Carbon Footprint 2024

UNIVERSITÀ DI TRENTO

renovit

Certificazione **B** Corporation

Agenda

- ✅ Purpose and Scope

- ✅ University Carbon footprint

- ✅ Carbon Footprint results – *Market based*

- ✅ Key Performance Indicators (KPIs)

- ✅ Emissions trend over time

Purpose and Scope

The document provides a summary of the **Carbon Footprint analysis** conducted for the University of Trento, aiming to quantify greenhouse gas (GHG) emissions for the **year 2024.**

The analysis, conducted **in accordance with the UNI EN ISO 14064-1:2019 standard**, provides a solid foundation for developing effective strategies aimed at reducing climate impact. The results of the analysis can be used for:

- Define GHG **reduction targets**, **measure progress**, and **report on achievements**

- Providing **quantitative information** to transparently report the **university's impacts**, including in public reports such as the **Sustainability Report**

- Identifying **emission hotspots**

- Identifying **mitigation actions**, which often represent cost-reduction opportunities

- Obtaining **certification** from a third-party organization

- Participating in **voluntary** impact reduction **programs**

University Carbon Footprint

Carbon Footprint methodology

Analysis of the University

- Locations, services, supply chain

Identification of organizational boundaries

- Organizational boundary
- GHG reporting boundary

Identification of emission sources

- Classification of emissions according to ISO 14064-1 categories

GHG Emissions Calculation

- Direct and indirect GHG emissions

Results Processing

- GHG emissions Inventory
- Identification of intervention/improvement areas

EMISSION CATEGORIES UNI EN ISO 14064-1:2019

1. COMBUSTION PROCESSES

2. IMPORTED ENERGY

3. TRANSPORT

4. MATERIALS/ SERVICES

5. USE/END OF LIFE

6. OTHER EMISSIONS

Calculation Scope

Organizational boundaries:

GHG emissions have been determined using the **operational control approach**. This method ensures the inclusion of all emissions from activities and facilities directly managed by UniTrento, providing a comprehensive and accurate assessment of sources under the university's full control..

- P.Molino Vittoria – P.Cavazzani – P.Dit.
- Polo di Mesiano
- Palazzo di Economia
- Palazzo di Giurisprudenza
- Povo Piazza Manci 17
- Unisport
- Palazzo di Sociologia
- Palazzo Sardagna
- Palazzo Paolo Prodi
- BUC
- Palazzo Fedrigotti

- Palazzo Piomarta
- Cittadella studenti
- Res. Bernardo Clesio e Asilo
- Manifattura Edificio 6
- Trade Center
- Altri
- Complesso di Mattarello
- Povo Zero
- Polo Ferrari 1, 2
- Manifattura Edificio 14
- Manifattura Edificio 10

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Carbon Footprint results
Market based

GHG Inventory 2024: category breakdown

Categories	Emission sources	Emissions [tCO$_2$e]	Category emissions [tCO$_2$e]	Category percentage [%]
Category 1	Combustion of stationary plants	2,830	2,844	11.1%
	Mobile combustion	14		
	Fugitive emissions	0		
Category 2	Electricity purchased from the grid	0	382	1.5%
	Thermal energy purchased from the grid	382		
Category 3	Staff and student commuting	11,246	14,870	58.1%
	International inbound/outbound mobility	1,507		
	Business travel of employees	2,104		
	Waste transportation	10		
	Upstream of company fleet	3		
Category 4	Purchased goods and services	4,007	7,516	29.3%
	Capital goods	2,755		
	Waste disposal	122		
	Upstream energy	632		

Total emissions 2024	25,612 tCO$_2$e

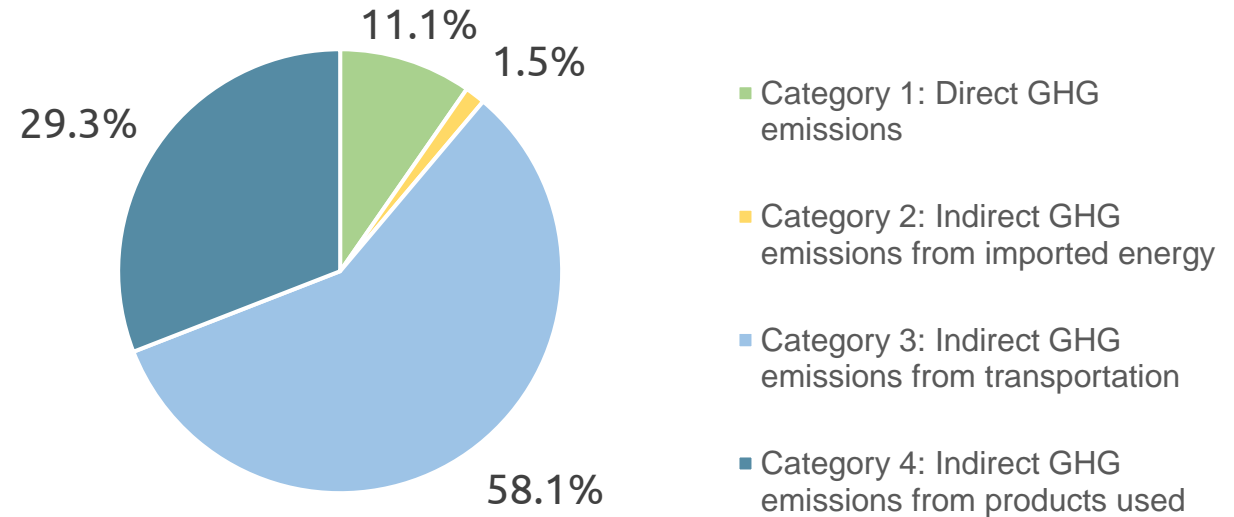Scope 2 emissions calculated according to the Location based approach amount to 5,808 tCO2e

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Carbon Footprint results

25,612

tCO$_2$e

11.1%

1.5%

29.3%

58.1%

- Category 1: Direct GHG emissions
- Category 2: Indirect GHG emissions from imported energy
- Category 3: Indirect GHG emissions from transportation
- Category 4: Indirect GHG emissions from products used
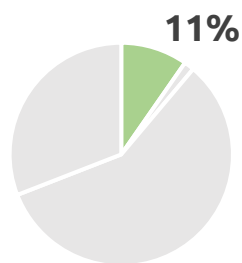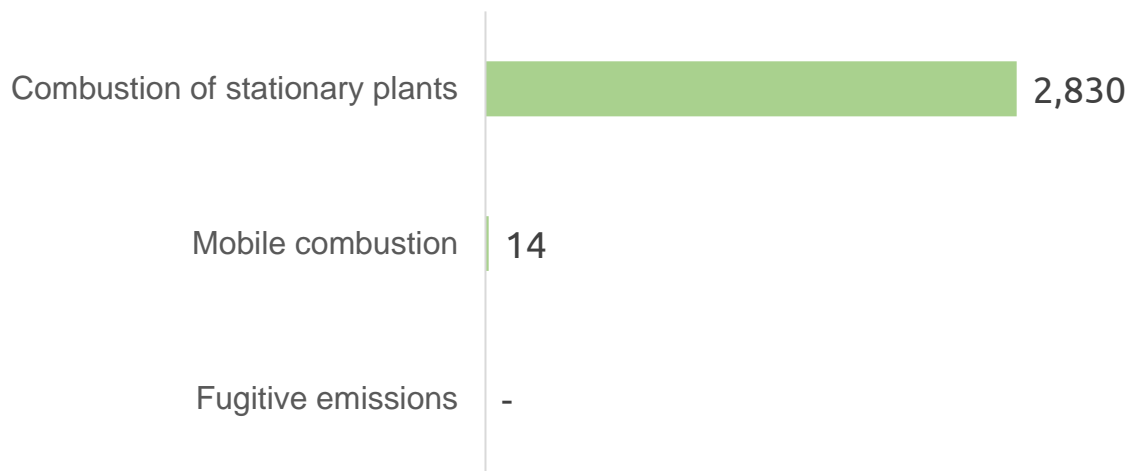
➢ The greatest impacts are associated with **transportation (Category 3)**, accounting for **58%** of total emissions

➢ **13%** of emissions are related to energy consumption, split between Category 1 - fuel use and fugitive emissions and Category 2 - imported energy (calculated using the market-based approach). The electricity purchased from the grid for all university buildings does not contribute to emissions impact due to the purchase of a 100% certified renewable energy with **Guarantees of Origin (GO)**

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Results Analysis – Category 1

2,844
tCO$_2$e

11%

Category 1 [tCO$_2$e]

|	
Combustion of stationary plants	2,830
Mobile combustion	14
Fugitive emissions	-

- Category 1 accounts for **11%** of total emissions

- The stationary combustion of natural gas for heating is the primary source of emissions in this category, contributing approximately **2,800 tCO$_2$e**. This is based on a total consumption of around 1.4 million Sm³ of natural gas and 500 kg of diesel

- The increase in consumption compared to 2023 is due to the return to standard setpoints and heating schedules, which had been reduced in 2023 following the energy crisis and the rise in gas costs

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Results Analysis – Category 2
Market based

382

tCO$_2$e

2%
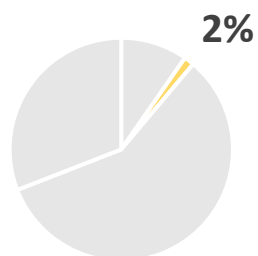
Category 2 [tCO$_2$e]

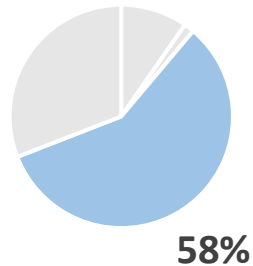Imported electricity (MB) — -

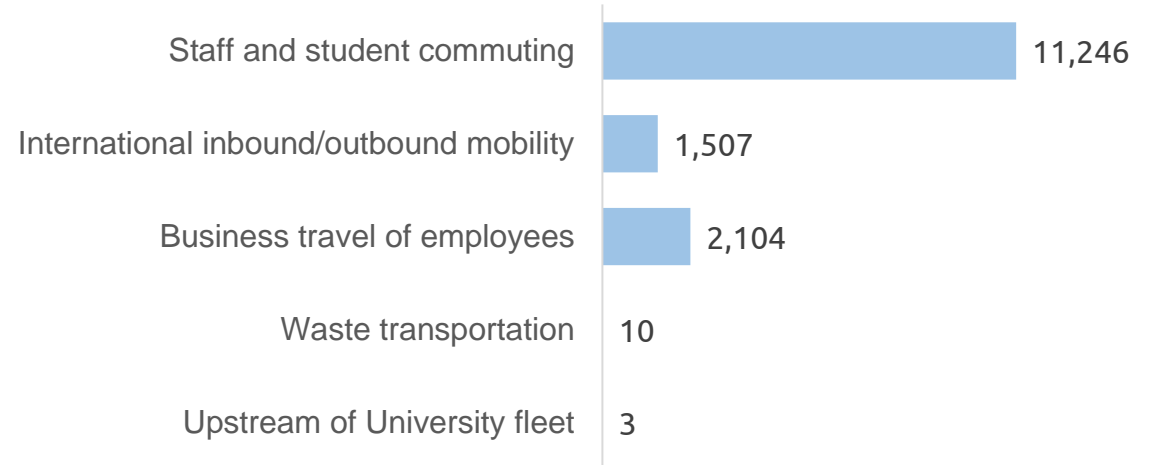Imported thermal energy — 382

➢ **Imported thermal energy** (district heating and cooling) is the only emission source in Category 2

➢ Electricity for all university campuses is purchased as 100% renewable, certified with **Guarantees of Origin (GO)**

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Results Analysis – Category 3

14,870

tCO$_2$e

58%

Category 3 [tCO$_2$e]

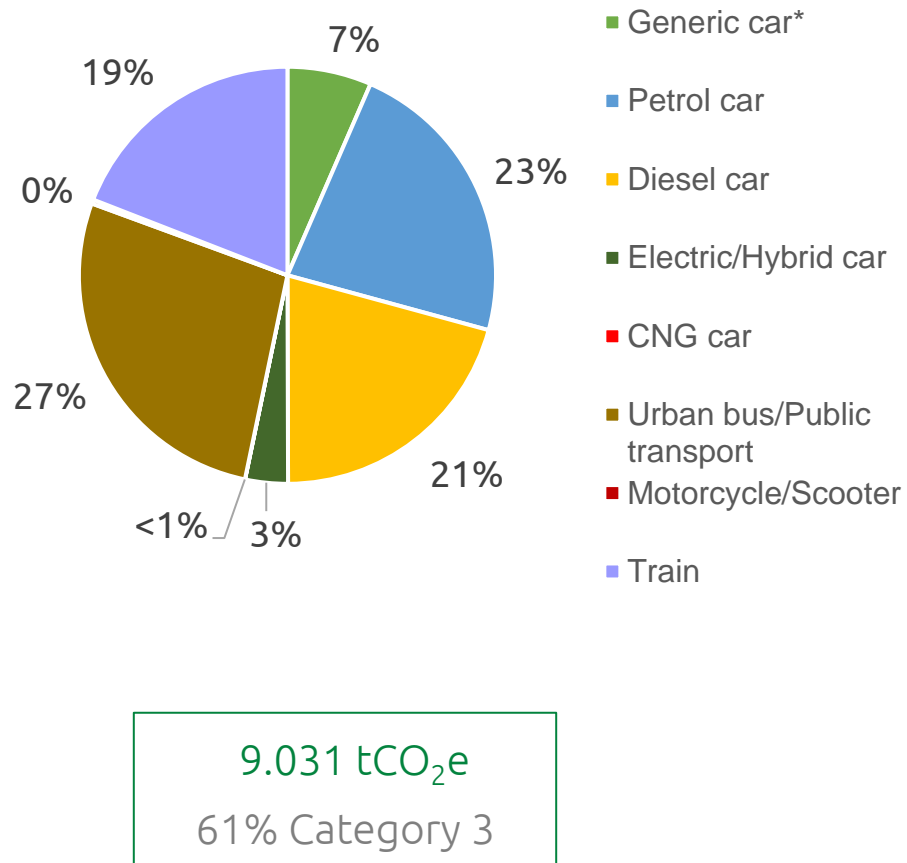|	
Staff and student commuting	11,246
International inbound/outbound mobility	1,507
Business travel of employees	2,104
Waste transportation	10
Upstream of University fleet	3

➢ **86%** of Category emissions are attributed to **commuting and international mobility**, with a total of 12,753 tCO$_2$e.

➢ Among the factors contributing to commuting-related emissions, the largest impact comes from **student home-to-university travel**, which accounts for **61%** of Category 3 emissions and **35%** of total emissions
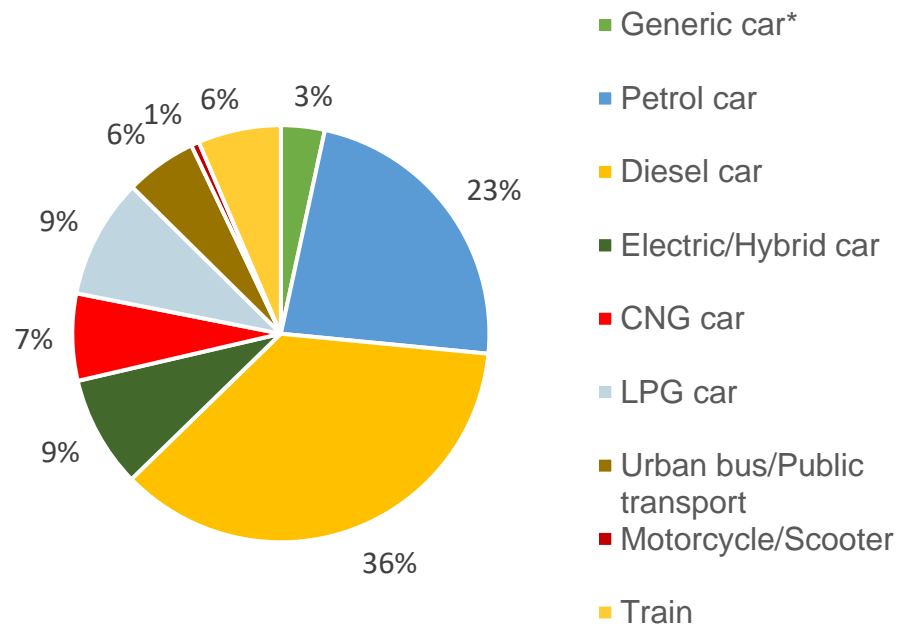
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Category 3 Focus – Student commuting

Pie chart legend:
- Generic car*
- Petrol car
- Diesel car
- Electric/Hybrid car
- CNG car
- Urban bus/Public transport
- Motorcycle/Scooter
- Train

Pie chart values: 7%, 23%, 21%, 3%, <1%, 27%, 0%, 19%

9.031 tCO$_2$e
61% Category 3

- Students collectively travel an estimated 79 million kilometres annually to and from university campuses. This figure is based on an estimated 30 weeks of attendance per year (approximately 160 days including lectures and exams)

- **Around 7% of the total distance is travelled on foot or by bicycle**, contributing zero emissions to this category

- **Private cars are the most impactful mode of transport,** despite accounting for only 18% of the kilometres travelled

- In contrast, **trains are the most efficient mode**, covering 49% of the total distance but contributing just 19% of the emissions in this category

- Commuting data for 2024 were based on the **2025 mobility survey**, which provides the most up-to-date information currently available.

*Where the vehicle's fuel type is not specified, a precautionary emission factor has been selected, referring to a generic car with an internal combustion engine

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Focus Category 3 – Staff commuting

Legend:
- Generic car*
- Petrol car
- Diesel car
- Electric/Hybrid car
- CNG car
- LPG car
- Urban bus/Public transport
- Motorcycle/Scooter
- Train

Pie chart values: 3%, 23%, 36%, 9%, 7%, 9%, 6%, 1%, 6%

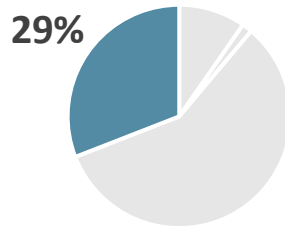**2.215 tCO$_2$e**

15% Category 3

- Staff travel an estimated 12 million kilometres annually commuting to and from university sites. This figure is based on an assumed 45 weeks of access per year (approximately 220 working days)

- **Around 13% of the total distance is travelled on foot or by bicycle**, contributing zero emissions to this category

- **Private cars are the most commonly used and highest-impact mode of transport**, accounting for nearly 6 million kilometres (51% of the total commuting distance) and approximately 87% of emissions associated with staff commuting

- Commuting data for 2024 were based on the 2025 mobility survey, which provides the most up-to-date information currently available.

*Where the vehicle's fuel type is not specified, a precautionary emission factor has been selected, referring to a generic car with an internal combustion engine
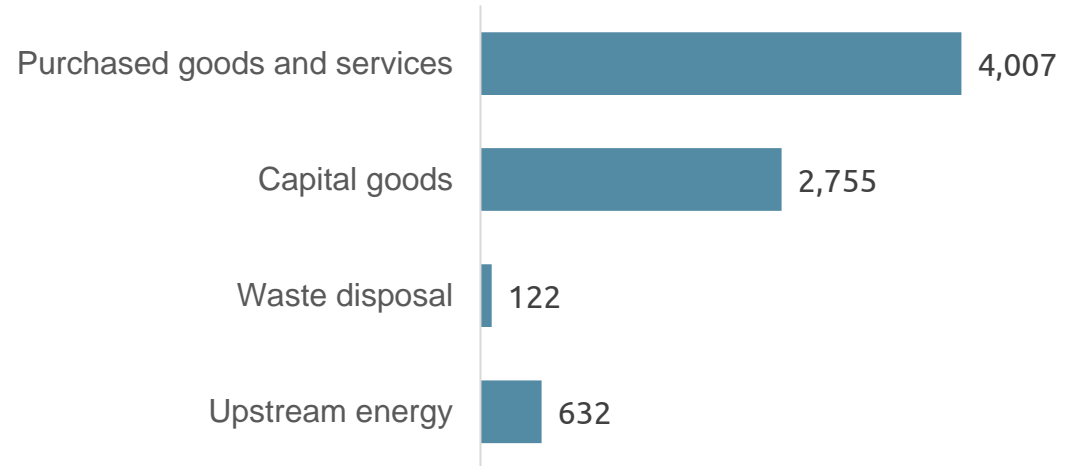
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Results Analysis – Category 4
Market based

7,516

tCO$_2$e

29%

Category 4 [tCO$_2$e]

Purchased goods and services	4,007
Capital goods	2,755
Waste disposal	122
Upstream energy	632

➤ The categories related to the **purchase of goods, services, and capital goods** account for the largest share of Category 4 emissions, representing **90%** of the total. These impacts have been calculated using the **spend-based approach**, with the largest portion attributed to the University's **construction works**, amounting to approximately €5.6 million

➤ Upstream emissions associated with energy have been calculated based on the **production technology of renewable energy sources**, as detailed in the Cancellation Statement of the GOs

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Key Performance Indicators (KPIs)

Key Performance Indicators 2024
Market based

For the purpose of monitoring emissions over time, verifying the outcomes of implemented actions, and making comparisons with other universities, the following indicators have been calculated:

- **University population**: 17,761

- **Area***: 230,013 m^2

|	Description	Emissions [tCO$_2$e]	Parameter value	UOM	KPI	UOM
KPI 1	Category 1 and 2 emissions per capita	3,226			0.18	
KPI 2	Category 3 emissions per capita	14,870			0.84	
KPI 3	Commuting emissions per capita	11,246	17,761	person	0.63	tCO$_2$e/person
KPI 4	Total emissions per capita	25,612			1.44	
KPI 5	Category 1 and 2 emissions per unit of area	3,226	230,013	m^2	0.01	tCO$_2$e/m^2

*The square meters included in the perimeter are those considered in the carbon footprint calculation and do not include leased buildings or those not in use

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Emissions trend over time

GHG Inventory 2024 vs 2023 vs 2022
Market based

In 2024, the GHG inventory showed a **6% reduction** compared to 2022 e **1%** reduction compared to 2023.
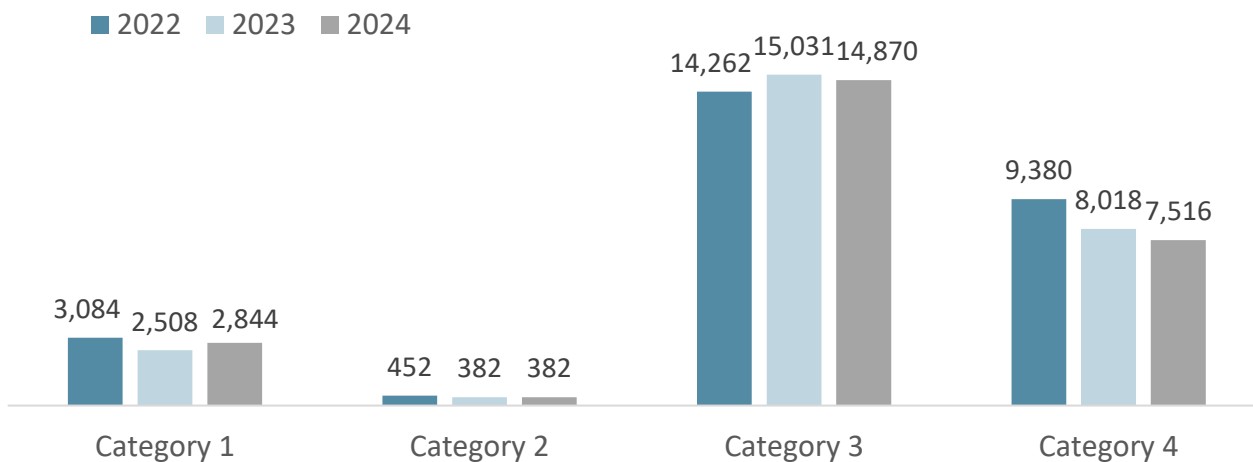
Categories	2022 [tCO$_2$e]	2023 [tCO$_2$e]	2024 [tCO$_2$e]	24 vs 23 [tCO$_2$e]
Category 1	3,084	2,508	2,844	+336
Category 2	452	382	382	-
Category 3	14,262	15,031	14,870	-161
Category 4	9,380	8,018	7,516	-502
Total GHG	27,178	25,939	25,612	-327

➢ **Category 1:** emissions **increased by 13% compared to 2023**, primarily due to an increase in the consumption of natural gas (+14%). The kilometers traveled by the University's fleet increased by about 8% (excluding those associated with the charging stations)

➢ **Category 2:** emissions **aligned** with 2023

➢ **Category 3:** a slight **decrease** in emissions **compared to 2023 (-1%)**, mainly due to the reduction in air kilometers traveled for work trips by employees and staff (-36%)

➢ **Category 4:** emissions **reduced by 6% compared to 2023**, mainly due to a decrease in spending on goods and services (€18 million in 2024 versus €22 million in 2023)

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KPI trends Over Time
Market based

Below is a comparison of the 2024 **key performance indicators (KPIs)** with 2023 and 2022, defined to monitor the trend of emissions in relation to the parameters deemed significant by the University.

	Description	Emissions 2024 [tCO$_2$e]	Parameter value 2024	UOM	KPI 2024	KPI 2023	KPI 2022	UOM
KPI 1	Category 1 and 2 emissions per capita	3,226			0.18	0.16	0.20	
KPI 2	Category 3 emissions per capita	14,870	17,761	person	0.84	0.84	0.79	tCO$_2$e/person
KPI 3	Commuting emissions per capita	11,246			0.63	0.62	0.61	
KPI 4	Total emissions per capita	25,612			1.44	1.45	1.51	
KPI 5	Category 1 and 2 emissions per unit of area	3,226	230,013	m^2	0.01	0.01	0.02	tCO$_2$e/m^2