



Jyothi Engineering College

NAAC Accredited College with NEER Accredited Programmes*

Approved by AICTE & affiliated to APJ Abdul Kalam Technological University

A CENTRE OF EXCELLENCE IN SCIENCE & TECHNOLOGY BY THE CATHOLIC ARCHDIOCESE OF TRICHUR

JYOTHI HILLS, VETTIKATTIRI P.O., CHERUTHURUTHY, THRISSUR, PIN-679531 PH: +91-4884-259000, 274423 FAX: 04884-274777



NBA accredited B.Tech Programmes in Computer Science & Engineering, Electronics & Communication Engineering, Electrical & Electronics Engineering and Mechanical Engineering valid for the academic years 2016-2022. NBA accredited B.Tech Programme in Civil Engineering valid for the academic years 2019-2022.

REPORT

ON

CARBON STUDY

FOR

JYOTHI ENGINEERING COLLEGE, THRISSUR

1. Introduction

This carbon footprint report has been prepared in full accordance with the Greenhouse Gas Protocol (GHG), the most widely used international carbon calculation methodology, compatible with other GHG standards such as the ISO 14064, which also allows for direct integration with national and international greenhouse gas (GHG) registries.

The carbon footprint gives a general overview of the possible greenhouse gas emissions from the institution, converted into CO₂ -equivalents and it is based on reported data from internal and external systems. The purposes of the carbon indicators are to measure the carbon intensity per unit of product, in addition to showing environmental transparency towards external stakeholders.

2. Methodology

The carbon footprint reporting approach undertaken in this study follows the guidelines and principles set out in the "Greenhouse Gas Protocol Corporate Accounting and Reporting Standard" (hereafter referred to as the GHG Protocol) developed by the Greenhouse Gas Protocol Initiative and international standard for the quantification and reporting of greenhouse gas emissions -ISO 14064. This is the most widely used and accepted methodology for conducting corporate carbon footprints.

This involves accounting for, and reporting on, the GHG emissions from all those activities for which the institution is directly responsible. The items quantified in this study are as classified under the ISO 14064 standards: This includes electricity, LPG consumption as well as emission associated with diesel consumption in the institute vehicle. Emissions from business activities are generally classified as scope 1, 2 or 3 areas classified under the ISO 14064 standards.

Scope 1: Direct emissions (mandatory reporting)

This level concerns all emissions from sources owned or controlled by the JEC. Scope 1 includes All direct emissions from the institution owned or controlled sources, such as institute vehicles, and heat generation (LPG). The study has made all efforts possible to use the best available emissions factors available at the time and has cited the source of all emission factors used.

There are three Tiers presented in the 2006 IPCC Guidelines for estimating emissions from fossil fuel combustion. The study has considered Tier 1 method. The Tier 1 method is fuel-based since emissions from all sources of combustion can be estimated on the basis of the quantities of fuel combusted (usually from national energy statistics) and average emission factors.

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The quality of these emission factors differs between gases. For CO₂, emission factors mainly depend upon the carbon content of the fuel. Combustion conditions are relatively unimportant. Therefore, CO₂ emissions can be estimated fairly accurately based on the total amount of fuels combusted and the averaged carbon content of the fuels. Hence, for CO₂ in general, a Tier 1 method based on fuel carbon and fuel amount used will often suffice and the same approach is used in the report for calculating the GHG emissions from the combustion of fuels.

The activity data for calculating the GHG emissions is the amount of fuel combusted. The direct measurement has been used as the preferred method for the data collection of fuel combusted to calculate the emissions so as to reasonably minimize the uncertainty. When there is no accessibility to the direct measurement, emissions have been calculated through the application of documented models or facility specific correlation or through the mass balance approach.

Scope 2: Indirect emissions (mandatory reporting)

This level concerns all emissions from purchased energy. This means the purchase of electricity from the KSEB (Kerala State Electricity Board) which is connected to the Indian Grid. The electricity CO₂ emission factor is calculated from the India electricity production mix, which is the suitable emission factor used for the Indian Grid.

Scope 3: Other Indirect Emissions

All other indirect emissions as a consequence of the activities of the institute that occur from sources neither owned nor controlled by the institution (e.g. outsourced distribution). Emissions covered under Scopes 1 and 2 are mandatory for reporting, while Scope 3 emissions can be reported on a voluntary basis.

Apart from the emissions from the institution, the possibilities of carbon sequestration by the vast area of college campus by soil and rich vegetation, is also explored in this carbon study.

3. Data Requirements and Emission Factors

The various data required and respective emission factors used in this study are shown in Table 1.

Table 1 Data Requirements and Emission Factors

Sl. No.	DATA		EMISSION FACTORS	
	Item	Unit of Data	Carbon equivalent	Unit
<i>Scope 1: Direct Emissions</i>				
1	Diesel Usage in Labs	litres of diesel/year	2.79	kg per litre
2	LPG (Hostels+ Canteen+Labs)	litre or kg of LPG / year	1.5	kg per litre
3	Incinerator	kg per year	1	kg per kg

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4	Transport			
	College Bus	disel fuel consumed / year	2.79	kg per kg
	HOD Van	Dist. travelled/ year	0.209	kg per km
	Other Adminstrative cars	Dist. travelled/ year	0.117	kgco2 per km
	Other Adminstrative bikes	Dist. travelled/ year	0.0542	kgco2 per km
	<i>Scope 2: InDirect Emissions</i>			
1	Grid Electricity	kW/year		
2	Solar Power	kW/year		
		Net	0.81	kg per kWh
3	Annual Consumption			
	Paper	kg per year	0.876	kg per kg
	Hostel Provisions for Food	No.of students plus other inmates	2.42	kg percapit per day
	<i>Scope 3: Other Indirect Emissions</i>			
1	Annual waste			
	Agricultural/garden	kg per year		
	Paper	kg of paper/year	0.21	kg per kg
2	Annual Purchases			
	Computer Accessories			D
	1. Computers	Number	660	kg per number
	2. Laptop	Number	260	kg per number
	Chemicals	kg per year	2	kg per kg
	Electronics and Electrical (Copper)	kg per year	2	kg per kg
	Engineering Workshops (Metal)	kg per year	2	kg per kg
3	Transport Other than College buses			
	Bike passes	Dist. travelled/ year	0.0542	kgco2 per km
	Car passes	Dist. travelled/ year	0.117	kgco2 per km
	Utility vehicles(Tempo, truck)	Dist. travelled/ year	0.5928	kgco2 per km
	Local Buses	pax. Dist. travelled/ year	0.015161	kgco2 per pax km

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The emission factors are deduced from the various secondary sources, reports and research papers. The institution has a solar power plant of 63 KW, which augments the energy needs in a sustainable way. The energy savings in this regard is assessed from an Energy audit conducted by an audited agency.

4. Conclusion

The total carbon emissions in Scope 1, Scope 2 and Scope 3 are estimated to be 329327 kg CO₂, 431353 kg CO₂ and 257744 kg CO₂ for the period April 2019 – March 2020. The total emissions of 1018424 kgCO₂ is expected to be generated by the institution accounting to about 0.63 tonnes per student on a per capita basis calculation.

The college campus spreading over 14.14 hectares of land diverse with rubber plantation, coconut plantation, trees and shrubs, potted plants and lawns is a potential source for carbon sequestration. The above ground biomass provided carbon are calculated with the help of carbon equivalency factors deduced from literature review. The below ground soil Carbon was estimated by Kerala Forest Research Institute by conducting carbon study on soil obtained from a set of sample test pits. The abundance of vegetation has elevated the chances of the institution to pose itself as a carbon neutral institution as the sequestered carbon is much more than the estimated carbon emission.

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14.01.2021

SOILS/STR/03/2021

Sri MG Cyriac
Jyothi Engineering College

Sir,

The submitted samples were analyzed and the carbon stocks assessed are given below

Site	Soil carbon stocks (t / Ha)
PIT 1 U	79.09
PIT 1 M	56.11
PIT 1 L	63.36
PIT 2 U	15.78
PIT 2 M	35.90
PIT 2 L	56.65

Yours faithfully

SANDEEP S.
Sr. Scientist, Dept. of Soil Science
KFRI, Peechi

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