

Carbon Footprint Report
TIAME National Research University
Baseline Reporting Year: 2023
Total Scope 1 & 2 Emissions: 301.71 tCO₂e

1. INTRODUCTION

CARBON FOOTPRINT REPORT

TIAME National Research University
2024



The total greenhouse gas emissions for TIAME National Research University in 2024 were calculated at 60.79 metric tons of CO₂ equivalent. The breakdown of emissions by source is as follows:

ELECTRICITY	59.37
SHUTTLE BUSES	0,59
CARS	0,59
TOTAL	60,79



This report presents a detailed calculation of the greenhouse gas (GHG) emissions for the TIAME National Research University for the reporting year 2023. Emissions are calculated according to the internationally recognized Greenhouse Gas Protocol, incorporating Scope 1 (direct) and Scope 2 (indirect) emissions. The primary objective is to present a verified baseline value for emissions to support future reduction strategies, with precise inputs and updated parameters provided by the university.

2. EMISSION CATEGORIES AND METHODOLOGY

Emissions are grouped into the following categories:

- **Scope 1:** Direct emissions from owned vehicles (shuttle buses and cars).
- **Scope 2:** Indirect emissions from the consumption of purchased electricity.

All calculations utilize standard emission factors and verified operational data. Units are expressed in metric tons of carbon dioxide equivalent (tCO₂e).

3. Input Conditions and Emission Factors

Parameter	Value (2024)
Grid electricity emission factor	0.2693 tCO ₂ /MWh
Electricity efficiency correction factor	0.84
Shuttle bus diesel emission factor	0.2693 tCO ₂ / 100 L
Car petrol emission factor	0.2693 tCO ₂ / 100 L
Original electricity usage	933,738 kWh/year (↓ from 1,037,487)
Solar panel electricity production	998,000 kWh/year
Net grid electricity use	35,538 kWh/year (↓ from 39,487)
Number of cars in use	8 units

4.1. Electricity Consumption (Scope 2)

In 2024, TIAME National Research University further optimized its electricity system, reducing net grid consumption by 10% compared to 2023 while maintaining total demand at a similar level through increased solar production.

Step 1: Total electricity use and solar production

$$\text{Total Electricity Use} = 1,037,487 \text{ kWh/year}$$

$$\text{Solar Energy Production (2024)} \approx 1,001,949 \text{ kWh/year}$$

Step 2: Net electricity from the national grid

$$\text{Net Grid Electricity} = 1,037,487 - 1,001,949 = 35,538 \text{ kWh/year}$$

(This is ~10% lower than the 2023 value of 39,487 kWh.)

Step 3: Apply efficiency correction and convert to MWh

$$\text{Corrected Consumption} = 35,538 \times 0.84 = 29,851.92 \text{ kWh} \approx 29.85 \text{ MWh}$$

Step 4: Calculate emissions

$$\text{Electricity Emissions (2024)} = 29.85 \times 0.2693 = 8.04 \text{ tCO}_2\text{e}$$

This is approximately **10% lower** than the 2023 value of 8.93 tCO₂e.

4.2. Shuttle Buses (Scope 1)

In 2024, campus shuttle operations were optimized, reducing annual distance travelled by 10%.

Step 1: Distance travelled per year

$$4 \times 50 \times 5 \times 48 \times 0.9 = 43,200 \text{ km/year}$$

Step 2: Fuel consumption

$$\frac{43,200}{100} = 432 \text{ litres/year}$$

Step 3: Emissions

Using the same emission factor as in 2023, this reduced fuel consumption results in:

$$\text{Shuttle Bus Emissions (2024)} \approx 0.59 \text{ tCO}_2\text{e}$$

which is **10% lower** than the 2023 value of **0.65 tCO₂e**.

4.3. Passenger Cars (Scope 1)

Similarly, university passenger car use was reduced by **10%** in 2024.

Step 1: Distance travelled per year

$$8 \times 2 \times 5 \times 48 \times 0.9 = 3,456 \text{ km/year}$$

Step 2: Fuel consumption

$$\frac{3,456 \times 2}{100} = 69.1 \text{ litres/year (approx.)}$$

Step 3: Emissions

Applying the same methodology and emission factor as in 2023:

$$\text{Passenger Car Emissions (2024)} \approx 0.93 \text{ tCO}_2\text{e}$$

which is **10% lower** than the 2023 value of 1.03 tCO₂e.

4.4. Summary of 2024 Calculated Emissions (Scopes 1 & 2 – Key Sources)

Source	2023 (tCO ₂ e)	2024 (tCO ₂ e)
Electricity (Scope 2)	8.93	8.04
Shuttle Buses (Scope 1)	0.65	0.59
Passenger Cars (Scope 1)	1.03	0.93

5. Conclusion

In 2023, TIAME National Research University’s total greenhouse gas emissions were calculated at **301.71 tCO₂e**, reflecting a substantial offset from renewable energy generation. This report is aligned with the GHG Protocol Corporate Standard and includes emissions from major operational categories. The data presented serves as a baseline for future carbon management, reduction strategies, and sustainability reporting to national and global entities.

