



Energy Audit, Environmental Audit & Green Audit of Govt. Digvijay Autonomous PG College Rajnandgaon



Conducted & Prepared By:

Raj Energy Services ----- dedicated in energy conservation

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We trust that the findings of this study will help the college in improving its green initiative towards creating awareness for healthy and sustainable environment.

Raj Energy Services



Sanjay Kumar Mishra

Certified Energy Auditor, EA- 8696

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We trust the data provided by Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon, personnel are true to their best of knowledge.

5. CERTIFICATE



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ENERGY AUDIT, ENVIRONMENTAL AUDIT & GREEN AUDIT CERTIFICATE

This is to certify that M/s. Raj Energy Services has conducted Energy Audit, Environmental Audit & Green Audit of Government Digvijay Autonomous Postgraduate College and submitted report under their Policy for Green Campus of the Institute.

Name of the Educational Institute	Govt. Digvijay Autonomous Postgraduate College, Kila Para, Rajnandgaon, Chhattisgarh, 491441
Contact Details	Phone : (07744) 225036 E – Mail : principal@digvijaycollege.com Website : https://www.gdcr.ac.in
Name of The Principal	Dr. Suchitra Gupta
Details of facilities Audited	Office, All departments, Laboratories, Classrooms, Auditorium, Srijan Samvaad, Triveni Parisar, Library, Electrical Systems and complete Installations including Solar Power Plant, Boys Hostel Girls Hostel, Rain Water Harvesting System etc.
Date of Audit Conducted	13 th & 14 th July, 2026
Name of Certified Energy Auditor	Sanjay Kumar Mishra
Registration Number	EA- 8696

For, Raj Energy Services

Date : August 17,2026

(Sanjay Kumar Mishra)

Certified Energy Auditor from Bureau of Energy Efficiency, Ministry of Power, Government of India, New Delhi
EA- 8696

6. AUDITOR'S CERTIFICATE



BUREAU OF ENERGY EFFICIENCY
Government of India, Ministry of Power

FORM – IIB

[See regulation 7]

CERTIFICATE FOR CERTIFIED ENERGY AUDITOR



This is to certify that Mr./Mrs./Ms Sanjay Kumar Mishra
Son/Daughter of Mr./Mrs. R. B. Mishra
who has passed the National Examination for Energy Auditor held in the month of May, 2008
is qualified as Energy Auditor under the Energy Conservation Act, 2001 (52 of 2001).

Energy Auditor No:
EA-8696

This certificate shall be valid for five years with effect from the award of the certificate and shall be renewed subject to attending the prescribed refresher training course once in every five years. Given under the seal of the Bureau of Energy Efficiency, this 4th day of September, 2008

Sunil Kisan, Deputy Director
Bureau of Energy Efficiency
New Delhi

Director
Bureau of Energy Efficiency,
New Delhi

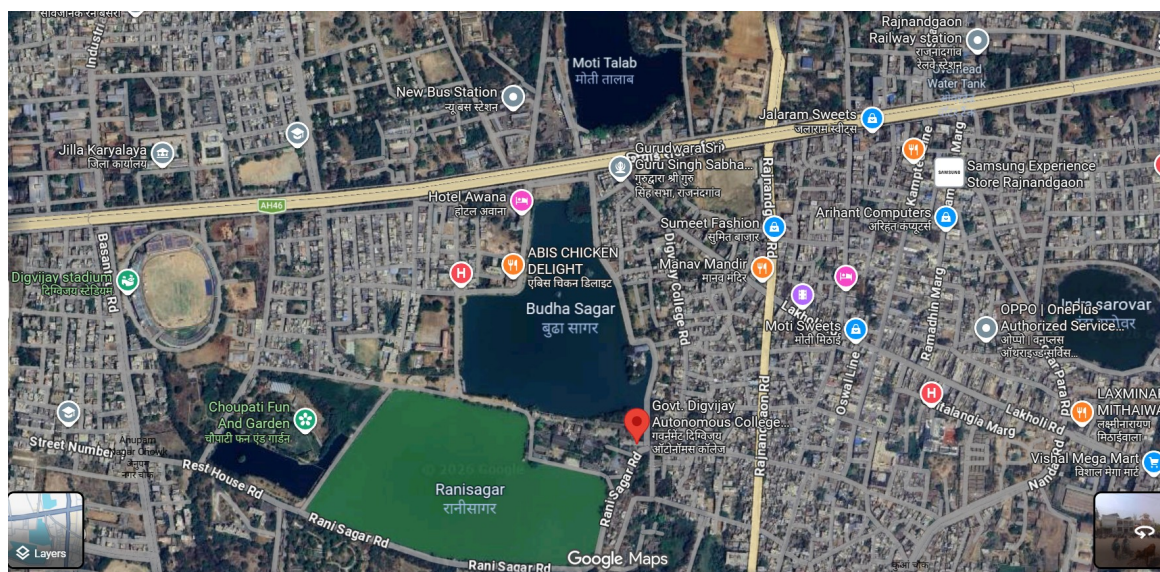
Dates of attending refresher course

22/01/2019	27/04/2025			
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7. INTRODUCTION

Introduction

The Government Digvijay Autonomous Post Graduate College, Rajnandgaon was established in 1957 and is one of the premier Institutions of Chhattisgarh, founded by the visionary personality, Late Mahant Raja Digvijay Das. The institution, surrounded by lakes from three sides, has plenty of natural and scenic beauty. From 1957 the college was being run as private college and was taken over by the government in 1973. The college has sufficient infrastructure and learning resources for academic and extra-curricular activities. The royal building of the institute is spread over 10.5 acres.



Vision

The vision of our institution is to provide quality education to the students of rural and tribal belt in the surrounding areas and to develop skills among students by keeping balance between the traditional human values and the new global challenge with use of information and communication technology.

The motto of the college “*Vidya Sarvasya Bhushanam*” (*Knowledge as the ornament for all*) has been the guiding force, the philosophical firmament and constant source of inspiration of the college ever since its inception. The institution aims to provide higher education to as many deprived and unprivileged youth as possible. The college community has always been dedicated to live up to the spirit of the core values of the college inspired by its motto – ***Distribution of knowledge to all without any discrimination.***

Mission

The Institution has an effective leadership, which is in tune with the vision and mission of the institution.

- Every year, induction program is organized in institution for newly admitted students so that students can get benefit of different types of courses and facilities.

- The institution provides various coaching classes for competitive examinations and different skill development programmes to promote entrepreneurship.
- Under NEP, students can be changed in logical, creative, moral thinking. So that students can get technical, practical knowledge.
- Inspire the young mind to develop the habit of critical thinking to achieve creative excellence.
- Promote quality research among the teachers and students.
- The syllabus of the institution is framed in such a way that after completing their degrees they find themselves fit for jobs.
- Campus selection is organised to provide better job opportunities.
- Various Government scholarships are provided to the economically challenged students.

The institution is offering 7 Under Graduate courses, 18 Post Graduate courses, 2 diploma courses, 2 Post Graduate diploma courses, 4 Add-on courses and 11 certificate courses.



Land Use System

Government Digvijay Autonomous PG College, Rajnandgaon, is located in between two large Ponds- Rani Sagar and Budha Sagar., Killapara, Rajnandgaon, Chattisgarh-491441, India The institution is expanded in about 10.5 acres of land in its first part and the second part of 5 acres is under construction. The college has 49 well ventilated classrooms, 16 labs including English, Mathematics, Central Lab & Sanskrit Labs, multi-purpose Auditorium, Boys/Girls Hostel and Outdoor Track & field. The up-gradation of the infrastructure continues with changing classrooms in to smart class and up gradation of traditional blackboards into green boards. All PG departments have Projectors; we have four smart classes and one e-classroom with equipment's having modern and latest technology. We have a zoology museum, botanical garden, green house, a well-established and computerized rich library, a fully AC meeting room & one conference hall, e-

library, fully AC Reading Room having special sitting arrangement for research scholars & specially-abled students, Gymnasium and Canteen.

The college has sufficient infrastructure and learning resources for academic and extra-curricular activities. The royal building of the institute is spread over 10.5 acres. The Campus has an ideal educational ambience having 44 classrooms, 7 conventional science labs, 1 Mathematics lab, 1 English Language lab, 1 Sanskrit Lab, 1 Commerce Lab, 1 Geography lab, 1 Geology lab, 1 Central Instrumentation Lab, two seminar halls, one auditorium, 1 computer Science lab, a well-equipped central digital library having approx. 95000 books and eBooks, one spacious fully Ac reading room, 1 e-classroom, 4 smart class-rooms, one gymnasium, indoor sports facility for badminton, Table Tennis, Chess, basketball, kabaddi, 1 ATM (SBI), water coolers with RO purifiers, campus with Wi-Fi connectivity. Audio-visual teaching aids like, interactive boards, overhead projector, slide projector, laptop, handy cam, headphones etc. are available for use. We also have our own collection of musical instruments like harmonium, tabla, and home theatres to support the students in cultural activities.

Laboratories

The institution has well equipped and effectively functional 17 laboratories and 1 central laboratory for all subjects including science laboratories viz. Physics, Chemistry, Botany, Zoology, Microbiology, Anthropology, Geology and Biotechnology & Arts labs viz. Geography and Home Science. Other than this we have three computer Labs (in Commerce, arts & science respectively), one Sanskrit Lab, one Commerce Lab, English Language Lab & Mathematics Lab.



Central Laboratory

We have established a central laboratory for research purpose. The laboratory is equipped with instruments (RT-PCR, AAS, UV Spectrophotometer, Flame Photometer, Gel Doc, Binocular Microscope) for Soil Analysis (Micro and Macro nutrients), Water Analysis (Chemical and Physical parameters), Food Adulteration Analysis, Industrial Pollutant Analysis, Heavy Metal Analysis (like Arsenic, Mercury, Molybdenum, Zinc,

Iron etc.), Plant Extraction Analysis, DNA test, Sickle Cell test, Diagnosis of Genetic Disease, Genetic Counselling, Screening of Genetic Disease, Diagnosis of Inherited Disease.

Triveni Literary Museum:

Established in the Historical palace donated by Mahant Raja Digvijay Das of Rajnandgaon Estate and surrounded by water bodies from three sides, Govt. Digvijay PG Autonomous College, Rajnandgaon is famous for the renowned literary personalities like Shri Gajanan Madhav Muktibodh, Shri Padumlal Punnalal Bakshi and Shri Baldeo Prasad Mishra who have contributed their immortal works to the world of literature during their life time. "Triveni Literary Museum" constructed on the bank of the pond to commemorate these three famous personalities reminds us of their literary contributions.

Use of Renewable Energy

The college has two solar power plant, one plant of 10 KWp capacity is installed above the roof top of office & and another solar power plant of 50 KWp capacity is installed above the roof of computer lab.



The botanical garden of GDACR is approximately 50x80 feet area with Medicinal, ornamental, commercial and some rare plant varieties (Plate XII). The plant sample uses in the experiments of botany, biotechnology and microbiology is fulfill by the botanical garden. It is maintained by both teaching and no teaching staff.



GOVERNMENT DIGVIJAY AUTO.P.G. COLLEGE, Rajnandgaon(C.G)

Policy Document on the Green Campus Green Campus:

A Green Campus is a place where environmental friendly practices and education combine to promote sustainable and eco-friendly practices in the campus. The green campus concept offers an institution the opportunity to take the lead in creating sustainable solutions to environmental, social and economic needs of mankind.

Objectives of the Go Green Programme:

The first step of the Green Campus Programme involves establishing a viable Green-Campus Committee, within the organizational structure of the Institute. Hence, to give this initiative more clarity and authenticity, we now roll out a POLICY DOCUMENT spelling out the strategies, plans and other allied tasks to make this Program functional officially. We believe that greening the campus is all about sweeping away wasteful inefficiencies, correct disposal handling, purchase of environment friendly supplies and effective recycling program.

The administration of the Institute believes that everyone has to work out the time bound strategies to implement green campus initiatives. These strategies need to be incorporated into the institutional planning and budgeting processes with the aim of developing a clean and green campus. Every individual of the college has to work, may he/she be a student, faculty and support staff, to foster a culture of self-sustainability and make the entire campus environmental friendly. The Green Campus Initiatives (GCI) will enable the institution to develop the campus as a living laboratory for innovation.

Composition of the Green Campus Committee:

1. Principal of the college- Chairperson
2. IQAC Coordinator- Secretary
3. Faculty Representative nominated by the Principal
4. Student Representative- General Secretary of the college
5. Non-Teaching Staff Representative- Office Superintendent
6. Parent Representative- An active Parent
7. Industry Representative- Member of Alumni Association

Role of the Green Campus Programme:

The impetus for a successful Green Campus must begin at the top and emanate throughout the rest of the campus. Thus in view of this, the committee will plan and execute to:

1. Seek views of all the Stakeholders to make the Green Campus initiative functional throughout the year.
2. Conduct the Campus' environmental impacts to identify the targets for improvements.

3. Establish a Green Campus Environmental Ethic Awareness campaigns. Set forth a Green Campus Mission and a Statement of Principles. Green Campus is a Cleaner, Safer and Healthier Place to Live and Work.
4. Link Green-Campus activities to Academics in the Institute.
5. Organize Awareness Programs for the students, faculty and society.
6. Chart out a yearly planner for the Institute, local community and Stakeholders.
7. Develop a strategic plan and create student teams to carry out specific tasks of the strategic plan.
8. Phase out the CFL and conventional light source such as bulbs and tube lights, halogen and mercury street/campus lights and get them replaced by the LEDs.
9. Conduct an Annual Green, Environment and Energy Audit.

Promotion of "Save Energy Tips" in and outside the Institute:

- Activate power management features on your computer and monitor so that it will go into a low power "sleep" mode when you are not working on it.
- Turn off your monitor when you leave your Table.
- Activate power management features on your laser printer.
- Whenever possible, shut down rather than logging off.
- Turn off unnecessary lights and use daylight instead.
- Avoid the use of decorative lighting.
- Use LED or compact fluorescent bulbs.
- Keep lights off in conference rooms, classrooms, lecture halls when they are not in use.
- Use the fans only when they are needed.
- Unplug appliances not plugged into power strips (like TVs, Refrigerators, ACs, tea/coffee pots, printers, faxes, and chargers etc.)

Waste Water Management/ Rain water harvesting:

The Institute takes all necessary measures to implement waste water management /rain water harvesting system.

Major Green Campus Initiatives:

- Installation of Solar Power Station
- Waste water Management/ Rainwater harvesting
- Sensor based energy conservation
- Maintenance of water bodies and distribution system in the campus
- Plastic free Campus • Tree Plantation Drive
- Cleanliness Drive
- Landscaping and gardens
- Use of LEDs only
- Digital Library/ E-Learning Centres
- Establishment of Environmental-Club
- Green, Environment and Energy Audit conducted
- Restricted entry of automobiles



Principal
Govt. Digvijay College
Rajnandgaon(C.G)

Program on Energy Conservation Day

The Government Digvijay Autonomous College organized a speech, slogan writing, poster, and essay writing competition to mark the Chhattisgarh Silver Jubilee of the Chhattisgarh State Power Distribution Company Limited (CSPDL). In the speech competition, students expressed their views on relevant and important topics such as the importance of energy in human life, renewable energy and India's future, energy utilization and conservation, generating energy from waste, and how to save energy every day.

The winners of the speech competition were Shivam Kumar Yadav, Vinay Vasnik & Medha Shree Mishra. Similarly, in the slogan writing competition, Students were assigned the following six topics for slogan writing. They had to select a topic of their interest and write slogans:

1. The importance of energy in our lives;
2. The use of solar energy as electrical energy;
3. Renewable energy sources
4. The utility of electricity and energy conservation;
5. Save electricity, save the future;
6. Renewable energy is India's future.

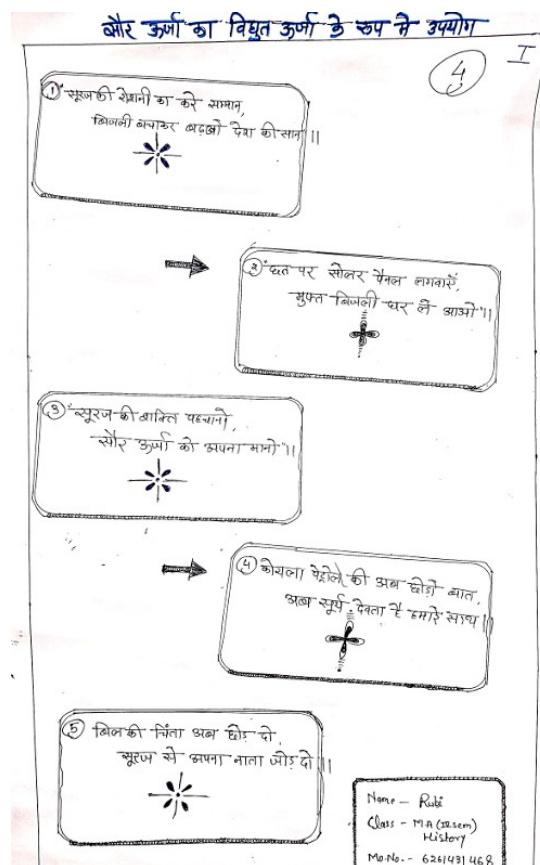
The names of the winning students were Ruby, Ruchika Ramteke & Rajkumar Verma. Similarly, the winners of essay writing competition were Nandini Uke, Mahi Singh & Durlabha Sahu.

In the poster competition, the name of winners were Divyanshu Ojha, Bhoi Ram Verma, Roshni.

The Govt. Digvijay College has fire



extinguishers and kept at designated locations to protect students and staff, stop small fires from turning into major disasters, and meet legal safety rules.



8. SCOPE OF STUDY

The 'Green Audit' aims to analyse environmental practices within and outside the College campus,

which will have an impact on the eco-friendly ambience. An energy audit can be defined as an inspection or survey analysis of energy flows in a structure, in a process or in a system, intended to reduce the amount of energy input without negatively affecting the outputs. An Environmental Audit is an independent assessment performed to ensure that businesses and organizations are complying with environmental policies

Objectives of the Study

The main objective of this audit is to promote the Environment Management and Conservation in the College Campus including the maximum use of renewable energy. The purpose of the audit is to identify, quantify, describe, and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

The main objectives of carrying out Green Audit are:

- To introduce and aware staff and students to real concerns of environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use of the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requiring high cost.
- To bring out a status report on environmental compliance.

Methodology

We had discussed in detail with Principal and Staff members of the college. The discussion was focused on identifying the attitudes and awareness towards energy and environmental issues at the institutional, district, national and global level. In order to perform the audit, the methodology included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations.

The study covered the following areas to summarize the present status of environment management in the campus:

- Water Management
- Energy Management
- Waste Management
- E-waste Management
- Green Campus Management
- Carbon Footprint

9.WATER MANAGEMENT

1. Water Management

2. Rain water harvesting structures and utilization in the campus

Water Management

This indicator addresses water consumption, water sources, irrigation, storm water, appliances and fixtures. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

9.1 Water Storage Tanks

Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon gets water from a ground water bore well source. Three pumps operated two times to fulfil the daily needs of college. College has seventeen rooftop overhead water storage tanks of different capacities.

Sr. No.	Capacity of rooftop water storage tanks	Numbers	Total storage quantity in liters
1	500 liters	5	2,500
2	750 liters	2	1500
3	1000 liters	10	10,000
Total water storage capacity in college			14,000
1	5000 liters	1	5000
Total water storage capacity in boys hostel			5,000
1	5000 liters	1	5000
Total water storage capacity in girls hostel			5,000
Grand Total			24,000

Table 1: Quantity and capacity of water storage tanks

College has not installed Water level indicator/ controller to avoid overflow from water tank.

9.2 Water Consumption at Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon

The water consumed in various works like washing, drinking, gardening, canteen, bath, toilet etc. The details of average water consumption per day is shown in following table:-

Water Audit at Govt. Digvijay College, Rajnandgaon					
1	2	3	4	5	6
Activity	Average liters of water used per activity in liters	Number of times of activity done each day	Total water used by a person each day (liters)	Number of people in the College using water	Water Consumption per day
College Premises					
Wash hands and face	1.5 liters	One times a day	1.5	1000	1500
Bath	60-120	once	90	6	540
Toilet / Urinal flush	6 To 21	once	6	1200	7200
Drinking	0.25	Four	1	3500	3500
Washing dishes (hand)	Basine	Four	4	1200	4800
Laboratory					500
Overflow of water & Leakage	1000			-	1000
Gardening	5000	once	5000	1	5000
Canteen					5000
Total Consumption of water in liter (A)					29040
Boys Hostel					
Overflow of water& leakage	100	1			100
Hostel (Wash hands and face)	1.25 liters	Two times a day	2.5	6	15
Hostel (Bath)	60-120	once	100	6	600
Hostel (Toilet flush)	6 To 21	once	15	6	90
Hostel Washing dishes (hand)	Basine	Twice	2	6	12
Hostel Drinking (cup)	0.4	Five Times	2	6	12
Total Consumption of water in liter (B)					829

Girls Hostel					
Overflow of water& leakage	120	2		100	240
Hostel (Wash hands and face)	1.25 liters	Two times a day	2.5	100	250
Hostel (Bath)	60-120	once	85	100	8500
Hostel (Toilet flush)	6 To 21	once	6	100	600
Hostel Washing dishes (hand)	Basine	Once	1	100	100
Hostel Drinking (cup)	0.4	Five Times	2	100	200
Total Consumption of water in liter (C)					9890
Total Consumption of water [(A)+(B)+(C)]					39,759

Table 2: Total Water Consumption Per Day

At some places, some stickers for conservation of water are pasted, but the numbers of awareness slogan for water conservation should be increased and placed at designated places.

Maximum amount of water is consumed for gardening purpose. Water is also consumed in wash basin, toilets etc. There are 162 water taps in Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon.

Description	Total numbers
Water Taps	162
Water Coolers	05

Table 3: Total numbers of water taps.

9.3 Rain Water Harvesting System

Rainwater harvesting is a technology used to collect, convey and store rain water for later use from relatively clean surfaces such as a roof, land surface or rock catchment. RWH is the technique of collecting water from roof, Filtering and storing for further uses. Rainwater Harvesting is a simple technique of catching and holding rainwater where its falls. Either, we can store it in tanks for further use or we can use it to recharge groundwater depending upon the situation.



Rain Water Harvesting System at Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon

Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon has a large open roof area for collecting rain water. At present, college has not installed rain water harvesting system.

The institution is located in between two large ponds- Rani Sagar and Budha Sagar. Its unique location helps us in managing the rain water. The rain water collected on the roofs of the building located on the bank of the pond is directly attached to the pond, further improving the water level. The outlets of all water dispensers are directed to the nearby garden in the campus. Eight Rain Water Harvesting Systems have been installed near: 1. Chemistry Department 2. Behind English Department 3. Besides Library Building 4. In front of IQAC Cell 5. New Wing Garden 6. RUSA Building 7. Mathematics Block 8. New Science Building.

The college has 20,234 sq. meter open roof area for rain water collection.

Open roof area College building (A)	20,234 Sq. Meter
Average rainfall per square meter in Rajnandgaon (B)	1274 mm or 1.274 Meter
Amount of water received through rain ($C=A \times B$)	25,778 Cu. Meter
Run off Coefficient factor through rain (E)	0.8
Potential of receiving rainy water ($F=D \times G$)	20,622 Cu. Meter

9.4 Recommendations

1) Controlled Water Management:

Overflowing of water through overhead tank should be installed by installing water level controller at overhead tanks. This will not only save water but also reduce operational time of pump. Gardens should be watered by using drip/sprinkler irrigation system to minimize water use. It is recommended to install taps with reduced water flow. Since there are no signs of addressing people to turn off water taps in the campus it is recommended to reward the personnel informing Leaky taps, Paste Labels where ever water is expected to be wasted.

2) Re-use of waste water from Air Conditioners

The air conditioning system cools the warm air and humidity form condensation in the unit. The water is normally drained to drain system. This waste water from air conditioners should be directed to the pots or garden. This comprehensive strategy plays a vital role in re-use of water from air conditioners unit.

3) Installation of Rain Water Harvesting System

Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon has 20,234 Sq. meter roof area for roof top rainy water. This roof area of college building should be used for rain water harvesting system. This will improve the recharging of ground water level.

4) Awareness activities for water conservation

Our government has started National Green Hydrogen Mission to use hydrogen as a fuel. As water is raw material to produce hydrogen and the water demand in our country is higher compared to water supply. Then, it is our duty to educate students and all, to encourage the awareness of water conservation activities. In college, various stickers/posters should be fixed near wash basin, water cooler etc; Seminar & Webinars may be conducted time to time for spreading awareness towards water conservation.

10. ENERGY MANAGEMENT

- **Alternate Energy initiatives such as: Percentage of annual power requirement of the Institution met by the renewable energy sources**
 - **Percentage of annual lighting power requirements met through LED bulbs**
-

Energy Management

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment.

10.1 Electricity

Electrical Energy is purchased from Chhattisgarh State Power Distribution Company Limited.

10.1.1 Contract Demand

Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon has total three service connections.

Sr. No.	BP No.	Name of customer	Sanctioned Load
1	1005641845	College Building	49 KW
2	1008529056	Boys Hostel	18 KW
3	1008455158	Girls Hostel	18 KW
Total sanctioned Load			85 KW

Table 4: Service connection details

10.1.2 Annual Electricity Consumption

A) College Building

India's building sector accounts for roughly 33% of the nation's total final energy consumption. Academic and institutional buildings represent a fast-growing share of this commercial sub-sector, driven by massive expansions in campus infrastructure, computer labs, and air-conditioning demand to combat rising seasonal temperatures

The billing meter was defective, hence actual electricity consumption was not reflecting in the monthly electricity bills. We have considered electricity bills from January 2026 detail of college building is mentioned below:

Sr. No.	Months	Maximum demand in KW	KWH Consumption	Power Factor	Bill Amount in Rs.	Electricity cost in Rs. Per unit.
1	Jan-26	11.8	4880	0.99	46,996	9.60
2	Feb-26	6.6	4740	1	46,715	9.90
3	Mar-26	60.8	7500	0.99	86,115	11.50
4	Apr-26	5.6	10,220	0.95	93,117	9.10
5	May-26	30.2	12,180	0.99	109,209	9.0
6	Jun-26	25.6	9,020	0.99	88,371	9.80

Table 5: Annual electricity consumption of college building

The average monthly contract demand is 23.40 KW and average monthly electricity consumption is 8090 units. The electricity cost for college building is Rs. 9.70 per unit. The power factor of college building is excellent.

B) Boys Hostel

Sr. No.	Months	Electricity Consumption in KWH
1	Jul-25	222
2	Aug-25	410
3	Sep-25	332
4	Oct-25	773
5	Nov-25	1624
6	Dec-25	522
7	Jan-26	522
8	Feb-26	339
9	Mar-26	243
10	Apr-26	875
11	May-26	682
12	Jun-26	560

Table 6: Annual electricity consumption of boys hostel

The Annual electricity consumption of Boys hostel is 7,104 units.

C) Girls Hostel

Sr. No.	Months	KWH Consumption
1	Mar-25	3908
2	Apr-25	5000
3	May-25	5665

4	Jun-25	4748
5	Jul-25	965
6	Aug-25	1080
7	Sep-25	0
8	Oct-25	8810
9	Nov-25	2858
10	Dec-25	2388
11	Jan-26	2191
12	Feb-26	2247
13	Mar-26	3308
14	Apr-26	5343
15	May-26	5991
16	Jun-26	2251

Table 7: Annual electricity consumption of girls hostel

The annual electricity consumption of Girls hostel is 37,432 units.

Gross Electricity Consumption

Name	Average Annual Electricity Consumption in unit
College Building	97,080
Boys Hostel	7,104
Girls Hostel	37,432
Grand Total	1,41,616

Table 8: Gross Electricity Consumption

Graphical Representation of Average Annual Electricity Consumption of College Building

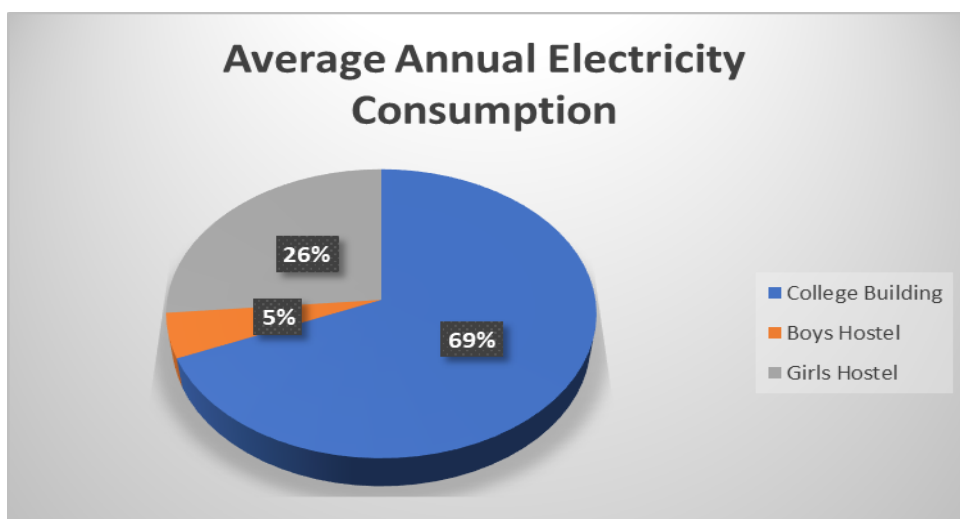


Figure 1: Monthly unit consumption of college building, boys hostel & girl hostel

10.1.3 Electrical Connected Load:

A) College Building

The connected load of college building is as under:

Sr. No.	Segment	Particulars	wattage	Quantity	Total wattage
1	Lighting	Conventional Tube light	40	245	9800
2		LED D Light	15	57	855
3		LED Tube light	20	522	10440
4		LED 2x2 Light	36	78	2808
5		Campus Lighting	125	3	375
6	Heating,	Fans	75	485	36375
7	Ventilation	Air Cooler	200	25	5000
8	& Air	Exhaust	100	12	1200
9	Conditioning	Air Conditioner	1800	36	64800
10	Water Supply	Water Pump	3750	3	11250
11	Office Equipment	Office Computers	70	95	6650
12		Photo copy machine	700	4	2800
13		Printers	350	21	7350
14	Others	Water Cooler	325	25	8125
15		Computers for Lab	100	100	10000
16		Refrigerator	750	10	7500
17		TV	200	2	400
18		Others			10000
Total Connected Load in watts					195,728

Table 9: Connected Load of College Campus

The total connected load of Govt. Digvijay Autonomous Postgraduate College building is about 196 KW.

Segment wise connected Load of Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon

Segment	Load in KW
Lighting	24.3
Heating, Ventilation & Air Conditioning	107.4
Water Supply	11.2
Office Equipment	16.8
Others	36
Total Connected Load	195.7

Table 10: Segment wise Connected Load of College Campus

Graphical representation of Connected Load of Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon

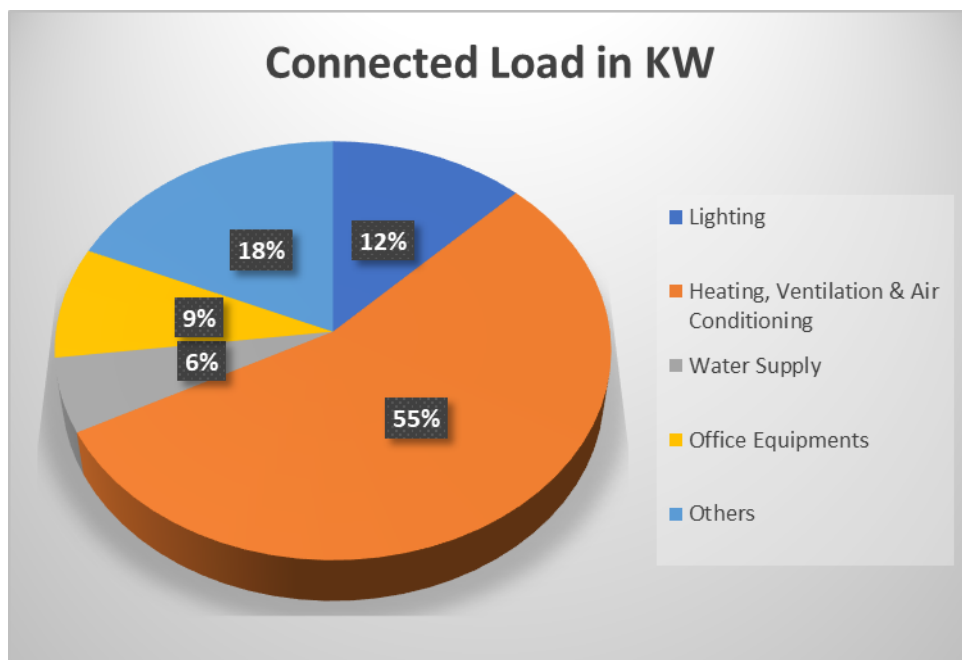


Figure 2: connected Load

The maximum share of connected load is in HVAC segment, which is about 55%. The connected load for water supply is lowest.

As per requirement of NAAC, we have calculated installed load of LED light fittings and Conventional light fittings.

10.1.4 Percentage of Lighting Power requirement met through LED lights

Segment	Total load in watt
Conventional Lights	9800
Energy Efficient Lights (LED)	14,478
Total Lighting Load	24,278
Share of LED light in total lighting load	60%

Table 11: Percentage of Lighting Power requirement met through LED lights

Thus, total Percentage of Lighting Power requirement met through LED lights is about 60 %. This percentage should be increased up to 100%.

Graphical representation of Percentage of Lighting Power requirement met through LED lights

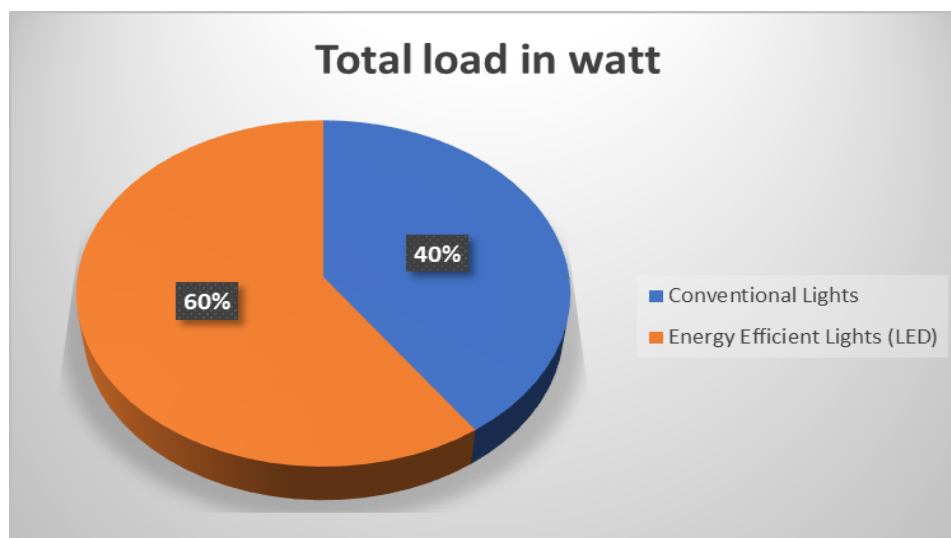


Figure 3: Percentage of Lighting Power requirement met through LED lights

10.1.5 Alternative Energy Initiative: Percentage of Power requirement met by Renewable Energy Source

The college had installed an off-grid solar power plant of 10 KW capacity and an on-grid solar power plant of 50 KW. Presently, both solar power plants are not working. About 23 solar panels of 50 KW panels are damaged. The College has requested the District In-charge of CREDA, an SDA of Bureau of Energy Efficiency, New Delhi in Chhattisgarh, to repair and prepare on-grid solar power plant system for both the plants.

After functioning of total 60 KW grid connected solar power plant, the total electricity generation per annum by solar power plant will be about 90,000 units. It is to be noted that the annual consumption of college building is about 97,080 units. Thus, maximum requirement of electricity will be fulfilled by Solar Power Plant due to net metering.

Details of Solar panels of 50 KW solar Power Plant

Modules	ICON Solar
Maximum Power	310 Wp
Open Circuit Voltage V_{oc}	44.70 V
Short Circuit Current I_{sc}	8.93 A
Total Quantity of Panel	167 Nos.

Table 12: - Details of Solar panels of 50 KW solar Power Plant



 Icon Solar-en Power Technologies Pvt.Ltd. Office Address : 319-320, Offizo, 3rd Floor, Magneto Mall, G.E. Road, Raipur (C.G.) Pin: 492001 INDIA Tel: +91771-4085755 www.iconsolar-en.com	
MODEL NO	ISEN310
PRODUCT TYPE	ATHARVA
MAXIMUM POWER (P _{max})	310 Wp
OPEN CIRCUIT VOLTAGE (V _{oc})	44.70 V
SHORT CIRCUIT CURRENT (I _{sc})	8.93 A
VOLTAGE AT MAXIMUM POWER (V _{mp})	36.43 V
CURRENT AT MAXIMUM POWER (I _{mp})	8.51 A
MAXIMUM SYSTEM VOLTAGE	1000 V
SERIES FUSE RATING	15 A
MAXIMUM DESIGN LOAD	2400 Pa
APPLICATION CLASS	CLASS A
SAFETY CLASS	CLASS II
MODULE SERIAL NO : INSIDE OF THE MODULE IN FRONT	
 WARNING ELECTRICAL HAZARD THIS UNIT PRODUCES ELECTRICITY WHEN EXPOSED TO LIGHT. COVER GLASS BEFORE CONNECTING TO THE LOAD. POWER SPECIFICATION MEASURED AT STANDARD TEST CONDITION. (Cell Temperature 25°C, Irradiance 1000W/m² & AM 1.5) Tested According to IEC 61215, IEC 61730, IEC 61701 & IEC 62804	


कार्यालय-प्राचार्य, शासकीय दिग्विजय स्वशासी स्नातक महाविद्यालय
राजनांदगांव (छ.ग.)
Web site- www.digvijaycollege.com Email: principal@digvijaycollege.com
College Code : 1901

राजनांदगांव

क्र. / 9510 / GDCR / 2026

प्रति,

जिला प्रभारी क्रेडा,
जिला कार्यालय,
राजनांदगांव (छ.ग.)

विषय :- शासकीय दिग्विजय महाविद्यालय राजनांदगांव में स्थापित पावर प्लांट को सुधार एवं अनग्राइड सिस्टम तैयार 4,21,136/- प्रेषित करने बाबत।

संदर्भ :- क्रेडा जिला राजनांदगांव का पत्र क्र.4666/क्रेडा/ONG 23/03/2026

—0—



10.2 Recommendation

1) Repair and operation of 60 KW solar power plant

After proper functioning of existing 50 KW & 10 KW solar power plant in On-grid mode, The plant will generate about 90,080 units annually. Under standard net-metering policies, the college can consume as much of its own generation as its real-time building load demands. Any immediate surplus generated during the daytime is exported back to the state electricity grid. So, the excess energy generated by solar power plant during vacations, holidays can be sold out to CSPDCL. The supply arrangement of Solar Power Plant should be such that it will first meet in-house electricity consumption of college, then after it will supply surplus energy to grid, which will be recorded by Import/Export meter.

Because educational facilities strictly run during peak daylight hours, they inherently achieve high self-consumption rates between 70% and 90% of their total daytime solar production without needing battery storage.

As per CREDA's letter the total Investment = Rs. 4,21,136

Total Annual Electricity generation = 90,080 units

Energy Cost per unit = Rs. 9.70 per units

Annual Saving = Rs. 8,73,776

Simple pay back period = 6 months

2) Installation of Hybrid Solar Power Pump

It is recommended to use solar water pump of 3 KW capacity in college for pumping to water storage tanks and gardening. A solar water pump is an application of photovoltaic technology which converts solar ener-

gy into electricity to run the pumping system thereby, replacing erratic grid supply and pollution-causing diesel-powered versions. The solar water pump is powered by solar modules that helps draw surface or ground water out for gardening/irrigation.

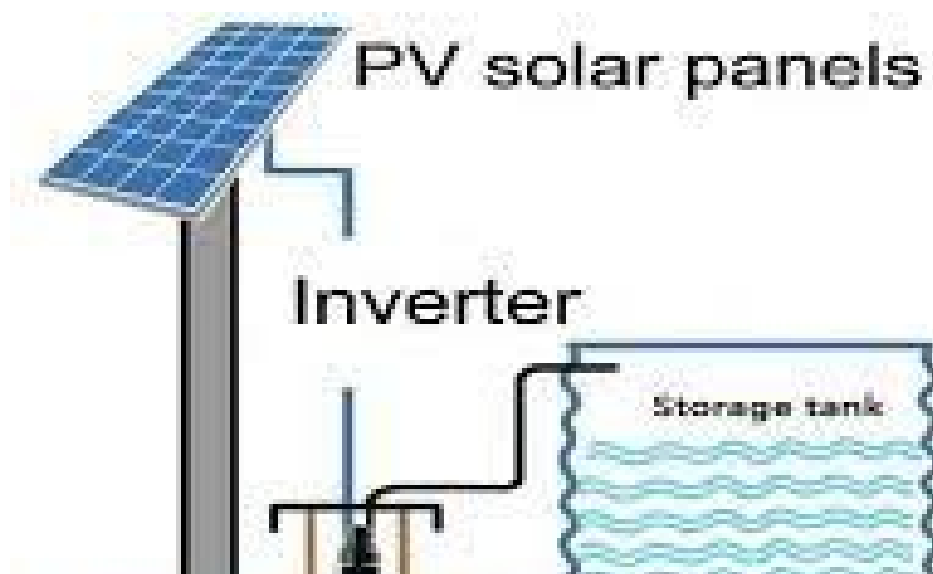


Figure 4: Solar pumping system

The college should install a solar power water pump for watering in garden and filling water in overhead tanks for daily use.



A view of solar pump

Investment	5,00,000
Annual Electricity Consumption of 5 HP Water Pump average running 8 hours daily	10444
Annual Energy Cost of CUTM	9.7
Anticipated monetary annual saving in Rs.	101307
Simple Payback period in years	5

The simple payback of this recommendation is 5 years

3) Replacement of 40 watts fluorescent tube lights with 20-watt LED tube lights

We recommend to replace all conventional FTL tube lights with 20-watt LED tube lights.

Wattage of Conventional FTL tube lights	40
Wattage of LED tube lights	20
Saving in wattage due to replacement	20
Total numbers of conventional tube light	245
Number of annual operational hours	2100
Saving in electricity in units	10290
Replacement Cost of a LED tube light	150
Total investment	36750
Annual anticipated monetary saving in Rs.	99813
Simple payback period in months	5

The total investment of this energy conservation measures is about 37 thousand and simple payback period of this measure is about 5 months

4) Formation of ENCON Club:

We recommend to formation of the ENCON (Energy Conservation) in Govt. Digvijay Autonomous PG College for spreading awareness on the importance of energy conservation. ENCON Club will participate in all energy conservation activities and organize program with the support of Chhattisgarh State Renewable Energy Development Agency, (CREDA) Raipur and Bureau of Energy Efficiency,(BEE) New Delhi.

This Club will celebrate “Energy Conservation Day” on 14Th December, each year. It would not only help in imparting knowledge on energy efficiency but also in its implementation in households and institutions.

Objective of ENCON Club

The objective of the club is to create awareness among the students, staff and teachers and equip them for efficient management of all forms of energy, to promote energy efficiency and energy conservation. The club will keen to spread “Energy Conservation Messages” in the society by conducting awareness programmes to students and public.

5) General recommendations

Equipment	Wattage	Comments
CRT Monitor	100 - 120W (during operating condition)	CRT monitors consume a lot of power, much of which is wasted as heat, and represent the largest power consumption component in a typical desktop computer. Emit potentially harmful radiation. Fortunately, most CRT monitors these days are legacy equipment as new computers are generally supplied with LCD monitors. Unfortunately, most CRT monitors end up in landfill.

Desktop Computer	150W (during operating condition)	Power consumption will differ significantly depending on whether a CRT or LCD monitor is used. In home and office situations where it is necessary to run multiple desktop computers, it may be possible to make significant power savings by running a single terminal server computer with several LCD monitors and keyboards attached. Terminal server computers can also greatly simplify network management, software upgrades, etc
Photo copier	7-30W (Sl. Mode) 40-300W (Standby) 200-1300W (op. contd)	Most of the energy used in a photocopier is consumed by the hot rollers, which are usually kept hot on stand-bay, consuming from 40-300W. Significant energy savings (40% to 60%) can be made by ensuring that photocopiers are switched off at night and on weekends. Some photocopiers consume up to 30 watts even when switched off, so photo copiers should be switched off at the power outlet to ensure they are really "off".
LCD Monitor	30-50W (during operating condition)	LCD monitors typically require about 30% of the power required for a CRT monitor with the same screen area. In addition, the amount of heat generated by an LCD monitor is considerably less than a CRT monitor, resulting in a lower load on ACs. Building cooling needs may be decreased by up to 20%.
Inkjet Printer	120W (during operating condition)	Inkjet printers use relatively little power in comparison to laser printers. From an energy consumption point of view, inkjets are preferable to lasers. Unfortunately, they typically cost more to run on a cost-per-print basis and sometimes produce less than optimum results
Laser Printer	25-80W (Standby) 150-1100W (during operating condition)	Laser printers consume significant amounts of power even when in standby mode. Over the course of an 8-10 hr working day, a laser printer could consume around 1kWh of energy. On the other hand, laser printers are cheaper to run on a cost-per page basis and generally produce better results. Both the number of laser printers used, and the number of hours they are operated for, should be minimized. As with printing of any kind, office procedures should be developed which minimize the need for printing to paper
Laptop Computer	15-40 W (during operating condition)	Laptop computer power consumption is typically 10% to 25% of that of a desktop computer. In situations such as an office or home office, where computers may operate for 8 to 10 hours a day, this difference is significant and could represent an energy saving of up to 1kWh per day.

Table 13: - General recommendation

11. WASTE MANAGEMENT

- **Solid waste management**
- **Liquid waste management**
- **E-waste management**

Waste Management

This indicator addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Municipal solid waste has several adverse environmental impacts, most of which are well known and not in need of elaboration.

The details of daily waste generation in Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon is shown in the table: -

Location	Biodegradable	Non-biodegradable	Hazardous
Office/ Class rooms	-----	< 1 Kg	No
Laboratories	< 1 Kg	< 1 Kg	< 1 Kg
Canteen / Kitchen	< 10 Kg	< 1 Kg	No

Table 14: Details of waste generation

11.1 Biodegradable Solid Waste Management

Effective biodegradable solid waste management in an academic institution requires source segregation, on-site biological treatment like composting or vermicomposting, and campus-wide engagement. Organic waste—primarily food scraps from canteens and hostels, paper, and garden foliage—makes up a major portion of institutional refuse and can be sustainably processed on campus

To reduce paper consumption in college both side of paper is used No waste is polluting surface/ ground water, small bucket and big buckets are used for solid waste.

Small Plastic bucket = 40 Nos.

Big Containers = 06 Nos.



The college has installed a Sanitary Napkins Vending Machine for girls at the college campus. But The vending machine is not in operative mode. The vending machines should work properly to ensure an effective, safe and convenient mode for any time access to the sanitary napkins. The purpose is to promote safe and hygienic sanitary practices among the women and girls.

This is in line with "Swatch Bharat" scheme as well as the "Beti Bachao" scheme and also in line with maintenance of the hygienic needs of the female staff and students.

Various waste such as wet waste generated from hostel mess, canteen & Tiffin of students and teachers is used for composting (in composting pit) to form manure and bio fertilizers and further used for organic farming in college campus.

Vermicomposting

Vermicomposting is the process of using earthworms and microorganisms to turn kitchen waste/ organic solid waste into black and nutrient-rich humus. Vermicomposting involves the stabilization of organic solid waste through earthworm consumption, which converts the material into worm castings. Vermicomposting is the result of the combined activity of microorganisms and earthworms. Microbial decomposition of biodegradable organic matter occurs through extracellular enzymatic activities (primary decomposition) whereas decomposition in earthworms occurs in the elementary tract by microorganisms inhabiting the gut (secondary decomposition).

The most important aim of vermicompost is manufacturing and generating organic manure that has a greater quality than other inorganic manure, to enrich the soil which lacks nutrition.

It is recommended to maintain compost pit continuously.



11.2 Non Bio degradable Solid Waste

Non- biodegradable are those waste, which cannot be decomposed by biological processes. These are of two types - Recyclable: waste having economic values but destined for disposal can be recovered and re-used along with their energy value. e.g. Plastic, paper, old cloth etc. Non-recyclable: waste which do not have economic value of recovery. e.g. Carbon paper, thermocol, tetra packs etc. Disposal of non-biodegradable waste is a major concern, not just plastic, a variety of waste being accumulated. There are a few ways to help non-biodegradable waste management. The impact of non-biodegradable waste on the environment and also focus on its safe disposal for sustainable environment.

Separate bins for different types of waste like plastic, glass, iron should be kept, so these wastes are segregated automatically in the premises of Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon. Presently all solid waste are collected in a garbage tank and Rajnandgaon Municipal Corporation collects the waste.

11.3 Liquid Waste Management

The waste water of chemistry lab should not mix with ground water. A dedicated pit should be constructed to collect the waste water. The outlets of all the water taps/resources are linked to the nearby gardens. College has a concealed sewage system comprising of underground septic tanks made of concrete, which is connected with the municipal sewage system.

11.4 E-Waste Management

Waste Electrical and Electronic Equipment (WEEE) or E-waste is one of the fastest growing waste streams in the world. In developing countries, it ranges from 0.01% to 1% of the total municipal solid waste gener-

ation. In countries like China and India, though annual generation per capita is less than 1 kg, it is growing at an exponential pace. Presently, a very small amount of E waste from offices is generated in Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon.

Government Digvijay Autonomous College in Rajnandgaon holds a formal contract and arrangement with ADV Metal Combine Pvt. Ltd., Rasmada, Borai Industrial Area, Durg; specifically for the safe and authorized disposal, write-off, and recycling of electronic waste (e-waste) generated across the institution's various departments. The total e-waste kept in college is about 10 Kg.

11.5 Recommendations

- 1) Awareness related to waste management has to be created among the staff and student through various programs and policies, emphasis to be laid on –reduce, reuse, and recycle.
- 2) To reduce waste at institute, students and staff are educated on proper waste management practices through lectures, advertisement on notice boards, displaying slogan boards in the campus.
- 3) Efforts should be taken to produce compost manure from compost pit, which may be used for the purpose of herbal garden as well or for planted tree.
- 4) The waste chemicals mixed water from laboratory should be connected with a separate dedicated pit.

12. GREEN CAMPUS MANAGEMENT

- Green Practices
- Green landscaping with trees and plants
- Flora of the College Campus

Green Campus Management

All plant and animal species - including humans - are linked together in a complex web of life; we depend upon biodiversity for our survival. Biodiversity is the key to healthy ecosystems and ultimately a healthy planet..



It keeps the air and water clean, regulates our climate and provides us food, shelter, clothing, medicine and other useful products. Each part within this complex web diminishes a little when one part weakens or disappears.

The Digvijay College is sandwiched between two most important ponds Ranisagar and Budasagar hence the college is natural host of different kinds of flora and fauna. Apart from these institutionally developed gardens are also the site of biodiversity.

The botanical garden of college is approximately 4000 square feet area with Medicinal, ornamental, commercial and some rare plant varieties. Apart from the botanical garden, departmental garden, other gardens not only enhance the beauty of the college but also offer a glimpse of the efforts being made to create a green campus.

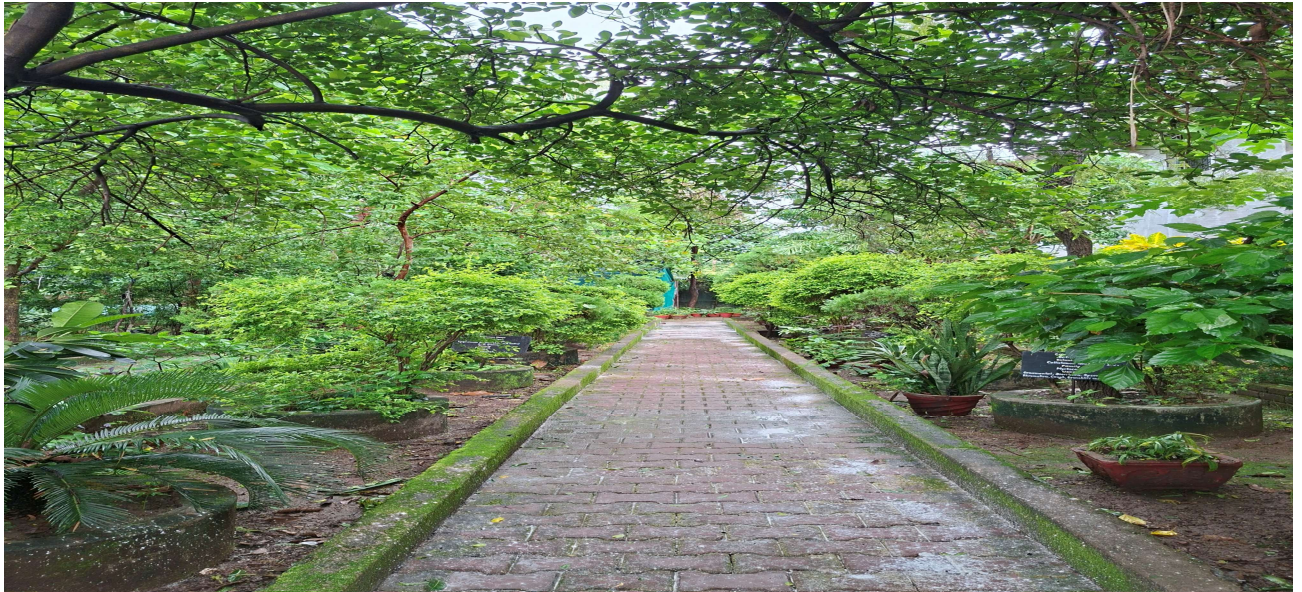
The trees work hard to keep the air we breathe clean and healthy. They are like sponges. Their leaves take in much of the poisonous unwanted carbon dioxide in the air, and replace it with the oxygen we need for healthy living.



This system of absorbing gases on which all plants rely for their food is called photosynthesis. In this process, the plants with the help of sunlight, water, minerals and the green material called Chlorophyll within the leaves change the carbon-dioxide into food for themselves. When doing this they release oxygen into the air which is vital for all life on earth. At night when there is no sunlight the plant no longer makes food, so it does not release the same amount of oxygen.



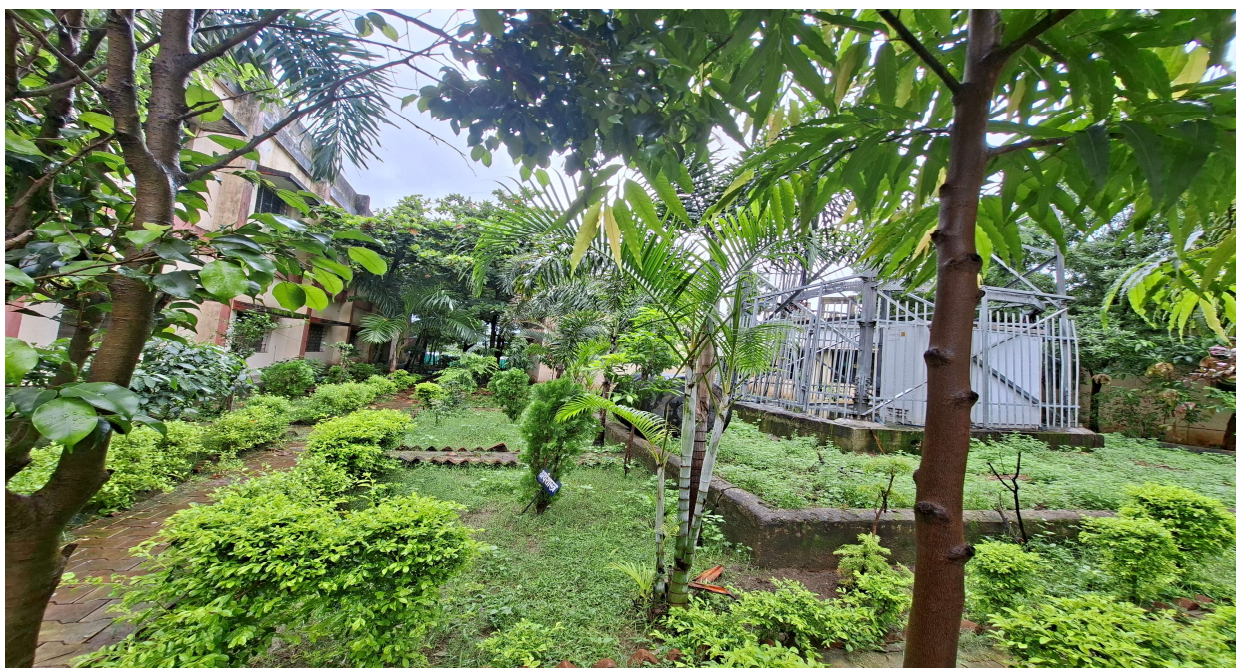
One is often told not to sleep with plants in one's room, as they will use up all the oxygen. However, at night although photosynthesis does take place the plants also rest, so that little oxygen is absorbed from the air and very little harm can be done to the ones sleeping in the room.



it away. This is very important as the earth has only a very thin layer (seldom more than one foot) of fertile soil covering it. If this is washed, blown or worn away leaving rock or sand on which no plants can grow then the earth would become a desert. The removal of this top-soil is called soil erosion. Scientists, all over the world are trying to find ways to prevent soil erosion. One of the most important ways is creating by planting more trees.



Trees send up water vapour into the atmosphere through their leaves. When this vapour meets the cool air above it turns into drops of water which then fall as rain. They give us beauty, colour and greenery. This is something which we often forget and fail to appreciate. They are the homes of many birds, animals and insects. Each of these is important in maintaining the balance of nature.



The college has also received ISO14001 certificate for their contribution to achieve their environmental objectives.

Flora	Numbers
Full grown Tree	95
Semi Grown Tree	120
Quarter grown plants	380
Lawn & Gardens	10,000 sq. ft

Table 15: Type and quantity of flora

13. CARBON FOOTPRINT

- **Scope 1 Direct Green House Gases Emission**
 - **Scope 2 Indirect Green House Gas Emission from Purchased Electricity**
 - **Scope 3 Other Indirect Green House Gas Emission**
-

India's National Determined Contribution

India's Nationally Determined Contributions (NDCs) commit to reduce its emission intensity per unit GDP by 33 to 35% below 2005 by 2030 under the Paris Agreement. This has resulted in the need for various sectors to come up and report their carbon emissions so that appropriate measures can be adopted. Reporting the emissions will enable them to set practical targets for carbon reduction in upcoming years. An educational institution plays an influential role in both local and national policymaking, both by informing society through research and educating graduates. It sets ground for imparting responsible perspectives to the young minds who act as successful incubators for innovation, from which many sustainability initiatives originate.

13.1 Green Credit Programme

India's environment ministry has proposed a Green Credit Programme under which individuals, organisations and industries can earn and sell credits for certain environment-friendly activities, which can then be traded.

Objectives of the Green Credit Programme

The main objectives of the Green Credit Programme are as follows: -

- a. Create a market-based mechanism for providing incentives in the form of Green Credits to individuals, Farmer Producer Organizations, cooperatives, forestry enterprises, sustainable agriculture enterprises, Urban and Rural Local Bodies, private sectors, industries and organizations for environment positive actions;
- b. Create mass movement around environment positive actions and realize the vision of "Mission LiFE" through pro-planet-people and entities. Sectors identified for the Programme with respective objectives are as follows:

i. Tree Plantation-based Green Credit:

To promote activities for increasing the green cover across the country through tree plantation and related activities.

ii. Water-based Green Credit:

To promote water conservation, water harvesting and water use efficiency/savings, including treatment and reuse of wastewater.

iii. Sustainable Agriculture based Green Credit:

To promote natural and regenerative agricultural practices and land restoration to improve productivity, soil health and nutritional value of food produced.

iv. Waste Management based Green Credit:

To promote sustainable and improved practices for waste management, including collection, segregation and treatment.

v. Air Pollution Reduction based Green Credit:

To promote measures for reducing air pollution and other pollution abatement activities.

vi. Mangrove Conservation and Restoration based Green Credit:

To promote measures for conservation and restoration of mangroves.

vii. Eco mark based Green Credit:

To encourage manufacturers to obtain Eco mark label for their goods and services.

viii. Sustainable building and infrastructure based Green Credit:

To encourage the construction of buildings and other infrastructure using sustainable technologies and materials.

13.2 Carbon Footprint

A carbon footprint is the amount of greenhouse gases—primarily carbon dioxide— released into the atmosphere by an individual, event, organization, service, or product, expressed as carbon dioxide equivalent. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions.

An important aspect of doing an audit is to be able to measure our impact so that we can determine better ways to manage the impact. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created.

Scope 1, 2 and 3 is a way of categorizing the different kinds of carbon emissions a company creates in its own operations, and in its wider value chain.

a) Physical boundary

- *Location of the Building* : Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon, Pendari, Bilaspur PIN – 495551
- *Description of areas excluded from GHG accounting*: The Nursing block was not in the scope.



b) Operational boundary

- *Scope 1 Direct GHG emissions from:*
 - Combustion of fuels in stationary sources – LPG consumption in canteen and Chemistry laboratories
- *Scope 2 Indirect emissions from:*
 - Purchased electricity
- *Scope 3 Other Indirect GHG emissions from:*
 - GHG emissions due to daily commuting of Teaching Staff, Non-Teaching Staff and Students to and from college

- GHG emissions due to paper consumption

13.3 Methodology for GHG Quantification

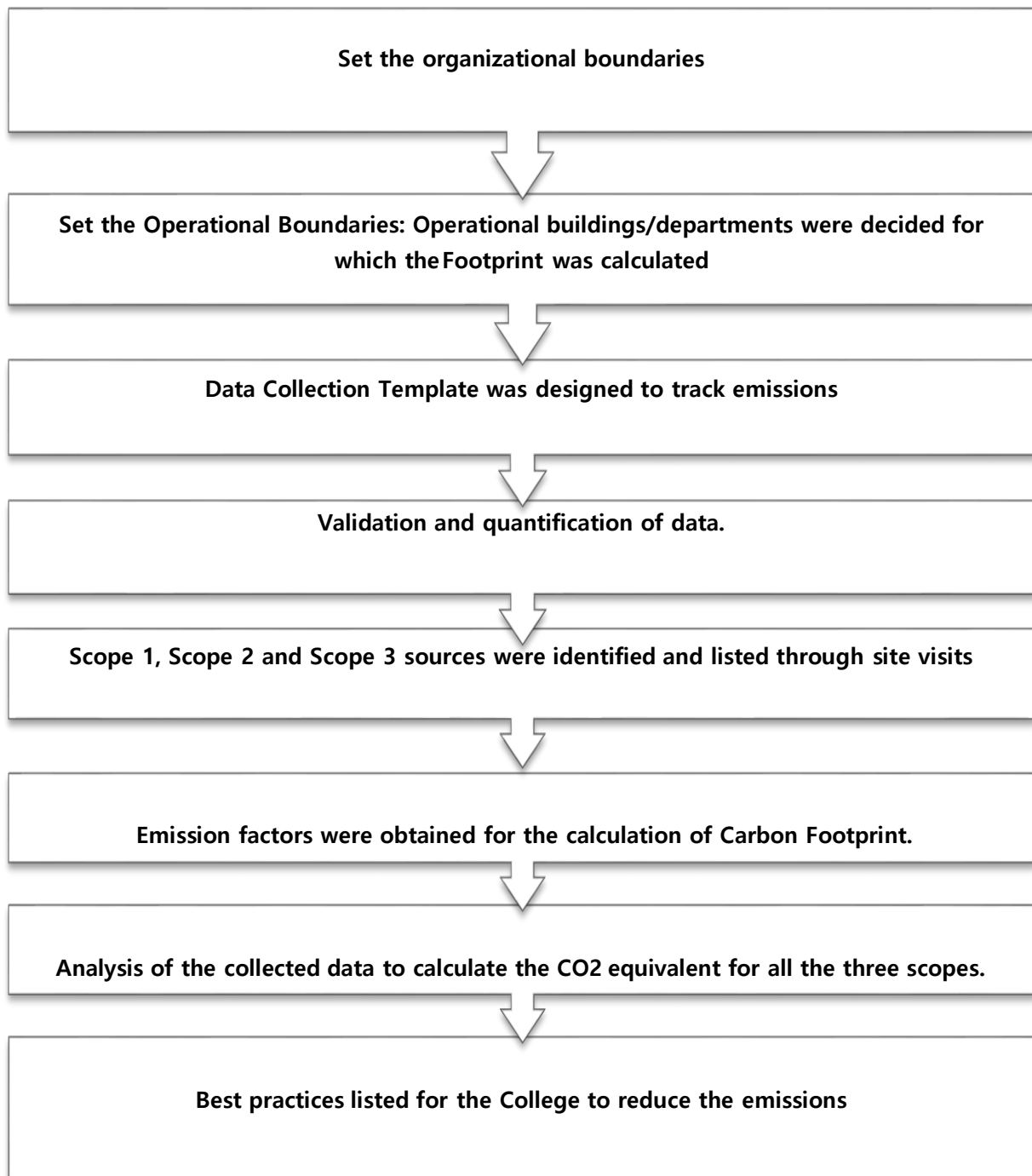


Figure 5: Flowchart showing adopted methodology for estimation of Carbon Footprint Both qualitative and quantitative data was collected for the project

On the basis of data collected, Emission factors were obtained for the calculation of Carbon Footprint. Scope 1, Scope 2 and Scope 3 sources were identified and listed through site visits. Validation and quantification of data. Data Collection Template was designed to track emissions. Set the Operational Boundaries: Operational buildings/departments were decided for which the Footprint was calculated. Set the organizational boundaries.

13.4 Data Collection

Scope 1 Direct GHG Emissions

Direct GHG emissions occur from sources that are owned or controlled by the organization, for example, emissions from combustion by LPG cylinders in laboratory or canteen. The LPG consumption is negligible in the college.

Scope 2 Electricity Indirect GHG Emissions

Scope 2 accounts for the GHG emissions from the generation of purchased electricity consumed by the organization.

Scope 3 Other Indirect GHG Emissions

It includes emissions from outsourced activities i.e. from the activities of members of the organization but occurred at sources owned/controlled by another organization. (E.g. commuting activities, paper consumption etc.)

GHG Accounting Activity

Sr. No.	GHG accounting activity	Scope	Activity subset	Data collection sources	Units
1	LPG consumption in Laboratory	Scope -1	Numbers of LPG gas cylinder consumed	IQAC Cell	KG of LPG used in a year
2	Purchased Electricity	Scope -2	Units of electricity used during one year	Registrar office	KWh / yr.
2	Paper Consumption	Scope-3	Amount of paper (fresh & recycled) used	College Administration	Kg of Paper Consumption/ yr.
4	Students, Teaching, Non-teaching & Supporting staff Commuting	Scope-3	Distance travelled; Mode of Transport used	Online Survey through google form	KM travelled by each person.
5	LPG consumption in canteen & laboratories	Scope-3	Numbers of LPG gas cylinder consumed used	Data shared by IQAC head	KG of LPG used in a year

Table 16:- GHG accounting activity in college

Use of Google Form

Data of Students, Teaching, Non-teaching & Supporting staff Commuting, an Online Survey through google form. Total about 1200 responses received from students through google form.

8/15/26, 7:41 PM महाविद्यालय के समस्त छात्र-छात्राओं को सूचित किया जाता है कि कॉलेज द्वारा विद्यार्थियों की सुविधा हेतु आवागमन (Commuting) से संबंधित एक स.

महाविद्यालय के समस्त छात्र-छात्राओं को सूचित किया जाता है कि कॉलेज द्वारा विद्यार्थियों की सुविधा हेतु आवागमन (Commuting) से संबंधित एक सर्वे महाविद्यालय के ऊर्जा अंकेक्षण (Energy Audit) के लिए किया जा रहा है। इस सर्वे के माध्यम से आपके कॉलेज पहुँचने की दूरी और यात्रा के साधनों का डेटा एकत्रित किया जा रहा है। अतः आप सभी अपनी जानकारी नीचे दिए गए गूगल फॉर्म लिंक पर क्लिक करके आज ही अनिवार्य रूप से भरें

Please fill this google form

resbhilai@gmail.com [Switch account](#)

* Indicates required question

Email *

☐ Record resbhilai@gmail.com as the email to be included with my response

Name *

Your answer

Your answer

Mobile Number *

Your answer

आपके निवास स्थान से महाविद्यालय की अनुमानित दूरी (KM) कितनी है? *

Your answer

आप कॉलेज आने के लिए मुख्य रूप से किस साधन का उपयोग करते हैं? *

☐ पैदल

☐ साइकिल

☐ स्वयं का दोपहिया वाहन (Bike/Scooter)

☐ स्वयं की कार

☐ Bus

☐ Train

☐ Auto

☐ E-Riksha

☐ E-Bike

☐ E- Scooter

☐ Other

Submit Clear form

Figure 6: Google Survey form

Online survey for conveyance details among students, non-teaching staff and teaching staff through google form. We have received the responses of 1159 students, 91 teaching staff and 12 non-teaching staff.

13.5 GHG Emission

13.5.1 Scope-1: Direct Emission

Negligible, hence not taken in account. The LPG consumption in laboratory is only 152 Kg, which is negligible, but we are taking in account. However, the LPG consumption in canteen for preparing foods is taken in scope 3 as canteen facility is outsourced by college.

Fuel Used	Quantity annually consumed in Kg	Emission factor in Kg CO ₂ /kg		Total Carbon emission in Kg
LPG - 19 Kg	152	0.2983		45.34

Table 17: LPG consumption in laboratories.

Thus, the total emission under scope 1 is about 46 KgCO₂e

13.5.2 Scope 2 : Indirect emission - Purchase Electricity From CSPDCL

Purchased Electricity

Electricity is purchased by CSPDCL. As per electricity bills of one-year of College building, Boys hostel and girls hostel, the total unit consumption for a year is 1,41,616 unit. The total annual emission by purchased electricity is 100,547 KG CO₂ equivalent.

Parameter	Emission Factor Kg CO ₂ e per KWH	Unit in KWH	Total emission in KG CO ₂ equivalent Per Year
Grid Electricity	0.71	1,41,616	100,547

Table 18: Carbon Emission by Electricity

Thus, the total emission under scope 2 is 100,547 KgCO₂e

13.5.3A Scope 3: Indirect emission - Purchase of registers, envelopes & papers

Purchase of registers, envelopes & papers comes under category 1 i.e. Purchase of goods and services.

Consumer	Particulars	Quantity	Kg	KgCO ₂ e per Kg of Paper	Total Carbon emission
College Administration	A 4 size papers	18 Ream	18	3.3	59.4
	Register	60	6	3.3	19.8
Autonomous Cell	Answer sheet	70,000	140	3.3	462
	A 4 size papers	100 packets	100	3.3	330
	Envelope A4	5000	75	6	450
	Envelope A3	5000	100	7	700
	Register 300 pages	5	2.5	3.3	8.25
	Register 100 pages	20	4	3.3	13.2
Total annual carbon emission due to purchase of registers, envelopes & papers					2042.65

Table 19: - Annual carbon emission due to purchase of registers, envelopes & papers

Thus, the total annual carbon emission due to category 1, scope 3 is about 2043 Kg CO₂e.

13.5.3B Scope 3: Indirect emission- Burning of LPG in canteen & laboratories.

As canteen is outsourced, hence burning of LPG comes under category 1. The annual consumption of LPG cylinders in canteen is 36.

Fuel Used	Quantity annually consumed in Kg	Emission factor in CO ₂ /kg	Total carbon emission
LPG - 19 Kg	692	0.2983	204

Table 20: Indirect emission- Burning of LPG in canteen & laboratories

The carbon emission due to burning of LPG in canteen is about 204 KgCO_{2e}.

13.5.3C Scope 3: Indirect emissions - Students, Teaching, Non-teaching & Supporting staff Commuting: Carbon Emission by commutation

The emission due to commutation of students, teaching, non-teaching & other staff comes under category 7 of scope 3 emission.

When students and staff travel to and from campus using vehicles powered by fossil fuels. Burning gasoline and diesel in cars, motorcycles, and buses releases greenhouse gases like carbon dioxide (CO₂), along with air pollutants such as particulate matter and nitrogen oxides. The two major fuels used for transportation by students, college faculties and directors are petrol and diesel. These fuels contain 80-85% of carbon by weight. It was also noticed that a large number of students come by bicycle.

We have received about 20% total responses. On the basis of pro rata, we have estimated the carbon emission by commutation. We have assumed the 70% attendance of students, about 92.6% attendance of teaching staff and about 82% attendance of non-teaching staff, while calculating GHG emission through commuting.

Sr. No.	Vehicle	Fuel Used	Numbers
1	Walk	Students	320
		Teaching Staff	4
		Non-Teaching & other staff	5
2	Bicycle	Students	280
		Non-Teaching & other staff	3
Total numbers			612

Table 21: Number of persons using bicycle & walk for commuting.

Thus, total 612 persons are using green mode of conveyance. Other persons use buses, two wheelers, car, e-riksha, e-scooter, auto riksha and train to come college. The detail of emissions is estimated at next page.

Sr. No.	Type of Vehicle	Particulars	Average dai-ly attendance	Passenger-KM per day	Total num-ber of days	Annual pas-senger - KM	Emission factor in gCO ₂ e per passenger-KM	Annual emission in Kg/CO ₂ e
1	Bus	Students	2600	154769	180	27858420	56	1560,072
		Teaching Staff	7	474	180	85320	56	4,778
		Non-Teaching & other staff	3	16	180	2880	56	161
2	Two wheeler	Students	720	22245	180	4004100	38.7	154,959
		Teaching Staff	55	865	180	155700	38.7	6026
		Non-Teaching & other staff	16	44	180	7920	38.7	307
3	Auto Riksha	Students	226	4480	180	806400	34	27,418
		Teaching Staff	7	61	180	10980	34	373
		Non-Teaching & other staff	3	6	180	1080	34	37
4	Train	Students	183	10363	180	1865340	11.5	21,451
		Teaching Staff	9	1052	180	189360	11.5	2178
5	E-Riksha	Students	125	2516	180	452880	19.129	8663
		Teaching Staff	2	12	180	2160	19.129	41
		Non-Teaching & other staff	3	19	180	3420	19.129	65
6	E-Scooter	Students	58	2165	180	389700	40	15,588
		Teaching Staff	1	8	180	1440	40	58
Total annual CO ₂ emission due to commutation								1802,175

Table 22: Carbon emission from commuting

Thus, total emission by the transport is 1802.2 T CO₂ eq. Per year

Graphical representation of mode of Conveyance used by Students

The graph shows that maximum students comes college by Two-wheelers, then followed by private buses. About 11% students comes college by walk and bicycle . These students contribute in reduction of Carbon footprint of the Institution.

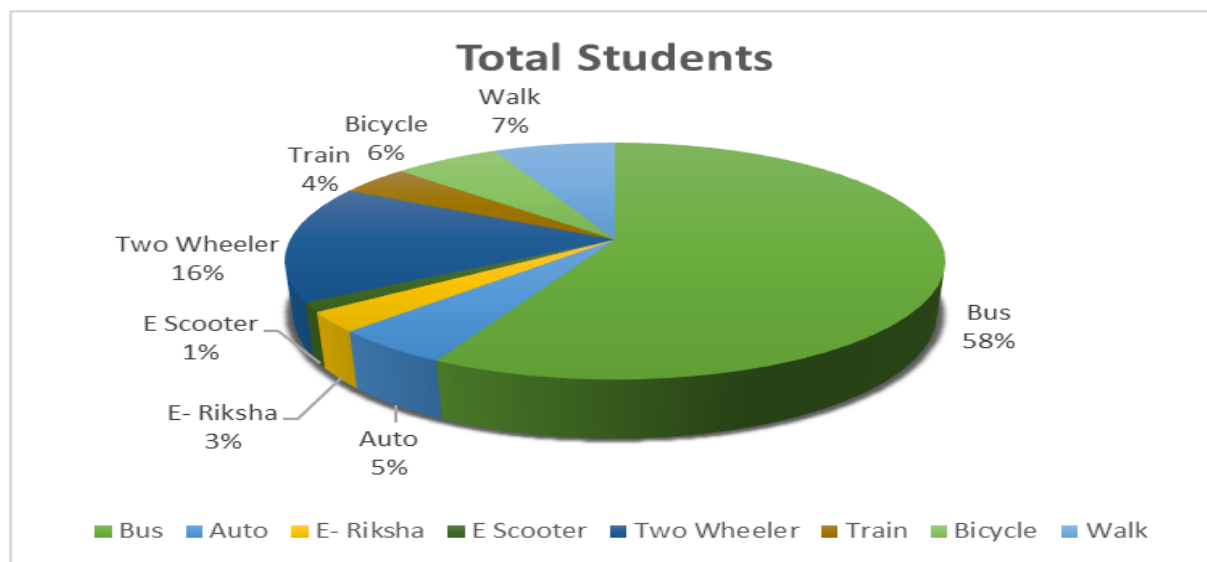


Figure 7: Mode of Conveyance used by Students

Graphical representation of mode of Conveyance used by Teaching & Non- Teaching Staff

The graph shows that maximum staff use college bus for coming college, then followed by two -wheeler. 17% staff (supporting staff) come college by walk and bicycle. It's a good number in view of reducing Carbon footprint of the Institution.

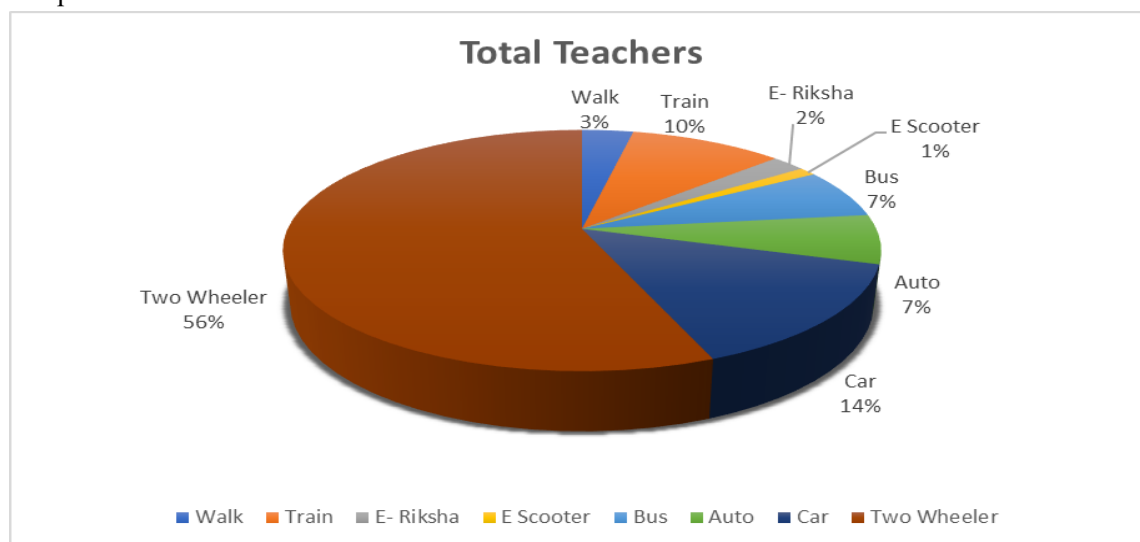


Figure 8: Mode of conveyance used by Teaching staff

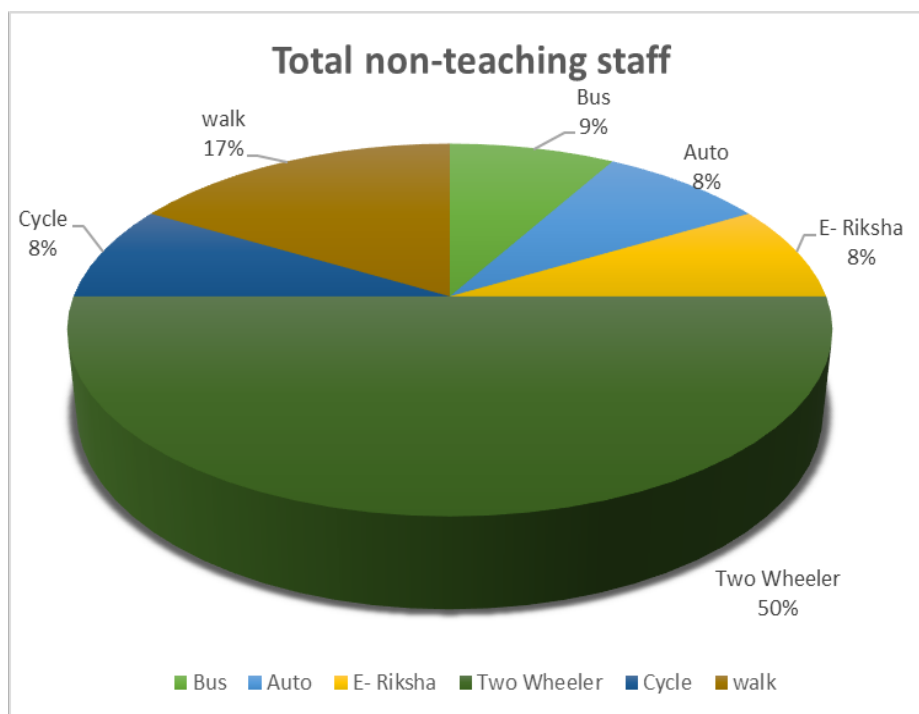


Figure 9: Mode of conveyance used by non-teaching staff

The category wise CO₂ emission and per capita CO₂ consumption is mentioned below :-

Table 18:- Category wise CO₂ emission and per capita CO₂ consumption

Percentage share of annual CO₂ emission in commuting

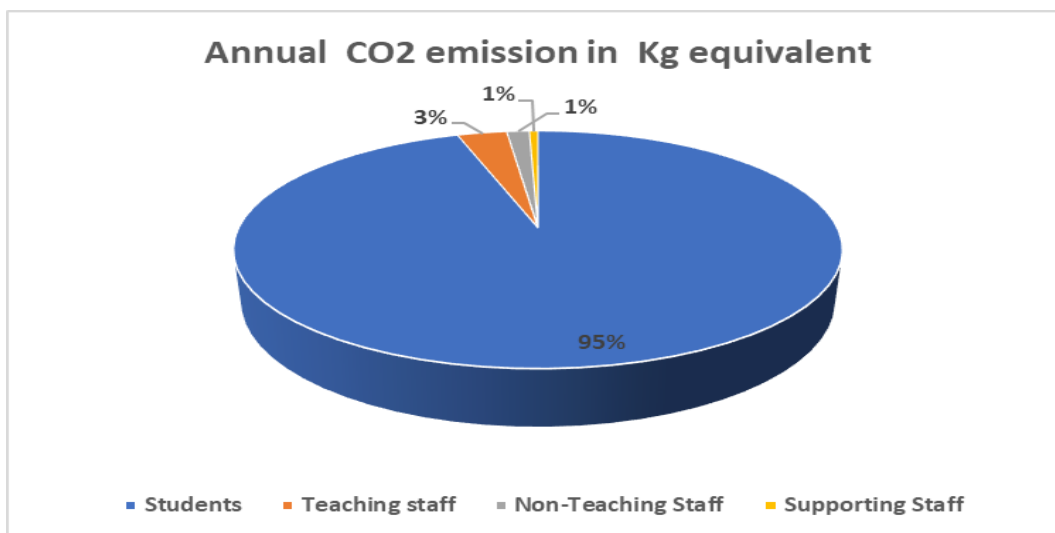


Figure 10: Annual CO₂ emission in commuting

The maximum share of Carbon emission is done by students, which is 95%.

Though the absolute emissions indicate maximum commuting emissions from students, however the intensity calculations conclude that maximum emissions are done by the non-teaching staff (120 kgCO₂e per non teaching staff), followed by students (112 kgCO₂e per students) and least by supporting staff (46 kg CO₂e per supporting staff).

13.6 Total Annual Carbon emission by the college

Sr. No.	Classification of GHG Emission	GHG accounting activity	GHG emission in KgCO ₂ eq.	Percentage Share
1.	Scope 1	Stationary Combustion	46	Negligible
2.	Scope 2	Purchased Electricity	100,547	5.28 %
3.	Scope 3	Paper Consumption	2043	Negligible
		Burning of LPG	204	Negligible
4.		Students, Teaching, Non-teaching & Supporting staff Commuting	1802,175	94.6 %
Total GHG emission			1905,015	

Table 23: Total Annual Carbon emission by the college

Scope wise GHG Emission

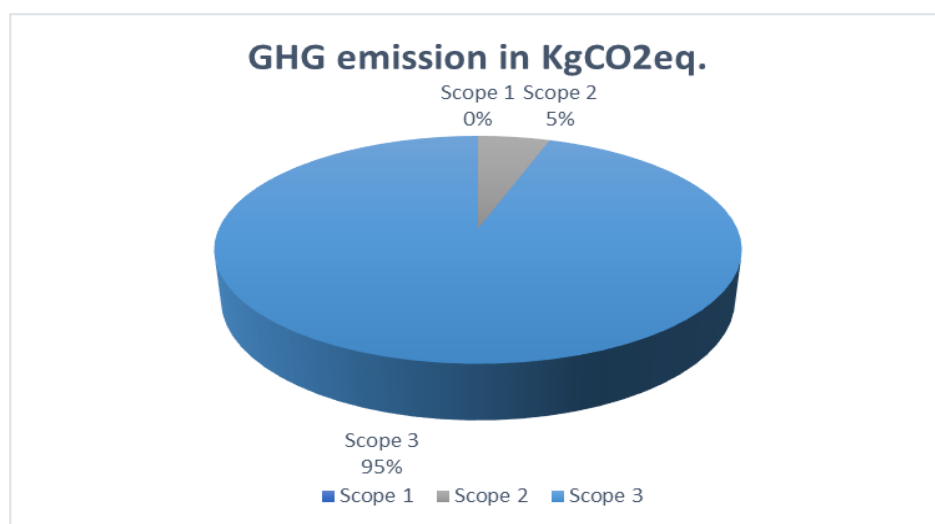


Figure 11: Scope wise GHG Emission

Scope 3 has maximum share in total emission of the college, which is about 95%.

13.7 Carbon sequestration: Reduction of Carbon Emission due to absorption of CO₂ by Tree Plantation

Trees, plants, and ocean life absorb carbon dioxide naturally through photosynthesis and store it in biomass and soil. Planting is a great way to help sequester carbon emissions. Through photosynthesis trees absorb carbon dioxide to produce oxygen, food and wood.

Particulars of Flora	Numbers (A)	Carbon absorption in Kg by one tree Per year (B)	Total Carbon Di Oxide absorbed in Kg (AxB)	Oxygen Production by one tree Per year (D)	Total Oxygen produced in Kg (AxD)
Full grown Tree	95	21	1995	117.6	11,172
Semi Grown Tree	120	9	1080	58.8	7,056
Quarter grown plants	380	3	1140	29.4	11,172
Lawn	10,000	3Kg /1000 sq. ft.	30	1.8 Kg per 1000 sq. ft.	18
Total Carbon absorption			4,245	Total Oxygen production	29,418

Table 24: Carbon absorption and oxygen production by tree plantation.

Total reduction in Carbon dioxide emission at Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon Campus due to carbon sequestration is 2,040 Kg.

13.8 Recommendation

- 1) To reduce carbon footprint of the college, Solar Power plant of 60 KW should be made in operation.
- 2) The carbon emission due to commutation of students, teachers & other staff is higher side. To reduce carbon emissions from commuting, academic institutions can improve public transit partnerships, build safe walking and cycling paths, offer electric vehicle charging, implement parking fees for single-occupancy cars, and promote hybrid work or learning schedules.

14. Annexure

The Eco Club / ENCON Club / Green Club may be formed in Govt. Digvijay Autonomous Postgraduate College, Rajnandgaon. The following activities may be taken under above mentioned clubs : -

(A) Role of the Club Members

1. Seek views of all the Stakeholders to make the Green Campus initiative functional throughout the year
2. Conduct the Campus' environmental impacts to identify the targets for improvements.
3. Establish a Green Campus Environmental Ethic Awareness campaigns.
4. Set forth a Green Campus Mission and a Statement of Principles.
5. Link Green-Campus activities to Academics in the Institute.
6. Organize Awareness Programs for the students, faculty and society
7. Chart out a yearly planner for the Institute, local community, and Stakeholders like preparation of Green Calendar
8. Develop a strategic plan and create student teams to carry out specific tasks of the strategic plan.
For instance, a plan of save energy at the institute level with time bound plan to use renewable energy in any form, if feasible.
9. Conduct an Annual Green, Environment and Energy Audit.
10. Purchase only Energy Efficient Computers viz: “ENERGYSTAR” or any other equivalent.

(B). Promotion of “Save Energy Tips” in and outside the Institute:

- Activate power management features on your computer and monitor so that it will go into a low power “sleep” mode when you are not working on it.
- Turn off your monitor when you leave your Table.
- Activate power management features on your laser printer.
- Whenever possible, shut down rather than logging off.
- Turn off unnecessary lights and use daylight instead.
- Avoid the use of decorative lighting.
- Use LED lights only
- Keep lights off in conference rooms, classrooms, lecture halls when they are not in use.
- Use the fans only when they are needed.
- Unplug appliances not plugged into power strips (like TVs, Refrigerators, ACs, tea/coffeepots, printers, faxes, and chargers etc.)

(C) Waste Water Management/ Rain water harvesting:

The Institute has to work in the direction of waste water management particularly in student's hostels. Water flow restrictors on bathroom faucets and showers, low water flow toilets and automated urinal flushers should be used to cut down campus water use. The Institute will take all necessary measures to implement waste water management /rain water harvesting.

The roof area of the hostel and remaining roof area of college building should also be used for rain water harvesting system.

(D) Major Green Campus Initiatives:

- Installation of Solar Power Station
- Waste water Management/ Rainwater harvesting
- Development of Sewage Water Treatment Plant
- Use of Micro-scale techniques
 - Sensor based energy conservation
- Displayed poster on E-waste Management
- Maintenance of water bodies and distribution system in the campus
- MIS to make paperless administration
- Plastic free Campus
 - Tree Plantation Drive
- Cleanliness Drive
 - Landscaping and gardens
 - Use of LEDs only
- Digital Library/ E-Learning Centre
 - Organization of sensitization programmes for the stakeholders
- Establishment of Enviro-Club
- Green, Environment and Energy Audit conducted
- Restricted entry of automobiles