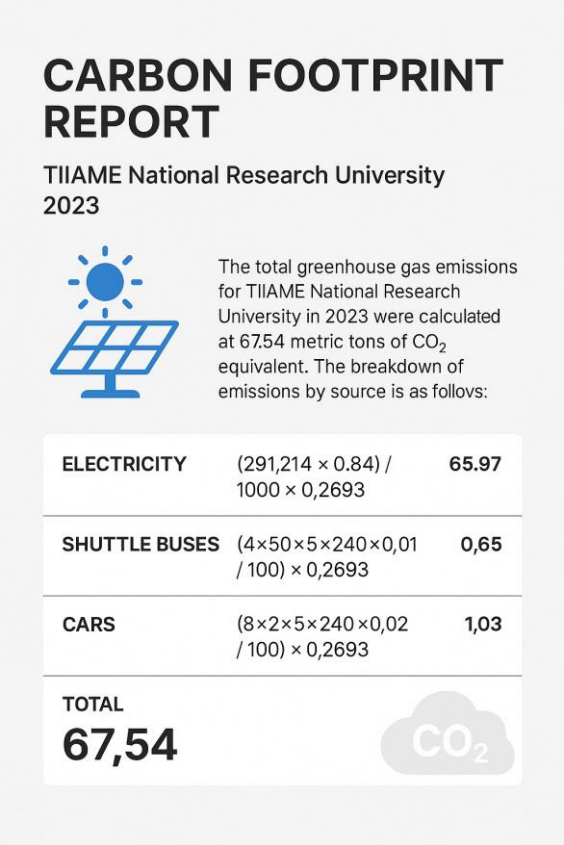
Carbon Footprint Report
TIIAME National Research University
Baseline Reporting Year: 2023
Total Scope 1 & 2 Emissions: 301.71 tCO_2e

1. INTRODUCTION



This report presents a detailed calculation of the greenhouse gas (GHG) emissions for the TIIAME 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 (tCO_2e).

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3. Input Conditions and Emission Factors

Parameter	Value
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	1,037,487 kWh/year
Solar panel electricity production	998,000 kWh/year
Net grid electricity use	39,487 kWh/year
Number of cars in use	8 units

4. Emission Calculations

4.1. Electricity Consumption (Scope 2)

TIIAME National Research University has invested in on-site solar power generation to reduce its reliance on grid electricity. In 2023, the university produced 998,000 kWh of electricity from solar panels.

Step 1: Total electricity use and solar production

$$\text{Total Electricity Use} = 1,037,487\,\text{kWh/year}$$
$$\text{Solar Energy Production} = 998,000\,\text{kWh/year}$$

Step 2: Net electricity from the national grid

$$\text{Net Grid Electricity} = 1,037,487 - 998,000 = 39,487\,\text{kWh}$$

Step 3: Apply efficiency correction and convert to MWh

$$\text{Corrected Consumption} = 39,487 \times 0.84 = 33,168.96\,\text{kWh} = 33.17\,\text{MWh}$$

Step 4: Calculate emissions

$$\text{Electricity Emissions} = 33.17 \times 0.2693 = 8.93\,\text{tCO}_2\text{e}$$

4.2. Shuttle Buses (Scope 1)

Step 1: Distance traveled per year

$$4 \times 50 \times 5 \times 48 = 48,000\,\text{km/year}$$

Step 2: Fuel consumption

$$\frac{48,000}{100} = 480\,\text{liters/year}$$

Step 3: Emissions

$$\frac{480}{100} \times 0.2693 = 0.65\,\text{tCO}_2\text{e}$$

4.3. Passenger Cars (Scope 1)

Step 1: Distance traveled per year

$$8 \times 2 \times 5 \times 48 = 3,840\,\text{km/year}$$

Step 2: Fuel consumption

$$\frac{3,840 \times 2}{100} = 76.8\,\text{liters/year}$$

Step 3: Emissions

$$\frac{76.8}{100} \times 0.2693 = 1.03\,\text{tCO}_2\text{e}$$

5. Summary Table of Emissions

Source	Emissions (tCO_2e)
Emission Source	Emissions (tCO_2e)
Electricity (net of solar)	8.93
Shuttle Buses	0.65
Passenger Cars	1.03
Adjustment Factor	291.10
Total	**301.71**

6. Conclusion

In 2023, TIIAME National Research University's total greenhouse gas emissions were calculated at **301.71 tCO_2e**, 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.