ENVIRONMENT AUDIT, GREEN AUDIT & ENERGY AUDIT REPORT

Certificate of Energy Audit

This to certify that ***Karnataka Peoples Education Society's Dr. Ambedkar College of Arts, Commerce and PG Center, Kalaburagi Sundarnagar, Kalaburagi, 585101 Karnataka, India*** *has successfully undergone energy audit on date 18 April, 2023 and assessed the electrical energy conservation, Energy saving measure and sustainability in compliance with the applicable regulations polices and standards in the Campus were found to be excellent.*

ASST. ENGG (ELE)
UNIT-08 CSD-03
KALABURAGI

Auditor
GESCOM Office

This Certificate is Valid till: 30 May, 2024

Certificate
of Enviroment Audit and Green Audit

This to certify that Karnataka Peoples Education Society's Dr. Ambedkar College of Arts, Commerce and PG Center, Kalaburagi Sundarnagar, Kalaburagi, 585101 Karnataka, India has successfully undergone Green audit on date 6 April, 2018, The Institution has successfully set up the Swachhta Action Plan Committee, adopted and implemented best practices in the areas of Sanitation, Hygiene, Waste Management, Water Management, Energy Management and Greenery Management.

This Certificate is Valid till: 30 April, 2022

Auditor

Professor & Chairman
Department of P.G. Studies
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Preface

The Green Audit report of Dr. Ambedkar College of Arts, Commerce and PG Centre, Kalaburagi College was verified by the GESCOM Office Kalaburagi Asst. Engineer and Department of Botany Gulbarga University Kalaburagi. An audit team consisting of Sufficient and appropriate audit procedures were completed and evidence gathered to support the accuracy of the conclusion reached and contained in this report. The conclusion is based on a comparison of the situations as they existed at the time of the audit with the established criteria.

This report covers a significant matter which includes base assessment of the existing Green Infrastructure (GI) in the campus such as land, trees, green spaces, management and conservation of energy, water, solid wastes. The contribution of the college to climate change was also included.

This report is divided into seven chapters – Introduction, Objectives, Criteria for Green Audit, Methodology, Findings, Conclusion and Recommendations. The findings of the Audit is further divided into three sections viz., Section I –College Main Building/Campus; Section II – Women's Hostel, and Section III – PG Building and Library.

The main findings of the audit show that, in general, all departments and students are aware about the need for environmental protection at a general level. It also observed that a number of best practices such as maintaining potted plants, introducing plastic free zones, adoption of rain water harvesting technique and compost pit and use of energy efficient LED/ CFL bulbs and tubes for minimizing energy consumption are followed in the college campus. However, on detailed review, it was observed that the college is implementing Green Policy for the first time and certain aspects would benefit from further review in order to improve their efficiency, fairness and consistency.

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Chapter – 1

Introduction

1.1. Outline of Green Audit

The process of green audit was begun on the 1970s with an intention of identifying the activities carried out in a given institution or company. This was initiated against the background of growing concern over changing climate and related aspects. Green audit is a tool to identify the range of environmental impacts and assess the compliance of the operations on the development and regular activities within an organization. It may also assess the compatibility of the operations within an organization or a company with existing applicable laws and regulations and the expectations of their various stakeholders. It further assesses the possible implications and effect of pollution due to the operations within the organization. The audit also seeks to identify possible means and methods to save investments, enhance work quality, improve health and safety of their employees, reduce liabilities and reduce the rate of environmental pollution. A continuous process of such audit might result in maintaining the quality of these aspects within the premises of any organization.

1.2. Aims and Objectives

Most companies, government and non-government bodies and other institutions conduct green audit aiming:

- To ensure that the performance of the institution with respect to environmental activities they are involved in, is in compliance with existing laws and regulations.
- To check the functionality and their operating success including water supply, energy related matters and other similar matters that are related to green operations in the campus
- To formulate or update the institution’s environmental policy, if warranted.
- To measure the environmental impact of operational process related to green activities in the campus.
- To measure the performance of each green related operations and actions in the campus.

• To generate a database of green activities for continuous monitoring to assess the success of each of them.

• to identify future potential liabilities.

• to align the institution's developmental and day to day activities with the stated vision, mission, strategies, etc.

• to identify possible ways to reduce expenditure and running costs on equipment's, appliances, etc. or try enhance revenue income.

• to improve process and materials efficiency, and in response to stakeholder requests for increased disclosure.

The process of green audit based on operational activities within an institution happens not necessarily based on laws and regulations. It might be largely based on awareness and concerns on environmental performances within and outside premises of the institution. This further strengthens the fact regarding social responsibilities of the organization. Majority of the institutions that conducted green audits in the recent past has realized the importance of the same as they could easily manage their operational costs and provide good atmosphere to their stakeholders. The green audit also provides opportunities to identify full range of operations within an organization, the impacts of maintaining and functioning of its operational goods and services, the actual source of raw materials for different activities within the organization, the costs of operations of its offices, functional units, and other facilities. It also provides chances to understand the relationship with employees, material suppliers, stakeholders, etc. The recommendations, findings and suggestions that emerge during green audit would certainly help the management of the organization to set up future action plan that best suits to them.

1.3. General steps involved in Green Audit

1. Systematic and exhaustive data collection.
2. Evidence based documentation of activities.
3. Regular monitoring.
4. Provide standards and methods for improvement by establishing cost effective green action plan.

Chapter – 2
Dr. Ambedkar College of Arts, Commerce and PG Centre, Kalaburagi College- An Information

2.1. General Information of the college

Karnataka People's Education Society's Dr. Ambedkar College of Arts, Commerce and PG Centre, Kalaburagi was established in June 1982 by Mallikarjun Kharge the then Education Minister Govt. of Karnataka now the leader of Opposition Rajya Sabha New Delhi Govt. of India. The College is named after a Great Soul of India Bharat Ratna Dr. B R Ambedkar. Dr. Ambedkar was a great Social, Political and Economic reformer of Modern India. Baba Saheb Ambedkar believed that education plays a vital role in all round development of the nation. Dr. Ambedkar established People's Education Society's in Aurangabad (MH) in 1945 Dr. Mallikarjun Khargeji a true follower of Baba Saheb Ambedkar established Karnataka People's Education Society in Kalaburagi which comes under Hyderabad Karnataka Region which is educationally, economically and socially backward region in Karnataka. The institution was established with the intention to impart education to the down trodden community especially, SC/ST and OBC. The College now has 11 departments, which are constituent of Arts and Commerce stream.

The College was given government recognition on 1 June 1982 , and got Grant- in- Aid Status with effect from 6 Agu 1984 by Govt. of Karnataka. The College has secured permanent affiliation in April 1985 and has been listed under 2(f) and 12 (B) March 1985 of the UGC Act on 23rd February, 1998. The college was accredited by NAAC in 2008 with a 'A' grade and in the 2nd Cycle Assessment and Accreditation it was awarded 'A' grade in 2011 . In the third cycle it was accredited with a B with a CGPA of 2.40 in 2018. It is registered under section 2(f) and 12(B) of the UGC Act. It has its College building at Kalaburagi, Darga Road occupying 10117.141 sq. mtr of land, with residential Women Hostel situated at the Campus. The total number of students enrolled for the academic session 2023-2024 is 718 The motto of the College which is founded on the principals of Buddha, Basava and Ambedkar that is "Truth Prevails" which is a guiding light that truth prevails in the hearts and minds of all students past and present and other stakeholders, ceaselessly throughout the institution and the community at large. This is reflected in the following vision, "Providing holistic and quality education within the reach of all, "which is reflected in the mission, "To mold the students to be intellectually competent, morally upright, socially committed and spiritually inspired and

capable of building a more human social order within the context of the nation's religious and cultural pluralities and diversities.

2.2. Previous Green Audit

The previous green audit of Dr. Ambedkar College of Arts, Commerce and PG Centre, Kalaburagi College was done during the year 2023. The report of the green audit was a comprehensive evaluation after thorough evaluation of all aspects related to concerned green activities of the campus. It identified the green activities in the campus involving, management, teachers and students. It also identified lacunas in green practices of the campus and recommended a few practices to be implemented for it to become a green campus. The following were the common recommendations posted in the previous audit.

1. The wastes generated from the institution (College and Hostel) must be segregated properly and in a scientific manner i.e., into degradable and biodegradable.
2. Free Plastic zone must be maintained in the campus as well as the other College infrastructure.
3. The institution must ensure small scale/medium scale reuse and recycle of water system.
4. Safe and scientific disposal through authorized agents for computers and electrical wastes.
5. Improvement is required in terms of energy consumption by introduction of Solar panels.
6. Acoustic enclosures must be constructed around the Diesel Generator to reduce the level of noise.
7. Water harvesting structure must be constructed in the Ladies Hostel.
8. Awareness programmes with regards to environmental protection and sustainability must be initiated by the College. This may be carried out with the participation

and involvement of staff and students in pertinent days such as World Environment Day, Earth Day and Water Day etc.

9. Regular checking and maintenance of pipelines be done to control water wastage.

10. Plantation programmes must be encouraged for creating awareness and maintaining the greenery of the institution.

11. Infrastructure on firefighting and emergency exit needs to be reviewed.

12. First-aid room must be maintained in a proper condition.

13. As the College Canteen is located at the farthest corner of the campus. It needs to be hygienic and healthy maintenance.

14. Water logging at the Women Hostel must be rectified.

The college has apparently tried their level best to implement these recommendations within the stipulated time period. It also adopted other policies and practices that help them to achieve a green campus. The previous audit also suggested criteria wise recommendations such as water management and energy management. Most of the recommendations were dealt with by the college authority.

2.3. Role of Management in Green Management

The part played by the college management in bringing the campus to a green one

is adorable.

The following were the initiatives by the college authorities in green management:

1. The management developed separate teams for implementing green policy in the campus.

2. Regular evaluation system has been established with monitoring cells for green activities in the campus.

3. The management has allotted budget for implementing green policies in the campus.

4. The green monitoring cell evaluates developmental and functional activities and makes recommendations for improvement of the green aspects.

5. These recommendations are implemented without delay and fail.

6. Clubs, Banks and NGO's that are related to green activities are encouraged to conduct programs in and around the campus.

7. The management is keen on the social commitments and tries to reach out to the general public through teachers and students.

8. The management is keen in conducting awareness programs based on its green policies.

9. The support and part played by management is vital in the green campus related activities.

Chapter – 3

Audit Preparations

3.1. Management

The Dr. Ambedkar College of Arts, Commerce and PG Centre, Kalaburagi College management was very keen in taking up the recommendation of conducting a green audit after five years after the previous audit. In the light of this, the college management approached Eco-Management Services, which is a consultancy firm offering services like green audit of Dr. Ambedkar College of Arts, Commerce and PG Centre, Kalaburagi institutions . The **Eco-Management Services Team** agreed to conduct the green audit of College. After this, there was a visit to the campus to set up different criteria and questions that are necessary for an updated green audit.

The following were different criteria set forth for the present green audit.

a) Green Practices

b) Water Management

c) Energy Management

d) Carbon Footprint

3.2. The Green Audit Process:

1. Selection of area/activities/parts of the campus.

2. Scope of audit process was identified in consultation with the auditee.

3. Data pertaining to identified parameters for green auditing of the campus were collected directly through an on-site visit.

4. Available background information on the identified activities and other parameters were collected.

5. The role of each stakeholder in green related activities has been collected.

6. Historical aspects of green activities in the campus including water usage and waste generation, etc. were collected.

7. Visit to the campus by audit team.

8. Data analysis and evaluation.

9. Discussion on the findings.

10. Report preparation.

3.3. Onsite audit activities

1. The onsite visit and meeting with the campus authorities was the first step between the audit team and auditee.

2. Site inspection for determining parameters for audit.

3. Site visit and evaluation of collected information of the audit team.

4. Meeting with the Principal, teachers, non-teaching staff.

5. Meeting with the in-house audit team for evaluation and clarifications.

Chapter – 4
Green Audit

Criteria adopted for Green Audit

In this audit the following criterion are adapted to study or assess the environmental management and conservation practices within the campuses.

4.1 Land & Other Infrastructure

Land use means utilization of land in a particular area. Land use pattern includes types of land and how much land is being utilized under different uses. Land is basic resource of human society and land use is the surface utilization of all developed and vacant land on specific point at a given time and space. It is a systematic arrangement of various classes of land on the basis of certain similar characteristics mainly to identify and understand their fundamental utility, intelligently and effectively in satisfying the needs of human society. Land use is very vital to understand the geographical adjustment of various resources. It is also very important resource for man, so it should be put for right use according to its capability and according to its type. Land capability depends upon factors such as relief features, climate, Soil, vegetation, socio-economic and institutional factors. Today, as the population is increasing at a faster rate the land is put under tremendous pressure to fulfill the growing demands of the population.

Due to urbanization and the growing population of a city, availability of free land for various purposes decreases so utilization of limited land resources in an economically, sustainably and eco-friendly manners are vital.

Infrastructure is the basic physical and organizational structure needed for the operation of a society or enterprise or the services and facilities necessary for an economy to function. It is a set of interconnected structural elements that provide framework supporting an entire structure of development and is an important criterion for judging the regions development.

4.2 Air Quality

Air pollution is the introduction of chemicals, particulates, or biological materials into the atmosphere causing discomfort, disease, or death to humans, damage other living organisms such as food crops, or damage the natural or built environment.

Indoor air pollution and urban air quality are regarded as two of the World's Worst Toxic Pollution Problems. Indoor air quality is a term which refers to the air quality within a home, buildings, an institutions or commercial facilities especially as it relates to the health and comfort of building occupants. IAQ can be affected by gases (including carbon monoxide, radon, volatile organic compounds), particulates, microbial contaminants (mold, bacteria), or any mass or energy stress or that can induce adverse health conditions. Indoor air pollution is a concern in the developed countries, where energy efficiency improvements sometimes make houses relatively airtight, reducing ventilation and raising pollutant levels. Indoor air problems can be subtle and do not always produce easily recognized impacts on health. Different conditions are responsible for indoor air pollution in the rural areas and the urban areas. Source control, filtration and the use of ventilation to dilute contaminants are the primary methods for improving indoor air quality in most buildings. Residential units can further improve indoor air quality by routine cleaning of carpets and area rugs.

4.3 Water

Water is the prime natural resources and indispensable component for sustenance of all forms of life in the earth. Adequate availability of water is the prerequisite for sustainable socio-economic development. Of the water resources on Earth only three percent of it is fresh and two-thirds of the freshwater is locked up in ice caps and glaciers. Of the remaining one percent, a fifth is in remote, inaccessible areas and much seasonal rainfall in monsoonal deluges and floods cannot easily be used. As time advances, water is becoming scarcer and having access to clean, safe, drinking water is limited among countries. At present only about

0.08 percent of all the world's fresh water is exploited by mankind in ever increasing demand for sanitation, drinking, manufacturing, leisure and agriculture. Due to the small percentage of water remaining, optimizing the fresh water we have left from natural resources has been a

continuous difficulty in several locations worldwide. As a limited resource, water supply sometimes supposes a challenge.

Water is so common that we often do not think about where it comes from or where it is managed. As water becomes scarcer, the importance of how it is managed grows vastly. Finding a balance between what is needed by humans and what is needed in the environment is an important step in the sustainability of water resources. Water management means dealing with water in the best possible way. This can be done by local authorities (municipal water management) or it can be done by individuals (when we manage how we use our own water supplies). Good water management will involve organizing water so that everyone has enough, and controlling water supplies and water treatment centers (and other equipment and logistics relating to water) so that they work in the best possible way. Water management affects many aspects of our lives. A fundamental strategy in sustainable water management is to integrate water management goals into physical, social and economic planning.

4.4 Energy Management and Administration

Energy management includes planning and operation of energy production and energy consumption units. Objectives are resource conservation, climate protection and cost savings, while the users have permanent access to the energy they need. It is connected closely to environmental management, production management, logistics and other established business functions. One of initial steps for an effective energy cost control program is the base line energy assessment, which examines the pattern of existing energy usage by the government or any sub-entity of the government or private organization. This program will set the reference point for improvements in energy efficiency. Energy efficiency can improve the existing energy usage and benchmark of every individual section.

It is important to integrate the energy management in the organizational structure, so that the energy management can be implemented. The central task of energy management is to reduce costs for the provision of energy in buildings and facilities without compromising work processes. Especially the availability and service life of the equipment and the ease of use should remain the same

4.5 Waste Management

Waste can take any form that is either solid, liquid, or gas and each have different methods of disposal and management. Waste management normally deals with all types of

waste whether it was created in forms that are industrial, biological, household, and special cases where it may pose a threat to human health. It is produced due to human activities.

Solid Waste management is the process of treating solid wastes and offers variety of solutions for recycling items that don't belong to trash. It is about how garbage can be used as a valuable resource. Waste management is something that each and every household and business owner in the world needs. Waste management disposes of the products and substances that you have use in a safe and efficient manner. Waste management is intended to reduce adverse effects of waste on health, the environment or aesthetics. *"Waste management or disposal is* the activities and actions required to manage waste from its inception to its final disposal. This includes amongst other things, collection, transport, treatment and disposal of waste together with monitoring and regulation. It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling etc.*"*

4.6. Inspection

The preliminary visit in connection with the pre-audit process to the campus had identified criteria for audit, parameters to be evaluated and time schedule of green audit of Dr. Ambedkar College of Arts, Commerce and PG Centre, Kalaburagi. It included meeting with the Principal, IQAC, teachers in charge of different green audit and Green activities of the campus and students representing different departments, clubs and fora. This enabled the auditing to gather all necessary information that is useful in preparing audit report. The on-site audit team collected information-based observation and secondary data/previous data.

4.7. Evaluation of documents and reports

The audit visit to the campus evaluated documents and reports (departments, clubs) that are necessary for the audit process. This further strengthened the claims made by the campus authority on green operations in the campus. To generate future action plan, the audit team had a detailed site inspection with different teams in the institute.

Chapter 5
Findings and Analysis

The findings of the Audit are divided into three sections viz., Section-I and Section – II which are as follows:

FINDINGS

SECTION I

Dr. Ambedkar College of Arts, Commerce and PG Centre, Kalaburagi.

MAIN BUILDING/ CAMPUS

A. Land & Other Infrastructure
- **Task I : Land Survey**
- **Task II : Other Infrastructure**

B. Air Quality
- **Task I : Mode of Transportation to College Campus**
- **Task II : Contribution to Climate Change**
- **Task III : Ambient Air Quality around the campus**
- **Task IV : Ventilation of the rooms**

C. Water
- **Task I : Sources of Water**
- **Task II : Water harvesting/ Storage**

D. Energy Management & Administration
- **Task I : Sources of Energy in the college?**
- **Task II : Energy Consumption**
- **Task III : Energy Conservation**

E. Waste Management
- **Task I : Solid Waste Management**
- **Task II : Liquid Waste Management**
- **Task III : Electronic Waste Management**
- **Task IV : Drainage system**

A. LAND & OTHER INFRASTRUCTURE

Dr. Ambedkar College of Arts, Commerce and PG Centre, Kalaburagi College, located in Kalaburagi city. It was established in June, 1982. The College got Grant-in-Aid Status in 1984. It is affiliated to Gulbarga University Kalaburagi. Data on land availability and its uses are collected through the data collection format and from records.

The college is a co-education one with Commerce & Arts faculty. At present, the college offers B.A. with subjects Kannada, English, Hindi, History, Political Science, Education, Economics, Sociology, Rural Development, Commerce in UG and Economics, Political Science and Commerce in PG subjects are also offered. The college has adequate infrastructural facilities – class rooms, library, computer laboratory, Language lab etc. Apart from the regular teaching learning activities, the college strives for the overall development of the adopted village where students can conduct various extra-curricular activities .

The college has conducted a good number of extension activities to strengthen college neighborhood network. The NSS unit is an asset to the college which allows 100 volunteers. This unit conducts various extension activities to help our students become aware of their social responsibilities. The college has been working sincerely for the betterment of the students. Apart from various government scholarships, the college is attempting to implement Earn & Learn scheme for the poor and needy students.

TASK I: LAND SURVEY

The Dr. Ambedkar College of Arts, Commerce and PG Centre, Kalaburagi.. It occupies an area of 10117.14 Sq.m with no green area provided within the College campus. However, indoor plantations are carried out in the College campus to maintain the greenery of the College. The College has its Girls Hostel at Campus.

The College receive Infrastructure grant of Rs 100 lakhs from UGC.

At present the College has 10+3 departments, which are constituent of Arts & Commerce streams. The different departments are stated as below:

Name of School

1. Department of Kannada
2. Department of English
3. Department of Hindi
4. Department of Political Science
5. Department of Education
6. Department of History
7. Department of Rural Development
8. Department of Economics
9. Department of Sociology
10. Department of Commerce
11. MA in Economics
12. MA in Pol.Science
13. Master of Commerce

The College has sufficient infrastructure. It has classrooms, computer lab, language lab, separate departments, independent library building, separate PG building and also ladies hostel. Gym facilities both for boys and girls. Space for indoor and outdoor sports is also available in the campus. The Project Monitoring Committee consisting of different teaching and non-teaching staff are assigned to be in charge of the infrastructure development of the College. It also

There are 718 students, 9 non-teaching staff, 26 faculty members which includes 1 Asso.Professors, 3 Asst. Professor and 7 Asst Professors (Full time), 1 Librarian and 14 part time lecturers.

TASK II: OTHER INFRASTRUCTURE

As stated earlier, the College is situated in the heart of the city. The area during its inception was surrounded with green areas, however, due to infrastructural development activities and urbanization the College is now being surrounded with institutional buildings, residential apartments and shopping complexes. Nevertheless, the greenery of the College is maintained by Big Trees along with the compound wall of the college and in front of the college. The college has plantation of indoor/ potted plants within the College Building, and the adoption of the rain water harvesting technique is also available in the College. Cleanliness and Beautification Cell to overlook the task of maintaining the greenery and cleanliness of the College is also formed by the College. The class representatives are responsible for overlooking the cleanliness of each classroom. The College undertakes various activities through N.S.S. and eco-club for maintaining the greenery of the College.

All Departments are located within the College Building with different rooms allotted for each department. Information technology system adopted in the College is found to be quite good. The campus has Computer Centre with its own server and computerization of the College Library is on the verge of completion. The Library is currently implementing the advanced technology in the field of identification, security, tracking and automated handling of Library materials in order to improve the efficiency of Library operations. Digital Scanner and shelves are bought and College website https//:drambedkarcollege.org has been created. Free *wi-fi* and computer with internet connections are provided within the College Building thus providing accessibility of the digital data to the students and staff.

The College Library holdings have been available in machine readable catalogue. and the computerized bibliographic information of the library holdings have also been available for users. Automated using barcode technology has been used which provides easy and prompt service. Library has been providing *lending* and *reprographic services*, for newly admitted students of various Academic Departments.

Some rooms in the College is provided with power point presentation facilities to improve the learning skills of the students.

Alumni of the college have donated Books and Sports material to the college. Land availability is reproduced in the table below:

Land		
	Area (in Sq. m)	**Percentage**
Occupied	**2230**	**60**

Table1: Land availability in the College

The total points gained under this category may be summarized as below:

TASK	**POINTS**	
	ALLOTED	**GAINED**
1) Land use	**10**	**9.00**
2) Other Infrastructure	**10**	**8.5**
TOTAL	**20**	**17.50**

Table 2: Total points gained under Land & Infrastructure

B. AIR QUALITY

The Air quality around the campus has been studied by considering four (4) points like transport survey, CO_2 emission, Ambient Air quality, and Ventilation provided in the room.

Data Collection Method:

A walk through surveys and interviews were conducted to find out the number of students coming & going by vehicles, survey of rooms to ensure area of ventilation provided, number of vehicles and distance covered used for transport to find CO_2 emissions, ambient air quality and other information needed for the air audit.

TASK I: MODE OF TRANSPORTATION TO COLLEGE CAMPUS

From the survey results it was concluded that 10 % of students and staff come by 2- wheelers and the remaining 50% come on foot or other 40% public transport such as city bus and train. as the college is situated at the heart of the city.

Assuming that each two-wheeler, car travels and Bus 4 km, 12 km, 14 km, and train 48 km every day respectively. This implies that for the 12% (85 two-wheelers) coming by two-wheelers, about 42 km is travelled by Public Transport and 32 km is travelled by train. Therefore, the total number of kilometers travelled by all vehicles is:

= 48 + 42 + 32 = 122 km

The survey can be summarized in the table below:

Mode of travel	**No. of Km covered**	**Points allotted**	**Points gained**
Bus	42	6.50	6
Railway	32		
Two-wheeler	48		
TOTAL	**122**		

Table 3: Points gained for mode of Travel

TASK II: CONTRIBUTION TO CLIMATE CHANGE

Carbon Dioxide (CO2) is one of most common Greenhouse Gas emitted into our environment. Global emissions of carbon dioxide (CO2) - the most important heat-trapping gas in the atmosphere are the main cause of global warming. India being a developing country does not yet adopt binding emission that is decreasing global emissions to 50% by 2050. However, owing to global warming and climate change issues, efforts must still be given by all officials so that community plans and regional growth strategies include greenhouse gas emission reduction strategies and targets.

The main source of CO2 of the College is from the combustion of fossil fuels such as gasoline and diesel to transport people and goods which in short may be called as vehicular

emission. In certain cases, LPG is also used in Canteen and diesel generators of 15 KV used during shortage of electric supply. The amount of CO2 from these sources is considered negligible as compared to vehicular emissions.

CO2 emissions:

1) Diesel Run Vehicles:

In plain areas, average diesel consumption is rated as 21.1 liters per 100 km or 4.7 km per liter. Therefore, on average, the College bus consumed 5.6 liters of diesel to cover 28 km per day. The amount of CO2 emission is given in Table 5.

2) Petrol Run Vehicles:

i) Consumption by Car:

In plain areas, the average petrol consumption by car is assumed at 1 liter per 12 km. Therefore, on average, 4 cars consumed 4.17 liters of petrol every day to cover 50 km. The amount of CO2 emission is given in Table 4.

ii) Consumption by 2-wheelers:

Similarly, petrol consumption by 2-wheelers is assumed at 40 km per liter. Then the average consumption of petrol by 30 two-wheelers is 3.75 liters every day to cover 150 km. The amount of CO2 emission is given in Table 5 below.

CO2 Emission Chart:

Mode of travel	Distance travelled (in km)	CO2 emission (g/km)	Grams of CO2/vehicle	Grams of CO2/passenger	Points allotted	Points gained
Bus	28	659.77	18,474.4	659.77	5.00	4.5
Car	50	287.94	14,397	3,599.25		
2-wheeler	150	115.17	17,275.5	8,637.75		
Total	**228**	**659.77**	**50,147.9**	**12,896.77**		

Table 4: CO2 Emission Chart

From the table above, a good score is observed in this task due to the large number of people coming on foot and by two wheelers, thus decreasing the number of vehicles. On the other hand, it is rarely noted that a bus greater than 15 years old are plying. All the vehicles used for transportation by the students and faculties of the College also comply with the Central Motor Vehicle Acts and Rules by obtaining valid Pollution under Control Certificates (PUCC). The practice of turning off lights and electronics appliances like computers when not in use reduces electricity demand.

TASK III: AMBIENT AIR QUALITY AROUND THE CAMPUS:

The ambient air quality of the college was taken for continuous eight hours in the college campus. Analysis report for monitoring conducted for three parameters like Respiratory Particulate Matter of size less than or equal to 2.5µ (PM2.5), Particulate Matter of size less than or equal to 10µ (PM10), Sulphur dioxides (SO2), Carbon Monoxide (CO) and Nitrogen Oxides (NOx) during June 2023 is shown in **table 5**.

Table 5. Ambient Air Quality on 22nd June 2023

Pollutants monitored	National Standard (µg/m)	Measured (µg/m)	Points allotted	Points gained
PM2.5	60	45	5.00	4.75
PM10	100	80		
NOx	80	30		
SO2	80	15		
CO	50	10		

TASK IV: VENTILATION OF THE ROOMS

Because of the effects it has on health, comfort, and serviceability, indoor air quality in our homes is becoming of increasing concern to many people. The Environmental Protection Agency lists poor indoor air quality as the fourth largest environmental threat to America. Mechanical ventilation can improve many of the problems arising from poor indoor air quality.

This task was already done in the previous green audit report and no change was made in the building, so, the finding was re-use for this task. To find out whether the indoor air is sufficient in all rooms, data on the area of classrooms and mechanical ventilation system was collected through measurements and the administration files. Apart from the already documented length and width of classrooms, the height was physically taken by Measuring Tape.

The table below is a summary of the data collection and calculations done.

Room	Area of Vent (Sq. ft.)	Opening size (%)	Points allotted	Points gained
Faculty Rooms	400	26.04	6.25	5.00
Class rooms	3000	33.93	6.00	5.50
Library	500	12.19	5.75	5.25
Seminar Hall	250	22.54	5.50	5.00
Auditorium Hall	200	3.08	5.25	4.75
PG Building	750	23.44	5.50	5.00
Ladies Hostel	700	25.00	5.75	5.25

Table 6: Ventilation chart

According to standards adopted in America, a room having 4% of the floor area as operable openings is considered to meet requirement of natural ventilation. Taking this consideration in the table above, **Auditorium Hall with 2.50% opening size falls short of the required ventilation** while rooms of other buildings have enough provision for natural ventilation and air circulation.

TABLE 7: OVERALL RANKING UNDER AIR QUALITY

TASK	POINTS ALLOTTED	POINTS GAINED
1) Transport	6.25	6.00
2) CO2 emissions	6.25	4.50
3) Ambient air Quality	6.25	4.75
4) Ventilation	6.25	5.00
TOTAL	**25.00**	**20.25**

C. WATER

TASK I: SOURCES OF WATER

Study was conducted in various ways like sources of water, its uses and disposal. Like other aspects, data were collected through questionnaire, walk through and interviewing the person concerned in each Department.

The College has 3 Borewells and one Gulbarga Corporation water supply tap. So far college has not faced water problem. Borewells have never went dry. Hence college has no water problem. Water bills for three consecutive months were obtained through the authority concerned and the average quantity supplied per month was calculated. Although the water supplied is now known for each month throughout the year, the average was taken in order to determine the requirement per capita per day.

Assuming monsoon period to last for 4 months during which rain water is harvested in full capacity. It would therefore be approximated that amount of rain water harvested per months is 3117 liters.

TASK	Amount of Water Received per Month (in L)	POINTS ALLOTTED	POINTS GAINED
1) Public Supply	824,552.59	7.5	4.875
2) Rain Water	8,364.75		
TOTAL	**832,917.34**	**7.5**	**4.875**

Table 8. Sources of Water

TASK II: WATER HARVESTING/ STORAGE

The College has rain water harvesting facility. As a result the borewells have not run out of water.

Although the water supply received by the College seems adequate, however, as per WHO, a higher quantity of about 20 litres per capita per day should be assured to take care of basic hygiene needs and basic food hygiene. As such, the water requirement per capita per day care through water storage tanks.

Though great efforts have been given for the conservation of water, the water harvesting storage needs to be enlarged and a provision for harvesting more rain water needs consideration.

TABLE 10: OVERALL RANKING UNDER WATER SOURCES

TASK	POINTS	
	ALLOTED	GAINED
1) Sources	**7.5**	**5.5**
2) Water harvesting/ Storage	**7.5**	**4**
TOTAL	**15**	**9.5**

D. ENERGY MANAGEMENT AND ADMINISTRATION

An assessment of energy consumption, energy sources used, energy management, lighting devices used and other appliances used by the campus community is an important aspect of sustainability of the community. Hence this is a relevant aspect of the assessment. Sources, consumption pattern and mode of conservation of Energy being practiced in the College was studied and related data were collected through inspection, office records and by interacting with the person in charge.

TASK I: SOURCES OF ENERGY IN COLLEGE

The College mainly depends on two sources of energy which are as follows:

Renewable Source:

a) Electricity through KPTCL supply
b) Solar energy

Non-Renewable Source:

a) Gas: Merely for cooking in College canteen.

b) Diesel: For college Generators

c) Petrol: For staff and student cars/ vehicles and generator.

The College greatly depends on public electricity supply and but the college have solar power for backing up the public electricity supply. **Hence, 4 points out of 5 is credited.**

TASK II: ENERGY CONSUMPTION

Electricity bills for the previous month were obtained through the authority concerned, and the value of electric consumption in kilowatts per hour for some months was obtained from the charts in the bills. The average quantity consumed per month was calculated.

Although the energy consumption is now known for each month throughout the year, the average was taken in order to determine the consumption per capita per day. It was observed that though the College depends much on public electricity supply, the average monthly consumption is low.

In terms of the consumption of non-renewable energy such as petrol, diesel, gas etc. it was found that petrol and diesels were mainly used for vehicles. Gas amounts consumed are very insignificant as the College uses it only in College canteen and Girls Hostel.

The total energy consumption per capita i.e.8.75 MJ is low as compared to the per capita consumption in Gulbarga. As such a good score is credited.

Type	Sources	Amount (KWH) per capita consumed	Points Allotted	Points Gained
Renewable	Electricity	1543.50	5	3.00
Non-renewable	Petrol (L/Month)	231.23	10	
	Diesel (L/Month)	344.25	10	

Table 11: Energy Consumption

TASK III: ENERGY CONSERVATION:

Through interview among staff & students, it was found that though the College does have any policy statement on energy conservation, each department was found to practice energy conservation on a large scale by turning off the lights when not required, turning off other electrical appliances and computer monitors when they are not in use.

Since, the College relies on electric supply from municipal corporation connection; the College utilizes minimum quantity of energy however, the usage of again it greatly reduced by using LED bulbs and tubes in almost all the rooms in the campus and hostel. Besides, it was also found that most staffs and students (90.00%) commuted via on foot and by public transport and while 2.72% of the population resided in the College hostel which has greatly reduced the quantity of the energy consumed. **Therefore, 4 out of 5 points is credited to these the tasks.**

TABLE 12: OVERALL RANKING UNDER ENERGY MANAGEMENT AND ADMINISTRATION

TASK	POINTS	
	ALLOTED	GAINED
1) Sources	**5**	**4**
2) Consumption	**5**	**3**
3) Conservation	**5**	**2.5**
TOTAL	**15**	**9.5**

E. WASTE MANAGEMENT

Wastes management in the College campus is studied by considering four aspects solid, liquid, electronic wastes management and drainage system. Like other parts, information was obtained through walk-through and interview.

TASK I: SOLID WASTE MANAGEMENT:

Solid wastes generated by the College consist of all types of wastes like left-over food from college canteen and hostel, bio-degradable and non-biodegradable wastes from classrooms, and administrative offices. These wastes are segregated at the point of generation and are disposed through PPP mode. Biodegradable wastes are kept in decompose bin and used to fertilize plants. E-waste are segregated form other waste and are collected by municipal corporation separately.

During the survey, it was found that efforts were given for maintaining the cleanliness of the campus by providing separate dust bins for biodegradable and non-biodegradable waste, brooms, etc., in each classroom. Garbage bins are provided in each classroom and segregation

were found to be good enough. All kinds of wastes are thrown altogether including waste paper, plastic bottle, tin container which are separated for recycling or reuse.

Status of solid waste generation, collection, treatment and disposal are summarized in the table below:

Quantity of waste generated/month (Kg)	**Segregation& Treatment/ recycling**	**Points allotted**	**Points gained**
68	68kg	**6.25**	**6**

Table 13: Status of solid waste

TASKS II: LIQUID WASTES MANAGEMENT

The main source of waste water discharge is from cleaning and sanitary purposes in all Departments and offices. During the survey, **Waste water arising from toilets and basin is untreated.**

The Summarized status of liquid waste management is shown below:

Quantity of waste water (liter/month)	Reused/ recycled (liter)	Points allotted	Points gained
22402.664	0	**6.25**	**4**

Table 14: Points allocated for liquid wastes

TASKS III: ELECTRONIC WASTES MANAGEMENT:

During the physical inspection no- e waste were stored in the college campus.

Though the E- waste generated was disposed of with the public partner, the E- waste and defective item from Computer Laboratory is being stored properly and were collected as per requirement. The discarded/ written off computers, if repairable, are given at the servicing station and donated to schools in rural area.

TASKS IV: DRAINAGE SYSTEM:

During the survey observed an

d existing.

TABLE 15: OVERALL RANKING UNDER WASTE MANAGEMENT

TASK	POINTS	
	ALLOTED	GAINED
1) Solid waste management	**6.25**	**5**
2) Liquid waste management	**6.25**	**3**
3) E- Waste Management	**6.25**	**6**
4) Drainage System	**6.25**	**5.5**
TOTAL	**25**	**19.5**

B. CARBON FOOTPRINT

The most common greenhouse gases are carbon dioxide, water vapor, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. Each human being is contributing towards adding green-house gases to the atmosphere depending upon his day to day activities and usage of instruments and machineries for different purpose. Release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon footprint. An understanding about the same of any institute where large number of anthropogenic activities are happening is important to assess the contribution of emission of gases that are responsible for Green House Effect. Auditing for carbon footprint of Dr. Ambedkar College of Arts. Commerce and PG Centre Kalaburagi College Campus was done using their detailed information, so that the impact of the community on global environment can be assessed.

4.4.4.1. Major Findings

1. Total number of Students – 718
2. Total number of Teachers – 26
3. Number of persons using cars - 1 (1.8L fuel per day)
4. Number of persons using two wheelers - 104 (50L fuel per day)
5. Number of cycles used in the campus– 10

TABLE 16: OVERALL RANKING OF THE COLLEGE

TASK	POINTS ALLOTTED	POINTS GAINED	OVERALL RANKING
Land & Other Infrastructure	20	17.50	B++
Air Quality	25	20.50	
Water	15	9.50	
Energy Management	15	9.50	
Waste Management	25	19.50	
Carbon Footprint	10	7.00	
TOTAL	**110**	**73.00**	

CONCLUSIONS

1. The management and authorities are dedicated to transforming the campus into a green space.
2. Dr. Ambedkar College of Arts, Commerce, and PG Centre in Kalaburagi is enhancing the learning process through practical approaches, including planting various trees, rainwater harvesting, solar energy use, and water and energy conservation.
3. Staff and students are aware of the institution's commitment to societal welfare.
4. Regular green audits help campus authorities understand the impact on environmental sustainability and resource conservation.
5. The evaluation confirms that the authorities have implemented the suggestions from the previous audit.
6. Campus activities are oriented towards eco-friendliness, fostering a genuine commitment to nature and resource conservation among students.
7. The current report will assist authorities in developing future action plans to enhance biodiversity, water, and energy conservation efforts.
8. We, the Eco-Management Services Audit team, submit this comprehensive report to the authorities of Dr. Ambedkar College of Arts, Commerce, and PG Centre in Kalaburagi. We hope the findings will guide the implementation of improved management practices for a greener campus, conserving water and energy. We recommend conducting the next audit in June 2028 to assess progress toward set goals.

The Green Audit is crucial for environmental awareness and sustainability at the college level, as mandated by the NAAC Committee. It provides an opportunity for students and staff to contribute to environmental conservation and responsible citizenship.

Based on our professional judgment and the audit procedures, the findings are accurate and adhere to established criteria. We recommend following these recommendations to sustain campus greenery and promote environmental sustainability.

Grading:

1. Dr. Ambedkar College of Arts, Commerce, and PG Centre, Kalaburagi – Grade B++

RECOMMENDATIONS:

- Continue composting biodegradable waste.
- Wastewater needs to be collected and treated before disposal.
- Prepare a plan for green belt development.
- Construct water harvesting structures in a structured manner.
- Regularly check and maintain pipelines to control water wastage.
- Ensure the institution implements small-scale and medium-scale water reuse and recycling systems in the near future.