</i>	Acoraceae
6	Xukloti	<i>Acaloipha indica</i>	Euphorbiaceae
7	Era goss	<i>Ricinus communis</i>	Euphorbiaceae
8	Canna	<i>Canna indica</i>	Cannaceae
9	Modhuri	<i>Psidium guajava</i>	Myrtaceae
10	Gulab	<i>Rosa</i>	Rosaceae
11	Nuni gos	<i>Morus alba</i>	Rubiaceae
12	Rubber plant	<i>Ficus elastica</i>	Moraceae

Sl. No.	Common Name	Scientific Name	Family
13	Vekuri Tita	<i>Solanum nigrum</i>	Solanaceae
14	Mati Kanduri	<i>Alternanthera sessilis</i>	Amaranthaceae
15	Kola Tulsi	<i>Ocimum tenuiflorum</i>	Lamiaceae
16	Ram Tulsi	<i>Ocimum sanctum</i>	Lamiaceae
17	Oregano	<i>Origanum vulgare</i>	Lamiaceae
18	Pudina	<i>Mentha spicata</i>	Lamiaceae
19	Horu Tengesi	<i>Oxalis stricta</i>	Oxalidaceae
20	Bor Tengesi	<i>Oxalis corniculata</i>	Oxalidaceae
21	Aloe Vera	<i>Aloe vera</i>	Asphodeloideae
22	Kona Himolu	<i>Commelina benghalensis</i>	Commenlinaceae
23	Xewali	<i>Nyctanthes arbor tristis</i>	Oliaceae
24	Amla	<i>Phyllanthus emblica</i>	Phyllanthaceae
25	Sugar cane	<i>Saccharum officinarum</i>	Poaceae
26	Hunaru	<i>Cassia fistula</i>	Fabaceae
27	Brahmi	<i>Bacopa monnieri</i>	Plantaginaceae
28	Elaichi	<i>Elettaria cardamomum</i>	Zingiberaceae
29	Citronella	<i>Cymbopogon nardus</i>	Poaceae

B. LIST OF PLANTS IN THE COLLEGE CAMPUS

Sl.No.	Common Name	Scientific Name	Family
1.	Arjun	<i>Terminalia arjuna</i>	Combretaceae
2.	Coconut	<i>Cocos nucifera</i>	Arecaceae
3.	Xonaru	<i>Cassia fistula</i>	Fabaceae
4.	Devodaru	<i>Polyalthia longifolia</i>	Annonaceae
5.	Ashok Ful	<i>Saraca asoca</i>	Fabaceae
6.	Bokul	<i>Mimusops elengi</i>	Sapotaceae
7.	Mamoi Tamul	<i>Chrysalidocarpus lutescens</i>	Arecaceae
8.	Tea	<i>Camellia sinensis.</i>	Theaceae
9.	<i>Bougainvillea</i>	<i>Bougainvillea glabra</i>	Nyctaginaceae
10.	Bogori	<i>Zizyphus jujube</i>	Rhamnaceae
11.	Radhachura	<i>Caesalpinia pulcherrima</i>	Leguminosae
12.	Pine (Ornamental)	<i>Araucaria heterophylla</i>	Araucariaceae
13.	Golden cypress	<i>Juniperous sebina</i>	Cupressaceae
14.	Eucalyptus	<i>Eucalyptus globulus Labill.</i>	Myrtaceae
15.	Mango	<i>Mangifera indica</i>	Anacardiaceae
16.	Aamlokhi	<i>Phyllanthus emblica</i>	Phyllanthaceae
17.	Powder puff.	<i>Calliandra surinamensis</i>	Fabaceae
18.	Bah (Ornamental)	<i>Bamboo Species</i>	Poaceae
19.	Neem	<i>Azadirachta indica</i>	Meliaceae
20.	Kaju Badam	<i>Anacardium occidentale</i>	Anacardiaceae
21.	Japani Korobi	<i>Nerium oleander</i>	Apocynaceae
22.	Bel	<i>Aegle marmelos</i>	Rutaceae
23.	Gulab	<i>Rosa Species</i>	Rosaceae
24.	Otenga	<i>Dillenia indica</i>	Dilleniaceae
25.	Xilikha	<i>Terminalia chebula</i>	Combretaceae
26.	Kola Tulsi	<i>Ocimum tenuiflorum</i>	Lamiaceae
27.	Siris	<i>Albizia lebbeck</i>	Fabaceae
28.	Syzygium	<i>Syzygium Species</i>	Myrtaceae
29.	Akhoi Phul	<i>Jasmine Species</i>	Oleaceae
30.	Chandni	<i>Tabernaemontana coronaria</i>	Apocynaceae
31.	Thuja (Ornamental)	<i>Thuja species</i>	Cupressaceae
32.	Areca Palm	<i>Dypsis lutescens</i>	Arecaceae

C. LIST OF PLANTS IN ROOF TOP GARDEN

Sl.No.	Common Name	Scientific Name	Family
1.	Dalim	<i>Punica granatum</i>	Lythraceae
2.	Gul Nemu	<i>Citrus limon</i>	Rutaceae
3.	Mango	<i>Mangifera indica</i>	Anacardiaceae
4.	Tomato	<i>Solanum lycopersicum</i>	Solanaceae
5.	Strawberry	<i>Fragaria ananassa</i>	Rosaceae
6.	Dragon fruit	<i>Hylocereus undatus</i>	Cactaceae
7.	Bhut jolokia	<i>Capsicum chinense Jacq</i>	Solanaceae
8.	Capsicum	<i>Capsicum</i>	Solanaceae
9.	Papaya	<i>Carica papaya</i>	Caricaceae
10.	Passion fruit (Lota bel)	<i>Passiflora edulis</i>	Passifloraceae
11.	Batabi nemu(Pomelo)	<i>Citrus maxima</i>	Rutaceae
12.	Kordoi (Star fruit)	<i>Averrhoa carambola</i>	Oxalidaceae
13.	Rohdoi	<i>Averrhoa carambola</i>	Oxalidaceae
14.	Poniol	<i>Flacourtia jangomas</i>	Salicaceae
15.	Tezpat	<i>Cinnamomum tamala</i>	Lauraceae
16.	Pati Nemu	<i>Citrus limon</i>	Rutaceae
17.	Apple modhuri	<i>Digera muricata (L.) Mart.</i>	Combretaceae
18.	Begum bahar	<i>Tibouchina semidecandra</i>	Melastomataceae
19.	Leteku	<i>Baccurea sapida</i>	Phyllanthaceae
20.	Litchi	<i>Litchi chinensis</i>	Sapindaceae
21.	Bismarckia Palm	<i>Bismarckia Nobilis</i>	Areaceae
22.	Orange	<i>Citrus reticulata</i>	Rutaceae

D. LIST OF HYDROPHYTIC PLANT

Sl.No.	Common Name	Scientific Name	Family
1.	Water Lettuce	<i>Pistia Species</i>	Araceae
2.	Water Lily	<i>Nymphaea</i>	Nymphaeaceae
3.	Water Hyacinth	<i>Eichhornia crassipes</i>	Pontideriaceae

PHOTO-GALLERY



Arjun (*Terminalia arjuna*)



Golden Bamboo



Bogori (*Zizyphus jujube*)



Coconut(*Cocos nucifera*)



Sugar cane (*Saccharum officinarum*)



Strawberry (*Fragaria ananassa*)



Bougainvillea (*Bougainvillea glabra*)



Citronella (*Cymbopogon nardus*)



Parijat



Magnolia (*Magnolia grandifolia*)



Water -Hyacinth



Water Lily (*Nymphaea*)

FAUNAL DIVERSITY OF THE COLLEGE

Jorhat Kendriya Mahavidyalaya is in Jorhat District of Assam. The wet season in Jorhat is hot, oppressive. and mostly cloudy, while the dry season is warm and clear. Throughout the year, the temperature typically ranges from 51°F to 89°F, with temperatures rarely falling below 47°F or rising above 95°F. The climatic conditions in the Jorhat district as a whole, and particularly in Jorhat Kendriya Mahavidyalaya, are ideal for a diverse range of flora and fauna to thrive and contribute to the district's rich biodiversity.

The following faunal diversity has been studied and documented in Jorhat Kendriya Mahavidyalaya-

Table: Common and Scientific names of birds and animals

S.No	Common Name	Scientific Name
1.	Common Myna	<i>Acridotheres tristis</i>
2.	White breasted waterhen	<i>Amaurornis phoenicurus</i>
3.	House Sparrow	<i>Passer domesticus</i>
4.	Crow	<i>Corvus sp.</i>
5.	Cuckoo	<i>Cuculidae</i>
6.	Snake	<i>Naja naja</i>
7.	Cattle egret	<i>Bubulcus ibis</i>
8.	Butter Fly	Danaus Genutia
9.	Common pigeon	<i>Columba livia</i>
10.	Garden tiger moth	<i>Arctia caja</i>
11	Bat	<i>Chiroptera</i>
12	Indian owl	<i>Bubo benghalensis</i>
13	Leech	<i>Hirudinea</i>
14	Earthworm	<i>Eisenia fetida</i>
15	Goat	<i>Capra aegagrus hircus</i>
16	Ceylon hawk cuckoo	<i>Hierococcyx varius.</i>
17	Cow	<i>Bos Taurus</i>

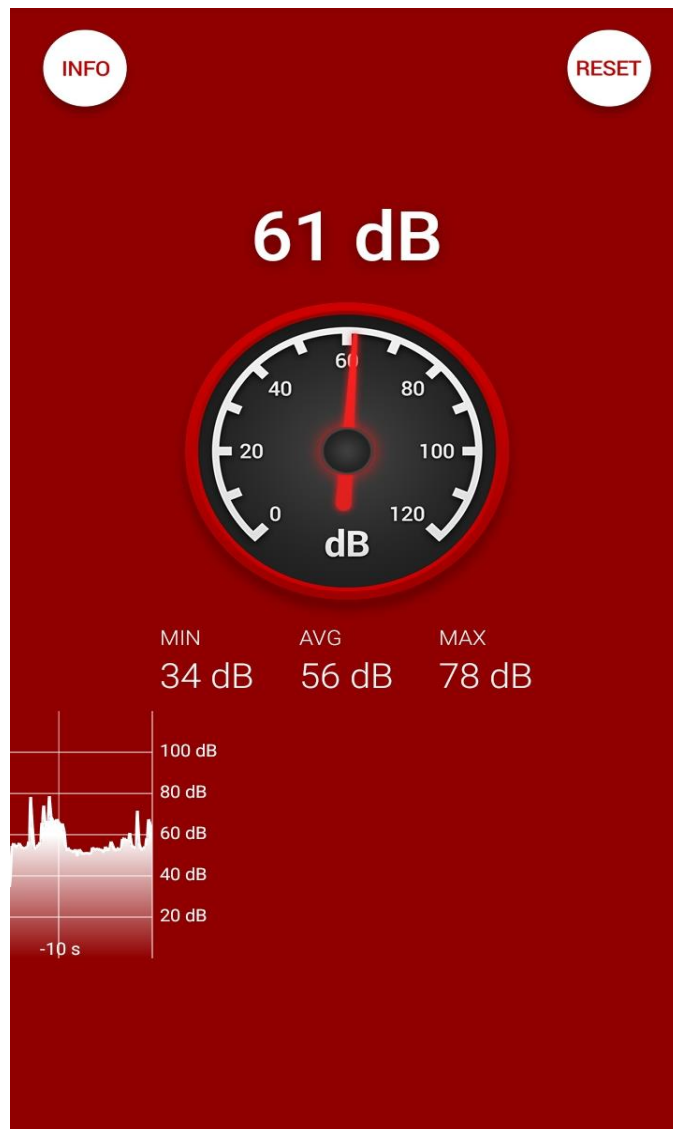
NOISE LEVEL IN THE SURROUNDING OF THE COLLEGE

Noise measurement, also known as sound level monitoring, is a process that determines the magnitude of noise in a specific area, such as an industrial and residential area. As noise has increased exponentially in recent years, this process is part of environmental monitoring and testing. Sound or noise has two important properties:

- **Loudness:** The intensity of a person's perception of sound is defined as loudness. Decibels are used to quantify it. A whisper is about 20 dB, a library is about 30 dB, normal conversation is about 35-60 dB, heavy street traffic is about 60-80 dB, boiler factories are about 120 dB, jet planes during take-off are about 150 dB, and rocket engines are about 180 dB. The loudest sound a person can tolerate without feeling ill is around 80 decibels (dB). Sounds above 80 decibels (dB) can be considered Pollutants because they harm the hearing system. The WHO has established 45 decibels as the safe noise level for cities. Noise levels of up to 65 dB are considered tolerable by international standards. Sones are another way to express loudness. One sone is equal to 40 decibels of sound pressure at 1000 hertz. The number of vibrations per second is defined as frequency. Hertz is the abbreviation for it (Hz).
- **Frequency:** The frequency of sound is defined as the number of pressure variations per second that occur when sound travels through air and is measured in Hertz (Hz). The higher the frequency, the higher pitched the sound is perceived to be.

MATERIALS, STUDY AREA & METHODS:

Noise level meter or noise measuring app (Sound meter), was used to measure the noise level. Noise test pro detect of any noise, music or sound in your surroundings. It will tell you maximum, minimum and average decibels.



DESCRIPTION OF THE COLLEGE SITE:

Jorhat Kendriya Mahavidyalaya is located in Kenduguri area of Jorhat District of Assam. It is situated in a beautiful natural ambience bounded to the north by NH-37 and Sarojini Devi High School, to the east by the Sewali Path and to the west and south by residential areas.

MEASUREMENT PROCEDURE:

The noise level was measured at various important locations of the college area. The measurements were taken for 60 seconds at each location during the day (9 a.m.-3 p.m.) and are recorded. Screen shots of noise measurements were taken on the app immediately at the 60th second of each measurement.

RESULTS:

The results of the experiments at different places have been tabulated in the following Table-

Table 1: Measurements of Noise in and around Jorhat Kendriya Mahavidyalaya campus

<i>PLACE</i>	<i>MEASUREMENT (Duration in Sec.)</i>	<i>MINIMUM (dBA)</i>	<i>Maximum (dBA)</i>	<i>AVERAGE (dBA)</i>
Library	60	30	89	44
IQAC room	60	26	89	59
Classroom	60	31	89	70
Administrative Building	60	26	69	58
College gate	60	31	89	71
Canteen	60	34	74	56

Source: The measurements were taken with the help of sound meter app.

The measurements of noise have been recorded in and outside of college area:

In Campus –

Minimum -26 dBA

Maximum- 89 dBA

Out Campus-

Minimum -31 dBA

Maximum-70 dBA

WEATHER REPORT OF THE COLLEGE

Located at an elevation of 94.12 meters (308.79 feet) above sea level, Jorhat has a Humid subtropical, dry winter climate (Classification: Cwa). The district's yearly temperature is 25.67°C (78.21°F) and it is -0.3% lower than India's averages. Jorhat typically receives about 96.46 millimeters (3.8 inches) of precipitation and has 66.44 rainy days (18.2% of the time) annually.

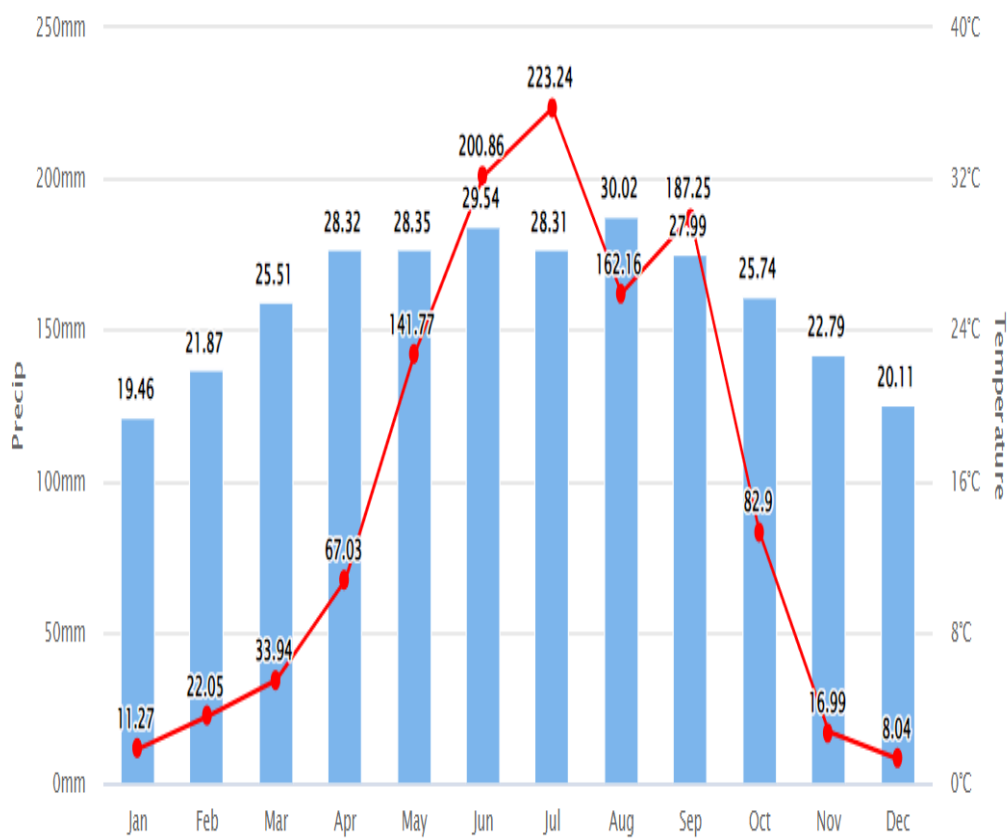
WEATHER DATA MONTH WISE JORHAT DISTRICT (Source: Google):

Weather and Climate IN		Search: City, Country, or Climate Q												Features	Countries	Metric (°C)
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Oct	Dec	Year			
Record high °C (°F)	27.0 (80.6)	30.0 (86.0)	37.0 (98.6)	39.0 (102.2)	38.0 (100.4)	37.0 (98.6)	38.0 (100.4)	38.0 (100.4)	35.0 (95.0)	32.0 (89.6)	29.0 (84.2)	27.0 (80.6)	39.0 (102.2)			
Average high °C (°F)	23.16 (73.69)	25.48 (77.86)	29.41 (84.94)	32.13 (89.83)	31.53 (88.75)	32.03 (89.65)	30.27 (86.49)	32.41 (90.34)	30.19 (86.34)	28.54 (83.37)	25.93 (78.67)	23.62 (74.52)	28.73 (83.71)			
Daily mean °C (°F)	19.46 (67.03)	21.87 (71.37)	25.51 (77.92)	28.32 (82.98)	28.35 (83.03)	29.54 (85.17)	28.31 (82.96)	30.02 (86.04)	27.99 (82.38)	25.74 (78.33)	22.79 (73.02)	20.11 (68.2)	25.67 (78.21)			
Average low °C (°F)	13.31 (55.96)	15.72 (60.3)	18.16 (64.69)	21.07 (69.93)	22.22 (72.0)	24.84 (76.71)	24.88 (76.78)	25.39 (77.7)	23.74 (74.73)	20.87 (69.57)	17.2 (62.96)	14.2 (57.56)	20.13 (68.23)			
Record low °C (°F)	8.0 (46.4)	12.0 (53.6)	13.0 (55.4)	15.0 (59.0)	16.0 (60.8)	20.0 (68.0)	19.0 (66.2)	20.0 (68.0)	17.0 (62.6)	17.0 (62.6)	14.0 (57.2)	11.0 (51.8)	8.0 (46.4)			
Average precipitation mm (inches)	11.27 (0.44)	22.05 (0.87)	33.94 (1.34)	67.03 (2.64)	141.77 (5.58)	200.86 (7.91)	223.24 (8.79)	162.16 (6.38)	187.25 (7.37)	82.9 (3.26)	16.99 (0.67)	8.04 (0.32)	96.46 (3.8)			
Average precipitation days (≥ 1.0 mm)	1.91	2.91	4.45	6.0	7.36	8.09	8.36	8.27	8.09	7.27	2.64	1.09	5.54			
Average relative humidity (%)	65.17	63.79	57.7	60.67	73.65	81.77	87.72	83.33	87.43	85.72	82.33	72.48	75.15			
Mean monthly sunshine hours	8.55	10.84	11.19	10.83	10.85	12.0	11.29	10.34	9.68	9.8	10.34	10.23	10.49			

CLIMATE GRAPH MONTH WISE

Climate Graph

The chart below shows the mean monthly temperature and precipitation of Jorhat in recent years.



WASTE DISPOSAL SYSTEM OF THE COLLEGE

Waste disposal is concerned with the removing and destroying or storing damaged, used or unwanted domestic, agricultural or industrial products and substances. It includes burning, burial at landfill sites or at sea, and recycling.

The waste from all around the college is separated daily as wet and dry waste in different bags which are disposed separately. Dry waste includes paper, cardboard, glass, tin cans etc. on the other hand; wet waste refers to organic waste such as vegetable peels, left-over food, wastes from vermicompost tanks etc. Separation of waste is done to make effective degradation or disposal of the wastes. The biodegradable waste material was composted and evaluated as a fertilizing material in the vermicompost units. Disposal of these waste results in the production of good quality organic manure that can be used as soil amendments and source of plant nutrients. Some of the biodegradable wastes are also used in the Bio-Gas Digester Tank to produce Bio-gas.

Jorhat Kendriya Mahavidyalaya has adopted various environment friendly practices and takes necessary actions such as – energy conservation, waste recycling, etc. to achieve higher level of environmental performance. By reusing or recycling we are contributing to the conservation of natural resources, saving energy, helping to protect the environment, reducing landfill.

A Paper Recycling Unit was established in the college on the occasion of National Science Day, 2023, with the help of which the waste paper is recycled to produce useful paper.

The impact of carbon emissions in the environment of the college is minimized by allowing the vehicles having the pollution certificates to enter inside the college campus. The biological reusable waste is processed as organic manure for the plants available in the college campus and the other solid waste generated in the college is taken to the community bin of Jorhat municipality for recycling and disposal through authorized vendors.

COLOURED DUSTBINS FOR COLLECTION OF VARIOUS WASTE



BAMBOO DUSTBINS LOCATED IN DIFFERENT PLACES IN THE COLLEGE



OTHER IMPORTANT FEATURES OF THE COLLEGE:

A. VERMICOMPOST PRODUCTION UNIT

A Vermicompost Production Unit was established in the college campus in the year 2021 with the objective to produce vermicompost, a beneficial organic compost. Later the vermicompost produced was named as “Krishi-Mitra” and was released as a start-up-product of JKM on 2022.

The biodegradable waste generated in the campus is used in this Unit to produce the Vermicompost with the help of vermi-earthworms.

With the help of this unit, the faculty members of the Zoology Department of the college give training to the students about the Vermicomposting Technology. Vermicompost is also included as a skill subject in SEC, Add on Certificate Course and Skill Hub Initiative Course(Under PMKVY -3.0 Scheme) to make the students skilled in the particular production and can be self-employed or be an entrepreneur.



B. BIO-GAS DIGESTER TANK

The biodegradable waste from canteen and hostel is used up in the Bio-gas Digester Tank to produce Biogas. It is a gaseous renewable energy source that is produced when food or animal waste is broken down by microorganisms in the absence of oxygen.



C.WASTE PAPER -RECYCLING UNIT

A Waste Paper Recycling Unit was established in the college on the occasion of National Science Day ,2023 to recycle the waste paper collected from the college to make useful paper. The students of the chemistry department do their projects of making useful paper out of the waste paper with the help of the waste paper recycling unit.



The students doing the projects of making useful papers out of waste paper

D. RAIN WATER HARVESTING AND GROUND WATER RECHARGING SYSTEM

Rainwater harvesting is the simple process or technology used to conserve rainwater for future use. The main purpose of the rainwater harvesting is to meet the water requirement throughout the year and in the water crisis period.

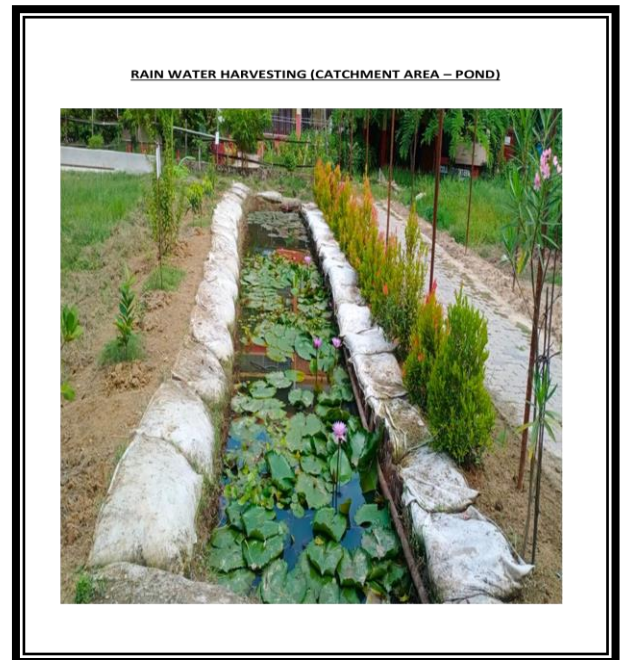
Ground water recharge is a process where water moves downward from surface water to ground water.

Roof Top Rainwater Harvesting Structures-

The college has taken an initiative to create 5 No. s of Roof Top Rainwater harvesting structures in the various buildings of the college (Roof-Top of Auditorium, Rusa, Arts, Science Building and in the newly constructed (Seuj Ashray) for collection and storage of rainwater. Collected rainwater from the roof is directed to different catchment areas like tanks, water bodies and reservoirs for its future use.

Ground water Recharge System-

JKM has provisions for Groundwater recharge. The Surplus rainwater is directed to two installed groundwater recharge well, which is an important technique for sustainable groundwater management and to prevent water logging.



Rainwater harvesting structure and the catchment area from the roof top structures

GROUND WATER RECHARGE



E. LED BULB PRODUCTION AND REPAIRING CENTRE

The College has a LED Bulb Production and Repairing Centre where the manufacturing of LED bulbs and its repairing process is carried out. LED is a widely used standard source of light in electrical equipment and are today's most energy-efficient and rapidly developing lighting technology. The LED Bulb manufactured in the institute has a brand name "**JKM Rhino**", which as a start-up product was released in February, 2022.

As a skill course, The LED Light repairing Technician course was included as an Add on Certificate course and as a Skill Hub Initiative Course, where training is given to the students as how to repair LED Bulbs.



F. PHOTO-VOLTAIC SOLAR PANEL

A major step has been initiated by the Institute for conservation of electrical energy by installing a Photo-Voltaic Solar Panel on the Roof Top, which has the capacity to generate a power of approximately 2.16 KW.



ENERGY AUDIT REPORT (2022-23)



OF

JORHAT KENDRIYA MAHAVIDYALAYA

Address: KENDUGURI, JORHAT

PIN - 785010

Assam

Submitted By

JKM Consultancy Service, Jorhat



Solution For Energy Audit

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Preface

Data collection for energy audit of the Jorhat kendriya mahavidyalaya , Jorhat was conceded by team for the period of April 2022 to March 2023.

This audit was over sighted to inquire about convenience to progress the energy competence of the campus. All data collected from each classroom, laboratory, every room. The work is completed by considering how many tubes, fan, A.C, electronic instruments, etc. in each room. How much was participation of each component in total electricity consumption.

We really appreciate the effort put by college management for creating awareness of Energy Audit, use renewable energy such as solar energy and their significance use for efficient energy saving and our nature among the all of us. We really appreciate Hon. Management of the college for encouraging us by providing this wonderful opportunity to do the energy audit. Through this, we have been cleared the vision of Institution towards the Green campus and save our green nature. We really appreciate to develop good quality weather station in house of the college.

Acknowledgement

We are sincerely thankful to the Jorhat kendriya mahavidyalaya , Jorhat management for giving us the opportunity to conduct energy audit in the college campus.

We are also grateful to Dr. Dulen Saikia , principal, Jorhat kendriya mahavidyalaya , Jorhat Assam whose valuable comment / feedback , during various reviews have helped us to bring the report in the present format.

We express our sincere gratitude to IQAC Coordinator and all other concerned officials for their support and guidance during the conduct of this exercise.

Energy Audit Assesment Team

(Internal)

- Dr Dulen Saikia, Principal, M.Sc, M.Phil. Ph.d
- Mr Rajib Bordoloi, Associate Prof. M.Sc
- Mr Arup Saikia, Assistant Prof. M.Sc, M.Phil
- Mr Amrit Dutta, Assistant Prof. M.Sc

Handwritten signatures and initials:
- Above Dr Dulen Saikia: *DS*
- Between Mr Rajib Bordoloi and Mr Arup Saikia: *R*
- Next to Mr Arup Saikia: *AS*
- Next to Mr Amrit Dutta: *ADutta*

(External)

- Mr. Sabikur Rahman, Assistant Prof.
- Dr. Dandeswar Dutta, Sr. Scientist

Handwritten signatures and initials:
- Next to Mr. Sabikur Rahman: *S*
- Next to Dr. Dandeswar Dutta: *DD*

Abbreviations

AHU	Air handling unit
APFC	Automatic Power Factor Controller
DG	Diesel generator
ECP	Energy Conservation Proposal
GCV	Gross Calorific Value
HVAC	Heating, Ventilation and Air Conditioning
HSDG	High speed diesel Generator
PF	Power Factor
SEC	Specific Energy Consumption
TR	Tons of Refrigeration
UOM	Unit of Measurement
APDCL	Assam Power Distribution Company Limited

Introduction to Energy Audit

- **General:**

Jorhat kendriya mahavidyalaya , Jorhat ,Assam entrusted the work of conducting a detailed Energy Audit of campus with the main objectives are as bellows:

- ☐ To study the present pattern of energy consumption
- ☐ To identify potential areas for energy optimization
- ☐ To recommend energy conservation proposals with cost benefit analysis.

- **Scope of Work, Methodology and Approach:**

Scope of work and methodology were as per the proposal While undertaking data collection, field trials and their analysis, due care was always taken to avoid abnormal situations so as to generate normal/representative pattern of energy consumption at the facility.

- **Approach to Energy Audit:**

We focused our attention on energy management and optimization of energy efficiency of the systems, sub systems and equipment. The key to such performance evaluation lies in the sound knowledge of performance of equipment and system as a whole.

- **Energy Audit:**

The objective of Energy Audit is to balance the total energy inputs with its use and to identify the energy conservation opportunities in the stream. Energy Audit also gives focused attention to energy cost and cost involved in achieving higher performance with technical and financial analysis. The best alternative is selected on financial analysis basis.

There are three phases of energy audit

1. Pre audit phase
2. Audit phase
3. Post audit phase

Above phase include following stages

1. Data collection- In preliminary data collection phase, exhaustive data collection was performed using different tools such as observation , survey communicating with responsible persons and measurements.

Following steps were taken for data collection:

- a) The team went to each department , centers, library, canteen etc.
- b) Data about the general information was collected by observation and interview.
- c) The power consumption of appliances was recorded by taking an average value in some cases

2. **Data analysis** – Detailed analysis of data collected include: calculation of energy consumption , analysis of latest electricity bill of campus .

3. **Recommendation** - On the basis of results of data analysis and observations , some steps For reducing power and water consumption were recommended. Proper treatments for waste were also suggested. Used of fossil fuels has to be reduced for the sake of community health The above target areas particular to the college was evaluated through questionnaire circulated among the students for data collection. Five categories of questionnaires' were distributed. The format of this are given below :

Pre audit phase

Survey form for data collection :

1. List ways that you use energy in your college .(Electricity , Electric stove , Kettle, Microwave , LPG , Petrol , Diesel and others).
2. Electricity bill amount for the last five year
3. Amount paid for LPG cylinders for last one year
4. Weight of firewood used per month and amount of money spent ? Also mention the amount spend for petrol/diesel/others for generators?
5. Are there any energy saving methods employed in your college? If yes , please specify . If no , suggest some.
6. How much money does your college spend on energy such as electricity , gas , etc. In a month . (Record monthly for the year 2022-23).
7. How many CFL bulbs has your college installed ? Mention use (Hours used/ Daily for how many days in a month)
8. Energy used by each bulb per month? (For example- 60 watt bulb x 4 hour x No of bulbs= kwh).
9. How many LED bulbs are used in your college ? Mention the use (Hours used / day for how many days in a month)

10. Energy used by each bulb per month? (kwh) .
11. How many incandescent(tungsten)bulbs have your college installed? .Mentions used (Hours used/day for how many days in a month)
12. Energy used by each bulb per month? (kwh). Mentions used (Hours used/day for how many days in a month)
13. How many fans are installed in your college ? Mention use(Hours used /day for how many days in a month)
14. How many air conditioners are installed in your college? Mention use(Hours used /day for how many days in a month)
15. How many electrical equipment including weighing balance are installed in your college ? Mention the use (Hours used /day for how many days in a month)
16. Energy used by electrical equipments per month? (kwh) Mention the use (Hours used /day for how many days in a month)
17. How many computers are there in your college? Mention the use (Hours used /day for how many days in a month)
18. How many photocopiers are installed by your college ? Mention use (Hours used /day for how many days in a month)
19. How many cooling apparatus per month are installed in your college ? Mention use(Hours used /day for how many days in a month)
20. Energy used by cooling apparatus per month? (kwh) Mention use (Hours used /day for how many days in a month)
21. Energy used by each photocopier per month? (kwh) Mention use(Hours used /day for how many days in a month)
22. How many inverters your college installed ? Mention use(Hours used /day for how many days in a month)
23. How many electrical equipment are used in different labs of your college? Mention use(Hours used /day for how many days in a month)
24. How many heaters are used in the college? Mention use (Hours used /day for how many days in a month)
25. Number of street lights in your college? Mention use (Hours used /day for how many days in a month)

26. Any other item that uses energy (Please write the energy used per month) Mention use (Hours used/day for how many days in a month)
27. Are any alternative energy sources /Known conventional energy sources employed / installed in your college? (Photovoltaic cell for solar energy, windmill , energy efficient stoves etc.,)Specify.
28. Do you run “switch off” drills at college?
29. Are your computers and other equipment put on power saving mode?
30. Does your machinery (TV, AC, Computer , weighing balance , printers, etc.)run on standby mode most of the time? If yes , how many hours?
31. What are the energy conservation methods adopted by your college?
- 32 . How many boards displayed for saving energy awareness?
33. How much ash is collected after burning firewood per day in the canteen?
34. Write a note on the methods/ practice / adaptation by which you can reduce the energy used in college campus in future.

2. Audit Phase

In Jorhat kendriya mahavidyalaya , Jorhat, Assam, energy auditing was done with the help of team teaching staff and students. The energy audit began with the teams walking through all the different facilities at the college, determining the different types of appliances and utilities (lights, taps, toilets, fridges, etc.) as well as measuring usage per item (watts indicated on appliances) and identifying the relevant consumption patterns (such as how often an applicant is used) and there impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances.

Data collection

Data collection was done in the sector such as sources of energy and energy consumption pattern, college records and documents were verified several times to clarify the data received through survey and discussions. Although whole process was completed from April-2022 to March-2023 , previous energy patterns were also observed.

Site Tour

Site inspection was done along with students and staff.

Review of Documents and Records

Documents such as electricity bill registers of electricity fuel consumption were collected .

Energy Consumption Profile**A. Source of Energy:**

a. Electricity from Assam Power Distribution Company Limited

b. High Speed Diesel Generator (HSDG):

HSD is used as a fuel for Diesel Generator which is run whenever power supply from APDCL is not available.

c. Solar Panel which can generate electricity up to 2 kw

Study of Variation of Monthly Units consumption & Power Factor:

In this Chapter, we study the details of the 12 months Electricity Bills.

Table No 4.1 Variation in Units Consumption & Power Factor (PF)**I. Jorhat kendriya mahavidyalaya , Jorhat, Meter no 20111299**

SI. NO.	Month	No. of unit (KWh)	Amount	Power factor
1	APRIL -2022	1385	11131	0.85
2	MAY-2022	2248	17007	0.85
3	JUNE-2022	-----	-----	-----
4	JULY-2022	2541	19007	0.85
5	AUGUST-2022	2541	19897	0.85
6	SEPTEMBER- 2022	2459	19255	0.85
7	OCTOBER-2022	2541	19516	0.85
8	NOVEMBER- 2022	2459	19255	0.85
9	DECEMBER- 2022	2541	19897	0. 85
10	JANUARY-2023	2541	20405	0.85
11	FEBRUARY- 2023	2295	18430	0.85
12	MARCH-2023	4430	29115	0.85
		Total unit (Av.) = 2543.72	Total= 212915	Av. =0.85

Conclusion: Variation of PF

The Power Factor to reduce the utility power bill. Most utility bills are influenced by KVAR usage. A good Power Factor provides a better voltage. Reducing the pressure on electrical distribution network. Reducing cable heating, cable over loading and cable losses. Reducing over loadings of control gears and switch-gears etc.

Whenever the average power factor over a billing cycle or a month, whichever is lower, of a higher tension consumer is below 90%, Penal charges shall be levied to the consumer at the rate of 2 % (two %) of the amount of monthly energy bill (excluding of Demand Charges, FOCA, Electricity Duty and Regulatory Liability Charge etc.)

For power factor of 0.99, the effective incentive will amount to 5% (five percent) reduction in the energy bill and for unity power factor; the effective incentive will amount to 7% (seven percent) reduction in the energy bill.

General Observations based on Electricity Bill:

1. The average electricity cost is Rs. 6.65 considering the last twelve months.
2. Average monthly Power Factor is maintained near P.F. 0.85
3. Load Factor need to be improved to maximum value.

Actual Measurements and its Analysis

1) Science Building (staff room, Physics lab, chemistry lab, botany lab Zoology lab, class rooms) :

Sr. No.	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption(Watt)	Usage per DayHr.	Power Consumption/day (Watt)
A	B	C	D	E = C X D	F	G = E X F
1	Ceiling fan	80 w	35	2800 w	5hrs.	14,000 w
2	Desktop computer	170 w	06	1020 w	2hrs.	2040 w
3	Tube light (LED)	16 w	12	192 w	1 hr.	192w
4	Refrigerator	130 w	03	390 w	24 hrs.	9360 w
5	Oven	2000 w	02	4000 w		
6	Incubator	250 w	01	250 w		
7	Water motor pump	760 w	01	760 w	1 hr.	760 w
8	Water purifier	25 w	01	25 w	5 hrs.	125 w
9	Internet Router	20 w	01	20 w	5 hrs.	100 w
10	CC TV	50 w	04	200 w	24 hrs.	4800w
11	LCD monitor	40 w	01	40 w	5 hrs.	200 w
Total		3411w				31452

2. Girls Hostel :

Sr. No.	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Usage per Day Hr.	Power Consumption/day (Watt)
A	B	C	D	E = C X D	F	G = E X F
1	Tube light(LED)	16 w	22	352 w		
2	Computer	170 w	05	850 w	4 hrs.	3400w
3	Xerox machine	1370 w	01	1370 w		
4	Water pump	1500 w	01	1500 w	1 hr.	1500 w
5	Ceiling fan	80 w	13	1040 w	5 hrs.	1500 w
6	Printer	50 w	01	50 w	1hr	50 w
Total		3186				64500

3) Arts building: (Staff room, class room, IQAC Office, Community college room, Student union room, conference hall) :

Sr. No.	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Usage per Day Hr.	Power Consumption/day (Watt)
A	B	C	D	E = C X D	F	G = E X F
1	Fan	80 w	89	7120 w	5 hrs.	35600 w
2	Computer	170 w	09	1530 w	2 hrs.	3060 w
3	Tube light(LED)	16 w	55	880w	1hrs.	880 w
4	Tube light (CFL)	40 w	08	320 w	1hrs	320 w
5	LED bulb	10 w	10	100 w	1 hrs.	100 w
6	CCTV	50w	11	550	24hrs.	13,440 w
7	Projector	100 w	05	500 w	2 hrs.	1000 w
8	Ceiling light (LED)	9 w	36	324 w	1 hr.	324 w
9	A C	2000 w	04	8000 w	1 hr.	8000w
10	L.E.D monitor	50 w	03	150 w	1 hr.	150 w
Total		2522				62834

**5)Administrative building (principal office, Office room, Conference room,
LED Bulb Repairing center)**

Sr. No.	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Usage per Day Hr.	Power Consumption/ day(Watt)
A	B	C	D	E = C X D	F	G = E X F
1	Ceiling fan	80 w	26	2080 w	5hrs.	10400 w
2	Tube light (LED)	16 w	38	608 w	1 hr.	608 w
4	Printer	50 w	04	200 w	2 hrs.	400 w
5	Xerox machine	1370 w	04	1370 w	2hrs.	2740w
6	Inverter	900 w	01	900 w	1 hrs.	900 w
7	Computer	170 w	06	1020 w	4hrs.	4080 w
8	Street light	100 w	06	600w	4hrs.	2400w
9	LED monitor	50 w	01	50 w	6 hrs.	300 w
10	A C	2000 w	01	2000 w	4 hrs.	8000 w
Total		4736w				29828w

6) Auditorium building (Auditorium, gymnasium, room no 14) :

Sr. No.	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Usage per Day Hr.	Power Consumption/day (Watt)
				$E = C \times D$		$G = E \times F$
	Ceiling fan	80 w	29	2320 w	1 hrs.	2320 w
	Tube light (LED)	16 w	15	240 w	1hrs.	240 w
	Adjust fan	80w	03	240 w	2 hrs.	480 w
	Ceiling light (LED)	9 w	28	252 w	1hrs.	252 w
	Total	185w				3292w

7) Canteen :

Sr. No.	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Usage per Day Hr.	Power Consumption/day (Watt)
1	Ceiling fan	80 w	07	560 w	4 hrs.	2240w
2	Adjust Fan	80 w	01	80 w	2hrs.	160w
3	Tube light (LED)	16 w	06	96 w	1hr.	96w
4	Refrigerator	130 w	01	130 w	24 hrs.	3120 w
5	Hot air Oven	1400 w	01	1400 w	2hrs.	2800 w
6	Water motor pump	1500 w	02	3000 w	2hrs.	6000 w
7	Total	32600w				14416w

Lighting System

Observations and suggestions:

- It is found that FTL, Bulbs, CFLs is installed in the facility.
- It is recommended that some tube lights in this area be switched off when sufficient daylight is available.
- Presently there are no reflectors installed for tube lights.
- Every light or electric gadget left on when not needed is wasting energy and money and is causing pollution that is totally unnecessary.
- Stand-by power can use up to 8% of a household's total electricity.

For most homes a 10% reduction in electricity consumption can save \$200 a more a year off our electricity bill and nearly $\frac{3}{4}$ of a tone of CO₂ pollution. A 20% reduction on average consumption will save over \$400 and over 1.5 tons of CO₂.

Don't forget to power down these things when not in use:

- Lights
- Heaters and fans (or air-conditioning)
- Printers and scanners
- Battery and phone chargers
- Computers
- Gaming consoles
- TVs, DVD players
- Stereos
- Kitchen gadgets such as blenders, kettles, toasters etc.

Study of Air Conditioners

In the facility for air conditioning there is no centralized system with AHU.

(air handling unit), but mostly split air conditioners are installed.

a. Load of ACs was as follows:

Item	Rated Power (kW)	Qty	Voltage	Current Amp	Actual Power (kW)
ACs	2	6	240	8.3	1.9

Observations and suggestions:

1. Normal air conditioning temperature should be kept as high as possible (i.e., 24 d.cel.). By thumb rule, increase in 3 degrees in indoor air temperatures can save 1% of electricity.
2. The ventilation in area can be provided with installation of natural ventilation. Natural ventilation will also minimize the requirement of exhaust fans.

Carbon Di-Oxide Emission

In this Chapter we compute the CO₂ emissions. For consumption of 1 Unit (1 kWh) of Electricity, the CO₂ emitted is 0.8 Kg. OR the Emission is 0.8 Kg/kWh. In the following Table we present the total units consumed and CO₂ emitted as under:

Table: CO₂ Emission:

SI. NO.	Month	No. of unit(KWh)	CO ₂ Emitted in MT
1	APRIL -2022	1385	1.11
2	MAY-2022	2248	1.79
3	JUNE-2022	-----	----
4	JULY-2022	2541	2
5	AUGUST-2022	2541	2
6	SEP-2022	2459	1.97
7	OCT-2022	2541	2
8	NOV-2022	2459	1.97
9	DEC-2022	2541	1.7
10	JAN-2023	2541	2
11	FEB-2023	2295	1.8
12	MARCH-2023	4430	3.5
Total unit (Average)		2543.72	1.98

Merits/Existing Features for Energy Savings.

1. Staff vigilance
2. Computers are connected in LAN.
3. Printers are shared in LAN.
4. Screen savers facility implemented for every computer.
5. AC's used are of three STARS.
6. Refrigerator's are of three STARS.
7. Incandescent Bulbs are nowhere used.
8. They are replaced by CFL tubes with electronic choke.
9. Maximum use of natural light.
10. Cross Ventilation is provided in laboratory & class rooms, which reduced number of fans.
11. Most of the practical's are scheduled in noon time when Billing Rate is normal.
12. Walls are painted with off white colour to have sufficient brightness.
13. LED flash light is used in Seminar hall.

Energy Conservation Proposals :

Providing Energy Saver Circuit to the Air Conditioners:

The energy saver circuits for the air conditioners, intelligently reduces the operating hours of the compressors either by timing or temperature difference logic without affecting the human comfort. This can save around 15% to 30% of the electricity depending on the weather conditions and temperature settings.

Replacing Fluorescent Tube Lights (FTL) with LED Tube Lights :

The 315 W FTLs can be replaced with the LED tube lights 16 W. These changes can be made at the places where the life is higher. Usually minimum of 3 years warranty is given and approximate burning hours is 40 000. (15 years considering 8 hours per day running)

Following calculations are done for 8 hours working:

- Power consumption by 36 W FTL with conventional choke = 40 W/ Tube Light
- Equivalent LED tube light = 16 W/ Tube Light
- Savings in power = 24 W/ Tube Light
- Operating hours = 8 h/day x 300 = 2400 h/year
- Tube Light Yearly savings = 2400 x 24 W = 57.6 kWh/year/Tube Light
- Average Cost of electricity = Rs.6.80/ kWh
- Saving = 57.6 kWh x 6.80 = Rs.391.68 / year/ Tube light
- Approximate investment on single LED Tube lights = Rs. 200
- Number of Tube Lights to be replaced = 315

Summary:

- ✓ **Total Yearly Saving = 315 x 391.16 = Rs. 123215.4/year**
- ✓ Total Investment = 315 x Rs. 200 = Rs. 63000/-

General Recommendations

- All Class Rooms and labs to have Display Messages regarding optimum use of electrical appliances in the room like, lights, fans, computers and projectors. Save electricity.
- Display the stickers of save electricity, save nature everywhere in the campus. So that all stakeholders encouraged to save the electricity.
- Most of the time, all the tube lights in a class room are kept ON, even though, there is sufficient light level near the window opening. In such cases, the light row near the window may be kept OFF.
- All projectors to be kept OFF or in idle mode if there will be no presentation slides.
- All computers to have power saving settings to turn off monitors and hard discs, say after 10 minutes/30 minutes.
- The comfort/Default air conditioning temperature to be set between 24°C to 26°C.
- Lights in toilet area may be kept OFF during daytime
- Use AUTOMATIC POWER FACTOR CORRECTION (APFC) Panel FOR PF improvement.
- Need to focus on existing solar plant which is generating power below the rated power
- Need to replace FTL by smart LED Tube
- Need to replace ordinary bulb by LED bulb.
- Need to replace ordinary CRT monitor by LED.
- Need to replace ordinary refrigerator by BEE power saver refrigerator if possible.
- Out of total electricity bill paid, 53 percentage are actual energy utilized charges and remaining expense belongs to additional taxes on energy consumption.
- Need to use power saver circuits for AC.

Executive Recommendations:

1. There has to be Institute level student community that keeps track of the energy consumption Parameters of the various departments, class rooms, halls, areas, meters, etc.
2. Energy auditing inside the campus has to be done on a regular basis and report should be made public to generate awareness.
3. Need to Create energy efficiency/ renewable energy awareness among the college campus i.e. solar, wind, Biogas energy. College should take initiative to arrange seminars, lectures, paper presentation competition among students and staff for general awareness.

2.3 Post audit phase

Follow up and action plans

Energy audits form a part of an on-going process. Innovative energy saving initiatives has to be designed and implemented every year to make the college environmentally sustainable. Follow of programs of energy auditing recommendations should be done meticulously before the next audit.

Photograph :



Administrative Conference Room



Academic Conference Hall











