KLE Society's

G. I. Bagewadi Arts, Science and Commerce College,

Nipani, Belgavi, Karnataka, India.

Green Audit Report

Prepared by

Department of Environmental Science,

Shivaji University, Kolhapur- 416004

2020-21

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KLE Society's
G. I. BAGEWADI ARTS, SCIENCE AND COMMERCE COLLEGE,
NIPANI - 591 237
Accredited at 'A' with 3.35 CGPA in 3rd Cycle by NAAC
C0llege with **P**otential for **E**xcellence (**CPE**)
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Principal's Message

Now-a-days, Green Audit, Energy Audit and Environment Audit of an institution have become significant for self-assessment which reflects the role of the institution in mitigating the environmental problems of the present day scenario. The rapid economic development and urbanization at all the levels has created many ecological problems related to environment. In such a crucial time, it is our foremost duty to protect the Only Earth we have from the environment pollution. It is the responsibility of everyone to contribute to the activities which save our environment.

Our institution has been putting great efforts to keep the environment clean and green since its establishment. The main purpose of this present green, environment and energy audits are to identify, quantify, describe, document and prioritize the framework of environment sustainability.

Environment Sustainability has become an important issue today and the role of HEIs in relation to this is more prevalent. To find out the environmental performance of our institution, to analyse the possible solutions for converting the institution as eco-friendly campus, the green, environment and energy audits have become indispensable. And the objective of such audits is to upgrade the environmental conditions in and around the institute.

So, I am happy that our institution is conducting these audits very keenly under the guidance of a team from the Shivaji University, Kolhapur. It certainly enables us to act in response to the environmental issues in future.

Thank you,

Place: Nipani
Date: 04.08.2021

Dr. M. M. Hurali
Principal

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Chapter - I
Introduction

1.1 Green Audit, a Tool for Environmental Protection:

The modernization and industrialization are the two important outputs of twentieth century which have made human life more luxurious and comfortable. On the other hand, they are responsible for voracious use of natural resources, exploitation of forests and wildlife, producing massive solid waste, polluting the scarce and sacred water resources and finally making our mother Earth ugly and inhospitable. Today, people are getting more familiar to the global issues like global warming, greenhouse effect, ozone depletion and climate change and so on. Now, it is considered that this is the final call by mother Earth. The time has come to wake up, unite and combat together for sustainable environment.

Green Audit is the most efficient ecological tool to solve such environmental problems. Such audit was invented in late 1970s with the motive for inspecting the work conducted within the organization. It is systematic identification, quantification, recording, reporting and analysis of components of ecological diversity and expressing the same in financial or social terms. Through green audit one gets a direction as how to improve the condition of environment.

1.2 Benefits of Green Audit:

There are many advantages of green audit if is implemented properly:

- It would help to protect the environment in and around the campus.
- Recognize the cost saving methods through waste minimization and energy conservation.
- Find out the prevailing and forthcoming complications.
- Empower the organization to frame a better environmental performance.
- It portrays good image of institution through its clean and green campus.

  Finally, it will help to build positive impression for the upcoming NAAC visit.

1.3 NAAC Criteria VII Environmental Consciousness:

Green Audit is assigned to Eco-club. The criterion VII of NAAC. National Assessment and Accreditation Council which is a self-governing organization that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time

of accreditation of the institution. The intention of green audit is to upgrade the environmental condition in and around the institution. It is performed by considering some environmental parameters like water and wastewater management, energy conservation, waste management, air monitoring, etc. for making the institution eco-friendlier.

Students are the major strength of any academic institution. Practicing green actions in any educational institution will inculcate the good habit of caring nature in students. Many environmental activities like plantation and nurturing saplings and trees, cleanliness drives, bird watching camp, no vehicle day, rain water harvesting visits to ecologically important places through Eco clubs will make the student a good citizen of country.

Chapter II

Methodology

The college has conducted Green Audit in the year 2020-21, on a yearly basis. The audit was carried out in three phases.

2.1 Questionnaire survey:

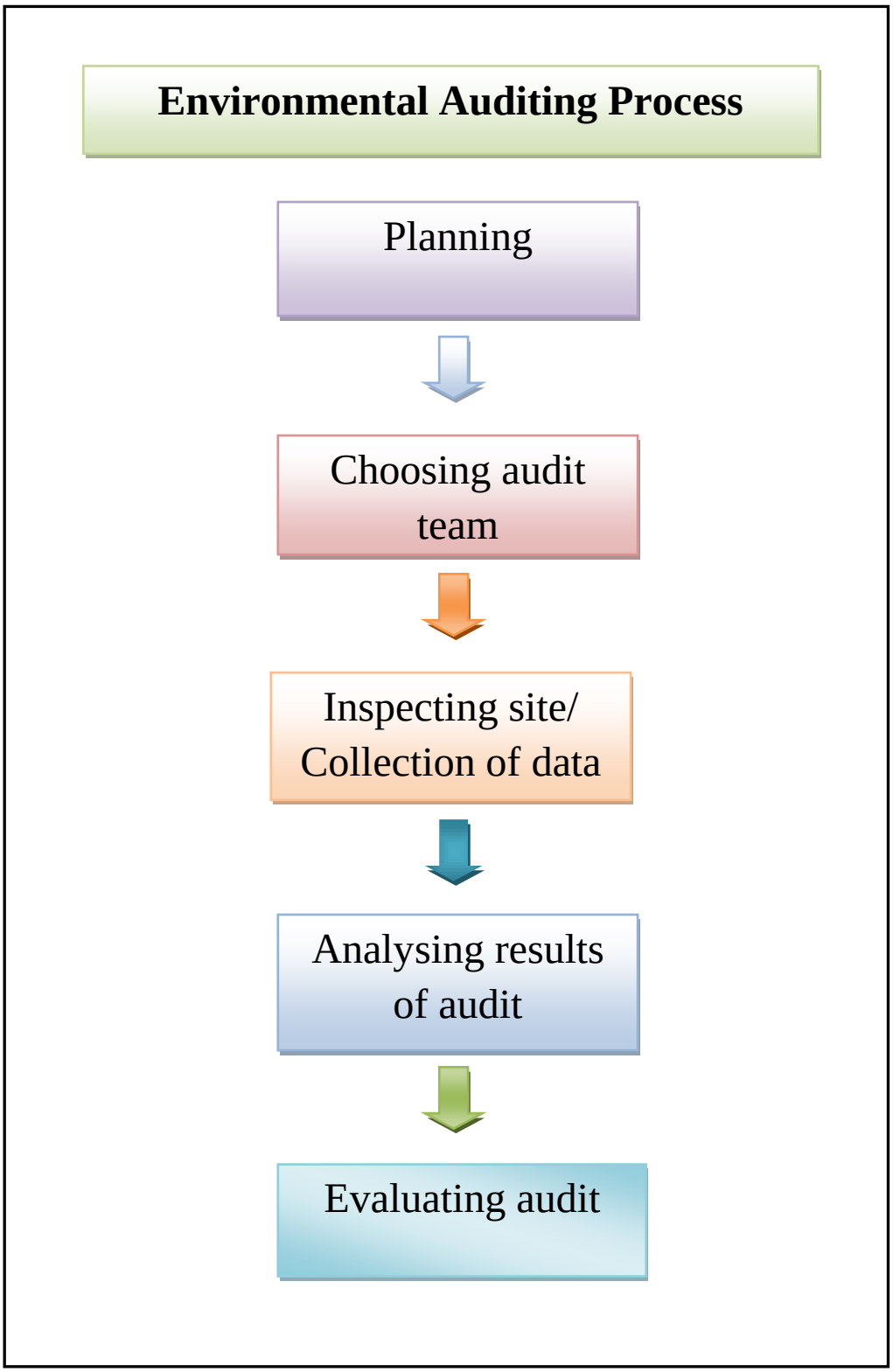
It includes administrative issues associated with the planning of audit, selecting the personnel for the audit team, preparing the audit protocol used by organization, obtaining background information, etc. The scope of the audit was defined at this step. It was decided that the information related to Water and Wastewater management, Energy conservation, Green belt, Carbon inventory, Solid waste management, Hazardous waste management, Air and noise quality status, activities of nature club, etc. should be gathered for the audit purpose. For collecting data related to these different areas, specific questionnaires were prepared.

2. 2 Onsite visit and observations:

The data related to above mentioned areas was collected by visiting each and every facility of college campus. The questionnaires were filled up according to the present situation. Photographic documentation was also done with the help of sophisticated camera.

2.3 Data analysis:

After collection of secondary data, the reviews related to each environmental factor were taken by the green audit team. The data was tabulated, analyzed and graphs were prepared using computer. Depending upon the observations and data collected, interpretations were made. The lacunas and good practices were documented. The Environmental Management Plan (EMP) was prepared for the next academic year in order to have better environmental sensitization. Finally, all the information was compiled in the form of Green Audit Report. The whole data reflects the effect of COVID pandemic situation on the college premises. Students were present through online mode for academic purpose. So the administrative staff,teaching and Non-teaching faculty was using the available resources on the campus which is observed during the audit visit.


Environmental Auditing Process
Planning
Choosing audit team
Inspecting site/ Collection of data
Analysing results of audit
Evaluating audit

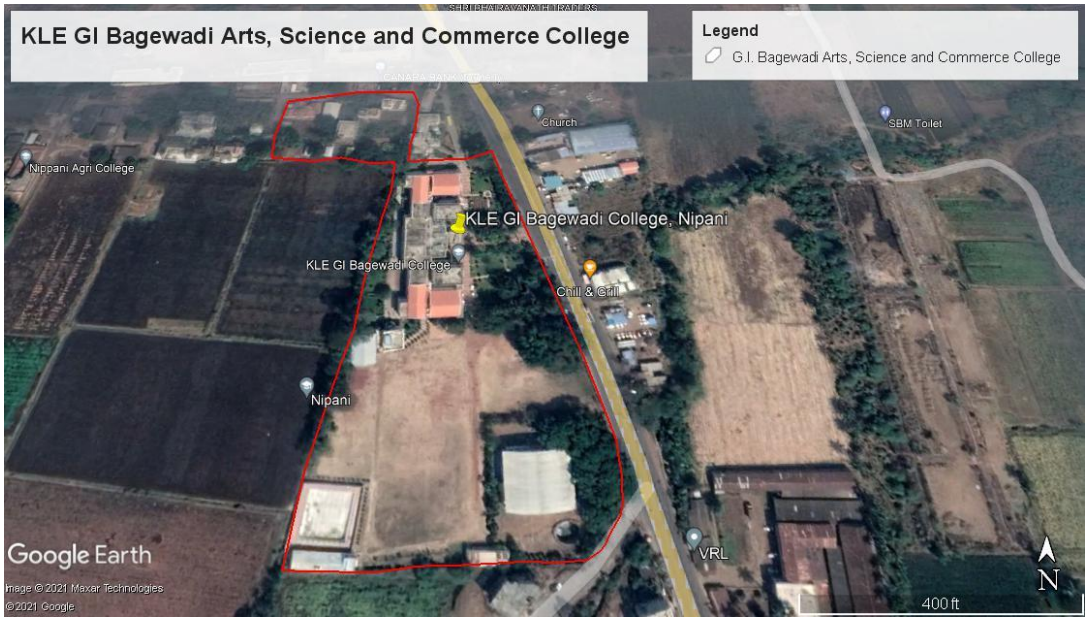
Chapter III
Overview of Green Audit

3.1 G. I. Bagewadi Arts, Science and Commerce College, Nipani a glance:

G. I. Bagewadi Arts, Science and Commerce College, Nipani is one of the leading college catering to educational needs of the major parts of Belagavi of Karnataka. The college caters Arts, Commerce and Science along with PG English, commerce and Mathematics added to the bunch of programmes. The institute has huge campus with many classrooms, laboratories, , girl's hostels, boy's hostels, mess, canteens, library building, etc. Enormous manpower including students, administrative faculty, teaching and nonteaching faculty, workers use this huge premises for various purposes.

G. I. Bagewadi Arts, Science and Commerce College, Nipani is situated in Karnataka near Maharashtra boundary at 16°24'28.54"N and 74°22'36.43"E, in the Belgavi District. It covers an area of about 11.2 acre.

Satellite image of Campus G. I. Bagewadi Arts, Science and Commerce College, Nipani



Source: Google Earth

COLLEGE PROFILE IN BRIEF

NAME OF THE COLLEGE:	G. I. Bagewadi Arts, Science and Commerce College, Nipani
ESTABLISHMENT:	1961
PIONEERS:	Late Shri. G. I. Bagewadi
No. OF STUDENTS:	1133
FACULTY:	77
NON-TEACHING STAFF:	27
STRENGTH OF CAMPUS:	1237
FACILITIES:	A well-resourced campus with a good infrastructure, gymkhana, A huge garden and qualified staff. The college is fulfilled with the following facilities like Library, Boys Hostel, ladies hostel and Canteen
RESEARCH AND EXTENSION ACTIVITY:	College conducts different courses for the excellence of PG, Degree and Certificate courses. The college has a good number of extension activities like plantation of trees, cleanliness drive, cleaning of public places and village, seminars, workshops, environmental awareness campaigns, etc.
AREA OF COLLEGE:	11.2 acres.

3.2 Water and Wastewater Audit:

Water which is precious natural national resource available with fixed quantum. The availability of water is decreasing due to increasing population of nation, as per capita availability of utilizable water is going down. Due to ever rising standard of living of people, industrialization, urbanization, demand of fresh water is increasing day by day. The unabated discharge of industrial effluent in the available water bodies is reducing the quality of these ample sources of water continuously. Hence, the National Mission on Water Conservation was declared by the then Prime Minister Hon. Dr. Manmohan Singh in 2003 and appealed to all citizens to collectively address the problem of water shortage, by conserving every drop of water and suggested for conducting water audit for all sectors of water use.

Water audit can be defined as a qualitative and quantitative analysis of water consumption to identify means of reducing, reusing and recycling of water. Water Audit is nothing but an effective measure for minimizing losses, optimizing various uses and thus enabling considerable conservation of water in irrigation sector, domestic, power and industrial as well. A water audit is a technique or method which makes possible to identify ways of conserving water by determining any inefficiencies in the system of water distribution. The measurement of water losses due to different uses in the system or any utility is essential to implement water conservation measures in such an establishment.

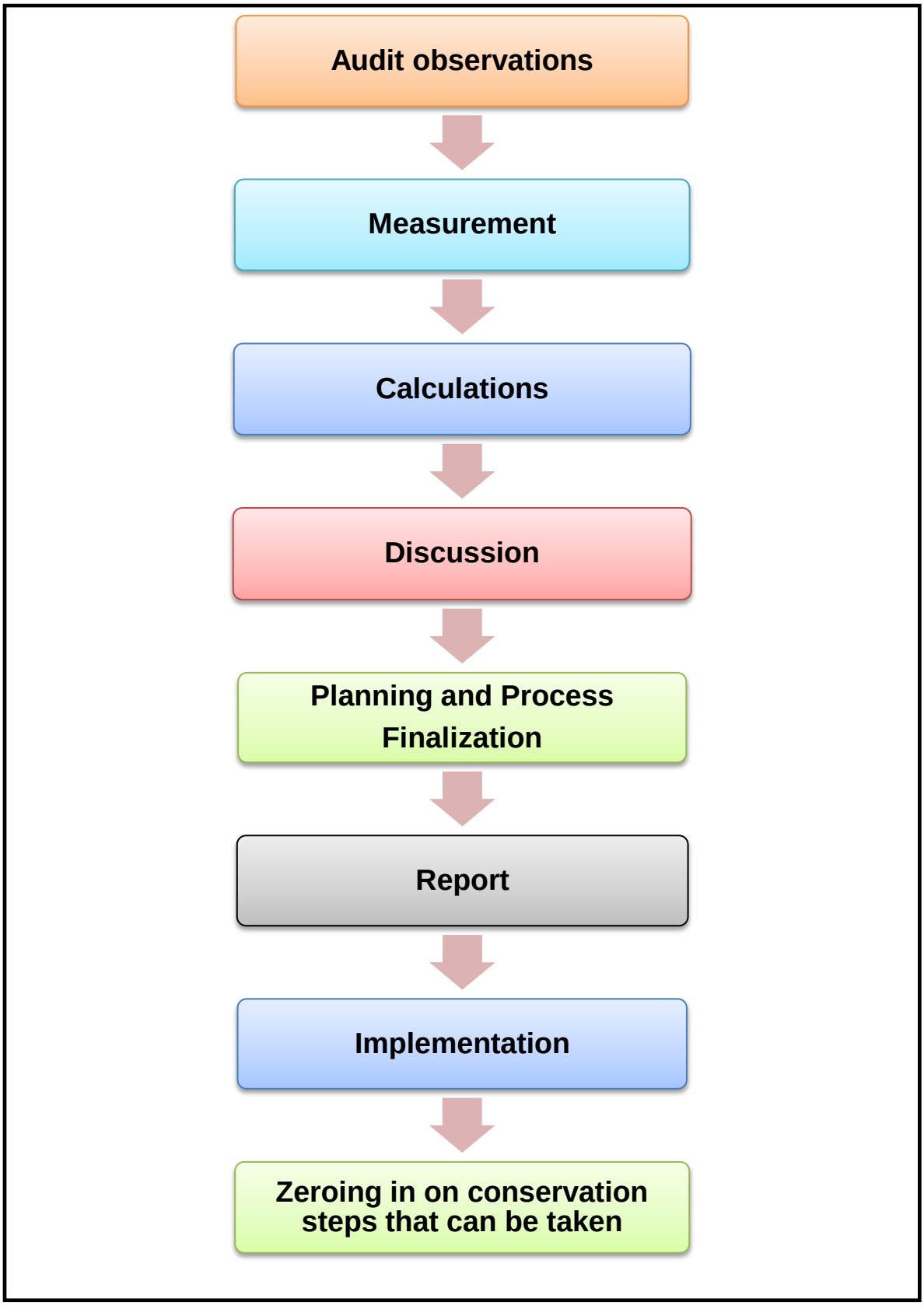
Importance of Water Audit:

It is observed that a number of factors like climate, culture, food habits, work and working conditions, level and type of development, and physiology determine the requirement of water. The community which has a population between 20,000 to 100,000 requires 100 to 150 liters per person (capita) per day. As per the standards provided by WHO Regional office for South East Asia Schools require 2 liters per student for drinking; 10-15 liters per student if water-flushed toilets, Administration requires (Staff accommodation not included) 50 liters per person per day, Staff accommodation requires 30 liters per person per day and for sanitation purposes it depends on technology.

3.2.1 Water Audit:

Water usage can be defined as water used for all activities which are carried out on campus from different water sources. This includes usage in all residential halls, academic buildings, on campus and on grounds. Wastewater is referred as the water which is transported off the campus. The wastewater includes sewerage, residence, hall waters used in cooking, showering, clothes washing as well as wastewater from chemical and biological laboratories which ultimately going down in sink or drainage system

Water Audit Process



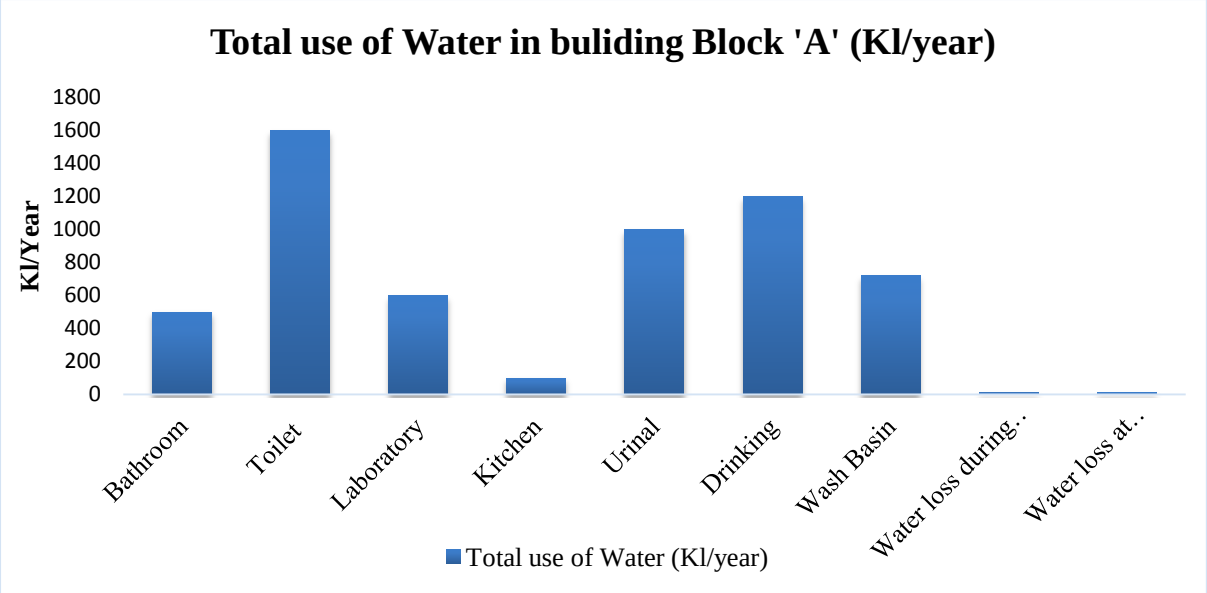
3.2.2 Water consumption in college:

From the data collected for water audit of G. I. Bagewadi Arts, Science and Commerce College, Nipani, Karnataka, the water distribution and water consumption pattern is noticed. The college is divided in different sectors such as main building for administrative work and others are different department. For the water audit purpose, the college campus area categorised into three buildings block namely Building block A including Main Building, having Arts, Commerce, Science Department, laboratories and Principal room. In building block B includes Central Library, Sanskrutic Hall, Gymkhana, Swimming pool, Canteen and Bank while in building block C includes Hostels and Support services

3.2.2. a The water consumption at Building Block 'A':

Table No. 3.2.1: Sector wise calculated use of water in Building Block A

Sr. No.	Sector	Total daily use (Kl/day)	Total yearly use (Kl/year)	Percentage %
1	Bathroom	3.125	500	3.89
2	Toilet	10.000	1600	11.79
3	Laboratory	3.750	600	3.50
4	Kitchen	0.625	100	9.71
6	Drinking	7.500	1200	5.97
7	Wash Basin	4.500	720	13.44
8	Urinal	6.250	1000	46.67
9	Water loss during Filling	0.072	11.52	2.15
10	Water loss at Discharge	0.096	15.36	2.87
Total		35.918	5746.88	100



Graph No. 3.2.1 Total water consumption yearly by Building block 'A'

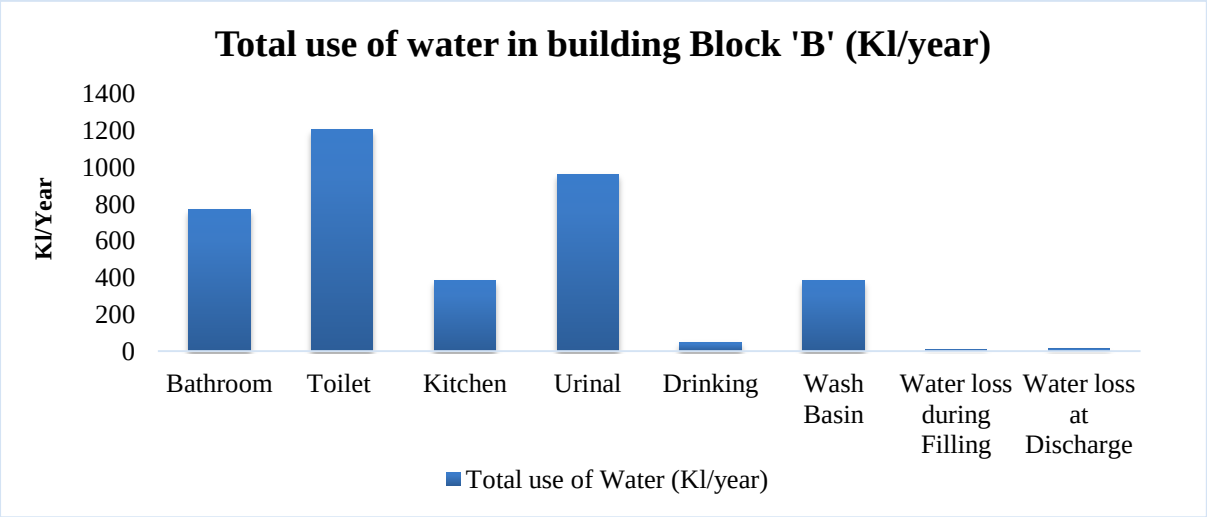
It is revealed from the data given in Table No. 3.1 and Graph No. 3.1 that total 35.918 Kiloliter daily and yearly 5746.88 Kiloliter water is used. In the Building block 'A' which Main Building, having Arts, Commerce, Science Department, laboratories, Teaching Staff and Principal room use of water is seen for bathrooms, toilet, drinking, wash basin, laboratory, kitchen and urinal purpose for daily and also calculated yearly. From above data, it is observed that the maximum water consumption was for washrooms which is 10.00 Kilolitre/day i.e. 1600 Kilolitre/year. Water loss during filling of water in tank was noted as 0.072 Kilolitre/day i.e. 11.52 Kilolitre/year and water losses at discharge were found to be 0.096 Kilolitre/day i.e. 15.36 Kilolitre/year.

3.2.2.b. Water consumption by Building Block 'B':

Table No. 3.2.2: Sector wise calculated use of water in Building Block 'B'

Sr. No.	Sector	Total daily use (Kl/day)	Total yearly use (Kl/year)	Percentage %
1	Bath room	4.8	768	12.45
2	Toilet	7.5	1200	31.12
3	Urinal	6.0	960	24.90
4	Kitchen	2.4	384	16.60
5	Drinking	0.3	48	6.22
6	Wash Basin	2.4	384	6.22

7	Water loss during Filling	0.048	7.68	1.00
8	Water loss at Discharge	0.072	11.52	1.49
Total		23.52	3763.2	100



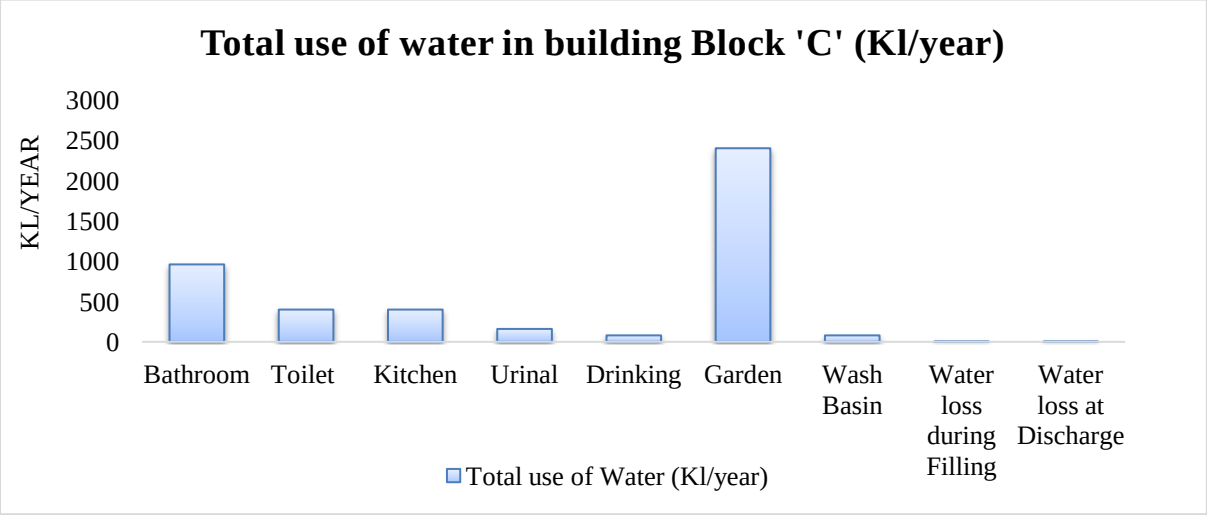
Graph No. 3.2.2 Total water consumption yearly by Building block 'B'

It is shown from the data in Table No. 3.2 and Graph No. 3.2 that total 23.52 Kiloliter water is used daily in Building block 'B' i.e in Central Library, Sanskrutic Hall, Gymkhana, Swimming pool, Canteen, Bank and Karnataka School. In this Block use of water occurs for Bathroom, toilets, drinking, wash basin, Kitchen and urinal purpose (is calculated) for daily and yearly. From the above data, it is observed that the maximum water consumption was for toilet purpose which is 7.5 Kiloliter / day i.e. 1200 Kiloliter /year. For bathroom and wash basin purpose 4.8 Kiloliter / day and 2.4 Kiloliter / day of water required daily while yearly it is 768 Kiloliter /year and 384 Kiloliter /year respectively. In case of drinking purposes 0.3 Kiloliter / day while yearly require 48 Kiloliter /year. Water loss during filling of water in tank was noted as 7.68 Kiloliter /year and water losses at discharge were found to be 11.52 Kiloliter /year.

3.2.2. c. Water consumption by Building Block ‘C’:

Table No. 3.2.3 Sector wise calculated use of water in Building Block 'C'.

Sr. No.	Sector	Total daily use (Kl/day)	Total yearly use (Kl/year)	Percentage %
1	Bath room	6.00	960	21.39
2	Toilet	2.50	400	8.91
3	Urinal	1.00	160	1.00
4	Kitchen	2.50	400	2.50
5	Drinking	0.50	80	0.50
6	Wash Basin	0.50	80	0.50
7	Garden	15.00	2400	15.00
8	Water loss during Filling	0.02	3.84	0.09
9	Water loss at Discharge	0.02	3.84	0.09
	Total	28.048	4487.68	100

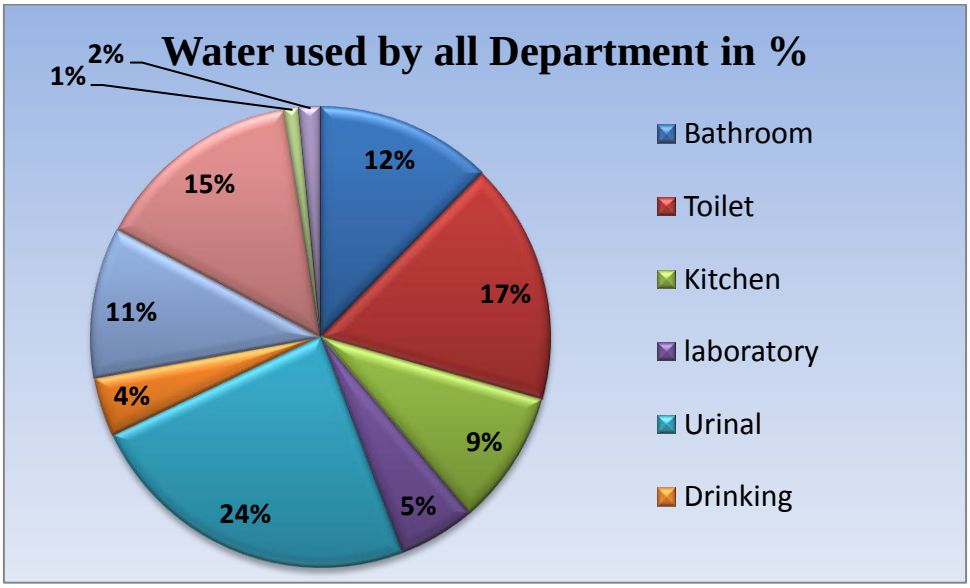


Graph No. 3.2.3 Yearly consumption of water Building Block 'C'

It is revealed from the data given in Table No. 3.3 and Graph No. 3. 3 that total 28.048 Kiloliter water is used daily and 4487.68 Kilolitres yearly. In Building Block 'C' water used for bathrooms, toilets, drinking, urinal, wash basin and garden etc. is calculated daily and yearly. From above data, it is observed that the maximum water consumption was for Garden which is 15.00 Kilolitre/ day i.e. 2400 Kilolitre /year. As Block ‘C’ includes Hostels

and Support Services. The consumption of water is more for bathroom is 6.00 Kilolitre/ day i.e. 960 Kilolitre /year and for toilet is 2.50 Kilolitre/ day i.e. 400 Kilolitre /year respectively. Water loss during filling of water in tank and water losses at discharge were found to be same as 0.02 Kilolitre/day i.e. 3.84 Kilolitres/year.

3.2.2. d. Average daily water consumption by G. I. Bagewadi Arts, Science and Commerce College, Nipani, Karnataka.



Graph No. 3.2.4 Average Daily Water consumption by G.I.Bagewadi Arts, Science and Commerce College, Nipani, Karnataka.

Graph No. 3.10 shows the total percent of water consumed by the G.I.Bagewadi Arts, Science and Commerce College, Nipani, Karnataka in the 2020-21. As per the graph urinal, toilets, bathrooms, garden and wash basins are the major sources of utilization comprising 24.19%, 17.27 %, 12.58%, 15 % and 10.72 % respectively. The other uses namely laboratory, kitchen and drinking purpose consume relatively less water with daily water requirement of 5.5 % Laboratory, 9.6 % Kitchen and 4 % Drinking purpose respectively in the year 2020-21.

3.2.3 Sustainable Water Practices (SWP):

3.2.3.a Distilled water collection tank:

Bagewadi College has constructed Distilled water collection tank in Chemistry laboratory as in chemistry laboratory for analysis required huge amount of water. So during distillation 75 %of water get wasted. Bagewadi College has done very excellent sustainable practices as they constructed tank having 1000 lit capacity to collect water which thrown away after distillation. Such water they use for other washing work.

3.2.3. b. Soak Pit

Bagewadi College has constructed soak pit near Chemistry laboratory as after practical huge amount of gray water containing different types of chemicals goes into municipal drainage line. Soak pit helps to remove solids and helps in filtration. These smaller particles are digested by the microorganisms which are a sustainable process of degradation. The filtered water is then discharged out through the porous wall of the soak pit.

Soak pit for treatment of Gray water

3.2.3. c. Constructed well for water storage

Bagewadi College has an open well near back side of swimming pool. It helps in recharging of ground water and maintaining aquifers. The water from it is supplied for hostel, staff quarters and garden purpose.

Open well near swimming pool

3.2.3. d. Small project of Rain water harvesting for Laboratory work:

G.I.Bagewadi Arts, Science and Commerce College, Nipani is having small project of rain water harvesting system near Chemistry laboratory. For the collection of harvested rain water, they have built one tank having capacity of 1000 litres. This collected water is used for laboratory work during rainy season.

Rain water harvesting at Bagewadi College.

Key Observations:

- The calculation revealed that highest water use sector is toilets which consumes average 15% water and remaining 85% water consumption further divided into other sectors in such bathrooms, washbasins, urinals, laboratory, kitchens and garden.
- College has sustainable water practices such as Distilled water preservation tank, Soak pit, Rain water collection in laboratory which are all in working condition.
- The institute cleans the water tanks properly, they have maintained the cleaning report of water tank. It is only necessary to reduce the force of tap water, so that water is not wasted.
- To enhance the operating efficiency and reduce the water wastage, College should include more sustainable water practices (SWP) such as Rain Water Harvesting project for whole college, Wastewater treatment plant, Biogas plant, Landscape areas, and Water sub metering.

3.3 Solid waste audit of the college:

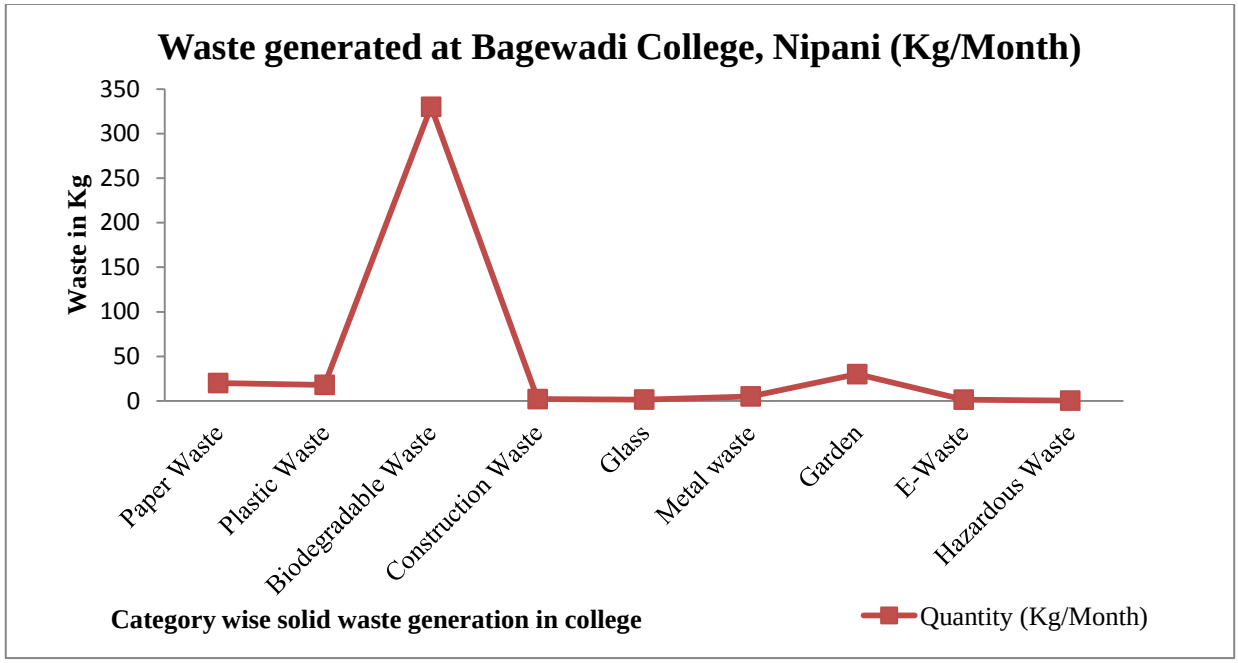
Solid waste management is a term that refers to the process of collecting and treating solid wastes. As long as people have been living in settlements, garbage and solid waste has been an issue. In recent years, it is observed that per capita waste generation has increased due to the changing life style. Improper disposal of solid waste is responsible for pollution of air, water and soil. Disposal of solid waste on open area leads to develop bad odour in the surrounding also it may develop unhygienic conditions. Improper waste disposal is root cause for spreading the infectious diseases among the human and animal. So, it is important to take some steps for the proper management of solid waste followed by reduce, reuse and recycle 3R principle. The intention of this inventory is to find out the quantity of waste generation and disposal methods which are currently followed at G. I. Bagewadi Arts, Science and Commerce College, Nipani.

Solid waste audit of Bagewadi college was conducted by grouping the college into Main building, Library, Girls Hostel, Boys hostel, Gymkhana and Canteen, Quarters and garden premises of Bagewadi college. Different types of waste are generated in the Bagewadi college campus. College has given yearly contract to private sanitary contractor to maintain cleanliness and hygiene conditions at indoor. Also, dustbins are fixed in the administrative building which is used for collection of waste.

3.3.1 Generation of solid waste in college:

Table No. 3.3.1: Category wise solid waste generation in college (kg/month)

Department	Paper Waste	Plastic Waste	Biodegradable Waste	Construction Waste	Glass Waste	Metal waste	Garden Waste	E-Waste	Hazardous Waste
Quantity (Kg/Month)	20	18	330	2	1.5	5	30	1.4	0.3
Quantity (Kg/ Year)	100	90	1,650	10	7.5	25	360	16.8	1.2



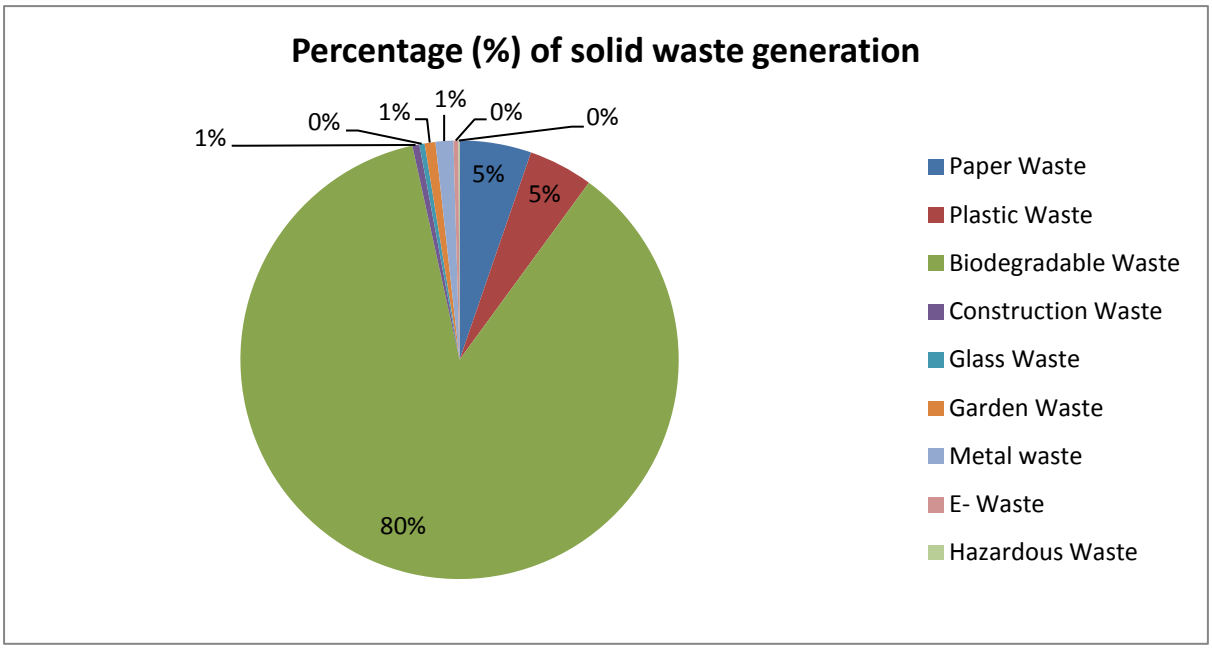
Graph No. 3.3.1: Category wise solid waste generation in college (kg/month)

The average amount of solid waste generated per month in Bagewadi College, Nipani is approximately 408.2 kg/month. On the basis of observations, the highest quantity of solid waste generated is biodegradable waste which is about 330 kg/month. This waste is produced from hostel mess, Canteens, Quarters, Gymkhana and Gardens. The leaf litter produced in the garden and premises is 30 kg/month. The biodegradable kitchen waste from hostel mess is given to the municipality while the garden waste is utilised for vermicomposting.

The glass waste is produced in minimum quantity i.e. 1.5 kg/month which is generally in the form of broken glassware, cups and glasses used in canteens and hostel mess. Besides, the above mentioned waste, plastic waste is generated in the form of plastic wrappers of food items. Approximately 20 kg/ month paper waste is generated in the institution and that is given to the vendor.

Table No. 3.3.2: Percentage of category wise solid waste in the college (kg/month)

Category	Paper Waste	Plastic Waste	Biodegradable Waste	Construction Waste	Glass Waste	Garden Waste	Metal waste	E-Waste	Hazardous Waste	Total Solid Waste in %
Percentage (%)	**4.89**	**4.4**	**80**	**0.48**	**0.36**	**0.73**	**1.22**	**0.34**	**0.07**	**100**



Graph No. 3.3.2: Percentage of solid waste generation in the college (kg/month)

Percentage wise distribution of different sources of solid waste is shown in the above graph. The maximum percentage of solid waste generated is of biodegradable waste which is 80.84% and minimum percentage of hazardous waste generated is about 0.07 %. The biodegradable waste is produced mostly through canteens, hostel mess and garden litter in the campus.

3.3.3 Status of solid waste generation in various departments and campus (kg /month):

For solid waste audit, the college campus and buildings are grouped into 13 different areas and the data was collected using questionnaire, actual site visit and discussion with the concern faculty members.

Table No. 3.3.3: Category wise solid waste generation in the college (kg/month)

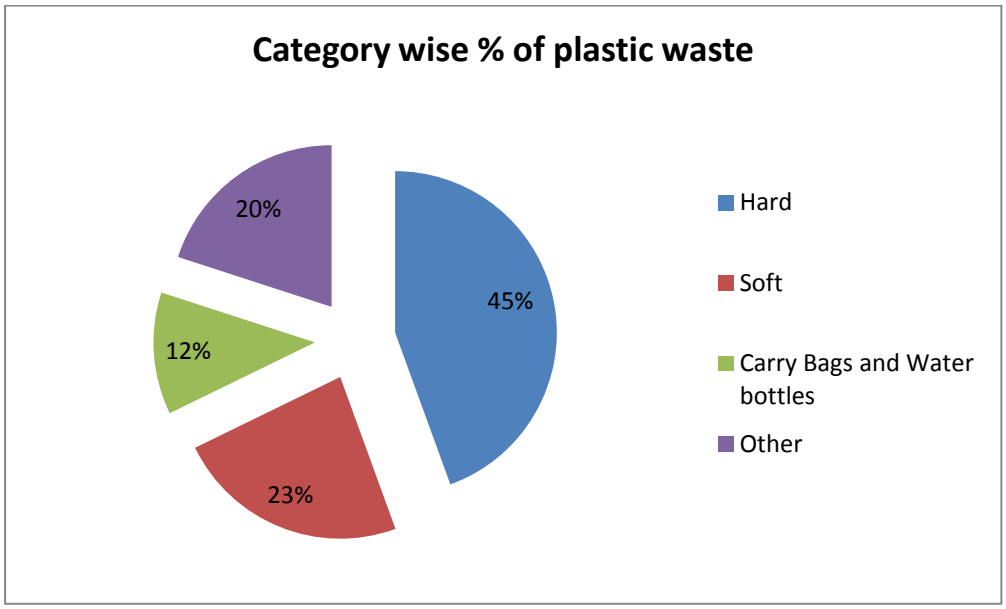
Building and categories of waste	Paper waste	Plastic waste	Biodegradable waste	Construction waste	Glass Waste	Metal waste	Garden Waste	E-waste	Hazardous waste
Classrooms	1	0.3	0	0	0	0	0	0	0
Physics Lab	1	0.4	0	0	0	0.3	0	0.1	0
Chemistry Lab	1	0.4	0	0	0.5	0.2	0	0	0.1
Botany Lab	1	0.2	0	0	0.2	0	0	0	0
Zoology Lab	1	0.2	0	0	0.1	0	0	0	0
Computer lab	0.2	0.2	0	0.5	0	0	0	1.2	0
Girls Hostel	2	2.6	9	0.4	0.1	1.4	0	0	0.2
Boys Hostel	1.8	2.7	10	0.5	0.1	1.5	0	0	0
Gymkhana	1	0.5	2	0	0.1	0	0	0	0
Library	3	0.6	0	0	0	0.2	0	0	0
Quarters	4	2.9	10	0.6	0.1	1.3	0	0	0
Canteen	2	6.5	287	0	0.1	0.1	0	0.1	0
Garden and college premises	1	0.5	12	0	0.2	0	30	0	0
Total solid waste generated (Kg/Month)	**20**	**18**	**330**	**2**	**1.5**	**5**	**30**	**1.4**	**0.3**
Total solid waste generated (Kg/Year)	**100**	**90**	**1,650**	**10**	**7.5**	**25**	**360**	**16.8**	**1.2**

3.4.1 Plastic Waste:

Table No. 3.3.4: Plastic waste generation and its distribution in the college

Category	Plastic Kg/month				Total
	Hard	Soft	Carry Bags and Water bottles	Other	
Quantity	8	4.2	2.2	3.6	18
Percentage	44.46	23.34	12.2	20	100

Plastic waste in the form of packaged food wrappers, old broken chairs, old broken water tanks, etc and plastic water bottles is approximately 18 kg/ month. Plastic wastes are difficult to dispose because it is non-biodegradable waste or it takes many years to degrade naturally. It can cause adverse impacts on environment.



Graph No. 3.3.3 Categorization of plastic waste at (kg/month)

Graph No. 3.3.3 shows that the hard plastic in the form of broken chairs, tables produces higher amount of hard plastic that is 45%. The soft plastic accounts 23 % of plastic while the carry bags, water bottles and packaged food items in canteens are present about 12.2%.

3.4.2 Hazardous waste audit of the college:

Hazardous waste is waste that has substantial or potential threats to public health or environment. The sources of hazardous waste in the Bagewadi college are very less. The amount of hazardous waste generated in the college is 0.3 kg/month. The major source of

hazardous waste in campus is the sanitary napkin waste generated in girl's hostels. Improper disposal of such waste can cause serious health effects. But, the college has provided the facility of incinerator in girl's hostel which has solved this major problem.

Very less quantity of hazardous waste and effluent are generated through chemical laboratories during the use of acids and various chemicals, fumes in the practical's. Further, the hazardous effluent gets diluted with remaining grey water and sewage generated in the campus and therefore, the toxicity gets decreased. Soak peat is provided for the chemical lab discharge.

3.4.3 E-waste generation in the college:

Generation of e-waste is found in every educational institute. All discarded electronic appliances are called as E-waste. E-waste requires special treatment for disposal so it is also called as special waste. It is observed that the e-waste generated at Bagewadi College, Nipani is of Schedule II category. Computers, printers, scanners, internet routers, CPU's, UPS, fused bulbs and tubes are used for administrative and laboratory work. The wire required for the connectivity also gets included in the E-waste. The college has its own computer laboratory. Besides this computer lab, each department and administration use computers for their routine work.

For e waste management KLE Society makes circular for collection of e waste to be disposed. As per the circular college examines the status of electronic equipments considering its working condition and decides its further disposal. The damaged computers, printers, UPS and other electronics devices are given for e waste recycling to an authorised dealer, Shiva Shakti Traders, Bengaluru. As per the data received by Shiva Shakti Traders, the college has handed over them about 75-80 kg of e waste on 3rd October 2019.

3.4.5 Construction waste:

Construction waste is generated from construction of new buildings and demolition activities consisting of concrete, tiles, bricks, drywall, asphalt, plastics, metals, wood, rock and more. These construction waste materials are often inert and non-biodegradable, heavy, bulky and responsible for overload landfills. About 2 kg of construction waste which is generated in the college premises due to the re-newation activity.

3.4.6 Metal waste

Metal waste is generated through various activities. The good thing about metal is they can be recycled over and over without changing its properties. Metal waste includes scrap of benches, table, cupboard, cots and other things which are made up of metals.

3.4 .7 Eco-friendly solid waste management practices:

The college follows following eco-friendly solid waste management practices.

1. Vermi Composting

The collage has one vermi composting plant in garden area. The leaf litter used as a composting is useful to increase the productivity of crop by supplying vitamin, nutrients and hormones. Utilizing the leaf litter waste by composting process will reduce the air pollution, health problems caused by leaf litter burning, decrease in municipal solid waste disposal and fire incidents in forests. The leafy waste is collected from the campus and dumped here for composting.

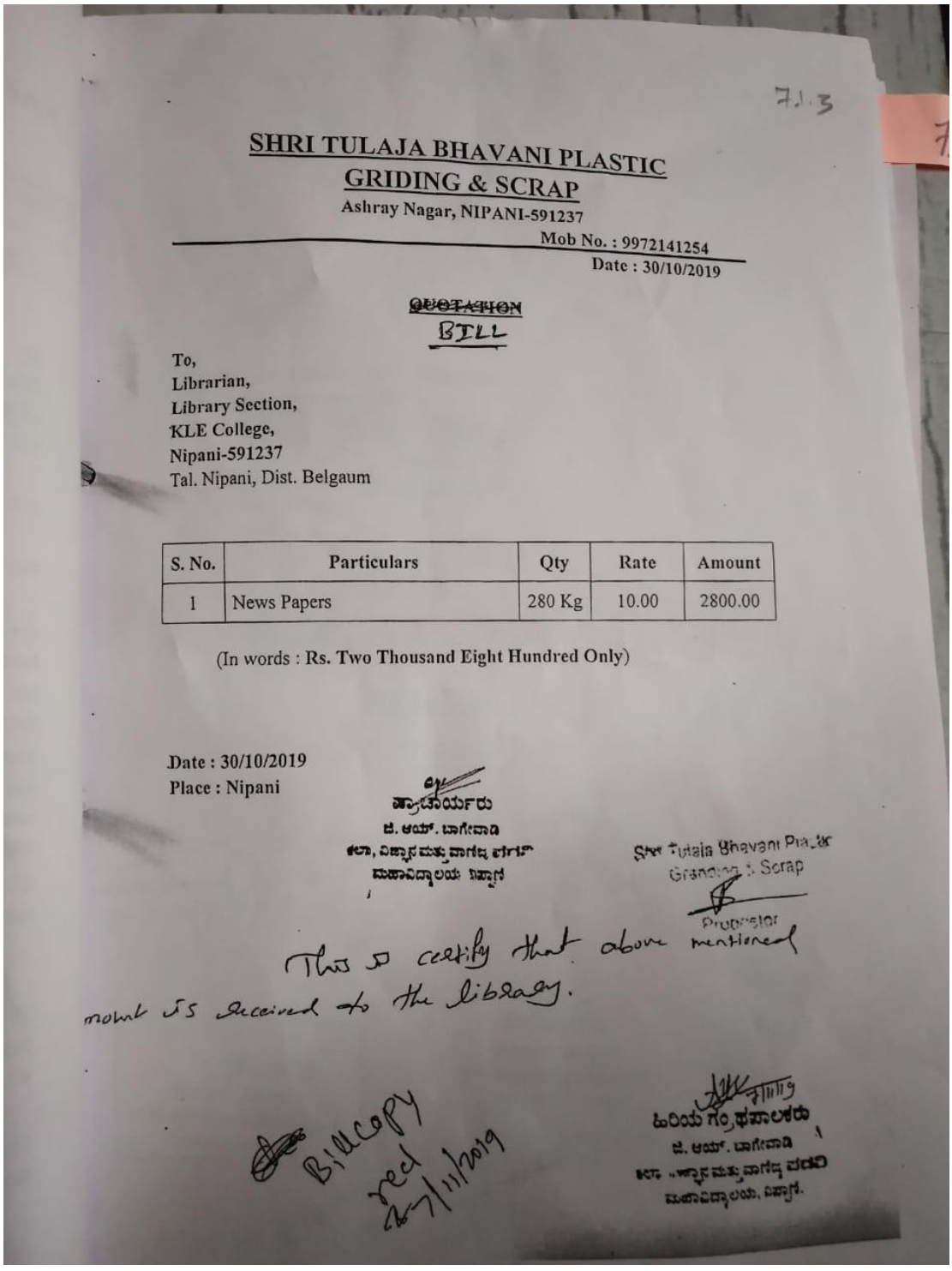
Figure 1: Vermi-composting plant in garden area

2. Reuse of food:

Food waste is generated from canteen, and mess of hostels. It is generated from raw waste during chopping or cutting of vegetables and left-over food from plates. This generated waste is about 330 kg/month. This waste is given to the animal farms.

3. Paper waste recycling:

Paper waste is handed over to the Shri Tulaja Bhavani Plastic Grinding and Scrap for recycling. This waste includes newspapers as well as office work paper.



7.1.3

SHRI TULAJA BHAVANI PLASTIC
GRIDING & SCRAP
Ashray Nagar, NIPANI-591237
Mob No. : 9972141254
Date : 30/10/2019

~~QUOTATION~~
BILL

To,
Librarian,
Library Section,
KLE College,
Nipani-591237
Tal. Nipani, Dist. Belgaum

S. No.	Particulars	Qty	Rate	Amount
1	News Papers	280 Kg	10.00	2800.00

(In words : Rs. Two Thousand Eight Hundred Only)

Date : 30/10/2019
Place : Nipani

ಪ್ರಾಚಾರ್ಯರು
ಜೆ. ಆಯ್. ಬಾಗೇವಾಡಿ
ಕೆಎಲ್ಇ, ವಿಜ್ಞಾನ ಮತ್ತು ವಾಣಿಜ್ಯ ಕಲಾ
ಮಹಾವಿದ್ಯಾಲಯ ನಿಪ್ಪಾಣಿ

Shri Tulaja Bhavani Plastic
Grinding & Scrap
Proprietor

This is certify that above mentioned amount is received to the library.

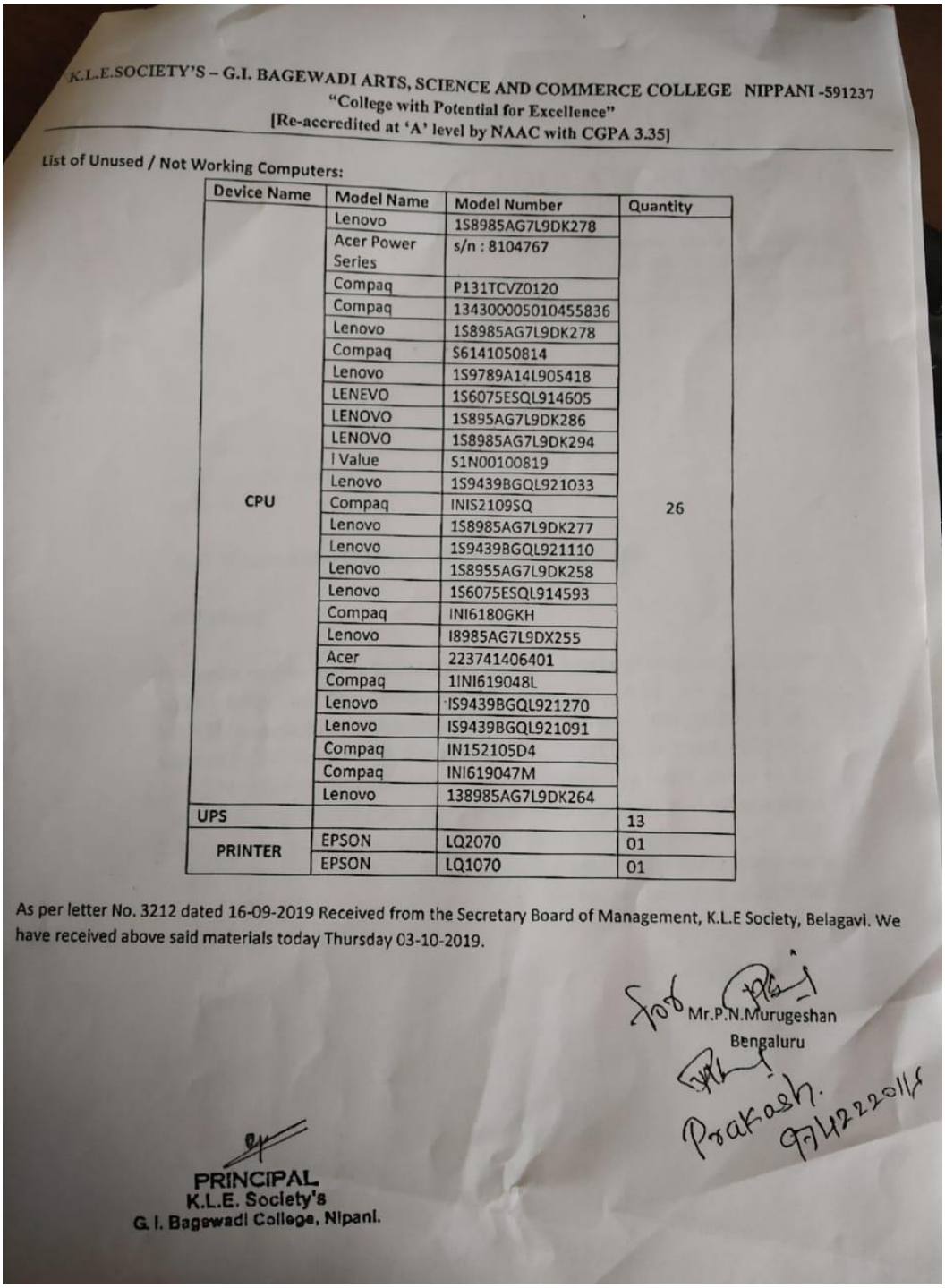
Bill copy
recd
4/11/2019

ಹಿರಿಯ ಗ್ರಂಥಪಾಲಕರು
ಜೆ. ಆಯ್. ಬಾಗೇವಾಡಿ
ಕೆಎಲ್ಇ, ವಿಜ್ಞಾನ ಮತ್ತು ವಾಣಿಜ್ಯ ಕಲಾ
ಮಹಾವಿದ್ಯಾಲಯ, ನಿಪ್ಪಾಣಿ.

Figure 2: Paper waste recycling certificate

4. E waste recycling:

All the E waste generated in Bagewadi college premises is recycled through Shiva Shakti Traders, Bengaluru.



K.L.E.SOCIETY'S – G.I. BAGEWADI ARTS, SCIENCE AND COMMERCE COLLEGE NIPPANI -591237
"College with Potential for Excellence"
[Re-accredited at 'A' level by NAAC with CGPA 3.35]

List of Unused / Not Working Computers:

Device Name	Model Name	Model Number	Quantity
CPU	Lenovo	1S8985AG7L9DK278	26
	Acer Power Series	s/n : 8104767	
	Compaq	P131TCVZ0120	
	Compaq	134300005010455836	
	Lenovo	1S8985AG7L9DK278	
	Compaq	S6141050814	
	Lenovo	1S9789A14L905418	
	LENEVO	1S6075ESQL914605	
	LENOVO	1S895AG7L9DK286	
	LENOVO	1S8985AG7L9DK294	
	I Value	S1N00100819	
	Lenovo	1S9439BGQL921033	
	Compaq	INIS2109SQ	
	Lenovo	1S8985AG7L9DK277	
	Lenovo	1S9439BGQL921110	
	Lenovo	1S8955AG7L9DK258	
	Lenovo	1S6075ESQL914593	
	Compaq	INI6180GKH	
	Lenovo	I8985AG7L9DX255	
	Acer	223741406401	
	Compaq	1INI619048L	
	Lenovo	IS9439BGQL921270	
	Lenovo	IS9439BGQL921091	
	Compaq	IN152105D4	
	Compaq	INI619047M	
	Lenovo	138985AG7L9DK264	
UPS			13
PRINTER	EPSON	LQ2070	01
	EPSON	LQ1070	01

As per letter No. 3212 dated 16-09-2019 Received from the Secretary Board of Management, K.L.E Society, Belagavi. We have received above said materials today Thursday 03-10-2019.

Mr.P.N.Murugeshan
Bengaluru
Prakash.
9742220115

PRINCIPAL
K.L.E. Society's
G. I. Bagewadi College, Nipani.

Figure 3: E waste recycling certificate

5. Disposal of hazardous waste:

The major source of hazardous waste in campus is the sanitary napkin waste generated in girl's hostels. The college has provided the facility of incinerator in girl's hostel and college for disposal of such waste.

Hazardous waste generated from the chemical laboratories during the use of acids and various chemicals. For disposal of this chemical discharge soak pit is provided in premises.

Figure 4: Soak pit for chemistry lab discharge

Figure 5: Incinerator

Key Observations:

- The average waste generated in the college is app. 408.2 Kg /month
- Highest quantity of solid waste is biodegradable waste around 330 Kg/month.
- Biodegradable waste is utilized properly for composting.
- Plastic waste is generated 18 Kg/month in the college campus. This generated waste is used to dump on open area followed by burning which causing loss of aesthetic beauty of premises and emission of harmful gases. To dispose plastic waste properly, this waste can be used for road construction along with other construction material.
- Segregation according to the categories of waste should be done at source of waste generation.
- The E- waste generated from damaged computers is given to the dealer for recycling.
- Cleanliness and hygienic conditions were maintained in the campus.

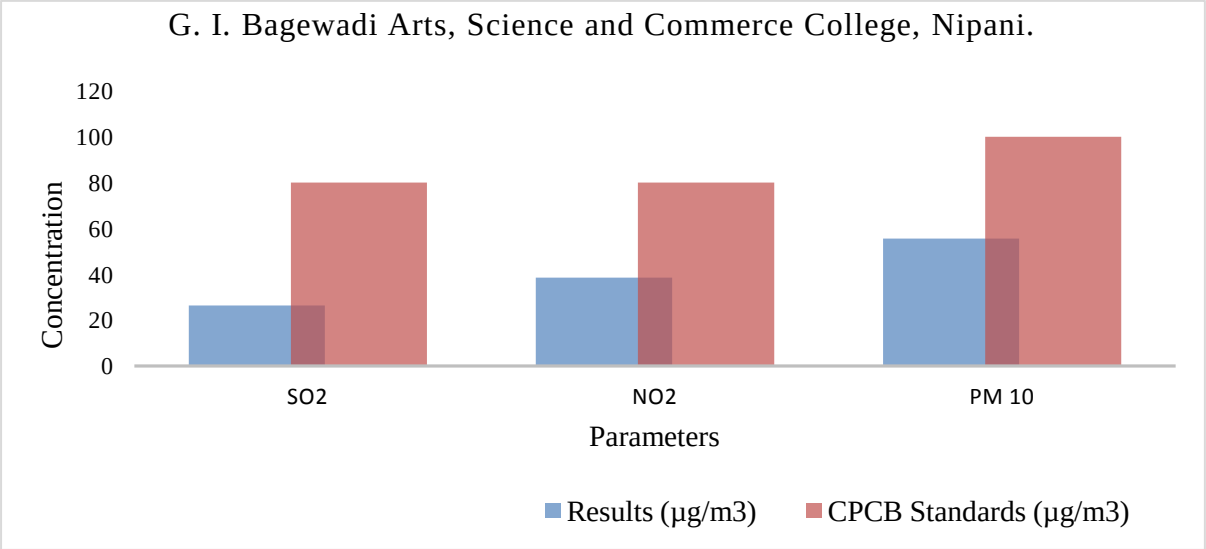
3.5. Air Quality Status:

Ambient air sampling is important part of environmental monitoring. Particulate matter and trace gases sampling were carried out on the college campus. The sampling was carried out using calibrated Handy Dust Sampler APM 821 with flow rate 1 lit/min equipped with glass fibre filter paper (size 25 mm). The sampling period was 4 hrs. Air monitoring was also done in last year 2018-19.

Sulphur dioxide (SO_2) and Oxides of Nitrogen (NO_2) in the air were estimated with West and Gaeke method and Jacob and Hochheiser modified method respectively. Particulate matter (PM_{10}) was measured gravimetrically. The samples were collected and analyzed in the laboratory of Department of Environmental Science, Shivaji University, Kolhapur. The details of air quality status in the college are given in the Table No. 3.14 and Graph No. 3.14.

Table No. 3.5.1. Ambient air quality status in G. I. Bagewadi Arts, Scince and Commerce College, Nipani.

Sr. No	Parameters	Results ($\mu g/m^3$)	CPCB Standards ($\mu g/m^3$)
1	SO_2	26.38	80
2	NO_2	38.56	80
3	PM_{10}	55.61	100



Graph No. 3.5.1 Ambient air quality status in G. I. Bagewadi Arts, Scince and Commerce college, Nipani.

The graph shows the SOx, NOx and PM10 concentration. The concentrations of the air pollutants are below the CPCB standards. It was observed that very few activities in the campus are responsible for air pollution. The green belt developed to reduce the air emission occurring through traffic on the road. Plantation present in the campus is playing a very important role in reducing the amount of carbon dioxide and making air clean.

Key Observations:

1. Prohibit burning mulch in the open.
2. Increase green cover.

3.6 Details of green inventory on college campus:

The modern world facing the biggest and toughest, still unsolved problem is Climate Change. The modern civilization in the earlier 21st Century comes with major concerned issues like population growth, food security, global warming, inequitable distribution of natural resources and poverty. The major concerns about the emission of Greenhouse Gases (GHGs) are unplanned civilization, industrialization, low cost products or lifestyles. CO_2 is the main contributor among these GHGs causing global warming. Atmospheric Carbon dioxide levels have increased to 409.8 parts per million till 2019. On this background, it is a need of time to cover the educational campuses with green cover interrelated with climate change as such campuses are spread in large areas.

The current observations are related to present status of tree cover, vegetation and carbon storage assessment of area under G.I. Bagewadi Arts, Science and Commerce College, Nipani, Karnataka. In the current time, institutional areas can play key role for sequestration, mitigation of carbon from their own area by various carbon reducing technologies. The institutional green cover acts as carbon sink. Carbon sequestration is a phenomenon of converting atmospheric carbon i.e. CO_2 in to other pools of carbon such as vegetation, soil, ocean, etc. in various forms to mitigate global warming. It is one of the important clauses of Kyoto Protocol.

The carbon sequestration potential of G.I. Bagewadi Arts, Science and Commerce College, Nipani, Karnataka was studied for the Green Audit preparation. Here tree census methodology has been adopted from the guidelines set by Indian Institute of Remote Sensing, Dehradun, Government of India. All the collected data is tabulated and analysed with the help of MS- Excel spreadsheets and objected findings were extracted by using various factors given by Intergovernmental Panel on Climate Change (IPCC).

3.6.1. Green inventory of G.I. Bagewadi Arts, Science and Commerce College, Nipani, Karnataka campus

G.I. Bagewadi Arts, Science and Commerce College, Nipani is located in Belagavi district of Karnataka state. Nipani is 597 m above sea level and located at 16.40° N 74.38° E. The Institute campus covers the total 11 acres area. Total 187 numbers of trees with more than 10cm girth and height more than 4 feet have been enumerated. The total 32 species of woody trees is identified during the visit. The campus has more native species of woody trees which is important aspect for the biodiversity. The inventory found highest number of *Azadirachta indica* on campus. The institute has planted trees having more potential of carbon sequestration. The Institute took the initiative for plantation of native plants which is

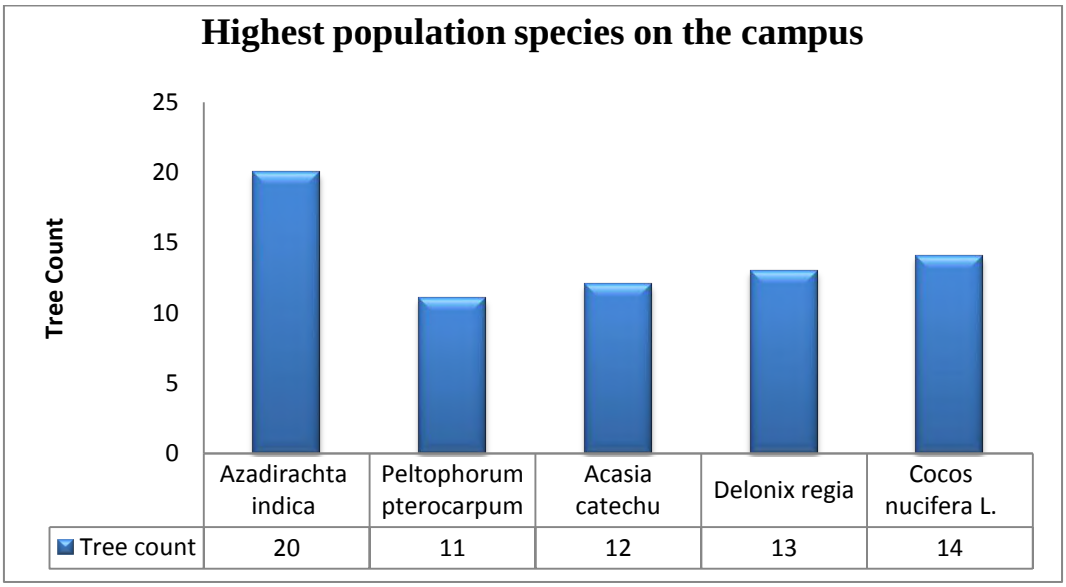
the best practice to conserve the local biodiversity. The institute have 26 species of fruit bearing plants which can be the good roosting spot for the native fruit eating birds as well as animals.

3.6.2 Species with highest population:

Table No-3.6.1 Species with Highest population

Sr. No.	Botanical Name	Common Name	Number
1	*Azadirachta indica*	Neem	20
2	*Cocos nucifera L.*	Coconut	14
3	*Delonix regia*	Gulmohar	13
4	*Hyophorbe lagenicaulis*	Royal Bottle Palm	12
5	*Terminalia catappa*	Wild Badam	12

During the inventory it is found that, *Azadirachta indica* is having highest population on the campus followed by *Cocos nucifera L.* and *Delonix regia* respectively.



Graph No.3.6.1 Highest population species on the campus

The species *Hyophorbe lagenicaulis* and *Terminalia catappa* have same count of population correspondingly on G.I. Bagewadi Arts, Science and Commerce College, Nipani campus.

3.6.3 Total biomass:

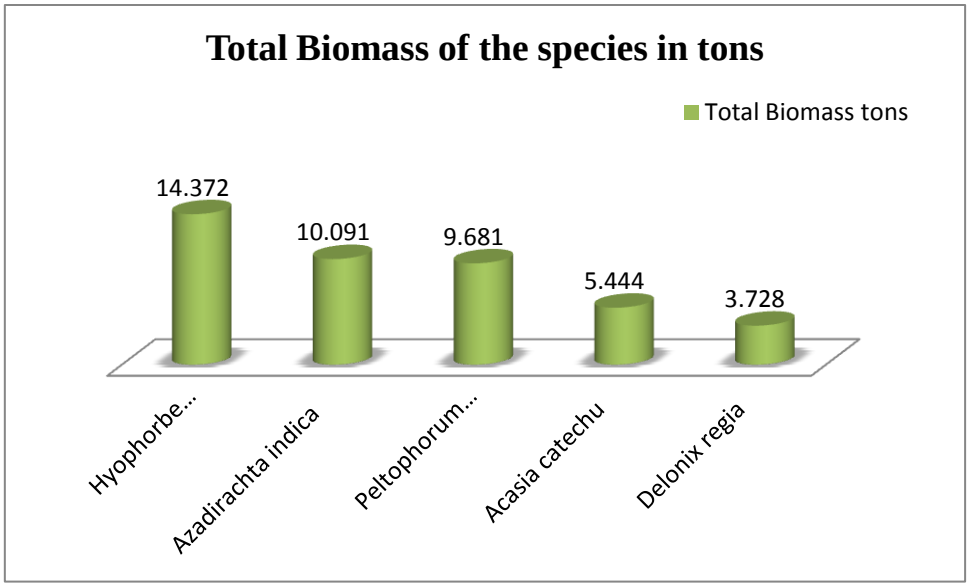
Biomass, in ecology, is the mass of living biological organisms in a given area or ecosystem at a given time. Biomass can refer to *species biomass*, which is the mass of one or more species, or to *community biomass*, which is the mass of all species in the community. It can include microorganisms, plants or animals. The mass can be expressed as the average

mass per unit area, or as the total mass in the community. The biomass includes branches, stem, fruits, roots and flowers of the individual tree. 71.28 tons of total biomass of woody vegetation has been recorded in G.I. Bagewadi Arts, Science and Commerce College, Nipani campus during the current tree census.

Table No-3.6.2 Total Biomass of trees in tons on the campus

Sr.No.	Botanical Name	Common Name	Total Biomass (Tons)
1	*Hyophorbe lagenicaulis*	Royal Bottle Palm	14.37
2	*Azadirachta indica*	Neem	10.09
3	*Peltophorum pterocarpum*	Copper Tree	9.68
4	*Acacia catechu*	Khair or Catechu	5.44
5	*Delonix regia*	Gulmohar	3.72

Hyophorbe lagenicaulis shows the highest biomass on the campus. Followed by *Azadirachta indica* and *Peltophorum pterocarpum* are rank at second and third place.



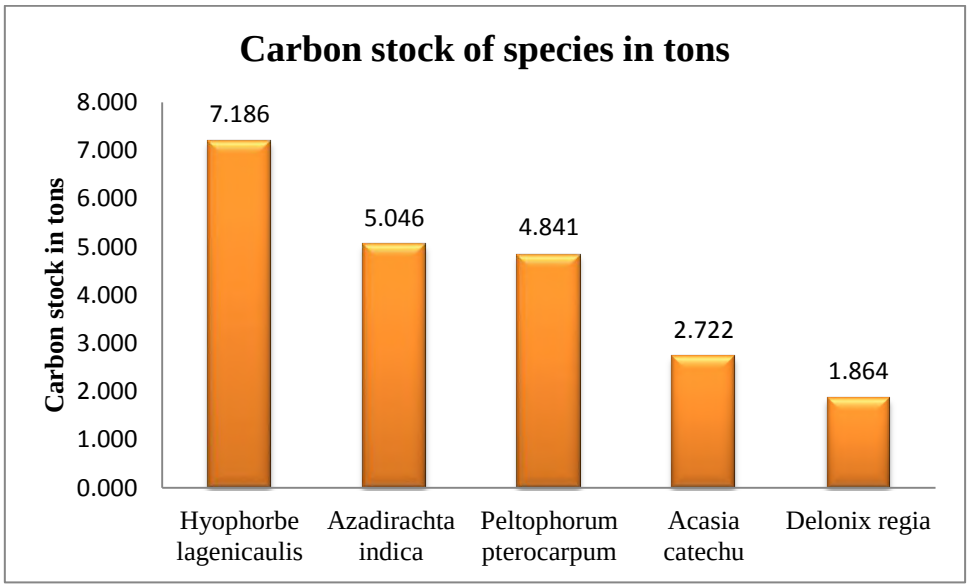
Graph No.3.6.2 Highest Total Biomass in tons

3.6.3 Carbon stock:

Forests and trees act as natural carbon stores, but this carbon is released when the trees are felled and the area deforested. The amount of carbon stored within an area of land varies according to the type of vegetation cover. The carbon sock is the amount of carbon stored in tree during the photosynthesis process. The total carbon stock is present on the campus is 35.64 tons.

Table No.3.6.3 Carbon stock of Trees in tones on the Campus

Sr.No.	Botanical Name	Common Name	Carbon stock (Tones)
1	*Hyophorbe lagenicaulis*	Royal Bottle Palm	7.18
2	*Azadirachta indica*	Neem	5.04
3	*Peltophorum pterocarpum*	Copper Tree	4.84
4	*Acacia catechu*	Khair or Catechu	2.72
5	*Delonix regia*	Gulmohar	1.86



Graph No.3.6.3 Highest carbon stock in tons

The highest carbon stock is recorded in *Hyophorbe lagenicaulis* followed by *Azadirachta indica* and Peltophorum *pterocarpum* respectively on the institute campus.

3.6.4 Carbon Sequestration:

Carbon sequestration describes long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming and avoid dangerous climate change. It has been proposed as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels. Vegetation carbon pool having the potential of 560 Pg (Pg: Petagram= billion ton) of carbon storage globally. In the current study the focus is given on the assessment of existing carbon stock stored G.I. Bagewadi Arts, Science and Commerce College, Nipani campus in the form of woody vegetation by enumerating every tree species. Overall 130.81 tons of CO_2 has captured and stored by the woody plants present in the college campus. A single tree consumes 0.0218 tons of CO_2 approximately

annually consequently, as the campus possess 187 mature woody plants on the campus total 4.07 tonnes of CO_2 is consumed yearly by all woody vegetation on the college campus.

3.6.5 Oxygen released:

Woody vegetation on G.I. Bagewadi Arts, Science and Commerce College, Nipani campus has released 349.26 tons of oxygen in their lifetime till date. Released oxygen is directly proportional to CO_2 sequestrate in the ratio of 32/12. Thus, it is supposed to release of oxygen annually. It is assumed that a single tree supports oxygen demand of two people for their life. Thus, woody vegetation of 187 trees in college campus is supporting 374 people in and around the campus.

3.6.6 Carbon sequestration potential of the campus in future:

The G.I. Bagewadi Arts, Science and Commerce College, Nipani currently nurtures the 96 trees having girth less than 10cm and height less than 4 feets. That will sequester 2.09 tons of atmospheric carbon dioxide annually. The total carbon potential of the campus in the future will be 6.16 tons annually.

3.7.8 Threats to the Green campus

The good efforts were taken by institution to maintain greenery on the campus. Though all the factors responsible for a good ecosystem are in good condition, need to be considered by the Institute to avoid the damage to ecosystem in the future. The threats are as follows:

3.6.8.1 Fire events near the woody vegetation on the campus:

During the tree census visit, fire event was observed near the woody vegetation on the campus. The fire event is made for the incineration of solid waste as well as dead carbon stock. These kinds of fire events can lead to immense fire accidents like wildfire on the campus. The campus posses grass hat can be eventually medium for wildfire during the summer season. Such type of acts can be lead to the loss of biodiversity on and around the campus in the future.

Fire events near the woody vegetation

3.6.8.2 Improper storage of dead carbon stock on the campus:

The institute should properly store dead carbon stock i.e. dead trees. The dead carbon stock was kept near the fire events which can release much amount of carbon into the atmosphere by burning.

Improper storage of dead carbon stock

3.6.9. Plant diversity on the campus:

The campus is rich in plant diversity. The campus posses total 13 species of sacred plants including *Santelum album*, *Phyllanthus emblica, Acacia catechu, Aegle Marmelose*. Total 150 species of medicinal plants including shrubs and herbs were recorded in the year 2015-16 on the college campus as per the college record documents. The campus includes *Curcuma domestica* (Turmeric), *Clitoria ternatea* (Shankhapushpi), *Centella asiatica* (Brahmi), *Ocimum sanctum* (Holy Basel), *Rauwolfia serpentine Benth* (Serpagandha) and *Withania somnifera* (Ashwagandha) etc. The campus has 25 species of fruit bearing plants. These fruit bearing plants can be great hosting venues for the native biodiversity in and around the campus.

3.6.10 Scope of Area:

The institute is having large area with good proportion of vegetation. The leaf litter can be converted into compost by using the vermicomposting plants available on the campus can store the carbon in the form of organic carbon. Currently the vermicomposting plant is working on small scale but it can be run on large scale by using leaf litter available on the campus. This compost can lead to increase in the soil fertility on the campus area.

Key Observation:

- Absence of fire lines can cause fire disaster on the Campus.
- The Institute take good initiative for green cover by planting fruiting and medicinal plants.
- Improper storage of dead carbon stock.
- Fire events near woody vegetation will be threat to vegetation on the campus as well as direct anthropogenic source of CO_2 emission.
- Well maintained vegetation on campus.

3.7 Electricity and energy audit:

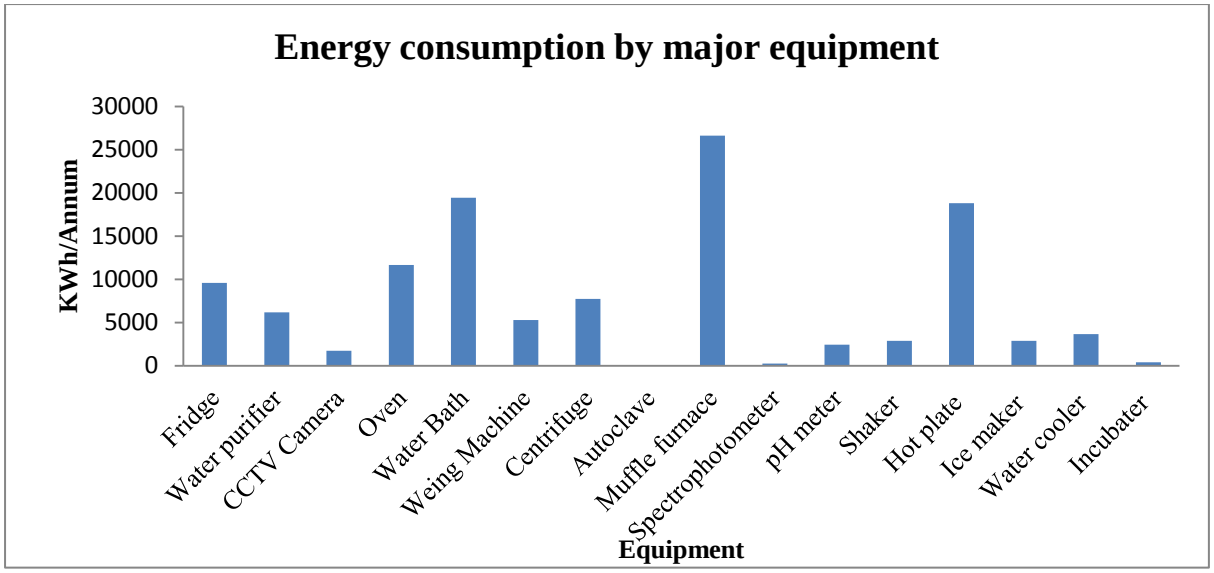
Energy sources utilized by all the departments, support services of G. I. Bagewadi Arts, Science, and Commerce College include electricity and liquid petroleum. Major use of the energy is at office, canteen, hostel and laboratories, for lighting, transportation, cooking and workshop instruments. Electricity is supplied to the college campus by Karnataka State Electricity Board also.

3.7.1 Energy consumption:

Electricity is utilized at all departments like Science, Commerce, and Arts. In the Science Departments several types of equipment are used in laboratory and some of them are run every day for 24 hrs. The calculations are based on the data provided by the college and actual observations taken at the site. The collected data shows all departments in the college have maximum number of major energy consuming equipments and energy consumption is 1, 19,724.8 KWh/ Annum.

Table No.3.7.1: Energy consumed per annum by major instruments in all the departments in the college

Sr. No.	Equipment	Number	KWh/Annum
1	Fridge	4	9,600
2	Water purifier	7	6,182.4
3	CCTV Camera	34	1,749.504
4	Oven	4	11,673.6
5	Water Bath	4	19,456
6	Weighting Machine	12	5,299.2
7	Centrifuge	1	7,752
8	Autoclave	2	7.296
9	Muffle furnace	2	26,624
10	Spectrophotometer	1	268.8
11	pH meter	3	2,448
12	Shaker	2	2,880
13	Hot plate	4	18,816
14	Ice maker	3	2,880
15	Water cooler	8	3,680
16	Incubator	2	408
	Total	**93**	**1,19,724.8**



Graph No.3.7.1: Energy consumed per annum by major instruments at all departments in the college

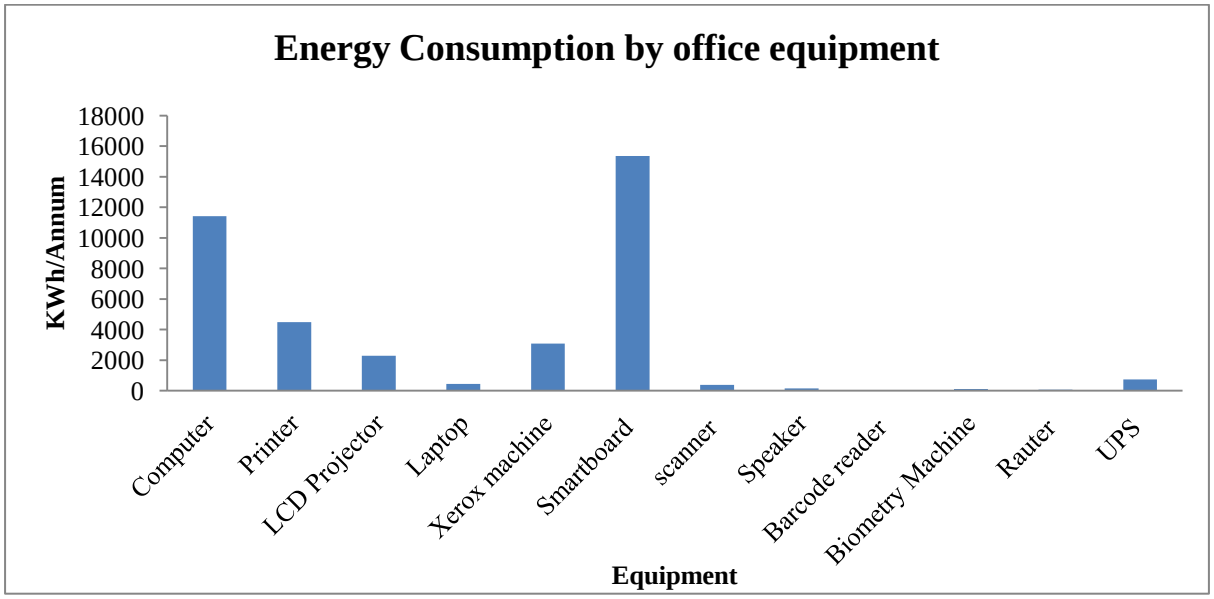
Major energy consuming equipment's at all departments consume electricity 1,19,724.8 KWh/Annum. As major energy consuming equipments, number of Muffle furnace is (2) than other equipment's and hence, energy consumed by major energy consuming equipments is also maximum i.e. 1, 19,724.8 KWh/ Annum. During the analyses it is observed that Number of Muffle furnace including all departments is 2 and it consumes highest energy i.e. 26,624 KWh/ Annum. Followed by Water bath 19,456 KWh/Annum, Hot Plate 18,816 KWh/Annum, Water purifier 6,182.4 KWh/Annum, and Water Cooler 3,680 KWh/Annum, CCTV Camera 1,749.504KWh/Annum respectively.

Similarly, to analyse the electricity consumption of office equipment's computers, printers, laptops were also considered for the calculation.

Table No. 3.7.2: Office equipments and their energy consumption (KWh/Annum) at all departments in the college

Sr. No.	Equipment	Number	KWh/Annum
1	Computer	68	11,424
2	Printer	28	4,480
3	LCD Projector	6	2,284.8
4	Laptop	8	430.08
5	Xerox machine	2	3,072
6	Smart board	8	15,360

7	Scanner	2	384
8	Speaker	12	139.776
9	Barcode reader	2	0.0256
10	Biometry Machine	1	96.768
11	Router	4	65.28
12	UPS	20	742.56
	Total	**161**	**38,479.29**



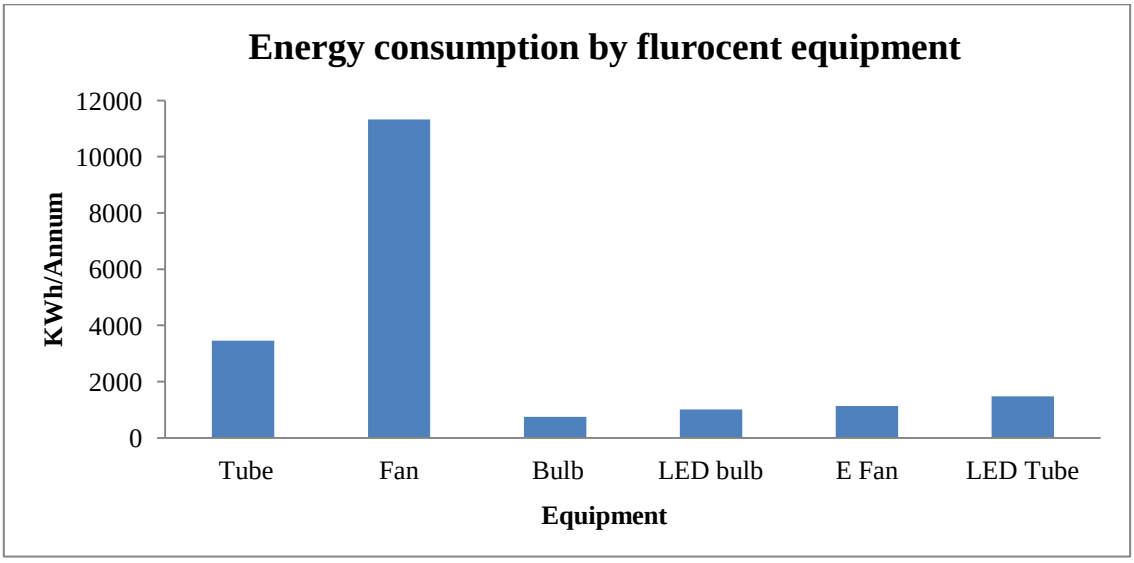
Graph No. 3.7.2: Office equipment's and their energy consumption (KWh/ Annum) at all Departments in the college

All the office equipments in every department's consume energy is 38,479.29 KWh/Annum. As office equipment, number of computers is (68) than Printers, Laptops, LCD projectors and Xerox machine hence the energy consumed by Smart board is also maximum i.e. 15,360 KWh/Annum followed by Computer 11,424 KWh/Annum, Printers 4,480 KWh/ Annum, LCD Projectors 2,284.8 KWh/Annum, respectively.

Similarly, to analyze the electricity consumption, lights and fans were also considered.

Table No. 3.7.3: Number of fluorescent tubes, bulbs and fans and their energy consumption (KWh/ Annum) at all departments in the college

Sr. No.	Equipments	Number	KWh/Annum
1	Tube	135	3,456
2	Fan	118	11,328
3	Bulb	42	752.64
4	LED bulb	35	1,008
5	E Fan	13	1,131.52
6	LED Tube	60	1,474.56
	Total	**403**	**19,150.72**



Graph No.3.7.3: Number of fluorescent Tubes, bulbs and fans and their energy Consumption (KWh/ Annum) at all departments in the college

Maximum use of energy is for lightning and fans in all the buildings. The total number of fluorescent tubes is 135 and their electricity consumption is 3,456 KWh/Annum. In the building total number of ceiling fans and LED bulbs are 35 and their electricity consumption for Fan (118) 11,328 KWh/Annum and LED Tube (60) 1,474.56 KWh/Annum, Exhaust Fan (E fan) 1,131.5 KWh/Annum respectively.

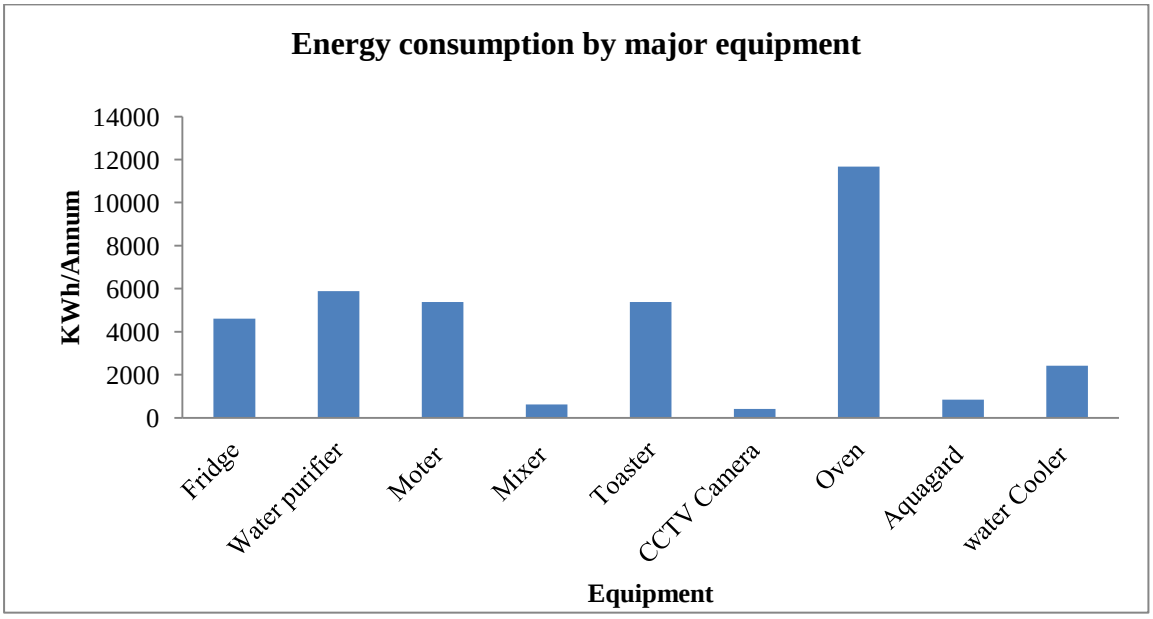
3.7.3 Energy consumption at Support services:

Support services includes – Ladies hostel, Boy's hostel, Canteen, Gymkhana, Library, Quarters, guest house, campus. The collected data shows the Support services have

maximum number of major energy consuming equipments and energy consumption is. 37,202.64 KWh/ Annum.

Table No.3.7.4: Energy consumed per Annum by major instruments at Support services

Sr. No.	Equipment	Number	KWh/Annum
1	Fridge	2	4,608
2	Water purifier	4	5,888
3	Motor	5	5,376
4	Mixer	4	614.4
5	Toaster	4	5,376
6	CCTV Camera	8	411.648
7	Oven	4	11,673.6
8	Aquagard	20	840
9	Water Cooler	5	2,415
	Total	**56**	**37,202.648**



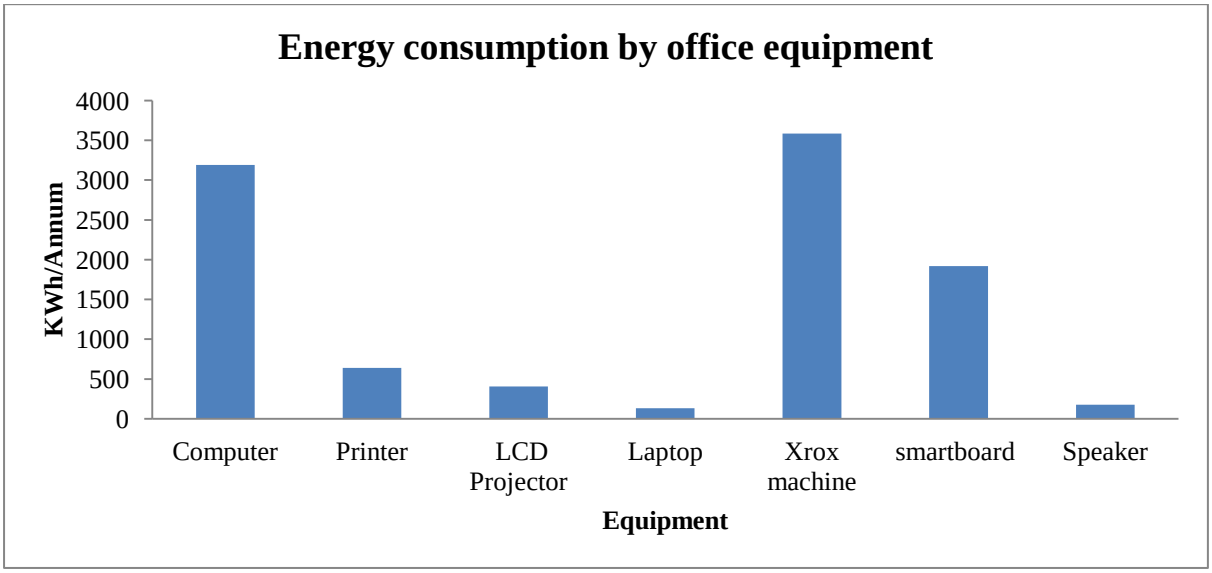
Graph No.3.7.4: Energy consumed per Annum by major instruments at support Services

The major energy consuming equipments at Support services consume energy 37202.648 KWh/Annum. In the Canteen the energy consumption is 4,608 KWh/ Annum by 2 fridges, followed by Oven 11,673.6 KWh/Annum, water purifier 5,888 KWh/Annum, Toaster 5,376 KWh/Annum, Motor 5,376 KWh/Annum, Water Cooler 2,415 KWh/Annum, Mixer 614.4 KWh/Annum, and Aqua guard 840 KWh/Annum respectively.

Similarly, to analyze the electricity consumption of office equipments computers, printers, laptops were also considered from support services.

Table No 3.7.5: Office equipments and their energy consumption (KWh/Annum) at support services.

Sr. No.	Equipment	Number	KWh/Annum
1	Computer	19	3,192
2	Printer	4	640
3	LCD Projector	2	408
4	Laptop	2	134.4
5	Xerox machine	2	3,584
6	Smart board	1	1,920
7	Speaker	12	174.72
	Total	**42**	**10,053.12**

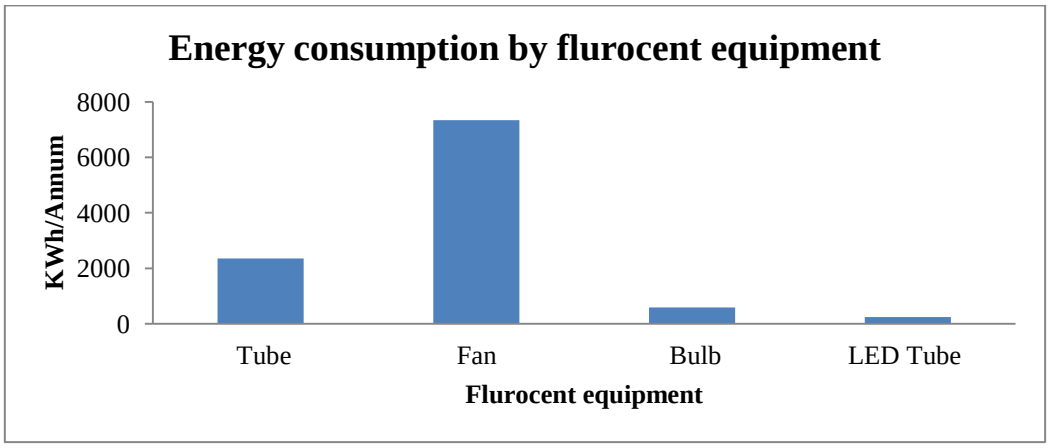


Graph No. 3.7.5: Office equipment's and their energy consumption (KWh/ Annum) at Support services.

Office equipments at Support Services consume energy 10,053.12 KWh/Annum. Office equipment, number of computers is (19) highest as compared to Printers, Laptops, LCD projectors and Xerox machine. The energy consumed by computers is also maximum i.e. 10,053.12 KWh/Annum, Xerox machine 3,584 KWh/Annum followed by smart board 1,920 KWh/Annum, Printers 640 KWh/ Annum, Laptop 134.4 KWh/Annum. Similarly, to analyze the electricity consumption, lights and fans were also considered.

Table No. 3.7.6: Number of fluorescent tubes, bulbs and fans and their energy Consumption (KWh/ Annum) at support services

Sr. No.	Equipment's	Number	KWh/Annum
1	Tube	55	2356.2
2	Fan	36	7344
3	Bulb	18	587.52
4	LED Tube	15	244.8
	Total	**124**	**10532.52**

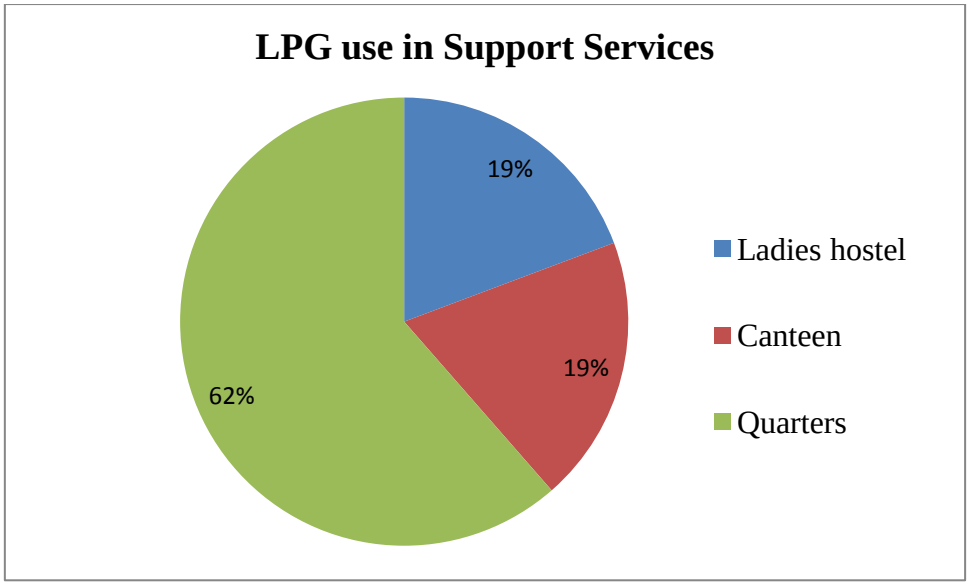


Graph No.3.7.6: Number of fluorescent Tubes, bulbs and fans and their energy consumption (KWh/ Annum) at support services

Maximum use of energy for lightning and fans occurs in the support services building. The total number of fluorescent Tubes is 55 and their electricity consumption is 2,356.2 KWh/Annum. In the support services, total number of ceiling fans and their electricity consumption were respectively i.e. Fan (36) 7,344 KWh/Annum and Bulb (18) 587.52 KWh/Annum, LED Tube (15) 244.8 KWh/Annum.

Table No.3.8.3g LPG Use in Support Services

Sr. No.	Support Services	kg/annum
1	Ladies hostel	156
2	Canteen	156
3	Quarters	497
	Total	**809**



Graph No. 3. 8. 3g LPG Use in Support Services

Maximum LPG is used in Support services i.e Hostels, Canteen, Quarters. LPG is used as a fuel for cooking purpose in canteen. The total number of LPG Cylinder required was 59 and their consumption is 809 kg/Annum. In the Support services, LPG Gas consumption respectively i.e. in Quarters 497 kg/Annum (62%), Ladies hostel 156 kg/Annum (19%), Canteen 156 kg/Annum (19%), respectively (Graph No. 3.10). This is might be effect of lockdown days. During lockdown period hostels and college canteen was closed.

Key Observations:

- The total energy consumption of college is 2,31,145.53 KWh/Annum
- Highest consumption of energy is by equipments i.e. 1, 19,724.8 KWh/Annum.
- The energy consumption of equipments is more than office equipments and fluorescent lamps.
- Electricity and LPG consumption is less because college, canteen, and hostel were closed due to the Covid pandemic situation.

Chapter IV
CONCLUSION AND MANAGEMENT PLAN

The Department of Environmental Science, Shivaji University, Kolhapur has conducted a Green Audit of G. I. Bagewadi Arts, Science and Commerce College, Nipani in the academic year 2020-21. Green auditing is the process of identifying and determining whether institution practices are eco-friendly and sustainable. The main objective of college to carry out green audit is to check green practices followed by college and to conduct a well formulated audit to understand where we stand on a scale of environmental soundness.

Conclusions:

From the green audit conducted by team following are some of the conclusions which can be taken for improvement of the college campus to become environment friendly college campus:

1. College takes efforts to dispose majority waste by using proper methods.
2. Confidential paper waste is disposed properly.
3. Glass waste is to be disposed properly.
4. Electricity consumption is more at some departments.
5. Use of CFL lamps in the college is minimum. Its use should be encouraged and now converted to LED lights.
6. Toilets and bathrooms are consuming more water.
7. Roof top rain water harvesting should be expanded which is useful for filling up of tanks on campus.
8. E-waste segregation, handling and disposal are properly done.
9. Practice of waste segregation to be initiated.
10. Air quality on the campus is good.
11. College can conduct more seminars, group discussions and eco-friendly activities on environmental education and awareness

Recommendations:

Following are some of the key recommendation for improving campus environment.

1. College should develop its own Environmental Policy by using guidelines given in Green Audit document.
2. The data related to all measured environmental parameters should be monitored and recorded regularly and information be made available to administration.
3. The college should develop internal procedures to ensure its compliances with environmental legislation and responsibility be fixed to carry out it in practice.
4. Wherever possible the waste should be reused or recycled.
5. All street lighting should be changed to LED lights to save electricity.
6. Rain water harvesting facility must be expanded
7. Drip irrigation for gardens and vegetable cultivation can be initiated.
8. Practice of waste segregation to be initiated.

ENVIRONMENT MANAGEMENT PLAN:

By understanding the dynamics of present situation of resource utilization and current practices of waste disposal we have prepared an Environment Management Plan (EMP) for the G. I. Bagewadi Arts, Science and Commerce College, Nipani. This plan not only will provide the strengths, weaknesses and remedies for the green and clean campus but also give priority of the sector where the college has to give more efforts to improve its environment.

Environment Management Plan 2020-21

Sector	Strengths	Weakness	Suggestions	Priority
Solid Waste				
Paper	• Use of one-sided papers in many departments and main building	• Multiple numbers of copies required for office work.	• Towards paperless office: More use of e-mails, e-money transfer and advance IT technology for communication.	Medium
Plastic	Reuse of plastic at some departments	• Plastic thrown with general waste in many departments	• Segregation of waste at the source and sending plastic waste for recycling. • Ban on Plastic carry bags in College premises.	Medium
Biodegradable waste	• Solid waste generated • College has its vermicomposting plant • Hostels are equipped with incineration facility for sanitary napkins.	• Solid waste is to be segregated at the source	• Segregation of solid waste help in composting process	Medium
Energy				
Electricity		• Unnecessary use of lights, fans and computers at some places when no one is using it. • More awareness is required	• Employment of more solar panels and other renewable energy sources. • Electrification of street lights by solar power. • Use of solar	Medium

		among students.	pumps for water tanks. • General awareness about electricity saving.	
Fuel	• Use of public Transport system is comparatively more by staff and students	• More awareness is required among students.	• Initiation of No vehicle day on campus • 'Cycle on rent' service for student • General awareness about efficient use of fuel.	Medium
Water				
Water utilization	• College has potential of Rain water harvesting.	• Overflowing of tanks at some places • Overuse of water at toilets.	• Installation of automatic water pumps to avoid overflowing losses • Proper and timely maintenance of plumbing at all departments • Installation of rain water harvesting assembly.	Medium
Waste water	• Septic tanks present for sewage treatment • Soak pit is present near laboratory	• Untreated laboratory effluent and other waste - water. It percolates into soil and may contaminate ground water.	• Installation of small scale STP to treat laboratory waste and toilet flushing.	High
Hazardous Waste				
E-waste	• E waste is sent to E waste collection centre at Bengaluru.	• E waste related to computer and its parts are only collected.	• There must be segregation of e-waste from regular waste and also among the e-waste. • E-waste in all forms not only computers, should be collected properly	High

Air				
Air	• Air quality is in good condition. There is no sound pollution	• Considering the future student population, there may be air and noise pollution	• The plantation can be increased by vertical gardening.	Medium
Tree Census				
Tree Vegetation	• There is lots of space for plantation	• Less plantation on campus	• Avoid monoculture, variety of species should be planted in campus area	Medium

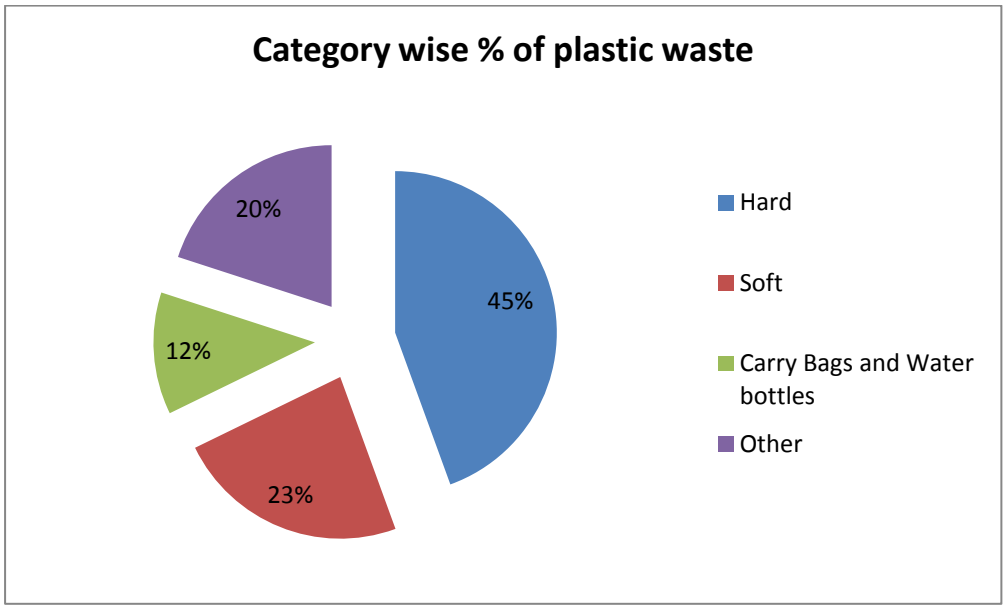
Plantation ceremony

3.4.1 Plastic Waste:

Table No. 3.3.4: Plastic waste generation and its distribution in the college

Category	Plastic Kg/month				Total
	Hard	Soft	Carry Bags and Water bottles	Other	
Quantity	8	4.2	2.2	3.6	18
Percentage	44.46	23.34	12.2	20	100

Plastic waste in the form of packaged food wrappers, old broken chairs, old broken water tanks, etc and plastic water bottles is approximately 18 kg/ month. Plastic wastes are difficult to dispose because it is non-biodegradable waste or it takes many years to degrade naturally. It can cause adverse impacts on environment.



Graph No. 3.3.3 Categorization of plastic waste at (kg/month)

Graph No. 3.3.3 shows that the hard plastic in the form of broken chairs, tables produces higher amount of hard plastic that is 45%. The soft plastic accounts 23 % of plastic while the carry bags, water bottles and packaged food items in canteens are present about 12.2%.

3.4.2 Hazardous waste audit of the college:

Hazardous waste is waste that has substantial or potential threats to public health or environment. The sources of hazardous waste in the Bagewadi college are very less. The amount of hazardous waste generated in the college is 0.3 kg/month. The major source of

hazardous waste in campus is the sanitary napkin waste generated in girl's hostels. Improper disposal of such waste can cause serious health effects. But, the college has provided the facility of incinerator in girl's hostel which has solved this major problem.

Very less quantity of hazardous waste and effluent are generated through chemical laboratories during the use of acids and various chemicals, fumes in the practical's. Further, the hazardous effluent gets diluted with remaining grey water and sewage generated in the campus and therefore, the toxicity gets decreased. Soak peat is provided for the chemical lab discharge.

3.4.3 E-waste generation in the college:

Generation of e-waste is found in every educational institute. All discarded electronic appliances are called as E-waste. E-waste requires special treatment for disposal so it is also called as special waste. It is observed that the e-waste generated at Bagewadi College, Nipani is of Schedule II category. Computers, printers, scanners, internet routers, CPU's, UPS, fused bulbs and tubes are used for administrative and laboratory work. The wire required for the connectivity also gets included in the E-waste. The college has its own computer laboratory. Besides this computer lab, each department and administration use computers for their routine work.

For e waste management KLE Society makes circular for collection of e waste to be disposed. As per the circular college examines the status of electronic equipments considering its working condition and decides its further disposal. The damaged computers, printers, UPS and other electronics devices are given for e waste recycling to an authorised dealer, Shiva Shakti Traders, Bengaluru. As per the data received by Shiva Shakti Traders, the college has handed over them about 75-80 kg of e waste on 3rd October 2019.

3.4.5 Construction waste:

Construction waste is generated from construction of new buildings and demolition activities consisting of concrete, tiles, bricks, drywall, asphalt, plastics, metals, wood, rock and more. These construction waste materials are often inert and non-biodegradable, heavy, bulky and responsible for overload landfills. About 2 kg of construction waste which is generated in the college premises due to the re-newation activity.

3.4.6 Metal waste

Metal waste is generated through various activities. The good thing about metal is they can be recycled over and over without changing its properties. Metal waste includes scrap of benches, table, cupboard, cots and other things which are made up of metals.

3.4 .7 Eco-friendly solid waste management practices:

The college follows following eco-friendly solid waste management practices.

1. Vermi Composting

The collage has one vermi composting plant in garden area. The leaf litter used as a composting is useful to increase the productivity of crop by supplying vitamin, nutrients and hormones. Utilizing the leaf litter waste by composting process will reduce the air pollution, health problems caused by leaf litter burning, decrease in municipal solid waste disposal and fire incidents in forests. The leafy waste is collected from the campus and dumped here for composting.

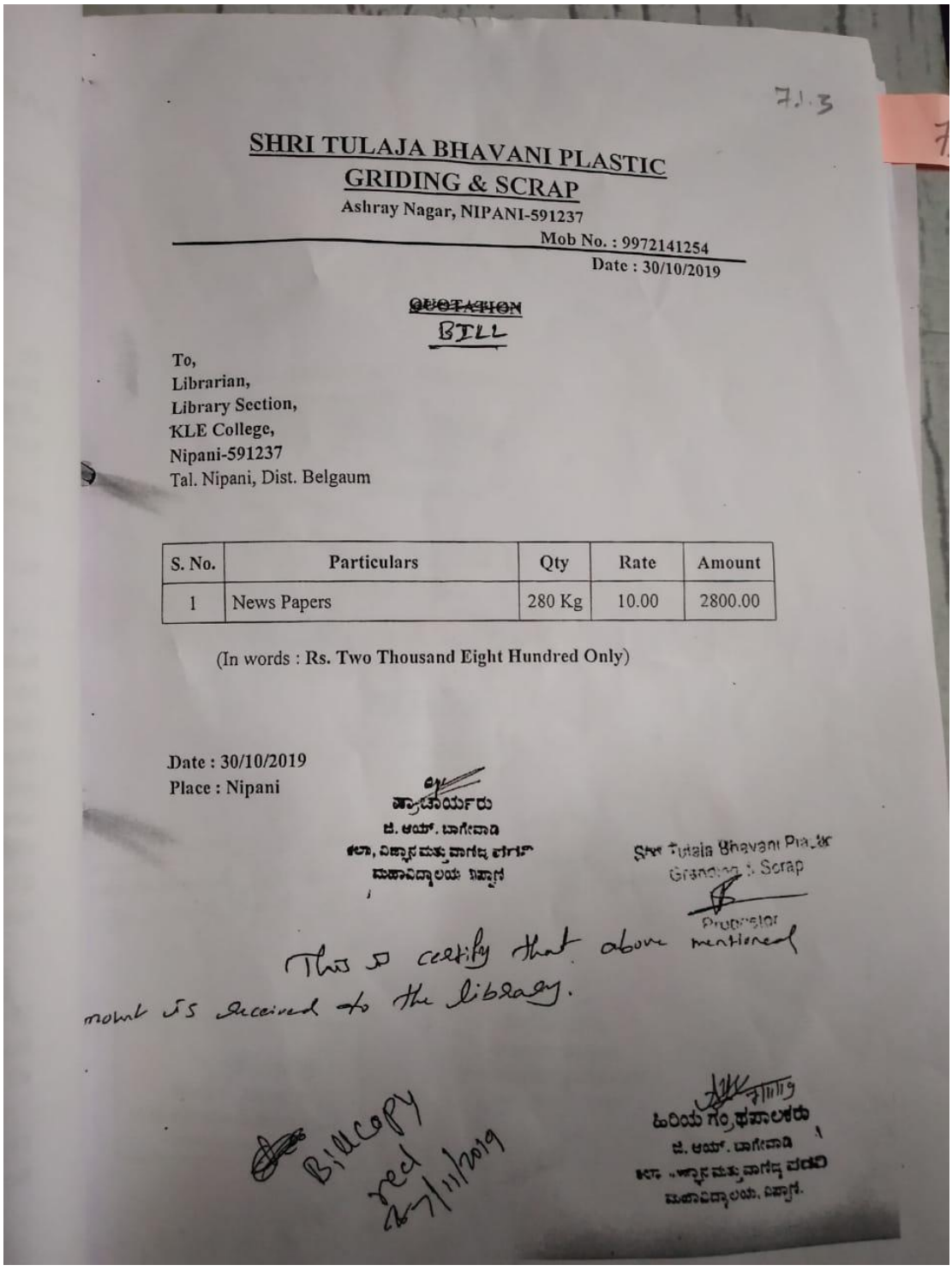
Figure 1: Vermi-composting plant in garden area

2. Reuse of food:

Food waste is generated from canteen, and mess of hostels. It is generated from raw waste during chopping or cutting of vegetables and left-over food from plates. This generated waste is about 330 kg/month. This waste is given to the animal farms.

3. Paper waste recycling:

Paper waste is handed over to the Shri Tulaja Bhavani Plastic Grinding and Scrap for recycling. This waste includes newspapers as well as office work paper.



7.1.3

SHRI TULAJA BHAVANI PLASTIC
GRIDING & SCRAP
Ashray Nagar, NIPANI-591237
Mob No. : 9972141254
Date : 30/10/2019

~~QUOTATION~~
BILL

To,
Librarian,
Library Section,
KLE College,
Nipani-591237
Tal. Nipani, Dist. Belgaum

S. No.	Particulars	Qty	Rate	Amount
1	News Papers	280 Kg	10.00	2800.00

(In words : Rs. Two Thousand Eight Hundred Only)

Date : 30/10/2019
Place : Nipani

ಗ್ರಂಥಪಾಲಕರು
ಜೆ. ಆಯ್. ಬಾಗೇವಾಡಿ
ಕೆಎಲ್ಇ ವಿಜ್ಞಾನ ಮತ್ತು ವಾಣಿಜ್ಯ ಕಲಾ ಮಹಾವಿದ್ಯಾಲಯ ನಿಪ್ಪಾಣಿ

Shri Tulaja Bhavani Plastic
Grinding & Scrap
Proprietor

This is certify that above mentioned amount is received to the library.

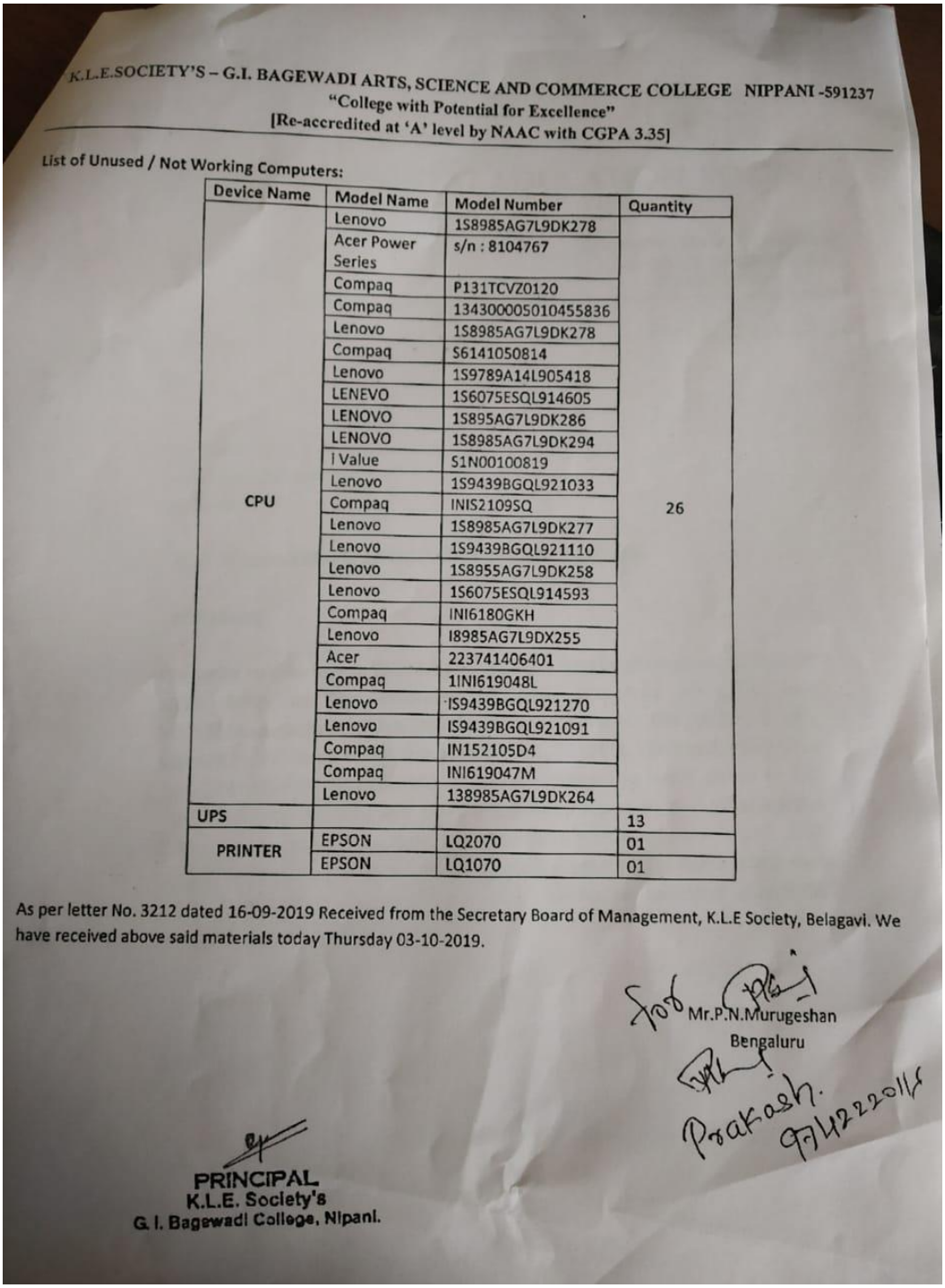
Bill copy
recd
4/11/2019

ಹಿರಿಯ ಗ್ರಂಥಪಾಲಕರು
ಜೆ. ಆಯ್. ಬಾಗೇವಾಡಿ
ಕೆಎಲ್ಇ ವಿಜ್ಞಾನ ಮತ್ತು ವಾಣಿಜ್ಯ ಕಲಾ ಮಹಾವಿದ್ಯಾಲಯ, ನಿಪ್ಪಾಣಿ.

Figure 2: Paper waste recycling certificate

4. E waste recycling:

All the E waste generated in Bagewadi college premises is recycled through Shiva Shakti Traders, Bengaluru.



K.L.E.SOCIETY'S – G.I. BAGEWADI ARTS, SCIENCE AND COMMERCE COLLEGE NIPPANI -591237
"College with Potential for Excellence"
[Re-accredited at 'A' level by NAAC with CGPA 3.35]

List of Unused / Not Working Computers:

Device Name	Model Name	Model Number	Quantity
CPU	Lenovo	1S8985AG7L9DK278	26
	Acer Power Series	s/n : 8104767	
	Compaq	P131TCVZ0120	
	Compaq	134300005010455836	
	Lenovo	1S8985AG7L9DK278	
	Compaq	S6141050814	
	Lenovo	1S9789A14L905418	
	LENEVO	1S6075ESQL914605	
	LENOVO	1S895AG7L9DK286	
	LENOVO	1S8985AG7L9DK294	
	I Value	S1N00100819	
	Lenovo	1S9439BGQL921033	
	Compaq	INIS2109SQ	
	Lenovo	1S8985AG7L9DK277	
	Lenovo	1S9439BGQL921110	
	Lenovo	1S8955AG7L9DK258	
	Lenovo	1S6075ESQL914593	
	Compaq	INI6180GKH	
	Lenovo	I8985AG7L9DX255	
	Acer	223741406401	
	Compaq	1INI619048L	
	Lenovo	IS9439BGQL921270	
	Lenovo	IS9439BGQL921091	
	Compaq	IN152105D4	
	Compaq	INI619047M	
	Lenovo	138985AG7L9DK264	
UPS			13
PRINTER	EPSON	LQ2070	01
	EPSON	LQ1070	01

As per letter No. 3212 dated 16-09-2019 Received from the Secretary Board of Management, K.L.E Society, Belagavi. We have received above said materials today Thursday 03-10-2019.

Mr.P.N.Murugeshan
Bengaluru
Prakash.
9742220115

PRINCIPAL
K.L.E. Society's
G. I. Bagewadi College, Nipani.

Figure 3: E waste recycling certificate

5. Disposal of hazardous waste:

The major source of hazardous waste in campus is the sanitary napkin waste generated in girl's hostels. The college has provided the facility of incinerator in girl's hostel and college for disposal of such waste.

Hazardous waste generated from the chemical laboratories during the use of acids and various chemicals. For disposal of this chemical discharge soak pit is provided in premises.

Figure 4: Soak pit for chemistry lab discharge

Figure 5: Incinerator

Key Observations:

- The average waste generated in the college is app. 408.2 Kg /month
- Highest quantity of solid waste is biodegradable waste around 330 Kg/month.
- Biodegradable waste is utilized properly for composting.
- Plastic waste is generated 18 Kg/month in the college campus. This generated waste is used to dump on open area followed by burning which causing loss of aesthetic beauty of premises and emission of harmful gases. To dispose plastic waste properly, this waste can be used for road construction along with other construction material.
- Segregation according to the categories of waste should be done at source of waste generation.
- The E- waste generated from damaged computers is given to the dealer for recycling.
- Cleanliness and hygienic conditions were maintained in the campus.

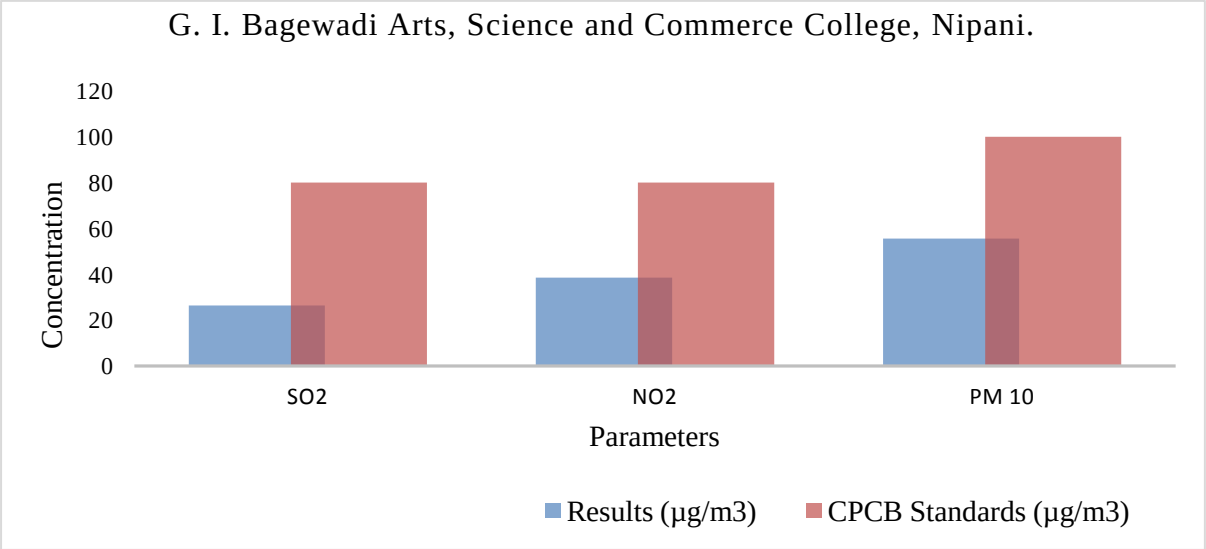
3.5. Air Quality Status:

Ambient air sampling is important part of environmental monitoring. Particulate matter and trace gases sampling were carried out on the college campus. The sampling was carried out using calibrated Handy Dust Sampler APM 821 with flow rate 1 lit/min equipped with glass fibre filter paper (size 25 mm). The sampling period was 4 hrs. Air monitoring was also done in last year 2018-19.

Sulphur dioxide (SO_2) and Oxides of Nitrogen (NO_2) in the air were estimated with West and Gaeke method and Jacob and Hochheiser modified method respectively. Particulate matter (PM_{10}) was measured gravimetrically. The samples were collected and analyzed in the laboratory of Department of Environmental Science, Shivaji University, Kolhapur. The details of air quality status in the college are given in the Table No. 3.14 and Graph No. 3.14.

Table No. 3.5.1. Ambient air quality status in G. I. Bagewadi Arts, Scince and Commerce College, Nipani.

Sr. No	Parameters	Results ($\mu g/m^3$)	CPCB Standards ($\mu g/m^3$)
1	SO_2	26.38	80
2	NO_2	38.56	80
3	PM $_{10}$	55.61	100



Graph No. 3.5.1 Ambient air quality status in G. I. Bagewadi Arts, Scince and Commerce college, Nipani.

The graph shows the SOx, NOx and PM10 concentration. The concentrations of the air pollutants are below the CPCB standards. It was observed that very few activities in the campus are responsible for air pollution. The green belt developed to reduce the air emission occurring through traffic on the road. Plantation present in the campus is playing a very important role in reducing the amount of carbon dioxide and making air clean.

Key Observations:

1. Prohibit burning mulch in the open.
2. Increase green cover.

3.6 Details of green inventory on college campus:

The modern world facing the biggest and toughest, still unsolved problem is Climate Change. The modern civilization in the earlier 21st Century comes with major concerned issues like population growth, food security, global warming, inequitable distribution of natural resources and poverty. The major concerns about the emission of Greenhouse Gases (GHGs) are unplanned civilization, industrialization, low cost products or lifestyles. CO_2 is the main contributor among these GHGs causing global warming. Atmospheric Carbon dioxide levels have increased to 409.8 parts per million till 2019. On this background, it is a need of time to cover the educational campuses with green cover interrelated with climate change as such campuses are spread in large areas.

The current observations are related to present status of tree cover, vegetation and carbon storage assessment of area under G.I. Bagewadi Arts, Science and Commerce College, Nipani, Karnataka. In the current time, institutional areas can play key role for sequestration, mitigation of carbon from their own area by various carbon reducing technologies. The institutional green cover acts as carbon sink. Carbon sequestration is a phenomenon of converting atmospheric carbon i.e. CO_2 in to other pools of carbon such as vegetation, soil, ocean, etc. in various forms to mitigate global warming. It is one of the important clauses of Kyoto Protocol.

The carbon sequestration potential of G.I. Bagewadi Arts, Science and Commerce College, Nipani, Karnataka was studied for the Green Audit preparation. Here tree census methodology has been adopted from the guidelines set by Indian Institute of Remote Sensing, Dehradun, Government of India. All the collected data is tabulated and analysed with the help of MS- Excel spreadsheets and objected findings were extracted by using various factors given by Intergovernmental Panel on Climate Change (IPCC).

3.6.1. Green inventory of G.I. Bagewadi Arts, Science and Commerce College, Nipani, Karnataka campus

G.I. Bagewadi Arts, Science and Commerce College, Nipani is located in Belagavi district of Karnataka state. Nipani is 597 m above sea level and located at 16.40° N 74.38° E. The Institute campus covers the total 11 acres area. Total 187 numbers of trees with more than 10cm girth and height more than 4 feet have been enumerated. The total 32 species of woody trees is identified during the visit. The campus has more native species of woody trees which is important aspect for the biodiversity. The inventory found highest number of *Azadirachta indica* on campus. The institute has planted trees having more potential of carbon sequestration. The Institute took the initiative for plantation of native plants which is

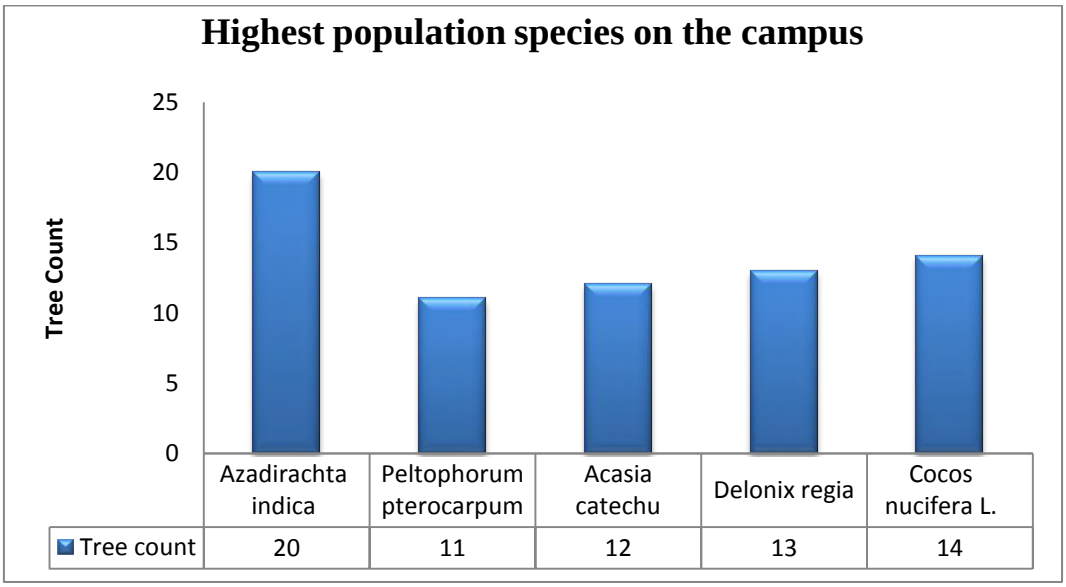
the best practice to conserve the local biodiversity. The institute have 26 species of fruit bearing plants which can be the good roosting spot for the native fruit eating birds as well as animals.

3.6.2 Species with highest population:

Table No-3.6.1 Species with Highest population

Sr. No.	Botanical Name	Common Name	Number
1	*Azadirachta indica*	Neem	20
2	*Cocos nucifera L.*	Coconut	14
3	*Delonix regia*	Gulmohar	13
4	*Hyophorbe lagenicaulis*	Royal Bottle Palm	12
5	*Terminalia catappa*	Wild Badam	12

During the inventory it is found that, *Azadirachta indica* is having highest population on the campus followed by *Cocos nucifera L.* and *Delonix regia* respectively.



Graph No.3.6.1 Highest population species on the campus

The species *Hyophorbe lagenicaulis* and *Terminalia catappa* have same count of population correspondingly on G.I. Bagewadi Arts, Science and Commerce College, Nipani campus.

3.6.3 Total biomass:

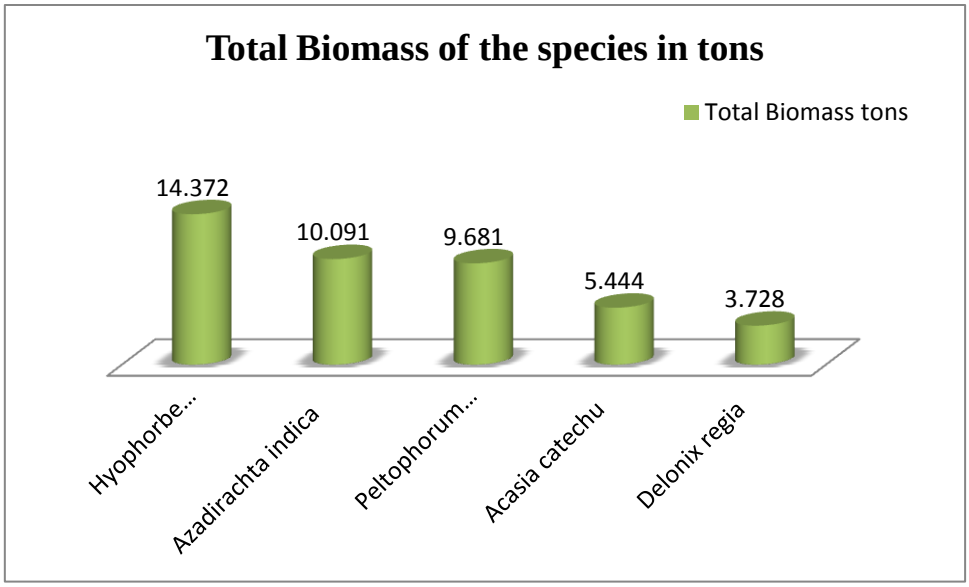
Biomass, in ecology, is the mass of living biological organisms in a given area or ecosystem at a given time. Biomass can refer to *species biomass*, which is the mass of one or more species, or to *community biomass*, which is the mass of all species in the community. It can include microorganisms, plants or animals. The mass can be expressed as the average

mass per unit area, or as the total mass in the community. The biomass includes branches, stem, fruits, roots and flowers of the individual tree. 71.28 tons of total biomass of woody vegetation has been recorded in G.I. Bagewadi Arts, Science and Commerce College, Nipani campus during the current tree census.

Table No-3.6.2 Total Biomass of trees in tons on the campus

Sr.No.	Botanical Name	Common Name	Total Biomass (Tons)
1	*Hyophorbe lagenicaulis*	Royal Bottle Palm	14.37
2	*Azadirachta indica*	Neem	10.09
3	*Peltophorum pterocarpum*	Copper Tree	9.68
4	*Acacia catechu*	Khair or Catechu	5.44
5	*Delonix regia*	Gulmohar	3.72

Hyophorbe lagenicaulis shows the highest biomass on the campus. Followed by *Azadirachta indica* and *Peltophorum pterocarpum* are rank at second and third place.



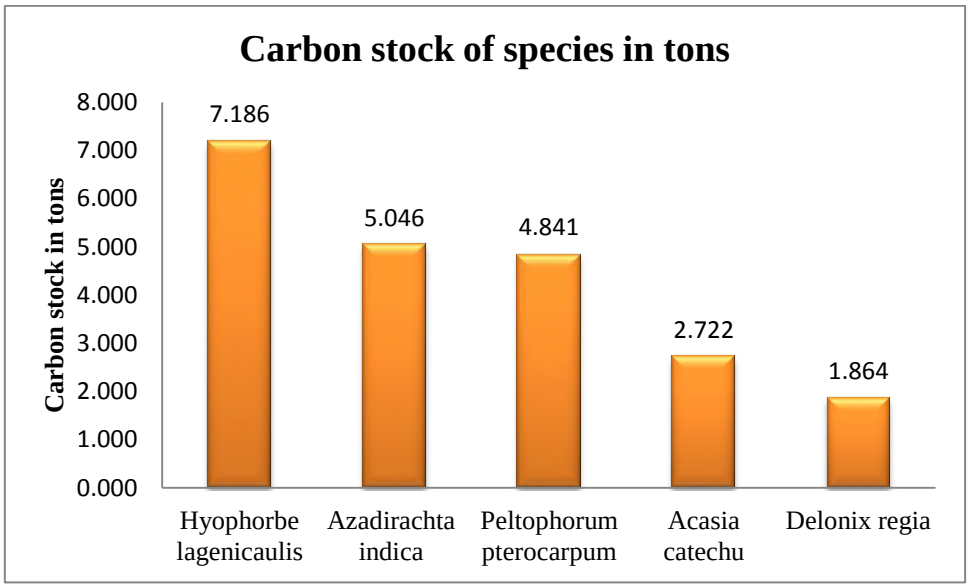
Graph No.3.6.2 Highest Total Biomass in tons

3.6.3 Carbon stock:

Forests and trees act as natural carbon stores, but this carbon is released when the trees are felled and the area deforested. The amount of carbon stored within an area of land varies according to the type of vegetation cover. The carbon sock is the amount of carbon stored in tree during the photosynthesis process. The total carbon stock is present on the campus is 35.64 tons.

Table No.3.6.3 Carbon stock of Trees in tones on the Campus

Sr.No.	Botanical Name	Common Name	Carbon stock (Tones)
1	*Hyophorbe lagenicaulis*	Royal Bottle Palm	7.18
2	*Azadirachta indica*	Neem	5.04
3	*Peltophorum pterocarpum*	Copper Tree	4.84
4	*Acacia catechu*	Khair or Catechu	2.72
5	*Delonix regia*	Gulmohar	1.86



Graph No.3.6.3 Highest carbon stock in tons

The highest carbon stock is recorded in *Hyophorbe lagenicaulis* followed by *Azadirachta indica* and Peltophorum *pterocarpum* respectively on the institute campus.

3.6.4 Carbon Sequestration:

Carbon sequestration describes long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming and avoid dangerous climate change. It has been proposed as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels. Vegetation carbon pool having the potential of 560 Pg (Pg: Petagram= billion ton) of carbon storage globally. In the current study the focus is given on the assessment of existing carbon stock stored G.I. Bagewadi Arts, Science and Commerce College, Nipani campus in the form of woody vegetation by enumerating every tree species. Overall 130.81 tons of CO_2 has captured and stored by the woody plants present in the college campus. A single tree consumes 0.0218 tons of CO_2 approximately

annually consequently, as the campus possess 187 mature woody plants on the campus total 4.07 tonnes of CO_2 is consumed yearly by all woody vegetation on the college campus.

3.6.5 Oxygen released:

Woody vegetation on G.I. Bagewadi Arts, Science and Commerce College, Nipani campus has released 349.26 tons of oxygen in their lifetime till date. Released oxygen is directly proportional to CO_2 sequestrate in the ratio of 32/12. Thus, it is supposed to release of oxygen annually. It is assumed that a single tree supports oxygen demand of two people for their life. Thus, woody vegetation of 187 trees in college campus is supporting 374 people in and around the campus.

3.6.6 Carbon sequestration potential of the campus in future:

The G.I. Bagewadi Arts, Science and Commerce College, Nipani currently nurtures the 96 trees having girth less than 10cm and height less than 4 feets. That will sequester 2.09 tons of atmospheric carbon dioxide annually. The total carbon potential of the campus in the future will be 6.16 tons annually.

3.7.8 Threats to the Green campus

The good efforts were taken by institution to maintain greenery on the campus. Though all the factors responsible for a good ecosystem are in good condition, need to be considered by the Institute to avoid the damage to ecosystem in the future. The threats are as follows:

3.6.8.1 Fire events near the woody vegetation on the campus:

During the tree census visit, fire event was observed near the woody vegetation on the campus. The fire event is made for the incineration of solid waste as well as dead carbon stock. These kinds of fire events can lead to immense fire accidents like wildfire on the campus. The campus posses grass hat can be eventually medium for wildfire during the summer season. Such type of acts can be lead to the loss of biodiversity on and around the campus in the future.

Fire events near the woody vegetation

3.6.8.2 Improper storage of dead carbon stock on the campus:

The institute should properly store dead carbon stock i.e. dead trees. The dead carbon stock was kept near the fire events which can release much amount of carbon into the atmosphere by burning.

Improper storage of dead carbon stock

3.6.9. Plant diversity on the campus:

The campus is rich in plant diversity. The campus posses total 13 species of sacred plants including *Santelum album*, *Phyllanthus emblica, Acacia catechu, Aegle Marmelose*. Total 150 species of medicinal plants including shrubs and herbs were recorded in the year 2015-16 on the college campus as per the college record documents. The campus includes *Curcuma domestica* (Turmeric), *Clitoria ternatea* (Shankhapushpi), *Centella asiatica* (Brahmi), *Ocimum sanctum* (Holy Basel), *Rauwolfia serpentine Benth* (Serpagandha) and *Withania somnifera* (Ashwagandha) etc. The campus has 25 species of fruit bearing plants. These fruit bearing plants can be great hosting venues for the native biodiversity in and around the campus.

3.6.10 Scope of Area:

The institute is having large area with good proportion of vegetation. The leaf litter can be converted into compost by using the vermicomposting plants available on the campus can store the carbon in the form of organic carbon. Currently the vermicomposting plant is working on small scale but it can be run on large scale by using leaf litter available on the campus. This compost can lead to increase in the soil fertility on the campus area.

Key Observation:

- Absence of fire lines can cause fire disaster on the Campus.
- The Institute take good initiative for green cover by planting fruiting and medicinal plants.
- Improper storage of dead carbon stock.
- Fire events near woody vegetation will be threat to vegetation on the campus as well as direct anthropogenic source of CO_2 emission.
- Well maintained vegetation on campus.

3.7 Electricity and energy audit:

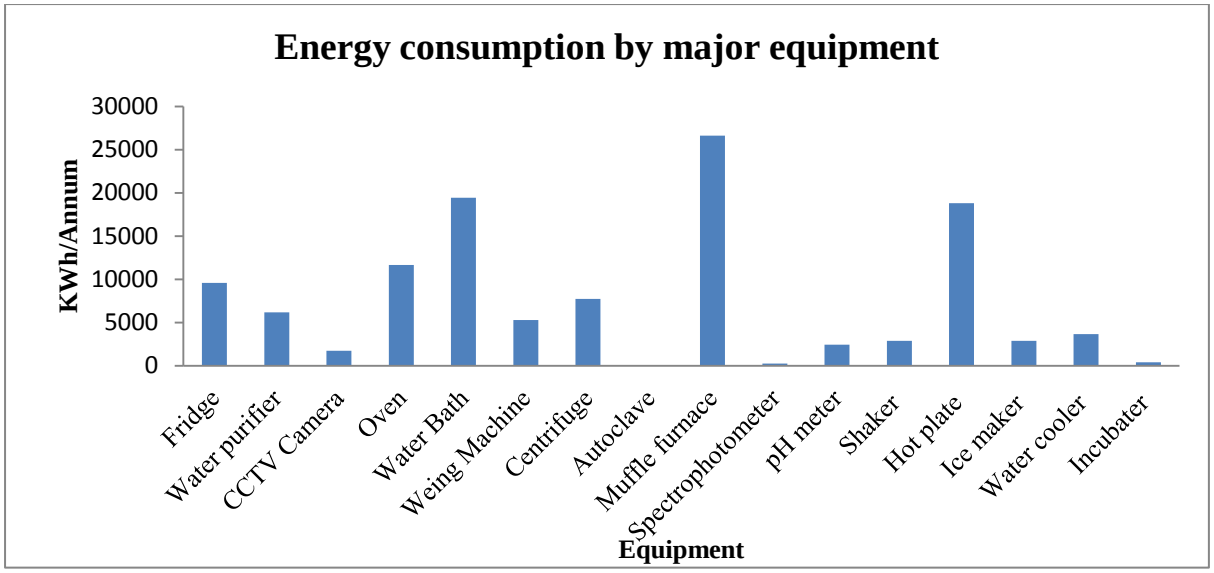
Energy sources utilized by all the departments, support services of G. I. Bagewadi Arts, Science, and Commerce College include electricity and liquid petroleum. Major use of the energy is at office, canteen, hostel and laboratories, for lighting, transportation, cooking and workshop instruments. Electricity is supplied to the college campus by Karnataka State Electricity Board also.

3.7.1 Energy consumption:

Electricity is utilized at all departments like Science, Commerce, and Arts. In the Science Departments several types of equipment are used in laboratory and some of them are run every day for 24 hrs. The calculations are based on the data provided by the college and actual observations taken at the site. The collected data shows all departments in the college have maximum number of major energy consuming equipments and energy consumption is 1, 19,724.8 KWh/ Annum.

Table No.3.7.1: Energy consumed per annum by major instruments in all the departments in the college

Sr. No.	Equipment	Number	KWh/Annum
1	Fridge	4	9,600
2	Water purifier	7	6,182.4
3	CCTV Camera	34	1,749.504
4	Oven	4	11,673.6
5	Water Bath	4	19,456
6	Weighting Machine	12	5,299.2
7	Centrifuge	1	7,752
8	Autoclave	2	7.296
9	Muffle furnace	2	26,624
10	Spectrophotometer	1	268.8
11	pH meter	3	2,448
12	Shaker	2	2,880
13	Hot plate	4	18,816
14	Ice maker	3	2,880
15	Water cooler	8	3,680
16	Incubator	2	408
	Total	**93**	**1,19,724.8**



Graph No.3.7.1: Energy consumed per annum by major instruments at all departments in the college

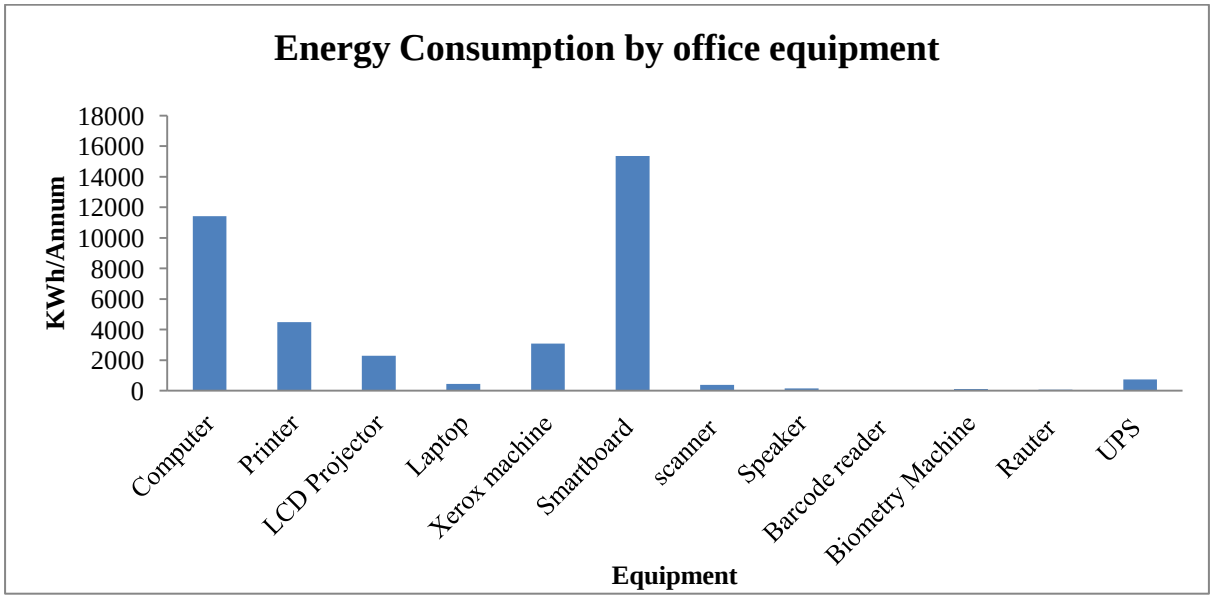
Major energy consuming equipment's at all departments consume electricity 1,19,724.8 KWh/Annum. As major energy consuming equipments, number of Muffle furnace is (2) than other equipment's and hence, energy consumed by major energy consuming equipments is also maximum i.e. 1, 19,724.8 KWh/ Annum. During the analyses it is observed that Number of Muffle furnace including all departments is 2 and it consumes highest energy i.e. 26,624 KWh/ Annum. Followed by Water bath 19,456 KWh/Annum, Hot Plate 18,816 KWh/Annum, Water purifier 6,182.4 KWh/Annum, and Water Cooler 3,680 KWh/Annum, CCTV Camera 1,749.504KWh/Annum respectively.

Similarly, to analyse the electricity consumption of office equipment's computers, printers, laptops were also considered for the calculation.

Table No. 3.7.2: Office equipments and their energy consumption (KWh/Annum) at all departments in the college

Sr. No.	Equipment	Number	KWh/Annum
1	Computer	68	11,424
2	Printer	28	4,480
3	LCD Projector	6	2,284.8
4	Laptop	8	430.08
5	Xerox machine	2	3,072
6	Smart board	8	15,360

7	Scanner	2	384
8	Speaker	12	139.776
9	Barcode reader	2	0.0256
10	Biometry Machine	1	96.768
11	Router	4	65.28
12	UPS	20	742.56
	Total	**161**	**38,479.29**



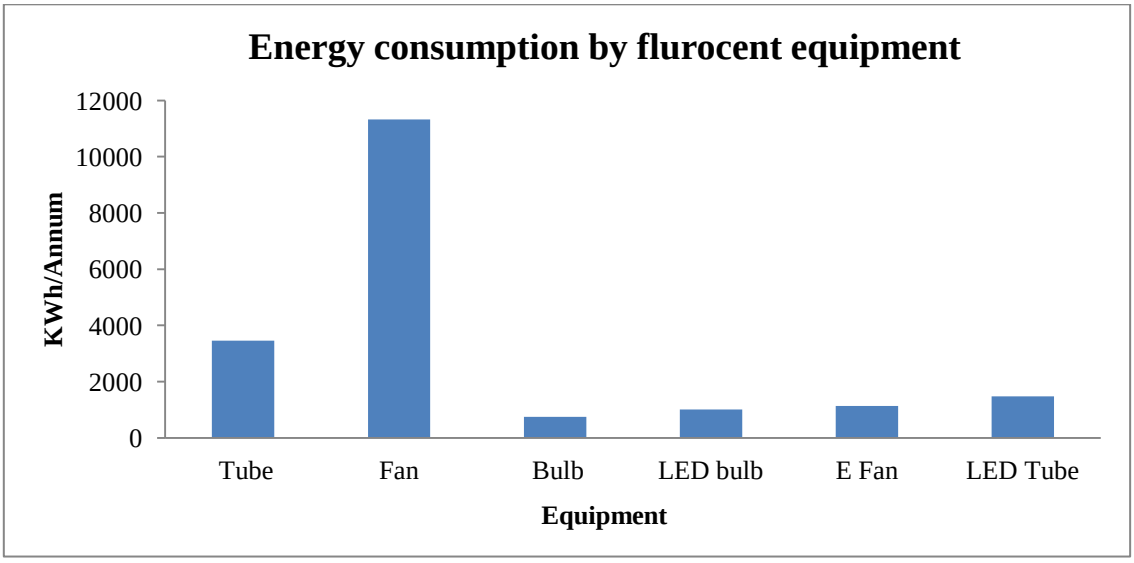
Graph No. 3.7.2: Office equipment's and their energy consumption (KWh/ Annum) at all Departments in the college

All the office equipments in every department's consume energy is 38,479.29 KWh/Annum. As office equipment, number of computers is (68) than Printers, Laptops, LCD projectors and Xerox machine hence the energy consumed by Smart board is also maximum i.e. 15,360 KWh/Annum followed by Computer 11,424 KWh/Annum, Printers 4,480 KWh/ Annum, LCD Projectors 2,284.8 KWh/Annum, respectively.

Similarly, to analyze the electricity consumption, lights and fans were also considered.

Table No. 3.7.3: Number of fluorescent tubes, bulbs and fans and their energy consumption (KWh/ Annum) at all departments in the college

Sr. No.	Equipments	Number	KWh/Annum
1	Tube	135	3,456
2	Fan	118	11,328
3	Bulb	42	752.64
4	LED bulb	35	1,008
5	E Fan	13	1,131.52
6	LED Tube	60	1,474.56
	Total	**403**	**19,150.72**



Graph No.3.7.3: Number of fluorescent Tubes, bulbs and fans and their energy Consumption (KWh/ Annum) at all departments in the college

Maximum use of energy is for lightning and fans in all the buildings. The total number of fluorescent tubes is 135 and their electricity consumption is 3,456 KWh/Annum. In the building total number of ceiling fans and LED bulbs are 35 and their electricity consumption for Fan (118) 11,328 KWh/Annum and LED Tube (60) 1,474.56 KWh/Annum, Exhaust Fan (E fan) 1,131.5 KWh/Annum respectively.

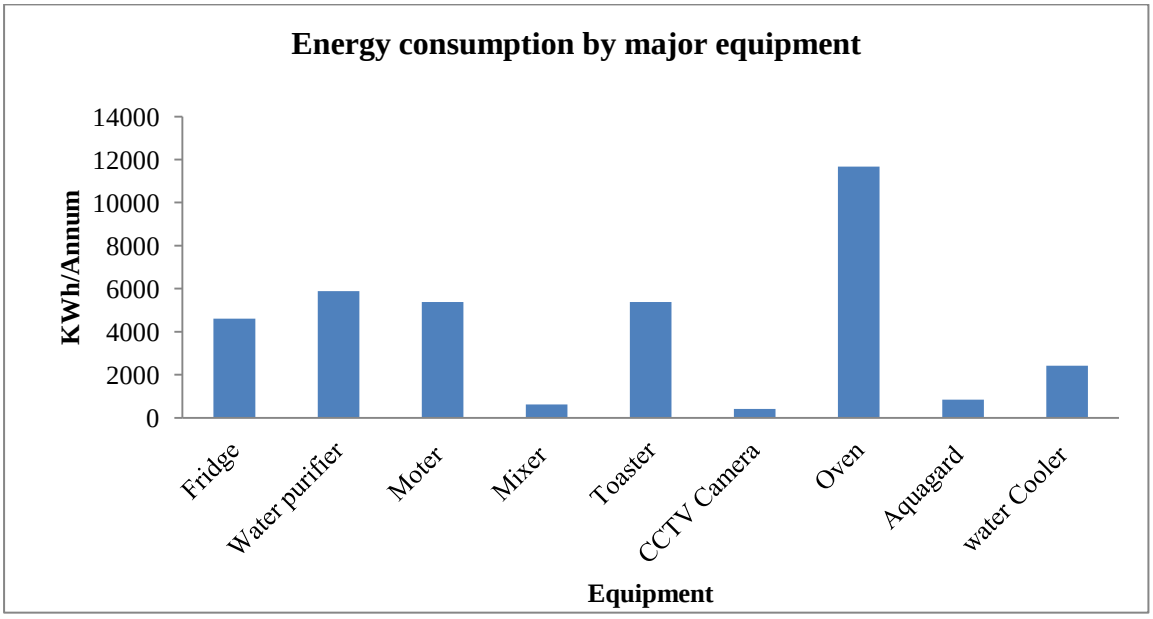
3.7.3 Energy consumption at Support services:

Support services includes – Ladies hostel, Boy's hostel, Canteen, Gymkhana, Library, Quarters, guest house, campus. The collected data shows the Support services have

maximum number of major energy consuming equipments and energy consumption is. 37,202.64 KWh/ Annum.

Table No.3.7.4: Energy consumed per Annum by major instruments at Support services

Sr. No.	Equipment	Number	KWh/Annum
1	Fridge	2	4,608
2	Water purifier	4	5,888
3	Motor	5	5,376
4	Mixer	4	614.4
5	Toaster	4	5,376
6	CCTV Camera	8	411.648
7	Oven	4	11,673.6
8	Aquagard	20	840
9	Water Cooler	5	2,415
	Total	**56**	**37,202.648**



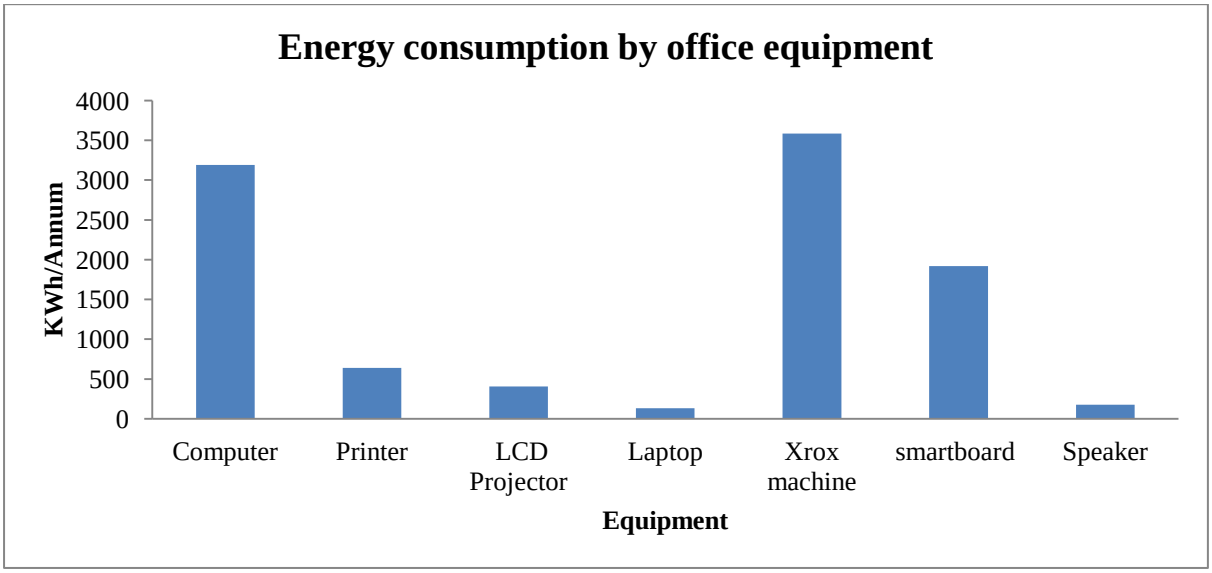
Graph No.3.7.4: Energy consumed per Annum by major instruments at support Services

The major energy consuming equipments at Support services consume energy 37202.648 KWh/Annum. In the Canteen the energy consumption is 4,608 KWh/ Annum by 2 fridges, followed by Oven 11,673.6 KWh/Annum, water purifier 5,888 KWh/Annum, Toaster 5,376 KWh/Annum, Motor 5,376 KWh/Annum, Water Cooler 2,415 KWh/Annum, Mixer 614.4 KWh/Annum, and Aqua guard 840 KWh/Annum respectively.

Similarly, to analyze the electricity consumption of office equipments computers, printers, laptops were also considered from support services.

Table No 3.7.5: Office equipments and their energy consumption (KWh/Annum) at support services.

Sr. No.	Equipment	Number	KWh/Annum
1	Computer	19	3,192
2	Printer	4	640
3	LCD Projector	2	408
4	Laptop	2	134.4
5	Xerox machine	2	3,584
6	Smart board	1	1,920
7	Speaker	12	174.72
	Total	**42**	**10,053.12**

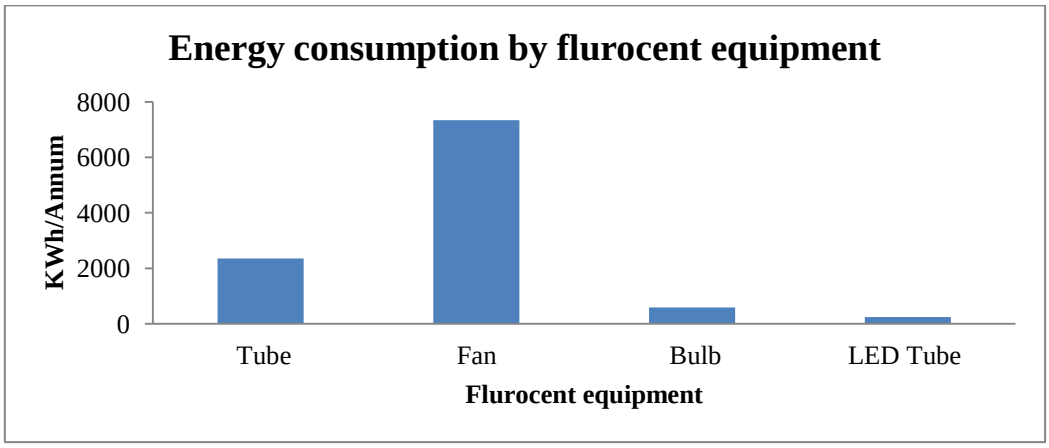


Graph No. 3.7.5: Office equipment's and their energy consumption (KWh/ Annum) at Support services.

Office equipments at Support Services consume energy 10,053.12 KWh/Annum. Office equipment, number of computers is (19) highest as compared to Printers, Laptops, LCD projectors and Xerox machine. The energy consumed by computers is also maximum i.e. 10,053.12 KWh/Annum, Xerox machine 3,584 KWh/Annum followed by smart board 1,920 KWh/Annum, Printers 640 KWh/ Annum, Laptop 134.4 KWh/Annum. Similarly, to analyze the electricity consumption, lights and fans were also considered.

Table No. 3.7.6: Number of fluorescent tubes, bulbs and fans and their energy Consumption (KWh/ Annum) at support services

Sr. No.	Equipment's	Number	KWh/Annum
1	Tube	55	2356.2
2	Fan	36	7344
3	Bulb	18	587.52
4	LED Tube	15	244.8
	Total	**124**	**10532.52**

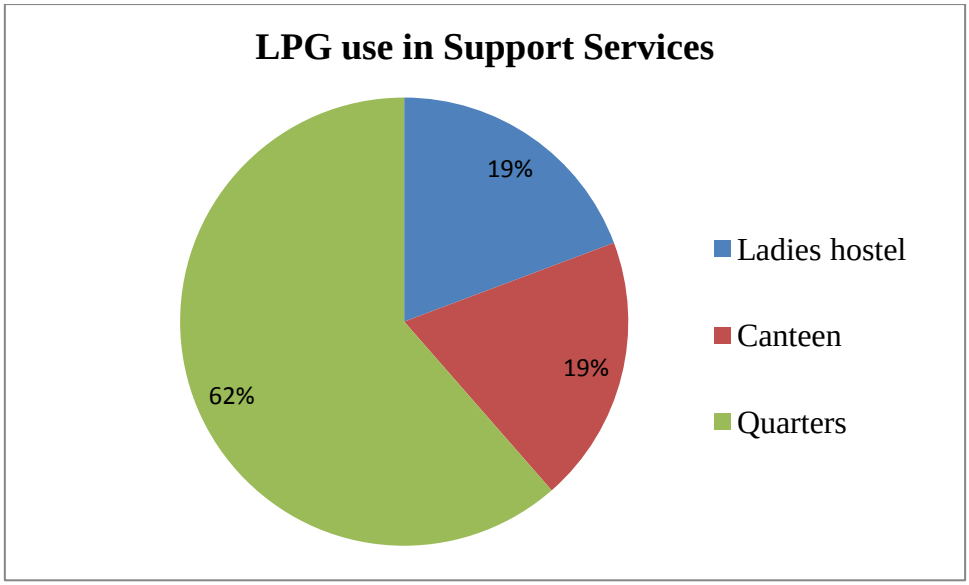


Graph No.3.7.6: Number of fluorescent Tubes, bulbs and fans and their energy consumption (KWh/ Annum) at support services

Maximum use of energy for lightning and fans occurs in the support services building. The total number of fluorescent Tubes is 55 and their electricity consumption is 2,356.2 KWh/Annum. In the support services, total number of ceiling fans and their electricity consumption were respectively i.e. Fan (36) 7,344 KWh/Annum and Bulb (18) 587.52 KWh/Annum, LED Tube (15) 244.8 KWh/Annum.

Table No.3.8.3g LPG Use in Support Services

Sr. No.	Support Services	kg/annum
1	Ladies hostel	156
2	Canteen	156
3	Quarters	497
	Total	**809**



Graph No. 3. 8. 3g LPG Use in Support Services

Maximum LPG is used in Support services i.e Hostels, Canteen, Quarters. LPG is used as a fuel for cooking purpose in canteen. The total number of LPG Cylinder required was 59 and their consumption is 809 kg/Annum. In the Support services, LPG Gas consumption respectively i.e. in Quarters 497 kg/Annum (62%), Ladies hostel 156 kg/Annum (19%), Canteen 156 kg/Annum (19%), respectively (Graph No. 3.10). This is might be effect of lockdown days. During lockdown period hostels and college canteen was closed.

Key Observations:

- The total energy consumption of college is 2,31,145.53 KWh/Annum
- Highest consumption of energy is by equipments i.e. 1, 19,724.8 KWh/Annum.
- The energy consumption of equipments is more than office equipments and fluorescent lamps.
- Electricity and LPG consumption is less because college, canteen, and hostel were closed due to the Covid pandemic situation.

Chapter IV
CONCLUSION AND MANAGEMENT PLAN

The Department of Environmental Science, Shivaji University, Kolhapur has conducted a Green Audit of G. I. Bagewadi Arts, Science and Commerce College, Nipani in the academic year 2020-21. Green auditing is the process of identifying and determining whether institution practices are eco-friendly and sustainable. The main objective of college to carry out green audit is to check green practices followed by college and to conduct a well formulated audit to understand where we stand on a scale of environmental soundness.

Conclusions:

From the green audit conducted by team following are some of the conclusions which can be taken for improvement of the college campus to become environment friendly college campus:

1. College takes efforts to dispose majority waste by using proper methods.
2. Confidential paper waste is disposed properly.
3. Glass waste is to be disposed properly.
4. Electricity consumption is more at some departments.
5. Use of CFL lamps in the college is minimum. Its use should be encouraged and now converted to LED lights.
6. Toilets and bathrooms are consuming more water.
7. Roof top rain water harvesting should be expanded which is useful for filling up of tanks on campus.
8. E-waste segregation, handling and disposal are properly done.
9. Practice of waste segregation to be initiated.
10. Air quality on the campus is good.
11. College can conduct more seminars, group discussions and eco-friendly activities on environmental education and awareness

Recommendations:

Following are some of the key recommendation for improving campus environment.

1. College should develop its own Environmental Policy by using guidelines given in Green Audit document.
2. The data related to all measured environmental parameters should be monitored and recorded regularly and information be made available to administration.
3. The college should develop internal procedures to ensure its compliances with environmental legislation and responsibility be fixed to carry out it in practice.
4. Wherever possible the waste should be reused or recycled.
5. All street lighting should be changed to LED lights to save electricity.
6. Rain water harvesting facility must be expanded
7. Drip irrigation for gardens and vegetable cultivation can be initiated.
8. Practice of waste segregation to be initiated.

ENVIRONMENT MANAGEMENT PLAN:

By understanding the dynamics of present situation of resource utilization and current practices of waste disposal we have prepared an Environment Management Plan (EMP) for the G. I. Bagewadi Arts, Science and Commerce College, Nipani. This plan not only will provide the strengths, weaknesses and remedies for the green and clean campus but also give priority of the sector where the college has to give more efforts to improve its environment.

Environment Management Plan 2020-21

Sector	Strengths	Weakness	Suggestions	Priority
Solid Waste				
Paper	• Use of one-sided papers in many departments and main building	• Multiple numbers of copies required for office work.	• Towards paperless office: More use of e-mails, e-money transfer and advance IT technology for communication.	Medium
Plastic	Reuse of plastic at some departments	• Plastic thrown with general waste in many departments	• Segregation of waste at the source and sending plastic waste for recycling. • Ban on Plastic carry bags in College premises.	Medium
Biodegradable waste	• Solid waste generated • College has its vermicomposting plant • Hostels are equipped with incineration facility for sanitary napkins.	• Solid waste is to be segregated at the source	• Segregation of solid waste help in composting process	Medium
Energy				
Electricity		• Unnecessary use of lights, fans and computers at some places when no one is using it. • More awareness is required	• Employment of more solar panels and other renewable energy sources. • Electrification of street lights by solar power. • Use of solar	Medium

		among students.	pumps for water tanks. • General awareness about electricity saving.	
Fuel	• Use of public Transport system is comparatively more by staff and students	• More awareness is required among students.	• Initiation of No vehicle day on campus • 'Cycle on rent' service for student • General awareness about efficient use of fuel.	Medium
Water				
Water utilization	• College has potential of Rain water harvesting.	• Overflowing of tanks at some places • Overuse of water at toilets.	• Installation of automatic water pumps to avoid overflowing losses • Proper and timely maintenance of plumbing at all departments • Installation of rain water harvesting assembly.	Medium
Waste water	• Septic tanks present for sewage treatment • Soak pit is present near laboratory	• Untreated laboratory effluent and other waste - water. It percolates into soil and may contaminate ground water.	• Installation of small scale STP to treat laboratory waste and toilet flushing.	High
Hazardous Waste				
E-waste	• E waste is sent to E waste collection centre at Bengaluru.	• E waste related to computer and its parts are only collected.	• There must be segregation of e-waste from regular waste and also among the e-waste. • E-waste in all forms not only computers, should be collected properly	High

Air				
Air	• Air quality is in good condition. There is no sound pollution	• Considering the future student population, there may be air and noise pollution	• The plantation can be increased by vertical gardening.	Medium
Tree Census				
Tree Vegetation	• There is lots of space for plantation	• Less plantation on campus	• Avoid monoculture, variety of species should be planted in campus area	Medium

Plantation ceremony

Visit of Green audit team of Shivaji University to G. I. Bagewadi Arts, Science and Commerce College, Nipani.

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Prepared by
Department of Environmental Science,
Shivaji University, Kolhapur-416 004

GREEN AUDIT REPORT

2019-20

in compliance with the statutory requirements under the NAAC accreditation procedures

Audited by:

Principal Lead Auditor:
Mallikarjun A Kambalyal. CEA, ISO 50001, 14001 Lead Auditor.

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Contents

CARBON FOOTPRINT - GREEN PLEDGE (PROPOSED)

We the Principal, the staff and students, adopt responsible practices in our daily activities with due regard to the environment. We set and continually review objectives and targets for achieving our goal to protect our entire college premises in front, backyard and all other non-approachable areas of all primary and secondary pollutions.

We seek to compile with safety and environmental regulations to implement inhouse standards to improve our environmental performance. We commit ourselves to the safe operation of all our working habits, be it in classrooms, library, canteen, on road, off road, in-campus out-campus as well as at our place of stay. We adhere to reduce environmental load by efficiently using resources, saving energy, reducing waste, encouraging material recycle, with special emphasize to minimising emissions of greenhouse gases, ozone depleting substance and particle matter.

We endure to minimise environmental loads and adopt environmentally friendly technologies when ordering and purchasing necessary products and resources. We endure to attend educational programs and promulgate our close friends and colleagues to follow suite We endure to ensure that we recognize the essence of this Green policy by actively and aggressively conducting workshops and training to all in environmental concepts. We make wide ranging social contribution to close association with the students, teaching staff, administrative staff, housekeeping staff by disclosing environmental information and supporting environmental consumption.

-Sd-

Principal

(*Indicative templet for display at all prominent areas, waiting rooms, canteen, library, relaxing areas in the campus.*)

EXECUTIVE SUMMARY.

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
1	Differently abled children.	Committee to monitor and arrange the basic needs like commutation, sitting arrangements, washroom for these special children.				
2	Girl children	To provide safe and dignified study time by providing health safety provisions in the campus.				
3	Green Commute	To promote green commute within the campus and also outside the campus.				
4	Green energy concept	College has kickstarted an initiative of lab testing the Solar thermal energy (Fresnel concentrating solar)				
5	Work culture	Self-imposed discipline brings out the best results. Avoids accidents, saves time.				
6	Paperless office.	On considering the present scenario, it is advised to communicate with No-Contact and safe distance method. This is possible under Paperless office method.				
5	Solid Waste Management	Spilling of waste	Dirty used packages in and around the college	Incorporate need for cleanliness and place waste collection bins.	Rs.4500 /- per set	Reduced cleaning hours and good hygienic conditions.
6	Outreach	Share the knowledge by example, by demonstration, by habitual practice.				

***Criteria* 7.1.6**

GREEN AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the Green Audit has been carried out on 20th Jan 2020 under the instructions of Dr.M.M. Hurali Principal, KLE Society's G.I.Bagewadi Arts,Science and Commerce College, Nipani-591237 Dist:Belagavi, Karnataka, India

This report is generated based on the site visits and evidence collected from the site.

All attempts have been made to evaluate the scope for development and inculcate green practices in the campus and extended throughout the campus. The focus is also laid to make positive impact on the society for a better living.

I also confirm and sign this certificate, in case the institution needs demonstration, my team of professionals shall be happy to do so.

We present this report to much more than the legal or mandatory compliances. This report is tabled in two parts. The first forms the core discussions which are general in nature. The second section is subject specific under the statutory requirements of the NAAC accreditation norms. They are Audit reports on, Green aspects, Energy aspects, Environment aspects, Health aspects and the discussions on net CARBON FOOTPRINT & the CARBON HANDPRINT initiatives.

Any modifications, changes, omissions after the site visit shall be exclusive.

Authorised Auditor.

Mallikarjun A. Kambalyal B.E (E&C)

Certified Energy Auditors EA-3485& ISO 50001:2011 & ISO14001:2015 Lead Auditor.

BUREAU OF ENERGY EFFICIENCY

Examination Registration No. : EA-3485 Serial Number 2838

Certificate Registration No. : 2838

Certificate For Certified Energy Manager

This is to certify that Mr./Mrs./Ms. Mallikarjun A Kambalyal Son/Daughter of Mr./Mrs. Andanappa V Kambalyal who has passed the National Examination for certification of energy manager held in the month of April 2006 is qualified as certified energy manager subject to the provisions of Bureau of Energy Efficiency (Certification Procedures for Energy Managers) Regulations, 2010.

This certificate shall be valid for five years with effect from the date of award of this certificate and shall be renewable subject to attending the prescribed refresher training course once in every five years.

His /Her name has been entered in the Register of certified energy manager at Serial Number 2838 being maintained by the Bureau of Energy Efficiency under the aforesaid regulations.

Mr./Mrs./Ms. Mallikarjun A Kambalyal is deemed to have qualified for appointment or designation as energy manager under clause (*l*) of Section 14 of the Energy Conservation Act, 2001 (Act No.52 of 2001).

Given under the seal of the Bureau of Energy Efficiency, this 7th day of February, 2013

Secretary
Bureau of Energy Efficiency
New Delhi

Dates of attending the refresher course	Secretary's Signature	Dates of attending the refresher course	Secretary's Signature
28.01.2020			

Bureau of energy Efficiency Regd No: EA3485

Certificate of Successful Completion

Intertek

This is to Certify that

MALLIKARJUN A KAMBALYAL

has successfully completed the

Intertek

CQI & IRCA Certified ISO 14001:2015
Auditor Conversion Training Course

The Course includes the assessment and evaluation of Environmental Management Systems to conform to the requirements of ISO 14001:2015 and ISO 19011:2011

This course is certified by the Chartered Quality Institute (CQI) and the International Register of Certificated Auditors (IRCA)
– IRCA REFERENCE 18093 –

The course meets the training requirements for individuals seeking certification under the IRCA Auditor Certification Schemes

CQI | IRCA
APPROVED TRAINING PARTNER

Authorising Signature:

Course Dates: 14th – 16th July 2017 Certificate Number: 47730

Membership Application To Be Made Within 3 Years From Last Day of Course

ISO Certified Lead Auditor. Certificate No: 47730

bsi.

By Royal Charter

BSI Training Academy

This is to certify that

Mallikarjun A. Kambalyal

has attended and passed

Energy Management Systems (ENMS) Auditor/Lead Auditor Training Course
(ISO 50001:2011)

Premanand Ramakrishnan, Director of Training

Date: 14/04/2016 - 18/04/2016

Certificate Number: ENR-00253448

This certificate is valid for 3 years from the date above for the purpose of registering as an auditor with IRCA.

Course number A17583 certified by IRCA

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The British Standards Institution is incorporated by Royal Charter
BSI India, The Mira Corporate Suites (A-2), Plot 1 & 2 Ishwar Nagar Mathura Road, New Delhi 110065, India Tel: +91 11 2692 9000

ISO Certified Lead Auditor. Certificate No: ENR-00253448

nly appropriate instruments will used wherever necessary.

ONGOING STATUS:

It's an optimistic & highly dedicated team effort lead by the Principal & the senior staff who have dedicated all their wits & free time to initiate Green Carpet the entire college premises. It is also a fact that there do exist few short comings which however is unintentional & on being trained & educated the campus should look for continued minimized waste generation. With all due appreciation to the management , staff involved & co operation by the students, we have made few suggestions which on implementation, will reduce, demand for water & electrical power. It will also reduce the existing level of pollution to bear minimum.

NO WASTE – NO POLLUTION – NO HEALTH HAZARD.

DISCUSSIONS ON EXECUTIVE SUMMARY.

Sr	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
	Differently abled children.	Committee to monitor and arrange the basic needs like commutation, sitting arrangements, washroom for these special children.				

GREEN AUDIT - Observations/Recommendations.

The institute has many short comings in meeting the requirements of the Physically challenged people. The college to setup a committee on immediate basis and come up with the action plan.

The check list is enclosed for compliance in line with the NAAC requirements under the 7th Criteria.

Disabilities for Differently Abled.

This section needs to be self-evaluated by constituting an internal team.

The corrective measures would take time but a move towards the implementation would be appreciated.

NAAC co-ordinating team may please look into the aspects and act.

Need to form an inhouse committee on making the campus disabled friendly. A clear task is necessary and the required check list is presented for compliance.

Before we conduct check on compliance,

A Brief note on Green Audit.

Please refer to http://www.disabilityindia.co.in/ for more information.

The green audit primarily lays focus on Energy use, its impact on environment and remedial measures.

It is equally focused on ways of making life of differently abled persons easy and readily adoptable to changing working environment.

Every citizen has to feel self-sufficient on economic front and self-reliant on meeting his daily chores.

While we have discussed elaboratively on Energy and Environmental aspects in the connecting audit reports, let us understand how we can focus on making differently abled life more meaningful Thus, the special focus.

Disabilities for Differently Abled.

In order to develop awareness in the higher education system and also to provide necessary guidance and counselling to differently-abled persons, it is expected that the Institutes

Facilitate admission of differently-abled persons in various courses.

Provide guidance and counselling to differently abled individuals.

Create awareness about the needs of differently abled persons and other general issues concerning their learning

Assist differently-abled graduates to gain successful employment in the public as well as private sectors.

The major functions of the institution should be,

- To provide counselling to differently - abled students on the types of courses they could study at the higher education institutions.
- To ensure admission of as many differently-abled students as possible through the open quota and also through the reservation meant for them.
- To gather orders dealing with fee concessions, examination procedures, reservation, policies, etc., pertaining to differently-abled persons.
- policies, etc., pertaining to differently-abled persons.
- To assess the educational needs of differently abled persons enrolled in the higher education institutes to determine the types of assistive devices to be procured.
- To conduct awareness programmes for teachers of the institute about the approaches to teaching, evaluation procedures, etc, which they should address in the case of differently-abled students.

- To study the aptitude of differently-abled students and assist them in getting appropriate employment when desired by them after their studies.
- To celebrate important days pertaining to disability such as the World Disabled Day, White Cane Day, etc., in the institute and also in the neighbourhood in order to create awareness about the capabilities of differently-abled persons.
- To ensure maintenance of special assistive devices procured by the higher education institute under the HEPSN scheme and encourage differently-abled persons to use them for enriching their learning experiences.
- To prepare annual reports with case histories of differently-abled persons who are benefited by the HEPSN scheme sanctioned to the higher education institute.

Providing Access to differently-abled persons

It has been felt that differently-abled persons need special arrangements in the environment for their mobility and independent functioning. It is also a fact that many institutes have architectural barriers that disabled persons find difficult for their day-today functioning. The colleges are expected to address accessibility related issues as per the stipulations of the Persons with Disabilities Act 1995, and ensure that all existing structures as well as future construction projects in their campuses are made disabled friendly. The institutes should create special facilities such as ramps, rails and special toilets, and make other necessary changes to suit the special needs of differently-abled persons. The construction plans should clearly address the accessibility issues pertaining to disability. Guidelines on accessibility laid out by the office of the Chief Commissioner of Disabilities.

Providing Special Equipment to augment Educational Services for Differently abled Persons

Differently-abled persons require special aids and appliances for their daily functioning. These aids are available through various schemes of the Ministry of Social Justice and Empowerment. In addition to the procurement of assistive devices through these schemes, the higher education institute may also need special learning and assessment devices to help differently-abled students enrolled for higher education. In addition, visually challenged students need Readers. Availability of devices such as computers with screen reading software, low-vision aids, scanners, mobility devices, etc., in the institutes would enrich the educational experiences of differently-abled persons. Therefore, colleges are encouraged to procure such devices and provide facility of Readers for visually challenged students.

INTERNAL AUDIT GUIDELINES.

Audit Process

This section discusses the planning and implementation of the actual audit. The planning for the audit should cover:

- The core audit team
- Media management
- Overall coordination

Core Audit Team

- The audit team should assemble outside the venue in advance to discuss the process of the audit.
- The attendance sheet should be signed by all the members of the assembled team.
- The team members should know the parts of the building they are to audit.
- The appropriate part of the audit checklist should be used for each section of the building audited. It is important to address each item of the checklist.
- The group should assess the area taking all kinds of disability into account.
- The photographer must be briefed and be guided by a member of the core audit team.
- The results of the different parts of the audit must be compiled.
- The audit team should meet the authorities of the organization, with the media, to inform them of the findings of the audit and submit a representation. The team must get a commitment to incorporate the changes necessary to make the building disabled-friendly.

MEDIA MANAGEMENT

The media members should be asked to assemble at one place from where they will be transported to the venue of the audit or they should assemble at the site of the audit. A person must be appointed to coordinate with the media. A press briefing should be held and the media provided with a press kit. The media must be invited to join the team when it submits its representation to the head of the organization.

OVERALL COORDINATION

Since the audit process involves many people, a well-defined programme for the audit has to be drawn up. The following must be kept in mind:

- A schedule. A person should be nominated to monitor adherence to the planned programme.
- A designated Coordinator for overall synchronization of the audit goals

The following items must be carried by the audit team:

- copies of the audit checklist
- pens and hard boards
- attendance sheets
- copy of The Disability Act, 1995
- awareness materials
- copy of the representation to be submitted to the organization audited
- press kits

POST AUDIT REPORTING AND FOLLOW-UP

The reporting of the audit is in 2 parts:

a. Report on the building being audited, for submission to the organization which houses the building; and

b. Complete report containing all the details relevant to the entire audit exercise.

REPORTS TO BE SUBMITTED TO THE ORGANIZATION AUDITED

The data collected during the audit must be compiled and a report must be prepared. The report would be based on the following points:

- name of the place audited
- date of the audit
- members of the audit team
- observations on the areas audited, and the main conclusions of the audit
- suggestions for short-term and long-term improvement, based on the CPWD guidelines
- follow-up guidelines

A time-frame can be suggested for adopting the suggested changes. This report must be handed over to the audited organization, with a letter of appreciation for courtesies and cooperation extended, a copy of the completed audit checklist used to audit the institution and a copy of the relevant CPWD guidelines (sample formats)

REPORT OF THE ACCESS AUDIT PROJECT

A report of the audit itself must be drawn up. It should include the aims, the details of the audit process, i.e., the pre-audit preparation, the process itself and the post audit reporting and follow-up, including the results of the audit and suggestions for improvement, which have been made. The report should include photographs and copies of news clippings of the audits. This report must be archived for future reference and follow-up action.

Brief Description Of The Essentials Of A Building That Are Evaluated

ENTRANCES/EXITS

The main entrances and exits of buildings must be clearly identifiable and easily accessible. They must be wide enough to accommodate wheelchair users. Steps and ramps must have hand railings of contrasting colours. Building should have automatic sliding doors. In multistorey buildings, the entrance should permit access to a conveniently located elevator. Emergency exits should be easily identifiable and accessible.

PARKING

Parking for people with disabilities should be available near the building. IT should be accessible to cross-disability groups equally. Accessible indoor parking spaces should be located closest to the elevators and within 50 metres of building entrance. The parking slots reserved for people with disabilities should be marked with the international symbol of accessibility. There should be procedures in place to make sure that non-disabled people do not use parking spaces reserved for people with disabilities. Drop off areas should be marked by a well-defined

signage system and an accessible travel path from this area to the building should be available.

RAMPS

Complementary ramps should be available next to stairs. The gradient of ramps should allow easy use by wheelchair users. Appropriate landings should be available and the ramps should be wide enough for use by wheelchair users. Ramps surfaces should be slip-resistant and clear of obstacles. They should be protected on both sides. Ramps should be marked with the international symbol of accessibility.

ELEVATORS

Elevators should be easily accessible and identifiable. The doors should be wide enough to accommodate wheelchair users and the space inside should be sufficient for them. Elevators should have handrails of contrasting colours on three sides and be at appropriate heights. Visual and audible signals indicating the arrival at different floors should be available. Emergency intercoms should be usable without voice communication in emergencies. Tactile/ Braille instructions should be provided for the communication systems.

Stairs

Stairs should be easily accessible and identifiable. The minimum width of the stairs should be wide enough and the landings have enough space at the top and bottom. The stair surfaces and nosing should be slop resistant. Handrails should be provided for staircases.

Corridors

The minimum unobstructed width of corridors should be wide enough for wheelchair users and should allow manoeuvring through doors along the length of the corridor. The corridors should have guiding blocks along its length.

Washrooms, Toilets And Bathrooms

Separate toilets should be available for people with disabilities. They should be clearly identifiable and accessible. The doors should be wide enough and should be lockable from inside and releasable from outside. There should be enough manoeuvring space inside. All floor surfaces should be slip resistant. Mirrors, flushing arrangements, dispensers and toilet paper should be mounted at appropriate heights. They should be equipped with alarm systems for emergencies.

Public Telephones

There should be at least one telephone accessible to wheelchair users and should be equipped with hearing aids. The numbers should be embossed to allow easy identification. The coin slots should be at appropriate heights.

Counters

This includes reception counters, ticket counters, cash counters and administration counters. Counters should be easily identifiable and accessible to wheelchair users. Counter staff should be able to communicate with persons with hearing and visual disabilities.

Drinking Water Facilities

They should be easily accessible and the fountain head accessible to wheelchair users.

The area around the fountain should be dry to prevent falls. Glasses should be provided at drinking water facilities. The taps should be easily manoeuvrable.

Eating Outlets

Accessibility of eating outlets for people with various kinds of disability must be assessed. Tables, service counters and cash counters should be at appropriate heights. There should be enough place inside for easy movement by wheelchair users. A menu card should be available in Braille. Facilities should be available for people with speech impairment to place orders.

Audit Of Specific Areas Of Buildings

Some buildings have areas specific to them and different aspects must be looked when auditing them.

Hospitals

Patients have to visit the examination and sample collection rooms of hospitals and may get admitted to wards in them.

Examination Rooms

Examination rooms should be easily identifiable and accessible. The examination tables should be of the right size and height.

Sample Collection Rooms

Sample collection rooms should be easily identifiable and accessible. The rooms should be large enough to enable easy mobility within them. The toilets attached to sample collection rooms should be east to use. The sample collection tables should be easily accessible.

Wards

Wards should be easily identifiable and accessible to people with different disabilities. Space in wards should allow easy mobility by wheelchair users. All fixtures should be at accessible heights. They should be obstacle free. Guiding lines should be available for people with visual impairment.

Banks

All counters should be easily identifiable and accessible. Counters should be at appropriate heights. The staff at the counters should be to communicate with people with hearing impairments. The manager's office should be easily identifiable and accessible. Various forms should be placed at accessible counters and space should be available for the clients to fill the forms easily.

Automatic Teller Machines (ATM) should be easily accessible to clients with various types of disability. They should be placed in areas, which allow mobility for wheelchair users. They should be slip resistant and have grab bars.

Hotel Rooms

At least one room easily accessible should be located on the ground floor to enable rapid evacuation in case of emergencies. The room should be equipped with an alarm system. All fixtures and controls should be at accessible heights. The space in the room should allow mobility for a wheelchair user. The windows should allow unobstructed viewing for wheel chair users. Room facilities, like phones, fire alarms, wake-up alarms, etc., should be accessible to people with different disabilities.

Cinema Halls

Tickets counters and the hall should be easily accessible. Specific seats should be allocated to wheelchair users.

Government Offices

The public areas should be accessible to people with different disabilities. The counter staff should be able to guide people with different disabilities. Letter boxes should be accessible.

Historical Sites

The site details should be available in Braille. Trained guides should be available for people with different disabilities. Shops should be accessible.

The Disability Access Audit Checklist

The disability access audit checklist includes details that have to be looked into for carrying out a disability access audit. They must be completely and accurately filled out to carry out a meaningful audit.

The checklist has been divided into two parts. Part 1 (A to K) is for areas common to all buildings audited, while Part 2 (L to Q) deals with areas specific to locations,

like banks, cinema halls, etc. It is non-exhaustive and should be adapted to specific needs.

The checklist must be filled in by answering **" yes ", "no",** or " **not applicable** " to the questions. Observations made in the remarks column during the audit will determine how disabled friendly a location is.

Indicative In-house check list for disabled friendly persons.

Check list for Compliance

DISABILITY ACCESS AUDIT CHECKLIST		
Date of audit:		
Staff In charge		
Department:		
Audited by (organization):		
General Remarks & Suggestions:		
Name of the team leader and Signature		
A	ENTRANCE	
1	Before main entrance	
(i)	Are there steps?	Yes/No*. If yes, how many?
(ii)	Does the steps have railings?	Yes/No*. If yes, one/both sides?
(iii)	Is there a ramp? Does the ramp have railings?	Yes/No*
(iv)	Does the ramp have an edge protection?	Yes/No*. Width?
2	Main Entrance	
(i)	Is the width of the entrance greater than or equal to 900mm?	Yes/No*. Width?

(ii)	Type of door	Automatic/Swing/Sliding*
(iii)	Type of door handle(if applicable)	Lever/Knob*
(iv)	Is the height of the door handle between900mm-1100mm?	Yes/No*. Height of Kerb:
(v)	Is there a kerb at entrance?	Yes/No*. Gradient:
(vi)	Is there a kerb ramp?	Yes/No*.
(vii)	Is there the International Symbol of Access (Disabled Logo) displayed?	Yes/No*.
3	Side Entrance	
(i)	Location (e.g., along Haig Road) (if there is more than one location, please specify all)	Yes/No*. If yes, location at
4	Side Entrance	
(i)	Is the width of the entrance greater than or equal to 900 mm?	Yes/No*. Width:
(ii)	Type of door	Automatic/Swing/Sliding*
(iii)	Type of door handle (if applicable)	Lever/knob*
(iv)	Is the height of door handle between 900 mm - 1100 mm?	Yes/No*. Height of kerb:
(v)	Is there a kerb at entrance?	Yes/No*. Gradient:
(vi)	Is there a kerb ramp?	Yes/No*.

(vii)	Is there the International Symbol of Access (Disabled Logo) displayed?	Yes/No*.
5	Is side entrance accessible to the wheelchair-users?(Please use section A2 as a guideline).	Yes/No*. If no, give details:
6	Is the accessible entrance clearly identifiable?	Yes/No*. If no, give details:
7	Is the entrance wide enough?	Yes/No*. If no, give details:
8	Is the door a push-open door?	Yes/No*. If no, give details:
9	In multi-storey buildings, does the accessible entrance permit access to a conveniently located elevator?	Yes/No*. If no, give details:
10	Is the entrance landing area sufficient?	Yes/No*. If no, give details:
11	Is the entrance landing easily identifiable?	Yes/No*. If no, give details:
12	Are there tactile landing areas free of obstacles?	Yes/No*. If no, give details:
13	Is the entrance landing area free of obstacles?	Yes/No*. If no, give details:
14	Are emergency exits easily accessible?	Yes/No*. If no, give details:
B	CAR PARKING	

1(i)	Is there a parking lot for the disabled person within the building?	
(ii)	Are there accessible parking facilities?	Yes/No*
(iii)	Are indoor parking spaces located closest to accessible elevators	Yes/No*
(iv)	Are accessible parking spaces within 50 meters of building entrances?	Yes/No*
2	If yes, how many are there and state location where these can be found (e.g., Basement 1, lot#112, near lift)	Yes/No*. If yes, location at
3(i)	Is there the International Symbol of Access (Disabled Logo) printed on the parking lot	Yes/No*.Size of logo: Yes/No*.If yes, describe signboard used:
(ii)	Is there a vertical and visible signboard indicating that the lot is for the disabled driver?	Yes/No*.Size of logo: Yes/No*.If yes, describe signboard used:
4	Are there directional signs within the parking lot to indicated the location of the parking lot for the disabled person?	Yes/No*.

5	Size of parking lot.(Min. Size: 4800 mm x 3600 mm)	Dimension:
6	Please provide information on accessibility from the parking lot to the lift lobby/building entrance.	Please tick on the box and delete accordingly for the following: There is kerb/no kerb at the Entrance of the lift lobby. There is a kerb ramp at the Entrance of the lift lobby. Gradient: There is a swing/automatic/ Manual* door leading to the main building Width of door entrance is at least 900 mm wide Width: Corridor width is at least 1200 mm wide Width: Width of lift door is at least 900 mm wide Width: State the type of flooring used:
C	Taxi Stand	
1	Is there a taxi stand at the building? If yes, please state the location (e.g., at the main entrance)	Yes/No*. Location:
2	Is there a kerb at the taxi stand?	Yes/No*.
3	Are these one/two kerb ramps for boarding and alighting the taxi?	One/Two* Kerb Ramos Ramp for Boarding. Yes/No*. Ramp for Alighting. Yes/No*.
D	Lift	
1(i)	Is the lift accessible to every floor?	Yes/No*.

(ii)	Is there an accessible path leading to the elevator?	If no, please specify which floor(s) the lift stops on:
(iii)	Is the elevator door easy to identify?	If no, please specify which floor(s) the lift stops on:
2	Is the clear door opening width more than 900 mm?	Yes/No*. Width:
3(i)	Is the height of the call button (outside the lift) between 900 mm-1100 mm?	Yes/No*. Height between:
(ii)	Is the space inside the elevator enough?	Yes/No*. Height between:
4	Is there an audio system installed (talking lift) for the lift?	Yes/No*.
5	Are there Braille/raised (for the visually impaired persons) numbers used on the control panel?	Yes/No*. Height between:
6	Is the control panel placed at a height of between 900 mm - 1200 mm from the floor level	Yes/No*. Height between:
7(i)	Are there grab bars inside the lift?	Slides: Yes/No*.
(ii)	Are the doors and handrails of the elevator of contrasting colour?	Slides: One/Both* Rear: Yes/No*.

8	Are the grab bars placed at height of 900 mm from the floor?	Yes/No*. Height:
9	Is the emergency intercom usable without voice communication?	Yes/No*.
10	Is the door opening/closing interval long enough?	Yes/No*.
11	Is the floor of the elevator non-slippery	Yes/No*.
E	Public Telephone	
1	Are there public telephones for the disabled person. If yes, provide location (e.g., level 1,2)	Yes/No*. Location:
2	Is the height of the operable parts (highest and lowest) of the public Phone between 800 mm-1200mm	Yes/No*. Actual height between:
3	Is there a clear knee space of more than 680 mm	Yes/No*. Actual clear knee space:
4	Is there at least one telephone equipped with hearing aids?	
5	Are the numerals on the telephone raised to allow identification by touch?	

6	Is the coin slot mounted at an appropriate height?	
7	Are accessible facilities identification?	
F	Counters	
1	Is the counter easily identifiable?	
2	Is the level of the counter accessible?	
3	Is the staff able to communicate with people with visual, hearing and speech impairment?	
4	Is the staff supportive to mentally-challenged clients?	
G	Public Toilets	
1(i)	Are there separate toilets for the disabled person? Is the accessible toilet identified by a sign?	Yes/No*.
(ii)	Is the entrance to the public toilet accessible to people with disabilities?	Yes/No*.
(iii)	Is the width of the door wide enough?	Yes/No*.

(iv)	Is there enough manoeuvring space in the toilet?	Yes/No*.
2	Are the toilets for the disabled person available on every floor?	Yes/No*. If no, specify on which floor they are available
3	What type of toilets is provided?	Individual/Compartment/Both*
4	Are the measurements of the toilet for the disabled person the same (if there are more than one toilet?	Yes/No*.
5	If the toilets for the disabled persons are different from one another, please complete separate copies for each toilet surveyed Sketch toilet surveyed (include door, water closet, wash basin, door and grab bars)	State location of toilet checked Please tick on the box and delete accordingly for the following Individual washroom/compartment * Individual washroom: Have clear dimensions between opposite walls of not less than 1750 mm. Actual dimension: mm x mm Water Closet Compartment Have clear dimensions of not less than 1500 mm by 1750 mm Actual dimension: mm x mm Door width more than 900 mm Actual width: No kerb/kerb ramp* at the Entrance to the toilet. If there Is a kerb ramp, the gradient is:

		Door handles are located: Inside/Outside/Both sides* Door opens outwards / inwards* Door is a swing / folding / sliding* door One horizontal grab bar is mounted at a height of between 280 mm and 300 mm from the top of the water closet seat and one horizontal grab bar is mounted on the side wall closet to the water extending from the rear wall to at least 450 mm-in-front of the water closet seat. Actual height: Actual height: Water basin has a clear knee Space of at least 750 mm wide by 200 mm deep by 680 m high with an additional toe space of at least 750 mm wide by 230 mm deep by 230 mm high. Actual clear knee space: (W) x (D) (H) Water closet is located between 460 mm - 480 mm from the centreline of the water closet to adjacent wall. Actual distance: Clear dimension of 750 mm from the front edge of the toilet bowl to the rear wall. Actual distance: The passage way leading to the cubicle is at least 900 mm. Actual width:

6	Is there at least one accessible shower?	
7	Are grab bars installed in bathtubs and showers at an appropriate height?	
8	Are accessible showers equipped with shower seats?	
9	Are the grab bars slip resistant?	
10	Can grab bars withstand load?	
11	Is the mirror at an appropriate height?	
12	Is the rest room equipped with an alarm system accessible to people with different disabilities?	
13	Are flushing arrangements, toilet paper and other dispensers mounted at an appropriate height?	
14	Are flushing mechanisms easy to operate?	
15	Are the doors lockable from inside and released from outside in emergency situations?	

H	Drinking Water Facility	
1	Is the water tap easily accessible?	
2	Can it be easily manoeuvred by a person with poor hand function?	
3	Is the area dry?	
4	Are glasses provided?	
I	Cafeteria	
1	Is there an eating outlet located within the building?	Yes/No*. Location
2	Is the eating outlet generally accessible to the disabled?	Yes/No*.
3	Is there a circulation path/passageway of at least 900 mm wide to allow the wheelchair user to move around the eating outlet and order their food?	Yes/No*.
4	Is there a table reserved for the disabled?	Yes/No*. If no, give details of seating arrangements:- Height of table-top not higher than 800 mm with a minimum clear knee of 700 mm x 480 mm deep. If no, provide Measurement: Table-top: Clear knee space: x Table with fixed stools/chairs Table without fixed stools/chairs

5	Are there directional signs to lead the disabled person to the reserved table?	Yes/No*.
6	Is there enough leg clearance space below the table?	Yes/No*.
7	Is the height of the table appropriate?	Yes/No*.
8	Is the height of the cash counter appropriate?	Yes/No*.
9	Is there a menu card available in Braille?	Yes/No*.
10	Is there a facility for a person with speech impairment to be able to pace an order?	Yes/No*.
11	Do the tables have straight legs?	Yes/No*.
J	Staircase	
1	Applies to flights of steps Check the following:	State where the staircase is located:
2	Are there handrails	Yes/No*. If yes, one/both sides
3	Height of hand rails between 800and 900 mm from the floor	Yes/No*.Actual height:
4	Are the handrails continuous	Yes/No*.
5	Is there a levelled platform at the top and bottom step extending	Levelled platform: Yes/No*. Extended railing: Yes/No*.

	not less than 300 mm (with railing)	
6	Steps specifications	Uniform riser: Yes/No*.Open Riser: Yes/No*.Height of risers: Protruding nosing: Yes/No*.
7	Is the minimum width of the stairs enough?	
8	Is the landing space at the top and bottom of the stairs enough?	
9	Are the stair nosing slip-resistant?	
10	Is the location of the stairs clearly identifiable?	
11	Is a handrail installed?	
12	Do the stairs have guide strips?	
K	Slop Ramps	
	Applies to slope ramps Check the following:	State where the slope ramps are located:
1	Are there handrails	Yes/No*. If yes, one/both sides
2	Height of hand rails between 800 and 900 mm from the floor	Yes/No*.Actual height:
3	Are the handrails continuous	Yes/No*.
4	Is there a levelled platform at the top and bottom ramp extending not less than 300 mm (with railing)	Levelled platform: Yes/No*.Levelled railing: Yes/No*.

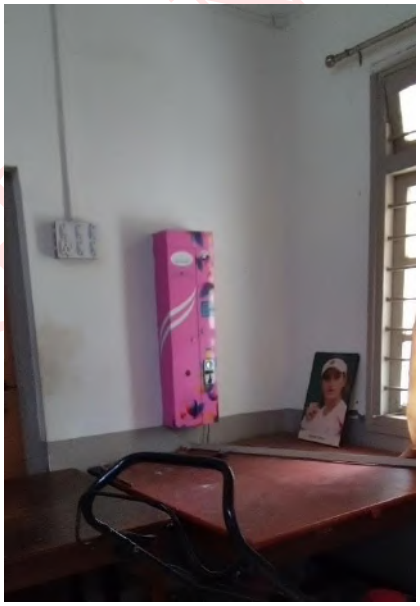
5	Is the width of the ramp at least 1200 mm	Yes/No*.Actual width:
6	Ramp landings are provided at regular intervals of not more than 9000 mm of every horizontal run	Yes/No*.Length of horizontal run:
7	Is an edge protection available	Yes/No*.
8	Type of flooring used	Specify:
9	Describe the condition of the flooring	e.g., levelled, tiles popping up, uneven surfaces
10	Are grafting found in the open area	Yes /No*
11	Are the gratings covered?	Yes/No*
12	Are grating placed across the dominant placed across the dominant of travel	Yes/No*
13	Is the width of spaces found between the grating strips less than 12 mm	Width:
	General description of accessibility within the premises	Paths to various locations of Attractions are easy and Accessible.
		Not quite accessible, there are Many obstacles such as
		Quite accessible but there are Steps (manageable).

		Inaccessible in most areas. (please specify)
L	Corridors	
	Is the minimum unobstructed width of the corridor wide enough for wheelchair users?	
	Does the corridor width allow manoeuvring through doors located along its length	
	Does the corridor have guide strips?	
	Is the corridor pathway obstruction-free?	
	Any other comments:	
	Name of Facilitator(s):	Name of Surveyor(s):

GENDER EQUALITY UNDER SEC 7.1.1

Sr	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
	Girl children	To provide safe and dignified study time by providing health safety provisions in the campus.				

The placement of CCTV surveillance builds confidence among the girl child to perform without fear.



DISPENSOR INCENERATOR

The convenience of the health safety arrangements are an added advantage and great moral booster.

GREEN PLEDGE TEMPLET.

Sr	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*
	Green Commute	To promote green commute within the campus and also outside the campus.				
	Green energy concept	College has kickstarted an initiative of lab testing the Solar thermal energy (Fresnel concentrating solar)				

REDUCE CARBON FOOTPRINT BY CYCLING

Cycling is usually a low-carbon way to travel – but it depends on what you eat. and it helps you to Reduce Your Carbon Footprint by Cycling.

The UN climate change report warns that we need to reduce our *carbon footprint* before it's too late. Here's how *bike* commuting can help.

You're probably well aware of cycling's numerous health benefits. But its impact on the planet can make life better and safer for all people, not just individuals aiming for a healthier lifestyle.

That's according to a new report from the UN's Intergovernmental Panel on Climate Change (IPCC). The panel's scientists determined that if the global temperature rises by 1.5°C or more by 2030, the worldwide risk of events like extreme droughts, wildfires, and floods will increase exponentially.

The bad news: If no changes are made, the global temperature could rise by as much as 3°C—double the rate that scientists agree would already be catastrophic. But everyone from governments and large corporations to private citizens can take steps to fight the effects of climate change. The IPCC suggested ways to reduce our carbon footprint—and cycling for transportation is one of them.

One thing that can be done is cities planning and implementing complete street policies—things like funding infrastructures, building protected bike lanes, and talking to citizens about what would make them feel safe," Whitaker told *Bicycling*. By using bike lanes and other infrastructure to better connect neighborhoods with schools, offices, and shopping centers, she said, cities and towns could encourage more people to ditch their cars and bike instead. This is the best way to Reduce Carbon Footprint by Cycling.

Taking the leaf off the Harvard university, We suggest that the concept of commute to work be explored. We present the link to understand how the Harvard university encourages and practices.
https://green.harvard.edu/tools-resources/how/10-tips-harvards-bike-commuting-pros

Although the formation of the ruels is out of the purview of the College management, It can initiate a self imposed action plan to set an example and draw the attention of the law makers. We suggest the ECO-CLUB to explore the possibilities and say no to NO-VEHICLES at least three days in a week.

USE OF NATURAL RESOURCES:

The institute has taken good initiatives in incorporating various measures to adopt to new technologies available.

The institute has started use of LED lights. At places where they are not in use, they are planed to be replaced by LED lights as and when they fuse out.

We suggest that the LED replacement project be takenup immediately to put the solar energy into good use.

When replacing the LED lights care should be taken to prevent LIGHT Pollution.

Light pollution is the presence of anthropogenic and artificial *light* in the day or night environment. It is exacerbated by excessive, misdirected or obtrusive use of *light*, but even carefully used *light* fundamentally alters natural conditions.

Light pollution is caused by inefficient or unnecessary use of artificial light. Specific categories of light pollution include light trespass, over-illumination, glare, light clutter, and skyglow. A single offending light source often falls into more than one of these categories.

Every day, people are exposed to hours of artificial light from computers, office lights and even 24-hour lighting in hospitals.

Now, new research in animals shows that excessive exposure to "light pollution" might be worse for you than previously known, taking a toll on muscles and bones.

Researchers at Leiden University Medical Center in the Netherlands tracked the health of rats exposed to six months of continuous light compared with a control group of rats living under normal conditions -- 12 hours of light, followed by 12 hours of dark.

During the study, reported in Current Biology, the rats exposed to continuous light had less muscle strength and showed signs of early-stage osteoporosis. They also got fatter, and some markers of immune system health worsened.

While earlier research found excessive light exposure might affect cognition, the new research showed a surprising effect on muscles and bones.

"Not only did motor performance go down on tests, but the muscles themselves just atrophied, and mice physically became weaker after just two months," said

Chris Colwell, a sleep specialist at the University of California-Los Angeles, who was not involved with the study.

The good news is the effects of light exposure appear to be reversible. When the study rats returned to their natural light-dark cycle, their health returned to normal after two weeks.

The data suggest more research is needed into the health effects of artificial light. One concern is the health of patients in hospital intensive care units, people in nursing homes and babies in neonatal units -- places where artificial lights often are kept on for 24 hours a day.

"We keep the sickest people in our society under constant light conditions," Colwell said.

The research also might have implications for people exposed to the blue wavelength light emitted from computers, which might be more disruptive to the body than the light that comes from traditional artificial lights.

NEED BASED LIGHTING:

SAFETY AND ACCIDENT PREVENTION METHODOLOGIES.

Electrical Safety :

Human safety is the topmost priority in all our aspirations. Electrical infrastructure drives all our aspirations. When quality work is to be delivered all the support mechanism should be in good operating condition. For the system to be in good operating condition, we need to follow certain the regulatpory bodies.

The campus lacks this vital fact. We have discussed the situation with site photos. We have also given solutions where necessary. Before we proceed, it is important for all the stake holders to understand few key aspects and why these standards have been specified.

ACCESSIBILITY: Electrical hazards are among the most common safety hazards found during compliance, occupational safety and health inspections. Electrical systems in the workplace should have mechanisms in place to protect employees from injury. However, these systems must be maintained properly in order to be effective. Electrical panels are the primary units that control the flow of electricity to different parts of an office or building equipment. Each connection on the panel has a switch that can stop the flow of current to specific electrical circuits and appliances.

If an employee receives an electrical shock, shutting down the source of power may be the only safe method to stop the electrical current. OSHA

requires enough access and working spaces around all electrical equipment, or panels, serving 600 volts or less. 29 CFR 1910.303(g). For equipment operating at 600 volts, nominal or less to ground, electrical panels must have a minimum of three feet of clearance in front of the panel and a minimum clearance width of 2.5 feet or the width of the equipment, whichever is greater. This assures that in case of an electrical emergency, there is a clear working space in front of the panel for quick access to the circuit breakers. Electrical panels should also have secure covers to ensure no wires are exposed that could cause electrical shock. This also prevents the internal mechanisms from being exposed to dust, dirt, and moisture. Electrical panel boxes in commercial buildings should be secured and accessible by trained personnel only.

It is important that these trained electrical staff be provided with appropriate PPE ie Personal Protective Equipment's for safe handling of these devices. We have shown few of the PPE's which need to be provided in all sizes so that every staff is well protected.

The floor of the electrical room housing the panel boards are not covered with Insulated rubber mat. It is important to have them in place to avoid accidental electrocution.

REFERENCES

IEEE standard 1100-2005: Recommended practice for power and grounding sensitive electronic equipment.

IEEE standard 518-1982: Guide for installation of electrical equipment to minimize

noise inputs to controllers from external sources.

Note: IEEE now has withdrawn this standard.

IEEE standard 142-1991: Recommended practices for grounding of industrial and commercial power systems.

IEEE standard 81-1983 and 81.2-1991: Guide for measuring earth resistivity, ground impedance, and earth surface potentials of a ground system.

NFPA-78 Lightning Protection Code 1986, Quincy, Massachusetts: National Fire Protection Association, 1986.

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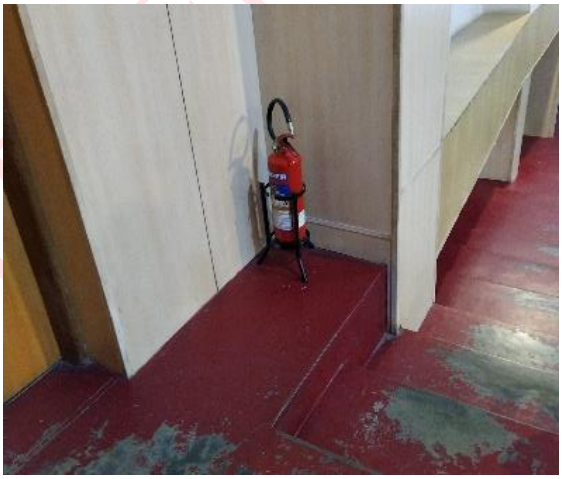
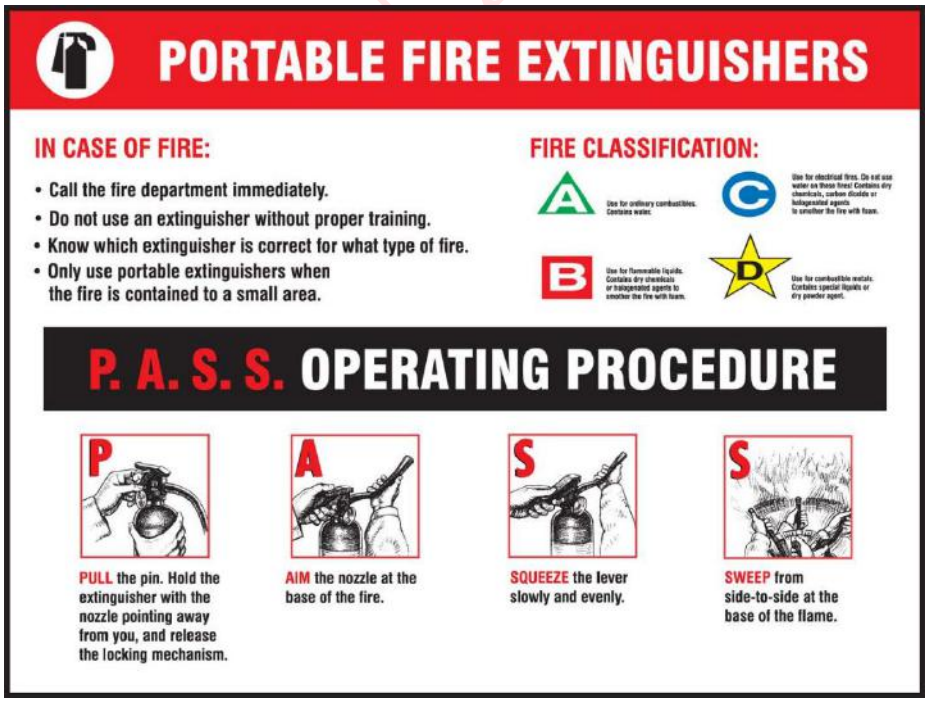
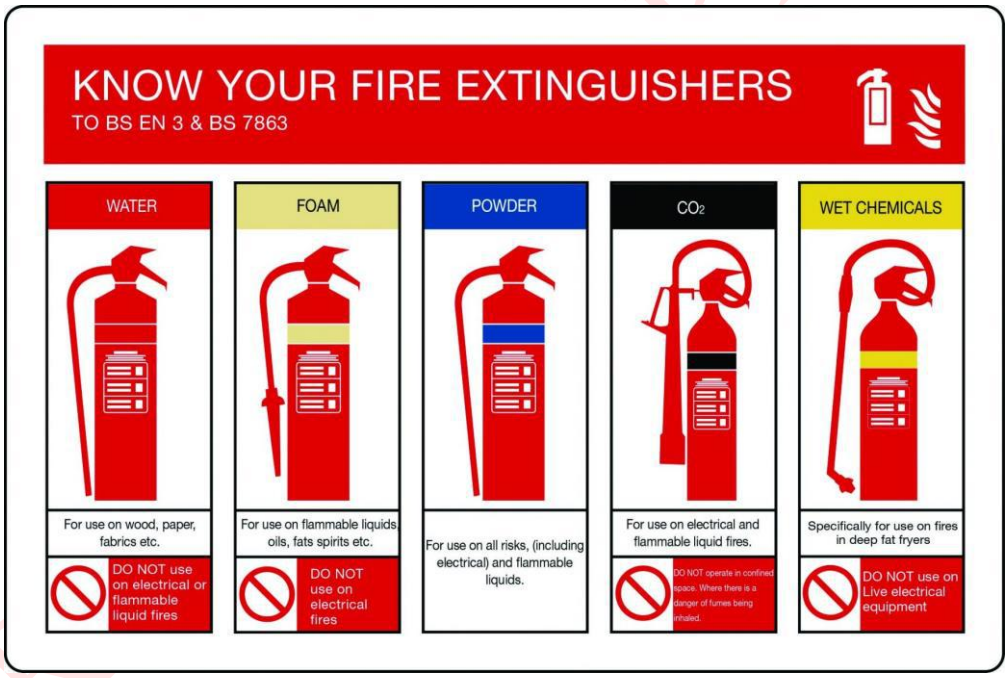
Fire SAFETY : The fire extinguishers should be placed at the entrance of the room housing dangerous devices. So that, they are handy when need to be used.





It is also important that the handling instructions are predominantly displayed. The sample poster is reproduced for replication.

Type (Fire / Extinguisher)	CLASS A Combustible materials (e.g. paper & wood)	CLASS B Flammable liquids (e.g. paint & petrol)	CLASS C Flammable gases (e.g. butane and methane)	CLASS D Flammable metals (e.g. lithium & potassium)	Electrical Electrical equipment (e.g. computers & generators)	CLASS F Deep fat fryers (e.g. chip pans)	Comments
Water	✓	✗	✗	✗	✗	✗	Do not use on liquid or electric fires
Foam	✓	✓	✗	✗	✗	✗	Not suited to domestic use
Dry Powder	✓	✓	✓	✓	✓	✗	Can be used safely up to 1000 volts
CO2	✗	✓	✗	✗	✓	✗	Safe on both high and low voltage
Wet Chemical	✓	✗	✗	✗	✗	✓	Use on extremely high temperatures



In case of fire, appropriate Fire extinguishers should be placed at the entrance but outside the room. The details of such classified Extinguishers is indicated for reference.

Fuel storage and handling.

♦ Gas bottle storage regulations require adequate ventilation for gas bottle safety. In the event of an LPG gas bottle storage release of gas and without adequate ventilation, gas dissipation occurs slowly and the accumulated gas remains within its explosive range over a longer period of time.

♦ LPG gas cylinder storage rules require (LPG storage requirements) storage must be free from sources of ignition for gas bottle safety.

♦ LPG gas bottle storage must always be upright so that the LPG gas cylinder safety pressure relief valve is in the vapour section of the LPG (propane) gas cylinder storage.

♦ For LPG gas cylinder safety, you should treat any LPG gas cylinder storage that has ever been filled as a full cylinder, even if you believe it to be empty. Only gas bottle storage purged with inert gas can be once again considered empty.

♦ Never open the valve of any unconnected LPG (propane) gas cylinder storage, even if it is believed to be empty, as there is almost always some remnant gas in every gas bottle storage.

♦ *LPG gas bottle storage (LPG cylinder storage) should be limited to no more than what is required.*

♦ *Forklift cylinders not being used are required to be stored outside in well ventilated LPG storage. This is typically in a storage cage at least 6 metres (20 feet) from other structures.*

♦ *LPG should never be stored in excess of 50C (122F) or near a heat source.*

♦ *LPG gas bottle storage must be prevented from falling, movement or physical damage by storing them in approved cages/racks, securing the LPG gas cylinder storage with LPG gas cylinder safety chains or using other approved retention methods for LPG gas cylinder safety.*

♦ ***LPG - Liquefied Petroleum Gas*** *- is heavier than air and will collect in low areas instead of dissipating.*

As a result, there must be adequate ventilation and air movement in any LPG (propane) gas cylinder storage area.

♦ *LPG gas bottle storage regulations (LPG storage requirements) require placarding when the combined capacity of the LPG gas cylinder storage exceeds 500 litres of water capacity.*

The stack pipe should be extended to over the top floor height. So as to avoid flue gas impact on the inmates of the complex and also to prevent defacing of the civil structure.

DISPOSAL OF USED BATTERIES

In compliance with **Category 7.1.1, 7.1.2, 7.1.3 and 7.1.5**

BATTERY PLACEMENT:

The batteries disposal is an environment threat. The lead which is a major component has serious adverse effects. The acidic fumes damage the electronic components and when disposed to environment through uncertified local ragpickers either as scrap or buyback option, the institute stands to be morally responsible to such environmental pollution.

Hence the disposal of the batteries should be prolonged. This is possible by putting into use the Battery regenerative system

However, much before the regeneration It is good practice to make room for cross ventilation for the batteries to be placed in cool place.
The benefits include –

- In normal operating mode, the batteries are known to last for 5 to 6 years.
- With good working practice, they would last for almost three times the life.
- Prolonged life of the Batteries.
- Avoids acid fumes accumulation on the Batteries.
- Increased life of all electronic gadgets around the Battery bank.
- Delayed discarding of the Batteries avoids environment pollution and Revenue outflow for the organisation.

WE suggest to regenerate the batteries once every 3 years, so that the sulfur lining is minimized. If the regeneration is executed once every three years, we can regain the working performance to 95 to 98% of its original status.

However, this needs to be backed up with necessary periodical check with the density of the battery solution.

BATTERY MANAGEMENT:

The batteries breath acid fumes. It is good practice to make room for cross ventilation for the batteries to be placed in cool place.

The benefits include –

- Prolonged life of the Batteries.
- Avoids acid fumes accumulation on the Batteries.
- Increased life of all electronic gadgets around the Battery bank.
- Delayed discarding of the Batteries avoids environment pollution and Revenue outflow for the organisation.

All batteries should be placed in well ventilated area. As battery disposal is turning out to be a serious issue, ways to prolong the life of the batteries is very important from the environmental point and also from the Financial implications.

We will discuss the regenerative system of used and week batteries to enhance the life. It is important to know few points on handling of batteries.

BU-703: Health Concerns with Batteries

Become familiar with the do's and don'ts when handling batteries.

Batteries are safe, but caution is necessary when touching damaged cells and when handling lead acid systems that have access to lead and sulfuric acid. Several countries label lead acid as hazardous material, and rightly so. Lead can be a health hazard if not properly handled.

Lead

Lead is a toxic metal that can enter the body by inhalation of lead dust or ingestion when touching the mouth with lead-contaminated hands. If leaked onto the ground, acid and lead particles contaminate the soil and become airborne when

dry. Children and foetuses of pregnant women are most vulnerable to lead exposure because their bodies are developing. Excessive levels of lead can affect a child's growth, cause brain damage, harm kidneys, impair hearing and induce behavioural problems. In adults, lead can cause memory loss and lower the ability to concentrate, as well as harm the reproductive system. Lead is also known to cause high blood pressure, nerve disorders, and muscle and joint pain. Researchers speculate that Ludwig van Beethoven became ill and died because of lead poisoning.

By 2017, members of the International Lead Association (ILA) want to keep the lead blood level of workers in mining, smelting, refining and recycling below 30 micrograms per decilitre (30µg/dl). In 2014, the average participating employee checked in at 15.6µg/dl, but 4.8 percent were above 30µg/dl. (Source Batteries & Energy Storage Technology, Summer 2015.)
In 2019, the University of Southern California published the detection of lead in teeth of children living near the Exide Technologies battery recycling plant in Vernon, California.

Lead occurs naturally in soil at 15–40mg/kg level. This level can increase multi-fold near lead battery manufacturing and recycling plants. Soil levels in developing countries, including on the continent of Africa, recorded lead contamination levels of 40–140,000mg/kg. (See BU-705: How to Recycle Batteries.)

Sulfuric Acid The sulfuric acid in a lead acid battery is highly corrosive and is more harmful than acids used in most other battery systems. Contact with eye can cause permanent blindness; swallowing damages internal organs that can lead to death. First aid treatment calls for flushing the skin for 10–15 minutes with large amounts of water to cool the affected tissue and to prevent secondary damage. Immediately remove contaminated clothing and thoroughly wash the underlying skin. Always wear protective equipment when handling sulfuric acid.

Cadmium

Cadmium used in nickel-cadmium batteries is considered more harmful than lead if ingested. Workers at NiCd manufacturing plants in Japan have been experiencing health problems from prolonged exposure to the metal, and governments have banned disposal of nickel-cadmium batteries in landfills. The soft, whitish metal that occurs naturally in the soil can damage kidneys. Cadmium can be absorbed through the skin by touching a spilled battery. Since most NiCd batteries are sealed, there are no health risks in handling intact cells; caution is required when working with an open battery.
Nickel-metal-hydride is considered non-toxic and the only concern is the electrolyte. Although toxic to plants, nickel is not harmful to humans.
Lithium-ion is also benign — the battery contains little toxic material. Nevertheless, caution is required when working with a damaged battery. When handling a spilled battery, do not touch your mouth, nose or eyes. Wash your hands thoroughly.

Keep small batteries out of children's reach. Children younger than four are the most likely to swallow batteries, and the most common types that are ingested are button cells. Each year in the United States alone, more than 2,800 children are treated in emergency rooms for swallowing button batteries. According to a 2015 report, serious injuries and deaths from swallowing batteries have increased nine-fold in the last decade.
The battery often gets stuck in the oesophagus (the tube that passes food). Water or saliva creates an electrical current that can trigger a chemical reaction producing hydroxide, a caustic ion that causes serious burns to the surrounding tissue. Doctors often misdiagnose the symptoms, which can reveal themselves as fever, vomiting, poor appetite and weariness. Batteries that make it through the oesophagus often move through the digestive tract with little or no lasting damage. The advice to a parent is to choose safe toys and to keep small batteries away from young children.

Safety Tips

- Keep button batteries out of sight and reach of children. Remote controls, singing greeting cards, watches, hearing aids, thermometers, toys and electric keys may contain these batteries.
- Similar to pharmaceutical products, keep loose batteries locked away to prevent access by small children.
- Communicate the danger of swallowing button batteries with your children, as well as caregivers, friends, family members and babysitters.
- If you suspect your child has ingested a battery, go to the hospital immediately. Wait for a medical assessment before allowing the child to eat and drink.

Ventilation

Charging batteries in living quarters should be safe, and this also applies to lead acid. Ventilate the area regularly as you would a kitchen when cooking. Lead acid produces some hydrogen gas but the amount is minimal when charged correctly. Hydrogen gas becomes explosive at a concentration of 4 percent. This would only be achieved if large lead acid batteries were charged in a sealed room.

Over-charging a lead acid battery can produce hydrogen sulphide. The gas is colourless, very poisonous, flammable and has the odour of rotten eggs. Hydrogen sulphide also occurs naturally during the breakdown of organic matter in swamps and sewers; it is present in volcanic gases, natural gas and some well waters. Being heavier than air, the gas accumulates at the bottom of poorly ventilated spaces. Although noticeable at first, the sense of smell deadens the sensation with time and potential victims may be unaware of its presence.

As a simple guideline, hydrogen sulphide becomes harmful to human life if the odour is noticeable. Turn off the charger, vent the facility and stay outside until the odour disappears. Other gases that can develop during charging and the operations of lead acid batteries are arsine (arsenic hydride, AsH_3) and (antimony hydride, SbH_3). Although the levels of these metal hydrides stay well below the occupational exposure limits, they are a reminder to provide adequate ventilation.

Regeneration of week batteries for the Second/Third lease of life.

Significance…

- The early regeneration results into second tenure of the batteries i.e. another term of 3 to 5 years as per Battery specifications.
- Optimised energy consumption. Thus, reduced cost of operation.
- Delayed disposal results into elimination of environment pollution.

Reduced impact on CARBON FOOTPRINTBATTERY MANAGEMENT :

All batteries should be placed in well ventilated area. As battery disposal is turning out to be a serious issue, ways to prolong the life of the batteries is very important from the environmental point and also from the Financial implications.

We will discuss the regenerative system of used and week batteries to enhance the life. It is important to know few points on handling of batteries.

SOLUTION: The placement of batteries needs to be at the place very close to cross ventilation, if possible, in open but shaded place. The following clippings are explained.

WORK CULTURE:

Sr	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
5	Work culture	Self-imposed discipline brings out the best results. Avoids accidents, saves time.				

Placement of footwear: Placing of footwear is a typical example. Our work culture is depicted in the way we behave and exhibit.

Value for all commodities is important to conserve the mother earth. Hence the placement of material of use/substance/importance should find appropriate placing. The passage should be clear from all obstacles weather small or large. Here the placement of footwear is only an example. One needs to practice and exhibit in all sectors, be it waste or unused materials or the vehicles parked in wrong place.

This image is just for illustration and is not from the college

The other example is the vehicle parking.

City has seen very high traffic growth and the vehicle parking is a burning issue.

Children exhibit what they learn at home and educational institutions.

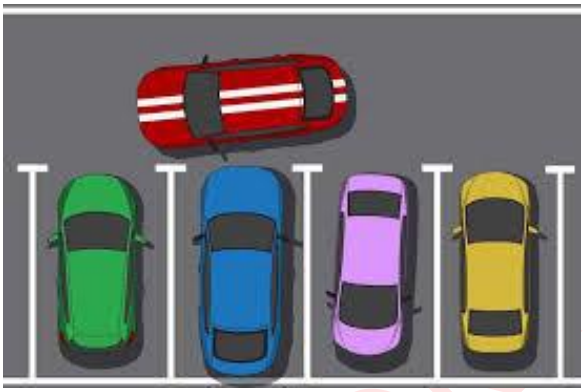
Today's crisis of vehicular movement is mainly due to erratic parking of vehicles at every space one finds it. It may also be known that; the majority of the lives are lost due to road accidents caused by rough driving.

It is seen from the college campus that the need for disciplined parking and vehicle movement is necessary step to be initiated.

To build-up sense of responsible citizenship, The management should educate the children and the staff in following traffic rules and parking in its designated location. The illustrations below set the way forward.

Culture	
It is important to consider the factors that can disturb others behaviour. Few factors the college can consider to bring in change in are PARKING: Random parking, be it two-wheeler or the four/six wheelers. We often see randomly parked. It is important that all the vehicles are parked in specified areas in such a way that one need not struggle to move out of the place. Educational institutes should inculcate these basic best practices	The images shown below are for illustration only and are not captured in the campus. (Kindly see the gallery for campus related photos) 

so that the three to five years of their college days, the student learn the sense of social responsibility. There behavioural culture makes a positive change when they walk out and behave responsibly. It is a matter of pride for the college too, to speak and practice best practices.



SUGGESTION:

We suggest that the parking space be marked with borders so that the staff and students park the vehicles at the designated space.

The image shown on the right, gives an indication for good parking.

The beautiful structures planed by the administrators and built by the management clearly indicate that they are concerned about the environment and are committed to deliver good sense of civic discipline and knowingly or unknowingly are exhaling the process of heading towards **ZERO CARBON FOOTPRINT.**

With the infrastructure is in place, the staff are inclined to perform, there is nothing that can stop from achieving the required.

The designated staff be trained in understanding the needs and allowed to test their innovative skills to move towards green practices will accelerate the process of green revolution.

PAPERLESS OFFICE:

Sr	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*
6	Paperless office.	On considering the present scenario, it is advised to communicate with No-Contact and safe distance method. This is possible under Paperless office method.				

In the present working conditions, transmission of infection has become vital and to address the issue, we can consider to accept digital documentation process. It has also been now legalized in accepting all such documents and a step towards paperless office is the next office administration process. We have discussed few aspects in the article presented below. For more details, the link provided at the end may be browsed.

With due credit to the authors This article can be downloaded using the link
https://www.ijeat.org/wp-content/uploads/papers/v8i4/D6268048419.pdf

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Paperless Administration in Indian Higher Education

Srimathi H, Krishnamoorthy A

Abstract*: The Higher Education sector in India is witnessing massive and exponential growth in terms of number of students and institutions. The procedures associated with the academic processes such as admission, teaching, examination and support services have also grown manifold. Institutions, irrespective of the size and scale, can practice better paperless administration using content ecosystem and digital tools. Both government and institutions make use of digital communication and customized applications. However, the over-dependence on paper in data processing is still a continued practice which necessitates the maintenance of volumes of physical documents by the administrative and academic departments that many times leads to delays in responses. The ideal scenario of a paperless learning environment may not be feasible in reality but the extents of paper usages can be brought down drastically to minimum levels with proper knowledge of information life cycle. The digitization with complete e-governance ensures paperless administration process. The institutions are having improbable idea to process automation and reducing paper consumption. This paper analyses the practices and methods in vogue that minimize usage of paper – based system and explores the feasibilities of interdependent work flow automation to make it better.

Index Terms: Admission, Paperless, Digital India Initiative, ECM, ERP

I. INTRODUCTION

Though computers are extensively used in universities, the administration process is paper based. The digitization of information content is easy, but there is no clue to proceed further with respect to application integration, control over scattered electronic documents, smooth information flow between departments, consistency and de-duplication, where the Enterprise Content Management (ECM) system provides solution to this. According to (Gartner, 2003), ECM refers all type of enterprise content and a bundle of software products which manage the entire content life cycle. (AIIM, 2010a) further extends ECM definition as "the strategies, methods and tools used to capture, manage, store, preserve and deliver content and documents related to organizational processes including unstructured information". ECM reduces burden of toggle between different Enterprise Resource Planning (ERP) applications, Customer Relationship Management (CRM), Learning Management System (LMS) and physical documents for decision support. The main challenge is in creating well-defined document flow since the process deals both structured and unstructured data formats as the activities are interlinked in nature as given in Figure 1. The research is motivated by the growing amount of Government initiatives with Digital India movement and technological implementation in higher education institutions to serve students of digital era. The study examines and evaluates the existing paper processes and workflow which will result in the implementation of electronic solutions. The need of best practices in information exchange, system complying with recordkeeping laws and information security managements is also highlighted.

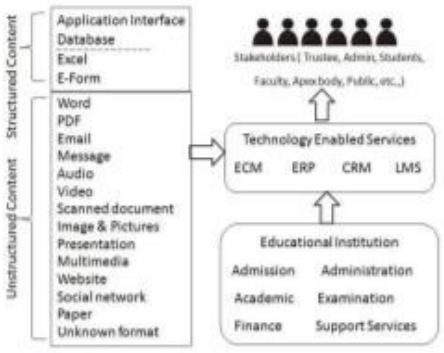

Figure 1. Educational Technology services deal with different content format

II. GOVERNMENT INITIATIVES

Department of Electronics and Information Technology (DeitY), Government of India is taking significant steps towards Digital India program and the same is supported and extended by Ministry of Human Resource Development (MHRD), Accreditation bodies and higher education councils. The announcements, notices, circulars and other communications from apex bodies to respective institutions are shared via email and hosted in website for quick reference. All India Council for Technical Education (AICTE) insists institutions to upload the approval documents of technical and management programme. University Grants Commission (UGC) accepts online submission for course approvals and institute affiliations in Distance Education, where it continues the hard copy submission for other programmes and affiliations. The online submission and electronic form (E-form) upload can be

Revised Manuscript Received on April 10 ,2019

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extended and practiced by UGC and all other statutory professional councils. The E-Form is used in self-study report of accreditation bodies such as National Assessment and Accreditation Council (NAAC) and National Board of Accreditation (NBA). The supporting documents are also to be submitted in the form of scanned digital documents.

The digital submission and facility of system decision support system on various parameters helps the accreditation bodies to scale up their reach and serve as pre-qualifier to plan evaluation. (MHRD, 2017) MHRD has adopted digital technology for information transmission under National Mission on Education through Information Communication Technology (NMEICT):

- Know your college portal for students
- National Program on Technology Enabled Learning (NPTEL). Indian Institute of Technology has promoted Massive Open Online Courses (MOOC) with edX platform (a digital initiative of MIT and Harvard University) to offer quality education from the best teachers to Indian students and ensure the improvement of individual academic performance.
- Educational satellite (EDUSAT) to home platforms
- A-View as multimedia platform for video delivery
- Virtual Labs helps in establishing remote access of lab experiments in various disciplines of science and engineering,
- E-Yantra (next generation embedded system), Talk to teachers, Spoken tutorial and free open source software to be used for academic purpose
- Data collection in data capture format (DCF) in annual All India survey on Higher Education (AISHE) and National Institute Ranking Framework (NIRF). The structured DCF used in data collection fasten the computation of Gross Enrollment ratio (GER) of higher education and useful to other statistical analysis.
- Library Resources: As a part of Universal Digital Library Initiative, the digital library India has scanned books written on English and Indian language. (Balakrishnan et al, 2006) The project fosters several research activities such as language technologies in text summarization, machine translation, hand writing recognition, optical character recognition etc.,
- DigiLocker facility: There are several school boards made their board result certificates digital and this enable the institutions to verify the scores. This will ease the merit list preparation of educational institutions in admission process, when the service is utilized by all boards of school education. As admission application went online, the digital verification of certificates minimizes the submission of hard copy submission of grade sheets and time taken for manual certificate verification as happened in case of Tamil Nadu Engineering Counseling 2018.

(UGC, 2017) UGC has also taken significant digital initiatives at its end and also through Information Library Network (INFLIBNET) as listed in Table 1.

III. AT INSTITUTION LEVEL

Apart from Government directives, institutions realized that the millennial students are technology oriented and demanding quick response on rendered services. The computerized business systems improve administrative efficiency and reduce a toll on management and faculty to process paper documents on students, courses and exams.

Table 1. List of digital initiatives of UGC and INFLIBNET

e-Office implementation	Public finance management system
e-Governance	University activity monitoring portal
Direct benefit transfer	Wifi connectivity to 40 central universities
Regional office website	Integrated portal for planning, finance, coordination
Academic job portal	National academic depository (NAD) exam certificates
UGC NET online	Online courses SWAYAM (Active learning platform)
Public grievance portal	E PG pathshala (Post graduate programme)
Student grievance portal	Shodhganga (digital repository of dissertation)
e-scholarship award & portal	e-ShodhSindhu (access to e-journals, e-books)
Antiragging mobile App	Indcat (online union catalog of bibliographic data)
Unipotal database of universities	Soul (State of art integrated Library Management)
SWAYAMPRAHA DTH channel	IRINS (Web Research Management System)

Universities incorporated electronic communication process for any kind of communication, upload the same on website and sends individual institution approval letter through email. (VTU, 2018) One of the universities hopes to gradually move towards a less paper and paperless office, since it serves digital communication to more than 200 affiliated colleges under its control.

(ePravesh, 2015) Considering the Indian youth population who aspires to tertiary education, the 'go online' in admission process reduces the paper usage. In addition, it helps to minimize problems related to overlapping counseling dates and in turn reduce physical / mental / financial burden of candidates due to multiplicity and transportation. The counseling process of engineering, medical and other professional courses are carried out online. Most of the entrance examination, application submissions and counseling are made online. As the medical entrance is mandate for admission throughout India, the strength of students who appear for medical entrance is increased and council planned to conduct medical entrance through online from year 2019.

(SRM, 2016) One of the biggest private institutions made its student course registration and support services as online for its fully flexible credit system, where the students have the liberty to choose course of study and select faculty members. Students receive individualized time table upon completion of registration. The students are serviced with quick response on cloud and eliminated to shuttle from one office to another for processing paper documents..

(Mindlogix, 2016) There are quite a few universities adopted paperless exam and digital evaluation system. The first initiative was sending question paper online through a digital secure network and affiliated colleges download the same, take sufficient printout and distribute. In the next level, the answer scripts are scanned and sent to examiners for evaluation. In the paperless exam, the students will get question paper on their computer screens, which avoid question paper leak and

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printing & dispatch of answer scripts. The technological advancement in digital exams permit candidates to write exam on flexible Tab devices, automatic dummy number allocation, quick process of multiple and re-evaluation processes, simplify the review of evaluated answer scripts and result processing with dashboard analytics.

(Kaushik, 2015) The university libraries are extended to do innovative e-resource services using technology such as OPAC search facility for both print and e-books of different publishers with links to full texts, digital scanning facility, host vide lectures and archive, online question bank, coordinate with MOOC initiatives, online reservation and renewal of books, indexing & abstracting services usage of Web 2.0 tools to disseminate new arrivals, maintain e-dissertations and subscribe e-journals. The digital libraries also face few challenges like archival of resource, longevity of storage media, removal of obsolete information to speed up the search process, deal copyright issues and intellectual property of resources and Universal access to knowledge and maintenance.

(NDTV, 2017) In accomplishing the government's challenging task of shifting India from cash dependent to a less cash-reliant economy, UGC issued an advisory to adopt online payment methods for tuition fees, exam fees, vendor payments, salary, wages and other campus services. All shops and vendors in institution premises including photocopier services, canteen and cooperative shops have adopted different mode of cashless transactions. In addition, all these shops come equipped with point of sale machines. One of the institutions has introduced smart cards to the students to buy food from canteen and shops in campus premises. The money is deposited by the parents online.

(Chronicle, 2018) Despite the digital initiatives of apex body in central and state governments and higher educational institutions own mission on implementing automation, there are institutions who could not achieve desired result in paperless office. The simple conversion of paper based activities to e-form will not be sufficient. The strong domain expertise with business process workflow, interconnectivity of data must be required. This necessitated knowledge on both ECM guidelines and Higher education administration.

IV. CHALLENGES IN ACHIEVING PAPERLESS

(LaMonte, 2016) indicates that the paper process still dominate in the office administration and increased the challenge on digital transformation. The mere implementation of ECM tools may not be sufficient, the performance to be measured for removing paper from operational processes in terms of response time, collaboration, back-office cost and compliance regulation to be focused as ECM is a process defined & utilized by stakeholder,. (Larrivee et al., 2016) survey reveals organization perception (P1 to P5), operation (O1 to O5) and need (N1 to N5) on ECM implementation as shown in the Figure 2.

The initial budget on technology investment may be high in paperless, but the paper based operations are costly in terms of back-office operation with duplication and siloed information. The main difficulties of ECM implementation are listed in the order as follows: re-orienting staff, integration with existing system, define process with clarity and making a business case, convincing legal compliance and dealing exceptions. (Genesis et al., 2018) The paperless higher education mission is affected by organizational cultural change, re-orienting staff, integration with existing system, verbatim implementation of traditional workflow, lack of network connectivity & power supply in rural area and overdependence on consultants. (Isaeva et al., 2016) The goal of developing ECM is to overcome the listed challenges and to make the system more transparent with efficient service integration.

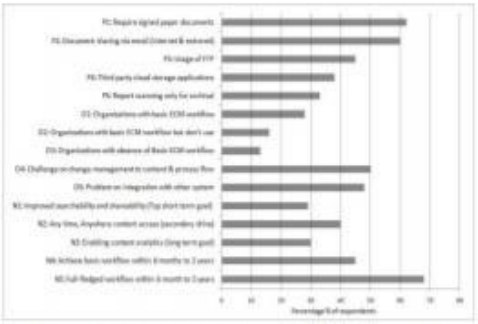

Figure 2. Organization view on ECM implementation (Source: Larrivee et al., 2016)

V. ECM GUIDELINES

(SUMS, 2017) As it is easy to create and repurpose digital documents over paper documents, a number of questions need to be answered prior to implementation.

- (SoftCo, 2016) storing as document as opposed to store as data
- (AIIM,2010b)Assess the functional gap in content management, integration of business application & link to database and document system with its affordability
- (Hullavarad et al., 2015) Version control to avoid duplication and inconsistency especially in concurrent access
- (Katuu, 2012, eGOV-PID, 2013) Fully automated retention rules of those records & documents, Compliance with Institutional governance & Record and Document retention policies
- (eSAFE,2010) Security impact & third party access requirements
- (Nordheim et al., 2004) Balancing user expectations and policies of information governance in customization
- (Cognizant, 2014) Technical viability of current/future content tools with ECM architecture.

(DTCA, 2014) The ECM reference architecture framework given in Figure 3 answers all the listed questions and provides services beyond the expectations. Apart from content capture & delivery of both human created and application created information, ECM is designed to manage document, web content, forms, records, digital assets of

rich media content, multi-format content repositories, business flow, preservation policies and development tools of workflow, taxonomy, forms template and content authoring. The core content services include indexing, searching, digital rights, security, collaboration, approvals, digital signature and etc, (Alawan et al., 2014) Thus the properly implemented ECM positively influences on speed of problem identification and decision quality. In addition, it ensures centralized control with local flexibility that helps higher educational institutions to provide better services.

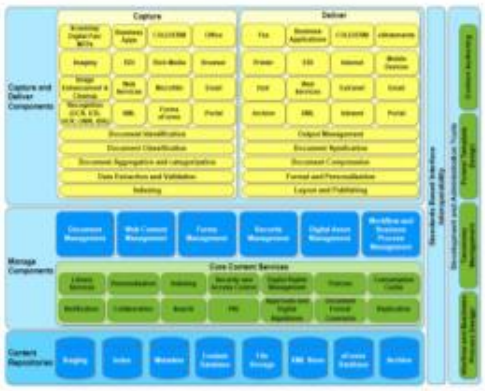

Figure 3. ECM Reference Architecture Framework (Source : DTCA, 2014)

VI. AREAS TO GO PAPERLESS

(AACRAO, 2016) Education sector is one of the important industries which not only creates and maintains large amount of information but also in the need of secured storage access and efficient business process. The functions of higher education system are segmented based on the nature of information impact, stakeholder's presence and kind of ECM implementation. The high impact business information which involves strategic decision on approvals and permanent preservation are grouped and listed in Table 2. The lack on preserving high impact strategic documents creates sever administration issues. The process flow of admission with both paperless and paper-based options is listed in Table 3, where the technology usage in every stage improves response in admission process.

The online admission process will enable the distributed target audience across the country and attract International students. The required ECM guidelines on academic, accounts and support services are briefed in Figure 4. Effective university websites speak clearly, even to yet-to-be students, and make it understandable by all. Table 4 provides guidelines on web content creation / maintenance.

Table 2. ECM guidelines for high impact Enterprise Content

Table 3. Admission

Admission Stages	Paperless Service	Paper based service
Marketing	Website, CRM, Digital Marketing (email, SMS, Webinars, Social Media, pay per click, Search Engine optimization, Chatbot, etc.,) & Lead conversion from info sessions & career guidance websites	News Paper advertisement, Banners, Hoardings, Brochure, & Prospectus usage in Open house and Info session
Application	Online	Download Form, Optical Mark Recognition (OMR)
Entrance Exam	Online	Paper-Pencil
Hall Ticket	Download	Through Courier / Postal service (such practice is stopped)
Certificate verification	Online & DigiLocker	Manual verification
Merit list & Counseling schedule	Online	Through Courier / Postal service (such practice is stopped)
Counseling	Online	On-campus
Payment	Online	Demand draft
Enrollment	Online for data capture	On-campus for student ID, document submission
Hostel booking	Online	On-campus

Figure 4. ECM guidelines in Academic, Accounts and support services

Table 3. ECM / Web guidelines & Best practices on Web Content

- Establish Web Governance Board to set the direction and policies, where the process chart should clearly mention the content type and responsibility of contributor, approver and publisher
- Apply Web Accessibility Standard Guidelines to optimize the impact of institution web content
- Ensure all content of university page is published within the university domain (no external website for any reason)
- Gear the content to target audience with quick scan rather than reading (prospective students, parents, current students, faculty, staff, alumni, prospective employer, press and general public)
- Do not upload video content as primary source of information
- Page should contain some useful information, prior to linking
- Emphasize strengths in Placements, Student achievements, Career guidance, Student affairs, Campus life, International alliances & Semester abroad programme, Industry internships, Faculty & infrastructure facilities, Admission procedure and mandate information etc.,
- Utilize content management tool for web publishing (especially pages with frequent updation)
- Audit web content prior to publishing. Perform usability testing to improve

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VII. CONCLUSION

(AISHE, 2018) In India, there are 903 universities, 9050 college and 10011 stand alone institutions as on date with cumulative enrollment of 36.6 million. Implementing paperless in simple office communication itself makes great change in cost cutting on paper usage and move towards green imitative. The research covered the government initiatives on digitization and the prospects of paperless in higher education academic, administration, research and support services. The present disintegrated / stand alone applications / paper based services to be integrated using ECM reference architecture with reference to capture / storage / security / access & deliver compliance. The institutions need to understand the importance of managing content life cycle from creation to final disposition. The study recommends the institution to investigate their present operation, future need, scale up with short /mid / long term plan of action in ECM implementation in turn make the administration go paperless. This helps in enhancing the communication, student experience, student support services and creating a campus with technology excellence.

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AUTHORS PROFILE

Prof. H. Srimathi has two decades of experience in higher education and services. She is employed at SRM Institute of Science and Technology since 1999 and served in various domains such as academics and administration. She is passionate about the studies on higher education systems, qualification framework, and academic mobility.

Prof. A. Krishnamoorthy has three decades of experience in engineering education. He is currently employed at SASTRA Deemed University. He is passionate about the studies on optimization techniques, machine design, renewable energy sources and higher education systems.

EXHIBIT GREEN HABITS:

WASTE MANAGEMENT:

Sr	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*
5	Waste Management	Spilling of waste	Dirty used packages in and around the college	Incorporate need for cleanliness and place waste collection bins.	Rs.4500 /- per set	Reduced cleaning hours and good hygienic conditions.

Segregated waste management is key initiative to minimise costs. In addition, the reuse of the anticipated waste can be considered as and when the need arises.

We also advice to source local.

These locally sourced bins may be placed all along the campus.

We suggest that these bins be colour coded to segregate the waste at source.

This option may look to be off the date but enriches the lives of local artisans and preserves the old art.

It is important to place a small placard as to why hand sewed bins are being put to use.

- The biggest being the empowering the rural youth in being economically self-sufficient.
- Bins are organic and biodegradable. Hence do not contribute to the carbon emissions. Leading to a very innovative Carbon Handprint initiative.
- Readily visible and easy to empty when half full.

OUTREACH

Sr	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
6	Outreach	Share the knowledge by example, by demonstration, by habitual practice.				

Gradient marking to manage rainwater and define Ideal point for Rainwater pond.

Rainwater management is important. However, being an educational institute, it is more important to dissipate the knowledge the information on Why, How, when where should be discussed so that the importance and the benefits of Rainwater management is carried forward to the field and the students speak for the technology in day today basis..

ACTION PLAN SUMMARY:

Earmark the action plan.

- Invite subject experts for Tec talks,
- Organize in person panel discussions and interaction to propagate the knowledge and mitigate the problems in practicing the same.
- Prioritize the initiatives and execute.
- Observe the benefits and shortcomings.
- Workout further improvement by involving the staff and students.

MODE OF ACTION:

- The process of GREEN AUDIT & ENERGY CONSERVATION should be carried out in three steps.
- Good housekeeping practices using available manpower.
- Minor alterations using in house work culture with minimum investments on accessories as discussed.
- Capital investments, which may be required for installation of new methodologies may be taken up on phased manner.

We will be happy to assist you for any further advice/consultancy if required either on Rainwater management or on any of the measures discussed in the report.

We hope the measures are implemented in good spirit and to human convenience and comfort.

For SUNSHUBH TECHNOVATIONS PVT LTD.,

Mallikarjun A. Kambalyal. B.E. (E&C)
Certified Energy Auditors EA-3485

WHY IS THIS AUDIT BEING CARRIED OUT.

Why it's important to have an Energy Audit

Whether you own or manage a small business, a large commercial facility, or a manufacturing operation, it's important to take advantage of any tips, programs and incentives that will help you save money on your energy bills. There are measures that will generate savings to positively impact your bottom line immediately, as well as longer-term strategic initiatives to assess your needs and stabilize your energy spend in the longer term – which is great news for your budget!

One such initiative is an Green audit. Green audits reveal your usage patterns, identify waste, over-expenditure and, generally, make you fully cognizant of where your energy dollars are going. This knowledge will enable you to be more efficient with your energy use and be able to track and accelerate savings. Green Audits may sound expensive or complicated, but they can be free and are easier than you think.

What is an Energy Audit?

An energy audit is an analysis of a facility, indicating how and where that facility can reduce energy consumption and save energy costs. Its insight to energy efficiency and conservation can lead to significant savings on the company's utility bill.

Why Should You Get an Energy Audit?

Energy costs are soaring and your business can be at considerable risk if you do not take the guesswork out of your energy usage and the budget you need to cover it. Energy audits identify where your business is wasting energy. Residential and commercial properties account for around 10% of carbon emissions in the US, according to the EPA, which means they are very inefficient and waste huge amounts of energy and… revenue. An energy audit helps by revealing just how and where energy is being wasted. With thousands of commercial energy customers nationwide, we are well-qualified to advise you on which methods are best used for reducing energy waste and

overall energy consumption. Let's start with a simple free evaluation of your bills and show you how we have been found to save between 5% and 35% for many of our customers.

In the case of energy, less is more. Lower energy consumption equals lower energy costs. And, of course, less energy consumption is obviously good for the environment.

As you can see, to be truly effective, energy management requires a strategy just like the other aspect of your operation and measures to curb costs can be simple and in some cases free. Gaining more control over your energy costs will improve the general health of your budget. Not only that but reducing your CARBON FOOTPRINT is great for the environment too!

ENVIRONMENT audit objectives.

ENVIRONMENT Audit was initiated in the beginning of 1970's, with the motive of inspecting the work executed within an organization, whose exercises could cause risk to the health of inhabitants and the environment. It exposes the genuineness of the proclamation made by the organisation with the concern on health issues. As a consequence of their operations with respect to environmental pollution it is the duty of the organisation to carry out the green audit of the ongoing processes for various reasons, such as,

- To make sure whether one is performing in accordance with the relevant rules and regulations,
- To improve the procedures and aptness of material in use,
- To analyse the potential duties and to determine a way which can lower the cost and to the revenue.

Through green audit one gets adoration as to how to improve the condition of the environment. There are

Know about this Audit and the objectives …

- Why?
- Where?
- What?
- When?
- How?

various factors that were forced upon and determine the growth of/or conduct of green audit. Incidents like,

- Decades old Bhopal gas tragedy, that has left its residual effect which still haunts us.
- Our buildings catching fire due to various reasons,
- Industries blowing off taking valuable human lives etc
- People going sick, feeling tired, after long hours of operations in the organization,
- Increased demand of generators due to inconsistent power supply, which has resulted or lead into recent floods and droughts,

are some of the situations to ponder about!

To address various issues in context with human health, green audit is assigned to "Criteria 7" of NAAC (National assessment and accreditation council) accreditation. NAAC is a self-governing organization in India that declares the institutions as Grade "A++", "A+", "A", Grade "B", …. according to the scores assigned at the time of accreditation.

The other intention of organising green audit is to update the environment conditions in and around the institutions i.e., within the compound and outside the compound. It is carried out with the aid of performing certain tasks like waste management, energy consumed, diesel burnt it performing the objective of the organization. Lastly to self-assess the net carbon footprint of the conduct of process in the organization.

The goals of green audit

- To initiate society integrated learning.

- To provide equal opportunity to all the students, women, physically abled.
- To motivate innovative thinking and build upon.
- The purpose of carrying out green audit is securing the environment and cut down the threat posed to human health.
- To Make sure that rules and regulations are complied with.
- To avoid the environmental interruptions that are more difficult to handle and their corrections call for high cost.
- To suggest the best protocol for adding to sustainable development.
- To execute the process of the organisation utilising minimum natural resources and efficient use of those resources contributing to minimum waste generation.

How is the green audit conducted?

Pre-audit

- Planning
- selecting the team of auditors both internal and external
- schedule the audit facility
- acquire the background information
- visit areas under audit

On site conditions:

- Understand the scope of audit
- Analyse the strengths and weaknesses of the internal controls
- Conduct audit with end user comfort focused and making it easy to perform.

- Collect necessary evidence so that the stakeholders stand to understand how and where they are going wrong in the process of their conduct.
- Post audit draw the report based on the data collected.
- On confirmation of the preliminary report, draw a final report of the observations and inference with accuracy more near to implementable way.
- Discuss various remedial measures for alternatives if required.
- Prepare an action plan to overcome the shortcomings with continual observation on the action plan initiated.

Steps under green audit

Water audit: Water is one of the cheapest commodities next to the Air we breathe. Although we Indians, use less water in comparison to western countries. However, the extent of pollutants that we leave behind has polluted all the resources including the deep well.

Rainwater harvesting is one of the best techniques that can be adopted by harvesting the rainwater and using it at the time of scarcity. the audit team to observe and investigate the relevant methods that can be adopted and implemented and draw the balance of use of water.

Waste management audit: The point of generation of waste, the type of waste generated, i.e., hazardous, recyclable and organically compostable wastes and segregating method at the point of generation for easy and best way to handle the same. Evaluating such

methods to minimise the use of resources in the process of their management.

Energy audit: It deals with use of energy in the conduct of the process. The priority is topmost for conservation over efficiency; hence, energy auditor should always consider not to use the energy if necessary. At best it can be used judiciously.

Environmental quality audit: It analyses air quality, noise level and the programs undertaken by the institution for plantation creating awareness of trees around us and how nature provides us with remedial measures within its framework.

Health audit: In the process of use of resources and conduct of the activities, they can develop impact on human health, that might be off minutely harmful, cause permanent disorder or may even cause death. Occupational health hazards are discussed in detail and the stakeholders are informed of the same and required necessary remedial measures indicated.

Renewable energy: To make in organisation net zero net zero carbon emission use of renewable resources including energy such as solar wind biogas geothermal energies are put into ooh utilisation.

Carbon handprint: The net impact All the above audits should be to make an organisation contribute zero emissions which are called bye bhai use of water generation of waste use of energy e environmental damage health damage and finally to explore if the campus or direction can go in in contributing to third-party emissions minimising

Benefits of green audit: To draw home the benefits, the system has been separated out into various audits as listed above. In doing so, and if audit findings are effectively implemented there are many advantages that can be practised in the process

- Recognise the cost saving methods through waste minimising and managing technologies.
- Point out the prevailing and forth coming complications.
- Authenticate conformity with the legal requirements.
- Empower the organisation to frame a better environmental performance.
- Portray a good image of the institution which helps build better relationships with the group's organisations, stakeholders in and around its operations

Enhance the alertness for environmental guidelines duties and conduct of preparedness for any eventualities due to environmental disasters.

DAY'S ENERGY USE PLEDGE

We, The Principal, staff and students, adopt responsible practices in our day's energy use with due regard to the environment. We pledge to avoid using electrical power where not needed. We also pledge to use judiciously the electrical power by using Energy efficient products. We shall practice to switch off all appliances when not in use.

PURPOSE: To realistically and comprehensively reduce energy consumption, assure acceptable indoor air quality, and improve energy efficiency on campus through methods that are consistent with a safe, secure, and inviting campus community. As outlined in this policy, energy conservation will be accomplished by developing a proactive and progressive approach to providing energy efficient, responsible, and cost-effective operations on campus. This policy will be reviewed and updated periodically as public awareness, management techniques, and technologies change.

APPLIES TO: Faculty, staff, students, and visitors.

CAMPUS: KLE Society's SCP Arts, Science & DDS Commerce College, Mahalingpur,

We pledge to speak in open forums for the energy conservation first, Energy Efficiency next and eliminating of High Energy use appliances for better or low energy use one's.

We commit ourselves to the safe operation of all our needs, be it in classrooms, library, canteen, on road, off road, in-campus out-campus as well as at our place of stay.

We adhere to reduce environmental load by efficiently using resources, saving energy, reducing waste, encouraging material recycle, with special emphasize to minimising emissions of greenhouse gases, ozone depleting substance and particle matter. we endure to minimise environmental loads and adopt environmentally friendly technologies when ordering and purchasing necessary products and resources.

(proposed)

Indicative templet for display at all prominent areas, classrooms, waiting rooms, canteen, library, relaxing areas in the campus.

We endure to attend educational programs and promulgate our close friends and colleagues to follow suite.

We endure to ensure that we recognize the essence of this energy use policy by actively and aggressively conducting workshops and training to all in environmental concepts.

We make wide ranging social contribution to close association with the students, teaching staff, administrative staff, housekeeping staff by disclosing energy use (Star rating appliances) information and supporting minimized consumption of energy.

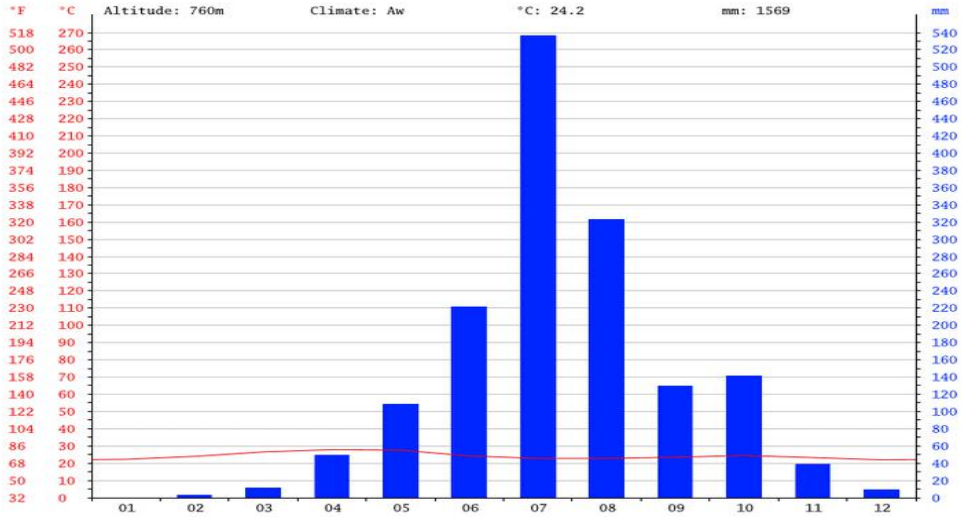
Principal

CONSIDERATIONS:

Before we present our report, the factors that are considered for positive impact recommendations are,

- Climatic conditions under which the institute is located.
- The core of activities carried out in the campus.
- The energy consumption pattern.
- Sources of electrical power to address the needs of the campus.

BELAGAVI CLIMATE GRAPH // WEATHER BY MONTH



The least amount of rainfall occurs in January. The average in this month is 0 mm | 0.0 inch. With an average of 536 mm | 21.1 inch, the most precipitation falls in July.

BELAGAVI WEATHER BY MONTH // WEATHER AVERAGES

COURTESY : (HTTPS://EN.CLIMATE-DATA.ORG/ASIA/INDIA/KARNATAKA/BELAGAVI-4076/)

The variation in the precipitation between the driest and wettest months is 536 mm | 21 inches

h. During the year, the average temperatures vary by 5.9 °C | 42.6 °F.

The temperature in Belagavi is, 5 months above 30**(°C)**, 3 months above 29**(°C)** and 4 months below 29**(°C). However, the minimum temperature has never exceeded 21°C. Indicating that the temperature has been very pleasant all over the year except reaching peak during the noon hours.**

BELAGAVI AVERAGE TEMPERATURE

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	22.2	23.9	26.5	27.8	27.5	24.2	22.7	22.7	23.4	24.4	23.2	21.9
Min. Temperature (°C)	14.4	15.6	18.3	20.1	21	20.8	20.1	19.8	19.5	19	17.2	14.5
Max. Temperature (°C)	30	32.2	34.7	35.6	34	27.7	25.4	25.7	27.4	29.8	29.2	29.3
Avg. Temperature (°F)	72.0	75.0	79.7	82.0	81.5	75.6	72.9	72.9	74.1	75.9	73.8	71.4
Min. Temperature (°F)	57.9	60.1	64.9	68.2	69.8	69.4	68.2	67.6	67.1	66.2	63.0	58.1
Max. Temperature (°F)	86.0	90.0	94.5	96.1	93.2	81.9	77.7	78.3	81.3	85.6	84.6	84.7
Precipitation / Rainfall (mm)	0	3	11	49	108	221	536	323	129	141	39	9

The temperatures are highest on average in April, at around 27.8 °C | 82.0 °F.

December has the lowest average temperature of the year. It is 21.9 °C | 71.4 °F.

LIST OF STAFF MEMBERS DESIGNATED FOR CRITERION VII

Sl.No	Name	Designation
1.	Dr. M. M. Hurali	Principal
2.	Dr. B.S Kamble	IQAC Co Ordinator
3.	Smt. S.B. Patil	Member

Eco Club Team Leaders:

- Smt S B Patil HOD, Dept of Bottony.
- Dr Smt Sujatha Shiragave.
- Smt. Shilpa Surnal

Committee for addressing Specially abled persons.

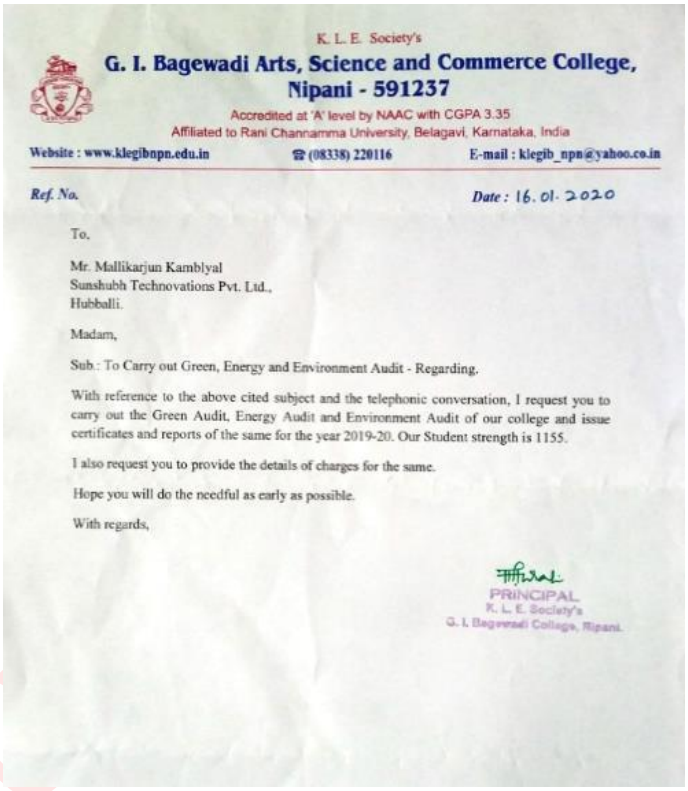
Sl.No	Name	Designation
1.	Dr. M. M. Hurali	Chairman
2.	Shri V B Dharwad	Convenor
3.	Smt. S.B. Patil	Member
4.	Miss B G Ullegaddi	Member
5.	Shri S M Jamadar	SDA

ACKNOWLEDGEMENT:

SUNSHUBH TECHNOVATIONS PVT LTD.,is pleased to express its sincere gratitude to the management of KLE Society's G.I.Bagewadi Arts,Science and Commerce College, Nipani-591237 Dist:Belagavi, Karnataka, for entrusting SUNSHUBH TECHNOVATIONS PVT LTD., with the assignment on Green Earth practices based on Educate, Practice, Advocate & Manage the resources in their educational organization.

We also wish to thank the officials and the maintenance staff for the help rendered during the energy flow study.

We would fail if we neglect to appreciate the sincere efforts put in by the 7th Criteria Team lead by the able and motivating Principal Dr. M M Hurali (Principal), and the students who against all odds have kept the college premises clean to the possible limits.



K. L. E. Society's
G. I. Bagewadi Arts, Science and Commerce College,
Nipani - 591237
Accredited at 'A' level by NAAC with CGPA 3.35
Affiliated to Rani Channamma University, Belagavi, Karnataka, India
Website : www.klegibnpn.edu.in ☎ (08338) 220116 E-mail : klegib_npn@yahoo.co.in

Ref. No. Date : 16. 01. 2020

To,

Mr. Mallikarjun Kamblyal
Sunshubh Technovations Pvt. Ltd.,
Hubballi.

Madam,

Sub.: To Carry out Green, Energy and Environment Audit - Regarding.

With reference to the above cited subject and the telephonic conversation, I request you to carry out the Green Audit, Energy Audit and Environment Audit of our college and issue certificates and reports of the same for the year 2019-20. Our Student strength is 1155.

I also request you to provide the details of charges for the same.

Hope you will do the needful as early as possible.

With regards,

PRINCIPAL
K. L. E. Society's
G. I. Bagewadi College, Nipani.

Without the crucial and significant support from the fellow teaching team the energy savings and carbon footprint reduction would not be a reality.

With the motivational support of the management, ground realistic support from teaching team and sincere efforts of the students in incorporating the change (habits) and instructions, the college could effectively declare the reduction in Carbon footprint and optimize the waste reductions.

We are not in a position to compute the carbon foot print at this point of time as the basic information from each of the students is yet to be collected; however, we will discuss the Carbon Foot print in the follow up compliance report.

Wishing the team, a great success we deeply express our gratitude and heartfelt "THANKYOU" for allowing us to assess the energy flow scenario there by the ENERGY STATUS.

Mallikarjun A. Kambalyal. B.E.(E&C).
Certified Energy Auditors (EA-3485)
SUNSHUBH TECHNOVATIONS PVT LTD.,

LIMITATIONS:

Our recommendations are in the interest of conservation of Electrical Energy and Green Culture i.e., the reduction in CARBON FOOTPRINT. The compliance to the recommendations will be subjected to meeting the safety and Environmental rules and guidelines.

AUTHENTICATION & DATE OF GREEN AUDIT:

This Green Audit has been carried out on 20th Jan 2020 under the instructions of Dr. M M Hurali. Principal. and in the presence of Dr. B S Kamble and Smt S B Patil.

ABOUT GREEN AUDIT:

KLE Society's G.I.Bagewadi Arts,Science and Commerce College, Nipani-591237 Dist:Belagavi, Karnataka has asked SUNSHUBH TECHNOVATIONS PVT LTD., Hubli., to conduct the Green Energy Audit for the Institution.

In this context, the management of the Institute represented by Dr. M M Hurali. Principal., interacted with us for the feasibility to reduce energy consumption and adopt green habits.

SUNSHUBH TECHNOVATIONS PVT LTD., represented by Mr. Mallikarjun A. Kambalyal made a detailed study and readings of various appliances were taken in presence of the officials and carried out the ENERGY audit along with the safety parameters. Based on the information available and the requirements put before us, it was decided to submit the report placing preference on conservation over efficiency. We hope the points presented will be self-explanatory, if there is need for any clarification, we are open for discussions.

LIST OF INSTRUMENTS:

During the process of the Audit, the following lists of instruments were used.

Sr No.	INSTRUMENT	MAKE	APPLICATION
1	Digital Power Analyser (PC Interfaced)	SCHIVAN ARNOX	Electrical Machinery.
2	Accessories -3000 Amps	ARNOX	Higher load UPTO 3000 Amps,
3	Accessories -200 Amps	ARNOX	UPTO 200 Amps,
4	Thermal Imager	FLIR	Identify loose contacts and bearing losses
5	Power Analyser (Manual)	MECO	Electrical Machinery.
6	Infrared Thermometer	METRAVI	Thermal (Fuel) Energy.
7	Digital (Contact) Temperature & Humidity Meter.	METRAVI	Electrical Machinery. (A/C's And Cooling Towers)
8	Digital Tachometer	METRAVI	Electrical Machinery.(A/C's And Cooling Towers)
9	Lux Meter	METRAVI	General & Task Lighting.
10	Sound Level Meter	METRAVI	Electrical Machinery. Generator Sound Proofing
11	Digital Anemometer	METRAVI	Electrical Machinery.(A/C's And Cooling Towers)
12	Digital KW Meter	METRAVI	Electrical Machinery.

13	Digital Power Factor Meter	METRAVI	Electrical Machinery.
14	Lap Top Computer	HP	To Interface The Instruments For More Accurate -Sophisticated Readings In Sensitive Equipments.
15	Ultrasonic flow meter		Measure liquid flow.
16	Portable Vibration Meter.	METRAVI	Effect Of Filtration - Sewing System. Structural Stability
17	Live cable detector probe	-	Detect hidden cables for safety audit.
18	Power Analyser – EMM 5	Beluk	For remote communication and detailed audit.
19	Power Analyser – ELITE PRO	Beluk	Power Analyser.
20	ETV meter, KWh & PF meters for site recording.	Secure	
21	PT's for Transformer audits.	KALPA	On field auditing of transformer loading and imbalance evaluation.

o

NOTES:

Notes:

ENERGY AUDIT REPORT

2019-20

in compliance with the statutory requirements under the NAAC accreditation procedures

Audited by:

Principal Lead Auditor:
Mallikarjun A Kambalyal. CEA, ISO 50001, 14001 Lead Auditor.

SUNBSHUBH TECHNOVATIONS PVT LTD.,
120-2, LGF, 'A' wing, IT Park,
Hubli – 580029. Karnataka. India.
German off: Neuer Weg 166, 47803 Krefeld,
Dusseldorf. Germany Anbieter-Nr 1041388

Website: www.sunshubhrenewables.ocm
Email: ceo@sunshubhrenewables.com

Contents

CARBON FOOTPRINT - GREEN PLEDGE (PROPOSED)

We the Principal, the staff and students, adopt responsible practices in our daily activities with due regard to the environment. We set and continually review objectives and targets for achieving our goal to protect our entire college premises in front, backyard and all other non-approachable areas of all primary and secondary pollutions.

We seek to compile with safety and environmental regulations to implement inhouse standards to improve our environmental performance. We commit ourselves to the safe operation of all our working habits, be it in classrooms, library, canteen, on road, off road, in-campus out-campus as well as at our place of stay. We adhere to reduce environmental load by efficiently using resources, saving energy, reducing waste, encouraging material recycle, with special emphasize to minimising emissions of greenhouse gases, ozone depleting substance and particle matter.

We endure to minimise environmental loads and adopt environmentally friendly technologies when ordering and purchasing necessary products and resources. We endure to attend educational programs and promulgate our close friends and colleagues to follow suite We endure to ensure that we recognize the essence of this Green policy by actively and aggressively conducting workshops and training to all in environmental concepts. We make wide ranging social contribution to close association with the students, teaching staff, administrative staff, housekeeping staff by disclosing environmental information and supporting environmental consumption.

-Sd-

Principal

(*Indicative templet for display at all prominent areas, waiting rooms, canteen, library, relaxing areas in the campus.*)

EXECUTIVE SUMMURY.

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category
1	Solar Power	Suggest to install Solar Power to minimise use of energy during Offgrid times.					7.1.
2	Occupancy sensor	Wastage of power	High	Occupancy sensor based switching	₹1500 per room	Resulted ROI of one year.	7.1.2
3	Battery placement	Concealed enclosure. Battery shell in conductor loop	Low performance & self-discharge.	Design the stacking arrangements.	In house resources	25% of the cost of the batteries.	7.1.2, 7.1.6
4	Battery regeneration.	Short life span	300% of the cost of the battery.	Subject all batteries to regeneration made.	Rs.20.00 Lacs or as per user agreement	300 %	7.1.2,
5	Electrical	Old tube lights	High energy consumers	LED lights of appropriate ratings.	Rs.80/- to Rs.250/- per unit	Rs.175/- per tube per annum. ROI of 1 years.	7.1.6
6	Natural Lighting	Un cleaned windows and ventilators, forced switching on of tube lights	High energy bills	Clean the windowpanes and allow maximum natural light penetration.	Nil, part of routine, In house manpower.	Substantial cost of energy bills on lighting.	7.1.2, 7.1.6
7	Natural Ventilation	Permanently closed ventilators.	Creation of hot air pockets below the ceiling.	Open the Ventilators for easy exit of hot/warm air from the rooms.	Nil, In house manpower.	Eliminates use of Electrical Fans and Substantial cost of energy bills	7.1.2, 7.1.6

* For details, please follow the discussions in the report.

***Criteria* 7.1.6**

ENERGY AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the Energy Audit has been carried out on 20th Jan 2020 under the instructions of Dr.M.M. Hurali Principal, KLE Society's G.I.Bagewadi Arts,Science and Commerce College, Nipani-591237 Dist:Belagavi, Karnataka, India

This report is generated based on the site visits and evidence collected from the site.

All attempts have been made to evaluate the scope for development and inculcate green practices in the campus and extended throughout the campus. The focus is also laid to make positive impact on the society for a better living.

I also confirm and sign this certificate, in case the institution needs demonstration, my team of professionals shall be happy to do so.

We present this report to much more than the legal or mandatory compliances. This report is tabled in two parts. The first forms the core discussions which are general in nature. The second section is subject specific under the statutory requirements of the NAAC accreditation norms. They are Audit reports on, Green aspects, Energy aspects, Environment aspects, Health aspects and the discussions on net CARBON FOOTPRINT & the CARBON HANDPRINT initiatives.

Any modifications, changes, omissions after the site visit shall be exclusive.

Authorised Auditor.
Mallikarjun A. Kambalyal B.E (E&C)
Certified Energy Auditors EA-3485& ISO 50001:2011 & ISO14001:2015 Lead Auditor.

BUREAU OF ENERGY EFFICIENCY

Examination Registration No. : EA-3485 Serial Number 2838

Certificate Registration No. : 2838

Certificate For Certified Energy Manager

This is to certify that Mr./Mrs./Ms. Mallikarjun A Kambalyal Son/Daughter of Mr./Mrs. Andanappa V Kambalyal who has passed the National Examination for certification of energy manager held in the month of April 2006 is qualified as certified energy manager subject to the provisions of Bureau of Energy Efficiency (Certification Procedures for Energy Managers) Regulations, 2010.

This certificate shall be valid for five years with effect from the date of award of this certificate and shall be renewable subject to attending the prescribed refresher training course once in every five years.

His /Her name has been entered in the Register of certified energy manager at Serial Number 2838 being maintained by the Bureau of Energy Efficiency under the aforesaid regulations.

Mr./Mrs./Ms. Mallikarjun A Kambalyal is deemed to have qualified for appointment or designation as energy manager under clause (*l*) of Section 14 of the Energy Conservation Act, 2001 (Act No.52 of 2001).

Given under the seal of the Bureau of Energy Efficiency, this 7th day of February, 2013

Secretary
Bureau of Energy Efficiency
New Delhi

Dates of attending the refresher course	Secretary's Signature	Dates of attending the refresher course	Secretary's Signature
28.01.2020			

Bureau of energy Efficiency Regd No: EA3485

Certificate of Successful Completion

Intertek

This is to Certify that

MALLIKARJUN A KAMBALYAL

has successfully completed the

Intertek

CQI & IRCA Certified ISO 14001:2015
Auditor Conversion Training Course

The Course includes the assessment and evaluation of Environmental Management Systems to conform to the requirements of ISO 14001:2015 and ISO 19011:2011

This course is certified by the Chartered Quality Institute (CQI) and the International Register of Certificated Auditors (IRCA)
– IRCA REFERENCE 18093 –

The course meets the training requirements for individuals seeking certification under the IRCA Auditor Certification Schemes

CQI | IRCA
APPROVED TRAINING PARTNER

Authorising Signature: Vyara Atanova

Course Dates: 14th – 16th July 2017 *Certificate Number: 47730*

Membership Application To Be Made Within 3 Years From Last Day of Course

12180T

ISO Certified Lead Auditor. Certificate No: 47730

bsi.

By Royal Charter

BSI Training Academy

This is to certify that

Mallikarjun A. Kambalyal

has attended and passed

Energy Management Systems (ENMS) Auditor/Lead Auditor Training Course
(ISO 50001:2011)

Premanand Ramakrishnan, Director of Training

Date: 14/04/2016 - 18/04/2016

Certificate Number: ENR-00253448

This certificate is valid for 3 years from the date above for the purpose of registering as an auditor with IRCA.

Course number A17583 certified by IRCA

...making excellence a habit.™

The British Standards Institution is incorporated by Royal Charter
BSI India, The Mira Corporate Suites (A-2), Plot 1 & 2 Ishwar Nagar Mathura Road, New Delhi 110065, India Tel: +91 11 2692 9000

ISO Certified Lead Auditor. Certificate No: ENR-00253448

ONGOING STATUS:

It's an optimistic & highly dedicated team effort lead by the Principal & the senior staff who have dedicated all their wits & free time to initiate Green Carpet the entire college premises. It is also a fact that there do exist few short comings which however is unintentional & on being trained & educated the campus should look for continued minimized waste generation. With all due appreciation to the management, staff involved & cooperation by the students, we have made few suggestions which on implementation, will reduce, demand for water & electrical power. It will also reduce the existing level of pollution to bear minimum.

NO WASTE – NO POLLUTION – NO HEALTH HAZARD.

DISCUSSIONS ON EXECUTIVE SUMMARY:

Aerial View of the College Campus.

It is also prominently exhibited in all prominent places. Aerial view indicates that the management has shown keen interest in providing the amenities and is focusing on keeping the campus green there by the cool environment within the boundaries of the college.

Image : courtesy, Google Earth Pro, 16.408037° 74.376359°

Renewable energy

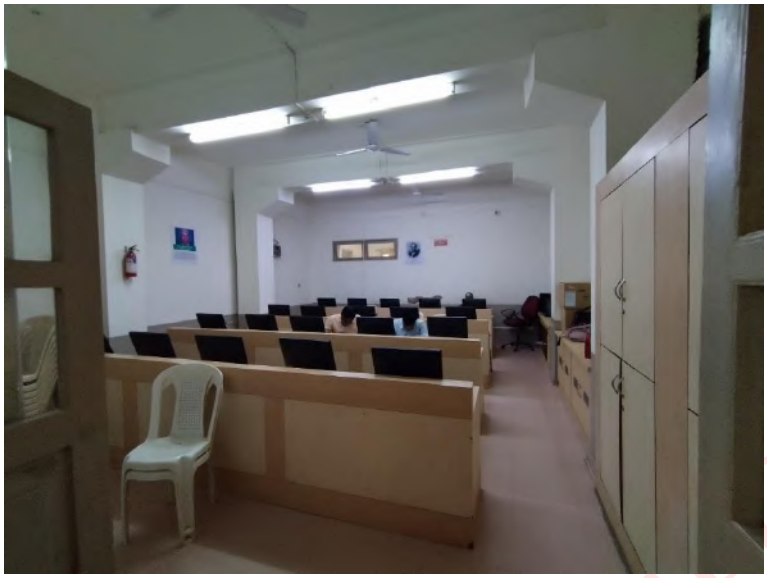
Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
1	Solar Power	Suggest to install Solar Power to minimise use of energy during Off grid times.					7.1.2

The institute has good space to explore rooftop Solar power to meet the energy requirement of the institute. The initiative can take the institute to net zero energy.

Sensor Technology

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
2	Occupancy sensor	Wastage of power	High	Occupancy sensor based switching	₹1500 per room	Resulted ROI of one year.	7.1.2

It is also observed that the lights are left switched ON at majority of places during daylight, thus calling for wastage of electrical power. Thus causing financial losses to the management and energy loss to the country.



Solution:

It is therefore required to install Light Intensity Sensors in all the rooms. Lighting improvements should be carried out by using T5/LED or The Induction Light systems in lieu of normal tube lights. If the finance department permits, it is advised to install 40W Induction lamps in all classrooms.

Source : Can be locally procured, However the load-based selection is key aspect in its installation. To set the visibility, the intensity of natural light is much stronger and hence LUX based setting doesn't work. Hence the technical supervision is key aspect.

We suggest to allocate this to the Physics stream of students to understand the science and application of technology.

Need based light energy utilisation should be imparted to the children so as to take it forward to the society.

The other aspect to the light energy is the task based lighting.

Ie., Task – normal or critical.

General lighting ie open larea or living room lighting.

External lighting ie yard lighting for security reasons.

Natural lighting

	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category
5	Electrical	Old tube lights	High energy consumers	LED lights of appropriate ratings.	Rs.80/- to Rs.250/- per unit	Rs.175/- per tube per	7.1.6
6	Natural Lighting	Un cleaned windows	High energy bills	Clean the windowpanes and allow	Nil, part of routine, In house	Substantial cost of	7.1.2, 7.1.6

We find use of T8 & T12 tube lights. It is wise to replace the same with LED tube lights on immediate basis. Considering the energy savings, the wait for there failure may not be justified.

We also suggest to make best use of natural lighting

In the above roof, it may be considered to replace couple of the Galvalume sheets with green tinted Translucent (frp) sheets as below.

Light Intensity Sensor requirement.

It may be seen that the Light is illuminated. However, the brightness on the students is seen to be coming from the sides. The shadow indicates natural light coming from the windows is brighter. Natural light is more predominant than the tube light. Hence tube light being switched off has no adverse effect. However, it would save on the energy consumption and contribute to green practices.

NATURAL LIGHTING: Category 7.1.1, 7.1.2, 7.1.3 and 7.1.5

Illustrative

Battery management.

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category
3	Battery placement	Battery shell in conductor loop	Low performance & self-discharge.	Design the stacking arrangements.	In house resource	25% of the cost of the batteries.	7.1.3

Criteria 7.1.1, 7.1.2, 7.1.3 and 7.1.5

BATTERY PLACEMENT:

The batteries should be placed on an

1. Batteries should be placed on an insulated platform not touching any of the metal frames with top clearance of 6" for ease of handling and breathing.
2. Need cross ventilation for favourable breathing.
3. Provision for periodical checking and maintenance should be made possible without major obstacles.

In absence of the above placement conditions,

1. The batteries will discharge faster. Loss of energy
2. The charging time and current will increase as there is the return path for self-discharge. Increased Energy Demand.

A well-maintained battery is known to serve for more than 7 years.

The presence of oxidation marks at the point of contact should not develop over the time.

We strongly advice for regenerating the batteries once every 3 to 4 years so that they serve over 15 years in liew of 5 years under present conditions.

A well-maintained battery will draw less charging power, i.e., saves on energy consumption, delivers more energy per charge thus resulting in better serviced life.

Batteries should be placed well ventilated and avoid dumping of any material on the breathers provided.

For more information on battery regeneration, Contact

Sunshubh Technovations Pvt Ltd, Hubli ceo@sunshubhrenewables.com.

BATTERY REGENERATION

Battery regeneration is very popular. 80% of the batteries breaking down and losing capacity are sulphated, but can be restored with the right equipment. Battery regenerator successfully replaces sulphation by active material thanks to an electrical high-frequency pulsation process. This process restores the battery capacity, giving you the ability to reuse old and sulphated batteries. You can also use the battery regenerator for annual maintenance to considerably prolong the lifespan of your batteries. The battery regenerator can be used in every lead-acid-based battery: starter batteries, stationary batteries, traction & semi-traction batteries, Ni-Cad batteries … Since the college uses BATTERIES in large numbers, the management can consider to procure one unit at the centralised station in the college campus.

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category
4	Battery regeneration.	Short life span	300% of the cost of the battery.	Subject all batteries to regeneration made.	Rs.20.00 Lacs or as per user agreement	300 %	7.1.2, 7.1.6

Necessity and Issues

It is customary in the present energy scenario to use Batteries either in our office or working environment. In continuation, The old week batteries are a nuisance as they need to be discarded in to the environment for further process. Which is a costly option both in terms of Health and pollution issues. Let us review our use of application and consider if we can improve our battery use methods. A brief note, before we consider to take corrective step.

Lead-acid batteries are widely used as important power supply devices that include automotive, uninterruptible power supply (UPS), telecommunication systems and various traction duties.

Lead-acid batteries are the workhorse of the rechargeable battery systems for its reliability, low cost, and good operational life. Predictably, approximately million tons waste batteries are generated every year and the production of lead-acid batteries will continue to rise even more sharply with sustained and rapid development of economy. The lead-acid battery is a complex industrial product, constituted by several different materials, the consequence was very serious which often caused much property loss, casualties and environment pollution once accidents happen

Based on "Technical Guidelines for Environmental Risk Assessment on Projects" and in consideration of the characteristics of the chemical compositions and contents, a framework of environmental risk assessment framework on lead-acid batteries was established. The work procedure included risk identification, sources analysis, pollution forecast, and defensive measures. By analysing the environmental risk assessment of lead-acid batteries, the study opined for directions both for the preventive measures and safe use, according to the forecast results of lead-acid batteries.

Risk identification of Lead-acid Batteries

Lead-acid batteries generally consist of four parts, which are electrolyte, lead and lead alloy grid, lead paste, and organics and plastics, which included lots of toxic, hazardous, flammable, explosive substances that can easily create potential risk sources. The materials contained in lead-acid batteries may bring about lots of pollution accidents such as fires, explosions, poisoning and leaks, contaminating environment and damaging ecosystem. The main chemical compositions and contents of spent lead-acid batteries are listed below.

Environmental effects of lead can end up in water and soils through corrosion of leaded pipelines in a water transporting system and through corrosion of leaded paints. ... **Lead** accumulates in the bodies of water organisms and soil organisms. These will experience health effects from Lead poisoning.

The main chemical compositions and contents of spent lead-acid batteries

Compositions	Contents (wt.%)
Electrolyte	11–30%
Lead and lead alloy grid	24–30%
Lead paste	30–40%
Organics and plastics	22–30%

The recognition & scope of lead-acid batteries, mainly focused on the pollutants involved in the process of centralized recovery, Storage areas and transport. Based on "Technical Guidelines for Environmental Risk Assessment on Projects" and" Identification of hazard installations for dangerous chemicals

With change in times, new solutions keep coming up. One such option is to Regenerate the dead or non-usable batteries. Energic Plus battery regenerator successfully removes sulphating due to an electrical high-frequency pulsation process.

This process restores the battery capacity, giving you the ability to reuse old and sulphated batteries. You can also use the battery preconditioner for annual maintenance to strongly prolong the lifespan of your batteries.

Main Benefits are :

- Removes excessive sulphate
- Prolongs the lifespan of your battery
- Generates detailed reports in Word, Excel or PDF
- Fully automatic, easy to handle
- Free software included with wireless data transfer to computer
- Combination of charging/discharging
- Works with all types of lead-acid-based batteries:
    1. Gel batteries,

2. Traction(semi-) batteries,
3. Starter batteries,
4. Stationary Batteries.

Concealed batteries in operation or used batteries should be properly named and placed in proper order. The used batteries should be considered for REGENERATION for the second and subsequent cycles and prolong the disposal as the chemicals cause high level of damage to the environment.

We will discuss the regenerative system of used and week batteries to enhance the life. It is important to know few points on handling of batteries.
BU-703: Health Concerns with Batteries.

1. Become familiar with the do's and don't's when handling batteries.

Batteries are safe, but caution is necessary when touching damaged cells and when handling lead acid systems that have access to lead and sulfuric acid. Several countries label lead acid as hazardous material, and rightly so. Lead can be a health hazard if not properly handled.

Lead

Lead is a toxic metal that can enter the body by inhalation of lead dust or ingestion when touching the mouth with lead-contaminated hands. If leaked onto the ground, acid and lead particles contaminate the soil and become airborne when dry. Children and foetuses of pregnant women are most vulnerable to lead exposure because their bodies are developing. Excessive levels of lead can affect a child's growth, cause brain damage, harm kidneys, impair hearing and induce behavioural problems. In adults, lead can cause memory loss and lower the ability to concentrate, as well as harm the reproductive system. Lead is also known to cause high blood pressure, nerve disorders, and muscle and joint pain. Researchers speculate that Ludwig van Beethoven became ill and died because of lead poisoning. By 2017, members of the International Lead Association (ILA) want to keep the lead blood level of workers in mining, smelting, refining and recycling below 30 micrograms per decilitre (30µg/dl). In 2014, the average participating employee

checked in at 15.6µg/dl, but 4.8 percent were above 30µg/dl. (Source Batteries & Energy Storage Technology, Summer 2015.)

In 2019, the University of Southern California published the detection of lead in teeth of children living near the Exide Technologies battery recycling plant in Vernon, California.

Lead occurs naturally in soil at 15–40mg/kg level. This level can increase multi-fold near lead battery manufacturing and recycling plants. Soil levels in developing countries, including on the continent of Africa, recorded lead contamination levels of 40–140,000mg/kg.

Sulfuric Acid

The sulfuric acid in a lead acid battery is highly corrosive and is more harmful than acids used in most other battery systems. Contact with eye can cause permanent blindness; swallowing damages internal organs that can lead to death. First aid treatment calls for flushing the skin for 10–15 minutes with large amounts of water to cool the affected tissue and to prevent secondary damage. Immediately remove contaminated clothing and thoroughly wash the underlying skin. Always wear protective equipment when handling sulfuric acid.

Cadmium

Cadmium used in nickel-cadmium batteries is considered more harmful than lead if ingested. Workers at NiCd manufacturing plants in Japan have been experiencing health problems from prolonged exposure to the metal, and governments have banned disposal of nickel-cadmium batteries in landfills. The soft, whitish metal that occurs naturally in the soil can damage kidneys. Cadmium can be absorbed through the skin by touching a spilled battery. Since most NiCd batteries are sealed, there are no health risks in handling intact cells; caution is required when working with an open battery.

Nickel-metal-hydride is considered non-toxic and the only concern is the electrolyte. Although toxic to plants, nickel is not harmful to humans.

Lithium-ion is also benign — the battery contains little toxic material. Nevertheless, caution is required when working with a damaged battery. When handling a spilled battery, do not touch your mouth, nose or eyes. Wash your hands thoroughly.
Keep small batteries out of children's reach. Children younger than four are the most likely to swallow batteries, and the most common types that are ingested are button cells. Each year in the United States alone, more than 2,800 children are treated in emergency rooms for swallowing button batteries. According to a 2015 report, serious injuries and deaths from swallowing batteries have increased nine-fold in the last decade.

The battery often gets stuck in the oesophagus (the tube that passes food). Water or saliva creates an electrical current that can trigger a chemical reaction producing hydroxide, a caustic ion that causes serious burns to the surrounding tissue. Doctors often misdiagnose the symptoms, which can reveal themselves as fever, vomiting, poor appetite and weariness. Batteries that make it through the oesophagus often move through the digestive tract with little or no lasting damage. The advice to a parent is to choose safe toys and to keep small batteries away from young children.

Safety Tips

- Keep button batteries out of sight and reach of children. Remote controls, singing greeting cards, watches, hearing aids, thermometers, toys and electric keys may contain these batteries.
- Similar to pharmaceutical products, keep loose batteries locked away to prevent access by small children.
- Communicate the danger of swallowing button batteries with your children, as well as caregivers, friends, family members and babysitters.
- If you suspect your child has ingested a battery, go to the hospital immediately. Wait for a medical assessment before allowing the child to eat and drink.

Ventilation

Charging batteries in living quarters should be safe, and this also applies to lead acid. Ventilate the area regularly as you would a kitchen when cooking. Lead acid

produces some hydrogen gas but the amount is minimal when charged correctly. Hydrogen gas becomes explosive at a concentration of 4 percent. This would only be achieved if large lead acid batteries were charged in a sealed room.

Over-charging a lead acid battery can produce hydrogen sulphide. The gas is colourless, very poisonous, flammable and has the odour of rotten eggs. Hydrogen sulphide also occurs naturally during the breakdown of organic matter in swamps and sewers; it is present in volcanic gases, natural gas and some well waters. Being heavier than air, the gas accumulates at the bottom of poorly ventilated spaces. Although noticeable at first, the sense of smell deadens the sensation with time and potential victims may be unaware of its presence.

As a simple guideline, hydrogen sulphide becomes harmful to human life if the odour is noticeable. Turn off the charger, vent the facility and stay outside until the odour disappears. Other gases that can develop during charging and the operations of lead acid batteries are arsine (arsenic hydride, AsH_3) and (antimony hydride, SbH_3). Although the levels of these metal hydrides stay well below the occupational exposure limits, they are a reminder to provide adequate ventilation.

Regeneration of week batteries for the second lease of life.

The financials and Return on Investments are:

First Investment and periodical expenses.		Earnings and Units Regenerated.	
Cost of Initial Capital Comprehensive. The system includes cost of Regeneration system, Digital Battery media Tester One Computer preloaded with Battery Monitoring System with required Report generating Templet. And other tools.	22,00,000	Monthly units of Batteries for regeneration targeted	45
Provision for GST charges	3,96,000	Cost of regenerating the batteries.	500
Energy Bills for the year @ Rs.640 per Battery	28,800	Cost of a new 120Ah battery is considered to be 10000	
Manpower for regular attendance – in house.	In-house	For Automobile batteries which are 65Ah, we may consider connecting in Parallel.	
Total first Year Capital cost.	26,24,000	Monthly Revenue	135000
Monthly Expenses recurring	₹500/- per Battery.	Monthly Net Earnings after expenses	107600
Return on investment Computation.	**22+2**	GST refund on (If Considered) sales	24300
Space required for the regeneration operation.	100 sqft	Net GST recovery in months	Can be offset.

The rest of the regeneration capacity/option can be extended to sister (group) concerns. In addition, the positive impact on the environment and health benefits with delayed investment on new batteries are few added feature.

Putting the Batteries into Regeneration cycle once every two years, the life of the Batteries can be enhanced to 12-15 years.

Hence the Future Value of Capital over the Rupee.

It may also be considered under the soft skill training to generate self employment. A town like Nippani with most of the houses using INVERTER and the economy driven by agriculture, industries, the battery regeneration should be a viable self-employment to couple of students. Thus the institute may consider to act as a catalyst in the battery management.

Natural ventilation.

Sr No	Observation *	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
7	Natural Ventilation	Permanently closed ventilators.	Creation of hot air pockets below the ceiling.	Open the Ventilators for easy exit of hot/warm air from the rooms.	Nil, In house manpower.	Eliminates use of Electrical Fans and	7.1.2, 7.1.6

The natural ventilators are missing in the top floor class rooms. We also see that the roof is of Galvalume sheets. This makes the room hotter and more intolerable during the hot days. In absence of cross ventilation, the room turns out to be a oven. WE

strongly suggest that the rooms be provided with cross ventilation just below the roof, making it easy for the hot air to vent out by thermosyphon.

Illustrative.

We also suggest ts use BLDC fans in Liew of normal ceiling fans which are energy intensive.

WHY SUPER ENERG Y EFFICIENT CEILING FANS?

Regular old ceiling fans

Ceiling fans escape one's mind when thinking about reducing electricity cost. This forgotten appliance contributes significantly to

electricity consumption due to its numbers and hours of usage. The following estimation supports this claim. A regular ceiling fan (1200 mm span) consumes about 75 W at the highest speed. There are over 400 million regular ceiling fans in India and each of them creates an electricity demand about 39W* (consumption at medium speed).

Super energy efficient ceiling fans

At present Brushless Direct Current (BLDC) ceiling fan is the popular choice of super energy efficient ceiling fans in India. There are two premier BLDC ceiling fan brands in India – Superfan (Versa Drives Private Limited) and Gorilla fans (Atomberg Technologies)**. These ceiling fans (1200mm span) consume 35W at the highest speed so they save over 50% of electricity consumption.

The higher efficiency comes with no compromise in air delivery. Now consider replacing all the ceiling fans in India with best energy saving

ceiling fan. The reduction in electricity demand created by ceiling fans will be:

Please contact M/s **VERSA DRIVES PRIVATE LIMITED**

38 B, Vadakku Thottam Part, Idikarai, Coimbatore. Tamil Nadu, India 641022

Tel: 0422-2972798 / 2972799 / 2972800

Reference to the audit report may be made to avail educational-additional discount.

Safety.

Sr No	Observation *	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
8	Electrical safety	Failure of electrical equipment	Loss of valuable data and assets.	Proper earthing and periodical maintenance with measurement.	Nil, In house manpower.	Eliminates electrical hazards and threat	7.1.2, 7.1.6

Name plate :

Earth pit connected to : xxxx system.

Date of inspection : dd/mm/yyyy

Measured values :

Reasistance: xx Ω

Leakage current : xx Amps.

Date of next inspection (Six months duration)

WHY IS THIS AUDIT BEING CARRIED OUT.

Why it's important to have an Energy Audit

Whether you own or manage a small business, a large commercial facility, or a manufacturing operation, it's important to take advantage of any tips, programs and incentives that will help you save money on your energy bills. There are measures that will generate savings to positively impact your bottom line immediately, as well as longer-term strategic initiatives to assess your needs and stabilize your energy spend in the longer term – which is great news for your budget!

One such initiative is an energy audit. Energy audits reveal your usage patterns, identify waste, over-expenditure and, generally, make you fully cognizant of where your energy dollars are going. This knowledge will enable you to be more efficient with your energy use and be able to track and accelerate savings. Energy Audits may sound expensive or complicated, but they can be free and are easier than you think.

What is an Energy Audit?

An energy audit is an analysis of a facility, indicating how and where that facility can reduce energy consumption and save energy costs. Its insight to energy efficiency and conservation can lead to significant savings on the company's utility bill.

Why Should You Get an Energy Audit?

Energy costs are soaring and your business can be at considerable risk if you do not take the guesswork out of your energy usage and the budget you need to cover it. Energy audits identify where your business is wasting energy. Residential and commercial properties account for around 10% of carbon emissions in the US, according to the EPA, which means they are very inefficient and waste huge amounts of energy and… revenue. An energy audit helps by revealing just how and where energy is being wasted. With thousands of commercial energy customers nationwide, we are well-qualified to advise you on which methods are best used for reducing energy waste and overall energy consumption. Let's start with a simple free evaluation of your bills and show you how we have been found to save between 5% and 35% for many of our customers.

In the case of energy, less is more. Lower energy consumption equals lower energy costs. And, of course, less energy consumption is obviously good for the environment.

As you can see, to be truly effective, energy management requires a strategy just like the other aspect of your operation and measures to curb costs can be simple and in some cases free. Gaining more control over your energy costs will improve the general health of your budget. Not only that but reducing your CARBON FOOTPRINT is great for the environment too!

ENERGY AUDIT OBJECTIVES.

Know about this Audit and the objectives …

- Why?
- Where?
- What?
- When?
- How?

Energy Audit was initiated in the beginning of 1970's, with the motive of inspecting the work executed within an organization, whose exercises could cause risk to the health of inhabitants and the environment. It exposes the genuineness of the proclamation made by the organisation with the concern on health issues. As a consequence of their operations with respect to environmental pollution it is the duty of the organisation to carry out the green audit of the ongoing processes for various reasons, such as,

- To make sure whether one is performing in accordance with the relevant rules and regulations,
- To improve the procedures and aptness of material in use,
- To analyse the potential duties and to determine a way which can lower the cost and to the revenue.

Through green audit one gets adoration as to how to improve the condition of the environment. There are various factors that were forced upon and determine the growth of/or conduct of green audit. Incidents like,

- Decades old Bhopal gas tragedy, that has left its residual effect which still haunts us.
- Our buildings catching fire due to various reasons,
- Industries blowing off taking valuable human lives etc
- People going sick, feeling tired, after long hours of operations in the organization,
- Increased demand of generators due to inconsistent power supply, which has resulted or lead into recent floods and droughts,

are some of the situations to ponder about!

To address various issues in context with human health, green audit is assigned to "Criteria 7" of NAAC (National assessment and accreditation council) accreditation. NAAC is a self-governing

organization in India that declares the institutions as Grade "A++", "A+", "A", Grade "B", …. according to the scores assigned at the time of accreditation.

The other intention of organising green audit is to update the environment conditions in and around the institutions i.e., within the compound and outside the compound. It is carried out with the aid of performing certain tasks like waste management, energy consumed, diesel burnt it performing the objective of the organization. Lastly to self-assess the net carbon footprint of the conduct of process in the organization.

The goals of green audit

- The purpose of carrying out green audit is securing the environment and cut down the threat posed to human health.
- To Make sure that rules and regulations are complied with.
- To avoid the environmental interruptions that are more difficult to handle and their corrections call for high cost.
- To suggest the best protocol for adding to sustainable development.
- To execute the process of the organisation utilising minimum natural resources and efficient use of those resources contributing to minimum waste generation.

How is the green audit conducted?

Pre-audit

- Planning
- selecting the team of auditors both internal and external
- schedule the audit facility
- acquire the background information
- visit areas under audit

- Understand the scope of audit
- Analyse the strengths and weaknesses of the internal controls
- Conduct audit with end user comfort focused and making it easy to perform.
- Collect necessary evidence so that the stakeholders stand to understand how and where they are going wrong in the process of their conduct.
- Post audit draw the report based on the data collected.
- On confirmation of the preliminary report, draw a final report of the observations and inference with accuracy more near to implementable way.
- Discuss various remedial measures for alternatives if required.
- Prepare an action plan to overcome the shortcomings with continual observation on the action plan initiated.

Steps under green audit

Water is one of the cheapest commodities next to the Air we breathe. Although we Indians, use less water in comparison to western countries. However, the extent of pollutants that we leave behind has polluted all the resources including the deep well.

Rainwater harvesting is one of the best techniques that can be adopted by harvesting the rainwater and using it at the time of scarcity. the audit team to observe and investigate the relevant methods that can be adopted and implemented and draw the balance of use of water.

Waste management audit: The point of generation of waste, the type of waste generated, i.e., hazardous, recyclable and organically compostable wastes and segregating method at the point of generation for easy and best way to handle the same. Evaluating such

methods to minimise the use of resources in the process of their management.

Energy audit: It deals with use of energy in the conduct of the process. The priority is topmost for conservation over efficiency; hence, energy auditor should always consider not to use the energy if necessary. At best it can be used judiciously.

Environmental quality audit: It analyses air quality, noise level and the programs undertaken by the institution for plantation creating awareness of trees around us and how nature provides us with remedial measures within its framework.

Health audit: In the process of use of resources and conduct of the activities, they can develop impact on human health, that might be off minutely harmful, cause permanent disorder or may even cause death. Occupational health hazards are discussed in detail and the stakeholders are informed of the same and required necessary remedial measures indicated.

To make in organisation net zero net zero carbon emission use of renewable resources including energy such as solar wind biogas geothermal energies are put into ooh utilisation.

The net impact All the above energy audits should be to make an organisation contribute zero emissions which are called bye bhai use of water generation of waste use of energy e environmental damage health damage and finally to explore if the campus or direction can go in in contributing to third-party emissions minimising

To draw home the benefits, the system has been separated out into various audits as listed above. In doing so, and if audit findings are effectively implemented there are many advantages that can be practised in the process

- Recognise the cost saving methods through waste minimising and managing technologies.

- Point out the prevailing and forth coming complications.
- Authenticate conformity with the legal requirements.
- Empower the organisation to frame a better environmental performance.
- Portray a good image of the institution which helps build better relationships with the group's organisations, stakeholders in and around its operations

Enhance the alertness for environmental guidelines duties and conduct of preparedness for any eventualities due to environmental disasters.

DAY'S ENERGY USE PLEDGE

We, The Principal, staff and students, adopt responsible practices in our day's energy use with due regard to the environment. We pledge to avoid using electrical power where not needed. We also pledge to use judiciously the electrical power by using Energy efficient products. We shall practice to switch off all appliances when not in use.

PURPOSE: To realistically and comprehensively reduce energy consumption, assure acceptable indoor air quality, and improve energy efficiency on campus through methods that are consistent with a safe, secure, and inviting campus community. As outlined in this policy, energy conservation will be accomplished by developing a proactive and progressive approach to providing energy efficient, responsible, and cost-effective operations on campus. This policy will be reviewed and updated periodically as public awareness, management techniques, and technologies change.

APPLIES TO: Faculty, staff, students, and visitors.

CAMPUS: KLE SOCIEY'S G I BAGEWADI ARTS, SCIENCE AND COMMERCE COLLEGE. NIPPANI. DIST:BELGAVI, KARNATAKA.

We pledge to speak in open forums for the energy conservation first, Energy Efficiency next and eliminating of High Energy use appliances for better or low energy use one's.

We commit ourselves to the safe operation of all our needs, be it in classrooms, library, canteen, on road, off road, in-campus out-campus as well as at our place of stay.

We adhere to reduce environmental load by efficiently using resources, saving energy, reducing waste, encouraging material recycle, with special emphasize to minimising emissions of greenhouse gases, ozone depleting substance and particle matter. we endure to minimise environmental loads and adopt environmentally friendly technologies when ordering and purchasing necessary products and resources.

We endure to attend educational programs and promulgate our close friends and colleagues to follow suite.

We endure to ensure that we recognize the essence of this Energy use policy by actively and aggressively conducting workshops and training to all in environmental concepts.

We make wide ranging social contribution to close association with the students, teaching staff, administrative staff, housekeeping staff by disclosing Energy use (Star rating appliances) information and supporting minimized consumption of Energy.

Principal.

KLE SOCIEY'S G I BAGEWADI ARTS, SCIENCE AND COMMERCE COLLEGE. NIPPANI. DIST:BELGAVI, KARNATAKA.

(proposed)

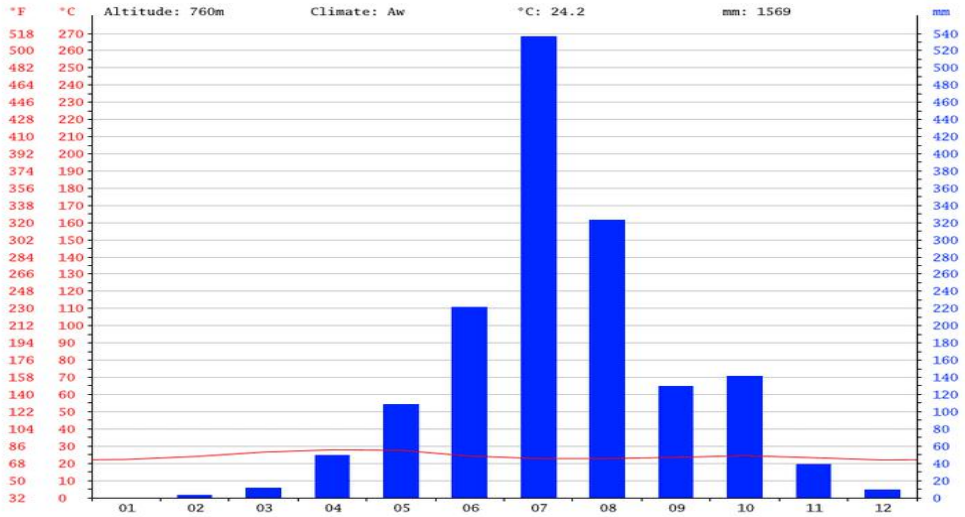
Indicative templet for display at all prominent areas, classrooms, waiting rooms, canteen, library, relaxing areas in the campus.

CONSIDERATIONS:

Before we present our report, the factors that are considered for positive impact recommendations are,

- Climatic conditions under which the institute is located.
- The core of activities carried out in the campus.
- The energy consumption pattern.
- Sources of electrical power to address the needs of the campus.

BELAGAVI CLIMATE GRAPH // WEATHER BY MONTH



The least amount of rainfall occurs in January. The average in this month is 0 mm | 0.0 inch. With an average of 536 mm | 21.1 inch, the most precipitation falls in July.

BELAGAVI AVERAGE TEMPERATURE

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	22.2	23.9	26.5	27.8	27.5	24.2	22.7	22.7	23.4	24.4	23.2	21.9
Min. Temperature (°C)	14.4	15.6	18.3	20.1	21	20.8	20.1	19.8	19.5	19	17.2	14.5
Max. Temperature (°C)	30	32.2	34.7	35.6	34	27.7	25.4	25.7	27.4	29.8	29.2	29.3
Avg. Temperature (°F)	72.0	75.0	79.7	82.0	81.5	75.6	72.9	72.9	74.1	75.9	73.8	71.4
Min. Temperature (°F)	57.9	60.1	64.9	68.2	69.8	69.4	68.2	67.6	67.1	66.2	63.0	58.1
Max. Temperature (°F)	86.0	90.0	94.5	96.1	93.2	81.9	77.7	78.3	81.3	85.6	84.6	84.7
Precipitation / Rainfall (mm)	0	3	11	49	108	221	536	323	129	141	39	9

The temperatures are highest on average in April, at around 27.8 °C | 82.0 °F.

December has the lowest average temperature of the year. It is 21.9 °C | 71.4 °F.

BELAGAVI WEATHER BY MONTH // WEATHER AVERAGES

COURTESY : (HTTPS://EN.CLIMATE-DATA.ORG/ASIA/INDIA/KARNATAKA/BELAGAVI-4076/)

The variation in the precipitation between the driest and wettest months is 536 mm | 21 inches

h. During the year, the average temperatures vary by 5.9 °C | 42.6 °F.

The temperature in Belagavi is, 5 months above 30**(°C)**, 3 months above 29**(°C)** and 4 months below 29**(°C). However, the minimum temperature has never exceeded 21°C. Indicating that the temperature has been very pleasant all over the year except reaching peak during the noon hours.**

LIST OF STAFF MEMBERS DESIGNATED FOR CRITERION VII

Sl.No	Name	Designation
1.	Dr. M. M. Hurali	Principal
2.	Dr. B.S Kamble	IQAC Co Ordinator
3.	Smt. S.B. Patil	Member

Eco Club Team Leaders:

Smt S B Patil HOD, Dept of Bottony.

Dr Smt Sujatha Shiragave.

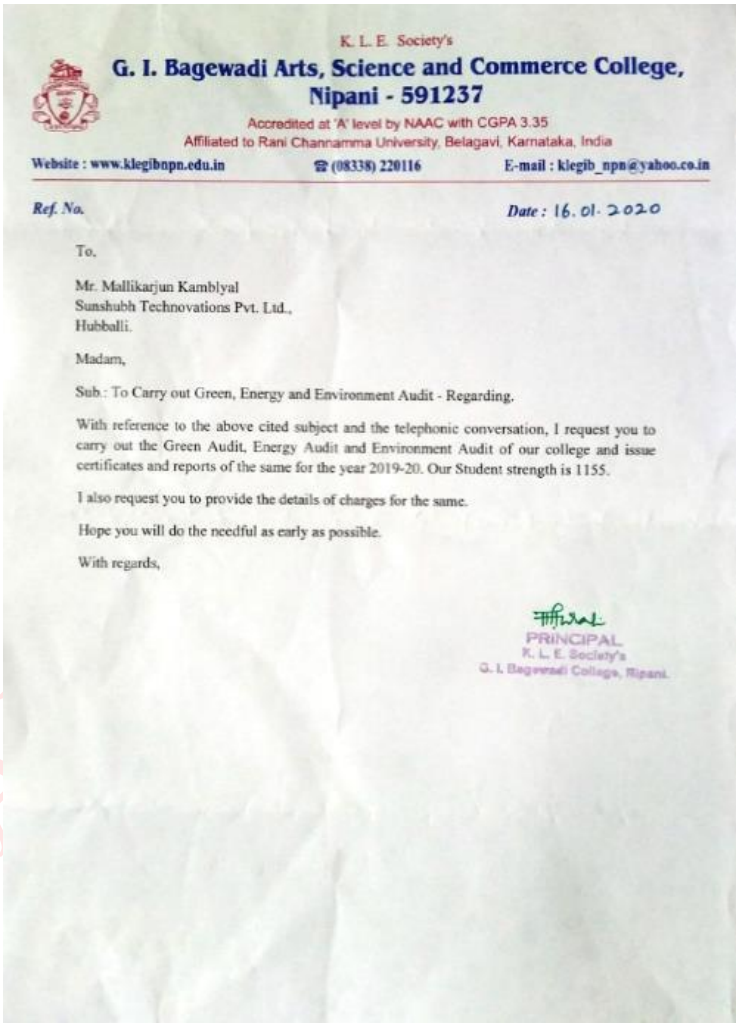
Smt. Shilpa Surnal

ACKNOWLEDGEMENT:

SUNSHUBH TECHNOVATIONS PVT LTD.,is pleased to express its sincere gratitude to the management of KLE Society's G.I.Bagewadi Arts,Science and Commerce College, Nipani-591237 Dist:Belagavi, Karnataka, for entrusting SUNSHUBH TECHNOVATIONS PVT LTD., with the assignment on Green Earth practices based on Educate, Practice, Advocate & Manage the resources in their educational organization.

We also wish to thank the officials and the maintenance staff for the help rendered during the energy flow study.

We would fail if we neglect to appreciate the sincere efforts put in by the 7th Criteria Team lead by the able and motivating Principal Dr. M M Hurali (Principal),



K. L. E. Society's

G. I. Bagewadi Arts, Science and Commerce College, Nipani - 591237

Accredited at 'A' level by NAAC with CGPA 3.35

Affiliated to Rani Channamma University, Belagavi, Karnataka, India

Website : www.klegibnpn.edu.in ☎ (08338) 220116 E-mail : klegib_npn@yahoo.co.in

Ref. No. Date : 16.01.2020

To,

Mr. Mallikarjun Kamblyal
Sunshubh Technovations Pvt. Ltd.,
Hubballi.

Madam,

Sub.: To Carry out Green, Energy and Environment Audit - Regarding.

With reference to the above cited subject and the telephonic conversation, I request you to carry out the Green Audit, Energy Audit and Environment Audit of our college and issue certificates and reports of the same for the year 2019-20. Our Student strength is 1155.

I also request you to provide the details of charges for the same.

Hope you will do the needful as early as possible.

With regards,

PRINCIPAL
K. L. E. Society's
G. I. Bagewadi College, Nipani.

and the Students who against all odds have kept the college premises clean to the possible limits. Without the crucial and significant support from the fellow teaching team the energy savings and carbon footprint reduction would not be a reality.

With the motivational support of the management, ground realistic support from teaching team and sincere efforts of the students in incorporating the change (habits) and instructions, the college could effectively declare the reduction in Carbon footprint and optimize the waste reductions.

We are not in a position to compute the carbon foot print at this point of time as the basic information from each of the students is yet to be collected; however, we will discuss the Carbon Foot print in the follow up compliance report.

Wishing the team, a great success we deeply express our gratitude and heartfelt "THANKYOU" for allowing us to assess the energy flow scenario there by the ENERGY STATUS.

Mallikarjun A. Kambalyal. B.E.(E&C).
Certified Energy Auditors (EA-3485)
SUNSHUBH TECHNOVATIONS PVT LTD.,

LIMITATIONS:

Our recommendations are in the interest of conservation of Electrical Energy and Green Culture i.e. the reduction in CARBON FOOTPRINT. The compliance to the recommendations will be subjected to meeting the safety and Environmental rules and guidelines.

AUTHENTICATION & DATE OF ENERGY AUDIT:

This Energy Audit has been carried out on 20th Jan 2020 under the instructions of Dr. M M Hurali. Principal. and in the presence of Dr. B S Kamble and Smt S B Patil.

ABOUT ENERGY AUDIT:

KLE Society's G.I.Bagewadi Arts,Science and Commerce College, Nipani-591237 Dist:Belagavi, Karnataka has asked SUNSHUBH TECHNOVATIONS PVT LTD., Hubli., to conduct the Green Energy Audit for the Institution.

In this context, the management of the Institute represented by Dr. M M Hurali. Principal., interacted with us for the feasibility to reduce energy consumption and adopt green habits.

SUNSHUBH TECHNOVATIONS PVT LTD., represented by Mr. Mallikarjun A. Kambalyal made a detailed study and readings of various appliances were taken in presence of the officials and carried out the ENERGY audit along with the safety parameters.

Based on the information available and the requirements put before us, it was decided to submit the report placing preference on conservation over efficiency.

We hope the points presented will be self-explanatory, if there is need for any clarification, we are open for discussions.

LIST OF INSTRUMENTS:

During the process of the Audit, the following lists of instruments were used.

Sr No.	INSTRUMENT	MAKE	APPLICATION
1	Digital Power Analyser (PC Interfaced)	SCHIVAN ARNOX	Electrical Machinery.
2	Accessories -3000 Amps	ARNOX	Higher load UPTO 3000 Amps,
3	Accessories -200 Amps	ARNOX	UPTO 200 Amps,
4	Thermal Imager	FLIR	Identify loose contacts and bearing losses
5	Power Analyser (Manual)	MECO	Electrical Machinery.
6	Infrared Thermometer	METRAVI	Thermal (Fuel) Energy.
7	Digital (Contact) Temperature & Humidity Meter.	METRAVI	Electrical Machinery. (A/C's And Cooling Towers)
8	Digital Tachometer	METRAVI	Electrical Machinery.(A/C's And Cooling Towers)
9	Lux Meter	METRAVI	General & Task Lighting.
10	Sound Level Meter	METRAVI	Electrical Machinery. Generator Sound Proofing
11	Digital Anemometer	METRAVI	Electrical Machinery.(A/C's And Cooling Towers)
12	Digital KW Meter	METRAVI	Electrical Machinery.
13	Digital Power Factor Meter	METRAVI	Electrical Machinery.

14	Lap Top Computer	HP	To Interface The Instruments For More Accurate -Sophisticated Readings In Sensitive Equipments.
15	Ultrasonic flow meter		Measure liquid flow.
16	Portable Vibration Meter.	METRAVI	Effect Of Filtration - Sewing System. Structural Stability
17	Live cable detector probe	-	Detect hidden cables for safety audit.
18	Power Analyser – EMM 5	Beluk	For remote communication and detailed audit.
19	Power Analyser – ELITE PRO	Beluk	Power Analyser.
20	ETV meter, KWh & PF meters for site recording.	Secure	
21	PT's for Transformer audits.	KALPA	On field auditing of transformer loading and imbalance evaluation.

Only appropriate instruments will used wherever necessary.

ACTION PLAN SUMMARY:

- Earmark the action plan.
- Invite subject experts for Tec talks,
- Organize in person panel discussions and interaction to propagate the knowledge and mitigate the problems in practicing the same.
- Prioritize the initiatives and execute.
- Observe the benefits and shortcomings.
- Workout further improvement by involving the staff and students.

MODE OF ACTION:

- The process of GREEN AUDIT & ENERGY CONSERVATION should be carried out in three steps.
- Good housekeeping practices using available manpower.
- Minor alterations using in house work culture with minimum investments on accessories as discussed.
- Capital investments, which may be required for installation of new methodologies may be taken up on phased manner.

We will be happy to assist you for any further advice/consultancy if required either on Rainwater management or on any of the measures discussed in the report.

We hope the measures are implemented in good spirit and to human convenience and comfort.

For SUNSHUBH TECHNOVATIONS PVT LTD.,

Mallikarjun A. Kambalyal. B.E. (E&C)

Certified Energy Auditors EA-3485

NOTES:

Notes:

Notes:

ENVIRONMENT AUDIT REPORT
2019-20

in compliance with the statutory requirements under the NAAC accreditation procedures

KLE Society's
G.I.Bagewadi Arts,Science and Commerce College,

Audited by:

Principal Lead Auditor:
Mallikarjun A Kambalyal. CEA, ISO 50001, 14001 Lead Auditor.

SUNBSHUBH TECHNOVATIONS PVT LTD.,
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Hubli – 580029. Karnataka. India.

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Contents

CARBON FOOTPRINT - GREEN PLEDE (proposed)to text

We the Principal, the staff and students, adopt responsible practices in our daily activities with due regard to the environment. We set and continually review objectives and targets for achieving our goal to protect our entire college premises in front, backyard and all other non-approachable areas of all primary and secondary pollutions.

We seek to compile with safety and environmental regulations to implement inhouse standards to improve our environmental performance. We commit ourselves to the safe operation of all our working habits, be it in classrooms, library, canteen, on road, off road, in-campus out-campus as well as at our place of stay. We adhere to reduce environmental load by efficiently using resources, saving energy, reducing waste, encouraging material recycle, with special emphasize to minimising emissions of greenhouse gases, ozone depleting substance and particle matter.

We endure to minimise environmental loads and adopt environmentally friendly technologies when ordering and purchasing necessary products and resources. We endure to attend educational programs and promulgate our close friends and colleagues to follow suite We endure to ensure that we recognize the essence of this Green policy by actively and aggressively conducting workshops and training to all in environmental concepts. We make wide ranging social contribution to close association with the students, teaching staff, administrative staff, housekeeping staff by disclosing environmental information and supporting environmental consumption.

-Sd-

Principal

(*Indicative templet for display at all prominent areas, waiting rooms, canteen, library, relaxing areas in the campus.*)

EXECUTIVE SUMMARY.

For details, please follow the discussions in the report.

	Observations	Issues/Problems	Resulting losses	Remedial measures	Capital	Projected savings
	Good Practices.	It is important to replicate all good practices discussed to all areas in the campus.	Focussed activities	N/A	N/A	Focussed results.
	Water management.	Flooding the lawns.	Excess water consumed.	Sprinkler.	@ Rs1000/- per unit.	Energy & Water savings
	Organic waste management.	System needs to be brought into order.	Handling costs	Composting at point of source	Nil.	Third party handling costs
	Clear windows	Distraction of attention	Failed objective.	Filming	Few thousands	Better academic results.
	Rainwater Harveting Abuse and Use.	Water contamination	Loss of quality water source.	Proper filtration should be incorporated.	@ ₹8000/-	Third party supply.

	Observations	Issues/Problems	Resulting losses	Remedial measures	Capital	Projected savings
	Chemical waste disposal	Attracts pollution control boards authorities and capital costs	Loss of revenue	Good use practices.	Nil	Longer/extended life of Batteries
	LPG (Fuel) cylinders storage and management.	Fire hazards	Loss of life and loss of assets	Organised way of handling of explosives	Nil or minimum	Safety in place.
	HACCP practices.	Inconvenient and non-operation of assets and utilities provided.	Added manpower costs.	Provide Sanitary pad dispensers at easy & where required.	₹. 15000/- per unit.	Health safety compliance.
	Utility Management.	Mainte-nance	Inefficient operation.	Periodical cleaning	NIL	Increased efficiency.
	Food wastage and waste minimisation.	Random disposal	unaccountability	Segregate, weigh and deliver.	NIL	Minimised wastage.

	Observations	Issues/Problems	Resulting losses	Remedial measures	Capital	Projected savings
	Construction waste management.	Unaccountability	Call for penalty or pollution	Land use change	Labelling & Transportation	Organised and compliance.
	Asset management.	Unaccountability	Loss of records	Move the unused assets to proper store area.	NIL	Increased accountability.
	Indoor Air Quality	Inhaling of polluted air	Human inefficiency	Fresh air filters	₹.10k-100k	Complains OSHO Safety standards
	Fire Safety	No training, awareness and non-suitable place.	Loss of assets	Training and awareness	NIL/Minimum	Emer-gency prepared ness.

***Criteria* 7.1.6**

ENVIRONMENT AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the Energy Audit has been carried out on 20th Jan 2020 under the instructions of Dr.M.M. Hurali Principal, KLE Society's G.I.Bagewadi Arts,Science and Commerce College, Nipani-591237 Dist:Belagavi, Karnataka, India

This report is generated based on the site visits and evidence collected from the site.

All attempts have been made to evaluate the scope for development and inculcate green practices in the campus and extended throughout the campus. The focus is also laid to make positive impact on the society for a better living.

I also confirm and sign this certificate, in case the institution needs demonstration, my team of professionals shall be happy to do so.

We present this report to much more than the legal or mandatory compliances. This report is tabled in two parts. The first forms the core discussions which are general in nature. The second section is subject specific under the statutory requirements of the NAAC accreditation norms. They are Audit reports on, Green aspects, Energy aspects, Environment aspects, Health aspects and the discussions on net CARBON FOOTPRINT & the CARBON HANDPRINT initiatives.

Any modifications, changes, omissions after the site visit shall be exclusive.

Authorised Auditor.

Mallikarjun A. Kambalyal B.E (E&C)

Certified Energy Auditors EA-3485& ISO 50001:2011 & ISO14001:2015 Lead Auditor.

BUREAU OF ENERGY EFFICIENCY

Examination Registration No. : EA-3485 Serial Number 2838

Certificate Registration No. : 2838

Certificate For Certified Energy Manager

This is to certify that Mr./Mrs./Ms. Mallikarjun A Kambalyal Son/Daughter of Mr./Mrs. Andanappa V Kambalyal who has passed the National Examination for certification of energy manager held in the month of April 2006 is qualified as certified energy manager subject to the provisions of Bureau of Energy Efficiency (Certification Procedures for Energy Managers) Regulations, 2010.

This certificate shall be valid for five years with effect from the date of award of this certificate and shall be renewable subject to attending the prescribed refresher training course once in every five years.

His /Her name has been entered in the Register of certified energy manager at Serial Number 2838 being maintained by the Bureau of Energy Efficiency under the aforesaid regulations.

Mr./Mrs./Ms. Mallikarjun A Kambalyal is deemed to have qualified for appointment or designation as energy manager under clause (*l*) of Section 14 of the Energy Conservation Act, 2001 (Act No.52 of 2001).

Given under the seal of the Bureau of Energy Efficiency, this 7th day of February, 2013

Secretary
Bureau of Energy Efficiency
New Delhi

Dates of attending the refresher course	Secretary's Signature	Dates of attending the refresher course	Secretary's Signature
28.01.2020			

Bureau of energy Efficiency Regd No: EA3485

Certificate of Successful Completion

Intertek

This is to Certify that

MALLIKARJUN A KAMBALYAL

has successfully completed the

Intertek

CQI & IRCA Certified ISO 14001:2015
Auditor Conversion Training Course

The Course includes the assessment and evaluation of Environmental Management Systems to conform to the requirements of ISO 14001:2015 and ISO 19011:2011

This course is certified by the Chartered Quality Institute (CQI) and the International Register of Certificated Auditors (IRCA)
– IRCA REFERENCE 18093 –

The course meets the training requirements for individuals seeking certification under the IRCA Auditor Certification Schemes

CQI | IRCA
APPROVED TRAINING PARTNER

Authorising Signature: Vyara Stoimova

Course Dates: 14th – 16th July 2017 *Certificate Number: 47730*

Membership Application To Be Made Within 3 Years From Last Day of Course

121807

ISO Certified Lead Auditor. Certificate No: 47730

bsi.

By Royal Charter

BSI Training Academy

This is to certify that

Mallikarjun A. Kambalyal

has attended and passed

Energy Management Systems (ENMS) Auditor/Lead Auditor Training Course
(ISO 50001:2011)

Premanand Ramakrishnan, Director of Training

Date: 14/04/2016 - 18/04/2016

Certificate Number: ENR-00253448

This certificate is valid for 3 years from the date above for the purpose of registering as an auditor with IRCA.

Course number A17583 certified by IRCA

...making excellence a habit.™

The British Standards Institution is incorporated by Royal Charter
BSI India, The Mira Corporate Suites (A-2), Plot 1 & 2 Ishwar Nagar Mathura Road, New Delhi 110065, India Tel: +91 11 2692 9000

ISO Certified Lead Auditor. Certificate No: ENR-00253448

Why is this audit being carried out.

Why it's important to have an Energy Audit

Whether you own or manage a small business, a large commercial facility, or a manufacturing operation, it's important to take advantage of any tips, programs and incentives that will help you save money on your energy bills. There are measures that will generate savings to positively impact your bottom line immediately, as well as longer-term strategic initiatives to assess your needs and stabilize your energy spend in the longer term – which is great news for your budget!

One such initiative is an energy audit. Energy audits reveal your usage patterns, identify waste, over-expenditure and, generally, make you fully cognizant of where your energy dollars are going. This knowledge will enable you to be more efficient with your energy use and be able to track and accelerate savings. Energy Audits may sound expensive or complicated, but they can be free and are easier than you think.

What is an Energy Audit?

An energy audit is an analysis of a facility, indicating how and where that facility can reduce energy consumption and save energy costs. Its insight to energy efficiency and conservation can lead to significant savings on the company's utility bill.

Why Should You Get an Energy Audit?

Energy costs are soaring and your business can be at considerable risk if you do not take the guesswork out of your energy usage and the budget you need to cover it. Energy audits identify where your business is wasting energy. Residential and commercial properties account for around 10% of carbon emissions in the US, according to the EPA, which means they are very inefficient and waste huge amounts of energy and… revenue. An energy audit helps by revealing just how and where energy is being wasted. With thousands of commercial energy customers nationwide, we are well-qualified to advise you on which methods are best used for reducing energy waste and

overall energy consumption. Let's start with a simple free evaluation of your bills and show you how we have been found to save between 5% and 35% for many of our customers.

In the case of energy, less is more. Lower energy consumption equals lower energy costs. And, of course, less energy consumption is obviously good for the environment.

As you can see, to be truly effective, energy management requires a strategy just like the other aspect of your operation and measures to curb costs can be simple and in some cases free. Gaining more control over your energy costs will improve the general health of your budget. Not only that but reducing your CARBON FOOTPRINT is great for the environment too!

ENVIRONMENT audit objectives.

Know about this Audit and the objectives …

ENVIRONMENT Audit was initiated in the beginning of 1970's, with the motive of inspecting the work executed within an organization, whose exercises could cause risk to the health of inhabitants and the environment. It exposes the genuineness of the proclamation made by the organisation with the concern on health issues. As a consequence of their operations with respect to environmental pollution it is the duty of the organisation to carry out the green audit of the ongoing processes for various reasons, such as,

- Why?
- Where?
- What?
- When?
- How?

- To make sure whether one is performing in accordance with the relevant rules and regulations,
- To improve the procedures and aptness of material in use,
- To analyse the potential duties and to determine a way which can lower the cost and to the revenue.

Through green audit one gets adoration as to how to improve the condition of the environment. There are various factors that were forced upon and determine the growth of/or conduct of green audit. Incidents like,

- Decades old Bhopal gas tragedy, that has left its residual effect which still haunts us.
- Our buildings catching fire due to various reasons,
- Industries blowing off taking valuable human lives etc
- People going sick, feeling tired, after long hours of operations in the organization,
- Increased demand of generators due to inconsistent power supply, which has resulted or lead into recent floods and droughts, are some of the situations to ponder about!

To address various issues in context with human health, green audit is assigned to "Criteria 7" of NAAC (National assessment and

accreditation council) accreditation. NAAC is a self-governing organization in India that declares the institutions as Grade "A++", "A+", "A", Grade "B", …. according to the scores assigned at the time of accreditation.

The other intention of organising green audit is to update the environment conditions in and around the institutions i.e., within the compound and outside the compound. It is carried out with the aid of performing certain tasks like waste management, energy consumed, diesel burnt it performing the objective of the organization. Lastly to self-assess the net carbon footprint of the conduct of process in the organization.

The goals of green audit

- The purpose of carrying out green audit is securing the environment and cut down the threat posed to human health.
- To Make sure that rules and regulations are complied with.
- To avoid the environmental interruptions that are more difficult to handle and their corrections call for high cost.
- To suggest the best protocol for adding to sustainable development.
- To execute the process of the organisation utilising minimum natural resources and efficient use of those resources contributing to minimum waste generation.

How is the green audit conducted?

Pre-audit

- Planning
- selecting the team of auditors both internal and external
- schedule the audit facility
- acquire the background information

- visit areas under audit

On site conditions:

- Understand the scope of audit
- Analyse the strengths and weaknesses of the internal controls
- Conduct audit with end user comfort focused and making it easy to perform.
- Collect necessary evidence so that the stakeholders stand to understand how and where they are going wrong in the process of their conduct.
- Post audit draw the report based on the data collected.
- On confirmation of the preliminary report, draw a final report of the observations and inference with accuracy more near to implementable way.
- Discuss various remedial measures for alternatives if required.
- Prepare an action plan to overcome the shortcomings with continual observation on the action plan initiated.

Steps under green audit

Water audit: Water is one of the cheapest commodities next to the Air we breathe. Although we Indians, use less water in comparison to western countries. However, the extent of pollutants that we leave behind has polluted all the resources including the deep well.

Rainwater harvesting is one of the best techniques that can be adopted by harvesting the rainwater and using it at the time of scarcity. the audit team to observe and investigate the relevant methods that can be adopted and implemented and draw the balance of use of water.

Waste management audit: The point of generation of waste, the type of waste generated, i.e., hazardous, recyclable and organically compostable wastes and segregating method at the

point of generation for easy and best way to handle the same. Evaluating such methods to minimise the use of resources in the process of their management.

Energy audit: It deals with use of energy in the conduct of the process. The priority is topmost for conservation over efficiency; hence, energy auditor should always consider not to use the energy if necessary. At best it can be used judiciously.

Environmental quality audit: It analyses air quality, noise level and the programs undertaken by the institution for plantation creating awareness of trees around us and how nature provides us with remedial measures within its framework.

Health audit: In the process of use of resources and conduct of the activities, they can develop impact on human health, that might be off minutely harmful, cause permanent disorder or may even cause death. Occupational health hazards are discussed in detail and the stakeholders are informed of the same and required necessary remedial measures indicated.

Renewable energy: To make in organisation net zero net zero carbon emission use of renewable resources including energy such as solar wind biogas geothermal energies are put into ooh utilisation.

Carbon handprint: The net impact All the above audits should be to make an organisation contribute zero emissions which are called bye bhai use of water generation of waste use of energy e environmental damage health damage and finally to explore if the campus or direction can go in in contributing to third-party emissions minimising

Benefits of green audit: To draw home the benefits, the system has been separated out into various audits as listed above. In doing so, and if audit findings are effectively implemented there are many advantages that can be practised in the process

- Recognise the cost saving methods through waste minimising and managing technologies.
- Point out the prevailing and forth coming complications.
- Authenticate conformity with the legal requirements.
- Empower the organisation to frame a better environmental performance.
- Portray a good image of the institution which helps build better relationships with the group's organisations, stakeholders in and around its operations

Enhance the alertness for environmental guidelines duties and conduct of preparedness for any eventualities due to environmental disasters.

DAY's ENERGY USE PLEDGE

We, The Principal, staff and students, adopt responsible practices in our da energy use with due regard to the environment. We pledge to avoid using electric power where not needed. We also pledge to use judiciously the electrical pow by using Energy efficient products. We shall practice to switch off all applianc when not in use.

PURPOSE: To realistically and comprehensively reduce energy consumption, assu acceptable indoor air quality, and improve energy efficiency on campus throu methods that are consistent with a safe, secure, and inviting campus communi As outlined in this policy, energy conservation will be accomplished by developi a proactive and progressive approach to providing energy efficient, responsib and cost-effective operations on campus. This policy will be reviewed and updat periodically as public awareness, management techniques, and technolog change.

APPLIES TO: Faculty, staff, students, and visitors.

CAMPUS: KLE Society's G.I. Bagewadi Arts, Science and Commerc College, Nipani-591237 Dist:Belagavi, Karnataka, India

We pledge to speak in open forums for the energy conservation first, Ener Efficiency next and eliminating of High Energy use appliances for better or lo energy use one's.

We commit ourselves to the safe operation of all our needs, be it in classroon library, canteen, on road, off road, in-campus out-campus as well as at our pla of stay.

We adhere to reduce environmental load by efficiently using resources, savi energy, reducing waste, encouraging material recycle, with special emphasize minimising emissions of greenhouse gases, ozone depleting substance and partic matter. we endure to minimise environmental loads and adopt environmento friendly technologies when ordering and purchasing necessary products a resources.

We endure to attend educational programs and promulgate our close friends a colleagues to follow suite.

We endure to ensure that we recognize the essence of this energy use policy actively and aggressively conducting workshops and training to all environmental concepts.

We make wide ranging social contribution to close association with the studer teaching staff, administrative staff, housekeeping staff by disclosing energy use (S rating appliances) information and supporting minimized consumption of energy

Principal

KLE SOCIEY'S G I BAGEWADI ARTS, SCIENCE AND COMMERCE COLLEGE. NIPPA DIST:BELGAVI, KARNATAKA.

(proposed)

Indicative templet for display at all prominent areas, classrooms, waiting rooms, canteen, library, relaxing areas in the campus.

ABOUT ENVIRONMENT AUDIT:

1. KLE Society's G.I.Bagewadi Arts,Science and Commerce College, Nipani-591237 Dist:Belagavi, Karnataka has asked SUNSHUBH TECHNOVATIONS PVT LTD., Hubli., to conduct the Green Energy Audit for the Institution.
2. In this context, the management of the Institute represented by Dr. M M Hurali. Principal., interacted with us for the feasibility to reduce energy consumption and adopt green habits.
3. SUNSHUBH TECHNOVATIONS PVT LTD., represented by Mr. Mallikarjun A. Kambalyal made a detailed study and readings of various appliances were taken in presence of the officials and carried out the ENERGY audit along with the safety parameters.
4. Based on the information available and the requirements put before us, it was decided to submit the report placing preference on conservation over efficiency.

We hope the points presented will be self explanatory, if there is need for any clarification, we are open for discussions.

ONGOING STATUS:

It's an optimistic & highly dedicated team effort lead by the Principal & the senior staff who have dedicated all their wits & free time to initiate Green Carpet the entire college premises. It is also a fact that there do exist few short comings which however is unintentional & on being

trained & educated the campus should look for continued minimized waste generation. With all due appreciation to the management , staff involved & co operation by the students, we have made few suggestions which on implementation, will reduce, demand for water & electrical power. It will also reduce the existing level of pollution to bear minimum.

NO WASTE – NO POLLUTION – NO HEALTH HAZARD.

DISCUSSIONS ON EXECUTIVE SUMMARY:

- Good Practices.
- Water management.
- Organic waste management.
- Clear windows
- Rainwater Harveting Abuse and Use.
- Chemical waste disposal
- LPG (Fuel) cylinders storage and management.
- HACCP practices.
- Utility Management.
- Food wastage and waste minimisation.
- Construction waste management.
- Asset management.
- Indoor Air Quality
- Fire Safety

It is important to discuss the geographical layout for better understanding.

Geographical layout.

Before we proceed with the discussions on various aspects of Environment impact. It is important that we look at the geographical spread of the college campus.

Satellite view of the College campus.

Satellite view of the Academic block.
Suitable for rooftop solar power.

Water availability and the quality of water decides the environment in the campus.

Considering the geographical parameters and weather conditions, water management methodology needs to evolve.

GOOD PRACTICES:

Welfare of the staff is taken care by providing Kinder Garden and Baby sitting facilities.

The old Gurukul system – Learning under the tree is a sign of continued traditional values.

Protecting the assets and use of Renewable energy.

Well protected open well

Safely and suiatably placed Chemicals. Large bottles on the lower shelf and small bottles on upper shelf.

ISI marked barbed LPG pipe for all weather suitability.

LPG cylinders placed outside the room and well protected with strong mesh.

well cordoned nursery.

Gradient marking to manage rainwater

Some points for further improvement.

Transparent window glasses should be placed at all possible

Translucent window glasses should be placed at all possible

See through windows should be camouflaged with translucent film.

The translucent window glasses up to the height of standing eye sight prevents diversion of attention and possible disturbance.

Placing of waste collection bins should be within reach.

Two options are provided. The management can select the method based on cost factor. If the rural technology is opted, the colour code can be maintained.

Considering human tendency, not to walk the distance, the waste collection bins should be placed before every room for ease of handling and convenience. Once the people get to the habit the waste collection will automatically be self-driven.

If sufficient bins are placed before every room with colour code i.e., Green bins for organic and compostable waste. Yellow/Red for non-compostable wastes. (The management may choose to have any colour options as required) the manpower required to clear the same will be reduced as well.

These locally sourced bins may be placed all along the campus.
We suggest that these bins be colour coded to segregate the waste at source.
This option may look to be off the date. It should be important in placing a small placard as to why hand sewed bins are being put to use.
- The biggest being the empowering the rural youth in being economically self-sufficient.

- Bins are organic and biodegradable. Hence do not contribute to the carbon emissions. Leading to a very innovative Carbon Handprint initiative.
- Readily visible and easy to empty when half full.
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ORGANIC WASTE COMPOST.

WATER MANAGEMENT.

The institute is located on the first floor. However the voluntary team may be formed to educate the other stake holders in managing the water appropriately.

The images shown are typical methods followed by many of the people for keeping green cover live.

Water is money. Water is Energy and water is life. Judicious use of water is crucial considering the availability of water we suggest that the team of gardeners get educated on… How we should water, How much should we water, How often should we water and when to stop watering are few check points.

Proper watering is crucial to having the best-looking lawn on the block. Here are some key points:

Since we reside in tropical zone, it is important that we operate the sprinklers after sunset to avoid evaporation and allow the water to percolate deep into the top soil.

- Lawn needs *at least* 1"-1 ½" of water per week, year-round, during the winter, too.
- It's important to retain moisture content hence, Water deeply 2-3 times per week, rather than daily.
- Watering early in the morning also is favoured, when possible.
- We will need more water during the day hours.
- Should not water the lawns for so long that, water runs down.

- It is important to have automatic sprinklers and also to check them regularly to be sure that we get complete coverage. Going a step further, one can place the moisture sensor and automate the operation of sprinklers if one can afford the system.

BATTERY MANAGEMENT :

The batteries regeneration if incorporated, can also be a revenue earning model for the college by educating the students and training them by undertaking third party batteries for re-generation.

This also takes the institute to reducing its Carbon Footprint and closely interacting with the Industries, other educational institutes and the society at large.

First is to enhance the life of these batteries by properly placing them.

All batteries should be placed in well ventilated area. As battery disposal is turning out to be a serious issue, ways to prolong the life of the batteries is very important from the environmental point and also from the Financial implications.

We will discuss the regenerative system of used and week batteries to enhance the life. It is important to know few points on handling of batteries. BU-703: Health Concerns with Batteries

Become familiar with the do's and don'ts when handling batteries.

Batteries are safe, but caution is necessary when touching damaged cells and when handling lead acid systems that have access to lead and sulfuric acid. Several countries label lead acid as hazardous material, and rightly so. Lead can be a health hazard if not properly handled.

Lead

Lead is a toxic metal that can enter the body by inhalation of lead dust or ingestion when touching the mouth with

lead-contaminated hands. If leaked onto the ground, acid and lead particles contaminate the soil and become airborne when dry. Children and foetuses are most vulnerable to lead exposure because their bodies are developing. Excessive levels of lead can affect a child's growth, cause brain damage, harm kidneys, impair hearing and induce behavioural problems. In adults, lead can cause memory loss and lower the ability to concentrate, as well as harm the reproductive system. Lead is also known to cause high blood pressure, nerve disorders, and muscle and joint pain. Researchers speculate that Ludwig van Beethoven became ill and died because of lead poisoning.

By 2017, members of the International Lead Association (ILA) want to keep the lead blood level of workers in mining, smelting, refining and recycling below 30 micrograms per decilitre (30µg/dl). In 2014, the average participating employee checked in at 15.6µg/dl, but 4.8 percent were above 30µg/dl. (Source Batteries & Energy Storage Technology, Summer 2015.)

In 2019, the University of Southern California published the detection of lead in teeth of children living near the Exide Technologies battery recycling plant in Vernon, California

Lead occurs naturally in soil at 15–40mg/kg level. This level can increase multi-fold near lead battery manufacturing and recycling plants. Soil levels in developing countries, including on the continent of Africa, recorded lead contamination levels of 40–140,000mg/kg. (See BU-705: How to Recycle Batteries.)

Sulfuric Acid

The sulfuric acid in a lead acid battery is highly corrosive and is more harmful than acids used in most other battery systems. Contact with eye can cause permanent blindness; swallowing damages internal organs that can lead to death. First aid treatment calls for flushing the skin for 10–15 minutes with large amounts of water to cool the affected tissue and to prevent secondary damage. Immediately remove contaminated clothing and thoroughly wash the underlying skin. Always wear protective equipment when handling sulfuric acid.

Cadmium

Cadmium used in nickel-cadmium batteries is considered more harmful than lead if ingested. Workers at NiCd manufacturing plants in Japan have been experiencing health problems from prolonged exposure to the metal, and governments have banned disposal of nickel-cadmium batteries in landfills. The soft, whitish metal that occurs naturally in the soil can damage kidneys. Cadmium can be absorbed through the skin by touching a spilled battery. Since most NiCd batteries are sealed, there are no

health risks in handling intact cells; caution is required when working with an open battery.

Nickel-metal-hydride is considered non-toxic and the only concern is the electrolyte. Although toxic to plants, nickel is not harmful to humans.
Lithium-ion is also benign — the battery contains little toxic material. Nevertheless, caution is required when working with a damaged battery. When handling a spilled battery, do not touch your mouth, nose or eyes. Wash your hands thoroughly.
Keep small batteries out of children's reach. Children younger than four are the most likely to swallow batteries, and the most common types that are ingested are button cells. Each year in the United States alone, more than 2,800 children are treated in emergency rooms for swallowing button batteries. According to a 2015 report, serious injuries and deaths from swallowing batteries have increased nine-fold in the last decade.
The battery often gets stuck in the oesophagus (the tube that passes food). Water or saliva creates an electrical current that can trigger a chemical reaction producing hydroxide, a caustic ion that causes serious burns to the surrounding tissue. Doctors often misdiagnose the symptoms, which can reveal themselves as fever, vomiting, poor appetite and weariness. Batteries that

make it through the oesophagus often move through the digestive tract with little or no lasting damage. The advice to a parent is to choose safe toys and to keep small batteries away from young children.

Safety Tips

- Keep button batteries out of sight and reach of children. Remote controls, singing greeting cards, watches, hearing aids, thermometers, toys and electric keys may contain these batteries.
- Similar to pharmaceutical products, keep loose batteries locked away to prevent access by small children.
- Communicate the danger of swallowing button batteries with your children, as well as caregivers, friends, family members and babysitters.
- If you suspect your child has ingested a battery, go to the hospital immediately. Wait for a medical assessment before allowing the child to eat and drink.

Ventilation

Charging batteries in living quarters should be safe, and this also applies to lead acid. Ventilate the area regularly as you would a kitchen when cooking. Lead acid produces some hydrogen gas but the amount is minimal when charged correctly. Hydrogen gas becomes explosive at a concentration of 4 percent. This would only

be achieved if large lead acid batteries were charged in a sealed room.

Over-charging a lead acid battery can produce hydrogen sulphide. The gas is colourless, very poisonous, flammable and has the odour of rotten eggs. Hydrogen sulphide also occurs naturally during the breakdown of organic matter in swamps and sewers; it is present in volcanic gases, natural gas and some well waters. Being heavier than air, the gas accumulates at the bottom of poorly ventilated spaces. Although noticeable at first, the sense of smell deadens the sensation with time and potential victims may be unaware of its presence.

As a simple guideline, hydrogen sulphide becomes harmful to human life if the odour is noticeable. Turn off the charger, vent the facility and stay outside until the odour disappears. Other gases that can develop during charging and the operations of lead acid batteries are arsine (arsenic hydride, AsH_3) and (antimony hydride, SbH_3). Although the levels of these metal hydrides stay well below the occupational exposure limits, they are a reminder to provide adequate ventilation.

Regeneration of week batteries for the Second/Third lease of life.

Significance…

- The early regeneration results into second tenure of the batteries i.e., another term of 3 to 5 years as per Battery specifications.
- Optimised energy consumption. Thus, reduced cost of operation.
- Delayed disposal results into elimination of environment pollution.
- Reduced impact on CARBON FOOTPRINT.

HACCP PRACTICES –gender equality:

Sanitary Pad dispenser :

We appreciate the placement of the sanitary pad dispenser and also being used by the members. One improvement is however needed. The custodian of the pads contact details may be displayed. This should help to draw the attention of the stock holder to replenish the dispenser when empty.

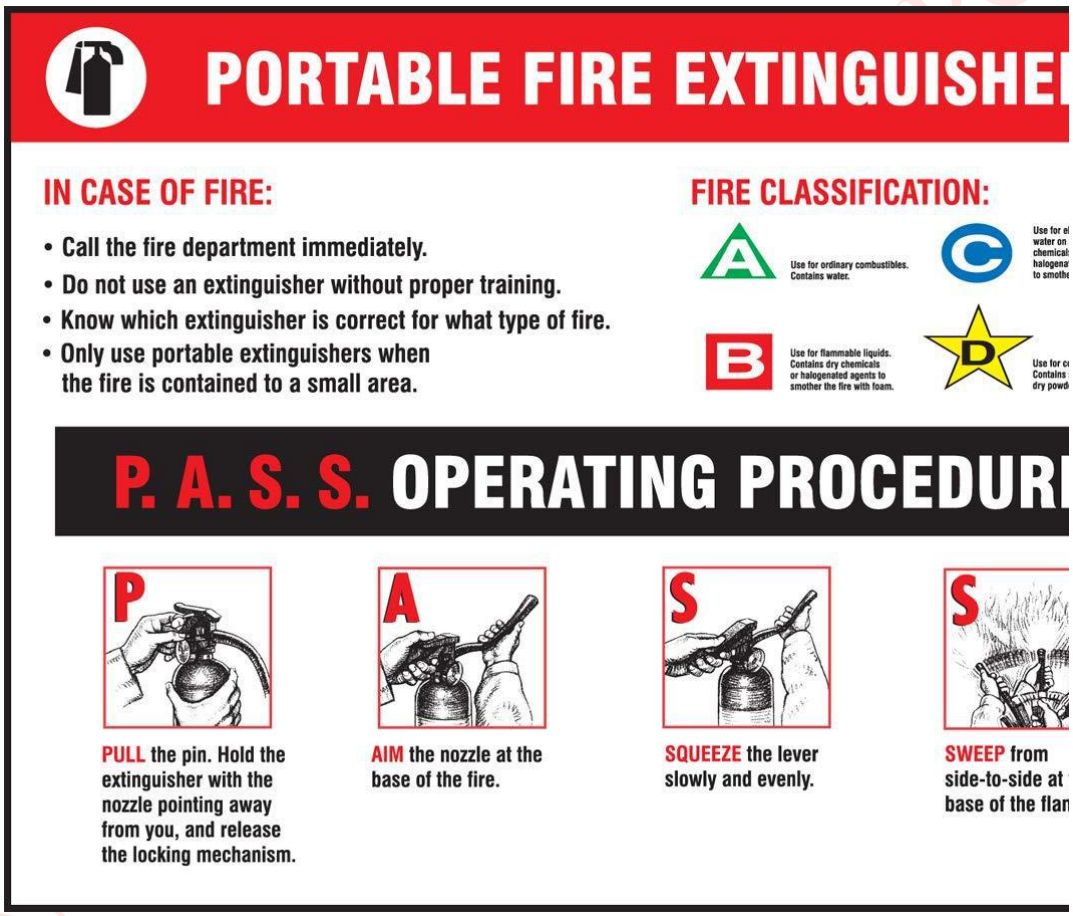
Sanitary pad Incinerator:

The pad incinerator is also found to be working and in order.

It would be important to display the usage instructions in Kannada, Hindi and English so that the members can operate the incinerator by themselves.

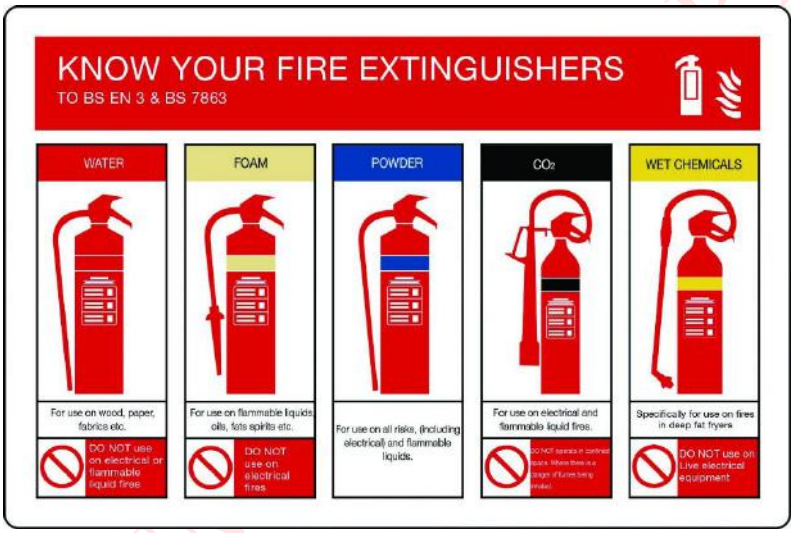
FIRE PREVENTION & SAFETY :

The fire extinguishers should be placed at the entrance of the room housing dangerous devices and chemistry lab. So that, they are handy when need to be used.
The detailed information chart on fire extinguishers is to be prominently displayed and all staff should be educated and trained.



It is also important that the handling instructions are Predominantly displayed. The sample poster is reproduced for replication.

Type (Fire / Extinguisher)	CLASS A Combustible materials (e.g. paper & wood)	CLASS B Flammable liquids (e.g. paint & petrol)	CLASS C Flammable gases (e.g. butane and methane)	CLASS D Flammable metals (e.g. lithium & potassium)	Electrical Electrical equipment (e.g. computers & generators)	CLASS F Deep fat fryers (e.g. chip pans)	Comments
Water	✓	✗	✗	✗	✗	✗	Do not use on liquid or electric fires
Foam	✓	✓	✗	✗	✗	✗	Not suited to domestic use
Dry Powder	✓	✓	✓	✓	✓	✗	Can be used safely up to 1000 volts
CO2	✗	✓	✗	✗	✓	✗	Safe on both high and low voltage
Wet Chemical	✓	✗	✗	✗	✗	✓	Use on extremely high temperatures



In case of fire, the appropriate Fire extinguishers should be placed at the entrance but outside the room. The details of such classified Extinguishers is indicated for reference.

Placement Gas fuel cylinders:

The LPG and other high pressure cylinders should be placed outside the room in well ventilated area as shown above.

If there is any space constraint, it is necessary that the lowest part of the space should be open and free ventilation provided.
The slope should be leading towards the outer wall and proper bund be made to prevent any leakage flowing into the hall/room/laboratory.

Rainwater Management.

Laying of rainwater opening pavers.

It was suggested that the pavers be made of openings for natural flow of rainwater down under. Since the pavers are already laid, we suggest the holes be drilled at regular intervals so as to make provision for rainwater percolation.

Medicinal plantation.

The medicinal plantation is well formed. The plant name and explanation is very informative.
One additional task, i.e., The information can be made in Kannada language and posted for everyone to read.

The similar placard may be posted at the entrance and extending the invitation to the citizens to visit the medicinal garden.
This initiative will take the information to the citizens and can help build dialog.

VERMICOMPOST.

The organic waste collected may be put to use. The system is already in place. The compost so formed should be exhibited for the information of the farming community through the children coming to college for education.

This may be used to showcase the ways of developing the vermicompost.

The benefits of vermicompost if exhibited, the children can disseminate the same to their parents back home.

Rooftop : Passive cooling.

The rooftop, needs to be white washed so as to avoid roof heating. This should help in keeping the room down below cooler.

The additional benefit of prevention of algae growth also brings about positive change.

Chemical storage.:

Hazardous chemicals stored in bulk should be moved to a separate room away from childrens access. The required quantity may be placed as and when required to avoid accidental spillage.

EXHIBIT GREEN HABITS:

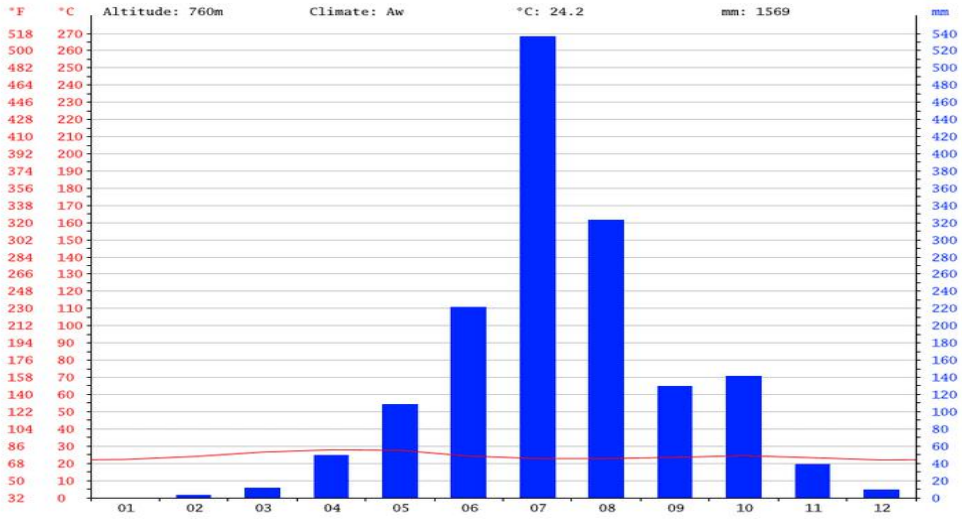
The college administration, should engage its resources in exhibiting Green Habits as discussed.

CONSIDERATIONS:

Before we present our report, the factors that are considered for positive impact recommendations are,

- Climatic conditions under which the institute is located.
- The core of activities carried out in the campus.
- The energy consumption pattern.
- Sources of electrical power to address the needs of the campus.

BELAGAVI CLIMATE GRAPH // WEATHER BY MONTH



The least amount of rainfall occurs in January. The average in this month is 0 mm | 0.0 inch. With an average of 536 mm | 21.1 inch, the most precipitation falls in July.

BELAGAVI AVERAGE TEMPERATURE

	January	February	March	April	May	June	July	August	September	October	November
Avg. Temperature (°C)	22.2	23.9	26.5	27.8	27.5	24.2	22.7	22.7	23.4	24.4	23.2
Min. Temperature (°C)	14.4	15.6	18.3	20.1	21	20.8	20.1	19.8	19.5	19	17.2
Max. Temperature (°C)	30	32.2	34.7	35.6	34	27.7	25.4	25.7	27.4	29.8	29.2
Avg. Temperature (°F)	72.0	75.0	79.7	82.0	81.5	75.6	72.9	72.9	74.1	75.9	73.8
Min. Temperature (°F)	57.9	60.1	64.9	68.2	69.8	69.4	68.2	67.6	67.1	66.2	63.0
Max. Temperature (°F)	86.0	90.0	94.5	96.1	93.2	81.9	77.7	78.3	81.3	85.6	84.6
Precipitation / Rainfall (mm)	0	3	11	49	108	221	536	323	129	141	39

The temperatures are highest on average in April, at around 27.8 °C | 82.0 °F. December has the lowest average temperature of the year. It is 21.9 °C | 71.4 °F.

BELAGAVI WEATHER BY MONTH // WEATHER AVERAGES

Courtesy : (https://en.climate-data.org/asia/india/karnataka/belagavi-4076/)

The variation in the precipitation between the driest and wettest months is 536 mm | 21 inches

h. During the year, the average temperatures vary by 5.9 °C | 42.6 °F. The temperature in Belagavi is, 5 months above 30**(°C)**, 3 months above 29**(°C)** and 4 months below 29**(°C).** However, the minimum temperature has never exceeded 21°C. Indicating that the temperature has been very pleasant all over the year except reaching peak during the noon hours.

List of Staff Members designated for Criterion VII

Sl.No	Name	Designation
1.	Dr. M. M. Hurali	Principal
2.	Dr. B.S Kamble	IQAC Co Ordinator
3.	Smt. S.B. Patil	Member

Eco Club Team Leaders:

Smt S B Patil HOD, Dept of Bottony.

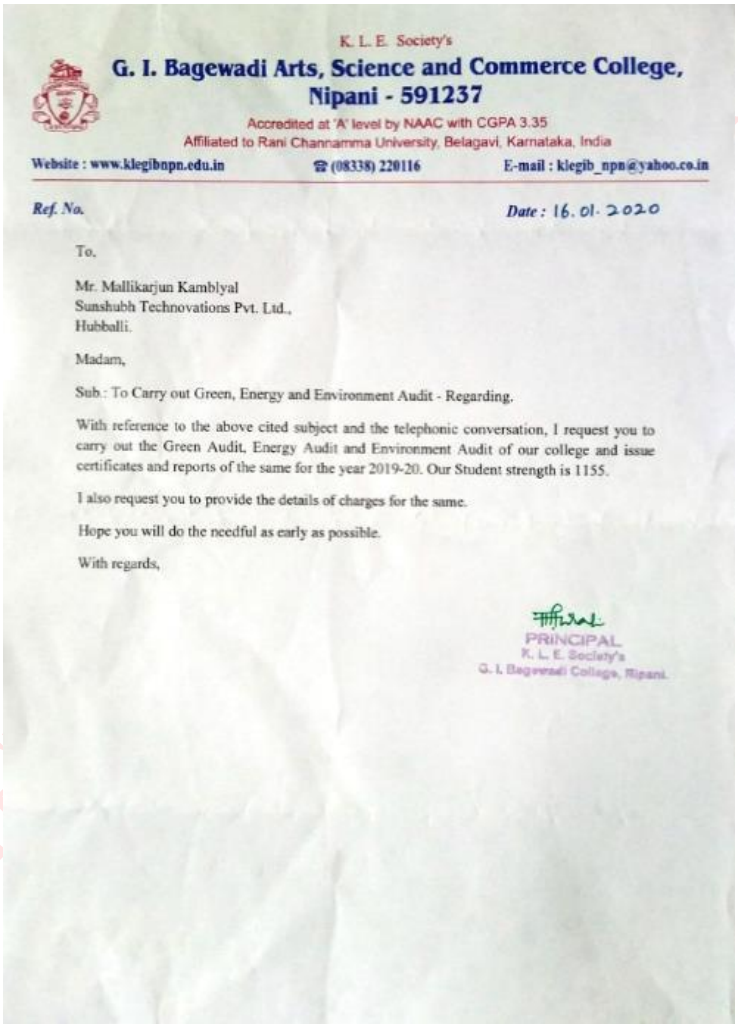
Dr Smt Sujatha Shiragave.

Smt. Shilpa Surnal

ACKNOWLEDGEMENT:

SUNSHUBH TECHNOVATIONS PVT LTD.,is pleased to express its sincere gratitude to the management of KLE Society's G.I.Bagewadi Arts,Science and Commerce College, Nipani-591237 Dist:Belagavi, Karnataka, for entrusting SUNSHUBH TECHNOVATIONS PVT LTD., with the assignment on Green Earth practices based on Educate, Practice, Advocate & Manage the resources in their educational organization.

We also wish to thank the officials and the maintenance staff for the help rendered during the energy flow study.



K. L. E. Society's

G. I. Bagewadi Arts, Science and Commerce College, Nipani - 591237

Accredited at 'A' level by NAAC with CGPA 3.35
Affiliated to Rani Channamma University, Belagavi, Karnataka, India

Website : www.klegibnpn.edu.in ☎ (08338) 220116 E-mail : klegib_npn@yahoo.co.in

Ref. No. Date : 16.01.2020

To,

Mr. Mallikarjun Kamblyal
Sunshubh Technovations Pvt. Ltd.,
Hubballi.

Madam,

Sub : To Carry out Green, Energy and Environment Audit - Regarding.

With reference to the above cited subject and the telephonic conversation, I request you to carry out the Green Audit, Energy Audit and Environment Audit of our college and issue certificates and reports of the same for the year 2019-20. Our Student strength is 1155.

I also request you to provide the details of charges for the same.

Hope you will do the needful as early as possible.

With regards,

PRINCIPAL
K. L. E. Society's
G. I. Bagewadi College, Nipani.

We would fail if we neglect to appreciate the sincere efforts put in by the 7th Criteria Team lead by the able and motivating Principal Dr. M M Hurali (Principal),

and the Students who against all odds have kept the college premises clean to the possible limits. Without the crucial and significant support

from the fellow teaching team the energy savings and carbon footprint reduction would not be a reality.

With the motivational support of the management, ground realistic support from teaching team and sincere efforts of the students in incorporating the change (habits) and instructions, the college could effectively declare the reduction in Carbon footprint and optimize the waste reductions.

We are not in a position to compute the carbon foot print at this point of time as the basic information from each of the students is yet to be collected; however, we will discuss the Carbon Foot print in the follow up compliance report.

Wishing the team, a great success we deeply express our gratitude and heartfelt "THANKYOU" for allowing us to assess the energy flow scenario there by the ENERGY STATUS.

Mallikarjun A. Kambalyal. B.E.(E&C).
Certified Energy Auditors (EA-3485)
SUNSHUBH TECHNOVATIONS PVT LTD.,

LIMITATIONS:

Our recommendations are in the interest of conservation of Electrical Energy and Green Culture i.e. the reduction in CARBON FOOTPRINT. The compliance to the recommendations will be subjected to meeting the safety and Environmental rules and guidelines.

AUTHENTICATION & DATE OF ENVIRONMENT AUDIT:

This ENVIRONMENT Audit has been carried out on 20th Jan 2020 under the instructions of Dr. M M Hurali. Principal. and in the presence of Dr. B S Kamble and Smt S B Patil.

LIST OF INSTRUMENTS:

During the process of the Audit, the following lists of instruments were used.

Sr No.	INSTRUMENT	MAKE	APPLICATION
1	Digital Power Analyser (PC Interfaced)	SCHIVAN ARNOX	Electrical Machinery.
2	Accessories -3000 Amps	ARNOX	Higher load UPTO 3000 Amps,
3	Accessories -200 Amps	ARNOX	UPTO 200 Amps,
4	Thermal Imager	FLIR	Identify loose contacts and bearing losses
5	Power Analyser (Manual)	MECO	Electrical Machinery.
6	Infrared Thermometer	METRAVI	Thermal (Fuel) Energy.
7	Digital (Contact) Temperature & Humidity Meter.	METRAVI	Electrical Machinery. (A/C's And Cooling Towers)
8	Digital Tachometer	METRAVI	Electrical Machinery.(A/C's And Cooling Towers)
9	Lux Meter	METRAVI	General & Task Lighting.
10	Sound Level Meter	METRAVI	Electrical Machinery. Generator Sound Proofing
11	Digital Anemometer	METRAVI	Electrical Machinery.(A/C's And Cooling Towers)
12	Digital KW Meter	METRAVI	Electrical Machinery.
13	Digital Power Factor Meter	METRAVI	Electrical Machinery.
14	Lap Top Computer	HP	To Interface The Instruments For More Accurate - Sophisticated Readings In Sensitive Equipments.
15	Ultrasonic flow meter		Measure liquid flow.
16	Portable Vibration Meter.	METRAVI	Effect Of Filtration - Sewing System. Structural Stability

17	Live cable detector probe	-	Detect hidden cables for safety audit.
18	Power Analyser – EMM 5	Beluk	For remote communication and detailed audit.
19	Power Analyser – ELITE PRO	Beluk	Power Analyser.
20	ETV meter, KWh & PF meters for site recording.	Secure	
21	PT's for Transformer audits.	KALPA	On field auditing of transformer loading and imbalance evaluation.

Only appropriate instruments will used wherever necessary.

ACTION PLAN SUMMARY:

Earmark the action plan.

- Invite subject experts for Tec talks,
- Organize in person panel discussions and interaction to propagate the knowledge and mitigate the problems in practicing the same.
- Prioritize the initiatives and execute.
- Observe the benefits and shortcomings.
- Workout further improvement by involving the staff and students.

MODE OF ACTION:

- The process of GREEN AUDIT & ENERGY CONSERVATION should be carried out in three steps.
- Good housekeeping practices using available manpower.
- Minor alterations using in house work culture with minimum investments on accessories as discussed.
- Capital investments, which may be required for installation of new methodologies may be taken up on phased manner.

We will be happy to assist you for any further advice/consultancy if required either on Rainwater management or on any of the measures discussed in the report.

We hope the measures are implemented in good spirit and to human convenience and comfort.

For SUNSHUBH TECHNOVATIONS PVT LTD.,

Mallikarjun A. Kambalyal. B.E. (E&C)
Certified Energy Auditors EA-3485

Notes:

Notes:

Notes: