2021

Audit

ST. THOMAS COLLEGE BHILAI
THE WAY THE LIFE THE TRUTH

GREEN AUDIT & ENERGY AUDIT OF ST. THOMAS COLLEGE, BHILAI

Conducted & Prepared by

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We express our sincere thanks to Rev.Fr. Dr. Joshi Varghese, Administrator for his kind support and giving us the assignment to contribute in their effort towards Green initiatives & efficient energy management in St. Thomas College, Ruabandha, Bhilai.

We are highly indebted to Dr. M.G. Roymon, Principal, St. Thomas College, and Bhilai for their guidance, intellectual advice and his kind support in completing the project.

Our boundless gratitude to Dr. Joyamma John ,Assistant professor , Department of zoology and Dr. Vinita Thomas, Dean Academics , Shyji Thomas and other teaching and non-teaching staff associated with this Green Audit study of St. Thomas College, Ruabandha ,Bhilai 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, Bhilai

Sanjay Kumar Mishra

Certified Energy Auditor, EA- 8696

4. EXECUTIVE SUMMARY

St. Thomas College a NAAC accredited B++ institution affiliated to Hemchand Yadav Viswavidyalaya, Durg (C.G.) Bhilai is established in the year 1984 and was affiliated to Pt. Ravishankar Shukla University, Raipur. STC has emerged as an institution of excellence in the field of higher education. The College was awarded the FIRST Dr. B. L. Pandey Memorial Trophy for Best College in 2014 on Performance Index – 2013 of Affiliated Colleges (PIAC) among 151 affiliated private Colleges under Pt. Ravishankar Shukla University, Raipur. All the courses of St. Thomas College are sanctioned by the Department of Higher Education State Government. The College was migrated to Hemchand Yadav Vishwavidyalaya, Durg in 2015.

St. Thomas College, Bhilai has been declared as a minority institution by National Commission for Minority Educational Institutions (NCMEI) vide its order dated 13.06.2006 in case No.203 of 2005. The same has been reiterated by Commissioner, *Adim Jati Thatha Anusuchit Jati Vikas Kariyalay*, C.G dated 24.08.2013 Aa.sa/151/2013-14/186/6544. A Governing body formed as per the judgment of NCMEI and Court delivered on 13.6.2006 (F.No. 203 of 2005/8509DT 15.6.2006) and the UGC (F.8-115/89 (CPP-I) DT 12.09.1989) oversees the functioning of the Collegeand recognized by Govt. of Chhattisgarh and under section 2(f) and 12 (B) of the UGC Act, 1956 .Institution tries to provide strong foundation to its students for their professional career in order to ensure all round development care has been taken to give advocate exposure to both staff and students in various fields. The college campus has area of 1.56 acre (Khasra No.97/2) and built up area of college is 2387.45 Sq. meter.

Green Audit

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

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

- Water Management
- Energy Conservation
- Waste Management
- E-waste Management
- Green Area Management
- Carbon Footprint

Water Management

St. Thomas College, Bhilai gets water from two own bore wells sources .Two submersible pumps are operating to fulfill the daily needs of college. College has seven Over head water storage tanks each having capacity of 1000 liter. Daily, 26000 liter of water is pumped to water storage tank. There are five water coolers with Aqua-guard /RO facility installed in college which provides clean and hygienic drinking water facility installed. Four water coolers have storage water capacity of 40 Liter with two taps and one has storage water capacity of 20 liter with one tap. Total 197 water taps are installed in the premises to fulfill the various needs of water for students and teachers.

College has not installed Water level indicator/ controller to avoid overflow from water tank. In case of overflow of water from water tanks of hostel building, the water is used in kitchen garden in mid of the hostel building. Some years ago, a rain water harvesting system was made which is catering rain water of main administrative block and has the dimension of 8 x 8 x 8 feet. However, there is a potential of rain water harvesting systems in remaining buildings.

Energy Management

St. Thomas College, Bhilai has contract Demand of 203 KVA with Town Services Department. Bhilai Steel Plant, Bhilai , St. Thomas College has also installed a grid connected solar power plant of 50 KWp on the rooftop. A DG set of capacity 82.50 KVA is installed in campus for emergency power supply.

The total connected load of St. Thomas College, Bhilai Campus is about 120 KW. The Heating, Ventilation and Air conditioning has about 42 % connected load share among all the electrical equipment.

The management has started replacement of conventional light with energy efficient LED light fittings. Thus, total Percentage of Lighting Power requirement met through LED lights is about 5 %. The population of LED lights is needs to be increased.

The total gross generation of solar power plant was 24,000 KWH during the last year. Thus the average generation of solar power plant was 4.41 Unit per KW per day for the month of June 2018. About 25 % of total power of contract demand is met with solar power plant. Percentage of Power requirement met by Renewable Energy Sources is 42 %. Although, nominal quantity of energy is consumed in the form of LPG.

Waste Management

St. Thomas College Bhilai 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. Maximum waste generated is recycled and reused. Non-biodegradable waste like plastics, metal, glass etc. is collected and handed over to Bhilai Municipal Corporation, Bhilai

To reduce paper consumption, college is using both side of paper. No waste is polluting surface/ ground water. Two machines are available in college for sanitary napkin waste disposal .

St. Thomas College, Bhilai has a girl's hostel having capacity of 200 students. Various waste such as wet waste generated from hostel mess, canteen & Tiffin of students and teachers is collected municipal corporation. Dry waste i.e. papers, coconut peels, huge amount of garden waste which is mostly in the form of leaves are used for composting (in composting pit) to form manure and used for organic farming in college campus.

Green Campus Management

St. Thomas College, Bhilai has established an Eco Club of its own from the session 2013-14.Since then, Eco Club has conducted various awareness programs at St. Thomas campus. The club is committed towards raising social awareness regarding environmental issues and changing students. Staff and society's attitude towards the environment by enlisting their active participation in club's activities.

Types and Quantities of flora

Particulars of Flora	Numbers
Full grown Tree	419
Semi Grown Tree	744
Quarter grown plants	1633

Carbon Footprint

A carbon footprint is an amount of greenhouse gases—primarily carbon dioxide—released into the atmosphere by an individual, event, organization, service, or product, expressed as carbon dioxide equivalent.

1. Total Carbon dioxide emission at St. Thomas College, Bhilai Campus

Area	CO2 eq. emission in KG
Electricity	36,729
Transport	1,90,678
LPG	217
Wood	7,650
Total	**2,35,274**

2. Total Reduction in Carbon dioxide emission at St. Thomas College Bhilai Campus

Area	Reduction in CO2 eq. emission in KG
Solar	52170
Trees	20394
Composting	500
Total	**73,064**

Symbiotic relationship exists between trees and humans at St. Thomas College Bhilai

A symbiotic relationship exists between trees and humans. Humans breathe in oxygen and exhale carbon dioxide, while trees breathe in carbon dioxide and exhale oxygen.

Oxygen Balance

Total oxygen emission by trees and oxygen consumption by human at St. Thomas College, Bhilai

Total Annual Oxygen Emission in Kg	Trees	141032
Total Annual Oxygen Consumed in Kg	Humans	55,588

Carbon Balance

Total Annual Carbon Di Oxide Emission in Kg	Humans	75,441
Total Annual Carbon Di Oxide Consumed in Kg	Trees	20,394

5. INTRODUCTION

In the year 1984, the visionary Late Lamented His Grace Dr. Stephanos Mar Theodosius foresaw the great oak within the tiny acorn which he planted and nurtured with care and dedication. His Grace was the Founder-Manager of St. Thomas College, Bhilai whose mission was to work for the spiritual, social, educational, cultural and economic upliftment of the people.

St. Thomas College (STC), Bhilai is one of the steps in this direction. Established in the year 1984 and affiliated to Pt. Ravishankar Shukla University, Raipur; STC has emerged as an institution of excellence in the field of higher education. The College was awarded the FIRST Dr. B. L. Pandey Memorial Trophy for Best College in 2014 on Performance Index – 2013 of Affiliated Colleges (PIAC) among 151 affiliated private Colleges under Pt. Ravishankar Shukla University, Raipur. All the courses of St. Thomas College are sanctioned by the Department of Higher Education State Government. The College was migrated to Hemchand Yadav Vishwavidyalaya, Durg in 2015.The vision and mission of His Grace have acted as beacons guiding the College in the right direction and the institution has progressed by leaps and bounds and has carved for itself a niche in the education map of India. He reckoned that education should give equal weightage to both knowledge and skills along with instilling moral values in the young minds.

St. Thomas College, Bhilai has been declared as a minority institution by National Commission for Minority Educational Institutions (NCMEI) vide its order dated 13.06.2006 in case No.203 of 2005.

Over the years, the College has garnered accolades in curricular and extracurricular domains. It has been reaccredited at B++ level by the National Assessment and Accreditation Council (NAAC) of the UGC. Every year the students bring laurels for their alma mater with their remarkable performance and also secure top positions in academics. The College places equal emphasis on literary, cultural and sports activities. The pupils have risen to the challenge of present day competition and have proved their mettle at district, state and national levels.

STC has a state of art infrastructure creating an environment conducive of higher learning and research. The College strives to strengthen its team of highly qualified, dynamic and dedicated faculty, diligent office staff and dependable support staff working tirelessly with a high spirit and strong sense of togetherness and ensures that the academic journey of student's progress smoothly. Though *digitalization of higher education is still evolving, as educators and learners, the College team uses digital technology to impart education.* The increased emphasis on interactive learning and discussion are one of the primary advantages of digitalization and the College believes that *working with these tools* is more interesting part of learning. The ever increasing collection of books, journals and digital content in the Central and Department Libraries

and the latest IT infrastructure ensures that the students have information in every form at their disposal to explore. Well-equipped laboratories, systematically furnished classrooms maintaining good indoor air quality, indoor and outdoor sports and culture facilities, canteen promoting healthy food habits and an eco-friendly campus provide students an encouraging learning environment.

STC is convinced that the students need to hone a variety of skills coupled with team spirit and leadership qualities. The College promotes varied kinds of activities apart from class room lectures and laboratory practice and has therefore provided conference and seminar halls to facilitate curricular and co-curricular activities.

Hostels are a home away from home and College provides safe accommodation facility for girls in the campus. The Hostel blocks are aesthetically built and are situated amidst lush greenery where students can feel homely and pursue their studies in a serene atmosphere.

Infrastructure

The college has a spacious sports complex with a basketball court, volleyball court & has seating capacity of 100 people. It is used as a venue for hosting college level & inter college competitions Facilities for indoor sports like table tennis, carom & chess are also there. The institution also has a fitness centre that has equipment for free weight exercises, bodyweight exercises, resistance machine exercises and stretching exercises
Adequate in-house staff is employed to meticulously maintain hygiene, cleanliness and infrastructure on the campus so as to provide a congenial learning environment. Wash rooms and rest rooms are well maintained. Dustbins are placed in every floor.

The green cover of the campus is well maintained by full time gardeners. Optimum working condition of all equipment on the campus is ensured through annual maintenance contracts to external agencies that includes maintenance of generator, air conditioners, computers, LAN servers, printers, projectors, scanners, surveillance cameras, &biometric attendance system. Estate manager and his team are involved in the maintenance of infrastructure facilities. They look after the regular maintenance of civil works such as furniture repairs, masonry and plaster works, painting, carpentry, plumbing and house- keeping. Equipment like generators, water motors, pumps, water purifiers and water coolers are also taken care of. Day to day maintenance ensured by the support staff. The quality of drinking water is tested time-to-time overhead water tanks are cleaned periodically. The fire extinguishers are also refilled timely. Watchmen

are deployed in shifts to ensure full-fledged security of institutional premises & girl's hostel both during the day & night

The college has a spacious sports complex spread over an area of 160 x 80 meters. *It* was constructed in the year 2012 through UGC aid. It has a seating capacity of 300 spectators and has facilities for football, cricket, volleyball and basketball

The college has procedures to create and continuously enhance the infrastructure in the form of Human Resources (Teachers, Technical and Administrative staff), Laboratory Equipment, Built-up Space and Learning Resources. The college has required number of Classrooms, Laboratories, Seminar Hall, Conference Hall and e-Classrooms conduct academic activities. All the Departments are well equipped with computing resources (Computer, Scanner & Printer) and Departmental Library.

The campus area is 10 acres, Playground area is 5 acre. There are 45 classrooms, 19 Laboratories,1 seminar Hall, 1 conference hall, The College campus has modern infra and convenient amenities that make life easy and fun during college hours for both students and staff, alongside making learning more interesting. Some of the facilities include well Ventilated classrooms, recreational areas, hostel facility for girls, indoor and outdoor games, well stocked library.

BUILDING

The College has a state of art infrastructure, divided in various departments and blocks, providing students with an encouraging learning environment.. It has administrative block, Catholicate block and Mar Theodosius block and St. Mary's girls hostel

CLASS ROOMS AND CONFERENCE HALL

Allocations of Class rooms are based on the number of students in a section .The college has a planning, building and maintenance committee comprising a members from the management, they take up the work of mentoring the maintenance of the class rooms, periodical painting and white washing. Cleanliness of the class rooms are ensured on daily basis. The college has a Conference hall with 150 seating capacity.

LABORATORIES

There are 3 computer Labs in Computer department and 1 in education Department. Computer labs are fully equipped and maintained by full time IT team appointed by the college for ensuring the network security, maintenances of the server, protection of system by installing anti-virus software and original software. Science labs are fully

equipped with necessary equipments and practical are conducted in a structured manner. All the labs have lab technicians and lab assistants. Besides science labs there are English Lab and Psychology Lab. The English Lab with 12 computers equipped with head phones is a great boon to English Language Learners. The microbiology department being the research centre has Ph.D. research laboratory also with all the basic equipments required by research scholars.

SPORTS & GAMES:

The open play ground spread over 5 acres on the college campus supports a wide variety of Sports and Games with relevant courts. Students are formed into teams and trained to participate in the tournaments organized by the college and at University, Zonal, State, National and International levels.. The winners are duly awarded with Certificates and Medals. Students have brought laurels to our college in many of the events. The multipurpose play ground is utilized for Volleyball Basket Ball, Foot Ball, Cricket and Lawn Tennis, Running track for Long Jump, High Jump Pits, Shot Put, Discus Throw and Javelin Throw areas during annual sports. The College has a mini stadium in the sports complex where these students can sit and view the sports events.

LIBRARY

Library is automated using Integrated Library Management System (ILMS) Response. It consists of double Decker iron racks with books arranged subject wise and number wise. At present there are a big numbers of books including Reference Books, Text Books, Journals, and Magazines. It is well equipped with all modern facilities including e-resources. It has evolved into a full-fledged Digital Library equipped with necessary equipment in order to provide various digital library services. It is fully automated with Integrated Library Management Software version 4.0.

The college library facility is very well utilized by the students and staff members of the college. The College runs an innovative practice in which the economically and socially weaker students can avail 4 books for whole session under BOOK BANK facility. Also the e-books are provided to the students for better understanding.

Total Campus Area & College Building Spread Area

Campus Area	10 Acre
Total Built up Area	Total Area : 7356.3 Sq. Meter Vehicle Stand Area :13,374 Sq. Ft.

Table 1 : Total Campus Area & College Building Spread Area

Adoption of Digital Technologies for teaching and meetings during Covid period

The Covid 19 pandemic has indirectly changed the landscape of education system. COVID-19 accelerated the adoption of digital technologies to deliver education. Education institutions moved toward blended learning and encouraged teachers and students to acquire technology savvy. Soft technology, online, webinars, virtual class rooms, teleconferencing, digital exams and assessments became common phenomenon, where otherwise we might have merely defined them — or they might have come into practical use a decade later or more. St. Thomas College, Bhilai also has adopted new techniques to streamline and transform the offline class to virtual mode.

St. Thomas College has conducted various certificate courses and awareness program to enhance the skill and understanding of the subject. To cope up with the challenges surfaced due to Pandemic, quite a few non-academic activities were carried out during this period. The teaching staff, present students as well as the alumni association of the college came forward to help the people in need at this time of distress

6. GREEN AUDIT

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.

Objectives of the Study

The main objective of the green 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 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 Eco Club members, 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.

The 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

6.1 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.

St. Thomas College, Bhilai gets water from two ground water bore well sources. Two pumps are operating to fulfil the daily needs of college. College has seven Over head water storage tanks each having capacity of 1000 litre. Daily, 26000 liter of water is pumped to water storage tank.

Source	Water capacity of one OHT	Total nos. of tanks	Total water pumped	Average times of pumping in a day	Total water pumped in a day
Source 1	1000	4	4000	3.5	14000
Source 2	1000	3	3000	4	12000
Total water supplied to overhead tanks in liter					**26000**

Table 2 : Total water supplied to overhead tanks

College has not installed Water level indicator/ controller to avoid overflow from water tank. In case of overflow of water from water tanks of hostel building, the water is now used in kitchen garden in mid of the hostel building.

Long ago, a rain water harvesting system was commissioned which is catering rain water of main administrative block and has the dimension of 8 x 8 x 8 feet. However, there is a potential of rain water harvesting systems in remaining portion of college and hostel buildings.

6.1.1 Water Consumption at St. Thomas College,, Bhilai

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 St. Thomas, Ruabandha, Bhilai					
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 (liters)**	**Number of people in the College using water**	**Water Consumption per day (liters)**
Four Overhead Water Tank installed above ADM block					
Wash hands and face	1.25 liter	One times a day	1.25	300	375
Bath	60-120	once	90	5	450
Toilet flush	6 To 21	once	6	300	1800
Drinking (cup)	0.25	Two	0.5	800	400
Washing dishes (hand)	Basin	Two	0.75	300	450
Overflow of water & Leakage	150	3.5	525	-	525
Gardening 12 taps	750	once	750	12	9000
Canteen (Av. For 5 people breakfast)	2		2	500	1000
Total Consumption of water in liter (A)					**14000**
Three Over Head Water Tank kept above Hostel					
Overflow of water& leakage	120	4			480
Hostel (Wash hands and face)	1.25 litres	Two times a day	2.5	160	400
Hostel (Bath)	60-120	once	60	160	9600
Hostel (Toilet flush)	6 To 21	once	6	160	960
Hostel Washing dishes (hand)	Basine	Once	1	160	160
Hostel Drinking (cup)	0.25	10 Times	2.5	160	400
Total Consumption of water in liter (B)					12000
Total water consumption in college [Sum of (A) and (B)]					26000

Table 3 : Total Water Consumption Per Day

There are five water coolers with Aqua-guard /RO facility installed in college which provides clean and hygienic drinking water facility installed. Four water coolers have storage water capacity of 40 Liter with two taps and one has storage water capacity of 20 liter with one tap. Total 197 water taps are installed in the premises to fulfill the various needs of water for students and teachers.

The details of water taps through which water is used for different purpose is mentioned below :-

Purpose	**Number of Water Taps**
Gardening	12
Water Cooler	9
Wash basin Taps (hand washing)	68
Wash basin Taps (laboratory)	11
Wash basin Taps (Kitchen)	2
Hostel Bathroom Taps	36
Hostel Toilet Taps	36
Office Bathroom / toilet Taps	23
Total Numbers of Water Taps	**197**

Table 4: Total numbers of water taps

Chemical waste water from Chemistry labs is not mixed with ground water. Chemical water has separate dedicated pit. Labs are practicing green chemistry method. Similarly, Botany and Zoology lab also have 8 separate dedicated pits. In the atmosphere, formaldehyde usually breaks down quickly to create formic acid and carbon monoxide ,carbon dioxide , which are harmful substances.

Awareness to students of college for water conservation is given by teachers on time to time. There is no signs of addressing people to turn off water taps in the campus, however they have the stickers and posters of water conservation messages. There are sprinklers and waterfall in Vandemataram park)

6.1.2 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 St. Thomas, Bhilai

Nearly, 25 years ago, the runoff from the terrace of the administration and main 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 waste. St. Thomas College, Bhilai has total 5,174 Sq. Meter open roof area. In which 2406 sq. mtr. Area is used for rain water harvesting.

The college has a rain water harvesting system Other buildings can be connected , though more pits are required for the same.

Amount of water received through rain

Open roof area (A)	2406 Sq. Meter
Average rain fall per square meter in Bhilai (B)	1200 mm or 1.20 Meter
Amount of water received through rain (C = A x B)	2887.20 Cu. Meter
Run off Coefficient factor through rain (D)	0.80
Total water received (E =C x D)	2310 Cu. Meter

Table 5: Amount of water received through rain

6.2 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.

St. Thomas College, Bhilai uses following energy in the campus:-

1) Electricity
2) Diesel in Diesel Generator Set
3) Liquid Petroleum Gas

6.2.1 Electricity

The class rooms and labs are well ventilated and also permit enough daylight. Maximum utilization of natural light is done to cut down usage of power in both classrooms and laboratories. Electrical Energy is utilized from these three power generation sources:-

a) Electricity from Distribution Company

b) Electricity from own DG set

c) Electricity from Grid connected Solar Power Plant of 50 KWp capacity

a) Electricity from Power Distribution Company

St. Thomas College, Bhilai Campus having Service number 65/009 and Contract Demand of **203 KVA** with Town Services Department, Bhilai Steel Plant, Bhilai. The tariff category is **HT-2**.

Electric Sub-Station and Import- Export Energy Meter of St. Thomas College, Bhilai

The college has also installed a grid connected solar power plant of **50 KWp** on the rooftop. The supply arrangement of Solar Power Plant is 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. We have analyzed the electricity bills of last one year.

We have noticed that exported unit to grid is not mentioned in electricity bill. However, Town Services Department should give details of exported unit in electricity bill as per regulation of Chhattisgarh State Electricity Regulatory Commission (GRID INTERACTIVE DISTRIBUTED RENEWABLE ENERGY SOURCES) Regulations, 2019 vide no. 82/CSERC/2019 dated 05 October 2019.

We have also noticed that electricity bill is charged on average consumption basis. The

Electricity Bill Analysis

We have collected & analyzed electricity bills of one year

Sl. No.	Month	Unit Consumption	Amount	Remarks
1	Apr-19	4000	35011	Assessed
2	May-19	4000	35011	Assessed
3	Jun-19	4000	35011	Assessed
4	Jul-19	4000	35011	Assessed
5	Aug-19	4000	35011	Assessed
6	Sep-19	4000	35011	Assessed
7	Oct-19	4000	35011	Assessed
8	Nov-19	4000	35011	Assessed
9	Dec-19	4000	35011	Assessed
10	Jan-20	4000	35011	Assessed
11	Feb-20	2000	17506	Assessed
12	Mar-20	2000	17506	Assessed
Total Unit Consumption		44000	385122	Assessed

Table 6: Electricity Bill Analysis

Town Services Department is not taking reading of electric billing meter, they are charging electricity bill on assessed basis.

Electrical Connected Load :

Connected Load

Segment	Equipment	Wattage	Quantity	Total load in watt	Total (Watt)
Lighting	Conventional FTL	40	671	26840	27589
	CFL	12	11	132	
	CFL	20	1	20	
	CFL	32	1	32	
	CFL	65	1	65	
	Metal Halide	250	1	250	
	Metal Halide	250	1	250	
	LED Fittings	22	37	814	1439
	LED Fittings	50	5	250	
	LED Bulb	15	25	375	
Heating Ventilation & Air Conditioning	Fan	70	526	36820	54080
	AC 2 T	2300	2	4600	
	exhaust mini	70	2	140	
	exhaust	130	4	520	
	AC 1.5 T	1800	6	10800	
	Air Cooler	300	4	1200	
Office / Computer Lab	Computer	70	111	7770	16520
	Computer old	150	13	1950	
	Printer	300	19	5700	
	Photo Copy Machine	1100	1	1100	
Others	Water Cooler 40 ltr.	600	4	2400	20700
	Water Cooler 20 ltr	300	1	300	
	Submersible Pump	1500	2	3000	
	Others			15000	
Total Connected Load in Watt				120328	120328

Table 7: Connected Load of St. Thomas, Bhilai Campus

The total connected load of St. Thomas, Bhilai Campus is about 121 KW. The maximum share of connected load is in HVAC segment, which is 45% and alone air conditioner has about 13% load share among all the electrical equipment.

Segment	Total load in watt
Lightings Conventional	27589
Lighting LED	1439
Heating, Ventilation & Air Conditioning	54080
Office/ Computers	16520
Others	20700
Total Connected Load in Watt	120328

Table 8 : Segment wise Connected Load of St. Thomas, Bhilai Campus

Graphical representation of Connected Load

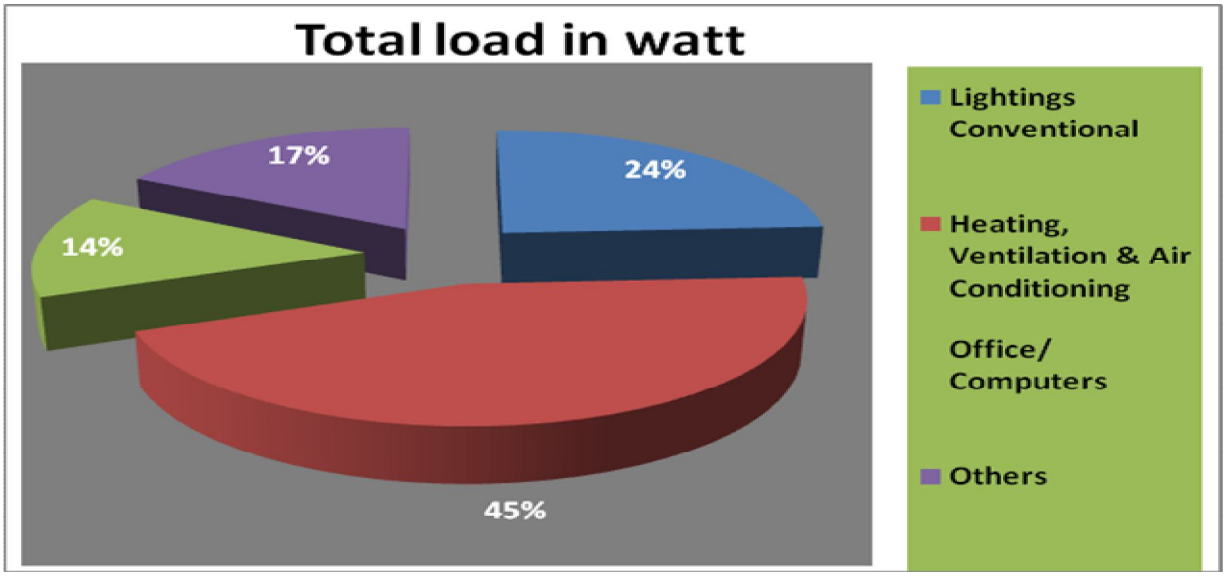


Figure 1 : Graphical representation of connected Load

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

Types of Light Fittings	**Load in Watt**
LED Light Fittings	1439
Conventional Light Fittings	27589

Table 9 : Connected Load of LED light fittings & Conventional fittings at St. Thomas, Bhilai

6.2.2 Percentage of Lighting Power requirement met through LED lights

LED Lighting Load in Watt	1439
Total Lighting Load in watt	29,028
Percentage of Lighting Power requirement met through LED lights	**5 %**

Table 10: Percentage of Lighting Power requirement met through LED lights

Thus, total Percentage of Lighting Power requirement met through LED lights is about 5 %.

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

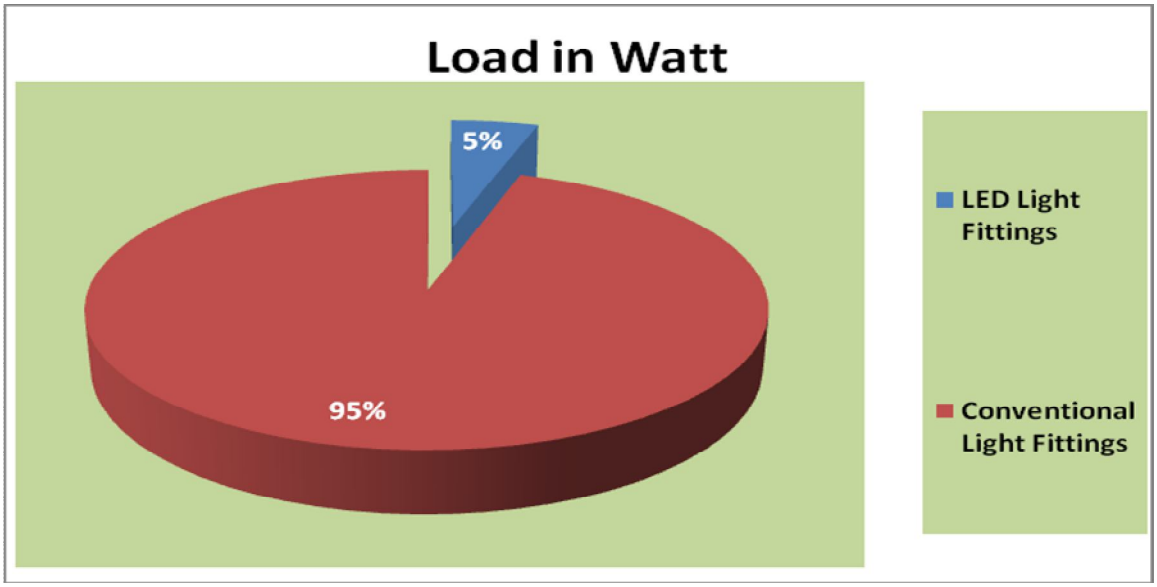


Figure 2 : Graphical representation of Percentage of Lighting Power requirement met through LED lights

b) Electricity from own DG set

6.2.3 Electricity from Diesel Generator Set

A **82.50 KVA** capacity of DG set of Jackson is installed to provide emergency power during load shedding period. The unit generated by DG set is not recorded by college, also they do not maintain log book to record diesel consumption and operational hours of DG set.

Diesel Consumption of DG Set

Year	Diesel Consumption in Litre
2019-20	440
2020-21	160

Table No. 11 : Yearly Diesel consumption of DG set

We have assumed that one litre diesel generates 2.5 Unit of electricity. Thus, for the year 2019-20, the total unit generated by DG set is 1100 Unit.

C) 6.2.4 Electricity Generation from Grid connected Solar Power Plant of 50 KWp capacity

The Grid Connected Solar Power Plant of 50 KWp is installed by Lucrative Solar Solution, Raipur on 21st May, 2018. Total 160 solar panels each having 315 watt capacity are generating power. The service provider of solar power plant has submitted the solar unit generation data of one month i.e. from 22/05/2018 to 21/06/2018. During this period the plant has generated 6624.4 unit of electricity. Thus the average generation of solar power plant was 4.41 Unit per KW per day for the month of June 2018..

Total Wattage of one Solar Panel	315
Total Numbers of Panel in one row	20
Total Numbers of row	8
Total Wattage	50400

The seller can sell energy maximum up to 49%. The supply arrangement of Solar Power Plant is 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.

A View of Solar Power Plant

The technical details of electrical parameters of Solar panel is mentioned below :-

Rated Capacity	315 watt
Output Voltage	36.50 Volt
Output Current	8.63 Ampere
Circuit Voltage	45.80 Volt
Short Circuit Current	9.13 Amp

Unit Generated from 22/05/2018 to 21/06/2018	6624.4
Total No. of Days	31
Total Unit Generation per day	213.70
Total Unit Generation per day per watt	4.27

Solar Power Plant Generation Panel Room

Month	Generation in KWH	Month	Generation in KWH
Apr-20	6428	Apr-19	6410
May-20	6214	May-19	6420
Jun-20	3452	Jun-19	3825
Jul-20	3120	Jul-19	3900
Aug-20	5025	Aug-19	4828
Sep-20	5019	Sep-19	4925
Oct-20	5238	Oct-19	5437
Nov-20	5243	Nov-19	5255
Dec-20	5428	Dec-19	5628
Jan-21	5061	Jan-20	5668
Feb-21	5001	Feb-20	5201
Mar-21	6099	Mar-20	6125
Total	**61328**	**Total**	**63622**

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

Power Requirement met by Solar	50 KWp
Total Power Requirement	120 KW
Percentage of Power requirement met by Renewable Energy Source	**42 %**

Table 12: Alternative Energy Initiative: Percentage of Power requirement met by Renewable Energy Source

Percentage of Power requirement met by Renewable Energy Source is 42%.

6.2.6 LPG Consumption in Laboratories

LPG is consumed not only in laboratory but also in hostel mess. Total 728 Kg of LPG is consumed in the year 2019-20.

Total LPG Consumed in a year	728 Kg

6.3 Waste Management

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

St. Thomas College Ruabandha 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.

6.3.1 Composting Pit

St. Mary's Hostel has the capacity of 200 students. Various waste such as wet waste generated from hostel mess, canteen & Tiffin of students and teachers are used for composting (in composting pit) to form manure and bio fertilizers and further used for organic farming in college campus.

The size of compost pit is 4' x4'x12'. The quantity of solid organic waste is 15 Kg per day before COVID period. Non-biodegradable waste like plastics, metal, glass etc. Is collected and taken away by Bhilai Municipal Corporation, Bhilai.

6.3.2 Solid Waste management

St. Thomas college is using both side of paper to reduce paper consumption. No waste is polluting surface/ ground water.

Solid waste can be divided into two categories: general waste and hazardous waste. General waste includes what is usually thrown away in homes and schools such as paper, plastics tins and glass bottles. Hazardous waste is waste that is likely to be a threat to one's health or the environment like cleaning chemicals and petrol. Small bucket and big buckets are used for solid waste.

Student of St. Thomas College has made many dust bins by use of waste cartoons and placed in classrooms. Beside this, Big plastic buckets and small buckets are placed at their designated locations.

Small Plastic bucket = 30 Nos.
Big Plastic Bucket = 10 Nos.
Total Production of Solid Waste (Bio degradable) : 10-15 Kg
Total Production of Solid Waste (Non Bio degradable) : 1- 2 Kg

There are two septic tanks located near to MTB block and Catholicate block. The dimension of one of the septic tank is 8'x4'x7' and another is 5'x4'x10'.

6.3.3 Non Bio degradable Waste – Plastic Bottles / Waste Paper etc.

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 reused 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.

6.3.4 Chemical Waste Management

Chemical liquid hazardous waste is sent to dedicated pits and they do not mix with ground water. The total numbers of such type pits are 12.

6.4 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 offices and glass waste from labs is generated in St. Thomas College, Bhilai

.

The E-waste are usually given to the stores where its parts are used in repair ing other system. At present E- waste is kept at a place in computer lab and it is planned to dispose all e-waste through vendor.

The total e-waste kept in college is about 14 Kg.

6.5 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.

Figure : Vandemataram Garden

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.

Trees give us food, and juice to drink. Ropes, medicines, wood, paper, and so many other things we use in our daily life, or which are necessary for our health, are made from trees.

Particulars of Flora	**Numbers**
Full grown Tree	419
Semi Grown Tree	744
Quarter grown plants	1633

Table 13 : Type and quantity of flora

6.6 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.

A) The following activity/utility is responsible for carbon emission:-

- Transportation
- Electricity purchased from Distribution companies.
- Diesel used in DG set
- Burning of wood / LPG

6.6.1 Carbon Emission by Transportation

Principal, Administrator , 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.

Type of Fuel	Mode of Conveyance	A	B	C	D= C/B	E	F=E x D	G	H=G x F x A
		No. of Vehicles	Mileage (KM/Lt)	Av. distance in KM	Fuel Consumed per Day per Vehicle in Lt.	Total working days	Petrol Consumption Per Vehicle in a year	Emission factor	Total emission in KG CO_2 Per Year
Petrol	Two Wheeler (Students)	975	40	14	0.35	180	63	2.67	164005
Petrol	Two Wheeler (Staff)	90	40	12	0.3	270	81	2.67	19464
Petrol	Four Wheeler	17	17	10	0.59	270	159	2.67	7209
Total CO_2 Emission by Transport									**1,90,678**

Table 14: Carbon emission by transport

Thus, Total Co2 emission is 1,90,678 KgCo2 eq. per Year

6.6.2 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 (A)	Unit in KWH (B)	Total emission (C= A x B)
Grid Electricity	0.82	44000	36080
Diesel Generator	0.59	1100	649
Total CO_2 Emission by Electricity			**36729**

Table 15: Carbon Emission by Electricity

Thus, total emission by purchased electricity and DG set is 36729 KG CO_2 eq. Per year.

6.6.3 Carbon emission from burning LPG

Total LPG consumed in KG	728
Emission Factor of LPG	0.2983
Total CO2 Produced	**217.1624**

Table 16 : Carbon emission from burning LPG

6.6.4 Carbon emission from burning wood

Wood Burning	4500
CO2 Produced per KG	1.7
Total CO2 Produced	**7650**

Table 17 : Carbon emission from burning wood

Total Carbon dioxide emission at St. Thomas College, Bhilai

Area	**CO2 eq. emission in KG**
Electricity	36,729
Transport	1,90,678
LPG	217
Wood	7,650
Total	**2,35,274**

Table 18 : Total Carbon dioxide emission at St. Thomas College, Bhilai

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

- Grid Connected Solar Power Plant of 50 KWp
- Composting
- Tree plantation

6.6.5 Reduction of Carbon Emission by Solar Power Plant

The solar power plant has generated 63,622 unit from renewable sources in the year 2019-2020 . If it is not generated from solar then it would be purchased from electricity distribution companies which will produced from burning of coals in thermal power plant, which causes carbon dioxide emission.

Parameter	**Emission Factor**	**Unit in KWH**	**Total reduction of CO_2 emission**
Solar Power Plant	0.82	63622	52,170

Table 19: Reduction of Carbon Emission by Solar Power Plant

Thus, solar power plant has reduced 19,680 KG of CO_2eq. Per year.

6.6.6 Reduction of Carbon Emission by composting

For producing 1000 Kg of fertilizer 1700 KG of coal is required and which gives carbon dioxide emission of 2500 Kg. Compost has a natural process, thus it reduces carbon dioxide emission, which would be generated in fertilizer.

Particulars	Fertilizer Production in KG	Coal Required in KG	CO2 Emission reduction in KG
Standard Values	1000	1700	2500
In College	200	340	500

Table 20: Reduction of Carbon Emission by composting

Thus, Carbon emission of 500 KG of CO_2eq. Per year is reduced by composting.

6.6.7 Reduction of Carbon Emission due to absorption of CO_2 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***.

Particulars of Flora	Numbers	Carbon absorption in Kg by one tree Per year	Total Carbon Di Oxide in Kg
Full grown Tree	419	21	8,799
Semi Grown Tree	744	9	6,696
Quarter grown plants	1633	3	4,899
Total Carbon absorption by trees			**20,394**

Table 21 : Carbon absorption by tree plantation

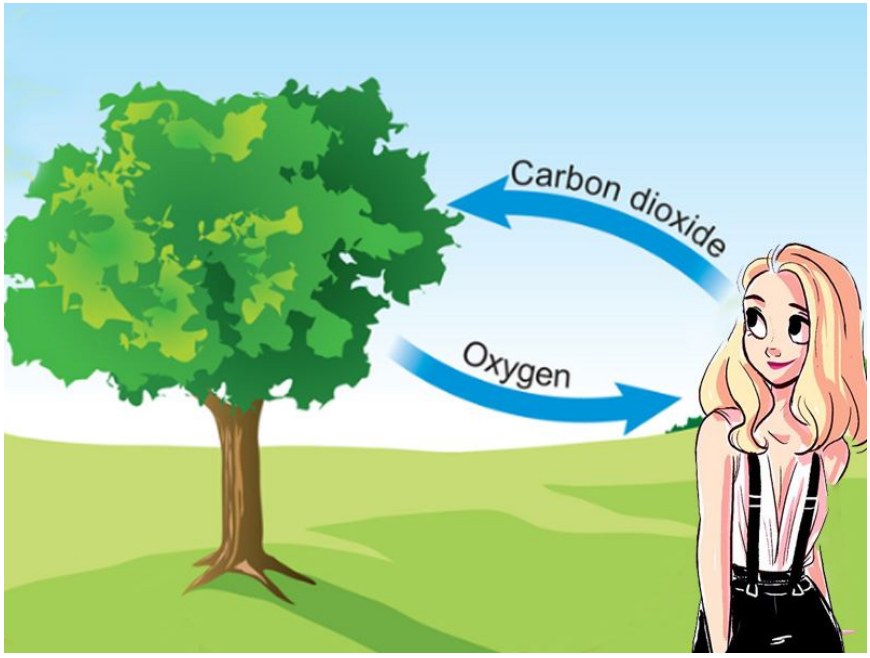
6.6.8 Total Reduction in Carbon dioxide emission at St. Thomas College Bhilai Campus

Area	Reduction in CO2 eq. emission in KG
Solar	52170
Trees	20394
Composting	500
Total	**73,064**

Table 22 : Total Reduction in Carbon dioxide emission

7. SYMBIOTIC RELATIONSHIP BETWEEN TREES & HUMANS AT ST. THOMAS COLLEGE, BHILAI

A symbiotic relationship exists between trees and humans. Humans breathe in oxygen and exhale carbon dioxide, while trees breathe in carbon dioxide and exhale oxygen.



Trees are nature's soldiers in the fight against global warming. As they feed themselves, they absorb carbon dioxide from the atmosphere and store it in the form of carbohydrates. The stored carbon remains locked inside the body of tree, keeping it out of the atmosphere.

Trees are able to clean the air and absorb harmful airborne particles and gaseous pollutants. Trees not only soak up carbon dioxide, they also absorb other harmful gases, such as carbon monoxide, sulfur dioxide and nitrogen dioxide.

This improves the air quality in the micro-climate around the trees and contributes to a healthier and cleaner environment overall. Trees also soak up the harmful carbon dioxide in our atmosphere.

The roots help clean and filter the rainwater that eventually runs off into our waterways. They also absorb unwanted chemicals from the surrounding soil. Trees can help clean up farm wastes, heavy metals, and sewage, among other waste products.

7.1 Carbon emission and oxygen consumption by human at St.Thomas College, Bhilai

Particulars	KG Per Person Per Day (24 Hours)	College run hours	KG Per person per college day	Total Person in College	Total College Days	Total KG in a Year	Total
Carbon Di Oxide Emission by Staff	1.14	7	0.3325	107	270	9606	75441
Carbon Di Oxide Emission by Students	1.14	7	0.3325	1100	180	65835	
Oxygen Consumed by Staff	0.84	7	0.245	107	270	7078	55588
Oxygen Consumed by Student	0.84	7	0.245	1100	180	48510	

Table 23 : Carbon emission and oxygen consumption by human

7.2 Oxygen emission and Carbon consumption by tree plantation at St. Thomas College, Bhilai

Planting is a great way to help sequester carbon emissions. Through photosynthesis ***trees absorb carbon dioxide to produce oxygen & food.***

Particulars of Flora	Numbers	Carbon absorption in Kg by one tree Per year	Total Carbon Di Oxide absorption in Kg	Oxygen Emission by one tree Per year	Total Oxygen produced in Kg
Full grown Tree	419	21	8,799	117.6	49,274
Semi Grown Tree	744	9	6,696	58.8	43,747
Quarter grown plants	1633	3	4,899	29.4	48,010
Total			**20,394**		**1,41,031**

Table 24 : Total Oxygen emission and Carbon consumption by Tree Plantation

Oxygen Balance

Total Oxygen Emission in Kg	**Trees**	**141032**
Total Oxygen Consumed in Kg	**Humans**	**55,588**

Table 25: Total oxygen emission by trees and oxygen consumption by human at St. Thomas College, Bhilai

Carbon Balance

Total Carbon Di Oxide Emission in Kg	**Humans**	**75,441**
Total Carbon Di Oxide Consumed in Kg	**Trees**	**20,394**

Table 26: Total Carbon Di Oxide emission by trees and Carbon Di Oxide consumption by human at St. Thomas College, Bhilai

8. ECO CLUB

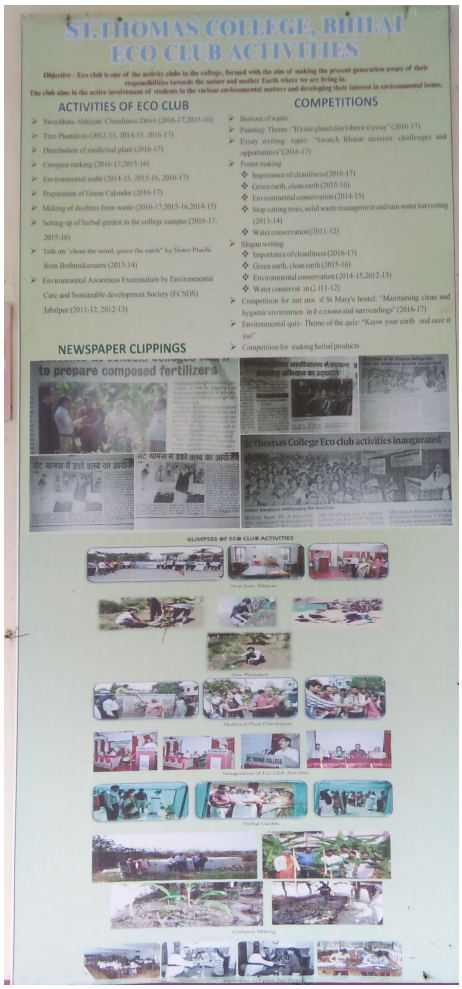
St. Thomas College, Bhilai has established the **Eco Club** of its own Eco club is one of the many important activity clubs of an educational institution. The need of the hour is to create an environment friendly generation, because the present generation lives in an artificial world created by man. It is necessary to sensitize them towards nature.

Vision:

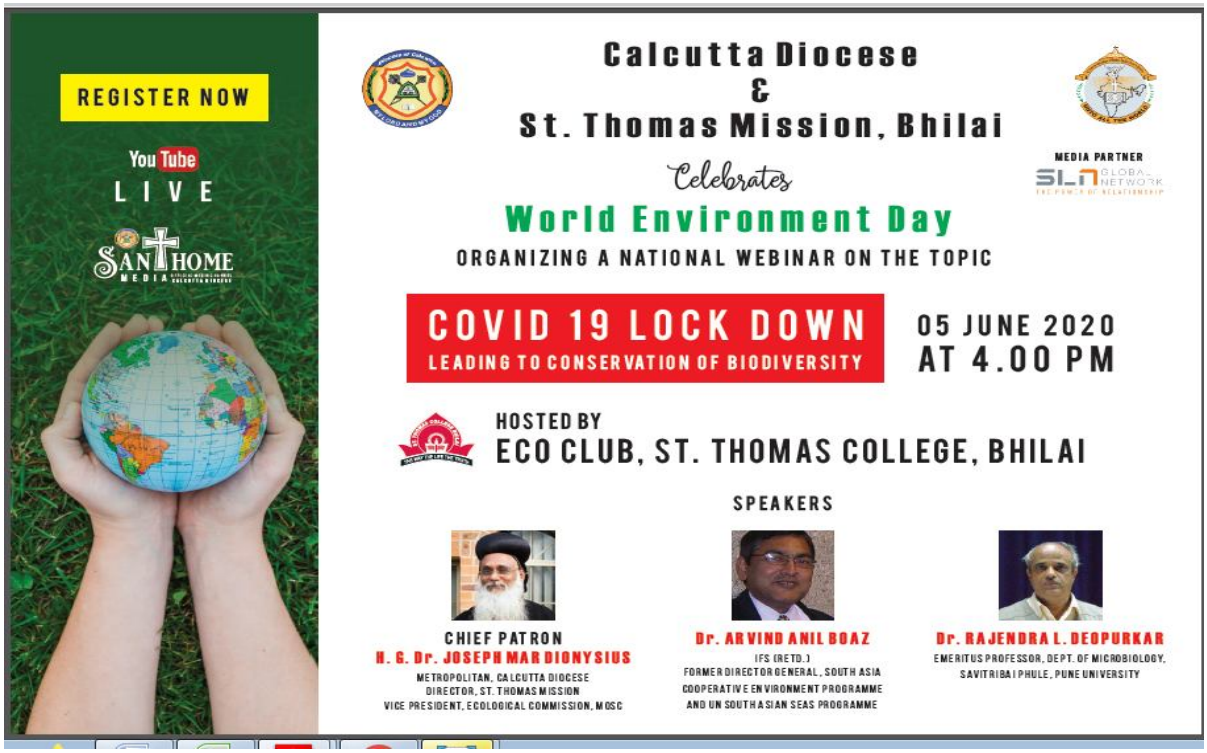
The club will be committed towards raising social awareness regarding environmental issues and changing students' attitude towards the environment by enlisting their active participation in club's activities.

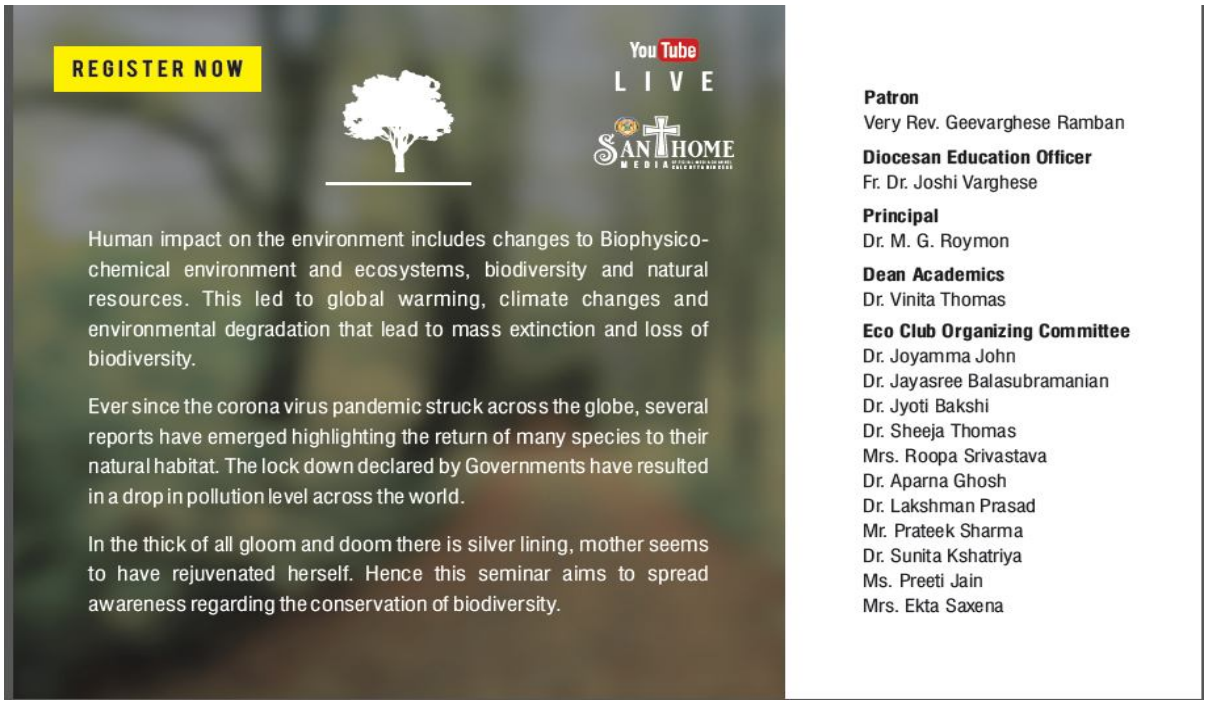
Mission

- To get the students actively involved in environmental matters and to develop their interest over environmental issues
- To exert value oriented efforts for a safer atmosphere, thus creating awareness towards the three 'R's-reduce, reuse and recycle- of conservation
- To inculcate proper attitude with regard to environment and its conservation through action-based programmes.
- To enhance students participation in protecting the micro environment.
- To implement efficient solid waste management.
- To reduce the use of plastic in the community.
- To forge ties with the community on ecological problems and conservation.



A National Webinar on World Environment Day Organized By ECO Club





9. AWARNESS ACTIVITIES IN ST. THOMAS COLLEGE

a) Energy Conservation :

(i) At the entrance gate of college, a beautiful painting is made under an initiative by ECO club, which shows energy conservation by setting temperature range of room in between 24-26 ^{0}C.

(ii) Slogan on Notice Boards and Classrooms. And Laboratories

Slogan in sticker form is pasted on notice board and class rooms to spread awareness regarding electricity conservation.

b) Water Management - Slogan on Notice board is pasted on notice board to spread awareness regarding water conservation.

(c) Green Campus Management

(d) Waste Management

(e) Fire Safety Equipments

St. Thomas College has installed fire safety equipment in the campus at various locations. All the fire extinguishers are filled and in working condition.

Other Activities

10. RECOMMENDATIONS

1) Formation of Energy Club: We recommend to formation of the Energy Club in St. Thomas College, Ruabandha for spreading awareness on the importance of energy conservation. Energy 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.

Energy Club will celebrate "Energy Conservation Day" on 16Th 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 Energy 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.

2) Replacement of all conventional tube light will replaced by energy efficient LED tube light: St. Thomas management shall enhance energy efficiency of the college and replace all conventional tube light with LED light fittings , It should be continue till all conventional tube light will replaced by energy efficient LED tube light. It will not only save in electricity consumption but also to save CO_2 emission directly and indirectly.

3)Electricity Bill

Town services department of Bhilai Steel Plant is giving electricity bill on the basis of assessed consumption. Management should request the TSD, Bhilai to record actual consumption of the college.

4)Electricity generation and Diesel Consumption of DG set

At present, no logbook is maintained for diesel generator set. A logbook shall be maintained with the following format. A three phase of KWH meter should installed for measuring unit generation.

Date	DG set on Time	DG set Off Time	Total running time in minute	Initial KWH reading	Final KWH reading	Total Unit Generated	Diesel Filled in Litre

Table 27 : Format for DG log book.

5)Waste Management: Ensure that all cleaning products used by college staff have a minimal detrimental impact on the environment, i.e. they are biodegradable and non-toxic, even where this exceeds the Control of Substances Hazardous to Health (COSHH) regulations. Composting should be adopted on at least 250 sq. ft. of land

St. Thomas College should re use plastic water bottles as vertical garden for growing small leafy vegetables and herbs. This plastic bottle vertical garden can be made of by stringing the bottles horizontally in a grid along the wall of the campus which then filled up by substrate and herb.

6) 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. Leakage of the taps are repaired, It is recommended to install taps with reduced water flow. Since there is 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.

7)Enhancement of Energy Efficiency: Cleaning of tube-lights/bulbs to be done periodically, to remove dust over It.

8)Green Campus Management: A Continual plantation of trees is going on. It is recommended to increase the Green Cover further to more area in coming one year.

9) A continuous practice of the same will helps to conserve energy and natural resources in the campus other practices like landfill waste can be reused, college can increase the number of dustbins targeting the areas with no or less no. of dustbins, waste segregation at the micro level is a necessity; separate bins for recyclable and non-recyclable wastes have to be set up throughout the campus, awareness has to be created among the staff and student through various programmes and policies, emphasis to be laid on –reduce, reuse and recycle.

Considering the fact that the institution is a non-technical college, there is a significant environmental activity both by faculty and students. The environmental awareness initiatives are substantial. The installation of ongrid solar photo voltaic panels and rain water harvesting system are noteworthy. Besides, environmental awareness programmes initiated by the administration shows how the campus is going green. 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 and thus sustainable environment and community development.

11.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. cond)	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.

Lukrative Solar Solutions

Generation Data of 50 Kw Grid Connected SPVPP

Site Name: St. Thomas Collage, Bhilai (C.G.)

S. No.	Month	Year	Genration Report
6	June	2018	5702
7	July		3729
8	August		4521
9	September		4798
10	October		5688
11	November		5720
12	December		5604
Total			**35762**

Lukrative Solar Solutions

Generation Data of 50 Kw Grid Connected SPVPP

Site Name: St. Thomas Collage, Bhilai (C.G.)

S. No.	Month	Year	Genration Report
1	January	2019	5652
2	February		5721
3	March		6438
4	April		6410
5	May		6420
6	June		3825
7	July		3900
8	August		4828
9	September		4925
10	October		5437
11	November		5255
12	December		5628
Total			**64439**

Lukrative Solar Solutions

Generation Data of 50 Kw Grid Connected SPVPP

Site Name: St. Thomas Collage, Bhilai (C.G.)

S. No.	Month	Year	Genration Report
1	January	2020	5668
2	February		5201
3	March		6125
4	April		6428
5	May		6214
6	June		3452
7	July		3120
8	August		5025
9	September		5019
10	October		5238
11	November		5243
12	December		5428
Total			**62161**

Lukrative Solar Solutions

Generation Data of 50 Kw Grid Connected SPVPP

Site Name: St. Thomas Collage, Bhilai (C.G.)

S. No.	Month	Year	Genration Report
1	January	2021	5061
2	February		5001
3	March		6099
4	April		6188
5	May		6314
6	June		4220
7	July		3120
8	August		5170
Total			**41173**