



Energy Audit, Environmental Audit & Green Audit of Seth R.C.S. Arts & Commerce College, Durg



Conducted & Prepared By:

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3. ACKNOWLEDGEMENTS

We express our sincere thanks to Mr. Praveen Chandra Tiwari, Chairman, Seth R.C.S. Arts & Commerce College for her kind support and giving us the assignment to contribute in their effort towards Green initiatives & efficient energy management in the college premises.

We are highly indebted to Dr. G. N. Katahare , Principal, Seth R.C.S. Arts & Commerce College, Durg for their guidance, intellectual advice and his kind support in completing the project. We also thank for the cooperation extended during our Audit work.

Our boundless gratitude to Dr. Pooja Malhotra, NAAC coordinator and Mrs. Pawandeep Kaur and other teaching and non-teaching staff associated with this audit study of Seth R.C.S. Arts & Commerce College, Durg for extending cooperation during collection of data and field study work.

We trust that the findings of this study will help the college in improving their 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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Exceptions

Nothing in this disclaimer notice excludes or limits any warranty implied by law for death, fraud, personal injury through negligence, or anything else which it would not be lawful for to exclude.

We trust the data provided by the Seth R.C.S. Arts & Commerce College, Durg, personelis true to their best of knowledge.

5. AUDITOR'S CERTIFICATE



BUREAU OF ENERGY EFFICIENCY



Examination Registration No. : **EA-8696** Serial Number **5435**

Certificate Registration No. : **5435**

Certificate For Certified Energy Manager

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 certification of energy manager held in the month of **May 2008** is
 qualified as certified energy manager subject to the provisions of Bureau of Energy Efficiency
 (Certification Procedures for Energy Managers) Regulations, 2010.

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

His /Her name has been entered in the Register of certified energy manager
 at Serial Number **5435** being maintained by the Bureau of Energy Efficiency under the
 aforesaid regulations.

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

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

Secretary
 Bureau of Energy Efficiency
 New Delhi

Digitally Signed: RAKESH KUMAR RAI
 Sun Mar 01 10:31:41 EST 2020
 Secretary, BEE New Delhi

Dates of attending the refresher course	Secretary's Signature	Dates of attending the refresher course	Secretary's Signature
22.01.2019			

6. AUDIT CERTIFICATE



RAJ ENERGY SERVICES

dedicated in energy Conservation

62 & 81, Daya Nagar, Raiali, Bhilai Nagar, 490006 (C.G.)
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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 Seth R.C.S. Arts & Commerce College, Durg and submitted report under their Policy for Green Campus of the Institute.

Name of the Educational Institute	Seth R.C.S. Arts & Commerce College Utai Road, Near Ravishankar Shukla Stadium, Durg, Chhattisgarh, PIN 491001
Contact Details	0788-2322457, 98262-08979 E- Mail: rcscollege1964@gmail.com Website: https://www.rcscollege.com
Name of Principal	Dr. G. N. Katahare
Details of facilities Audited	Office, all departments, computer labs, classrooms, Seminar Hall, Yoga Hall, Library, Electrical Systems, and complete installations including Rain Water Harvesting System etc.
Date of Audit Conducted	15 th , 16 th & 17 th April 2022
Name of Certified Energy Auditor	Sanjay Kumar Mishra
Registration Number	EA- 8696

For, Raj Energy Services

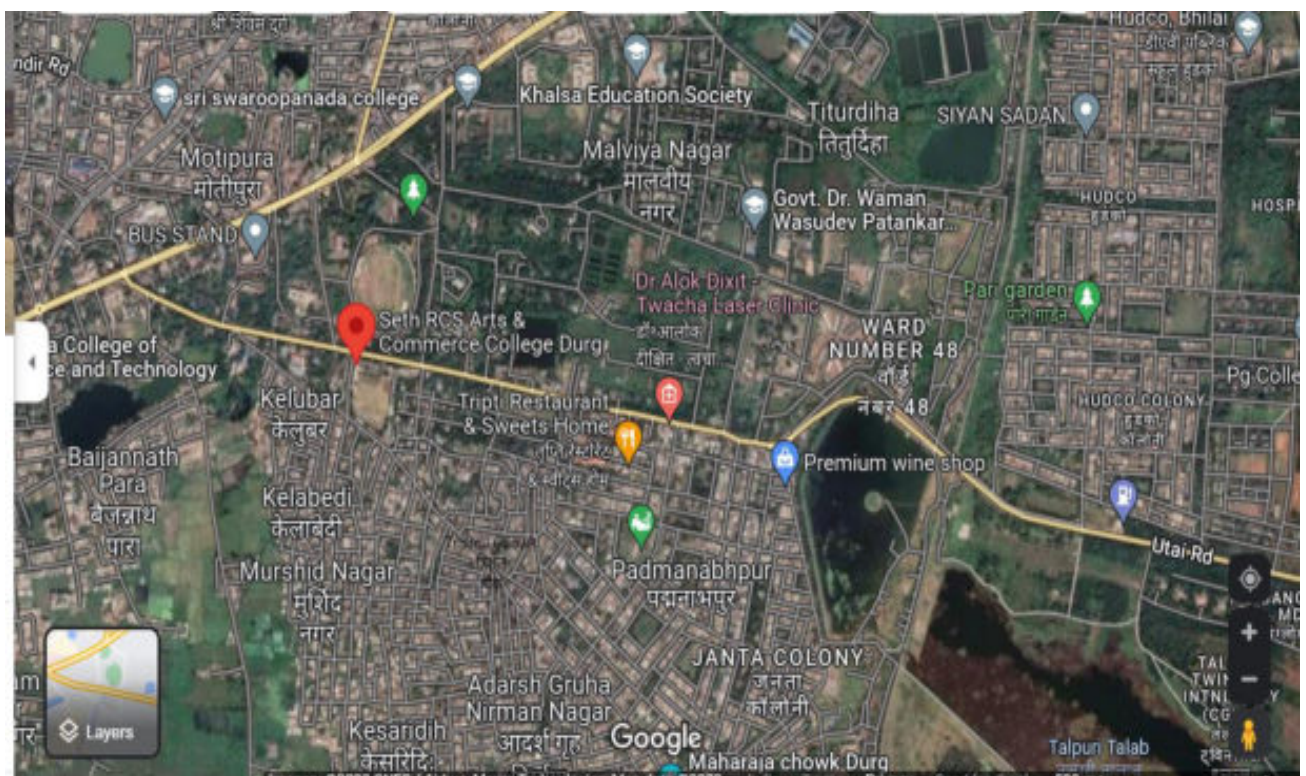
Date: April 27, 2022

(Sanjay Kumar Mishra)

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

7. INTRODUCTION

Seth R. C. S. Arts & Commerce was established in the year 1964. It is managed by the District Education Society Durg. In 1962, The object of starting the college was to cater to the need of higher education in society. In the beginning it is started as a commerce college. The popularity of the college enhanced day by day and in the year 1969 Arts faculty was also started. Now college became Arts & Commerce College. Later, looking the demand of other courses the college started many more courses.



Seth R. C. S. Arts & Commerce College campus extends over an area of 24281 sq. mt. comprising Classrooms with proper ventilation, Smart Classroom, Library, Computer Lab, Seminar Hall, Yoga Hall, Indoor Hall and a Big Playground for Outdoor Games. The Institution has policies for conception and enhancement of infrastructure in order to endorse a good teaching-learning environment. The need for infrastructure is examined regularly based on the requirement of students and prerequisite of the departments. The classrooms consist of essential provisions to enable the use of internet and Laptop/Computer for Teaching-Learning process. The College has seminar hall with LCD projector, computer with internet connectivity and public address system. Hall is utilized

for co-curricular activities such as Seminars, Guest lectures, Workshops, Conferences and Faculty development programmes.



The College has more than 50 computers and all those are connected with internet. The use of Information and Communication Technology (ICT) enhances the teaching and learning process and contribute to skill formation. The infrastructure of the institution is continuously enhanced with this view. Every department has adequate number of class rooms for teaching both core and elective subjects. The campus building accommodates the Principal Room, Administrative Office, Classrooms, Smart Class Room, Computer Lab, Economics Department, Arts Department, Commerce Department, Physical Education Department, Political Science Department, Central Library, Reading Room, NSS Room, NCC Room, IQAC Room, Girls Common Room, Seminar Hall, Yoga Hall, Gymnasium, Playground for outdoor games and Indoor Hall with the facility of Badminton Court and other Indoor Games.



The Purpose of Higher Education is to Create Knowledge, Disseminate Knowledge and Transfer knowledge and skill to the society for its Empowerment. Education is Process of Empowerment Which is to promoted through the development of knowledge, Skills & Values. A Higher Education system stands for the onward march of the human race. Learning is acquiring necessary knowledge and skill for better performance.



Vision:

Seth R. C. S. Arts & Commerce College, Durg has a understanding of its role in the society as a institution of higher education plays in the Society. Its vision is based on this understanding. It constantly visualizes itself as an effective catalytic agent of Socio-intellectual upliftment of its educationally challenged surrounding through imparting quality education. Besides this, institution strongly believes in the values which are to prove ourselves as an institution which fully carters to the local need of quality higher education and remains wedded to the national goal of producing, productive, morally responsible disciplined and intellectually vibrant citizens and play role for nation building.

Mission:

We aim at excellence while working to our full potentially within the constraints of infrastructure and resources. Our mission is to be and remain an institution which does its level best to train our students so as to make them able to avail the job opportunities

in the present competitive scenario. This college is on the mission to provide a satisfactory access to higher education for the socially and economically marginalized sections of the society. They constitute the majority of our student intake. We also work through our various academic cultural activities for the all round development of our students and teachers personality. In short, the mission of our college is to make it an institution of higher education of excellence which is known for its disciplined morally, responsible and academically strong products, not just academically but also physically through activities conducted by our Physical Education Department. We also need to improve the research activities for PG students of all departments.

Ground floor built up area (Block A)	1139 Sq. Meter
First floor built up area (Block A)	921 Sq. Meter
Ground floor built up area (Block D)	451 Sq. Meter
First floor built up area (Block D)	127 Sq. Meter
Ground floor built up area (Block E)	268 Sq. Meter
First floor built up area (Block E)	92 Sq. Meter
Total built up area	2,998 Sq. Meter



Fire extinguishers are kept near to electrical meters at ground floor in the college.

College Rooms

Class rooms are equipped with conventional teaching tools and furnished to meet the student's requirements and have proper ventilation.

IT Infrastructure

Institution frequently updates its IT facilities including Wi-Fi Response. All the class rooms and departments have internet and Wi-Fi facility. The college has a comprehensive IT policy to support and facilitate teaching, evaluation, research, and administration of the college through a secured e-supported environment. All the buildings get wide wireless computing network that allows faculty and students to log on the internet at any point of time. There is one lab in the college with internet facility for the students and teachers. Lab is well equipped with teaching aids and LCD projectors.

Library

Library of RCS College function as the leading information resource centre and is a treasure house of books, journals, magazines, newspapers, and e-resources for staff and students facilitating activities in the institution. Other than text books, the library houses growing collection of reference books, journals, magazines, periodicals, dictionaries, rare books and encyclopaedias, etc. Likewise, the library facilitates access to a number of e-journals and e-books through NLIST. The Bar-coding technology is adopted with the software to speed up the circulation process. It is known for its collection of rare and old edition books in different subject areas

Seminar Hall

The College has air-conditioned seminar hall with LCD Projector, Computer with internet connectivity and public address system for organizing interactive programme, special lectures, seminar and meetings with a seating capacity of 200.

Sports and Games Facilities

The College provides ample facilities for the students to participate in sports and games. The College also organizes various sports and games in the campus. Outdoor and indoor games facilities available in the campus are effectively used by the students during and after the college hours, facilities for the outdoor games such as Basketball, Cricket, Hockey, Volleyball, Kho-Kho and Kabadi, etc are available. The college has Indoor Hall for the indoor games such as Badminton, Table Tennis, Carom, Chess etc.





Akarshi Kashyap, a student of Seth R.C.S. Arts & Commerce College Durg, has become a national player in badminton and won the all-India ranking tournament in Chennai and finished runner-up in Hyderabad in 2021 and recently is winner in women's singles.



Naina Singh Dhakad, a student of Seth R.C.S. College, Durg is a well-known name as a young mountaineer of Chhattisgarh, had succeeded in scaling the world's highest peak Mount Everest on June 1st,2021.

Gymnasium Facilities

The gym equipment comprises of Multigym Suspension, Butterfly Machine, Jogger Machine, Cycling Machine, Bench Press, Conveyor Belt, Stepper, Rowing, Pommel Horse, Vaulting Horse, Motorized Jogger, Vibrator, Weight Lifting Weight and Bar, Weight Lifting Belt, Power lifting Set, Weight Stand, Curling Rod, Dumbbells etc.



Numbers of seats and course offered

S. No.	Level	Programmes	Duration	Seats
1	Under Graduate	B. A.	3 Years	160
2		B. Com.	3 Years	320
3		B. Lib.	1 Year	40
4		B. P. Ed.	2 Years	100
5	Post Graduate	M. A. Political Science	2 Years	40
6		M. A. Economics	2 Years	40
7		M. Com.	2 Years	60
8		M. Lib. I.Sc.	1 Year	15
9	PG Diploma	PGDCA	1 Year	30
10		PG Diploma in Yoga Education and Philosophy	1 Year	30

During the period of Covid-19, college extends their helping hand to the local surrounding by the distributing mask and sanitizer. The college students were part of free food program during pandemic and provide food to homeless people near railway station. As a socio-economic activities college conduct program like rallies, road safety, Swatchhata Pakhwara and other awareness programs.



8. ENERGY, ENVIRONMENTAL AND GREEN AUDIT

The Energy audit, Environmental audit and Green audit study covered the following areas to summarise the present status of environment management in the campus:

- Water management
- Energy management
- Waste management
- E-waste management
- Green campus management
- Carbon footprint

Green Audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The 'Green Audit' aims to analyse environmental practices within and outside the College campus, which will have an impact on the eco-friendly ambience. It was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit.

These audits are assigned to the criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India which declares the institutions as Grade A, B or C according to the scores assigned during the accreditation.

Objectives of the Study

The main objective of the audit is to promote the Environment Management and Conservation in the College Campus. 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 the audit are:

- To introduce and aware students to real concerns of environment and its Sustainability.
- To secure the environment and cut down the threats posed to human health by analysing 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 coordinator, staff members and Principal. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional, district, national and global level. The discussion revolved around three key questions: Do the members of the group consider themselves eco-conscious? Do they consider the Institution to be eco-friendly? What do they think are the issues that need to be given top priority? In order to perform green 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.

8.1 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.

Seth R.C.S. Arts & Commerce College, Durg gets water from two sources- one of which is from its own bore wells and another source is municipal supply water. One submersible water pump and one mono block pump operates to fulfil the daily needs of college. The College has total 5 over head water tanks.

Particulars	Storage capacity of water tank in litre	Quantity	Total
Water tanks above building	2000	4	8000
Small Water tank	500	1	500
Total Water storage capacity			8500

Table 1 : Water storage capacity

Being an arts and commerce college, there are no generation of hazardous chemicals due to Chemistry lab. Thus, no chemical hazardous water mixed with ground water.

Two water coolers are installed in college for clean water drinking purpose and five air coolers are used during summer season. There is total 12 toilet in the college. Water saving tips and turn of tap after using the water tap are not displayed.

Auditing for Water Management			
1.	Uses of water in college.	:	Drinking, gardening, hand washing, pantry, canteen
2.	sources of water in college.	:	Tube well and municipal supply
3.	No. of wells in college.	:	One
4.	No. of motors used for pumping water from well and municipal water	:	02
5.	Total horse power of motor.	:	2 HP & 0.5 HP
6.	Storage of water.	:	5 Tank (4 tanks each 2000 lit and 1 tank of 500 liter capacity.)
7.	Quantity of water stored in overhead water tank? (in liters)	:	8,500 liters
8.	Quantity of water pumped every day (in liters)	:	One times in a day.
9.	If there is water wastage, specify why?	:	1) Overflow of water from tanks. 2) Leakage in one tank of 2000 liters
10.	How can the wastage be prevented / stopped?	:	1) Water level controller can be installed. 2) Leakage can be stopped by M-Seal.
11.	Locate the point of entry of water and point of exit of waste water in your College?	:	Entry of municipal water is near the main gate of the college and exit point of waste water is place off the campus.
12.	Where does waste water come from?	:	Toilet & Wash Basin
13.	Where does the waste water go?	:	In waste water pit

14.	What are the uses of waste water in your college?	:	Recharging of ground water level.
15.	What happens to the water used in your labs? Whether it is mixing with ground water?	:	No chemistry lab
16.	Is there any treatment for the lab water?	:	No hazardous chemicals are used
17.	Are your labs practicing green chemistry methods?	:	Not applicable
18.	Record water use from the college water meter for six months?	:	Not applicable
19.	No. of water coolers. Amount of water used per day? (in litres)	:	2 water cooler, 40 liter capacity
20.	Amount of water used per day for garden use?	:	700 liter
21.	No. of water taps in laboratories. Amount of water used per day in each lab?	:	No chemistry lab
22.	Total use of water in hostel?	:	Not applicable
23.	At the end of the period, compile a table to show how many liters of water have been used in the college for each purpose?	:	Attached
24.	Is there any water used for agricultural purposes?	:	No
25.	Does your college harvest rain water?	:	Yes
26.	If yes, how many rain water	:	Two

	harvesting units are there?(Approx. amount)		12.69 cubic Meter & 7.14 cubic meter
27.	How many of the taps are leaky? Amount of water lost per day	:	Yes at one of the main tank at a speed of 2 liter per minute
29.	Are there signs reminding people to turn off the water?	:	No
30.	How often is the garden watered?	:	In winter season every alternate day, In summer season daily.
31.	Amount of water used to water the ground?	:	No
32.	Amount of water used for bus cleaning? (litres per day)	:	Not applicable
33.	Amount of water for other uses?	:	No
34.	Area of the college land without tree/building canopy?	:	About 21,000 Sq. meter
35.	Is there any water management plan for the college?	:	The college has planned for rain water harvesting in remaining portion of college building.
36.	Please share Some IDEA for how your college could save more water?	:	College should put the instruction for water conservation slogan at designated place and eliminate leakage & wastage of water.

Table 2: Auditing of water management

Wash Basin	13 Nos.
Toilet	12 Nos.
Urinals	12 Nos.
Water Cooler	2 Nos.
Air Cooler	5 Nos.
Total Number of water taps	42 Nos.

Table 3: Total numbers water taps

8.1.1 Water Consumption at Seth R. C. S. Arts & Commerce College, Durg

Water Consumption					
1	2	3	4	5	6
Activity	Average litres of water used per activity in litres	Number of times activity done each day	Total water used by a person each day (litres)	Number of people in the College using water	Water Consumption per day in litres
Five Water Storage Tank					
Wash hands and face	1 litres	One times a day	1	800	600
Toilet flush	6 To 21	once	12	50	600
Urinals	2	Once	2	800	1600
Drinking (cup)	0.4	Two	0.8	800	640
Gardening					2400
Leakage in one water tank	2 Lit. per minute				2000
Washing dishes (hand)	1.5	Once	1.5	300	450
Overflow of water	300	1		-	300
Total Consumption of Water in litres					8,590

Table 4 : Total Water Consumption Per Day

The college has two rain water harvesting system

8.1.2 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. RWH system provides sources of soft, high quality water reduces dependence on well and other sources and in many contexts are cost effective.

Rain Water Harvesting System at College

Water conservation has become the need of the hour. The runoff from the terrace of the college building is channelized into recharge well located in the campus. All the rooftop rainwater outlets discharge into storm water drains and then to the recharge Layer of bricks filled inside the recharge well ensures proper filtration of harvested water. Seth R.C.S. Arts & Commerce College, Durg has 1140 Sq. Meter open roof area.



Amount of water received through rain

The college has adopted a measure of increasing ground level water by use of Roof Top Rain Water Harvesting System. They have an area of 304 Sq. Mtr for roof top rainy water collection & after using the Roof Top Rain water Harvesting System, they assume that about 2,92,000 Lof rain water is absorbed in earth soil through their system.

Open roof area main College building (Block A)	921 Sq. Meter
Roof area used for rain water harvesting system in college (B)	304 Sq. Meter
Average rainfalls per square meter in Durg (C)	1200 mm or 1.20 Meter
Amount of water received through rain (D = B x C)	364.8 Cu. Meter
Run off Coefficient factor through rain (E)	0.8
Total water received (F =D x E)	292 Cu. Meter

Table 5: Amount of water received through rain

8.2 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. Seth R.C.S. Arts & Commerce College, Durg purchases electricity from CSPDCL

8.2.1 Electricity

Electricity is purchased from Chhattisgarh State Power Distribution Company Limited. Seth R.C.S. Arts & Commerce College has two service connections

Connection 1	BP No.1000581606 Tariff Category LV2ND3OT19 Sanctioned Demand 30 KW Meter No. CSE 25513
Connection 2	BP No.10007665692 Tariff Category LV2ND3OT19 Sanctioned Demand 10 KW Meter No. L0198887

8.2.2 Electricity Bill Analysis

We have received the copy of electricity bills of both the connections.

BP No.1000581606

Months	Maximum Demand	Power Factor	Unit Consumption in KWH	Total Bill in Rs.	Energy Cost in Rs. Per unit
Apr-21	0		0	25123	
May-21	5	0.89	748	-9285	
Jun-21			2483		
Jul-21	10	0.91	1781	18916	10.62

Aug-21	13.5	0.98	1764	19309	10.95
Sep-21	12.7	0.98	2298	24302	10.58
Oct-21			1147		
Nov-21	8.9	0.98	975	12926	13.26
Dec-21	5.1	0.96	1270	15631	12.31
Jan-22	4	0.96	853	11935	13.99
Feb-22	5.1	0.96	846	11876	14.04
Mar-22	12.2	0.98	1321	15682	11.87

Table 6: Electricity Bill Analysis of BP No.1000581606 for last one year

The maximum demand was 12.7 KW in the month of January and maximum electricity consumption was in the month of June 2021. Annual electricity consumption of BP No.1000581606 for the year 2021-22 is 15,486 units.

BP No.10007665692

Months	Maximum Demand	Power Factor	Unit Consumption in KWH	Total Bill in Rs.	Energy Cost in Rs. Per unit
Apr-21					
May-21	3	1	159	3910	24.59
Jun-21	3	1	247	2850	11.54
Jul-21	3	1	114	1860	16.32
Aug-21	3	1	278	3150	11.33
Sep-21	2	1	391	4130	10.56
Oct-21	2	1	228	2820	12.37
Nov-21	2	1	333	3640	10.93
Dec-21	2	1	210	2720	12.95
Jan-22	2	1	192	2540	13.23
Feb-22	2	1	218	2710	12.43
Mar-22	2	1	400	4110	10.28

Table 7: Electricity Bill Analysis BP No.10007665692 for last one year

Received the electricity bill for 11months, based on average monthly consumption of BP No.10007665692, the annual electricity consumption is 3024 units.

Hence, the total annual electricity consumption of Seth R.C.S. Arts & Commerce college is 18,510 units

8.2.3 Connected Load

Segment	Electrical Equipment	Wattage	Quantity	Total
Lighting	FTL 40 W	40	88	3520
	LED TL 20 Watt	20	95	1900
	LED Bulb	15	12	180
HVAC	AC 2 T	2200	1	2200
	AC 1.5 T	1750	12	21000
	Fan	80	136	10880
	Air Cooler	250	5	1250
	Exhaust fan	150	4	600
Office	Computer	100	12	1200
	Computer lab	100	40	4000
	Photo Copy machine	500	2	1000
	Printers	500	4	2000
Water Supply	Pump for boring	2250	1	2250
	Pump for municipal water	375	1	375
Campus lighting	LED 70 W	70	5	350
	FTL 40 W	40	1	40
	LED 35 W	35	1	35
	LED 20 W	20	2	40
Others	Others			1100
Total Connected Load in watts				53,920

Table 8 : Connected Load of college

Segment wise connected load

Segment	Wattage
Lighting	5600
HVAC	35930
Office	8200
Water Supply	2625
Campus lighting	465
Others	1100

Table 9: Segment wise Connected Load of college

Graphical representation of segment wise Connected Load

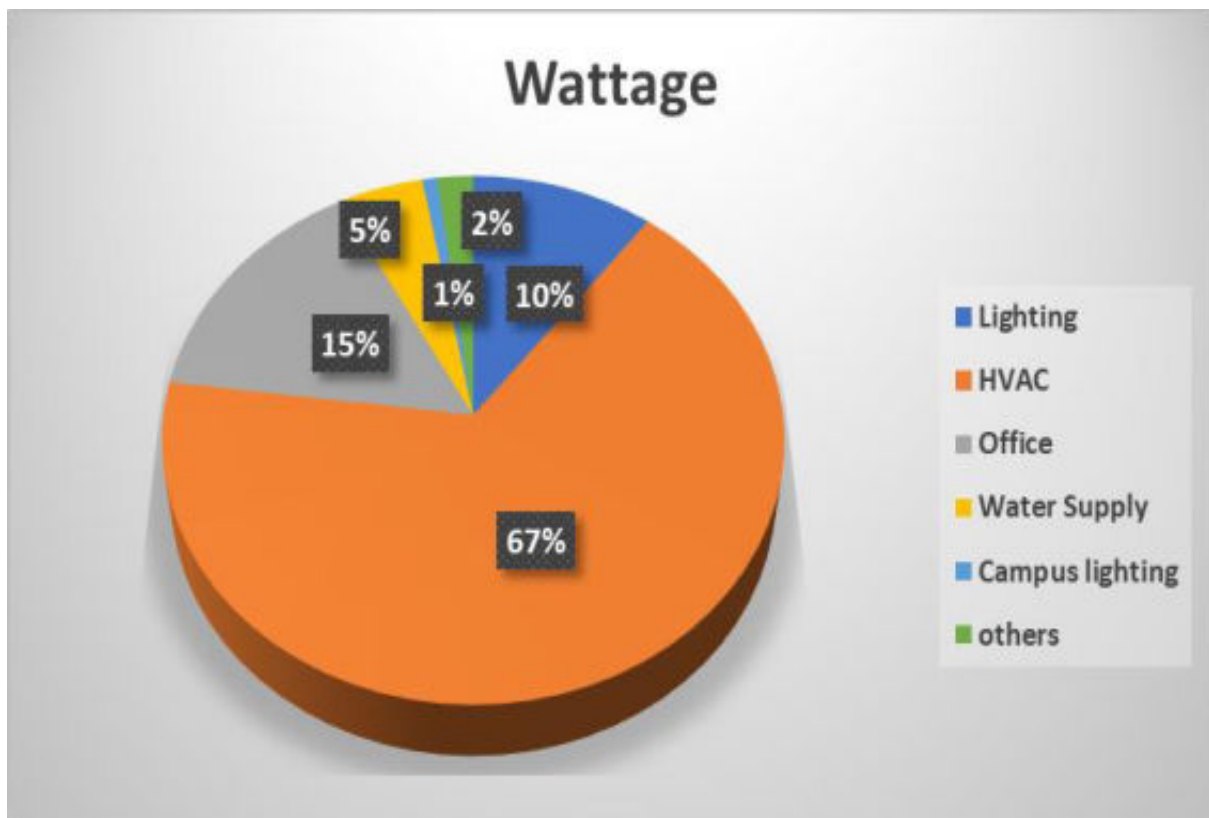


Figure 1 : Graphical representation of Connected Load
The total connected load of college is about 54 KW. The maximum share of connected load is in HVAC segment, which is about 67%.

8.2.4 Annual Energy Consumption

Segment	Electrical Equipment	Wattage	Quantity	Diversity Factor	Annual Operational Hours	Annual Unit Consumption
Lighting	FTL 40 W	40	88	0.5	950	1672
	LED TL 20 Watt	20	94	0.5	950	893
	LED Bulb	15	12	0.5	950	86
HVAC	AC 2 T	2200	1	1	750	1650
	AC 1.5 T	1750	12	0.2	750	3150
	Fan	80	134	0.5	950	5092
	Air Cooler	250	5	1	750	938
	Exhaust fan	150	4	0.25	300	45
Office	Computer	100	12	0.25	600	180
	Computer lab	100	40	0.8	300	960
	Photo Copy machine	500	2	1	300	300
	Printers	500	4	0.5	300	300
Water Supply	Pump for boring	2250	1	1	300	675
	Pump for municipal water	375	1	1	440	165
Campus lighting	LED 70 W	70	5	1	4015	1405
	FTL 40 W	40	1	1	4015	158
	LED 35 W	35	1	1	4015	139
	LED 20 W	20	2	1	4015	158
Others						544
Total Annual Unit Consumption						18510

Table 10: Annual Energy Consumption

Segment wise Energy Consumption

Segment	Annual Electricity Consumption
Lighting	2651
HVAC	10875
Office equipment	1740
Water Supply	840
Campus Lighting	1860
Others	544

Table 11: Segment wise Energy Consumption

The total annual electrical energy consumption is 18,510 unit.

Graphical representation of Energy Consumption

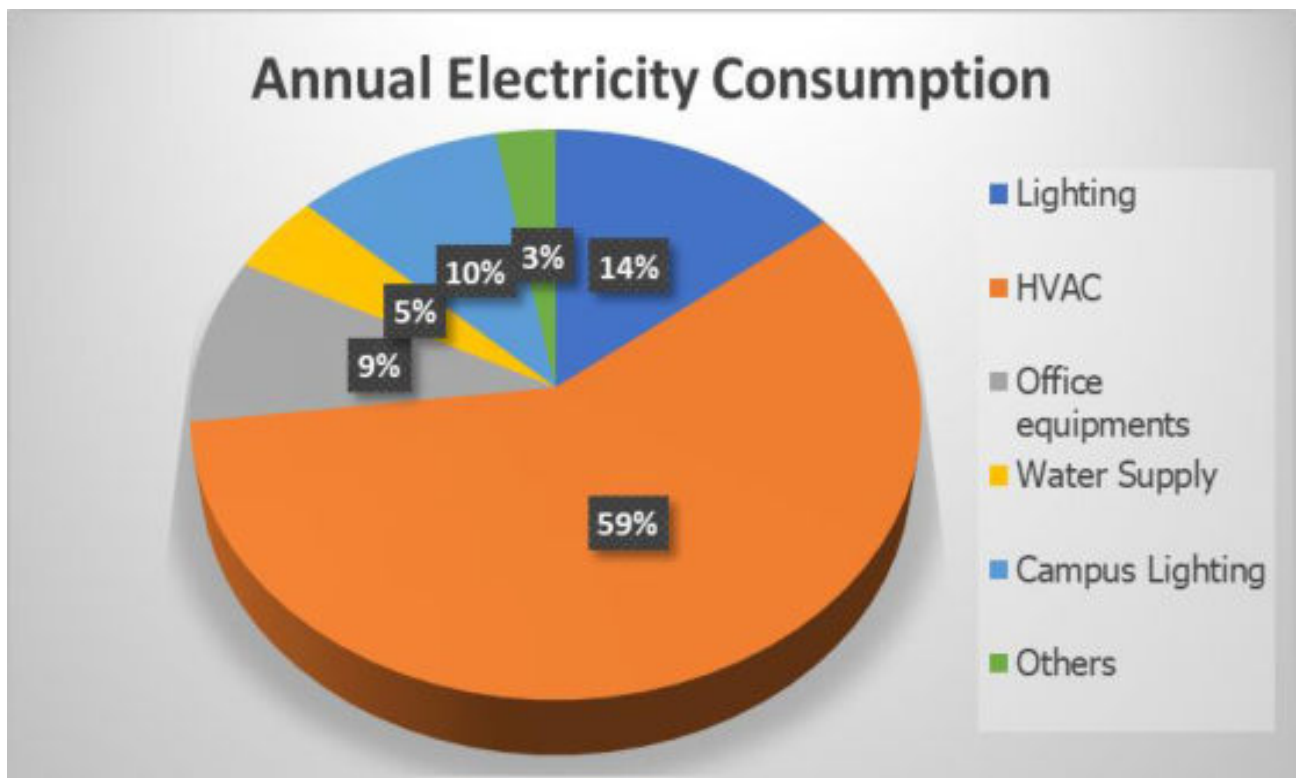


Figure 2: Graphical representation of Energy Consumption

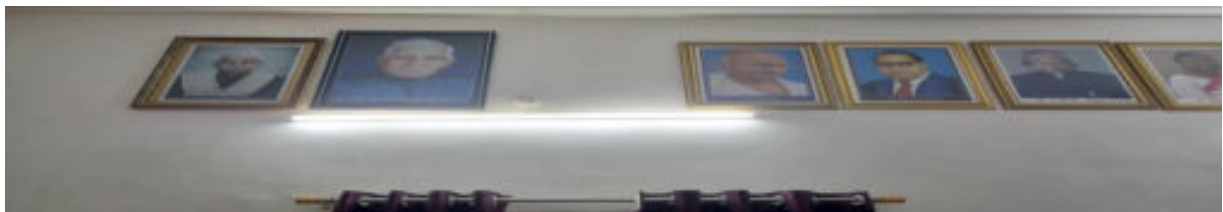
As per NAAC requirement, we have calculated installed load of LED light fittings and Conventional light fittings.

8.2.5 Percentage of Lighting Power requirement met through LED lights

Wattage of LED Lighting	2505
Wattage of Conventional Lighting	3560
Percentage share of LED lighting in total Connected load	41 %

Table 12: NAAC Requirement: % of Lighting Power requirement met through LED lights

Thus, total Percentage of Lighting Power requirement met through LED lights is about 41%. This figure is appreciable which shows college management commitment towards the use of energy efficient equipment in college premises.



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

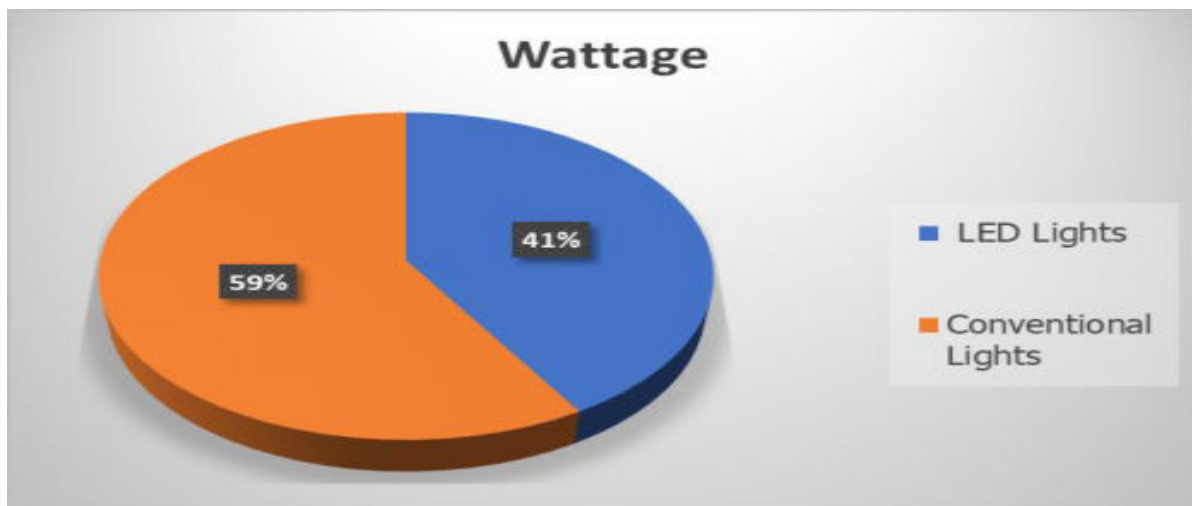


Figure 3: Graphical representation of Percentage of Lighting Power requirement met through LED lights

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

At present, solar panels are not installed in the campus. However, college management has planned to install grid connected system.

8.3 Waste Management

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

The college practices solid waste management which includes segregation of waste, the most important step in waste management. College encourages the process of eco friendly waste disposal method.

8.3.1 Composting Pit

At present, compost pits are not constructed. College management has planned to construct a compost pit, so that all the leaves of tree and other biodegradable generated in premises from canteen & tiffin can be utilized in the pit to form manure.



Non Bio Waste – Plastic Bottles / Waste Paper etc.

Non- biodegradable waste, which cannot be decomposed by biological processes is called non- biodegradable waste. These are of two types - Recyclable: waste having economic values but destined for disposal can be recovered and reused along with their energy values. e. g. Plastic, paper, old cloth etc. Non-recyclable: waste which do not have economic value of recovery. e.g. Carbon paper, thermo coal, 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 focus on its safe disposal for sustainable environment. However, college has banned the use of plastic inside its premises.



Seth. R. C. S. Arts & Commerce College

Utai Road, Near Ravishankar Shukla Stadium Durg (C.G.) 491001
(Run by District Education Society Durg)

Accredited with Grade B by NAAC

Affiliated to Hemchand Yadav Vishwavidyalaya, Durg
Recognised under 2(f) & 12(B) of the UGC Act, 1956

Phone: (0788) 2322457

Website: www.rcscollege.com Email: rcscollege1964@gmail.com

No. SRCS/1256 A/PE/2020

Date 24/02/2020

CIRCULAR

Sub: Ban of Plastic Use in Seth R. C. S. Arts & Commerce College Campus.

Ref: Guideline issued by University Grants Commission to ban single use plastic in the campus.

Whereas plastic waste has emerged as one of the biggest environmental concerns adversely impacting the soil, water, health and well-being of citizens at large. Excess-consumption of plastic combined with limited waste disposal systems has become a challenge to the urban waste disposal systems, and has choked the rivers and water systems in rural areas.

To reduce the usage of plastic University Grants Commission issued guidelines to all the Higher Education Institutions to ban on use of single-use plastics in campus.

Accordingly, all the staff and students are hereby informed that the use of plastic in any form is banned in the college. College has decided to take following steps to make campus 'plastic-free' by systematically banning use of plastics.

- Ban use of single-use plastics in the institution's premises.
- Carry out awareness drives and sensitization workshops on the harmful impacts of single use plastics.
- Mandate all students to avoid bringing non-bio-degradable plastic items to the institution.
- Encourage students to sensitize their respective households about harmful effects of plastics and make their households 'plastic free'.
- Install necessary alternative facilities like water units to avoid the use of plastic water bottles and encourage use of alternative solutions like cloth bags, paper bags etc., instead of plastic bottles, bags, covers and other goods on campuses.


Principal
Seth R.C.S. Arts & Comin.
College Durg (C.G.)

Copy to:

1. HOD, All Departments, Seth R. C. S. Arts & Commerce College.
2. Notice Board of college.

Non biodegradable waste like plastics, metal, glass etc. is collected in the buckets kept at various places in premises and handover to Municipal corporation, Durg.

To reduce paper consumption, college is using both side of paper. No waste is polluting surface/ ground water.

8.4 E-Waste Management

Waste Electrical and Electronic Equipment (WEEE) or E-waste is one of the fastest growing waste streams in the world. In developed countries, it equals 1% of total solid waste on an average. In developing countries, it ranges from 0.01% to 1% of the total municipal solid waste generation. 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 office is generated in the college.

8.5 Green Campus Management

Greening the campus is all about sweeping away wasteful inefficiencies and using conventional sources of energies for its daily power needs, correct disposal handling, purchase of environment friendly supplies and effective recycling program. College 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.



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.





The roots of trees dig deep into the earth and hold it together so that the rain and wind cannot wash or blow 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.

8.5.1 Tree Plantation in Premises

Trees & Plants	Numbers
Full grown Tree	21
Semi Grown Tree	84
Quarter grown plants	570

Table 13: Trees & plants

8.6 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.

The following activity/utility is responsible for major portion of carbon emission:-

- Electricity purchased from Distribution companies
- Transportation

8.6.1 Carbon Emission by Electricity

Electricity is taken by grid which uses coal for generating electricity or DG set which uses diesel for electricity generation.

Parameter	Emission Factor	Unit in KWH	Total emission in KG CO₂ equivalent Per Year
Grid Electricity	0.82	18510	15,178

Table 14: Carbon Emission by Electricity

Thus, total emission by purchased electricity is 15,178 KG CO₂ eq. Per year.

8.6.2 Carbon Emission by Transportation

Principal, teaching & non-teaching staff and students comes to college either by two wheelers & four wheelers. The two major fuels used by the transport sector are petrol and diesel. These fuels are carbon intensive as they contain 80-85% of carbon by weight.

Particulars	Place	Average Nos. of students	Mode of conveyance	A	B	C	D= C/B	E	F=E x D	G	H=G x F x A
				Nos. of vehicles used	Milage (KM /L)	Average distance in KM	Fuel consumption per day per vehicle (litre)	Total working days	Fuel consumption per vehicle in a year	Emission factor	Total emission by college students/faculty
Students	Kasaridih & near by Durg City & near by villages	40	On foot			2	0				
		170	Bicycle			10	0				
	Gunderdehi,Dhamdha, Rajnandgaon	60	Public Bus (56 seats)	4	6	60	10	150	1500	2.67	16020
	Supela & near by	170	Two-Wheeler	140	40	24	0.6	150	90	2.67	33642
	Bhilai/Durg City	180	Two-Wheeler	150	40	20	0.5	150	75	2.67	30038
	Other Village near by durg city	220	Two-Wheeler	180	40	30	0.75	150	112.5	2.67	54068
Teachers	Kasaridih & near by	3	On foot								
	Charoda & near by	1	Two-Wheeler	1	40	40	1	150	150	2.67	401
	Bhilai /Durg	2	Two-Wheeler	2	40	20	0.5	150	75	2.67	401
	Durg City	12	Two-Wheeler	1	6	6	1	150	150	2.67	401
	Durg, Bhilai	5	Four wheeler	5	20	8	0.4	150	60	2.67	801
Other Staff	Durg	22	Two Wheeler	22	40	40	1	150	150	2.67	8811
Total Co2 emission in KgCO₂ eq per Year											1,44,583

Table 15: Carbon emission by transport

Thus, Total Co2 emission by transport is 1,44,583 KgCO₂ eq. per Year

8.6.3 Total Carbon dioxide emission

Area	CO2 eq. emission in KG
Electricity	15,178
Transport	1,44,583
Total	1,59,761

Table 16: Total Carbon dioxide emission

The following installation /activity is responsible for reduction in carbon emission: -

- Tree plantation

Trees help to combat global warming by absorbing carbon dioxide, removing and storing carbon while releasing oxygen back into the air. They also reduce wind speeds and cool the air as they lose moisture and reflect heat upwards from their leaves.

Other environmental benefits include the fact they help to prevent flooding and soil erosion, by absorbing thousands of litres of stormwater.

8.6.4 Reduction of Carbon Emission due to absorption of CO₂ by Tree Plantation

Particulars of Flora	Numbers	Carbon absorption in Kg by one tree Per year	Total Carbon Di Oxide absorbed in Kg	Oxygen Production by one tree Per year	Total Oxygen produced in Kg
Full grown Tree	21	21	441	117.6	2470
Semi Grown Tree	84	9	756	58.8	4939
Quarter grown plants	570	3	1710	29.4	16758
Total			2907		24167

Table 17 : Total Carbon absorption and oxygen production by tree plantation

Planting is a great way to help sequester carbon emissions. Through photosynthesis

trees absorb carbon dioxide to produce oxygen, food and wood.

9. RECOMMENDATIONS

1) Formation of Green Club under Green Campus Policy.

A Green Campus is one that integrates environmental knowledge into all relevant disciplines; improves environmental studies course offerings; provides opportunities for students to study campus and local environmental problems; conducts environmental audits of its practices; Colleges environmentally responsible education combine to promote sustainable and eco-friendly practices in the campus.

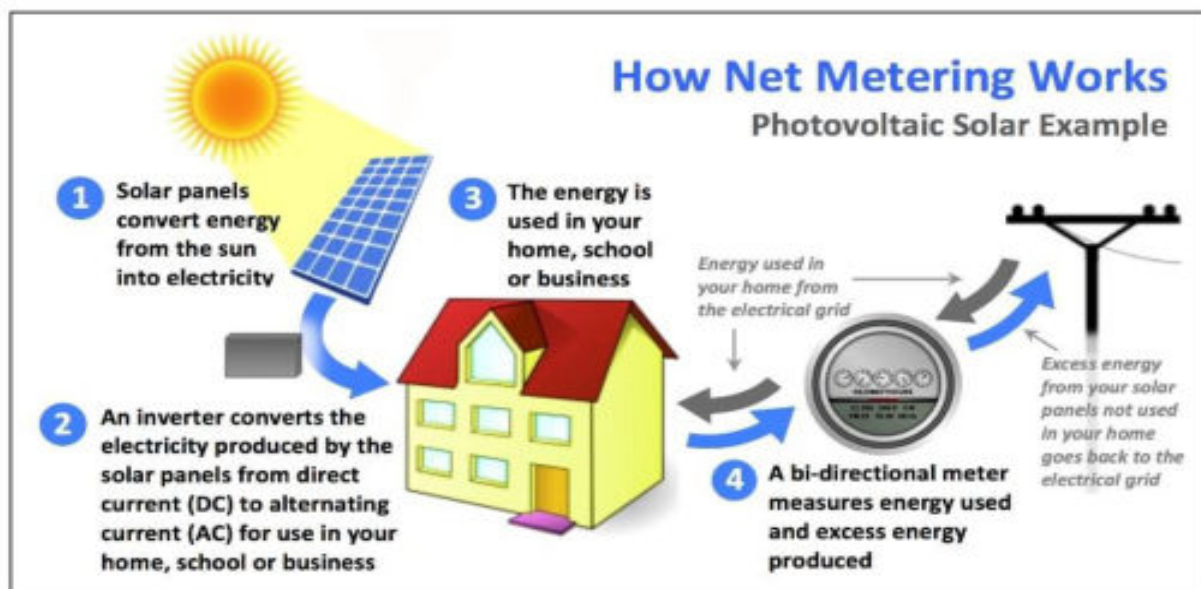
Though Seth R.C.S. Arts & Commerce college is doing the activities of Green Campus policy, but it is required to frame out a Green Campus Policy and carry out the activities as per Green Calendar every year under Green Club. Few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus & thus sustainable environment and community development. The green campus concept offers an institution the opportunity to take the lead in redefining its environmental culture and developing new paradigms by creating sustainable solutions to environmental, social and economic needs of the mankind.

Green Club will be formed under the policy of Green Campus. Green Club will prepare Green calendar of each session and celebrate all important days related to environment protection and sustainability. We have mentioned the details of Green Campus Policy in annexure.

Green Club will also be responsible for spreading awareness on the importance of energy conservation in the students and staff of college. The club will participate in all energy conservation activities and organize program with the support of Chhattisgarh State Renewable Energy Development Agency, (CREDA) Raipur.

1) Installation of Grid connected solar power plant

A grid connected solar power plant should be installed on "Net Metering" basis. The working of Net Metering is shown below as example.



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.

2) Replacement of all conventional tube light will replaced by energy efficient LED tube light :

The share of Energy Efficient LED lights is about 41%. Remaining 59% of conventional lights in the premises should be replaced with LED light fittings. It will not only save in electricity consumption but also save CO₂ emission directly and indirectly.

3) Installation of water level controller for water tanks.

It is suggested to install water level controller for overhead water tanks. Gardens should be watered by using drip/sprinkler irrigation system to minimize water use. Leakage of the taps are repaired, It is recommended to install taps with reduced water flow, . Reward the personnel informing Leaky taps , Paste Labels where ever water is expected

to be wasted. a) Repair sources of water leakage, such as dripping taps and showers as quickly as possible.

b) Use an efficient and hygienic water storage mechanism is to minimize the loss of water during storage.

4) Installation of Rain Water Harvesting System for remaining roof area of college building

At present, the college has 304 Sq. Mtr area for roof top rainy water collection. The remaining roof area of college building should also be used for rain water harvesting system. This will improve the recharging of ground water level.

5) Enhancement of Energy Efficiency of Tube lights

It should make practice of removing dust over solar panels to increase the efficiency of solar modules. Also cleaning of tube-lights periodically, to remove dust over It. It will improve lumen efficiency of light fittings.

6) General Recommendation for Energy Saving in Office Equipment :

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. condition)	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 un 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 the 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.
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Table 18: General Recommendation for Energy Saving in Office Equipment

7) Waste management :

Waste minimization is very important because it makes good sense to protect the environment and boost environmental performance. Waste minimization techniques focus on preventing waste from ever being created, otherwise known as source reduction, and recycling. The college therefore commits to:

- a) Keep a stack of paper that has been printed on one side and use it for day to day rough paper work
- b) Use more readout material in soft form. Reduce the hard readout material. Use more of e-mail for officially communicating the information needed, online reading.
- c) Minimize the use of fertilizers and pesticides in college grounds, opting for the use of compost produced on site wherever possible.
- d) Reduce the practice of burning plastic and other materials that emit harmful gas on burning is prevented in the campus.

10. Awareness Activities at Seth R.C.S. Arts & Commerce College, Durg

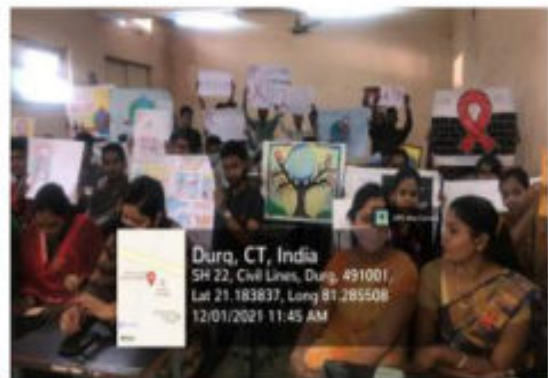
Seth R.C.S. Arts & Commerce College, Durg has the practice of conducting various awareness program in college as well as surrounding areas.

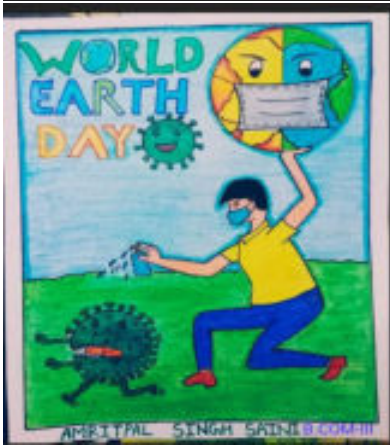
Report - World Aids Day



Red Cross Society of Seth RCS Arts & Commerce College Durg organised a college level poster making competition on account of World Aids day. Theme for the same was to promote awareness about the disease. Principal Shri D R Bhawnani, senior staff Dr G N Kathare, Dr Kiran Tiwari, Dr A K Pandey along with other teaching faculties were present for the occasion. They all were welcomed with a red ribbon which signifies AIDS awareness. Students from Red Cross Society also welcomed the teaching staff of Seth Badrilal Khandelwal Education College and National School Durg with red ribbons. The programme

was hosted by Dr Durga Shukla and Dr Pooja Malhotra (NSS and Red cross society office).





Report on One Day Seminar on Career Guidance

Department of Commerce organized One Day Seminar on 4th Dec. 2021 with the collaboration of Seth Badrilal Khandelwal College . The chief guest for the day Mr. Raj Kumar Kurrey, Deputy Director, Employment Office Durg was welcomed by the M.Com. Students. Principal Mr. D. R Bhawnani and HOF Commerce Dr G. N. Katahare guided the students with their golden words. Our guest addressed the students with the valuable words and encouraged them to qualify the PSC and other Competitive Exams. He even suggested them the techniques and the good books for competitive exams. Approx 200 students were present in the seminar. The programme was hosted and organized by the M.Com. students to increase their management skills and leadership qualities



11. ANNEXURE

Green Campus Policy:

A Green Campus is a place where environmentally 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 redefining its environmental culture and developing new paradigms by creating sustainable solutions to environmental, social, and economic needs of mankind.

Objectives

The first step of the Green Campus Programme involves establishing a viable Green-Campus Committee, within the organizational structure of the College. 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 and using conventional sources of energies for its daily power needs, correct disposal handling, purchase of environment friendly supplies and effective recycling program. The administration of the College believes that everyone must 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 campus will work, may he/she be a student, faculty, and support staff to foster a culture of self-sustainability and make the entire campus environmentally friendly.

The Green Campus Initiatives (GCI) will enable the institution to develop the campus as a living laboratory for innovation.

(A) Composition of the Green Club/ Green Campus Committee.

1. Chairman of the College – Chairperson
2. Principal of the college- Vice Chairman
3. IQAC Coordinator- Secretary
4. Faculty Representative nominated by the principal
5. Student Representative- General Secretary of the college
6. Non-Teaching Staff Representative- Office Superintendent
7. Parent Representative- Secretary of the Parent Teacher Association
8. Industry Representative- Member of Alumni Association

(B) Role of the Green Club

The impetus for a successful Green Campus must begin at the top and emanate throughout the rest of the campus. Without a strong message of commitment and involvement from both the Chairperson and Members of the Committee, well-intentioned initiatives may be too fragmented to allow for college-wide participation. 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.
4. Set forth a Green Campus Mission and a Statement of Principles.
5. Link Green-Campus activities to Academics in the College.
6. Organize Awareness Programs for the students, faculty and society.
7. Chart out a yearly planner for the College, 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 College 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.

11. Establish public/private partnerships with personnel from federal, state, and local environmental agencies, utilities, and the business community.

12. Evaluate daily operations in terms of pollution prevention, waste stream management, and energy efficiency, reducing, reusing, recycling, and repairing wherever possible.

13. Secure a commitment up front from the people in charge that well-founded recommendations will be acted upon once audits are completed.

(C). Promotion of "Save Energy Tips" in and outside the College:

- 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.)
- 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 & public.

(D) Waste Water Management/ Rain water harvesting:

The College has to work in the direction of waste water management. 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 College will take all necessary measures to implement waste water management /rain water harvesting.

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

(E) 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
- Green, Environment and Energy Audit conducted
- Restricted entry of automobiles