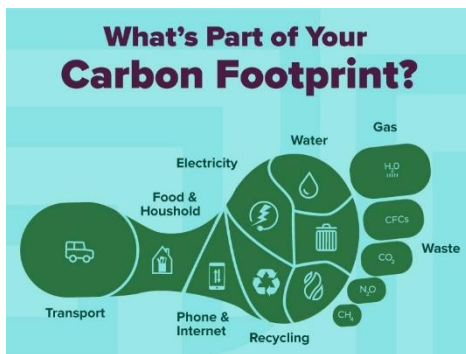


CARBON FOOTPRINT ASSESSMENT

TERI SAS Campus

(Nov 2022 – Oct 2023)



Study Undertaken by

Students of MSc-CSP (Batch 2023-25)

Guidance - Dr. Sapan Thapar, Associate Professor

Executive Summary

This report presents findings of a comprehensive carbon footprint assessment of TERI SAS Campus, for the period November 2022 to October 2023.

The total carbon emissions were estimated at 1,410 TCO₂eq. with key contributors as grid electricity, transportation and waste management. The share of Scope-1 and Scope-2 emissions came at 36% each, while Scope-3 emissions were estimated to be 28%.

Taking the total number of institution users to be 800 (students-700 and staff/ faculty-100), per capita emissions was 1.75 TCO₂eq, indicating a low-carbon campus.

The findings emphasize the need for targeted interventions, such as transitioning to renewable energy sources, promoting sustainable commuting and adopting effective waste management practices.

Objectives

- Evaluate GHG emissions associated with TERI SAS Campus
- Identify key emission sources
- Propose actionable recommendations to reduce emissions
- Findings to serve as a baseline for setting future targets
- Achieve more sustainable and eco-friendly campus

Introduction

This carbon footprint assessment covers a wide range of activities and operations within the University Campus for the period **November 2022-October 2023**.

Protocol

The study focused on emissions covering all the 3 scopes defined under the Greenhouse Gas (GHG) Protocol:

- **Scope 1:** Direct emissions from on-campus fuel combustion, institution-owned vehicles and equipment
- **Scope 2:** Indirect emissions from grid purchased electricity
- **Scope 3:** Other indirect emissions, including staff and student commuting, waste disposal and outsourced activities

Methodology

Steps

- Locating emission activities and placing them under different scopes
- Identification of data sources and emission factors
- Collection of data along with proofs
- Conduction of sample survey and data extrapolation

Calculation formula

Total emissions = Activity Data X Emission factor

Calculation Table

Scope	Activity data	Emission factor (EF)	Total emissions =Data*EF	Source of data
Scope 1	LPG for cooking - 20 cylinders per month	EF LPG cylinder= 5.89 kgCO ₂ -eq (IPCC guidelines, 2019)	508 TCO ₂ - eq	College Canteen
	Diesel consumption in DG Sets = 205 kg	EF diesel =3.193 kgCO ₂ -eq (IPCC AR5, 2014)		Admin office
	Refrigerant coolant R-410A=160 kg R-22=70 kg R-32=20 kg R-134A=4 kg	EF refrigerants: R-410A=2088 kgCO ₂ -eq R-22=1810 kgCO ₂ -eq R-32=675 kgCO ₂ -eq R-134A=1430 kgCO ₂ -eq (IPCC AR5, 2014)		
Scope 2	Electricity purchase from Grid 6,34,141 kWh	EF Grid Electricity 0.81 tCO ₂ /MWh (CEA)	514 TCO ₂ -eq	Electricity bills
Scope 3	Staff/Faculty commute: (in km) Car= 25 km Two-wheeler= 17.5 km Auto= 23.5 km Bus=7.5 km Metro=52.5 km Personal vehicle=101 km	EF (kgCO ₂ -eq): Car=0.17753 2-wheeler =0.0452 Auto=0.0864 Bus=0.10097 Metro= 0.0376 Personal vehicle= 0.17753	389 TCO ₂ - eq	Sample Survey of students, staff and faculty, Results extrapolated for 59 faculty and

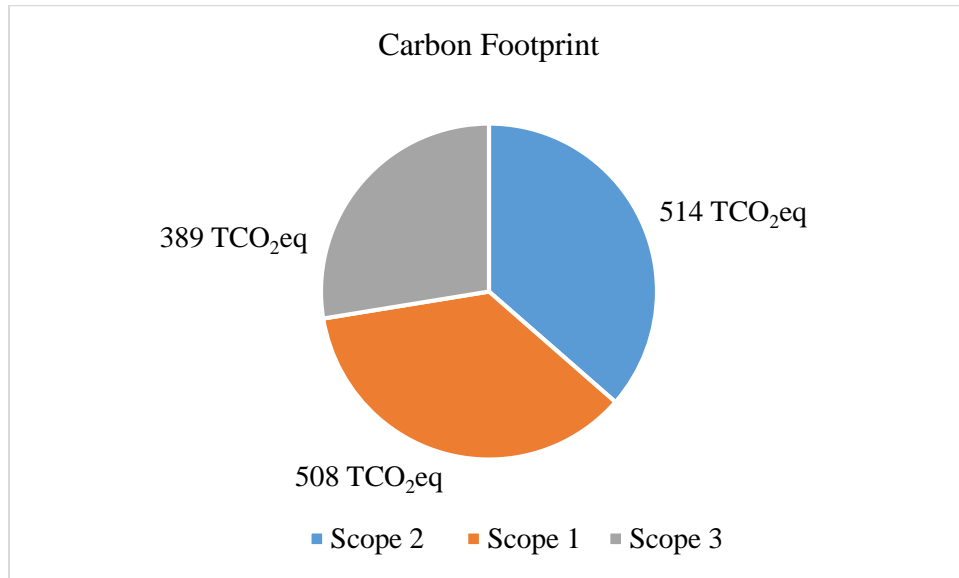
Scope	Activity data	Emission factor (EF)	Total emissions =Data*EF	Source of data
Scope 3	Student commute: (in km) Car= 342 km Two-wheeler= 274 km Auto= 493 km Bus=173 km Metro=1191.5 km Personal vehicle=350 km			700 students; for 232 working days
	Use of Materials: Letters =3566 (kg per item) Paper=520 kg E-waste=196 kg	EF: Letter=0.02 kg CO ₂ /letter Paper=1.8670 kg CO ₂ /kg <u>E-waste (kg CO₂/kg):</u> Cartridge=0.46 CO ₂ /kg Keyboard=22 CO ₂ /kg Mouse=7.84 CO ₂ /kg Headphones=14.2 CO ₂ /kg CD drive=22 CO ₂ /kg Speaker=7.8 CO ₂ /kg W/L Mouse=8.76 CO ₂ /kg Laptop CO ₂ /kg battery=24.6 CO ₂ /kg		Admin

Results and Analysis

The total carbon footprint for the TERI SAS Campus was estimated as 1,410 TCO₂eq.

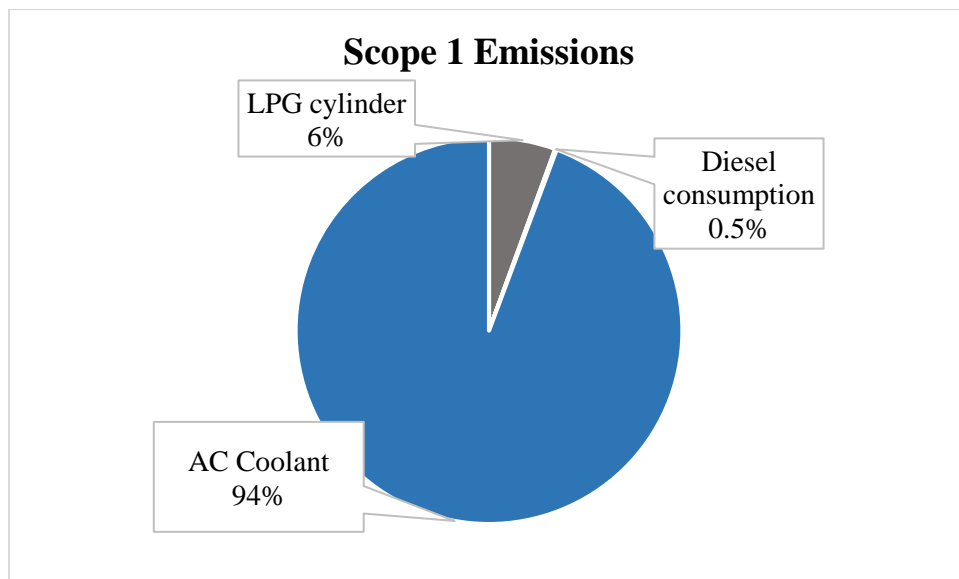
- Scope-1: 514 TCO₂eq (36%)
- Scope-2: 508 TCO₂eq (36%)
- Scope-3: 389 TCO₂eq (28%)

Per capita emissions = 1.75 TCO₂eq (total no of institution users- 800)



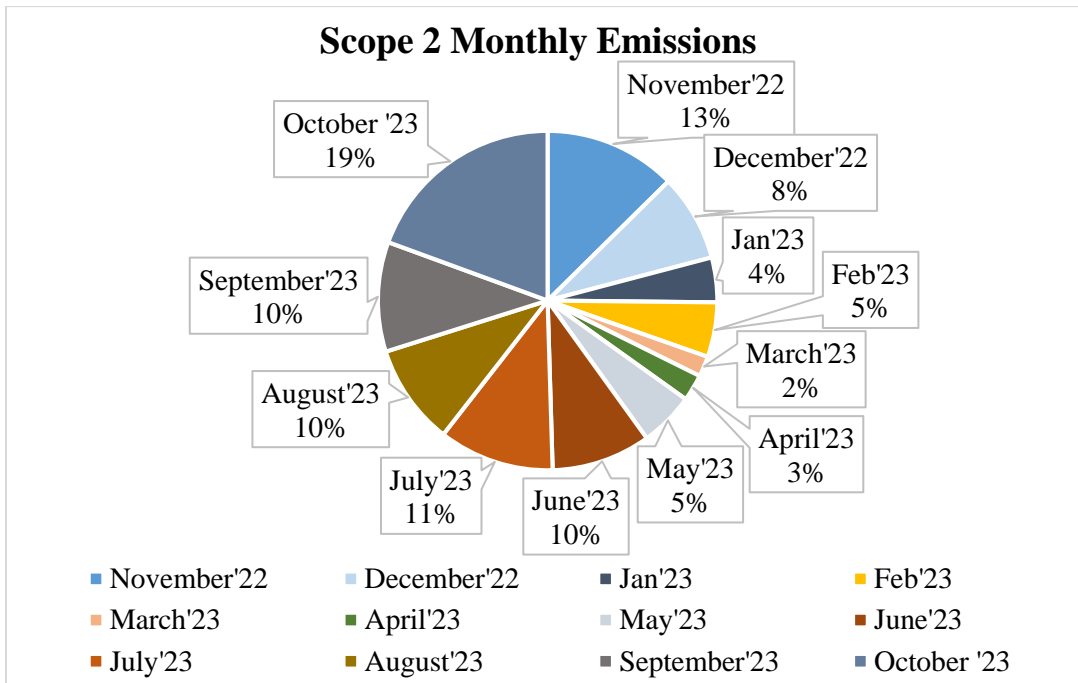
Scope Specific Segregation:

Scope-1:

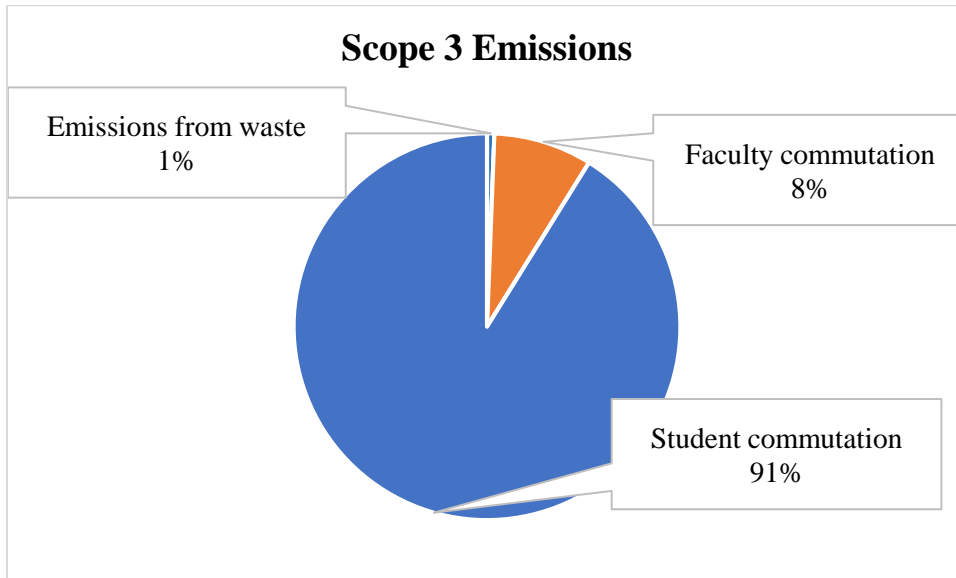


Scope-2:

As purchase of grid electricity was the only factor, we undertook a monthly assessment.



Scope-3:



Conclusions and Way Forward

The total carbon emissions of TERI SAS Campus were estimated to be 1410 TCO₂eq., with key contributors as grid electricity, transportation and waste management. The share of Scope-1 and Scope-2 emissions were similar at 36%, while Scope-3 emissions were at 28%. Taking the total number of institution users to be 800 (students-700 and staff/ faculty- 100), the per capita emissions comes at 1.75 TCO₂eq, indicating a low carbon campus.

The carbon footprint assessment conducted for TERI SAS provides a comprehensive understanding of the greenhouse gas emissions generated by the institution's activities and operations. The study serves as a critical baseline for the institution to measure its sustainability performance and identify areas towards becoming carbon neutral.

The findings emphasize the need for targeted interventions, such as transitioning to renewable energy sources, promoting sustainable commuting, and adopting effective waste management practices. It further underscores the importance of collective action involving students, faculty, and staff to foster a culture of sustainability on the campus.

The findings and recommendations provide a roadmap for the institution to make meaningful and lasting changes, ensuring a greener and more sustainable future for generations to come. Implementing these measures not only aligns with the institution's commitment to environmental stewardship but also enhances its role as a leader in the area of sustainable education.

Limitations

- Assumptions taken for commutation
- Extrapolation of average data from sample
- Data on waste taken as fixed, though it may vary on a daily basis
- Emission factors taken from different sources

Acknowledgements

We would like to thank all the respondents as well as the administration for facilitating the required information/ datasets to arrive at the final results.

Team Photo



END OF REPORT