

Carbon Footprint 2023



UNIVERSITÀ
DI TRENTO



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 2023**.

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 Mancini 17
- Unisport
- Palazzo di Sociologia
- Palazzo Sardegna
- Palazzo Paolo Prodi
- BUC
- Palazzo Fedrigotti
- Palazzo Piomarta
- Cittadella studenti
- Res. Bernardo Clesio e Asilo
- Manifattura Edificio 6
- Trade Center
- Others
- Complesso di Mattarello
- Povo Zero
- Polo Ferrari 1, 2
- Manifattura Edificio 14

Carbon Footprint results

Market based

GHG Inventory 2023: category breakdown

Categories	Emission sources	Emissions [tCO ₂ e]	Category emissions [tCO ₂ e]	Category percentage [%]
Category 1	Combustion of stationary plants	2,493	2,508	9.7%
	Mobile combustion	15		
	Fugitive emissions	-		
Category 2	Electricity purchased from the grid	-	382	1.5%
	Thermal energy purchased from the grid	382		
Category 3	Staff and student commuting	11,152	15,031	57.9%
	International inbound/outbound mobility	1,495		
	Business travel of employees	2,374		
	Waste transportation	6		
	Upstream of company fleet	4		
Category 4	Purchased goods and services	4,515	8,018	30.9%
	Capital goods	2,827		
	Waste disposal	103		
	Upstream energy	573		

Total emissions 2023

25,939 tCO₂e

Scope 2 emissions calculated according to the Location based approach amount to 5,876 tCO₂e



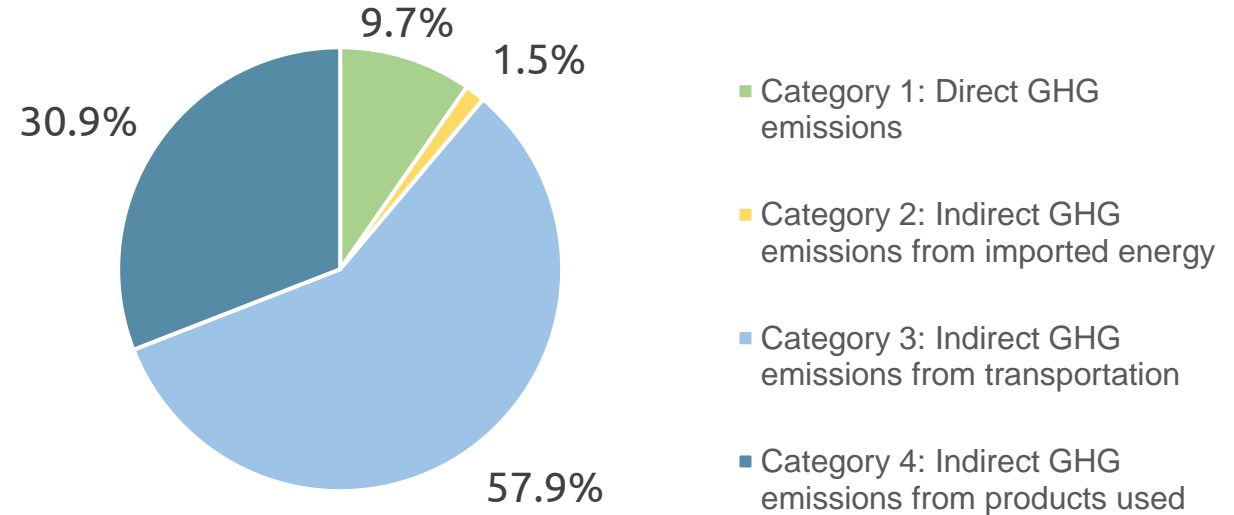
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Carbon Footprint results

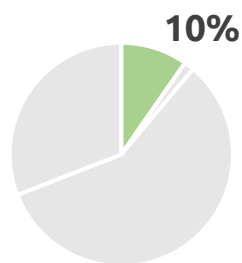
25,939
tCO₂e



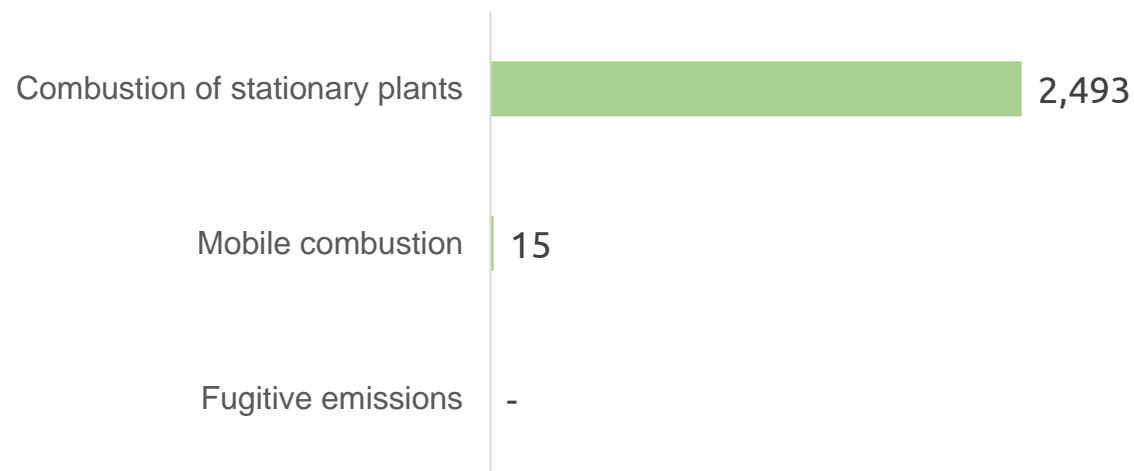
- The greatest impacts are associated with **transportation (Category 3)**, accounting for **58%** of total emissions
- **11%** of emissions are related to energy consumption, split between Category 1 - fuel use and fugitive emissions and Category 2 - imported energy (calculated using the market-based 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)**

Results Analysis – Category 1

2,508
tCO₂e



Category 1 [tCO₂e]



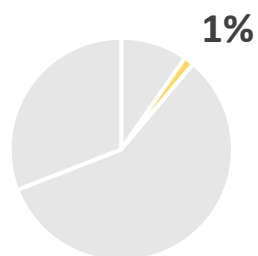
- Category 1 accounts for **10%** of total emissions
- The stationary combustion of natural gas for heating is the primary source of emissions in this category, contributing approximately **2,500 tCO₂e**. This is based on a total consumption of around 1.2 million Sm³ of natural gas and 526 kg of diesel

Results Analysis – Category 2

Market based

382

tCO₂e



Category 2 [tCO₂e]

Imported electricity (MB)

-

Imported thermal energy

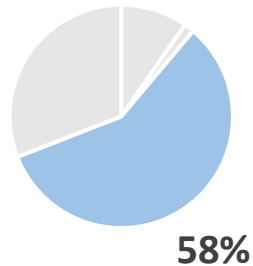
382

- 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)

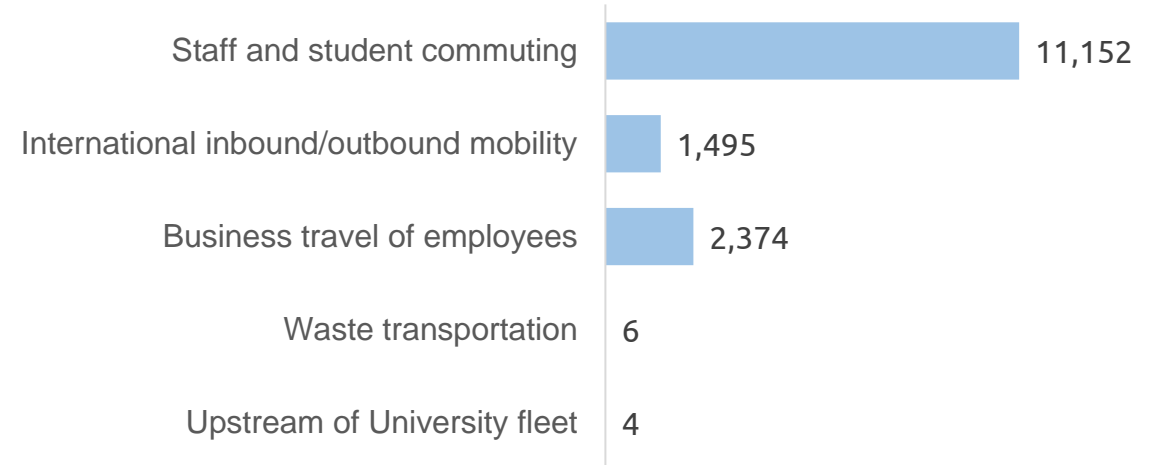
Results Analysis – Category 3

15,031

tCO₂e

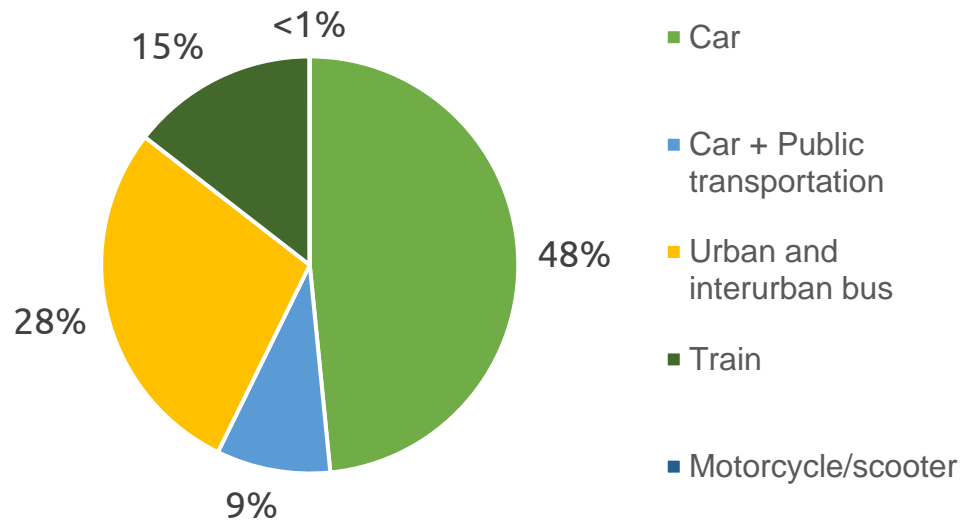


Category 3 [tCO₂e]



- 84% of Category emissions are attributed to **commuting and international mobility**, with a total of 12,647 tCO₂e.
- Among the factors contributing to commuting-related emissions, the largest impact comes from **student home-to-university travel**, which accounts for 57% of Category 3 emissions and 33% of total emissions

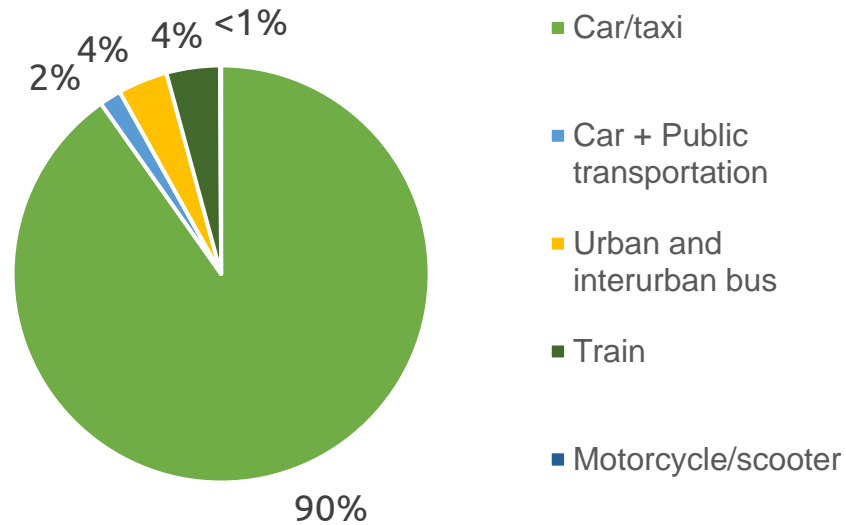
Category 3 Focus – Student commuting



8,615 tCO₂e
57% Category 3

- Students collectively travel an estimated 68 million kilometres annually to and from university campuses. This figure is based on an estimated 32 weeks of attendance per year (approximately 160 days including lectures and exams)
- Around 6% 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 17% of the kilometres travelled
- In contrast, **trains are the most efficient mode**, covering 41% of the total distance but contributing just 15% of the emissions in this category
- Commuting data for 2023 were based on the **2022 mobility survey**, which provides the most up-to-date information currently available. The difference in emissions compared to the previous year reflects the use of updated emission factors in the current reporting year

Focus Category 3 – Staff commuting



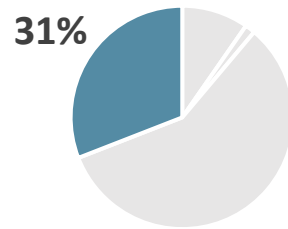
2,537 tCO₂e
17% Category 3

- Staff travel an estimated 10 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 3% 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 (60% of the total commuting distance) and approximately 90% of emissions associated with staff commuting
- Commuting data for 2023 were based on the 2022 **mobility survey**, which provides the most up-to-date information currently available. The difference in emissions compared to the previous year reflects the use of updated emission factors in the current reporting year

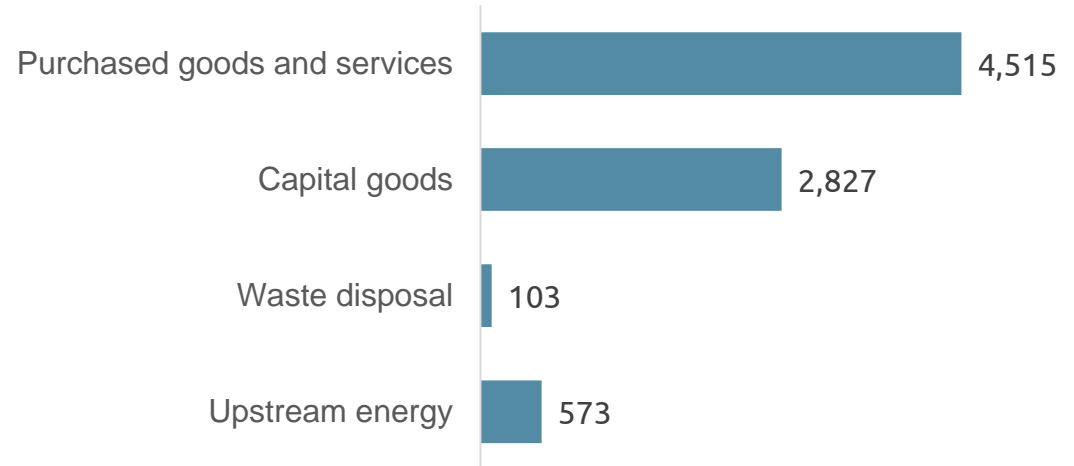
Results Analysis – Category 4

Market based

8,018
tCO₂e



Category 4 [tCO₂e]



- The categories related to the **purchase of goods, services, and capital goods** account for the largest share of Category 4 emissions, representing **92%** 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 €6.3 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

Key Performance Indicators (KPIs)

Key Performance Indicators 2023

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: 17,325
- Area*: 226.699 m²

Description		Emissions [tCO ₂ e]	Parameter value	UOM	KPI	UOM
KPI 1	Category 1 and 2 emissions per capita	2,890	17,325	person	0.17	tCO ₂ e/person
KPI 2	Category 3 emissions per capita	15,031			0.87	
KPI 3	Commuting emissions per capita	11,152			0.64	
KPI 4	Total emissions per capita	25,939			1.50	
KPI 5	Category 1 and 2 emissions per unit of area	2,890	226,699	m ²	0.01	tCO ₂ e/m ²

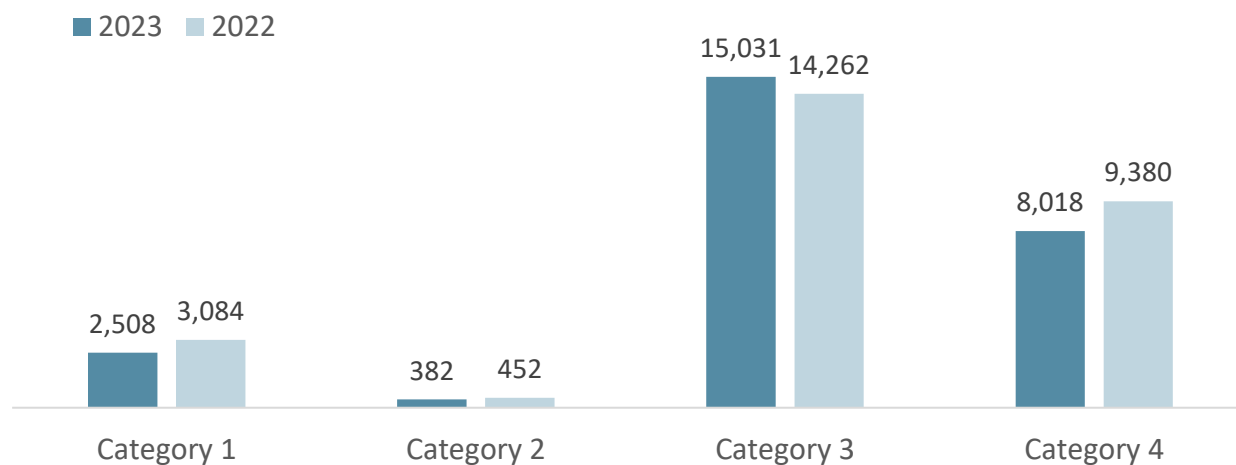
*The square meters included in the perimeter are those considered in the carbon footprint calculation and do not include leased buildings or those not in use

Emissions trend over time

GHG Inventory 2023 vs 2022

Market based

In 2023, the GHG inventory showed a 5% reduction compared to 2022.



Categories	2023 [tCO ₂ e]	2022 [tCO ₂ e]	Δ [tCO ₂ e]
Category 1	2,508	3,084	-576
Category 2	382	452	-70
Category 3	15,031	14,262	769
Category 4	8,018	9,380	-1,362
Total GHG	25,939	27,178	-1,239

- **Category 1:** emissions **decreased by 19%**, primarily due to a reduction in the consumption of gas (-20%) and diesel (-49%) for heating the campuses. The total distance driven by the University fleet also decreased by 3%
- **Category 2:** emissions **decreased by 15%**, driven by a reduced demand for thermal energy for district heating and cooling across the campuses
- **Category 3:** a slight **increase** in emissions **(+5%)**, mainly attributed to a rise in business travel by employees (+33%)
- **Category 4:** emissions **reduced by 15%**, with a general decrease in impacts across all subcategories, except for waste disposal

KPI trends Over Time

Market based

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

Descrizione		Emissions 2023 [tCO ₂ e]	Parameter value	UOM	KPI 2023	KPI 2022	UOM
KPI 1	Category 1 and 2 emissions per capita	2,890	17,325	person	↓ 0.17	↑ 0.20	tCO ₂ e/person
KPI 2	Category 3 emissions per capita	15,031			↑ 0.87	↓ 0.79	
KPI 3	Commuting emissions per capita	11,152			↑ 0.64	↓ 0.61	
KPI 4	Total emissions per capita	25,939			↓ 1.50	↑ 1.51	
KPI 5	Category 1 and 2 emissions per unit of area	2,890	226,699	m ²	↓ 0.01	↑ 0.02	tCO ₂ e/m ²