

# UNIVERSITY OF TWENTE.

Carbon Footprint Report 2022



realised

# University of Twente Carbon Footprint 2022

## Introduction

Dear reader,

Welcome to the University of Twente 2022 carbon footprint report. Every year the university reports their carbon footprint with the goal of providing full transparency of its impact. The ambition of the university is to reduce her carbon footprint by 49% in 2030. This year, a significant reduction in the carbon footprint was achieved. We hope you carefully read this report on how these reductions have been established. In addition, this year, we are also reporting the underlying values, such as energy consumption or travel distance, in order to further provide transparency and support policy development.

CO2 data is collected and stored in the newly developed Carbon Platform, with the aim to increase the frequency of data acquisition where relevant, enable better monitoring, improve communication and create more impactful policies and measures. The previous reports were snapshots of our carbon footprint of what we had insightful at a specific moment in time. As organisations supply us with information throughout the year, this is often added the year after, making a report incomplete.

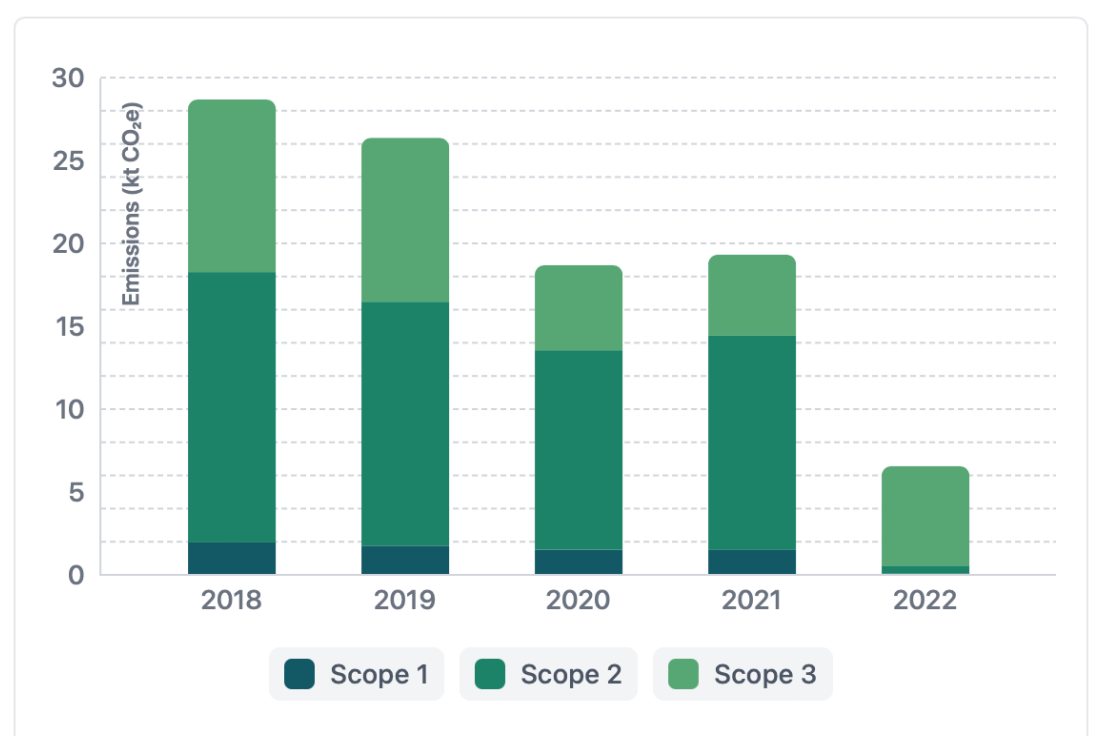
That is why the carbon footprint report is now a dynamic webpage. Increasing data acquisition where possible, for themes such as flying or waste, allows the UT to more closely follow the measures taken to reduce the impact and offer guidance where needed. Presenting this directly coupled with data allows for the most recent numbers to be public, in line with the aim to have full transparency.

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## Summary

The university has been assessing its environmental impact by reporting her carbon footprint since 2014. The carbon footprint reflects not only the impact of the activities of the university itself, but is also used as a tool to encourage its partners to report their greenhouse gas emissions and work together towards a sustainable future. The carbon footprint enables monitoring of the progress of the strategic goal to: "Become a sustainable organisation in 2030 and reduce the carbon footprint by 49% in 2030."

The carbon footprint of 2022 with 6.6 kton is a significant reduction from 2019. The purchase of green electricity and compensation for the gas consumption as well as a reduction in flights compared to 2019 led to a significant decrease. The report aims to clarify these reductions but also report on the underlying values to provide further explanation and support for policy decisions.



CATEGORY	UNIT	2018	2019	2020	2021	2022
Scope 1	kg CO <sub>2</sub> e	1,958,168.28	1,761,167.85	1,519,025.55	1,500,455.8	71,684.34
Scope 2	kg CO <sub>2</sub> e	16,310,971.44	14,720,950.35	12,034,634.12	12,931,521.18	488,043.2
Scope 3	kg CO <sub>2</sub> e	10,409,495.87	9,877,607.97	5,127,803.85	4,883,975.24	5,997,240.79

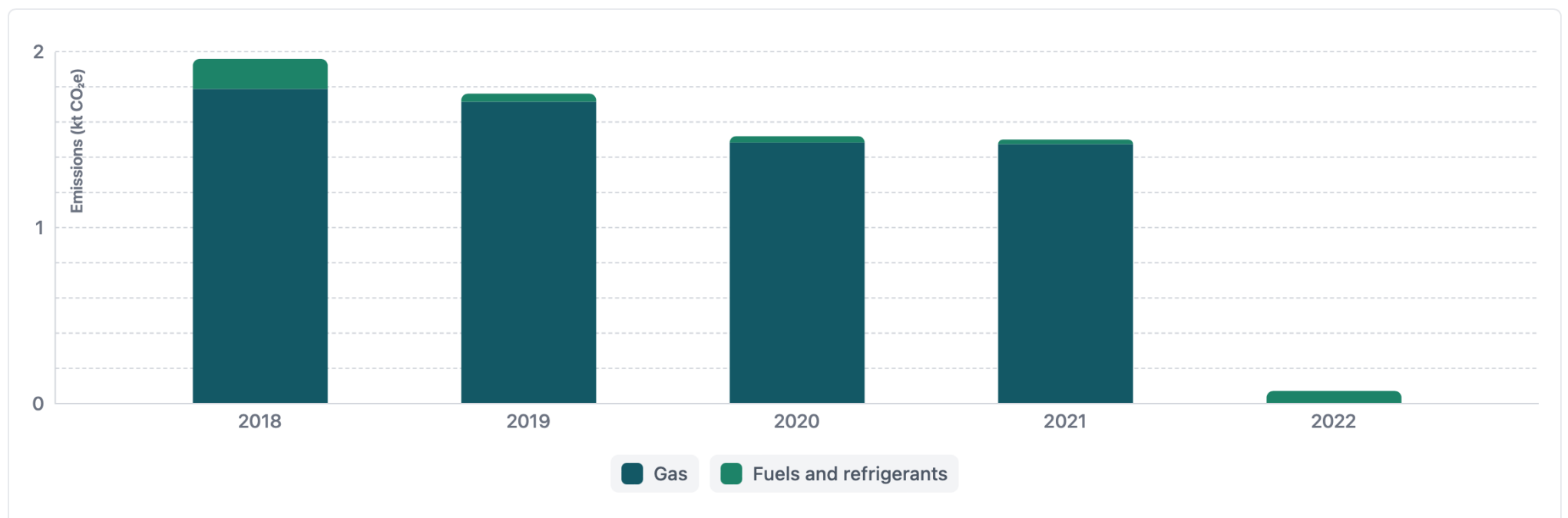
# Scope 1 - Direct Emissions

The University of Twente has various direct sources of GHG emissions. Over 2022 the emissions of gas consumption were offset through a Voluntary Emission Reduction (VER). The remaining emissions are caused by the use of petrol, diesel, and refrigerants. The gas consumption of the university is low as most buildings use district heating. Real-time information about energy consumption can be found at [Energy Data platform](#). The refrigerants are incidental refills of air conditioning systems and do not occur each year. The emissions of all sources and the total are given in the table below.

In addition, the consumption of gas is reported. The consumption of gas has been significantly reduced since 2019, with a reduction of more than 29% due to saving measures and further implementation of district heating. The largest remainder of gas consumption is due to the humidification of laboratories.

CATEGORY	UNIT	2018	2019	2020	2021	2022
Gas	kg CO <sub>2</sub> e	1,788,119.55	1,714,989.78	1,483,314.65	1,473,877.69	0
Petrol	kg CO <sub>2</sub> e	0	7,958.43	8,143.76	7,565.8	7,193.24
Diesel	kg CO <sub>2</sub> e	26,998.13	31,955.64	21,929.55	19,012.31	9,900.69
Refrigerant R134a	kg CO <sub>2</sub> e	61,490	0	0	0	39,000
Refrigerant R410a	kg CO <sub>2</sub> e	65,772	6,264	5,637.6	0	0
Refrigerant R407c	kg CO <sub>2</sub> e	15,788.6	0	0	0	15,590.4
Scope 1	kg CO <sub>2</sub> e	1,958,168.28	1,761,167.85	1,519,025.55	1,500,455.8	71,684.34

CATEGORY	UNIT	2018	2019	2020	2021	2022
Gas	m <sup>3</sup>	946,095	907,402	787,322	782,313	641,149



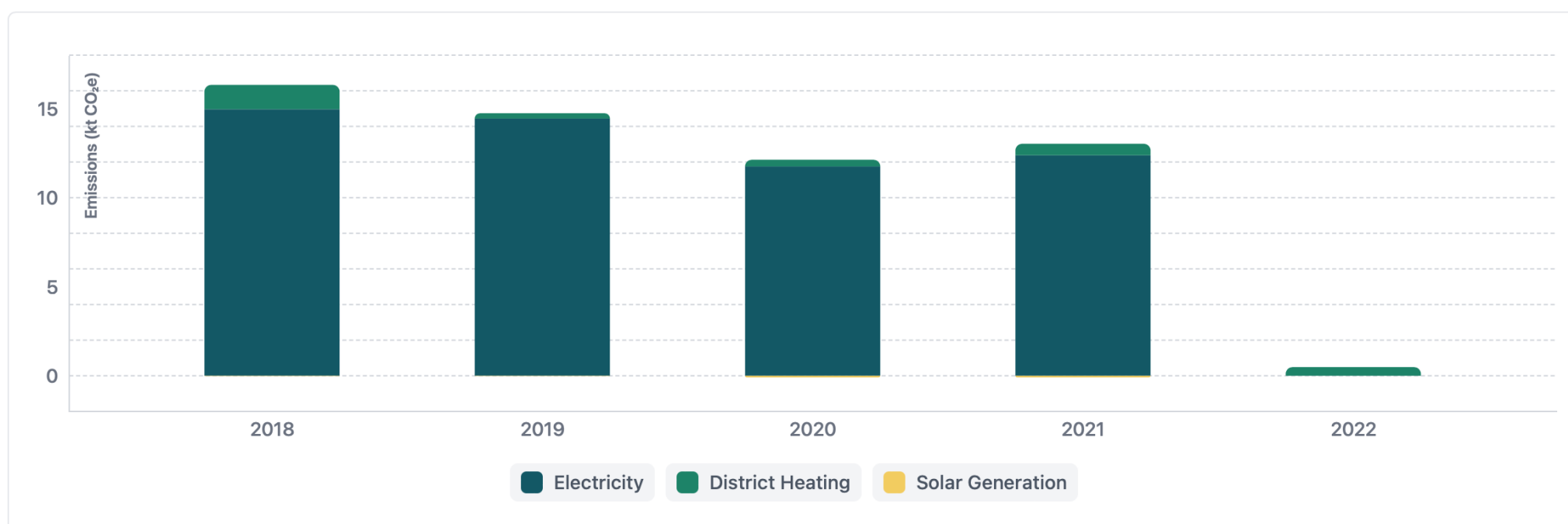
# Scope 2 - Indirect Emissions

Indirect GHG emissions are caused by the electricity and district heating consumed at the university. These forms of energy are generated elsewhere but are directly consumed by the university. The total consumption of electricity by the university is accounted for and the generation of solar is deducted from that. Solar energy generation with solar panels occurs at the Horst, Drienerburgh, Solar car park at the Pavillion, and Technohal buildings and solar collectors are used at the Sports Centre and Swimming pool.

With the purchase of certificates of origin from Wind and Solar power, the university has mitigated its emissions from electricity. Solar generation is therefore also not accounted as a mitigating measure, as the university utilises all power itself. In order to communicate the actual consumption to motivate reduction measures the total consumption of electricity and district heating, and generation of solar power are also provided. In comparison to 2019, the electricity consumption has increased by 6% and the consumption of district heating by 17%. The increase in district heating can partly be attributed to the replacement of gas for heating for some buildings.

CATEGORY	UNIT	2018	2019	2020	2021	2022
Electricity	kg CO <sub>2</sub> e	14,961,498.24	14,439,229.77	11,750,795.9	12,377,792.1	0
Solar Generation	kg CO <sub>2</sub> e	-19,813.32	-18,419.92	-94,194.18	-93,644.86	0
District Heating	kg CO <sub>2</sub> e	1,369,286.52	300,140.5	378,032.4	647,373.94	488,043.2

CATEGORY	UNIT	2018	2019	2020	2021	2022
Electricity	MWh	23,053.16	22,248.43	21,134.53	22,262.22	23,602.37
Solar Generation	MWh	-30.53	-28.38	-169.41	-168.43	-210.21
District Heating	GJ	56,772.11	54,571	55,593	73,565.22	63,880





# Scope 3 - Sphere of Influence

The third scope of the carbon footprint considers upstream and downstream GHG emissions. Upstream refers to purchased goods and services, waste, rented assets, work-related travel, and transport and distribution while downstream includes waste processing, let assets, investments, and transport and distribution.

The upstream and downstream categories are further specified and aligned with the university's strategy into: Business Travel, Commuting, Procurement, Waste, and Water. In these categories, the supply of data from third parties varies yearly. More details per category are provided below.



CATEGORY	UNIT	2018	2019	2020	2021	2022
Business Travel	kg CO <sub>2</sub> e	4,045,016.67	2,892,563.23	675,978.9	293,855.19	2,164,210.88
Commuting	kg CO <sub>2</sub> e	4,723,731.7	4,976,383.21	2,390,434.08	2,400,418.19	2,043,148.84
Procurement	kg CO <sub>2</sub> e	912,279	1,227,628.53	1,282,580.1	1,382,973.4	639,432.16
Waste	kg CO <sub>2</sub> e	607,000	631,000	749,913.93	775,380.27	1,112,086.77
Water	kg CO <sub>2</sub> e	121,468.5	150,033	28,896.84	31,348.18	38,362.14

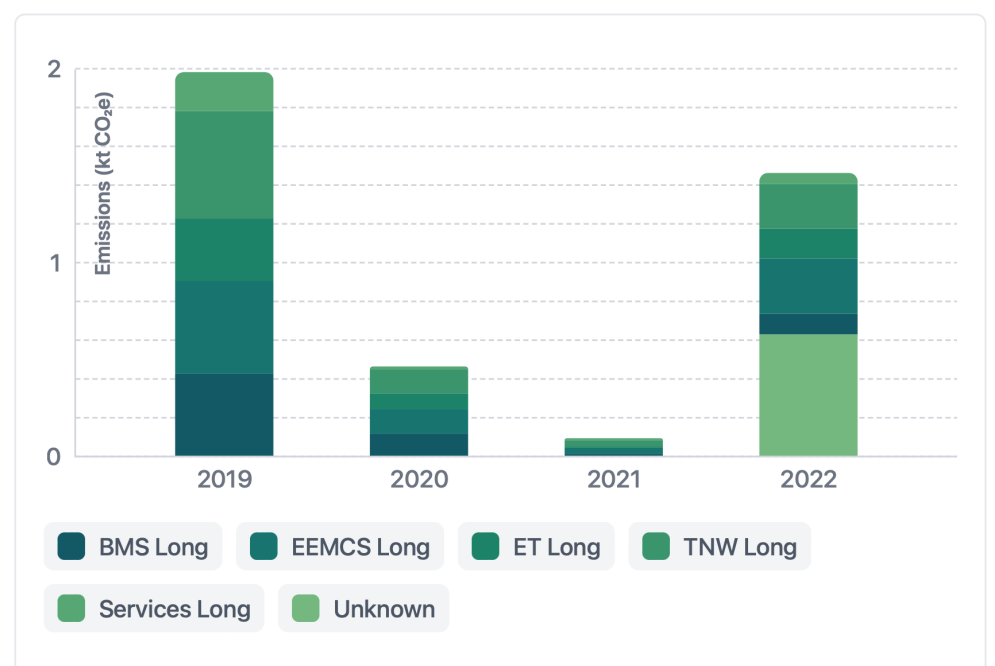
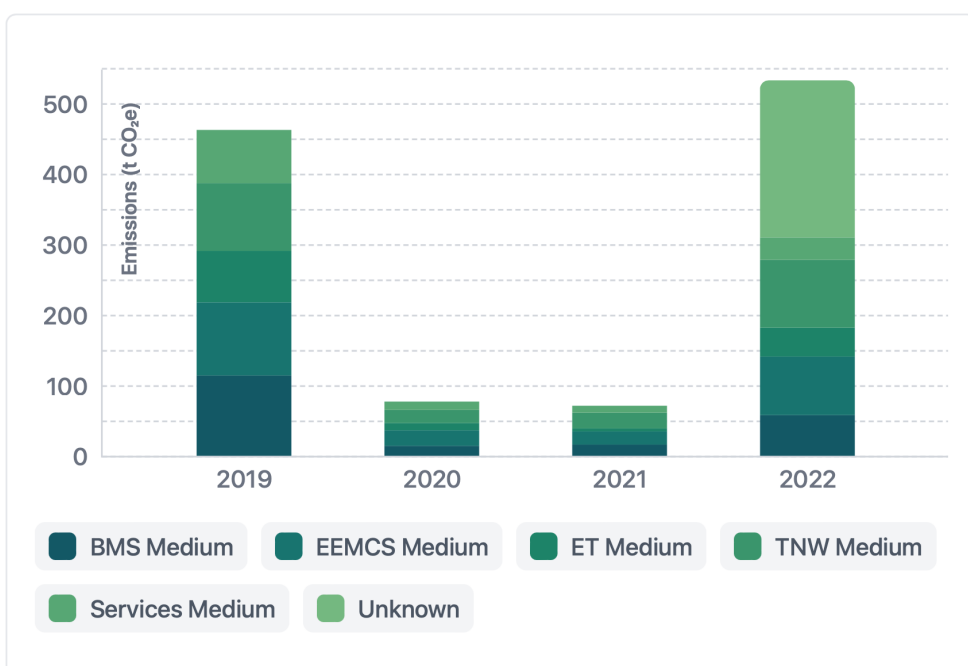
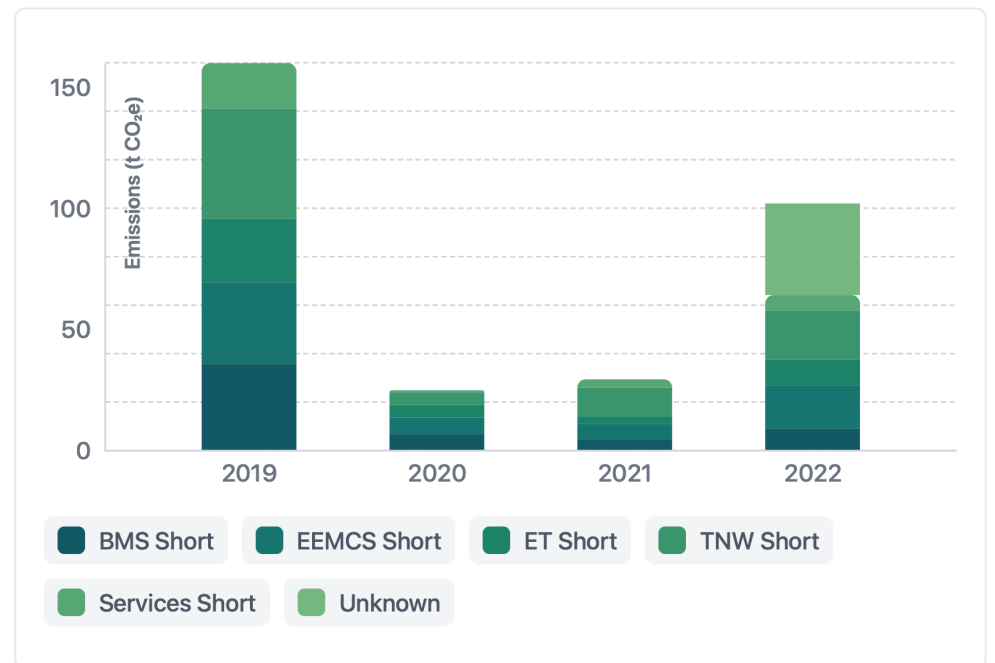
## Business Travel

All travel by employees, using all forms of transport is accounted for in scope 3. This includes train travel, car rental, flying and private car use for work. The university discourages flying to locations within a 800 kilometer radius from the university. Although a mobility study and carbon footprint rely on the same data, a carbon footprint accounts for the GHG emissions for flights in three distance categories. For example: a flight with a distance of 700 kilometers or less can occur between locations anywhere in the world, thus making the figures represented here relevant for GHG emissions but not directly for a mobility study. The monitoring of this ambition uses the same data as is used for the CO<sub>2</sub> footprint. But the emission factors used to calculate the CO<sub>2</sub> emissions of flights are categorised slightly differently: short (<700 km), medium (700-2500 km) and long (>2500 km).

CATEGORY	UNIT	2018	2019	2020	2021	2022
Flying short	kg CO <sub>2</sub> e	0	159,864.41	24,897.81	29,406.27	101,966.44
Flying medium	kg CO <sub>2</sub> e	0	463,253.8	78,050.6	72,152.6	533,554.15
Flying long	kg CO <sub>2</sub> e	0	1,982,664.26	464,540.73	94,250.81	1,462,583.74
Flying short 2014-2018	kg CO <sub>2</sub> e	233,755.93	0	0	0	0
Flying medium 2014-2018	kg CO <sub>2</sub> e	627,429.6	0	0	0	0
Flying long 2014-2018	kg CO <sub>2</sub> e	2,883,429.7	0	0	0	0

CATEGORY	UNIT	2018	2019	2020	2021	2022
Coach rental	kg CO <sub>2</sub> e	0	0	3,534.73	371.31	2,757.11
Car rental	kg CO <sub>2</sub> e	54,545.04	58,102	11,715.86	10,796.12	25,331.48
Train	kg CO <sub>2</sub> e	25,056.49	28,515.06	10,150.69	2,734.19	10,167.68
Car expense claims	kg CO <sub>2</sub> e	220,799.92	200,163.7	83,088.5	84,143.89	27,850.29

Since 2019 we can discern the flight emissions per faculty. The ITC faculty compensates their emissions and thus is accounted as zero-emission. For the other faculties, the emissions from short-distance flights are given to the right and the medium and long below. The data acquisition of travel data is challenging, and with a new financial bookkeeping system at the university, not all flights could be allocated to the associated faculty. We encourage further improvements on this and in addition a clear university-wide policy on possible compensation schemes instead of faculty, or research group-specific measures.



In order to compare the flying behaviour of various faculties and departments overview is present of the total flight kilometers in each category. The following tables are the kilometers traveled between destinations that are <700 km, 700-2500 km, and 2500+ km apart from each other.

CATEGORY	UNIT	2019	2020	2021	2022
BMS	km	120,348	22,412	14,379	38,795
EEMCS	km	113,288	23,418	22,542	76,415
ET	km	88,287	17,654	10,805	45,028
ITC	km	99,974	14,128	21,332	22,009
TNW	km	153,287	17,690	39,762	86,695
Services	km	63,054	2,657	11,523	27,428
Unknown	km	0	0	0	161,393

CATEGORY	UNIT	2019	2020	2021	2022
BMS	km	575,278	76,363	85,297	342,213
EEMCS	km	518,893	110,200	93,617	482,781
ET	km	364,198	50,907	21,195	238,186
ITC	km	376,169	84,550	160,271	258,413
TNW	km	480,353	93,432	111,292	558,677
Services	km	377,547	59,351	49,362	185,151
Unknown	km	0	0	0	1,295,051

CATEGORY	UNIT	2019	2020	2021	2022
BMS	km	2,906,203	803,048	96,842	671,410
EEMCS	km	3,260,880	867,779	209,852	1,815,516
ET	km	2,178,136	541,068	36,365	981,421
ITC	km	6,578,724	1,954,421	497,564	1,946,346
TNW	km	3,777,733	849,278	232,489	1,465,008
Services	km	1,364,560	98,968	65,614	366,894
Unknown	km	0	0	0	4,015,571

## Commuting

Most employees and students travel to the university by car, train, or bike. Last year a new mobility survey was conducted, which greatly improved the data on commuting.

CATEGORY	UNIT	2018	2019	2020	2021	2022
Employees Car	kg CO <sub>2</sub> e	1,782,457.6	1,882,117.38	910,219.64	967,394.22	1,238,723.22
Employees Train	kg CO <sub>2</sub> e	43,246.79	45,664.79	24,915.46	8,826.83	6,874.73
Employees Electric Bike/Speedpedelec	kg CO <sub>2</sub> e	0	0	0	0	17,954.81
Employees Electric car	kg CO <sub>2</sub> e	0	0	0	0	22,184.15
Employees Plug-In Hybrid	kg CO <sub>2</sub> e	0	0	0	0	5,987.71
Employees Hybrid car	kg CO <sub>2</sub> e	0	0	0	0	62,915.9
Employees Motor	kg CO <sub>2</sub> e	0	0	0	0	17,598.4
Employees Bus	kg CO <sub>2</sub> e	0	0	0	0	20,534.76

CATEGORY	UNIT	2018	2019	2020	2021	2022
Students Car	kg CO <sub>2</sub> e	2,709,205.18	2,849,968.22	1,349,208.12	1,387,821.44	506,978.77
Students Train	kg CO <sub>2</sub> e	188,822.12	198,632.82	106,090.87	36,375.7	10,435.36
Students Electric Bike/Speedpedelec	kg CO <sub>2</sub> e	0	0	0	0	3,670.37
Students Electric car	kg CO <sub>2</sub> e	0	0	0	0	1,019.58
Students Hybrid car	kg CO <sub>2</sub> e	0	0	0	0	0
Students Plug-In Hybrid	kg CO <sub>2</sub> e	0	0	0	0	10,747.26
Students Motor	kg CO <sub>2</sub> e	0	0	0	0	0
Students Bus	kg CO <sub>2</sub> e	0	0	0	0	117,523.82

## Procurement

The suppliers and contractors of the university were invited to submit CO2 footprint data concerning the services or goods delivered to the university. The various categories in this section and their impact are listed below. Every year the aim is to grow this comprehensive list of suppliers.

CATEGORY	UNIT	2018	2019	2020	2021	2022
Infrastructure	kg CO <sub>2</sub> e	39,400	39,020	30,170	15,850	14,540
Maintenance	kg CO <sub>2</sub> e	53,275	421,400	523,340	374,964.43	17,392.91
Cleaning	kg CO <sub>2</sub> e	71,800	68,590	65,147.6	64,032.64	1,474.71
Catering	kg CO <sub>2</sub> e	29,200	340,627	21,000	414,026	582,495
Hotels	kg CO <sub>2</sub> e	0	0	333,658.26	389,005.57	2,686
Landscaping	kg CO <sub>2</sub> e	92,900	62,350	3,794.4	-75,632	-157,012
Movers	kg CO <sub>2</sub> e	0	4,749.73	254.44	671.45	32.64
Mobility hired personnel	kg CO <sub>2</sub> e	36,500	47,660.8	20,369.7	25,669.8	3,993.17
Lab supplies	kg CO <sub>2</sub> e	0	0	6,244.79	22,264.46	93,262.53
Office supplies	kg CO <sub>2</sub> e	0	0	9,664.5	32,331.44	73,448.25
Printing services	kg CO <sub>2</sub> e	0	68,870	115,127.36	106,568.12	201.24
ICT Hardware	kg CO <sub>2</sub> e	382,500	0	40,214.2	13,013	6,521.55
Financial Services	kg CO <sub>2</sub> e	0	0	0	208.5	250.8

# Waste

PreZero carries out the waste management for the university since 2017 and provides GHG emissions data for the various waste streams of the university. PreZero works together with consultancy firm CE Delft to provide an accurate estimation of the impact of the waste streams. The amount of waste reduced from 880 tonnes in 2019 to 624 tonnes in 2020, but due to more detailed reporting by PreZero the CO2 emissions have increased. The emissions for waste have increased mostly due to better data acquisition of various waste streams.

CATEGORY	UNIT	2018	2019	2020	2021	2022
Waste	kg CO <sub>2</sub> e	607,000	631,000	749,913.93	775,380.27	1,112,086.77

CATEGORY	UNIT	2018	2019	2020	2021	2022
Waste	ton	607	631	624.28	650.06	1,142.46

# Water

The GHG emissions of water for this year are based on figures supplied by the water supplier Vitens. The campus-specific study of 2010 that was used previously has been replaced, as these figures better reflect the current situation. From 2019 onwards, water consumption of the ITC hotel has been included, this causes an increase in water consumption, as this was not done previously.

The amount of water that is consumed has returned to pre-Covid levels.

CATEGORY	UNIT	2018	2019	2020	2021	2022
Water	kg CO <sub>2</sub> e	121,468.5	150,033	28,896.84	31,348.18	38,362.14

CATEGORY	UNIT	2018	2019	2020	2021	2022
Water	m <sup>3</sup>	80,979	100,022	72,788	79,362.48	100,953