VUB CLIMATE ACTION PLAN

PAVING THE WAY TO A NET-ZERO UNIVERSITY IN 2050

Update - Carbon Footprint 2022

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Context

Carbon Footprint

Baseline

Action plan

Next steps

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BRUSSEL

Context

Carbon Footprint

Baseline

Action plan

Next steps

VRIJE
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CONTEXT

WHY DO WE NEED A CLIMATE ACTION PLAN?

The **window** to act on climate change is **closing**. The recent Climate Change Conference in Dubai (COP 28) has once again shown us that the national action plans are not sufficient to limit global warming to 1.5 °C. We can and must do better. VUB, that has an **exemplary societal role as a university**, wants to take its responsibility and take concrete action to decrease its climate impact in line with the Paris agreement.

Climate change poses **multiple risks** for the VUB, both physical risks, as well as transition risks. However, if well prepared for, some of these can also be turned into an **opportunity**. Now is the time to implement a robust climate strategy. Because **the world needs us**.

CONTEXT

WHAT IS THE VUB CLIMATE ACTION PLAN?

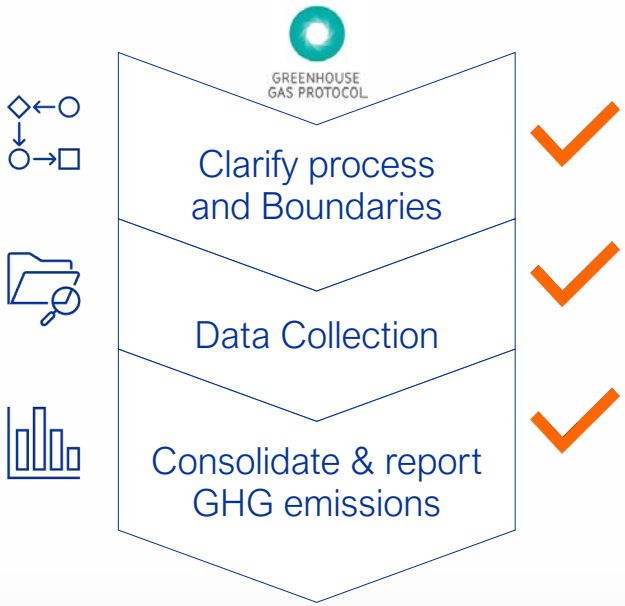
The Climate Action Plan describes the measures VUB is taking to become **a net-zero organization** by 2050, in line with the Paris Agreement. Determining and evaluating these measures is done through the biennial measurements of our **carbon footprint**.

The climate action plan was developed together with **Climact**, using robust global standards such as the **Greenhouse Gas Protocol** (GHG protocol) and the **Science-based Targets initiative** (SBTi).

CONTEXT

FOLLOWING A STRUCTURED APPROACH

UNDERSTAND the challenges | **MEASURE** your climate impact | **DEFINE** a vision & objectives | **DEVELOP** a reduction plan | **INSPIRE** your stakeholders

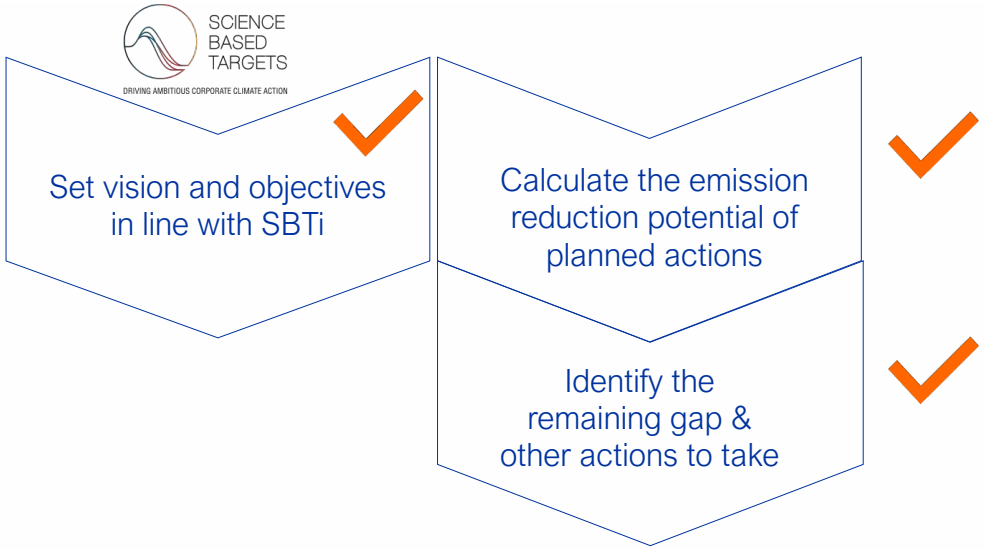


- The VUB KAP-team has, together with CLIMACT, defined the boundaries (organisational and operational) of the carbon footprint, in accordance with the GHG-protocol.
- Data has been collected by VUB in collaboration with data owners, through tailor-made data collection sheets, and consolidated by CLIMACT.

CONTEXT

FOLLOWING A STRUCTURED APPROACH

- After identifying the key hotspots in VUB's footprint, targets in line with the science-based target initiative were defined for scope 1, scope 2 and scope 3.
- The reduction potential for key actions was calculated by CLIMACT with input from the VUB team.
- Advice on extra actions and steps to take to address the remaining gap were given by CLIMACT

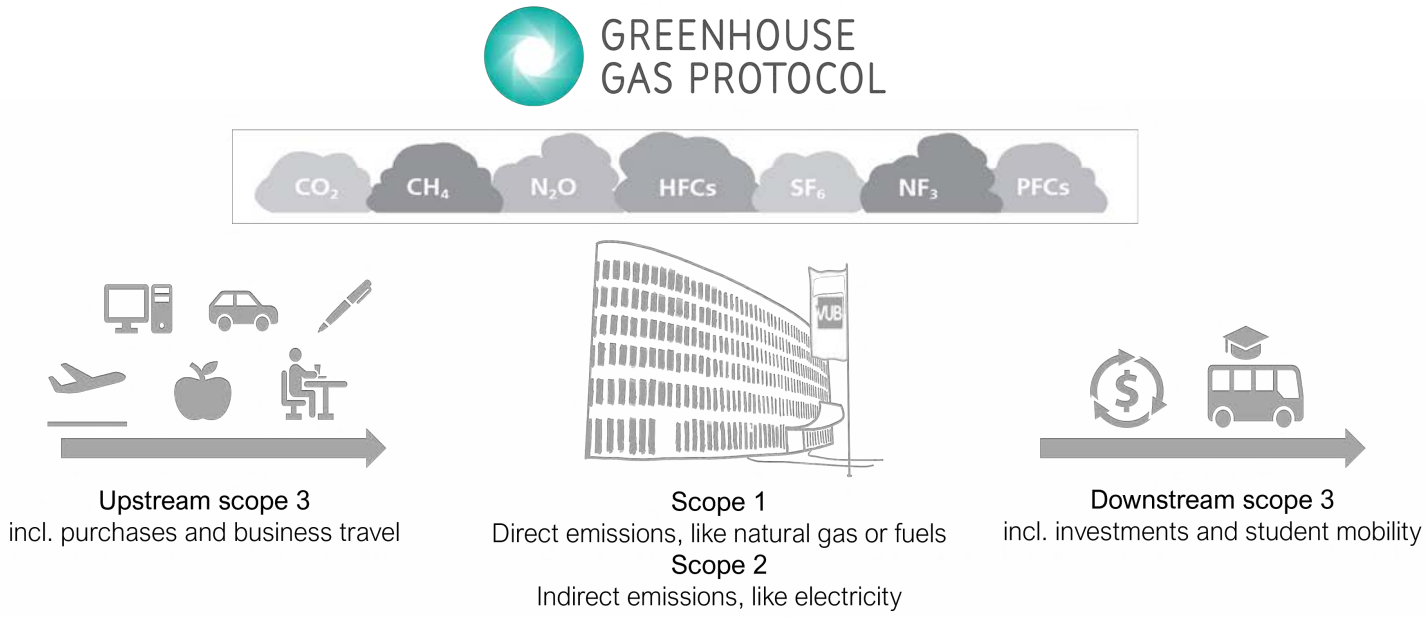


CONTEXT

GHG PROTOCOL AS ACCOUNTING METHODOLOGY

The GHG Protocol is a global standard for companies & organisations to measure, manage and report their GHG emissions

- Measurement and evaluation of emissions, and identification of high-impact reduction actions
- Structured into 3 scopes:
  - scope 1 - direct emissions
  - scope 2 - indirect emissions
  - scope 3 - value chain emissions



CONTEXT

SCIENCE-BASED TARGETS AS A REDUCTION METHODOLOGY

The Science-Based Targets Initiative (SBTi) provides the framework and the tools for companies to set science-based net zero targets and limit global temperature rise above pre-industrial levels to 1,5 °C

- It is the world's most credible climate target methodology.
- Allows companies to have their emission reduction targets independently validated. This is not yet possible for universities.

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

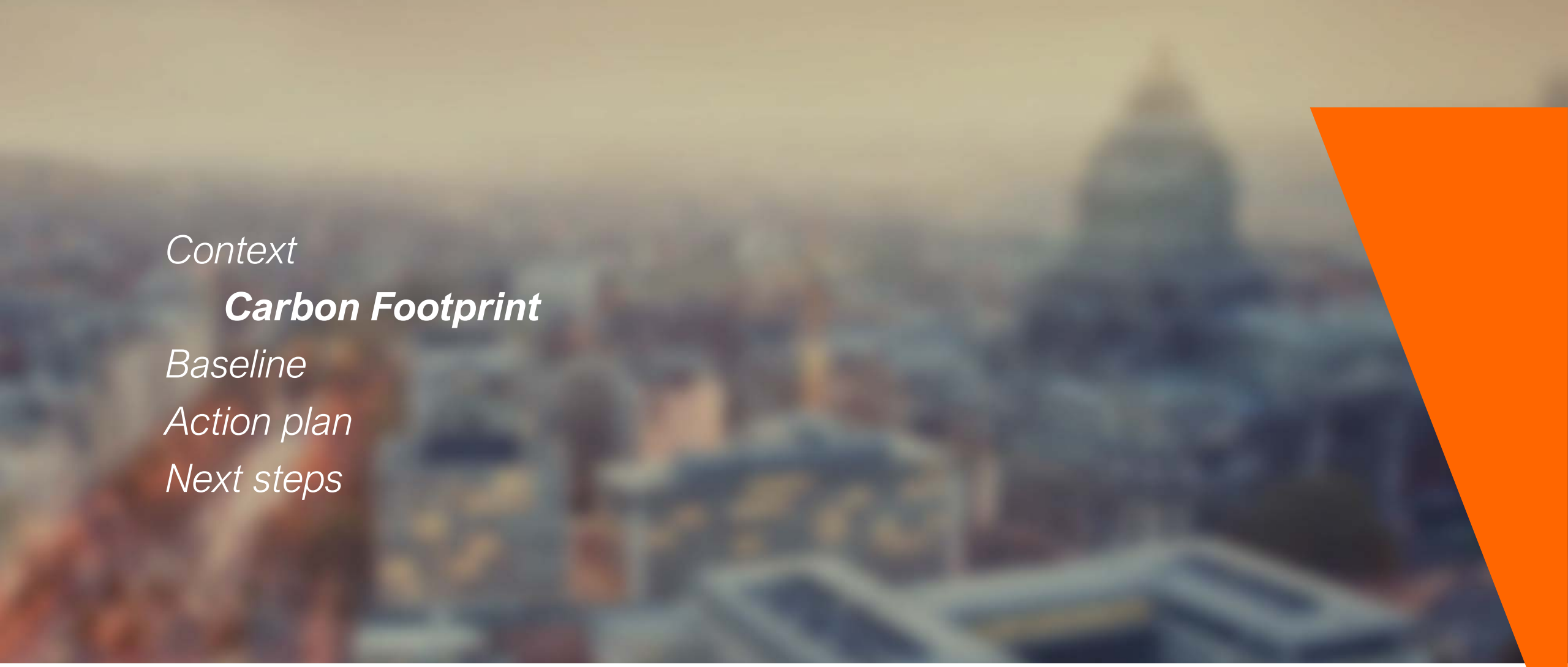
CONTEXT

BACA AS A BELGIAN CLIMATE ACTION NETWORK

VUB is a member of the Belgian Alliance for Climate Action (BACA), a national initiative that invites organisations to set up ambitious climate plans.

- Members are required to set science-based targets.
- The initiatives allows for knowledge sharing through workshops, webinars and networking events.

Belgian Alliance for Climate Action



Context

Carbon Footprint

Baseline

Action plan

Next steps

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DUAL REPORTING OF CARBON FOOTPRINT

MARKET-BASED VS. LOCATION-BASED

This report consists of both the location-based, as well as market-based emissions. The two methodologies only differ in 2 categories: *2.1. the purchase of electricity* and *3.3. Other fuel- and energy related emissions*. The difference between them is explained below:

LOCATION-BASED METHOD

Reflects the **production mix of the country or region** where the organization is **located** = average emission intensity on grid where electricity consumption occurs

This means that **electricity consumption is visible** in the CF, which incentivizes reduction of electricity consumption and the increase of own renewable energy production

In this case, the national electricity mix emission factor is used.

MARKET-BASED METHOD

Reflects the **electricity purchase contract** of the reporting organization = emissions from electricity that companies have purposefully chosen

Here, the **purchase of green electricity is valorized**, as the emission factor of green electricity is zero. However, this means that electricity consumption is not represented in the CF, and companies are not incentivized to decrease their consumption.

In this case, our emissions linked to electricity consumption are very small, as we purchase green electricity.

Because the VUB has switched to green electricity, the market-based carbon footprint has decreased. This decrease is not visible in the location-based carbon footprint, as this uses the emission factor of the Belgian electricity mix. In this report, both methodologies will be discussed for the energy category. For all other categories, there is no difference between the two methodologies, so only one is discussed.

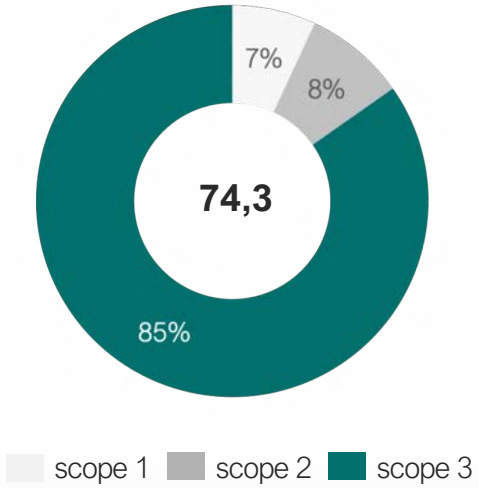
OUR CARBON FOOTPRINT

MARKET-BASED 2022 VS. 2019

2019

74 332 ton CO_2eq

Emissions in 2019 per scope [ktCO2e]

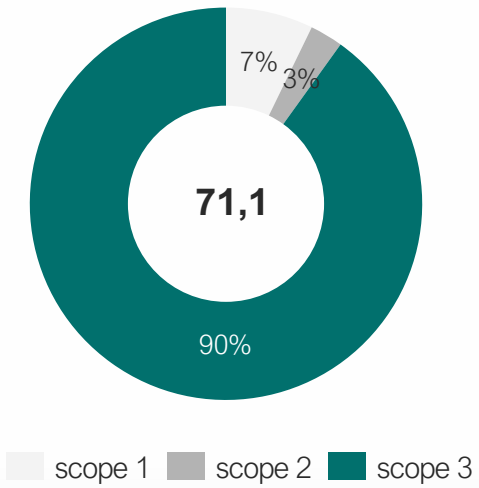


-4,4%

2022

71 093 ton CO_2eq

Emissions in 2022 per scope [ktCO2e]



OUR CARBON FOOTPRINT

LOCATION-BASED 2019 VS. 2022

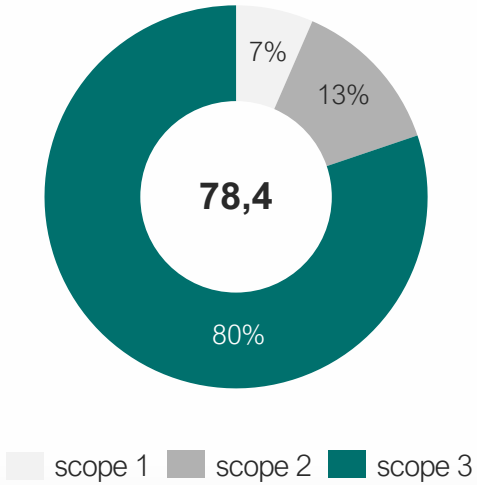
2019

73 600 ton CO_2eq

2022

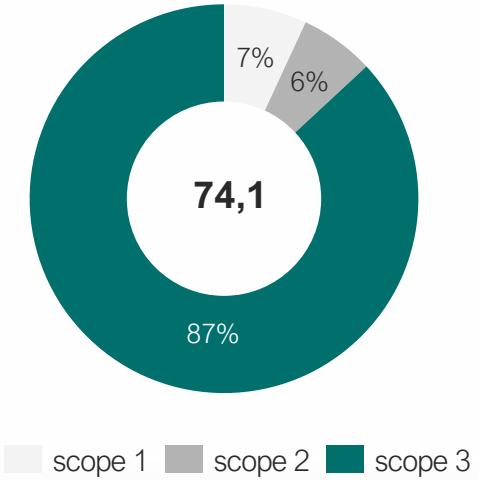
74 152 ton CO_2eq

Emissions in 2019 per scope [ktCO2e]



+0,7%

Emissions in 2022 per scope [ktCO2e]



OUR CARBON FOOTPRINT

EMISSIONS PER GHG CATEGORY – MARKET BASED

SCOPE	GHG-protocol categories	2019 [tCO2e]	2022 [tCO2]	
SCOPE 1	1.1 Stationary sources – fuel combustion (buildings)	4.618	4.604	↘
	1.2 Fugitive process emissions (refrigerant leakages)	471	493	↗
	1.3 Mobile sources – fuel combustion (company cars)	40	21	↘
SCOPE 2	2.1 Purchased electricity	5.040	579	↘
	2.2 Purchased heat, steam and cold	1.163	1.357	↗
SCOPE 3	3.1 Purchased Goods & Services	16.588	15.181	↘
	3.2 Capital Goods	12.737	24.141	↗
	3.3 Other fuel- and energy related activtities	1.456	1.230	↘
	3.4 Upstream transportation & distribution (delivery of goods)	98	120	↗
	3.5 Waste from operations	331	292	↘
	3.6 Business travel	4.250	3.382	↘
	3.7 Employee commuting	1.743	1.899	↗
	3.9 Downstream transport and distribution (student mobility & travel)	8.463	10.713	↗
	3.13 Downstream leased assets	192	65	↘
	3.15 Investments	17.143	7.016	↘

CARBON FOOTPRINT

MOBILITY

HIGHLIGHTS

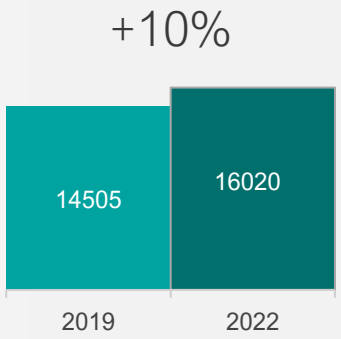
1. **Student mobility, both commuting and international travel, represents the largest emission category (67%).**

2. **We see a significant drop in emissions resulting from business travel.** This is most likely due to long-lasting effects of COVID-19, which has led to an increase in online conferences and meetings. Data quality has also improved due to the introduction of a framework agreement with a travel agency.

3. **An increase in number of international and exchange students has caused an increase in the emissions from international student travel.**

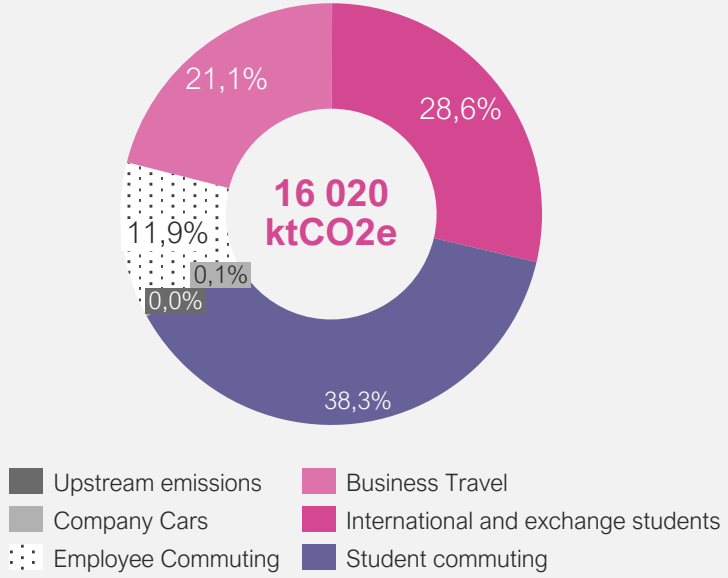
4. **Emissions from both student and employee commuting have increased due to an increase in number of students and staff.** The calculation of emissions is still based on the modal split results from the 2021 mobility survey. The new mobility survey will be conducted in 2024 and will lead to new, more accurate results which incorporate the effects of increased homeworking and hybrid teaching.

Mobility emissions comparison 2019 to 2022 [tCO2e]



Business travel	- 20%
Employee commuting	+ 9%
International and exchange student mobility	+ 16%
Mobile fossil fuel combustion	- 47%
Other fuel & energy related activities	- 50%
Student commuting	+ 36%

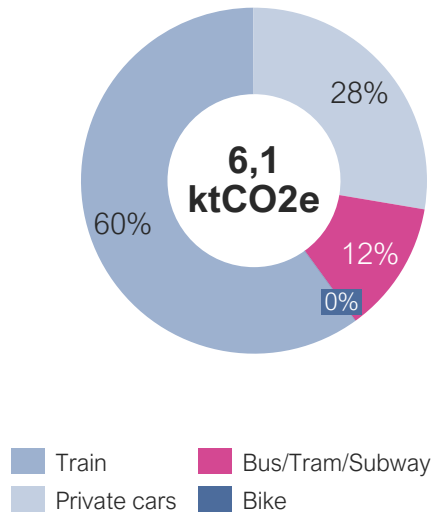
Breakdown emissions from mobility by category in 2022



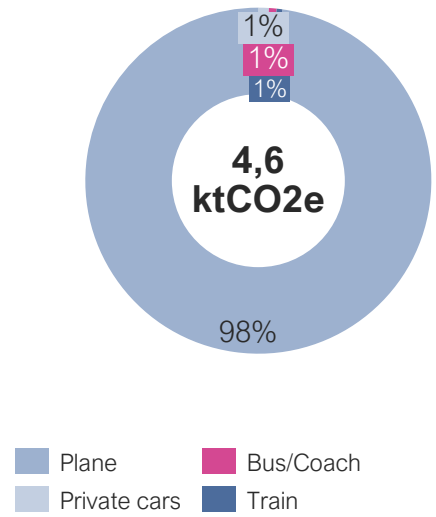
CARBON FOOTPRINT

MOBILITY - BREAKDOWN BY MODE OF TRANSPORT

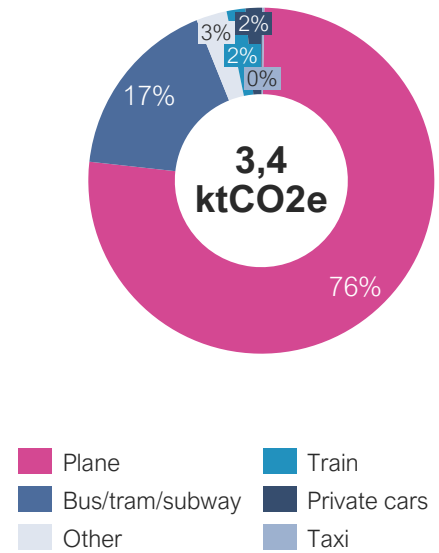
Breakdown emissions from **student commuting** by mode of transport



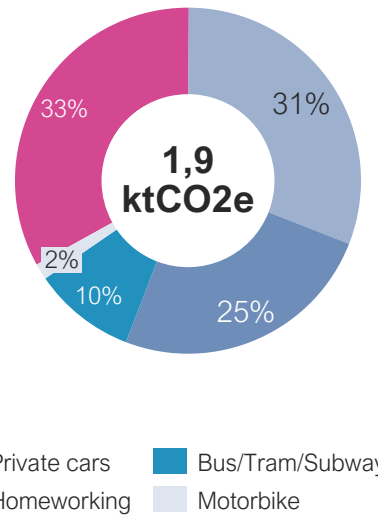
Breakdown emissions from **international and exchange students** by mode of transport



Breakdown emissions from employee **business travel** by mode of transport



Breakdown emissions from **employee commuting** by mode of transport



CARBON FOOTPRINT

PURCHASES

! Emissions in this category were calculated using the spend-based method (see GHG protocol for details). Although the results do give an indication of where the bulk of the emissions is located, they are not accurate enough to make detailed and correct analyses.

HIGHLIGHTS

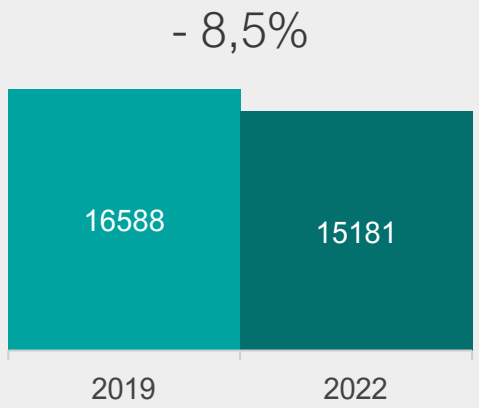
1. **The total emissions from purchases have decreased, despite an increase in number of staff and students.**

2. **ICT and research and lab represent the largest share of emissions from purchases.**

3. **The emissions from research and lab have decreased significantly.** This is due to a change in methodology. The emissions in 2019 were an overestimation due to a lack of detailed data. The 2022 data was assessed in more detail to achieve a more accurate result.

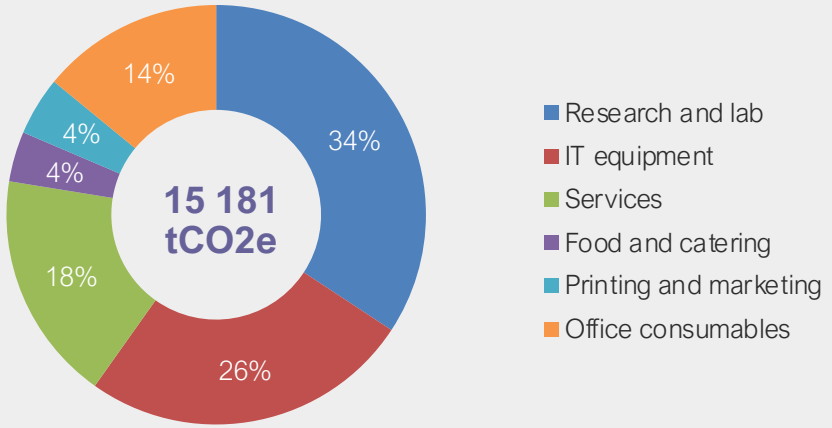
4. **Emissions from office consumables have increased by more than 300%.** Extra data was considered in 2022 that might explain the sharp increase compared to 2019.

Purchase emissions comparison 2019 to 2022 [tCO2e]



Research and lab	- 50%
IT equipment	+ 41%
Services	+ 58%
Food and catering	- 17%
Printing and marketing	+ 5%
Office consumables	+ 359%

Breakdown emissions from purchases by category in 2022



CARBON FOOTPRINT

ENERGY

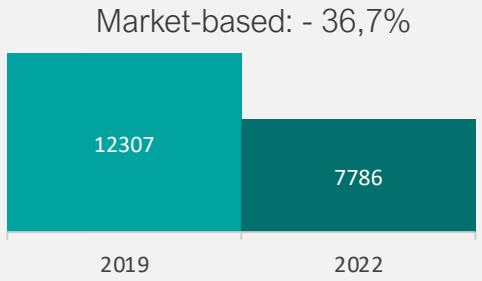
HIGHLIGHTS

1. **The purchase of 100% green energy has decreased emissions from electricity consumption (market-based).** Green electricity has an emission factor of 0, thereby reducing our scope 2 to only 3% of the total carbon footprint. In the location-based CF, electricity emissions have also decreased due to a decrease in the national electricity mix emission factor. Our electricity consumption itself did not decrease, due to new sites that were taken into scope.

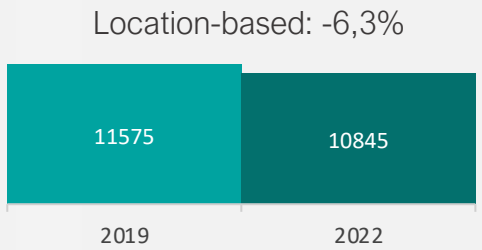
2. **The emissions from natural gas (scope 1) only decreased slightly.** Several measures were implemented over the past few years to decrease our natural gas consumption, with positive results. However, a new site (Usquare) was taken into scope for the first time, leading to an increase in gas consumption.

3. **The emissions from the purchase of heat have increased.** The heat demand was lower in 2022 than in 2019, but the efficiency factor of the combined heat and power (CHP) in Jette was lower in 2022, resulting in a higher emission factor.

Energy emissions comparison with 2019

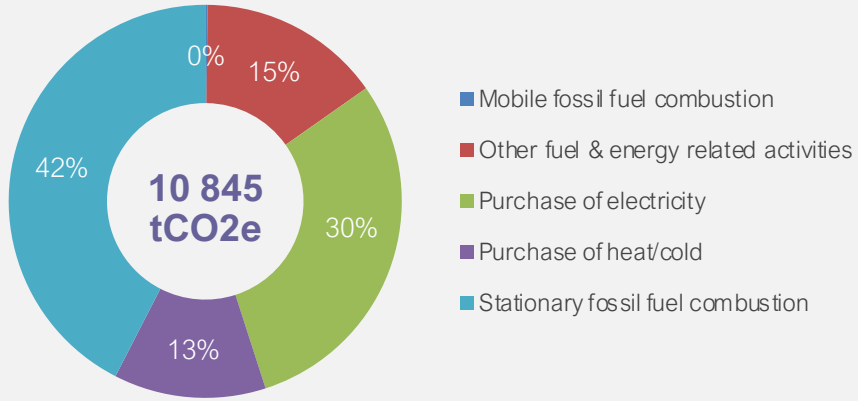


Mobile fossil fuel combustion	- 47%
Other fuel & energy related activities	- 15%
Purchase of electricity	- 89%
Purchase of heat/cold	+ 17%
Stationary fossil fuel combustion	- 0,3%



Other fuel & energy related activities	+ 15%
Purchase of electricity	-26%

Breakdown energy emissions by category in 2022 - Location-based



CARBON FOOTPRINT

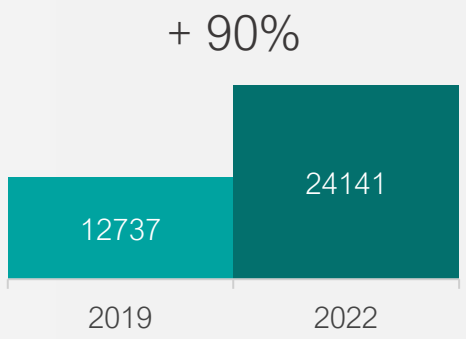
BUILDINGS AND EQUIPMENT

! Emissions in this category were calculated using the spend-based method (see GHG protocol for details). Although the results do give an indication of where the bulk of the emissions is located, they are not accurate enough to make detailed and correct analyses. Measures to improve data quality are currently under research.

HIGHLIGHTS

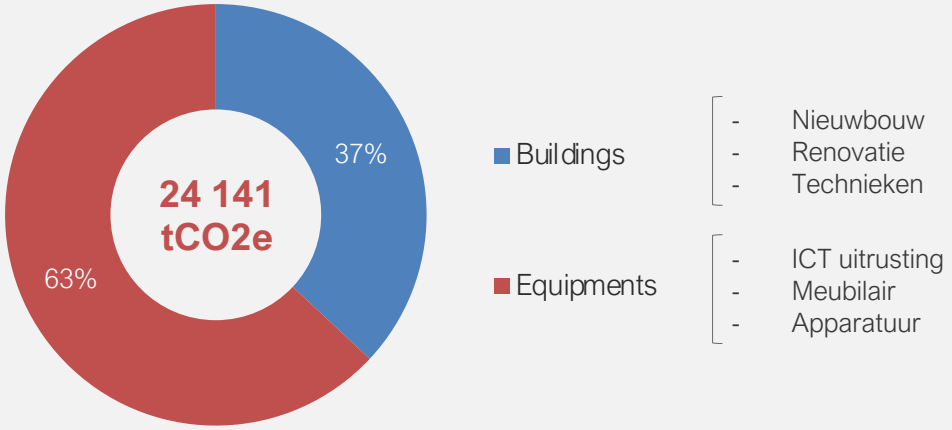
1. **The emissions from buildings and equipment has increased significantly.** Renovation is needed to conform our buildings to current and future energy norms, thereby reducing our energy consumption. However, the emissions from renovation and building need to be considered as well. This category varies strongly, as it is dependent on the number of projects that is executed each year. A strong increase in the number of projects in 2022 has thus led to an increase in emissions.

Buildings and equipment emissions comparison 2019 to 2022 [tCO2e]



Buildings	+ 33,4%
Equipments	+ 137,1%

Breakdown emissions from buildings and equipment by category in 2022



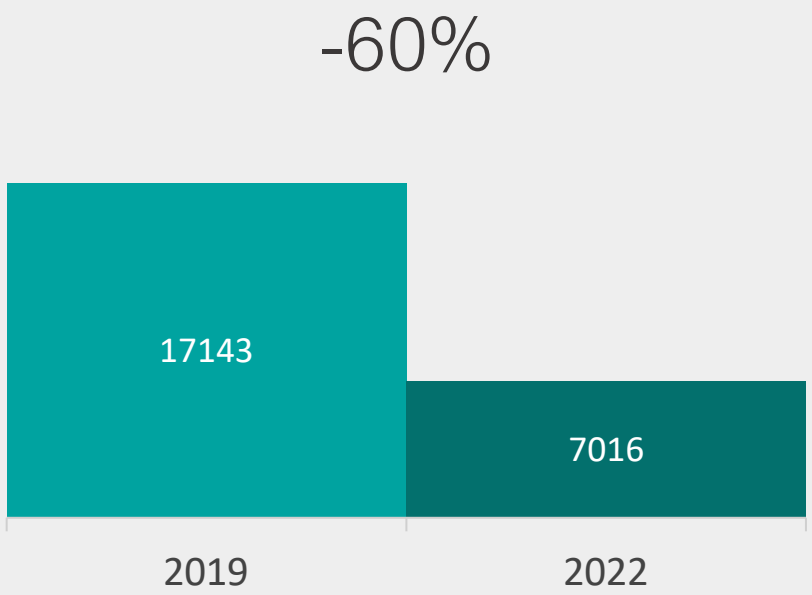
CARBON FOOTPRINT

INVESTMENTS

HIGHLIGHTS

1. **The transition to greener funds is reflected in a sharp decrease of the emissions.** Over the past few years, we have shifted our investments towards ESG-balanced funds. All funds are SFDR article 8 or 9, which are funds that promote environmental or social characteristics (8) or have sustainable investment as their objective (9).

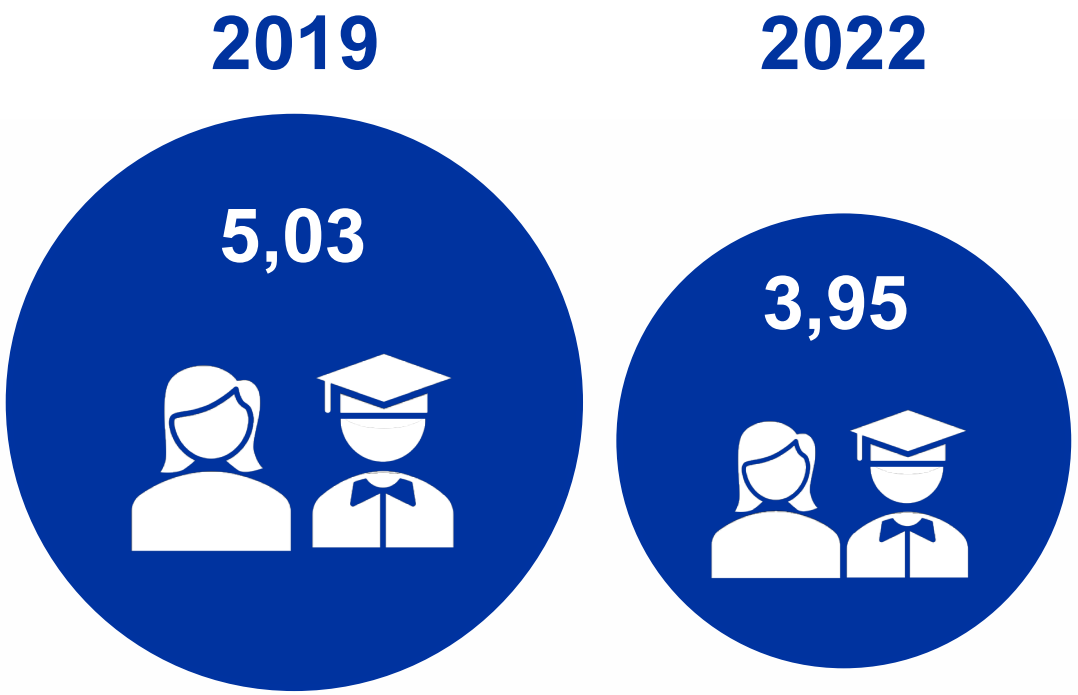
Investments emissions comparison 2019 to 2022 [tCO2e]



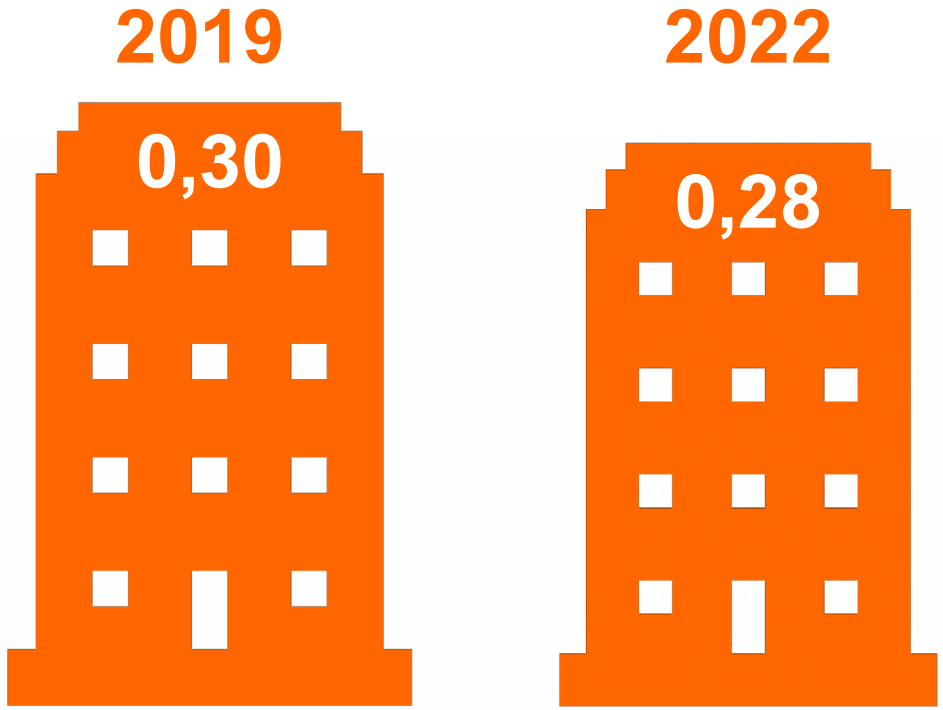
CARBON FOOTPRINT

CARBON FOOTPRINT INDICATORS

CO2e per VUB FTE (staff and students) [tCO2/FTE.eq]



CO2e per heated surface [tCO2/m²]



The diameter of the circle and the height of the building are scaled to the CO2 amounts per year, emissions according to market-based method

Context

Carbon Footprint

Baseline

Action plan

Next steps

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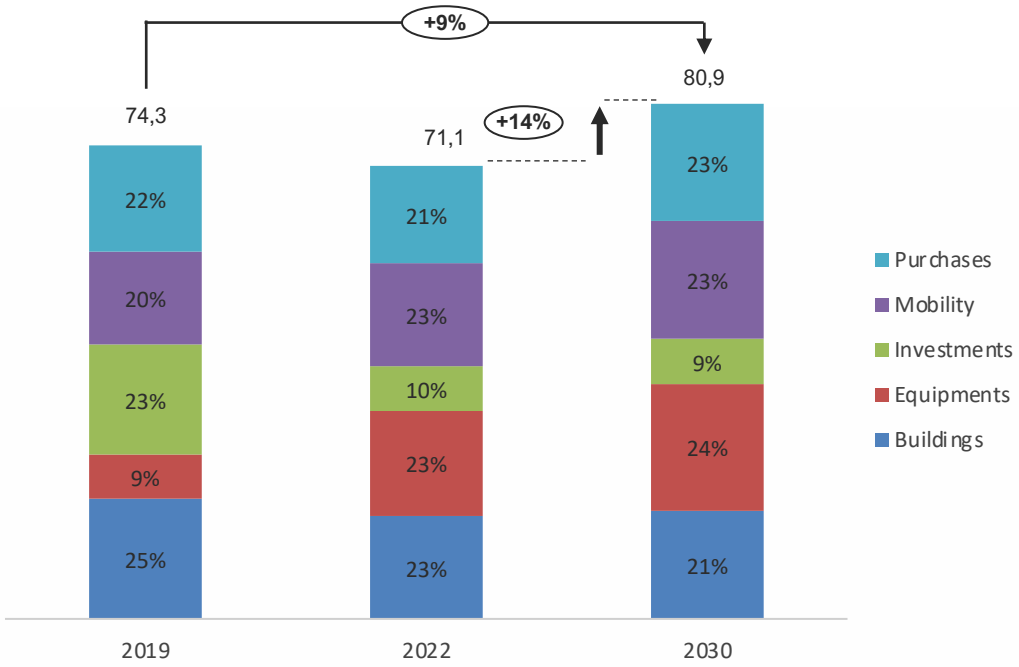
BASELINE

BUSINESS-AS-USUAL SCENARIO

VUB's carbon footprint in 2022 and 2030 according to a business-as-usual scenario [ktCO2e]



Note: Emissions are reported here according to the market-based approach
Business as usual is heavily dependent on assumptions & estimations of driver trends.

The **business-as-usual scenario** is the expected carbon footprint in 2030 when **no additional mitigation actions** are taken. It is always (re)calculated based on the most recent carbon footprint, in this case 2022.

HYPOTHESES OF DRIVERS

- Number of students will grow by 51%
- Number of staff will grow by by 24%
- The building surface will increase by 3%
- The research budget will increase by 49%

Context

Carbon Footprint

Baseline

Action plan

Next steps

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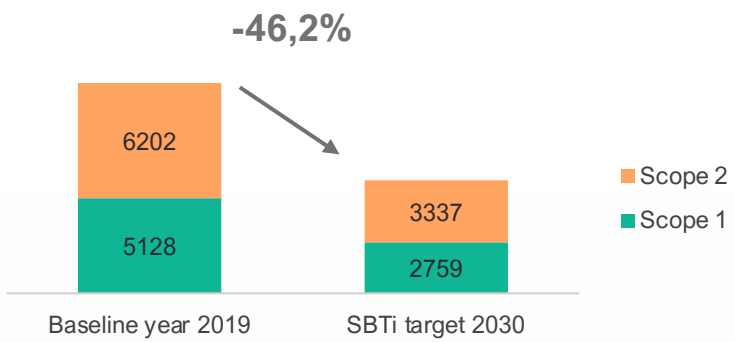
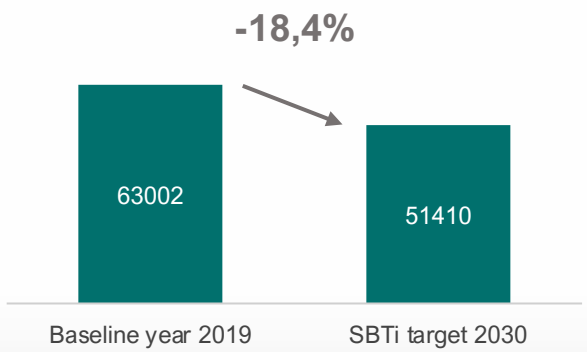
TARGETS

SCIENCE-BASED TARGETS FOR THE VUB

Illustrative SBT targets for scopes 1&2 [ktCO2e]



Illustrative SBT targets for scope 3 [ktCO2e]



Science-based targets (SBT) are aligned with the Paris agreement and are the most credible climate targets for VUB

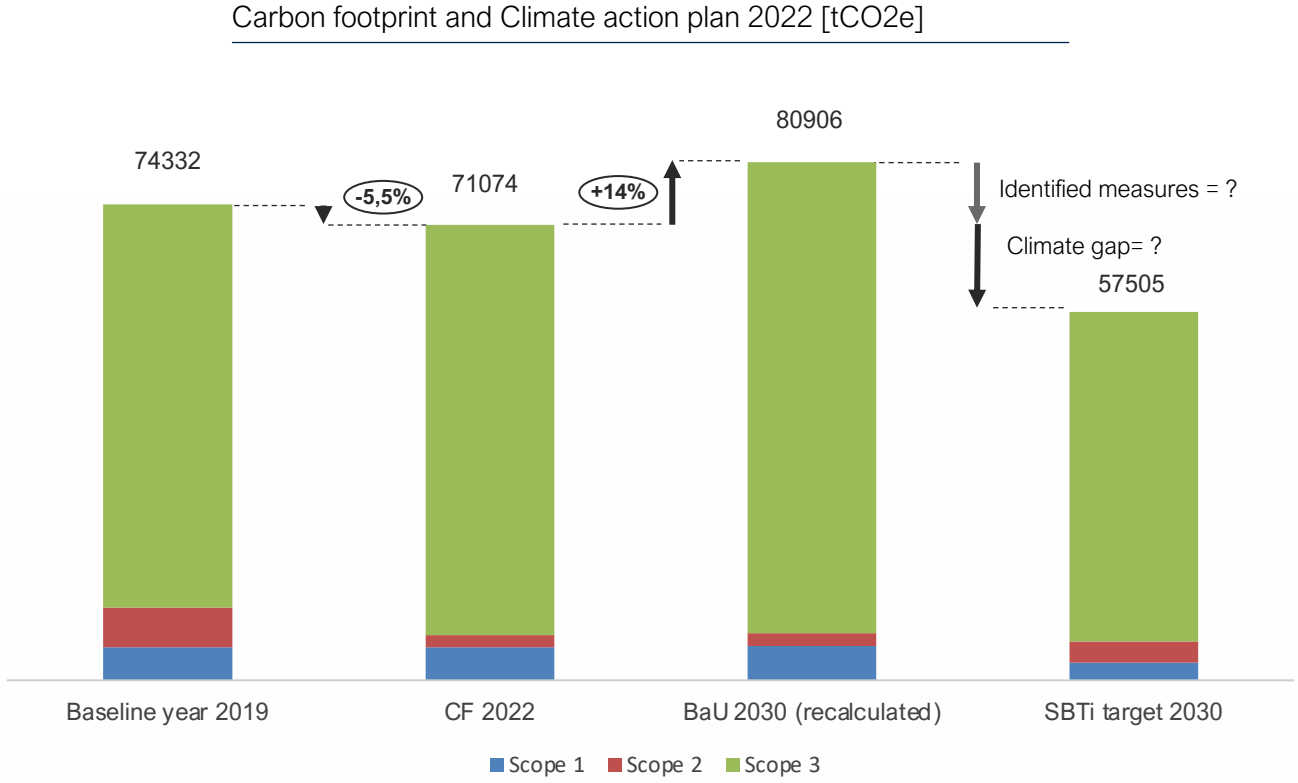
- A minimum SBT ambition means (absolute contraction method):
  - Scope 1 & 2: -4,2% per year (-46,2% in 2030 compared to 2019)
  - Scope 3: -2,5% per year (-27,5% in 2030 compared to 2019)
- Boundaries of the target may be applied to a sub-scope of the footprint:
  - Min 67% of scope 3 footprint (-18,4% over 11 years)

Targets are always compared to the base year (2019), annual reduction rate may vary depending on how the carbon footprint varies.

ACTION PLAN

FIRST AND SECOND ITERATION

- The first iteration of the climate action plan was calculated based on the 2019 carbon footprint and the associated BaU.
- Identified measures (or Climate Actions) were considered if
  - enough data was available
  - technical and operational feasibility was demonstrated
  - in policy or policy-in-design
  - aligned with budgetary priorities
- Conclusion from first iteration
  - The reduction of the scope 1 and 2 emissions is feasible if the identified measures are prioritized and implemented
  - Reducing the scope 3 still requires a lot of additional effort
  - The climate gap was about **20 000 tCO_2e**
- The second iteration will be based on the recalculated BaU.



ACTION PLAN

EXAMPLES OF MEASURES IN FIRST ITERATION OF ACTION PLAN

- Further roll-out of PV panels to 2000 kWp in total by 2030
- Monitoring and control HVAC (Etterbeek and Jette): gives savings in gas, electricity and heat
- Renovation of buildings: labs G8-G10, Braem and WVDM
- Heat recovery on all ventilation
- LED lighting everywhere
- Cogeneration in Etterbeek (= own production of electricity, in addition to heat)
- Renovation of substations (Etterbeek and Jette)
- Purchase of green electricity, which was not the case in 2019, but since 2020 it is again
- Cooling gases: more efficient cooling and refrigerant with a max. GWP of 550
- …

! Not all these measures have been implemented yet and will be part of the second iteration as well.

Context

Carbon Footprint

Baseline

Action plan

Next steps

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NEXT STEPS

PRIORITIES FOR 2024

- Monitor progress on existing measures
- Improvement of data quality
- Define new measures in priority areas such as
  - Business travel: update of sustainable travel policy
  - Purchases: sustainable purchasing policy,
  - Buildings: sustainable materials and circularity

- Recalculation of climate gap (second iteration) after new measures are defined

NEXT STEPS

TIMELINE