

Astana International University
Greenhouse Gas Emissions Calculation
Academic Year 2024–2025

Scope 1 – University-owned vehicles

Emission factors used:

- Gasoline: 2.31 kg CO₂ per liter
- Diesel: 2.68 kg CO₂ per liter

Gasoline consumption: 3,828.803 liters

$$3,828.803 \times 2.31 = 8,844.53 \text{ kg CO}_2 \quad 3,828.803 \times 2.31 = 8,844.53 \text{ kg CO}_2$$

Diesel consumption: 397.16 liters

$$397.16 \times 2.68 = 1,064.39 \text{ kg CO}_2 \quad 397.16 \times 2.68 = 1,064.39 \text{ kg CO}_2$$

Total Scope 1 emissions:

$$8,844.53 + 1,064.39 = 9,908.92 \text{ kg CO}_2 \quad 8,844.53 + 1,064.39 = 9,908.92 \text{ kg CO}_2$$

$$9,908.92 / 1000 = 9.91 \text{ tCO}_2$$

Scope 1 emissions: 9.91 tCO₂

Scope 2 – Purchased electricity

Electricity consumption: 670,711.04 kWh

Kazakhstan grid emission factor: 0.709 kg CO₂/kWh

$$670,711.04 \times 0.709 = 475,548.13 \text{ kg CO}_2 \quad 670,711.04 \times 0.709 = 475,548.13 \text{ kg CO}_2$$

$$475,548.13 / 1000 = 475.55 \text{ tCO}_2$$

Scope 2 emissions: 475.55 tCO₂

Scope 1 + Scope 2 total

$$9.91 + 475.55 = 485.46 \text{ tCO}_2 \quad 9.91 + 475.55 = 485.46 \text{ tCO}_2$$

Scope 3 – Business travel

Emission factors used (GHG Protocol / DEFRA):

- Air travel: 0.158 kg CO₂e/km
- Rail travel: 0.041 kg CO₂e/km
- Road transport: 0.180 kg CO₂e/km

Air travel:

$$276,064.37 \times 0.158 = 43.62 \text{ tCO}_2\text{e} \quad 276,064.37 \times 0.158 = 43.62 \text{ tCO}_2\text{e}$$

Rail travel:

$$7,181.31 \times 0.041 = 0.29 \text{ tCO}_2\text{e} \quad 7,181.31 \times 0.041 = 0.29 \text{ tCO}_2\text{e}$$

Car travel:

$$6,542.82 \times 0.180 = 1.18 \text{ tCO}_2\text{e} \quad 6,542.82 \times 0.180 = 1.18 \text{ tCO}_2\text{e}$$

Bus travel:

$$1,917.96 \times 0.180 = 0.35 \text{ tCO}_2\text{e} \quad 1,917.96 \times 0.180 = 0.35 \text{ tCO}_2\text{e}$$

Scope 3 emissions: 45.44 tCO₂e

Total greenhouse gas emissions

Scope	Emissions
Scope 1	9.91 tCO ₂
Scope 2	475.55 tCO ₂
Scope 3	45.44 tCO ₂ e
Total	530.90 tCO₂e