

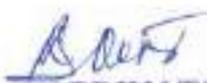


GREEN AUDIT

GREEN AUDIT



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Belgaum -16 Cell No : 99024 28248


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Karnataka State Law University
Hubballi-25.





Registrar
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Navanagar, Hubballi-580 025.



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GREEN AUDIT REPORT

This is to certify that, *Our Audit Team* has visited **KARNATAKA STATE LAW UNIVERSITY, HUBBALLI : 580 025** on 28th Dec 2023 and undertook the "GREEN AUDIT" of University campus.

The University is located in HUBBALLI-DHARWAD city Corporation limits. The twin cities together make the second largest city in Karnataka by population of 9,43,788 in 2011 census with 86.79 literacy rate. *The twin cities are selected for solar cities / green cities in the year 2017 by Govt of India.* Hubballi-Dharwad cities emerged as an educational hub in north Karnataka.

Our team took a survey of flora and fauna of the campus. Identified almost all the plant wealth of the campus and nomenclatured. Classified, all plants in different categories depending on medicinal, market values and social economic importance. Abundance of plant wealth, bio mass, carbon sequestration, carbon foot print, oxygen ooze in the campus has been worked out.

AIRVEDA Camera Techniques Beta Attenuation Method (BAM) has been employed to check the air quality parameters in terms of Air Quality Index (AQI) and audible intensity measured by standard sensors of sound, in decibel Bell (dB). Waste management solutions are suggested

Twin cities are semi organized Industrial cities. It seems to be free from industrial harmful gas effluents.

All green related data charts and their importance are submitted to the college.

The University campus is fit in all respects for academic developments.

Technical staff

Date : 28th Dec 2023
Place : Hubballi




Convener
Energy Audit Team


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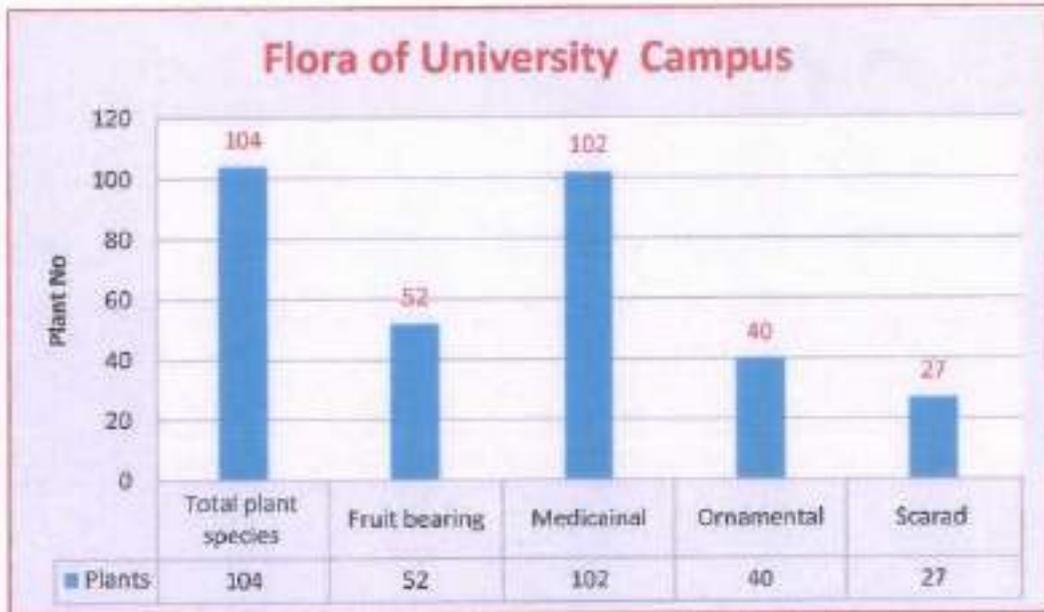


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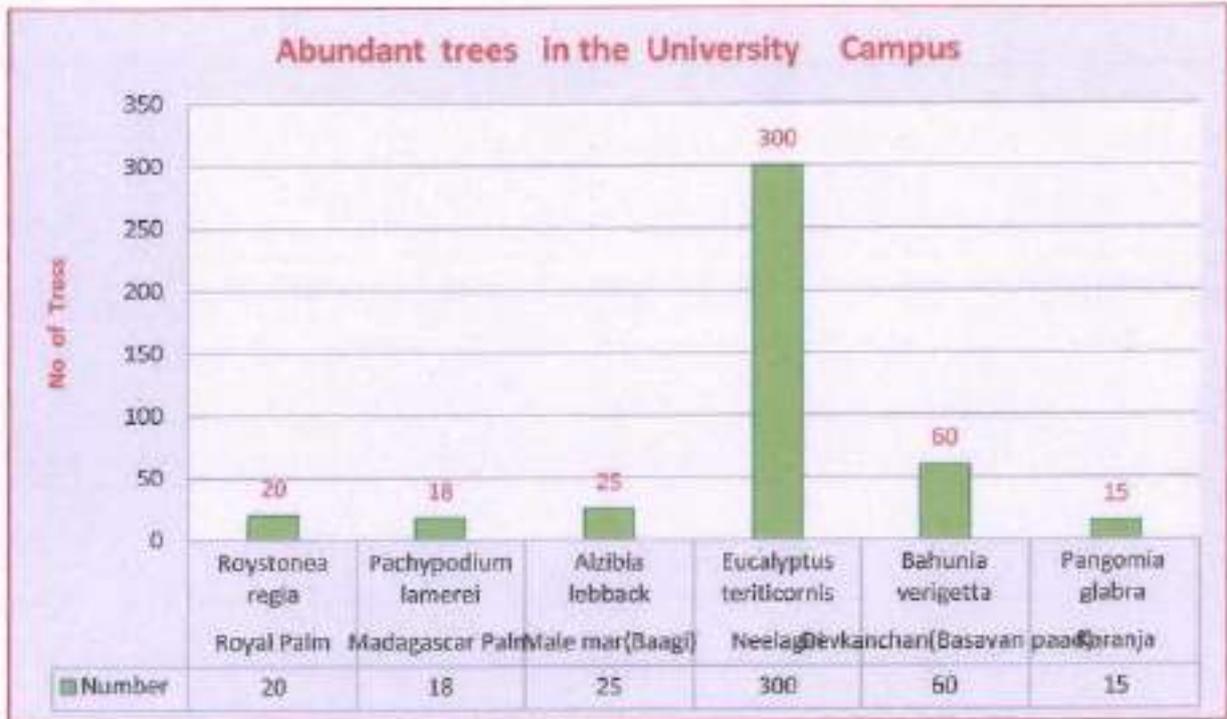
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ABUNDANT OF TREES IN THE CAMPUS

There are about 875 big trees of different variety, which are abundant in the campus. They contribute a lot to major amount of bio mass and fresh oxygen ooze in the campus. Predominant photosynthetic activity by this fresh air keeps the campus cool.



The University Campus is spread on 52 Acres of land. At least 25% of the University under vegetation canopy. This adds a serene beauty to the campus. Rest the area includes the carpet area of building, play ground and approach roads, manicure lawn etc.

Trees are grown naturally or planted for beautification of the campus. (25% area) Such a plant vegetation of the campus will also contribute to biomass, carbon stock carbon sequestration and also oxygen oozing in the campus. The contribution from these plants is accounted on per hectare basis.



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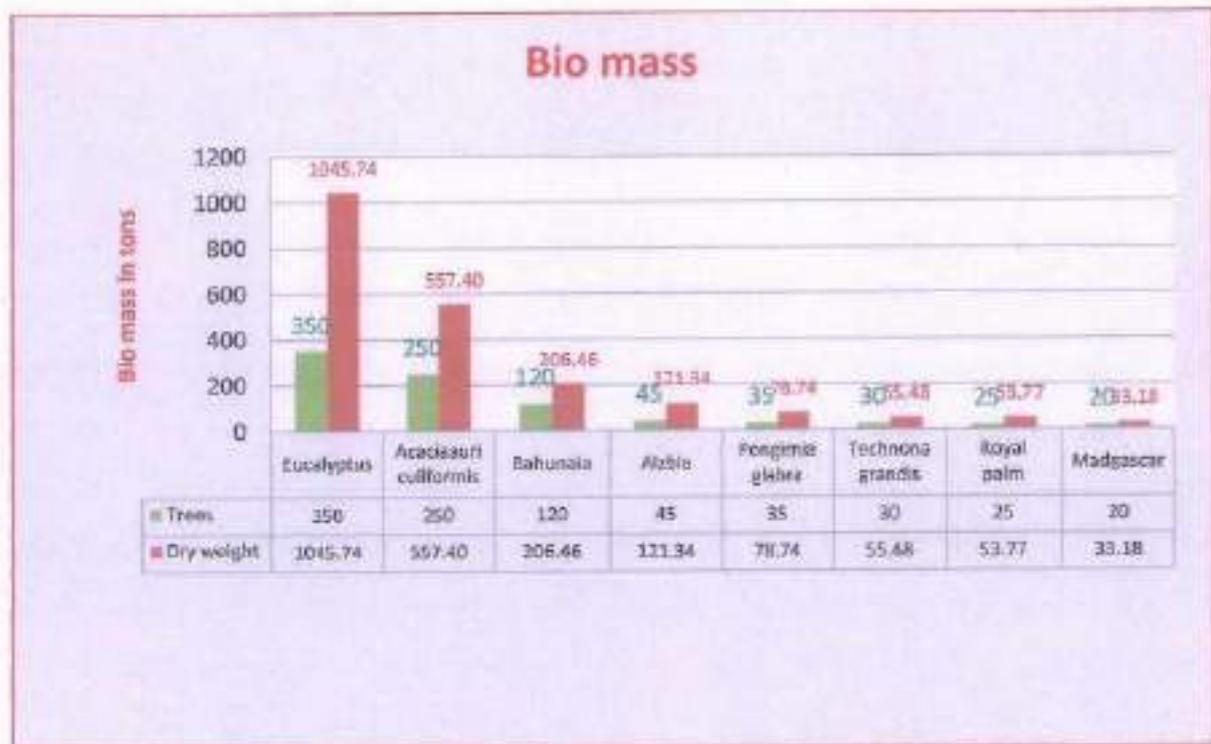
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BIO MASS

Biomass is renewable organic material that comes from plants. Biomass contains stored chemical energy from the sun that is produced by plants through photosynthesis. Biomass can be burned directly for heat or converted to liquid and gaseous fuels through various processes.

The bio mass is calculated, in two steps, one by the measurement of growth by DBH rule in abundant plants, and on contribution to biomass small tree herbs shrubs on per unit hectare bases. (25% of University area at the rate of 10 ton per hectare)



Bio mass from abundant trees = 2151.10 ton

Bio mass contribution from rest of trees = 52.63 ton

Net Bio mass = 2203.73 ton



AJ

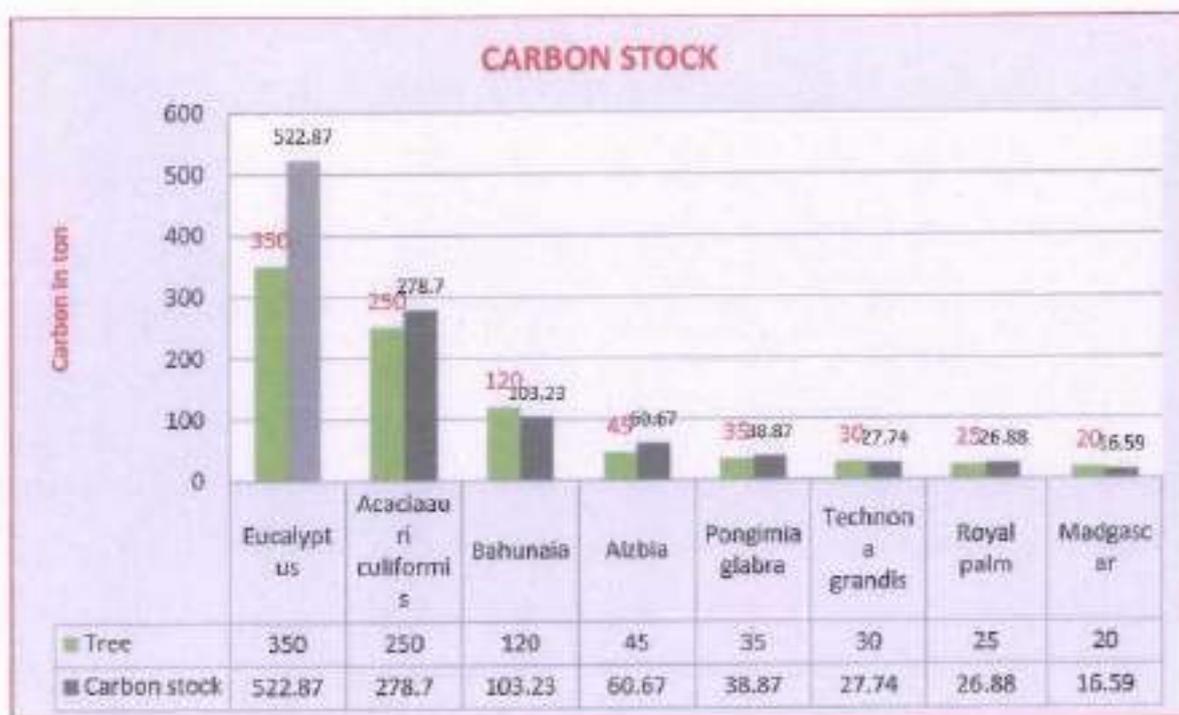
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CARBON STOCK

Forest carbon stock is the amount of carbon that has been sequestered from the atmosphere and is now stored within the forest ecosystem, mainly within living biomass and soil, and to a lesser extent also in dead wood and litter.

The carbon stock is calculated, in two steps, one by the measurement of growth by DBH rule in abundant plants, and on contribution to biomass small tree herbs shrubs on per unit hectare bases.



Carbon stock from abundant tree = 1075.55 ton

Carbon stock from rest of trees = 26.32 ton

Net Bio mass = 1101.87 ton



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CARBON SEQUESTRATION

Carbon sequestration is the removal of carbon dioxide from the air by plants. Carbon storage is the amount of carbon already bound up in the parts of woody vegetation

The carbon sequestration is calculated, in two steps, one by the physical measurement of by DBH rule growth in abundant plants, and on contribution to biomass small tree herbs shrubs on per unit hectare bases.



Carbon sequestration from abundant trees = 3947.27 ton

Carbon sequestration from rest of trees = 97.31 ton

Net Bio mass = 4044.58 ton



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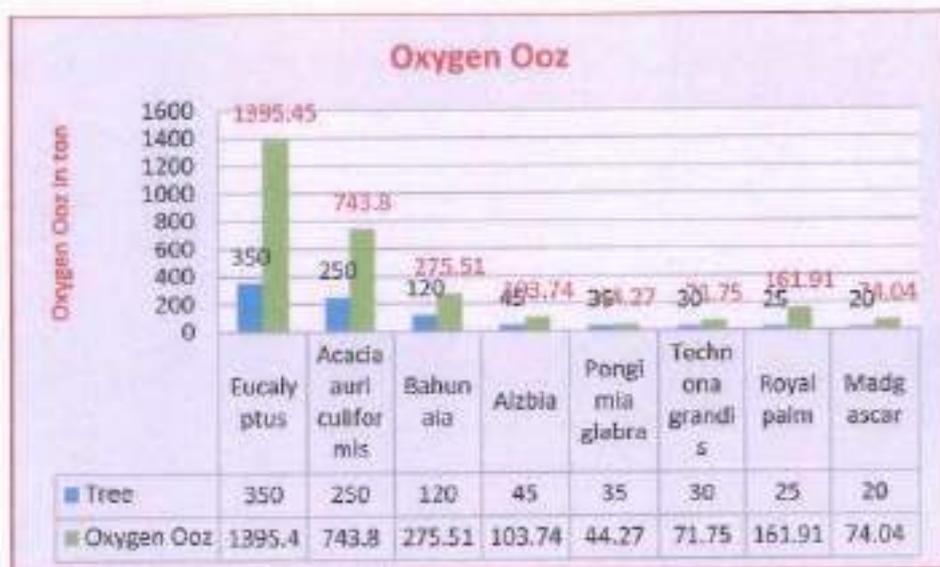
OXYGEN OOZE

The process of photosynthesis is :



During this process of photosynthesis, leaves suck carbon dioxide, water and utilize trapped solar energy of sun and convert this into chemical compounds such as sugars. During this photosynthetic activity oxygen is oozed as bio product by the tree.

Here reactants are six carbon dioxide molecules and six water molecules, react in presence of sun light by captured by chlorophyll and produce one sugar molecule and six oxygen molecules, as products. It means 6CO_2 sequester is proportional 6O_2 . Thus carbon sequestration, carbon stock and by in large bio mass are related.



One oxygen molecule is oozed from every one molecule of Carbon dioxide sequestration

Oxygen ooze from abundant trees = 2870.46 ton

Oxygen ooze from rest of trees = 19.13 ton

Net Oxygen ooze = 2889.59 ton

Woody vegetation on campus releases 2889.59 ton tons of oxygen in their life time till date. Released oxygen is directly proportional to CO_2 sequestrate in molecular terms (1:1 by molecule, 32/44 by molecular weight). It is assumed that a single tree supports oxygen demand of two- three people for their life. Thus woody vegetation of 875+ trees in college campus is supporting 2187 people in and around the campus.

"It seems Karnataka Law University Campus is an ideal campus se in all respects."


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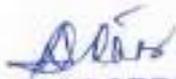



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**GOVT of KARNATAKA
KARNATAK STATE LAW UNIVERSITY, NAVANAGAR
HUBBALLI**



GREEN AUDIT REPORT - 2023


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GREEN AUDIT REPORT

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GLOBAL ECO TECH AND SOLUTIONS

2309 I-CROSS MANHESH NAGAR BELGAUM -16

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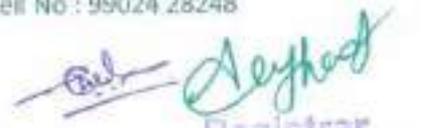
KARNATAKA STATE LAW UNIVERSITY, HUBBALLI

- I. **NAME OF THE INSTITUTION** : Karnataka law University- Navanagar, HUBBALLI
- II. **CLASS OF INSTITUTION** : UNIVERSITY
- III. **ESTABLISHMENT** : 2009
- IV. **ORGANISATION** : Govt of Karnataka
- V. **VICE CHANCELLER** : Prof Dr: C BASAVARAJU
- VI. **NO. OF STUDENTS** : 489
- VII. **FACULTY** : 20
- VIII. **NON-TEACHING STAFF** : 35
- IX. **PREVIOUS "NAAC" GRADE** : A
- XI. **FACILITIES** :
A well-resourced campus with qualified staff and with a good infrastructure. The University has other facilities like Library, Boys Hostel, Ladies hostel, Play ground and Canteen.
- XII. **RESEARCH** :
University conducts different courses for the excellence in PG. The University has research activities.
- XIII. **EXTESION ACTIVITY** :
The University has a good number of extension activities like plantation of trees, cleanliness drive, NSS activities, workshops, environmental awareness campaigns, etc.
- XIV. **AREA OF UNIVERSITY** : 52 Acres

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EXECUTIVE SUMMARY

The twenty first century has seen, a rapid urbanization and economic developments locally, regionally and hence at global levels. This has led to several environmental and ecological crises.

To boost the economy man has tried to collect the natural resources from the earth Surface & crust, to set up industries. This mainly include exploitation of forest. Every year of million tons industrial effluence in the form of pollutants are being added in the atmosphere, which has resulted in **global warming, ozone depletion, acid raining and green house effect.**

Of course the modernization changed the life style of human society, but it is heading towards unhealthy living. **Modern man** now woke up and compromising with the nature seeking a sustainable environmental set up for their life.

Now it is need of the day, i.e bounded duty for every citizen, state, country to save the earth (nature) from environmental and ecological disorder and achieve a economic goal for the progress on sustainable balance compromises.

After **"RIO de JANERIO SUMMIT, BRAZIL (1992)"**, Ministry of Environment and Forest and climate change (MoEFCC) Government of INDIA has introduced its **GREEN POLICY** implementation as a mandatory activity in all campuses of the country.

The purpose of the present audit is to ensure that the **practices** followed in the campus (Criteria VII Q.NO 7.1.6) those are in accordance with the Green Policy of MoEF.

* GREEN ADIT

"Global Readiness in Ensuring Ecological Neutrality. *It is an acronym.*

Green audit is systematic identification, recording and analysis of components related to sustainable development of an educational institution to preserve for future generations. The process has three important stages such as pre audit stage, audit stage and post audit stage.


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METHODOLOGY OF AUDIT :

The audit of a campus is broadly classified in three categories

- 1) Environment audit
- 2) Energy Audit
- 3) Green Audit.

Every Audit as mentioned above is carried in three stages.

Execution of GREEN AUDIT is carried in three preliminary stages

- i) Pre audit stage
- ii) Audit stage
- iii) Post audit stage

1) PRE AUDIT STAGE

Head of the Institute nominates, a "*Planning committee*" which include a efficient convener and skilled members.

A flow chart for, audit is framed by the committee. Inventories, questionnaire are prepared for data collection. At the initial stage only advise from subject exports keeping in view of progress and prosperity of the Institution is obtained.

Preparation and attending questionnaire, observation, views and reviews of the documentation, fit for data analysis, measurements and recommendations if any are being followed.

2) AUDIT STAGE

This stage of audit mainly include collections of data and measurement as per the inventory and questionnaire related to the following three prime audits.

i) Study of environment parameter

Geographical location of the Institution , weather zone, type of soil, PH of soil, temperature , humidity, pressure, rain fall, wind velocity, wind direction, snow fall, gust, pollutant, AQI levels etc

ii) Energy policies


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Inventories so developed to study energy utilization in each and every room, ensuring a judicious use energy is there are not. A cross check is made and data is recorded for the analysis purpose.

Replacing out dated electric appliances, a follow up to switch to newer energy efficient techniques are mandatory as per the Standard norms of MoEF norms.

iii) Green techniques

Mapping of Biodiversity, water Conservation, Tree Plantation, Waste Management, Paperless Work, search alternative energy are brought to the notice of steering Committee for fruitful discussions. The aim of this audit is to evaluate the adoptability environment sustainability,

Physical inspection of the campus in view of achieving goal.

3) POST AUDIT STAGE.

Analysis of the data, measurement and calculations if any are carried out at this stage and reviewed for the progress and prosperity of the Institution without compromising the policies of **GREEN AUDIT POLICIES.**

A broader scope of discussion is made after the data analysis for the implementation. Execution of policies shall be done after a fruitful discussions among steering committee and Head of the Institutions.

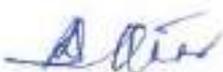
The specific objective of the audit is to evaluate the adoptability environment sustainability as well as a degree to which the Departments are in compliance with the applicable regulations, policies and standards.

A pre planned audits system shall make a better impact on staff student and student in terms of health and learning Institute operational costs and the environment in long run.

Hence it mainly analysis and directive stage.

EXECUTION COMMITTEE.

Head of the Institution nominates an *executive committee* with three audit conveners as executive members along with related experts, for the implementation of the dreamed plans.


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SWOT CYCLE

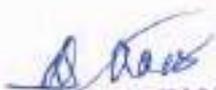
Every Institution has got its own **STRENGTH** and it is matter of pride. However there may be a few **WEAKNESSES**, which were not been achieved in the previous accreditation processes. The three staged audit system gives a plat form to covert such weaknesses in to **OPORTUNITES**.

THREAT is one which may be beyond the potential barrier of any Institution.

REAPING THE BENEFITS

1. *It shall help to protect the environment of the campus.*
2. *Identify the cost saving methods through waste minimization and judicious use of energy.*
3. *Find ways and means to over come the prevailing and forthcoming complications.*
4. *Empower the organization to frame better environmental policies for the yeas to come.*
5. *It shall portrait a good image of Institution through its clean and green campus.*

* * *


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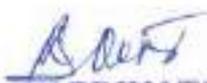


GREEN AUDIT

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All green related data charts and their importance are submitted to the college.

The University campus is fit in all respects for academic developments.

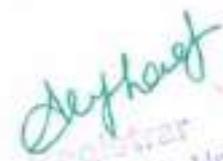
Technical staff


Convener
Energy Audit Team

Date : 28th Dec 2023
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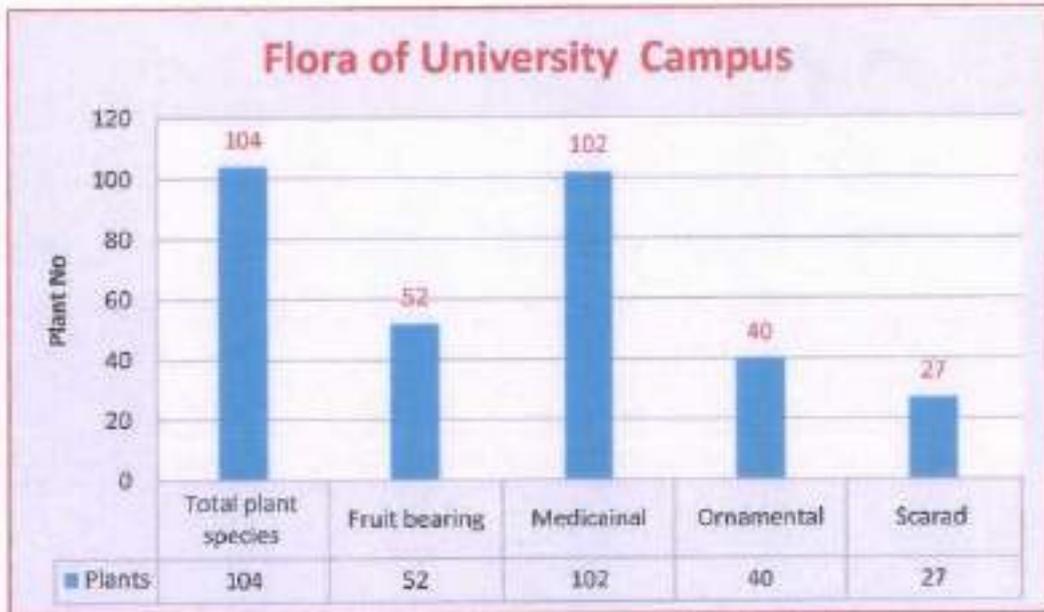


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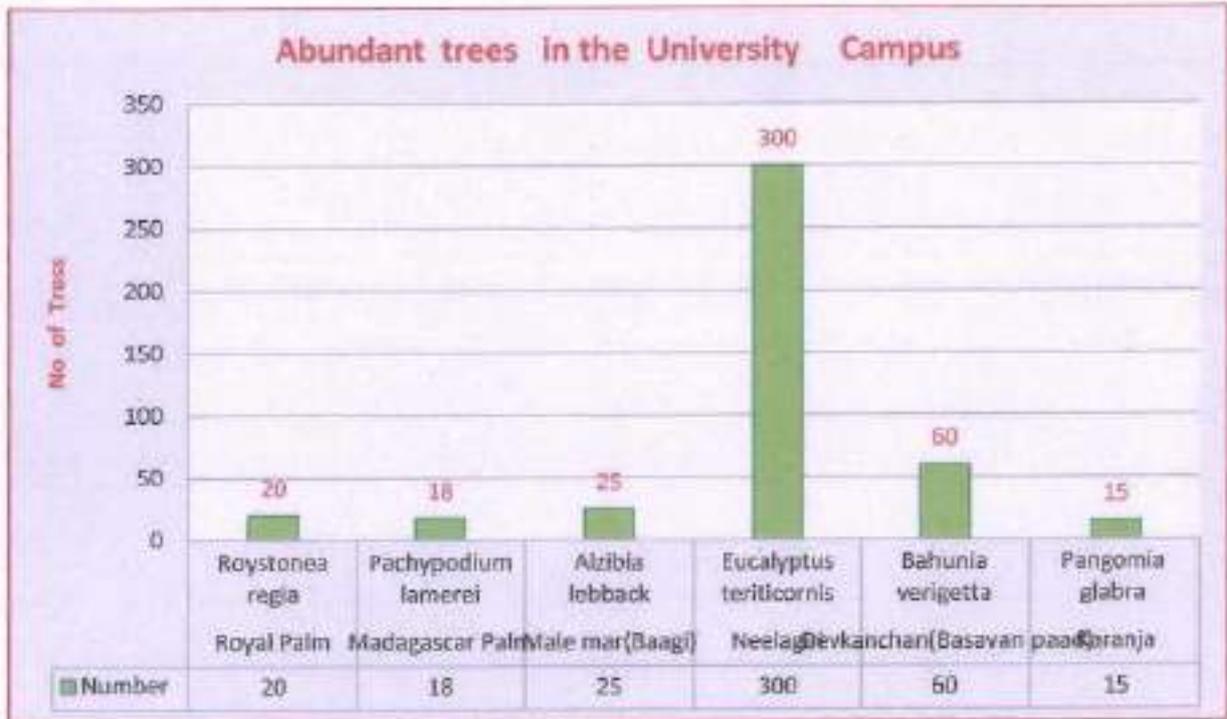
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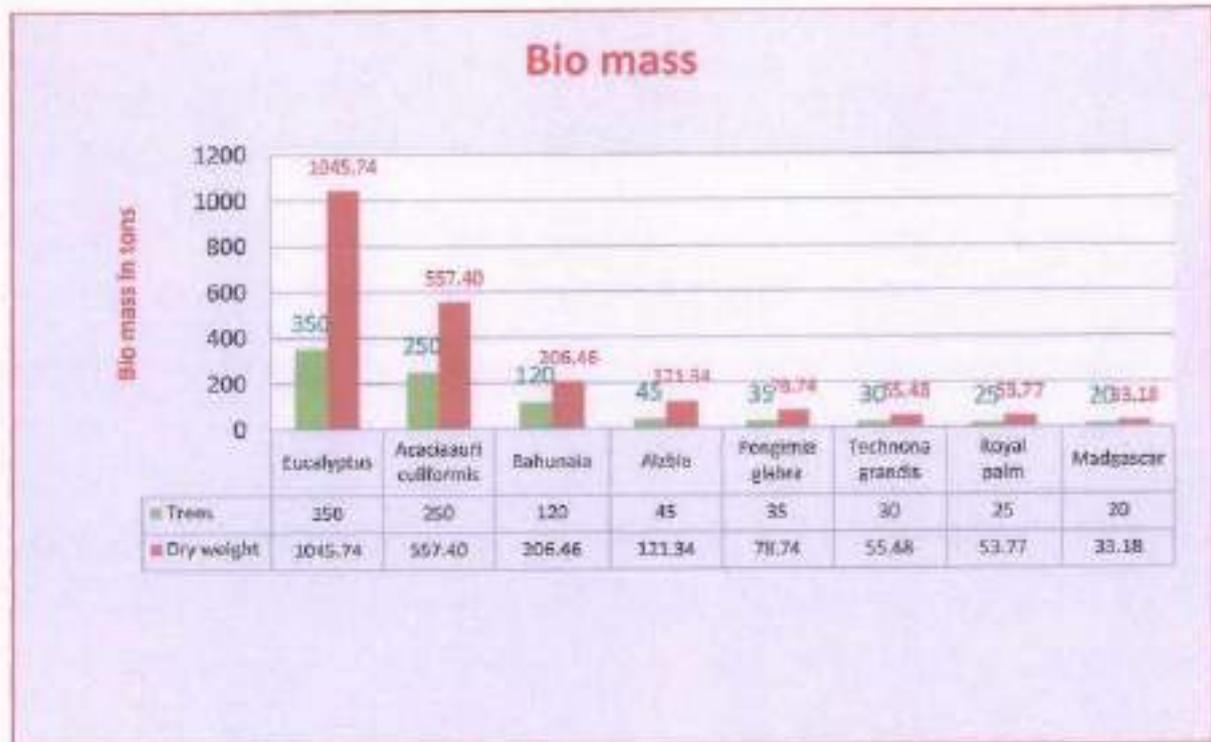
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Bio mass contribution from rest of trees = 52.63 ton

Net Bio mass = 2203.73 ton



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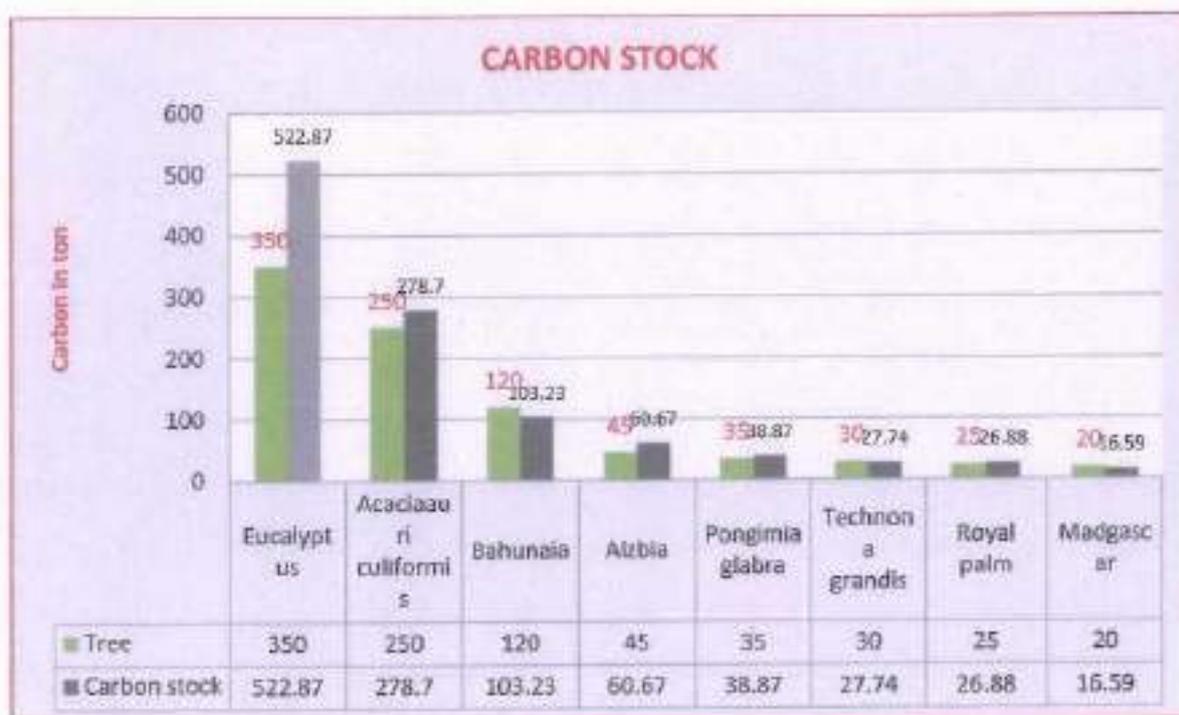
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CARBON SEQUESTRATION

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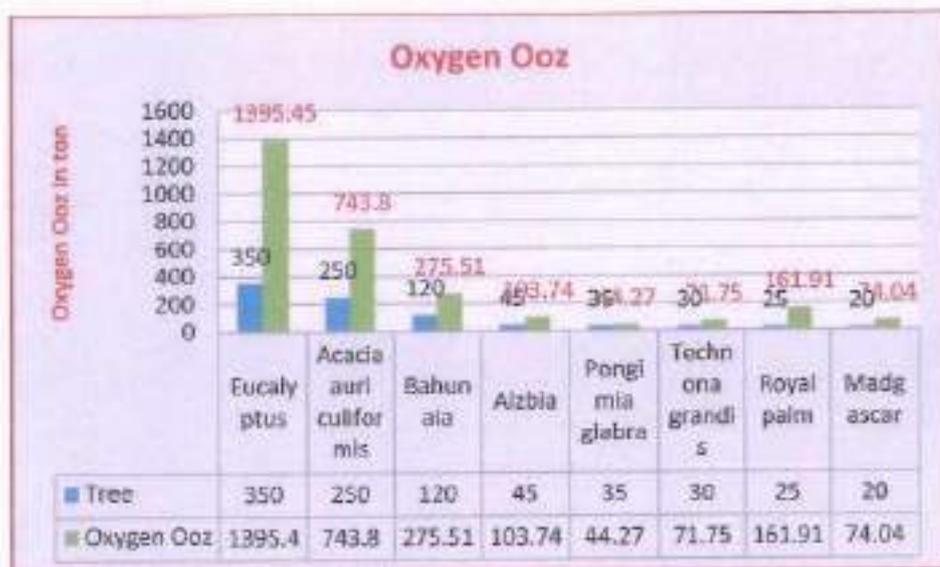
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CARBON NEUTRALITY

Energy Conservation in Boys and Girls Hostel (Usage of Solar water heaters)

No of Hostels : 3 No

No Hostelites and Capacity of Solar water heater

| S.No | Name of the Hostel | Capacity Of Resident Hostels | Capacity Solar heaters in litre |
|------|--------------------|------------------------------|---------------------------------|
| 1 | Ladies hostel A+B | 70+70 | 180+180 |
| 2 | Boy's Hostel | 180 | 200 |
| | Total | 320 | 560 |

- 1KW/h energy is generated from burning wood equivalent to 0.932 kg of CO₂
- Total hot water required per day = 6400 Lit /day
- Required rise in temperature = (45-25) = 20 °C (ideal case)
- Specific gravity of water = 1kg/lit
- Sp heat of water = 4.18 kJ/ kg °C
- Total amount of heat energy required = $M \times C_p \times (T_2 - T_1)$
 = 6400x4.18x20 = 535040 kJ
- Energy obtained from solar collectors = 535040 kJ
 = 36.208 kg/year
 = 36 ton/year
- 36.00 ton of CO₂ emission/ year, prevented using solar water heater



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ANNUAL SAVING OF ELECTRIC BILL

1. Electric energy units saved /day = 185.77/day
2. HESCOM rate electric energy per unit = Rs 7.30
3. Total saving per day = $185.77 \times 7.30 = \text{Rs } 1356.12$
4. Annual saving = $185.77 \times 7.30 \times 210 = \text{Rs } 2,84,785.20$
5. Cost of one solar water heater approx = Rs 32,000.00
6. B.C ratio = 2.96 appreciable

Analysis of out come

Note : Installing solar water heater is a most welcome and of worth investment.

It is a wise step towards achievement of Clean and Green Energy.

Technical staff

Date: 28th Dec 2023

Place : Hubballi

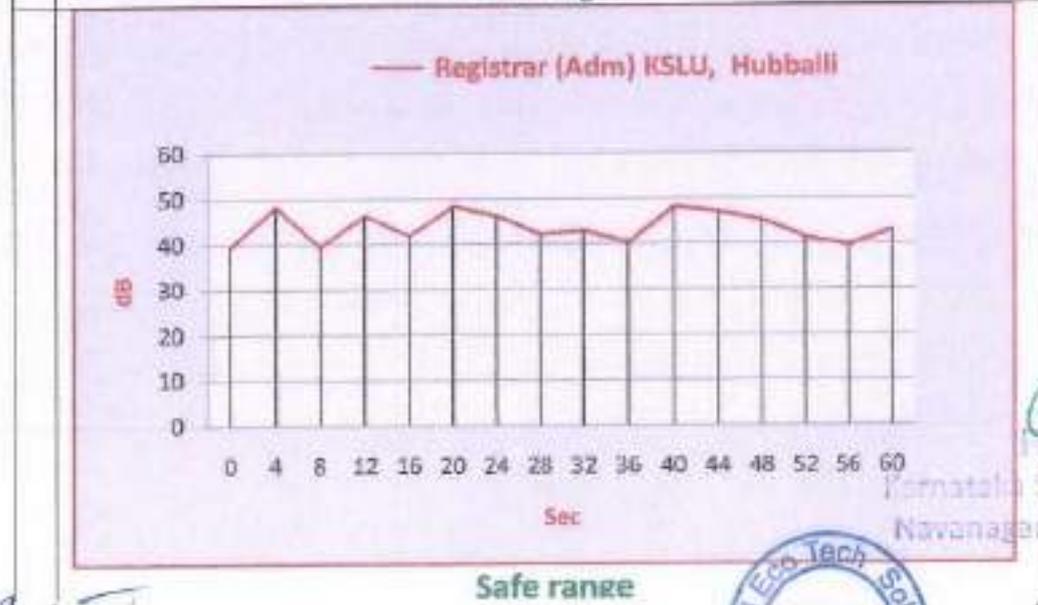
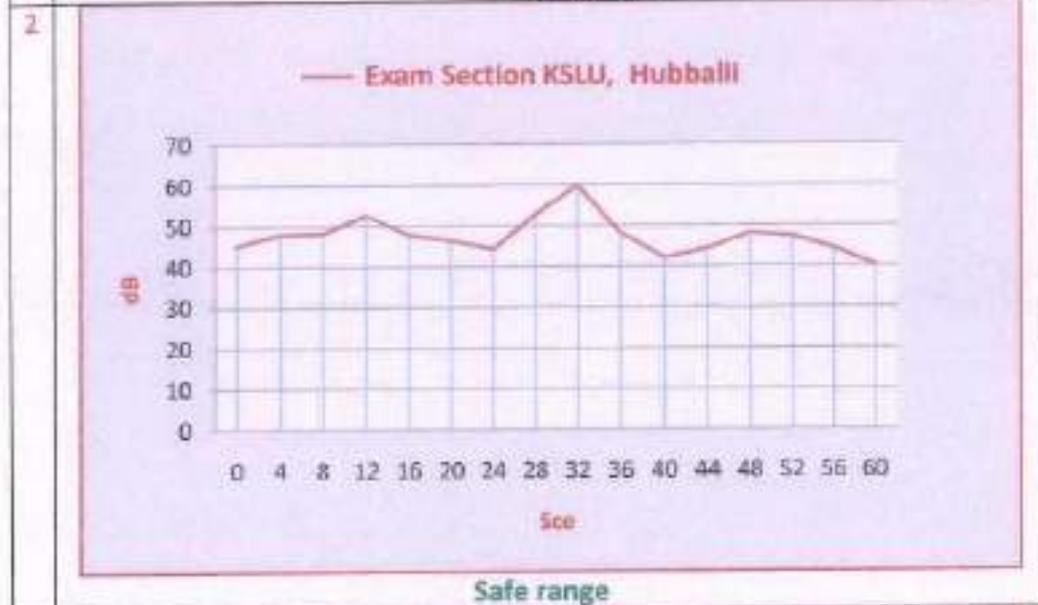
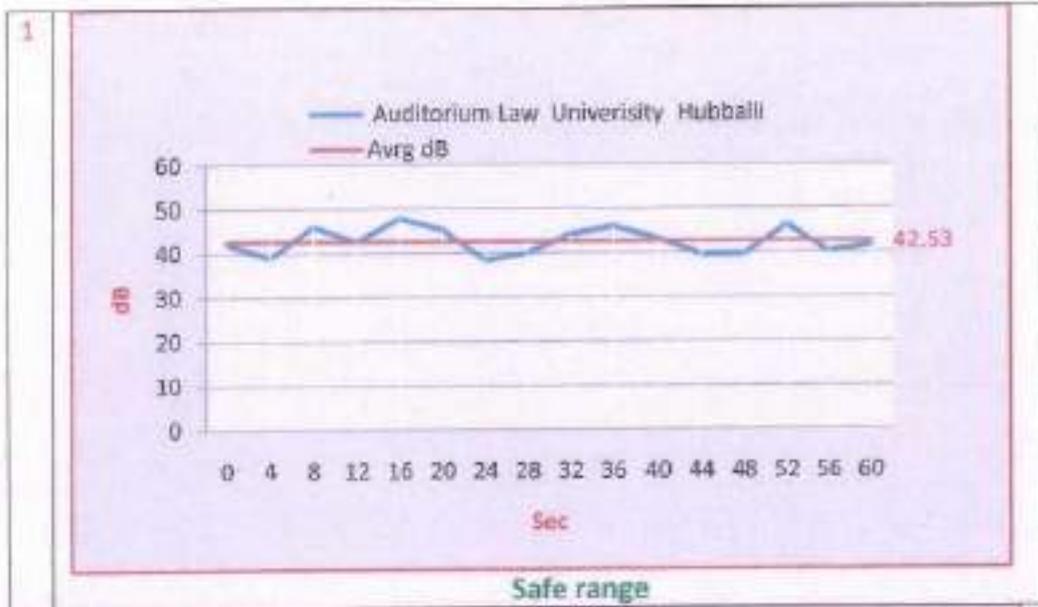
Convener
GREEN Audit Team



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KARNATAKA STATE LAW UNIVERSITY, HUBBALLI
Intensity of Sound in dB



Dayal

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R. Das
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Dayal



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 Cell No: 9902428248, Reg No.: 562493

CARBON FOOT-PRINT OF THE INSTITUTE (ISO 14064)



"A carbon foot print of the Institute is the total sum of Green House Gases (GHG) emissions caused by the organization event or product".

INPUT DATA

- ❖ Electric energy consumed in (avrg of last three years) = 6928 KWh/month.
- ❖ No of petrol cars used staff = 8.
- ❖ No of diesel cars used staff = 6.
- ❖ No of two wheelers brought by staff and students = 10+40 =50.
- ❖ Diesel generator = 01.
- ❖ Omni bus = Nil
- ❖ LPG consumed in(kg)/month (staff common room) = Nil.
- ❖ LPG consumed in(kg)/month (canteen) = Nil. (out Sourced)

CONSUMPTION RATES

- ❖ Electric energy consumed (avrg) last five years = 6928 x12 = 83136 units/year.
- ❖ Average petrol consumed petrol car liter /month =12 lit /month.
- ❖ Average diesel consumed diesel car liter/month =12 lit /month.
- ❖ Average petrol consumed by students-two wheelers (Liter)/month =12 x2 lit /month.
- ❖ Average diesel consumed for Generator = 25 lit /month.
- ❖ Average diesel consumed diesel by Omni buss = 1x (5 Liter)/day =25.00 lit /month.
- ❖ LPG consumed in(kg)/month (staff room) = 7.4 Kg /month.
- ❖ LPG consumed in(kg)/month (canteen) = 29.6 Kg /month.

CARBON FOOT PRINT BY THE WAY OF IN KG OF CO₂ EQUIVALENTS

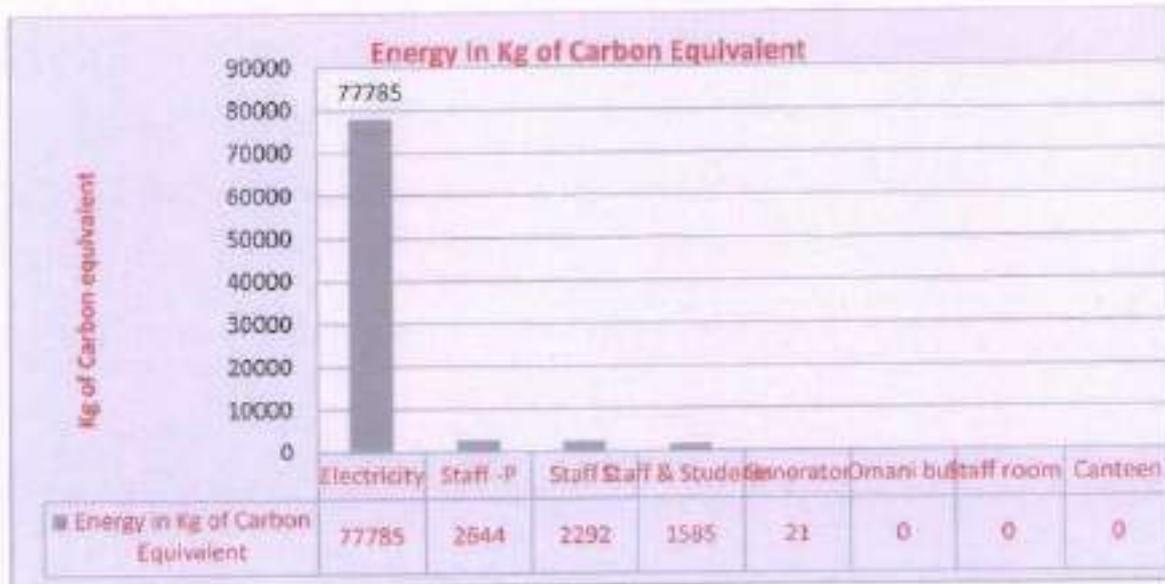
1. Electricity =8246x12x0.85 = 70665.00
2. Petrol (staff) = 8 x 12x12 x2.296 =2644.00
3. Diesel (staff) = 6 x12 x 12 x2.653 = 2292.00


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4. Two wheeler Petrol (staff and students) = $50 \times 2 \times 12 \times 210 / 365 \times 2.296 = 1585.00$
5. Diesel (Generator) = $1 \times 8 \times 2.653 = 21.00$
6. Diesel by Omni buses = $0.00 \times 100 \times 12 \times 2.653 \times 210 / 365 = 0.00$
7. LPG (staff room) = $0.00 \times 12 \times 2.983 = 0.00$
8. LPG (Canteen) = $0.00 \times 12 \times 2.983 = 0.00$ (Out sourced)
9. **Net Carbon foot print in ton of CO₂ = 77207Kg /year**
= 77.20 ton/year

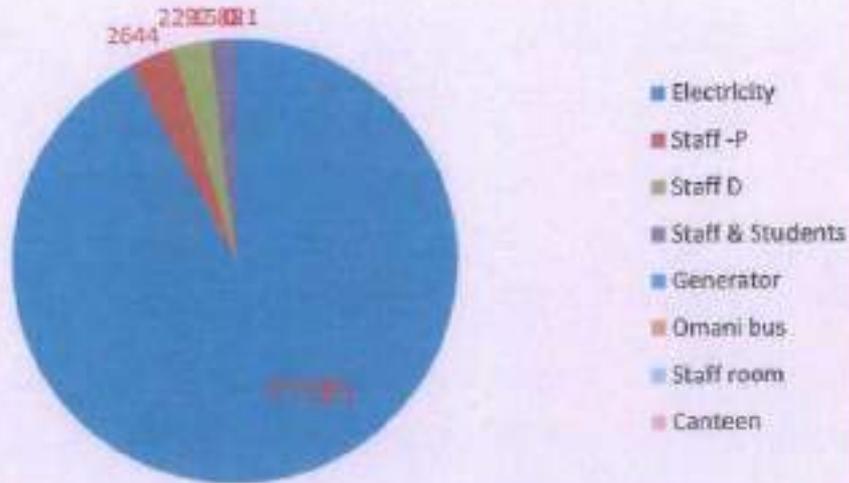


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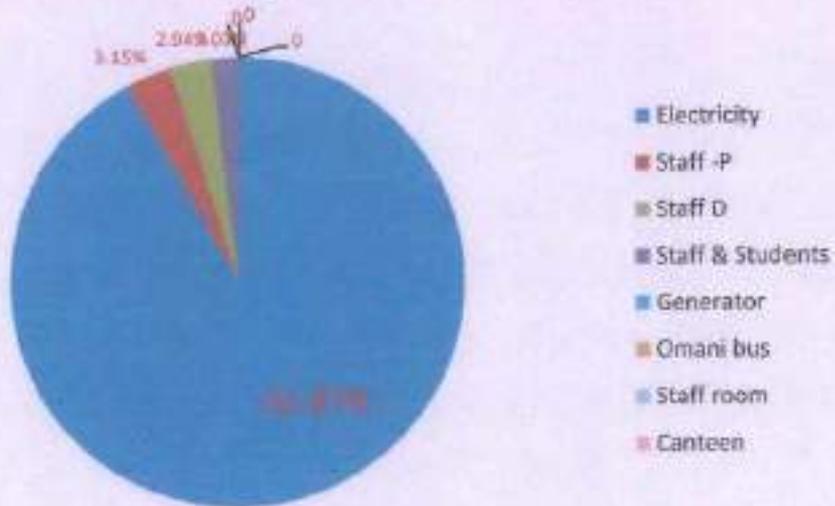


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Energy in Kg of Carbon Equivalent



% share in Energy in Kg of Carbon Equivalent



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CARBON HAND PRINT FOR THE INSTITUTE
(ISO 14064)

"A Carbon Hand Print of the Institute is the total sum of positive impact produced on the environment in reducing the carbon foot print".



To **reduce** the "Carbon foot print", "Carbon hand print" following techniques practiced

- i) Creating awareness regarding energy sensitization programs.
- ii) Creating awareness annual 'PUC' test of vehicles (Pollution Under Control).
- iii) Encouraging to purchase of BS VI certified vehicles.
- iv) Promoting electrical vehicles.
- v) Installing stand alone solar units in the campus.
- vi) Planning for roof top harvesting of solar energy.
- vii) Celebrating Green Earth day
- viii) Following Citizen Charter like Do & Don'ts

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SOLID AND HAZARDOUS WASTE MANAGEMENT

The university has deep concern regarding sustainable practices to protect the environment, health and wellbeing through implementation of effective waste management practices such as segregation. Recycling, composting, and solid wastes are classified as

1. BIODEGRADABLE WASTE :

Litter, food waste, canteen waste and waste from toilets etc.

Biodegradable kitchen waste from mess and canteen, such as dried leaves, twigs, and plant clippings is collected from all around the campus and used for vermin composting. Dustbins have been installed throughout the campus for waste segregation.

2. NON-BIODEGRADABLE WASTE.

Waste like Plastic, metals, glass, waste bottle (dry waste) are systematically collected, segregated and sold to authorized Vendors for its recycling purpose

3. RECYCLABLE WASTE

Newspaper, cardboard, and stationery write off books are collected and sold to authorized vendors

4. SOLID WASTE MANAGEMENT:

University has a tie-up with Hubballi Dharwad Mahanagara Palike (HDMP) to collect solid waste from the campus every day. The waste is segregated at a source and later collected by Powrakarmikas to dispose of properly to the dumping yard of HDMP.

5. LIQUID WASTE MANAGEMENT:

The liquid wastes are mainly drained to improve the ground water level. The grey water from the hostels and canteen is discharged to the recharge pit. Neutralized water from the above process is allowed to sediment in a tank to remove solid suspended waste and later this water is utilized for gardening and landscaping around Campus.

6. SANITORY WASTE

Biomedical waste disposed off as per the Bio-medical Waste Management Rules 2016. Biomedical waste is collected in color-coded bags, disposed and managed as per norms of as per the standard Protocol of Karnataka State Pollution Control Board, in Girls' hostels provided with incinerators for the Disposal of menstrual waste material.

7. e-WASTE MANAGEMENT

The e-wastes generated from Computer Section, Library, Examination section, academic and administrative offices. It includes out of order equipment or obsolete items like circuits, desktop, laptop and accessories, printers, charging and network cable, Wi-Fi devices, sound system, display unit, UPS, Biometric Machine, Electronic instruments etc. All such equipment which cannot be reused or recycled are disposed through authorized e-waste recyclers.


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FOUNA OF UNIVERISITY CAMPUS

Birds Animals insects ocasionaly visiting the campus

| S.No | Scientific name | Family | Vernacular name | Photo |
|------|---------------------------|--------------|-----------------|--|
| 1 | <i>Pavo cristatus</i> | Phasianide | Naveelu |  |
| 2 | <i>Passer domesticus</i> | Passeridae | Gubbi |  |
| 3 | <i>Psittaciformes</i> | Pscittacidae | Gili |  |
| 4 | <i>Egretta garzeta</i> | Aeidae | Bellakki |  |
| 5 | <i>Centropus sinensis</i> | Cuculdae | Bharatdwa j |  |


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| | | | | |
|----|-----------------------------------|-----------------|-----------|--|
| 6 | <i>Corvus culminatus</i> | Corvidae | Kage |  |
| 7 | <i>Picinae</i> | Picidae | Markutuk |  |
| 8 | <i>Suborder Serpentes</i> | Serpentes | Nagar hau |  |
| 9 | <i>Fundambulus palmarum</i> | Sciuridae | Squirrel |  |
| 10 | <i>Simiiformes Catarrhini</i> | Cercopithecidae | Mang |  |


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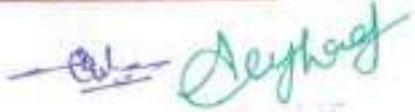



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| | | | | |
|----|-------------------------------------|--------------|--------------|--|
| 11 | <i>Canis Lupus familiaris</i> | Canidae | Naai |  |
| 12 | <i>Lasius niger</i> | Formicidae | Iruve |  |
| 13 | <i>Columba livia</i> | Columbidae | Pigeon |  |
| 14 | <i>Hermimetalobolous neopterans</i> | Isoptera | Geddalu |  |
| 15 | <i>Bubobengslesis</i> | Tytonidae | Goobe |  |
| 16 | <i>Saxicoloides fulicatus</i> | Muscicapidae | Indain robin |  |


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| | | | | |
|----|--------------------------------|---------|-----------|--|
| 17 | <i>Calotes versicolor</i> | Aguania | Otiikattu |  |
| 18 | <i>Hemidactylus frenatus</i> | Gecko | Halli |  |
| 19 | <i>Hopobatrachus tigerinus</i> | Ranidea | Kappe |  |
| 20 | <i>Apis mellifera</i> | Apidae | Jenu non |  |


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PHOTO GALLERY

| S.No | Item Description | Photos / images |
|------|--|---|
| 1 | <p style="text-align: center;">Vanamahotsav celebration by Vice Chancellor</p> |  |
| 2 | <p style="text-align: center;">Plantation of Saplings by Vice Chancellor</p> |  |

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| | | |
|----------|--|---|
| <p>3</p> | <p>Solar energy harnessing Unit</p> <p>1) Water heater Front photo</p> <p>2) Solar Power generation Rear photo</p> |  <p>Solar Water Heaters on Ladies Hostel</p> |
| <p>4</p> | <p>Harvesting rain water pit</p> |  |
| <p>5</p> | <p>Waste collection by Purakarnik HDMP</p> |  |
| <p>6</p> | <p>Waste bins</p> |  |

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| | | |
|----|-----------------------------|--|
| 7 | Ladies napkin Vendor |  |
| 8 | Fire Extinguishers |  |
| 9 | R.O Drinking water Facility |  |
| 10 | First Aid Box |  |
| 11 | Car parking Shed |  |


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