GREEN AUDIT REPORT

2023-2024

HOLY CROSS COLLEGE (AUTONOMOUS)

Nagercoil
Tamilnadu -629 004.
INDIA

TJ Solutions

4/101, Raja Sir Muthiah Nagar, Bye-pass road, Ellis Nagar, Madurai-625 016.

CERTIFICATE

GREEN AUDIT 2023-2024

This is to certify that **HOLY CROSS COLLEGE (AUTONOMOUS), NAGERCOIL**, has conducted a detailed **Green Audit** of their campus and has submitted the necessary data and credentials for scrutiny. The activities and measures carried out by the College have been verified based on the field visit and reports submitted and were found to be **EXCELLENT**. The efforts taken by the faculty and students towards environment and sustainability are highly appreciated andcommendable.

U.Chandra Kumar B.E -BEE Accredited auditor
(AEA-0244)

TJ Solutions
4/101 , Raja Sir Muthiah Street, Bye Pass Road , Ellis Nagar,
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ACKNOWLEDGEMENT

Green Audit Assessment Team thanks to the Principal, HolyCross College(Autonomous), Nagercoil for assigning the task of Green Audit of this college to us. We appreciate the cooperation that we got from all the faculties and students during the entire process.

The following officers from TJ Solutions under the guidance of Mr. U.Chandra kumar B.E., have carried out the Green Audit.

Name	Qualifications	Certification Number
Mr.Chandra kumar.U	B.E	BEE Accredited auditor (AEA-0244)
Mr. N. Tamil selvan	B.Sc.,	ISO Lead Auditor / Energy Consultant
Mrs.Tamil selva parvathi	MSc.,DTC.,PGDESD.,	Environmentalist
Mr. R.Manikandan	DEEE	Electrical Data Analyst
Er.A.Rajendran	B.E	Electrical Engineer C. Licence Holder; C 39095
Er. P.Deleepan	B.E	Assistant Engineer (Electrical / Energy)

TJ Solutions Madurai

Disclaimer

TJ Solutions Audit Team has prepared this report for Holy Cross College(Autonomous) based on input data submitted by the representatives of the college complemented with the best judgement capacity of the expert team.

While all sensible care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the conclusions are arrived at by best estimates and no representation, warranty or undertaking, express or implied, is made and no responsibility is accepted by the Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

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TJ Solutions

Madurai

Accredited Energy Auditor

CHANDRA KUMAR.U

BEE Accredited Energy Auditor

(AEA 0244)

TJ Solutions Madurai

Concept and Content

The green audit aims to examine environmental practices within and outside the college campus, which impact directly or indirectly on the atmosphere. Green audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of the college environment. It was initiated with the intention of reviewing the efforts within the institutions whose exercises can cause risk to the health of inhabitants and the environment. Through the green audit, a direction as to how to improve the structure of the environment and inclusion of several factors that can protect the environment can be commenced. This audit focuses on the Green Campus, Waste Management, Water Management, Air Pollution, Energy Management & Carbon Footprint etc. being implemented by the institution. The concepts, structure, objectives, methodology, tools of analysis, objectives of the audit are given in the report.

4. INTRODUCTION

Nowadays, the educational institutions are becoming more thoughtful towards the environmental aspects and as a result new and innovative concepts are being introduced to make them sustainable and eco-friendly. To preserve the environment within the institution, a number of viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of saving energy, waste recycling, water consumption reduction, water harvesting and many more... The activities carried out by the institution can also create adverse environmental impacts. Green audit is defined as an official inspection of the effects a college has on the environment. Green Audit is conducted to evaluate the actual scenario at the institution campus. Green audit can be a useful tool for a university /college to determine how and where they are using the most of the energy or water or resources; the institution can then decide how to implement changes and make savings. It can also be used to determine the nature and volume of waste, which can be used for a recycling project or to improve waste minimization plans. Green auditing and the application of mitigation measures is a win-win situation for all the institutions, the learners and the mother earth. It can also result in health awareness and can promote environmental awareness, values and beliefs. It provides a better understanding to staff and students about the Green impact on institutions. Green auditing also upholds financial savings through reduction of resource usage. It gives an opportunity to the students and teachers for the development of ownership of personal and social responsibility. The audit process involves primary data collection, site walk through with the team of university /college including the assessment of policies, activities, documents and records

5. OVERVIEW OF THE COLLEGE

5.1 Environmental Policy of the college

Holy Cross College (Autonomous), Nagercoil always believes in maintaining its own standard in matters of environment and quality consciousness. It has taken a number of initiatives to protect its own environment with a pollution free campus Being an environmentally conscious college, the administration and the students of the college look after the environment carefully. Every year, during the rainy season, tree plantation is carried out and carefully looked after. Holy Cross College (Autonomous) Nagercoil owns responsibility to preserve the work carried out on the campus relates to the environment.

5.2 Total Campus Area & Building Spread Area

Campus area-20 Acres

Total Built up area 1922.72 lakh sq. m.

5.3 NAAC Grading & ISO Audit

Accredited with 'A+' Grade by NAAC, Holy Cross College (Autonomous), Nagercoil is an ISO 9001:2015 Certified Institution.

5.4 Campus Infrastructure

Holy Cross College (Autonomous), Nagercoil is located in calm and quiet surroundings that are conducive to learning. It helps to stimulate both personal and professional growth of the students. The campus is located about 5 Kms from Nagercoil railway station and 6 Kms from Bus Stand.

5.5 CLASS ROOMS

Spacious, well ventilated and well-equipped classrooms with projectors and screens facilitate and reinforce effective teaching-learning experience for the faculty and students.

5.6 LABORATORIES

The college has set up highly advanced science and computer laboratories attached to different departments. These are adequately equipped with the latest gadgets, instruments and apparatus with the aim of providing students conceptual as well as practical understanding of the subject through hands-on training.

5.7 LIBRARY

A modern digital library network with a high speed internet access is also housed in the premises. Reprographic facilities with printer & CD writer are made available for the beneficiaries. Separate sections for Reference Material, Book Bank, Periodicals, and Project Reports are provided for easy access. There are 102358 books, 8 newspapers, 8048 e- Journals,60000+ E-Books and 10000+ E-journals.

5.8 DRINKING WATER

Water is not just an ordinary need for human beings. It plays a vital role in our life hence the institution gives more care towards the provision of safe water to everyone. The College has installed a Double disinfection water treatment plant which supplies pure and safe drinking water.

5.9 INTERNET

The College is fully equipped with round the clock internet facility

5.10 HOSTEL

In the hostel accommodation is provided with quality food, RO purified drinking water,24 x7 availability of water, Recreation provisions and other amenities. Accommodation is available for undergraduate and postgraduate students.
The hostel provides a calm and relaxing atmosphere to accelerate the creative talents of the students. The wardens of the hostels provide moral and emotional support and guidance to the inmates. The hostel securities ensure 24 hours safety.
The amenities like Visitors' Room, Library, Reading Room, Clinic, Cafeteria, Ironing Room, Television Room, Prayer Hall, Auditorium, Multipurpose Hall, Guest House, Internet Browsing Centre, Play Ground, Canteen, Generators and Public Address System are available in the hostel premises, to facilitate the inmates and stakeholders.

6. EXECUTIVE SUMMARY

Green auditing is an essential step to identify and determine whether the institutional practices are sustainable and ecological. Traditionally, we were upright and efficient users of natural resources. But over the period of time, excessive usage of resources like water, electricity, petrol, etc. have become habitual for everyone especially, in urban and semi-urban areas. Is it actually the right time to check if we (our process) are consuming more than required resources? Whether we are using resources sensibly? Green audit standardizes all such practices and provides an efficient way to use natural resources. In the time of climate change and resource exhaustion it is necessary to re-check the processes and convert them into green and sustainable. Green audit provides an approach for the same. It also increases overall awareness among the folks working in institutions towards the eco-friendly environment. This audit was mainly focused on greening indicators like consumption of energy in terms of electricity and fossil fuel, quality of soil, water usage, vegetation, waste management practices and carbon footprint of the campus. Initially a questionnaire was shared to know about the existing resources of the campus and resource consumption pattern of the students and staff in the campus.

7. 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 the framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Green Audit are: To secure the environment and cut down the threats posed to human health by analysing the pattern and extent of resource use on the campus. To establish a baseline data to assess future sustainability by avoiding the interruptions in the environment that are more difficult to handle and their corrections requires high cost. To bring out a status report on environmental compliance.

8. METHODOLOGY

In order to perform green audits, the methodology included different tools such as preparation of questionnaires, 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

9. FOCUS AREA OF STUDY

- Water management
- Energy use & conservation
- Waste Management
- Green Belt area & Bio-diversity
- Environmental Initiative

9.1 WATER MANAGEMENT

Water is a valuable natural resource for all living organisms. It is freely available depending on the climate and topographic features of a region. Although water is naturally freely available, portable (drinkable) water is not available freely for human consumption. On our planet 70% of the area is covered by water but only 3% of it is fresh water. Around 1.1 billion people in the world face a water crisis. Water pollution and wastage plays a vital role in the water crisis. Water contaminations are taking place at an alarming rate. Drinking or using contaminated water leads to many diseases or death. That is why it is important to ensure that drinking water is safe, clean and free from bacteria and disease. It is also important to conserve, protect and manage the water resources availability and usage so that it is sustainably used. Our college examines the quality and usage of water in the college campus. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water.

USES AND MANAGEMENT

WATER USERS IN CAMPUS

Sl.	Persons in Different sections	Strength
1	Students	2005
2	Staff	146
3	Hostel Students + Staff	173
4	Non Teaching Staff	72

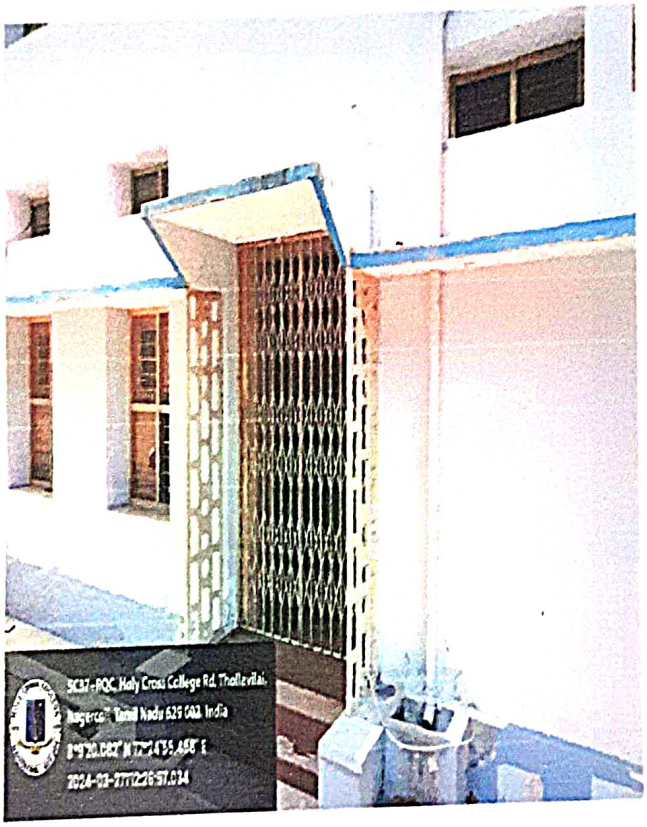
The visitors of the college vary with respect to different activities conducted in the college campus. During admission and different competitive exams conducted in the college campus. The total number of visitors of the college increases up to 3000 on such days.

QUANTITY OF WATER USED IN DIFFERENT SECTIONS OF THE CAMPUS

Sl.No	Section	Water use (litre/day)
1	Academic building	2000
2	Canteen	1000
3	Departments	500
4	Laboratories	1000
5	Urinal and Toilets	2000
6	Garden	10000
7	Drinking	3000
8	Hostel	20000
9	Leakage	1000
10	Construction	2000

Rainwater Harvesting

At Holy Cross College(Autonomous), Nagercoil rainwater harvesting is done effectively to enhance the groundwater level. The institution has rainwater harvesting pits at various locations with Desilting chambers and recharge cum percolation chambers,and they are being maintained properly. The rooftop water is also drained during the rainy season and is allowed to flow into the pits constructed in various places inside the campus including the Hostel Premises. The total area of the college is around 20 acres, the rooftop area of the building comprising various departments is approximately 1922.72 lakh Sq.m.



MAJOR OBSERVATIONS IN REGARD OF WATER USAGES AND CONSERVATION PLAN

1. RO reject water is reused for garden purpose
2. Drip irrigation and sprinklers are used for watering the garden..
3. The rain water is drained to the rainwater desilting chamber and percolation chamber.
4. Press type taps are used for water conservation purposes.
5. Sensor based smart tap controllers are designed by the students of the college.

The water conservation measures conducted by the College is very much impressive and scientific. Water management is conducted as follows:

Rain Water Harvesting

During rain, water from the main buildings and hostels flow into a reservoir and is utilized. The water from the other buildings and the surface run off during the rain is gathered through 13 rain water harvesting pits with the capacity of 156 square feet size constructed at appropriate places. The Built in roof top area in sq.mt where rainwater collected is 1922.72 lakh sq.m.

Borewell/Open well recharge

The surface runoff from the 5 acre playground is channelized into the 100' deep well with 20' diameter. Apart from that, a wall is constructed near the western tip of the campus where water normally flows during heavy rains due to natural topography to prevent loss of water. Thus every single drop of rain water from the campus is enabled to permeate into the soil to replenish the ground water table.

Construction of tanks and bunds

In the college campus tanks are constructed in all areas. The storage tanks situated at various locations of the college are pumped with ground water.

Water Tank in the College Campus

S.No	Block	No of Tank	Capacity of Tanks
1	ADMINISTRATIVE BLOCK	5	1000 Litre-1 2000 Litre-3 7000 Litre-1
2	St. JOSEPH'S BLOCK	2	5000 Litre-2
3	GOLDEN JUBLIEE HALL	1	5000 Litre-1
4	PUMB ROOM TANK	1	15000 Litre-1
5	Fr. PETER MERIMIER BLOCK	2	2000 Litre-2
6	MULITPPURPOSE HALL	2	1000 Litre-2

- Every Month, there is Maintenance of Water Tank
- Everyday water is filled in the morning and evening.

. Water from the bore well, open well and other water bodies are collected through the pipes and stored in the tank (at every block). Maintenance and cleaning the tanks take place regularly as per the Government norms.

The proper Bunds are constructed in the campus and used for retaining the water, creating obstruction and thus to control erosion. Bunds can be used to hold rainwater in lightly sloping plains and to ensure that bunds continue to provide the necessary protection against leaks and spills etc. Hence bunds should be assessed periodically to ensure that they continue to provide sufficient integrity around the campus.

Water irrigation pipes and sprinklers are installed in the green lawns.

Water treatment system

Out of the 39,69,000 litres of waste water generated per year, around 38,21,400 litres of water are recycled.

Water Treatment:

- Facilitating free flow of water through open channels with cement bottom.
- Filtering the floating wastes.
- Channelizing the water to flow through PVC pipes.
- The toxins in the water are removed through natural water treatment method whereby the water passes through area covered by Typha, a plant known to remove toxins from the water.
- Using sand bags as the medium of filtration to remove floating waste.
- The filtered water is further purified through septic tank method.

The water passes through the filtration tank and sedimentation tank and finally collects in earthen cisterns.

The water thus collected and purified is used for the culture of aquatic weeds, fish and frogs. Excess water from the cistern is used for moriculture and horticulture. Such scientific water management and application of organic fertilizers have contributed to the improvement of Soil Organic Carbon (SOC).

RO Plants

Area Code	Placement	Capacity
1	Office	10 LPH
2	Controller of Exam Section	10 LPH
3	Exam Centre Outside	10 LPH
4	DIST - FIST - Lab	10 LPH
5	Main Block Ground Floor	25 LPH
6	Department of Physics	10 LPH
7	Main Block First Floor	25 LPH
8	Main Block Second Floor	10 LPH
9	Botany Department	10 LPH
10	Cecile Block	10 LPH
11	Indoor Stadium	25 LPH
12	Department of Mathematics	10 LPH
13	Department of English	10 LPH

14	C Block First Floor	10 LPH
15	C Block Second Floor	10 LPH
16	C Block Under Step	25 LPH
17	B Block Ground Floor	10 LPH
18	B Block First Floor	25 LPH
19	Department of commerce SF 2	10 LPH
20	Commerce Department	10 LPH
21	Department of Commerce SF 1	10 LPH
22	Library	25 LPH
23	Jubilee Hall Room No 154	10 LPH
24	Jubilee Hall	10 LPH
25	Jubilee Hall	25 LPH
26	Multi-Purpose Hall	250 LPH
27	Madona Block	10 LPH

Ø Regular Service is done for the RO plants.

Ø Every Month Checkup is done through Annual Maintenance Contract.

TAMILNADU WATER SUPPLY AND DRAINAGE BOARD

DISTRICT WATER TESTING LABORATORY

Asaripallam Medical College Road, Post Office Upstair,
Asaripallam – 629201
Phone: 04652 - 238315 E-mail:jwalabngl@gmail.com

TEST REPORT		Doc.No: DWTL/FORM/7.8/01
Test Report No: 45894-45897	Report Issue Date :	30.01.2023
Invoice Details: 9803/ Dt.19.01.2023		

S.No	Parameters	Test Method	Unit	Result		Specification as per IS 10500 : 2012	
8	Appearance	Physical observation	–	Clear	Clear	-	-
9	Colour	APHA 23rd Edition 2017 4500 H+B	Hazen	Colourless	Colourless	Agreeable	Agreeable
10	Odour	IS 3025 Part 5 : 1983	–	None	None	-	-
11	Turbidity	APHA 23rd Edition 2017 - 2130 B	NTU	0	0	1	5
12	Total Dissolved Solids	APHA 23rd Edition 2017 – 2540 C	mg/L	93	322	500	2000
13	Conductivity	APHA 23rd Edition 2017 – 2510 B	µS/cm	141	487	-	-
14	P – Alkalinity	IS 3025–Part 23-1983	mg/L	0	0	-	-
15	Calcium	APHA 23rd Edition 2017 – 3500 Ca B	mg/L	7	53	75	200
16	Magnesium	APHA 23rd Edition 2017– 3500 Mg B	mg/L	3	9	30	100
17	Sodium	APHA 23rd Edition 2017 – 3500 Na B	mg/L	15	33	-	-
18	Potassium	APHA 23rd Edition 2017 – 3500 K B	mg/L	6	5	-	-
19	Iron	APHA 23rd Edition 2017– 3500 Fe B	mg/L	0.12	0.24	0.3	1
20	Manganese	APHA 23rd Edition 2017 – 3500 Mn B	mg/L	0.00	0.00	0.1	0.3
21	Ammonia	APHA 17th Edition-1989– 4500 NH3C	mg/L	0.08	0.12	0.5	0.5
22	Nitrite as NO_2	APHA 23rd Edition 2017– 4500-NO2 B	mg/L	0.01	0.03	-	-
23	Total Phosphate as PO4	APHA 23rd Edition 2017 – 4500 P- D	mg/L	0.10	0.20	-	-
24	Tidys	APHA 23rd Edition 2017 – 4500 O - B	mg/L	0.28	0.32	-	-
25	Residual Chlorine as RC	IS / APHA	mg/L	0	0	0.2	0.2
				45895	45897		
26	Feacal Coliform	IS / APHA	CFU / 100 ml	40	200	0	0

Remarks : The above water sample confirmed to IS 10500-2012. Drinking water specification with respect to above tested parameters. 45595 & 45597 : The water is bacteriologically unsafe.

.....End of the report.....

30.1.23
Authorised Signatory
B.Hari Govind - Assistant Executive Engineer

Note:
1. The test results relate only to the items tested.
2. The test report shall not be reproduced anywhere except in full and in the same format without the permission of the laboratory.
3. Unless informed by customer, the test items will not be retained for more than 15 days from the date of issue of the test report.
4. The Result apply to the sample as Received.

TAMILNADU WATER SUPPLY AND DRAINAGE BOARD

DISTRICT WATER TESTING LABORATORY

Asaripallam Medical College Road, Post Office Upstair,
Asaripallam – 629201
Phone: 04652 - 238315 E-mail:jwalabngl@gmail.com

TEST REPORT

Doc.No: DWTL/FORM/7.8/01

Test Report No: 45894-45897	Report Issue Date :	30.01.2023
Invoice Details: 9803/ Dt.19.01.2023		

Customer Name & Address Contact No / Email.ID	: The Principal, Holy Cross College, Kurusady, Konam Post. Nagercoil
Sample Name	: Water
Sample Description	: R.O. Water, Panchayat Water - Drinking Purpose
Sample Submitted by	: Customer
Location & Date	: Office Near, Holy Cross College
Quantity of sample Received	: 2 Litres
Sample Container	: PT Cane
Sample Condition on Receipt	: Good
Sample Received On	: 19.01.2023
Test Commenced on	: 19.01.2023
Test Completed on	: 30.01.2023
Environmental Condition	: 24.5° C

S.No	Parameters	Test Method	Unit	Result		Specification as per IS 10500 : 2012	
				45894	45896		
1	pH	IS 3025 Part 11-1983	-	6.32	6.78	6.5-8.5	6.5-8.5
2	Total Hardness as CaCO3	IS 3025 Part 21-20009	mg/L	32	152	200	600
3	Total Alkalinity	IS 3025–Part 23-1986	mg/L	36	60	200	600
4	Chloride as Cl	IS 3025-Part 32-1988	mg/L	58	110	250	1000
5	Sulphate as SO4	IS 3025-Part 24-1986	mg/L	6	10	200	400
6	Nitrate as NO_3	APHA 23rd Edition 2017– 4500 –NO3 B	mg/L	Less than 2	2	45	45
7	Fluoride as F	APHA 23rd Edition 2017 – 4500- F-D	mg/L	0.2	0.2	1.0	1.5

30.1.23

Authorised Signatory
B.Hari Govind - Assistant Executive Engineer

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4. The Result apply to the sample as Received.

S.No.	Description	Quantity				Unit
		2019-2020	2021-2022	2022-2023	2023-2024	
1.	Biomass generation	1	1.5	2	2	kg/day
2.	RO water / Drinking water usage per day	2500	2500	2500	3000	l/Day
3.	Water usage in the College	41000	45000	51000	52000	l/Day
4.	Water usage per stakeholder in the Hostel	17	19	19	20	l/Day
5.	Waste water generation - College	1250	7100	15000	12000	l/Day
6.	Water usage in the Hostel	11500	19500	27900	23000	l/Day
7.	Water usage per stakeholder in the hostel	100	112	126.8	130	l/Day
8.	Waste water generation - Hostel	11000	19000	22400	22500	l/Day
9.	Waste water recycled in College	1200	7000	14500	11500	l/Day
10	Waste water recycled in Hostel	10550	18950	20200	22250	l/Day
11	Water conservation	38000	44250	50000	51000	l/Day

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12.	Waste water recycled through ETP plant	-	-	-	2000	l/Day
13.	Rainwater harvest area covered in College	146.37sqft	146.37sqft	146.37sqft	156.37sqft	sqft
14.	Rooftop area of Rainwater collection	1922.22 lakh	1922.22 lakh	1922.32 lakh	1922.72 lakh	Sq.m
15.	Medicinal plant area inside the campus	2021sqft	2021sqft	2021sqft	2021sqft	sqft
16.	No. of trees present inside the campus	900	1925	2940	2952	
17.	Tree plantation - outside the campus	75	140	175	350	

9.2 ENERGY USE AND CONSERVATION

- **ELECTRICAL ENERGY CONSUMPTION IN THE COLLEGE AND HOSTEL**

TNEB Grid Electrical Energy Consumption: 2023-2024

Area	Service Line	Tariff	Unit Consumed
College LAB	7123014167	LM2B1	64696
College	7123014181	LM2B1	51435
Library	7123014166	LM51	2809
Sericulture	7123014335	LM61	94
College	7123014180	LM51	255

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College	7123014321	LM51	4868
Zoology	7123010534	LM51	2278
Hostel	7123014168	LM51	2480
Hostel	7123014169	LM51	330
Hostel	7123014170	LM51	12772
Hostel	7123014171	LM51	14730
Total			156747

Total Electrical Energy consumption in the College & Hostel -156747 unitsElectrical Energy consumption per stakeholder per year – 70.5 units

Diesel Electrical energy consumption

Diesel generators are used in both college and hostels.

ELECTRICAL ENERGY CONSUMED(based on de	**DIESEL in Liters**	**UNITS**
Hostel	45L	135
College	540L	1620
Total	585L	1755

Solar Electrical energy Consumption

Solar panel Installed capacity -19 KW

Solar energy generation from solar power plants- 7.6 units/day

Sl. No	Solar panel Capacity KW	Solar Power Generation Units/yr
1	19	28433.5

Solar street light

No of Solar Street lights- 17

50 W lights- 17 nos

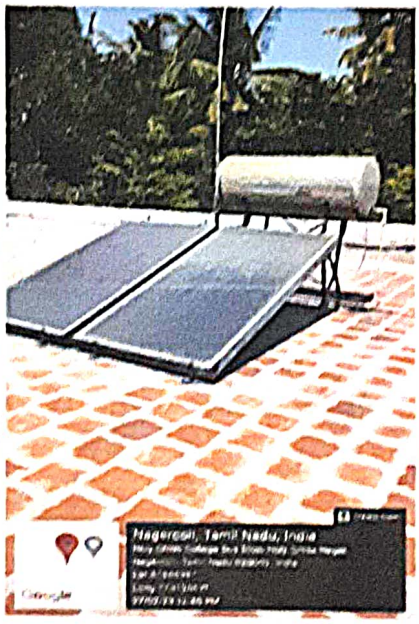
Solar power generation and utilized from all the street lights- 33915.5 units/yr

Solar water heater

200L

Grid electrical energy (equivalent) saved due to Solar water heaters is 3000 units/year

Source	Energy consumption -unit
Solar power plant	28433.5
Solar street light	2482
Solar water heater	3000
Total	33915.5



FUEL CONSUMPTION

LPG

For cooking LPG gas is used in the hostels & College canteen and for heating in the lab

LPG cylinders used- commercial cylinders of 19 kgs capacity

- Total LPG consumption during the year 2023-2024- 140*19 Kg= 2660 Kgs

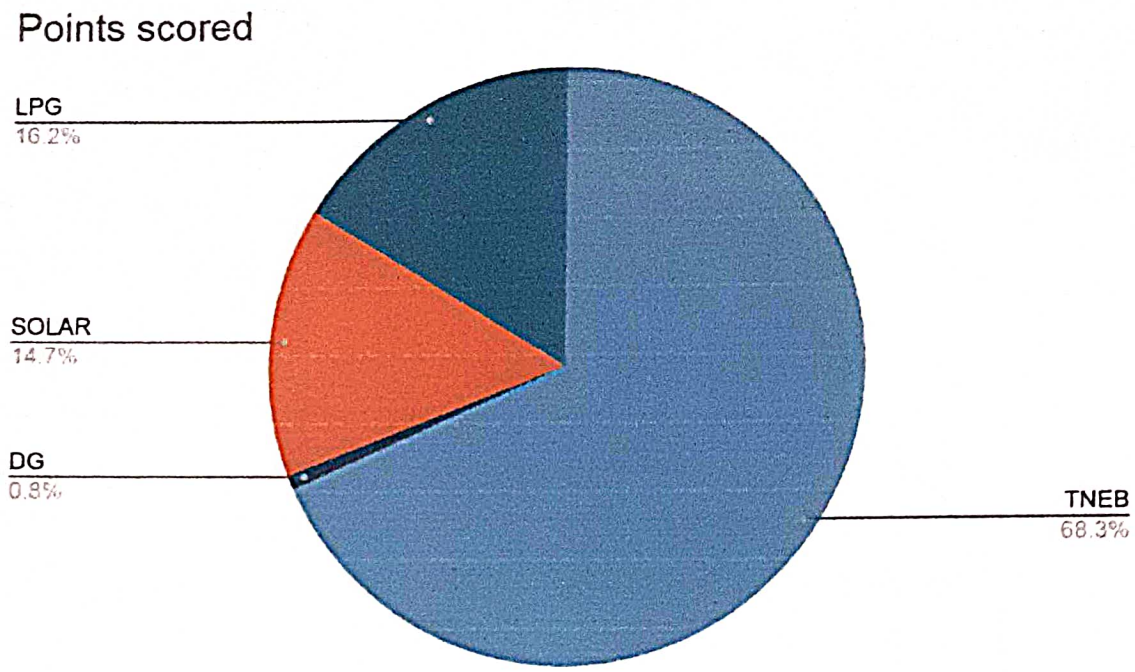
Bio Gas

A biogas plant is constructed in the campus with the capacity of 3 M3

Total biogas consumed = 3M3 * 220 = 660 m3/yr

Total Energy consumption Electrical (Conventional & Renewable) and Thermal(Conventional & Renewable)

Sl.no	Type of energy	Energy -GCAL	%
1	TNEB electrical energy	134.8	68.3
2	DG electrical energy	1.5	0.8
3	Solar electrical energy	29.1	14.7
4	LPG	32	16.2
	Total	197.4	100



The energy conservation measures followed

- The fans, lights, air-conditioners and other electronic and electrical equipment are switched off when not in use.
- Computers are switched to sleep mode or hibernate mode automatically when not in use.
- Electrical equipment like CROs, Oscillators, Sodium lamps are switched off in the laboratory when the students complete their observations.
- At the end of every practical session, Computer monitors and UPS are switched off.
- Periodical maintenance and overhauling of generators is being carried out.
- Soft copies are maintained instead of hard copies, to reduce power consumption and paper.
- Work supervisor and electrician regularly check the usage of lights, fans and all other energy sources during and out of the college hours.
- Staff and Students are made aware of vehicle pooling.
- Lights and fans are switched off by the students whenever they are out of hostel rooms

9.3 Waste Management and reduction

Liquid waste Management

- The treated filtered water is re-used for gardening purposes within the College campus.
- RO plants rejected are used for gardening purposes.
- The ETP plant is constructed.

Solid waste Management

- Glass wastes are disposed off periodically through the municipal waste collection system.

Biodegradable waste management

- Separate dustbins are kept to collect the waste food and used plates.
- BioDegradable and nonbiodegradable waste are collected in separate bins provided.
- Withered dry leaves are collected separately and dumped in the pits and converted into Biofertilizer by vermicomposting pits.

Plastic Waste Management

- Use of polythene bags, plastic cups and laminated papers are prohibited.
- Students and staff are advised to bring cloth bags
- All the stakeholders are motivated to use stainless steel water bottles and lunch boxes.
- Plastic utensils in the stores, canteen and hostel kitchen are replaced with stainless steel plates, tumblers etc
- Use of plastic folders for assignments and projects are prohibited.
- Plastic waste that comes in through lab equipment's package, empty chemical containers etc. are collected separately and disposed periodically for recycling.

E-Waste Management

- Most electronic machines are purchased under Buy-Back agreement and others were disposed off through authorised vendors.
- Have signed a MOU with the E-Waste service.

Hazardous Waste Management

- To get rid of toxic fumes in the Chemistry laboratory industrial exhaust fans are installed.

Waste Reduction

- Students are instructed not to waste paper while writing examinations.
- In order to reduce the use of paper the following initiative were taken
- Student admission-Attendance – Electronic Method
- Payment of fees- Through Bank net banking system
- Selection of elective courses through online mode
- Online assignments
- Submission of e-assignment through email
- Profile of staff and students are made online
- Office circulars through SMS, WHATSAPP or Email
- Online Admission Process – Printing of applications reduced & submission of applications through admission portal.
- All inter department communications are through intranet
- Online exams are conducted to reduce paper usage.
- Library accessibility through library smart card.

Classification of Waste Generated

S.No.	Place in the College	Waste generated (kg/day)		
		Biodegradable (kg/day)	Non-Biodegradable (kg/day)	Hazardous (ml)
1.	Office	< 0.25	< 0.1	-
2.	Labs	< 0.5	< 0.5	-
3.	College Canteen	2	< 0.5	-
4.	Hostel	4	<1	-
5.	Open Area	11	-	-

Waste Generation

S.No.	Type of waste	Waste generated	
1.	Solid (kg/day)	Food	11
		Plastic	2

		Paper	5.3
2.	Liquid (kL / day)	In the College	24
		In the hostel	18

An active Waste Management Service Agreement is made with the Service Provider in Nagercoil to safely dispose paper, cardboards and plastic wastes.

Bio-gas Plants

Two bio gas plants have been installed in the College premises with the capacity of 6 cubic meters each. The feeders for the bio gas plants consists of cow dung from the cows of the small diary unit, food waste and other degradable solid waste. 10 cubic meter capacity bio gas plant will produce 5 cubic meter bio gas per month. If this is converted into LPG cylinder, the monthly equivalent of LPG to bio gas is 10 LPG cylinders with 14.2 Kg. capacity. Based on this calculation, one 6 cubic meter bio gas plant produces 6 LPG cylinders of 14.2 Kg. per month and the annual production of LPG cylinder equivalent per plant is 72 LPG cylinders. Thus the two bio gas plants produce 144 LPG equivalent of bio gas.

FORMULA TO CALCULATE CARBON EMISSION BY LPG

LPG: Input Value (in Kg./Yr) X 2.983 (Emission Factor) = Output value (in Kg. of CO2). Based on this formula, the carbon emission from LPG cylinder equivalent of two bio gas plants is calculated below:

Bio gas plants 2 (12 cubic meters @ 6 cubic meter each)

(144 LPG X 14 Kg.) x (2.983 Emission Factor) = 6013.7 Kg. of CO2

Total reduction of Carbon Foot Print per year through two bio gas units is 6013.7 Kg. or 6 tons of CO2.

Solid Waste Management and CO2 Reduction

Solid waste management is not restricted to maintain environment hygiene alone. Nowadays environmental scientists are focusing their attention to the proactive role of solid waste management in reducing the carbon foot print in the atmosphere.

The CO2 reduction in the atmosphere through solid waste management is based on three calculations. They are:

1. Conversion of solid waste into organic fertilizers and measured in Kilograms or Tons.
2. Coal required to produce the same quantity of ammonia or urea.
3. CO2 emitted by coal into the atmosphere.

The compostable solid waste is collected through the following procedures. In each class room one dust bin is placed to collect the solid waste and in the campus 20 big dust bins are placed. Average amount of degradable waste produced per day is 300 Kg. The biodegradable wastes are used to produce organic fertilizer and vermicompost.

In this regard, five decomposing pits had been dug in the campus with the following specifications:

Capacity of the decomposing pits – 10 x 10 x 4' – 1

10 x 10 x 2' – 2

10 x 7 x 2′ - 1

26 x 10 x 8′ - 1

Amount of Biodegradable waste used to produce organic fertilizer - 54 tons/year

Amount of organic fertilizer produced - 12 tons/year. Number of vermicompost tanks in the campus - 8 Capacity and number of tanks

8 x 5 x 2′ - 3

11 x 4 x 2′ - 1

10 x 4 x 2′ - 4

Quantity of organic waste used for vermicomposting - 20 tons/year

Quantity of vermicompost produced - 4 tons/year

Total quantity of organic fertilizer and vermicompost per year (12+4) = 16 tons 1.7 tons of coal is required to produce 1 ton of ammonia or urea. The assumption is that one ton of organic fertilizer/vermicompost almost equals one ton of ammonia or urea in providing plant nutrition. Therefore, at this rate, 16 tons of ammonia requires (16x1.7) = 27.2 tons of coal. As one ton of coal emits 2.86 tons of CO2, if burned, the quantity of CO2 emitted by 27.2 tons of coal is (27.2 x 2.86) = 77.8 ton CO2.

This is the positive contribution of Carbon Foot Print reduction through solid waste management by Holy Cross College.

Liquid waste management

Waste water Recycling System

An Effluent Treatment Plant (ETP) is installed in the College Campus , which is a specialized facility designed to treat and purify industrial wastewater before its safe discharge into the environment. Its capacity is 2000 litres.

ETPs employ various physical, chemical, and biological processes to remove contaminants, ensuring compliance with environmental regulations and minimizing negative impacts on ecosystems and public health.

Oxidation pond

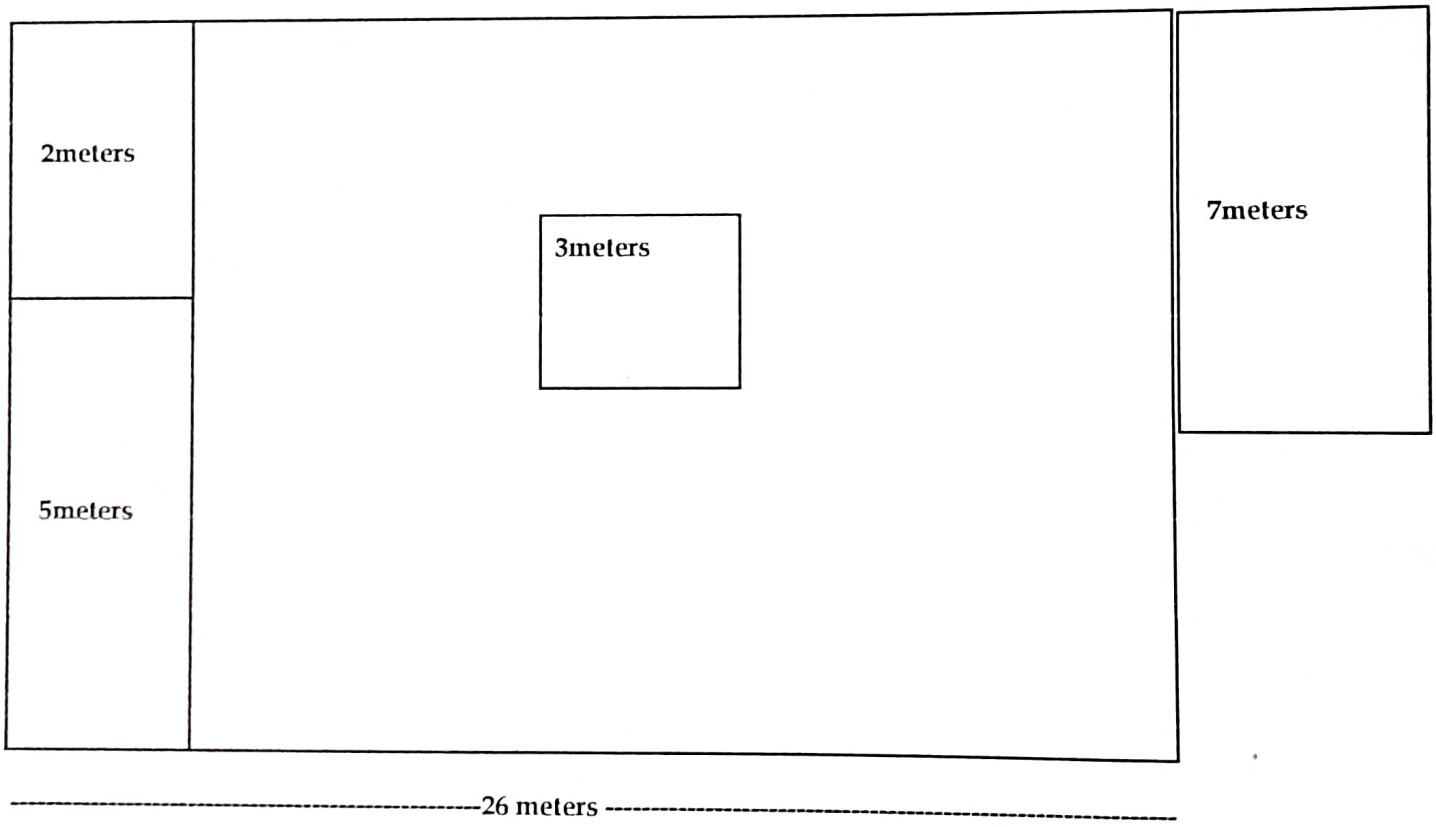
Wastewater treatment is a crucial process that ensures the safe disposal of waste materials into the environment. Oxidation ponds, also known as stabilization ponds or lagoons, are one of the most cost-effective and efficient methods of treating wastewater, especially in areas with ample land and sunlight.

The process of biological oxidation in these ponds is facilitated by two main types of microorganisms: aerobic bacteria and algae. Aerobic bacteria consume organic matter in the wastewater and produce carbon dioxide. This carbon dioxide is then used

by algae for photosynthesis, which in turn produces oxygen. The oxygen is then used by the bacteria to continue the process of breaking down the organic matter, thus creating a symbiotic relationship.

Waste Water from the hostel is redirected to the Oxidation pond and the pH level of the water treated is found to be 7. Oxidation ponds offer several advantages over other wastewater treatment systems. They are cost-effective, require low energy input, and have low maintenance requirements. They are also capable of treating a wide range of pollutants, including organic matter, nutrients, and pathogens. Daily water is recycled. During Semester holidays also the Oxidation Pond is maintained. The Botany and Zoology Department Gardens are benefitted.

OXIDATION POND



E-waste Management

The Memorandum of Understanding is signed between Vilraay Computers, Nagercoil and Holy Cross College (Autonomous), Nagercoil on 11th April 2022. The sole purpose of this MOU is to dispose the non-degradable e-waste of Holy Cross College Campus as the scrap and the payment will be settled before handing over. The period of agreement is from 11-04-2022 to 31-3-2025.

9.4 GREEN BELT AREA & BIODIVERSITY

The Green Belt Area is meant for conservation of nature and aesthetic value of the college premises. The Green Area in the college includes the plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards This also helps in ensuring that the Environmental Policy is enacted, enforced and reviewed using various environmental awareness programmes.

OBSERVATIONS

The eco-friendly ambience of the campus is a noteworthy feature of Holy Cross College(Autonomous),Nagercoil. Green belt is developed in all possible open areas and is being converted into greenery Green belt is developed in 20 acres area.The Green campus drive is an initiative of the College to protect the environment. Environmental awareness rallies are conducted regularly to spread the message of environment preservation. R/D on increasing the efficiency of vegetation in plants has been done by spraying the fertilisers on the surface of the plant instead of on the soil.

Flora in the Campus

Geographically important 140 trees are given QR codes.

S.No.	Full grown trees	Number
1.	Number of varieties of woody shrub species	54
2.	Total number of woody shrubs	618
3.	Number of varieties of climbing shrubs & lianas species	7
4.	Total number of climbing shrubs and lianas	30
5.	Number of varieties of succulent shrubs and trees species	7
6.	Total number of succulent shrubs and trees	11
7.	Number of varieties of trees species	116
8.	Total number of trees	2293
9.	Number of varieties of woody plants species	182
10.	Total number of woody plant species	2952

The biodiversity of Holy Cross College is as follows:

There is a rich flora and fauna in the Campus which balances the carbon footprint and establishes a pollution-free campus.

Among the Fauna, there are 36 species of butterflies, 36 species of ants, 69 species of arthopods and 9 species of centipedes.

CARBON FOOTPRINT REDUCTION IN THE ATMOSPHERE THROUGH FLORA

Carbon FootPrint is historically defined as "the total set of greenhouse gas emissions caused by an individual, event, organization or product expressed as carbon dioxide equivalent."

Calculation of carbon absorption by Flora in Holy Cross College

The floral status of the College

Table I

S.No.	Particulars	Sq.m
1.	Green area (bushy plants and grass)	69798
2.	Areas of grass land/lawns	9,196

560 to 700 fully grown trees shall be raised in one acre of land. This depends on the type of soil, the species and spacing. However, with the normal spacing of 6x10 feet, the total number of trees shall be taken up as 600/acre. However, an approximate survey of the number of flora in the area is taken by the Department of Botany and the Green Audit Team members.

Table II

S.No.	Floral Status	Number/Area
1.	Total number of fully grown trees	2952
2.	Total number of semi grown trees	3405
3.	Total number of bush/shrub /grassy plants	69,79,800
4.	Total number of ornamental plants	9558
5.	Grass lawn	9196 sq. mt

Table III

S.No.	Full grown trees	Number
1.	Number of varieties of woody shrub species	54
2.	Total number of woody shrubs	618
3.	Number of varieties of climbing shrubs & lianas species	7
4.	Total number of climbing shrubs and lianas	30

5.	**Number of varieties of succulent shrubs and trees species**	**7**
6.	**Total number of succulent shrubs and trees**	**11**
7.	**Number of varieties of trees species**	**116**
8.	**Total number of trees**	**2293**
9.	**Number of varieties of woody plants species**	**182**
10.	**Total number of woody plant species**	**2952**

Plant/tree calculator methods employed

It is very difficult to categorize fully grown and semi grown trees and work out a universal formula to measure carbon absorption and oxygen emission. This difficulty is caused by canopy cover of each tree which subsequently is determined by the circumference of the trunk, number of branches, sub branches and foliage sprouting from the sub branches. Hence, we have adopted the universally recognized criteria to enumerate fully grown and semi grown trees. Trees with a life span of above ten years and with more than ten main branches shall be categorized as fully grown trees and one acre of land shall accommodate 700 such trees. Trees with more than ten years life span but without branches or trees having life span of less than five years with branches shall be categorized under semi grown category.

Another problematic area is enumeration of bushy plants in a given area. Here too different tools are employed for different geographical regions such as hilly areas and forests where wild bush plants and grasses jostle together without respecting scientific calculation of spacing. But here we are calculating the bush plants and grasses in the controlled plot, i.e. college campus. Hence the following formula is taken up for enumeration of bush plants per square meter.

The number of plants was taken and multiplied by 100 and divided by the seed row spacing in cm to get plants per square metre. For example, 25 plants per metre multiplied by 100 then divided by 25 cm (10" row spacing) is 100 plants per square metre. If we take up this formula to enumerate the total number of bush plants in 69,798 square meters, then the total number of bush plants in the campus is 69,79,800 or about 6.9 million plants.

TOOL TO MEASURE CARBON ABSORPTION

ASSUMPTION

One fully grown large tree with a wide canopy cover inhales 20 Kg. carbon dioxide per year and exhales equal amounts of oxygen. Such trees are quite often found in the forests. In households and educational institutions, large canopy covers are pruned to accommodate smaller revenue earning trees and plants. Hence it is appropriate to adopt the following formula to calculate carbon absorption. This formula was arrived at through controlled plot field experiment methodology conducted in the USA. Many variables, say road condition, type of car and carbon emission as per US standards, absence of traffic congestion etc. played key roles in arriving at 20 KM per litre. This need not be taken as standard unit of measurement of fuel/ mileage ratio discussed in page 19 where the average distance covered by Indian cars under local road conditions and traffic congestion is worked out at 12 KM/ litre petrol

1.Average number of mature trees in one acre is 700.

2.Carbon absorption capacity of 700 trees is equivalent to carbon emitted by a speeding car travelling for 41,843 Km.

3.Average kilometre covered by a car per litre of petrol is 20 Km.

4.Total quantity of petrol consumed by the car for travelling 41,843 Km is 2092 litres.

The carbon emission for a litre of petrol is 2.3 Kg. of CO2. At this rate, the total quantity of carbon emitted by 2092 litres of petrol is 4812 Kg. of CO2 or 4.8 tons of CO2. Hence the carbon absorption of one fully grown tree is 4812/700 = 6.8 Kg. of CO2. The carbon foot print calculation is based on the standard unit of one litre petrol = 2.3 Kg. of CO2.

CARBON ABSORPTION OF FLORA IN THE INSTITUTION

Carbon absorption of one fully grown tree = 6.8 Kg. of CO2.

1.Therefore, the carbon absorption of 2952 fully grown trees in campus of the institution is (900 x 6.8 Kg. CO2) = 20,073 Kg. of CO2 or 20 tons of CO2.

2.At this rate, the carbon absorption of 5,420 semi grown trees is half or 50% of the carbon absorption capacity of fully grown trees. Hence the carbon absorption is (5,420 x 3.4 Kg. of CO2) = 11,577 Kg. of CO2 or 11.5 tons.

3.The total ornamental plants raised in pots and garden are 9558 . Apart from that approximately 69,79,800 bushy plants and wild grasses have been raised by Nature with very small intervention by the College authorities. We prefer to name them as gift of Nature. This is based on the standard bushy plant counting formula mentioned above.

4.Carbon absorption of plants, bushes and shrubs vary widely according to the species, genus and family. Certain bush plants absorb as high as 49,000 grams CO2 per plant whereas some other bush plants absorb as low as 150 g of CO2 per plant. It is very difficult to measure specifically the carbon absorption and oxygen emission of each family of plants and grasses. Therefore, in consultation with environment scientists, it is fixed that carbon absorption per plant is 200 gm. per plant/year.

5.Based on this, the total carbon absorption of 9558 ornamental plants is calculated as 9558 x 200 gm. = 1,911,600 gram or 1,911 Kg. If it is converted into tons, it is 1.9 tons of CO2.

6.It is enumerated that 69,79,800 wild bushy plants and grasses are raised by Nature in the 69,798 square meter area. It is not possible to apply the formula used to measure the carbon absorption of Buffalo or Mexican variety of grass lawns in this case. Hence the above 200 gm./plant capacity is taken up to calculate the carbon absorption of 69,79,800 bushy plants. Thus (69,79,800 x 200) = 139, 59, 60,000 grams or 13, 95,960 Kg. If it is converted into tons it is 1,395 tons of CO2.

7.The grass lawns account for 9,196 square meters of land. The lawns have different measurement tool for carbon absorption and oxygen emission. One square meter of grass lawn absorbs one gram of CO2. An active person exhales about one Kg. CO2 per day. Hence 1000 square meter lawn is required to absorb one Kg. CO2 per day. At this rate, 9,196 square metre of lawn absorbs 9 Kg CO2 per day. The annual carbon absorption of 9,000 square metre lawn is 9 Kg x365 = 3,285 Kg or 3.3 tons.

8.The grant total of carbon absorption of the flora in the campus of Holy Cross College in tons is (20 +11.5 + 1.9 + 1,395 + 3.3) = 1,431 tons and 700 Kg.

This is the sink effect of the Flora in the campus and the proactive Carbon FootPrint reduction measures.

TOOL TO MEASURE OXYGEN EMISSION BY FLORA IN THE INSTITUTION

According to the Arbor Day Foundation, "A mature leafy tree produces as much oxygen in a season as 10 people inhale in a year." The air that is inhaled is about 20-percent oxygen, and the air that is exhaled is about 15-percent oxygen, so about 5-percent of the volume of air is consumed in each breath and converted to carbon dioxide. Therefore, a human being uses about 550 litres of pure oxygen (19 cubic feet) per day.

Calculation of oxygen emission by flora

The number of litres in 1 kilogram depends on the density of the substance being measured. The litre is a unit of volume, and the kilogram a unit of mass. Litres and kilograms are approximately equivalent when the substance measured has a density close to 1 Kg. per litre.

"On an average, one fully grown tree produces nearly 260 pounds or 117.6 Kg. of oxygen each year.

Total mass (Kg.) of oxygen emitted by 2952 fully grown trees per year is (117.6x 2952) = 3,47,155 Kg. of O2 or 347.1 tons of oxygen

1. Total oxygen emitted by semi grown trees (3405 × 58.8) = 2, 00,214 Kg. of oxygen or 200.2 tons.

2. Total oxygen emitted by 69, 79,800 (69, 79,800 wild bushy plants + 9558 ornamental plants in pots and in garden) bushy plants is calculated on the basis of oxygen inhaling requirement per person/day. One normal human being requires 550 litres of oxygen per day to avoid airlock. 400 bush plants produce enough oxygen per day to enable a person to breathe an adequate quantity of oxygen. Total quantum of oxygen produced by 400 plants per day is 550 litres of oxygen.

3. If we take 400 plants as one unit, then the number of units of bush plants in the campus is (69,79,800/400) = 17,449 units. Total quantity of oxygen produced by 17,449 units is (17,449 x 550 litres) = 95, 96,950 litres of oxygen per day or 9596 tons. The annual production of oxygen at this rate is (9596 tons x 365) = 35, 02,540 tons of oxygen.

4. The grass lawns are incredible oxygen-making machines. A 25 sq. ft. area will supply enough oxygen to support one person for a day. In other words, quantitatively speaking, a 25 square foot area of grass produces 550 litres of oxygen per day. Hence, we take a 25 square foot area as one unit which is equivalent to 550 litres of oxygen.

5.Total area of grass land is 9,196 sq. mt. or 98,984 sq.ft. If we calculate units it is 98,984/25 = 3,959 units which produces (3,959 x 550 litres of oxygen) = 21,77,450 litres of oxygen per day. Total quantity of oxygen produced per year is 21,77,450 x 365 = 79,47,69,250 litres of oxygen. If it is converted into tons, it stands at 7,94,769 tons of oxygen.

Table IV

S.No.	Types of Trees/Plants	Oxygen in tons
1.	2952 fully grown trees	347.1
2.	3405 semi grown trees	200.2
3.	69,79,800 bushy/ornamental plants	35, 02,540
4.	98,984 sq. ft. of grass lawns	7,94,769
	Total	42,97,856.3

Carbon footprint

A carbon footprint is the total amount of greenhouse gases (including carbon dioxide and methane) that are generated by our actions.

t CO_2 e stands for tonnes (t) of carbon dioxide (CO_2) equivalent (e)

S.No.	Parameters	Carbon footprint measurement in terms of GHG emission (CO_2 e) kg			
		2021-2022	2022-2023	2023-2024	
1.	Green House Gas emission due to diesel	57271.5	58953.6	79392.4	
2.	Green House Gas emission due to petrol	23151.6	24957	32398	

3.	Green House Gas emission due to LPG	33045.18	35347.9	8059.8
4.	Green House Gas emission due to Grid power	97142.49	107691.1	126965
5.	Green House Gas emission due to biomass	-	-	7200
6.	Total GHG emission	210610.7 kg = 210.61 t	226949.6 kg = 226.9 t	254015 kg= 254 t
7.	Total Green House Gas reduction	10.23 t	10.23 t	28.6 t
8.	Net Green House Gas emission	210.61-10.23= 200.38 t	226.9- 10.23 = 216.67 t	254 – 28.6 = 225.4 t

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Reduction in CO2 emission due to Shuttle Free Day

S.No.	Parameters	Carbon footprint measurement in terms of GHG emission ($CO_2 e$) kg		
		2021-2022	2022-2023	2023-2024
1.	Green House Gas emission due to diesel	57271.5	58953.6	79392.4
2.	Green House Gas emission due to petrol	23151.6	24957	32398
3.	Total GHG emission per year (approximately for 192 working days)	80423.1	83910.6	111790.4
4.	Total GHG emission per day	418.87031	437.034375	582.24166
5.	Reduction in CO2 emission due to Shuttle Free Day	418.87031 kg CO2 e (0.52 %)	437.034375 kg CO2 e (0.52 %)	582.24166 kg CO2 e (0.52 %)

Carbon footprint

Release of carbon dioxide into the atmosphere contributes to global warming and increases the pace of climate change. More trees in the campus will make a source of sink for the carbon dioxide and for other greenhouse gases.

- Diesel consumption by college buses/auto per year- 29150 L
- Diesel consumption by DG sets in the college/hostel – 585 L
- Total Diesel Consumption- 29735 L
- Radius of Nagercoil town- 10 KM
- Average distance traveled by staff and students per day 15Km
- No of four wheelers being used by students and staff - 20
- No of two wheelers being used by students and staff - 226
- College working days during the year 2023-2024: 192 days
- Average Fuel efficiency of four wheelers – 20 KM/ L
- Average Fuel efficiency of two wheelers - 60 KM/ L
- Average Petrol consumption by four wheelers -2880 L
- Average Petrol consumption by two wheelers- 10848 L
- Total Petrol consumption-13728 L
- Total LPG consumption(Hostel & canteen & College) per year- 2660 Kg
- Total Biogas consumption per year- 660 m3/yr
- Total electrical power consumed from Grid- 156747 units

- GreenHouse Gas emission due to diesel 79392.4 Kg CO2 e
- GreenHouse Gas emission due to petrol 32398 Kg CO2 e
- GreenHouse Gas emission due to LPG 8059.8 Kg CO2 e
- GreenHouse Gas emission due to Grid power 126965 Kg CO2 e
- GreenHouse Gas emission due to Biomass 7200 Kg CO2 e
- Total GHG emission 254015.25 Kg CO2 e

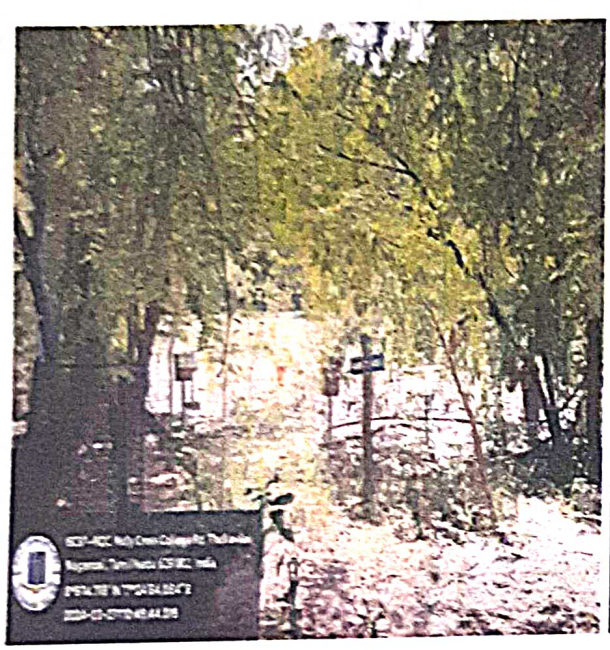
254 t CO2 e

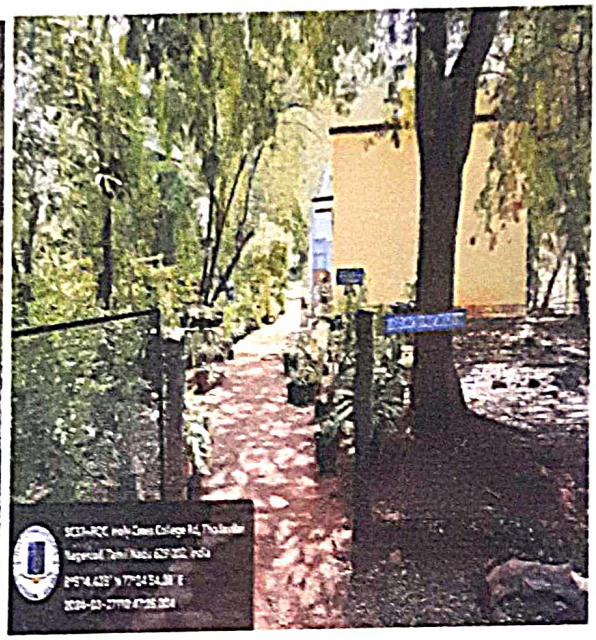
GreenHouse Gas Reduction

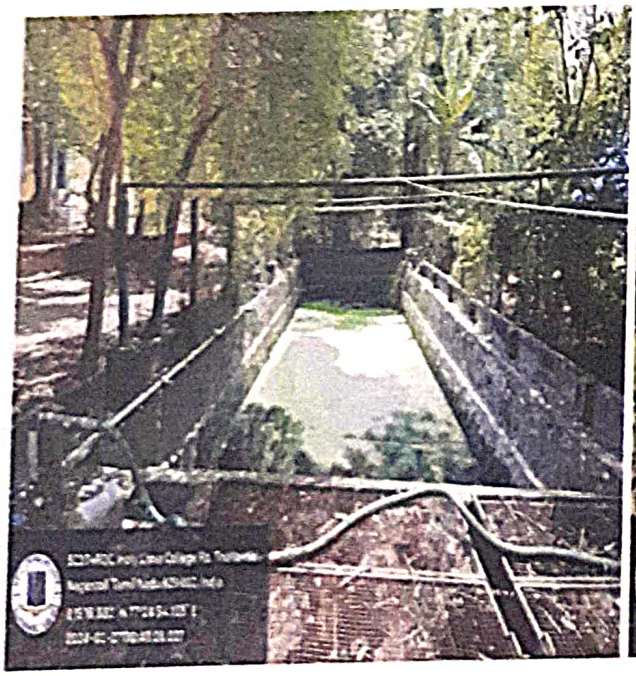
- GreenHouse Gas reduction due to Solar power 28.6 t CO2e
- Net GHG Emission (254-28.6) 225.4t CO2 e

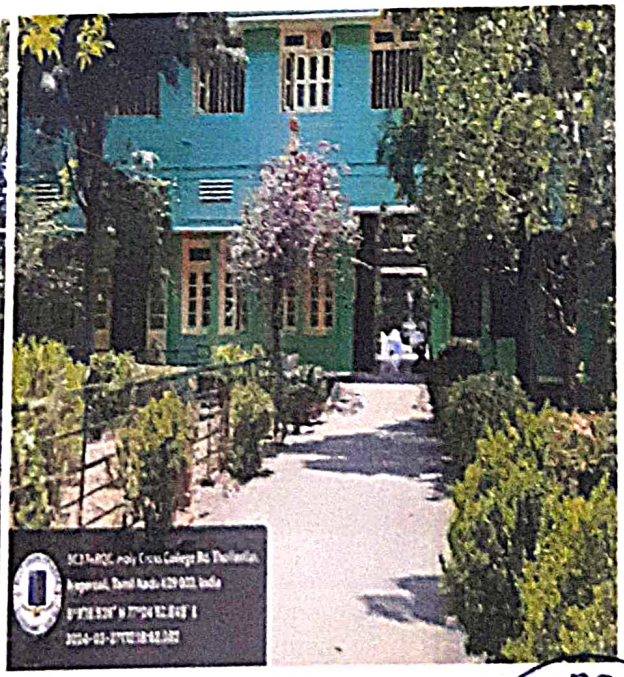
9.5 ENVIRONMENTAL AWARENESS INITIATIVE

Holy Cross College(Autonomous).Nagercoil conducts regular training to staff and faculties regarding use of bicycles, controlled use of paper, plantation target and implementation. Display of environment protection banners, posters like save water, save energy at prominent places, waste disposal bins for wet and dry waste disposal bins for wet and dry waste disposal are some of the initiatives taken.









10. RECOMMENDATION

- Environmental parameters shall be included in purchase policy to achieve a cradle to grave approach for sustainability.
- Increase the capacity of solar PV so that it can fulfil at least 70% of the electricity requirement
- A Water flow Metre should be installed at every building of the institute for monitoring of water consumption per capita.
- Increase plantation drives in nearby villages, local bodies, NGO and Municipal Corporation in order to balance the carbon emission and absorption.
- Arrange training programmes on environmental management systems and nature conservation for schools and local people.

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