Universiteit Utrecht

CO_2 footprint report 2019

SUSTAINABILITY PROGRAMME

15 JUNE 2020

Contents

Summary

Utrecht University plans to be **CO_2 neutral by 2030**. Since 2014, the university annually publishes the greenhouse gas emissions caused by activities of the organisation. **The total CO_2 emissions in 2019 amounted to 62,780 tonnes.** This is 1% more than in 2018. In 2019, the footprint was 17,311 tonnes (22%) less than in 2014. Since 2014, the UU has emitted a total of 402,000 tonnes.

The main categories of CO_2 emissions are natural gas combustion (53%), air travel (15%), commuting (11%) and agriculture (5%). In addition, emissions from fuel generation (mainly natural gas) make up 12% of the total.

In 2019, the university generated more than 3% of its energy from its **own renewable sources**. Together with the purchase of wind energy and green gas certificates, **the share of renewable energy was 25% of the total energy mix**. The university aims to generate 100% of the energy used locally and renewably by 2030. Without the purchase of wind energy and green gas, emissions in 2019 would be 70,445 tonnes.

The most important developments in 2019 are interventions and decisions that will have an impact on the footprint in the coming years: real estate renewal, sustainable travel and a reorganisation of agricultural activities. Together, preliminary calculations show that these measures will result in the UU emitting less CO_2 in the coming decade than in the past six years.

Continued attention to timely implementation of real estate renewal (and thus reduction of natural gas consumption) and other measures (especially on agriculture and air travel) is crucial to minimize CO_2 emissions in the next decade. **Ultimately, combating climate change is about the emissions that accumulate in the atmosphere. These cumulative emissions will logically be at their lowest in 2030 when the UU achieves major savings as soon as possible.**

Introduction

Climate change is one of the biggest challenges of this century. Scientists from Utrecht University have made important contributions[1] to the IPCC[2] reports, which show that emissions of greenhouse gases by human activity has already caused a temperature increase of more than 1 degree Celsius. Further warming poses a risk to the social and economic well-being of our society.

The goal of the signatories of the Paris Climate Accord is to keep warming below the relatively safe limit of 1.5 degrees Celsius[3]. To achieve this, global CO_2 emissions must be drastically reduced and the UU wants to contribute to this. With the help of education and research aimed at sustainability and the climate, along-side progressive management, the UU aims to be CO_2 neutral by 2030.

This CO_2 footprint is part of the UU Sustainability Monitor and has been drawn up by the University's Sustainability Programme on behalf of the Executive Board (CvB). Based on this report, the Executive Board annually evaluates progress on the CO_2 strategy. The present report concerns the CO_2 emissions of 2019 and the progress over the period 2014-2019.

The UU wants to be CO_2 neutral by 2030. This means that the UU's activities do not contribute to climate change in net terms. Climate neutral is therefore actually a better term, because it concerns all greenhouse gases that cause climate change.

However, it is important to be realistic about the objectives to be achieved: becoming truly CO_2 neutral is not feasible for the UU for many practical reasons; in 2030 there will still be activities resulting in greenhouse gas emissions, which are part of Utrecht University's primary process. Think of flying to conferences and the livestock of the Faculty of Veterinary Medicine. It goes without saying that remaining emissions can be offset, although this is not a real solution.

1 https://www.uu.nl/in-de-media/de-ipcc-ervaringen-van-roderik-van-de-wal

2 Intergovernmental Panel on Climate Change (United Nations)

3 The Paris Climate Accord (2015) set the upper limit of 2 degrees warming compared to the pre-industrial era. In addition, it set the goal of limiting warming to 1.5 degrees.

CHAPTER 1

CO_2 footprint 2019

The total CO_2 footprint of the university in 2019 is 62,780 tonnes[4]. That is 647 tonnes or 1% more than in 2018 and 17,311 tonnes or 22% less than in 2014. The following diagram shows which factors contribute to the 2019 footprint and to what extent.

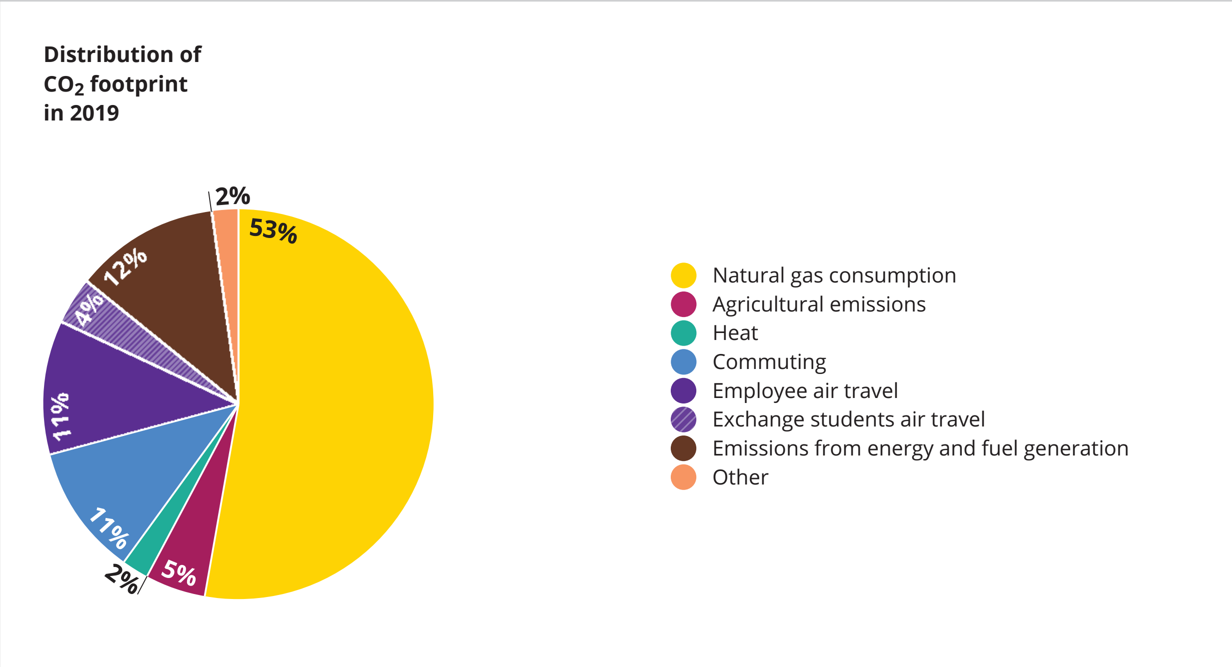

Figure 1. CO_2 emissions 2019 per category.

4 That is 62,780,000 kilogram CO_2 equivalents, which includes all greenhouse gases.

The table below shows the figures by category for the years 2014 (base year), 2018 and 2019.

EMISSIONS BROKEN DOWN BY SCOPE

		CO_2 emissions per year (tonnes/year)			Difference [%]
		2014	**2018**	**2019**	**2018**
	Direct emissions	35,393	36,345	36,712	1.01%
Scope 1	Natural gas consumption	32.823	32.650	33.310	2.02%
	- Power plant: electricity feed-in	-	*1591*	*1802*	*13.30%*
	- Power plant: third party electricity	-	*2139*	*2074*	*-3.01%*
	- Power plant: heat for the benefit of third parties	-	*5858*	*5312*	*-9.32%*
	Fuel consumption of own feed/ implements	242	140	121	-13.76%
	Fuel consumption emergency generators	20	9	8	-10.85%
	Refrigerants	367	161	106	-34.26%
	Emissions from agriculture	1.961	3.384	3.167	-6.43%
	Indirect emissions from energy generation	13.590	1.045	1.145	-1.65%
Scope 2	Purchase of electricity	12.175	-	-	-
	(Residual) heat consumption	1.415	1.045	1.145	9.63%
	Other indirect emissions	31.108	24.743	24.923	15.15%
Scope 3	Fuel consumption commuting public transport	8.574	2.732	2.745	0.48%
	Fuel consumption commuting private cars (incl. scooter)	3.963	4.020	4.132	2.78%
	Fuel consumption business traffic private cars	280	264	173	-34.32%
	Fuel consumption air travel employees	5.959	6.664	6.873	3.13%
	Fuel consumption air travel exchange students	2.351	2.710	2.905	7.20%
	Emissions from waste processing	505	350	329	-6.00%
	Emissions catering	352	423	423	0.00%
	Emissions from energy and fuel generation (WTT)	9.125	7.580	7.343	-3.13%
	Total	**80.091**	**62.133**	**62.780**	**1.04%**

Table 1. Emissions by detailed category in base year 2014, 2018 and 2019, and the difference between 2019 and 2018. Due to a correction to the calculation based on new key figures, the total CO_2 footprint of 2018 has changed slightly compared to last year. Also, due to direct purchase of Vertogas, the emissions of this gas now take place in scope 1, instead of scope 3 (see also the heading 'Natural Gas').

FOOTPRINT ANALYSIS 2019

Below, the most important contributors to the CO_2 footprint are briefly explained and ordered based on share of total emissions.

Natural gas – 53.06%

Utrecht University consumed a total of 20,733,848 m^3 of gas. This is roughly 350,000 m^3 more than in 2018. Nearly 10% of the total gas consumption, 2 million m^3, was compensated with green gas. This is gas generated through the fermentation of biomass in the Netherlands. In 2019, the university purchased this directly from the source for the second time. The emissions of this gas are absent in the emissions from scope 1, and partly return in scope 3, in coherence with emissions originating from generation.

The increase in natural gas consumption is due to the recent renovation of one of the two boiler houses in Utrecht Science Park. The combined heat and power plant takes over part of the heat production, while simultaneously generating electricity. Because the power station always produces electricity when producing heat (see also Appendix I), more gas was needed on balance (and less electricity purchase). As a result of this construction, there is security of supply in an efficient manner for energy generation. This corresponds with the third pillar of the Trias Energetica.

Air traffic – 15.57%

Emissions from air travel by employees and exchange students increased by approximately 400 tonnes, more than 4%. This is due to an increase in the number of employees and students. The university determines these emissions based on the average number of air journeys per person, revealed by a mobility study (2017). In order to obtain a more realistic picture of the number of air travel, the university is working on a different way of monitoring.

In 2019, the university offset the emissions from air traffic with a certified CO_2 offsetting project. This compensation was not included in the footprint, because the price per tonne of CO_2 (5 euros) is very different from the current European CO_2 price (20-30 euros) and the estimated actual price of CO_2 (100-200 euros).

Generation of energy and fuel – 11.70%

The emissions associated with the production of, among other things, natural gas, vertogas and wind energy by other companies accounted for 7,343 tonnes. The total decreased by more than 3% compared to 2018.

Commuting – 10.95%

The commuting of employees and students (thus including "home-study traffic") consists of 6.6% car and 4.4% public transport. Similar to air travel, the university determines emissions on the basis of travel behaviour based on a mobility study (2017). Data from the parking management system show that the distribution by means of transport used is fairly accurate. Also see the Mobility chapter in the Sustainability Monitor 2019.

Agricultural activities - 5.04%
Total emissions from agricultural activities was 3,167 tonnes, more than 6% less than in 2018. This decrease is the result of fewer cows and pigs kept in 2019.

The Faculty of Veterinary Medicine carried out an inventory of CO_2 emissions per kilogram of measuring milk[5] for the De Tolakker university farm. The CO_2 emissions in 2019 was 1.07 kg CO_2/kg measuring milk. The national and global average is respectively 1.24 and 2.4 CO_2/kg. The 2030 target for De Tolakker is 0.95 kg CO_2/kg[6] measuring milk.

Heat - 1.82%
In 2019, the university consumed slightly more district heating from the Eneco power station in Utrecht than in 2018, resulting in an additional 100 tonnes (10%) of emissions.

Other - 1.85%
The category other, with several small categories such as refrigerants and waste disposal, remained virtually unchanged at 1,160 tonnes.

Purchase of electricity - 0%
Since the UU purchases 100% Dutch wind energy, the emissions from the purchase of electricity in scope 2 is zero. In 2014, emissions from the purchase of electricity was still 12,175 tonnes of CO_2, or 15% of the total footprint. Only now are emissions from the generation of wind energy included in the footprint, under the category Energy and fuel generation (scope 3).

In 2019, the university purchased almost 8 million kWh (40%) less wind energy. The section on Natural Gas already explained that in 2019 more natural gas was consumed and more heat was generated in the combined heat and power plant. As a result, the power station automatically produced more electricity, allowing the purchase of wind power to be reduced. Otherwise there would have been a surplus of electricity. Although increasing the university's footprint, the climate effect on the (inter)national scale is positive: as scarce wind energy was now purchased by others and the university used natural gas to generate its own electricity relatively efficiently.

5 Measuring milk stands for the quantity of milk corrected for fat and protein. Because not every dairy farmer has the same fat and protein content in the milk, a correction is made so that the quantity of milk is converted to 4.00% fat and 3.33% protein. Source: http://www.liba.be/wp-content/uploads/2016/05/toelichting.htm

6 Source: https://www.duurzamezuivelketen.nl/resources/uploads/2018/04/Kennisdocument-DZK-broeikasgassen.pdf

Missing factors
In February 2020, an external consultancy investigated which categories are missing from the UU's CO_2 footprint. This 'gap analysis' serves to support the current footprint and checks whether all CO_2-emitting categories are included in the CO_2 footprint. The gap analysis follows the categories and the working method of the GHG protocol[7].

The gap analysis showed that the UU is already very extensive compared to other organisations. Three categories are worth including in the next CO_2 footprint: purchased goods and services (anything the UU purchases, such as data usage), capital goods (the impact of building materials in its own premises) and downstream leased assets (premises the UU rents to third parties). The analysis also made an initial estimate of the emissions caused by these categories based on knowledge of the organisation and previous footprints. In the case of purchases and leased buildings, the estimated issues turned out to be relatively small, while in the case of capital of buildings and goods, the issues turned out to be much larger. In addition, the calculation of the emissions from catering should be made in full.

To add to the above missing factors, research is currently done which will not be completed by 2020. New findings are always implemented retrospectively, so that comparisons with previous years remain possible. Examples of actions that are already being taken within the three categories outlined above are the research into the CO_2 footprint of laptops and the decision to keep the concrete core of the Van Unnik building. The latter decision mainly concerns the large amount of CO_2 that is released during the construction of a new concrete core. On one hand, this is due to the construction activities and the fuel used, on the other, the CO_2 emissions that are created while making concrete also weigh heavily. The emissions saved by this decision will be approximately 3,100 tonnes of CO_2, comparable to the annual emissions from agriculture at the UU.

EMISSIONS PER SCOPE
As shown in the figure below, almost two-thirds of the footprint consists of emissions in scope 1. This scope consists of emissions that are directly caused by the university and therefore also have a direct influence on it. Emissions from scope 2 are a fraction of the total footprint, as only the purchase of heat from Eneco contributes to emissions in this category. Electricity also belongs to Scope 2, but because the UU buys green electricity, no emissions are released. The unavoidable emissions from the generation of green electricity fall under scope 3.

Emissions in scope 3 are more than a third of the total. In general, an organisation has limited influence on emissions in scope 3. Although emissions occur elsewhere,

7 See Appendix II for an explanation of the Greenhouse Gas Protocol used by the UU for this footprint.

these emissions do have a direct relationship with policy and management. By accurately identifying this category, the UU can influence and steer towards more sustainable alternatives. For example, making agreements with suppliers about reducing packaging materials or offering more sustainable food in catering.

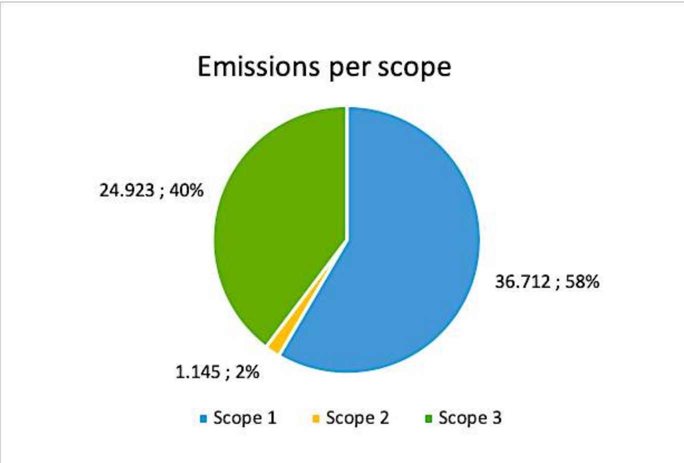

Figure 2. Emissions per scope 2019, in tonnes CO_2 and %.

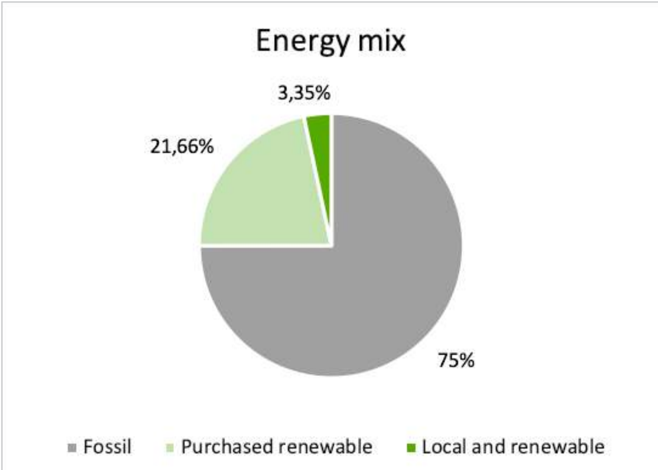

Figure 3. Energy mix 2019.

LOCAL AND RENEWABLE

The goal of Utrecht University is to generate as much energy as possible locally and renewably, based on step 2 of the Trias Energetica[8]. Currently, the university generates 3.35% of its own consumption with solar panels and heat and cold installations (CHP). Including the purchase of wind energy and green gas certificates, the renewable share is 25% (figure 3). To be CO_2 neutral in 2030, it is necessary to focus on reducing consumption and generating as much of the remaining energy as possible both locally and renewably.

Furthermore, it has been decided to purchase 8 million m^3 of green gas certificates annually from 2020.

There is a difference between purchased renewable energy and self-produced (local) renewable energy. An energy mix of 100% self-produced, local renewable energy is the university's ambition, because this is the most sustainable. Energy produced from fossil raw materials is not desirable and will therefore have to be scaled down in the future.

The CO_2 neutral target in 2030 assumes 100% local and renewable energy for the remaining energy needs in 2030. That is why we always distinguish in this report between purchased renewable energy and locally generated renewable energy.

8 The Trias Energetica is a three-step strategy to make an energy-efficient design: 1) reduce energy consumption; 2) maximise the use of renewable sources; 3) efficient use of fossil fuels.

CHAPTER 2

Analysis progress 2014-2019

This chapter looks at the development of the CO_2 footprint from the base year 2014 up to and including 2019.

The graph below shows that from 2014 to 2017 total emissions decreased from over 80 kilotons[9] to around 62 kilotons. Since 2017, emissions have remained virtually unchanged.

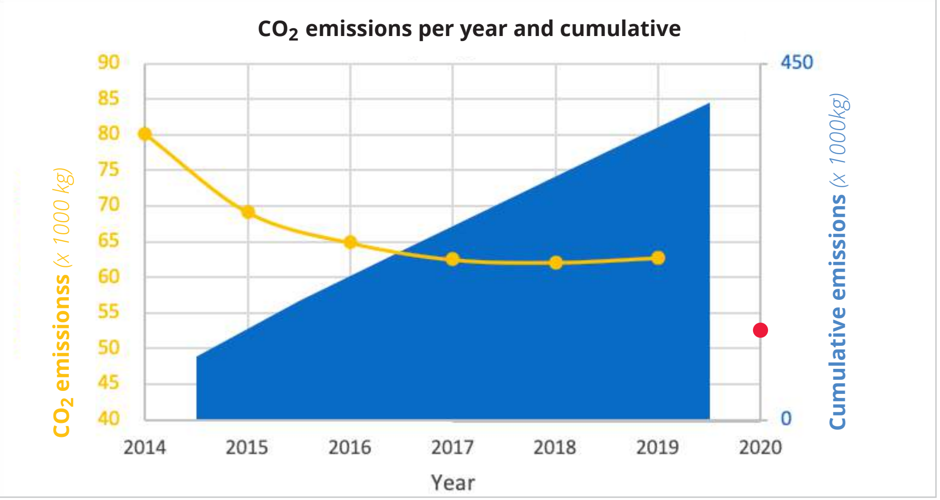

Figure 4. CO_2 emissions 2014-2019.

Without the purchase of green gas and wind energy, the total footprint in 2019 would be 70,445 tonnes. Green gas results in a reduction of 1,062 tonnes compared to natural gas consumption. Wind energy reduces the footprint by 6,603 tonnes compared to the use of electricity generated from fossil fuels. The role of green gas and wind energy is important to mention because the university aims for 100% local and renewable energy generation.

In the CO_2 Strategy 2017-2020, the UU aims for a 33% reduction in 2020 compared to 2014. This would mean a footprint of no more than 53 kilotons. Figure 4 shows that the university is unlikely to achieve this target, as indicated by the red dot.

EMISSIONS PER SCOPE

Figure 5 shows that emissions in scope 1 decreased in 2019 and retroactively in 2018. This is due to a change in the way of registering green gas. While this was registered as offsetting last year, it is now counted as direct purchase. This means that the emissions in scope 1 are eliminated, because the direct emissions of green gas are CO_2 neutral. The emissions in scope 3 increase as a result of green gas production that has been moved to the designated

9 A kiloton is 1,000 tons or 1,000,000 kilos.

category (generation of energy and fuel). Although this change does not affect the total emissions, it does change the ratio between the scopes. Total natural gas consumption rose by some 350,000 m^3. This is reflected in a slight increase in scope 1 compared to 2018. Emissions from agriculture (also scope 1) decreased by 218 tonnes.

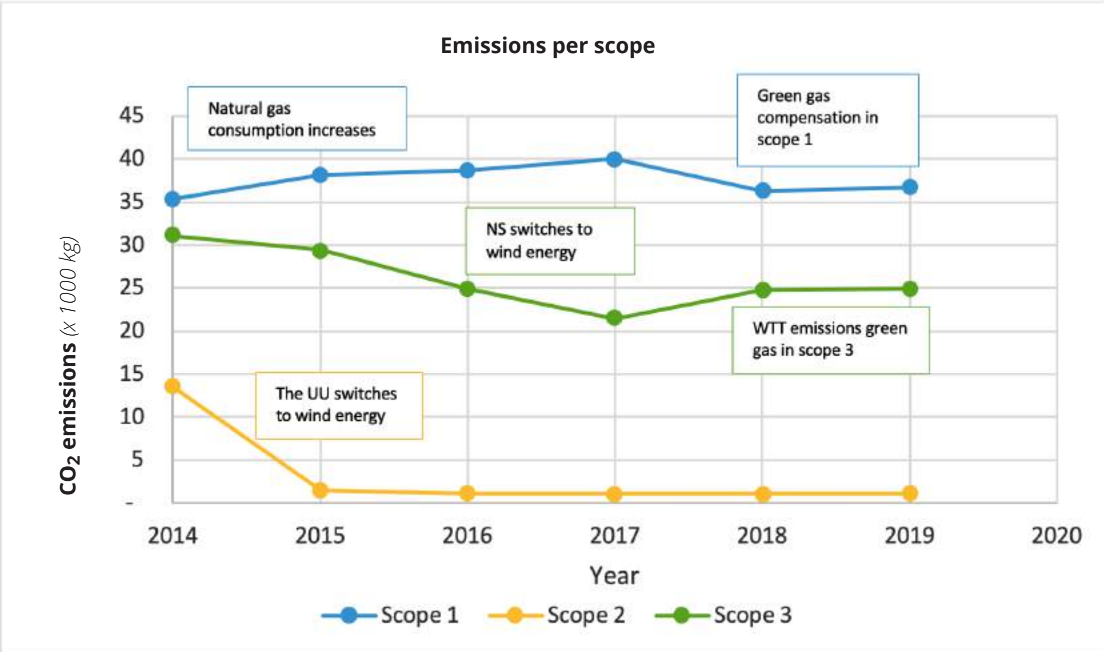

Figure 5. Emissions per scope 2014-2019.

LOOK AHEAD

The university has made important preparations in 2018 and 2019, which shall lead to an accelerating reduction in emissions in the coming years. Cumulative emissions from 2014 to 2019 are 402 kilotons. Based on preliminary calculations, it seems possible to emit less CO_2 in the next ten years than was emitted in the past six years. In the soon to be published CO_2 strategy of 2020-2025, the university will present quantitative scenarios towards 2030. Some important elements in those scenarios are explained below.

The biggest savings will come from the large-scale renovation of university real estate. In 2019, the Executive Board laid down this renewal in a new Strategic Housing Plan. This will make the UU buildings more economical and suitable for the application of sustainable energy sources. A concrete example is the Martinus de Bruin building, which will be taken out of use in the short term, saving the UU almost 700 tonnes of CO_2 per year from then on. The first results of this renovation, which is favourable for the footprint, are already becoming visible. In the car park on the Cambridgelaan, motion sensors and LED lighting will be installed in December 2019, saving the university approximately 200,000 KWh annually. Assuming ¼ green electricity and ¾ grey electricity (2018 figures), this will save 50 tons of CO_2. These technical improvements in energy consumption will eventually lead to major CO_2 reductions.

The university also launched the ***Anders Reizen*** (Travel Differently) campaign in 2019, encouraging employees and students to adopt more sustainable travel behaviour. At the same time, the UU invested 2.7 million in advanced audiovisual means to stimulate distance working. By 2030, the university wants to fly 50% less, which would result in an annual CO_2 reduction of almost 5,000 tonnes - about 8% of the current footprint.

At the end of 2019, the UU's Executive Board approved investments of more than 1 million euros to increase the solar panel area of the UU. These projects will mostly be realised in 2020. A second series of investments in solar energy will also be prepared in 2020.

With the realisation of phase 1 of the Thermal Energy Storage (TES) ring for the central area of the USP, the application of the TES in this area is well underway. Additional connections to existing buildings will be prepared and realised in 2020 and 2021. This follows the ***TES-max*** policy adopted by the Executive Board in 2018. In principle, all buildings that are renovated within the framework of the Strategic Housing Plan or for which new construction is being realised, will also be connected to the TES network.

Within the framework of 'USP gas-free', research is being conducted into more cooperation between USP partners in the field of a collective WKO-network. This will give substance to USP becoming gas-free.

The CO_2 footprint will be significantly lower in 2020 due to the Covid-19 outbreak in the spring of 2020. This is separate from the energy related measures taken. Such a CO_2 reduction is a good thing, but obviously not a sustainable solution. The CO_2 footprint will inevitably increase post-corona (excl. energy measures).

CHAPTER 3

Conclusions

The footprint of 2019 shows no significant changes compared to 2018. If we zoom in, shifts are visible, but they have no effect on total emissions.

The most important developments in 2019 are decisions that will impact the footprint in the coming years. As a result, relatively little seems to have changed in 2019, but major steps have been taken at the policy level. A concrete example of this is the energy-saving measure in the Cambridgelaan car park. There will be more measures of this kind in the future to improve efficient use of energy. In addition, a decision was taken in 2019 to demolish or renovate buildings with high energy consumption. Combined, the measures relating to real estate will result in a large CO_2 reduction in the field of energy; the largest factor in the CO_2 footprint. The ‘Travel Differently’ policy, which was launched in November 2019, will also have a positive effect on the university’s footprint in the coming years. In addition, the university has made investment decisions for solar energy that will have an impact as early as 2020. Also in 2020, after years of preparation, the 1st phase of the USP centre area will be realized and steps have been taken to achieve a more efficient use of the TES capacity. Together, preliminary calculations show that these measures will result in the UU emitting less CO_2 in the coming decade than in the past six years.

In the CO_2 strategy 2017-2020, the university aims for a 33% reduction in 2020 compared to 2014. Currently, the UU has achieved a 22% reduction, so the intermediate target will most likely not be achieved. The reduction since 2014 has mainly been achieved thanks to purchased wind energy and cleaner public transport.

CHAPTER 4

Recommendations

It is crucial for the university to achieve reductions in scope 1 by minimising energy consumption and covering the remaining energy needs with as much local and renewable energy as possible. This requires the university to make space available in the USP for the development of solar fields and wind turbines. In view of the other interests at stake, this will require an intelligent and creative approach that also does justice to, for example, the interests of biodiversity, recreation and landscape experience. Moreover, by combining this with existing knowledge and living labs, it will provide added value for the university.

In addition, the potential reduction through real estate renewal is enormous, but has yet to be realised. Ongoing attention, urgency and timely implementation of all proposed plans are therefore crucial in order to emit as little CO_2 as possible over the next ten years. It must be clear that it is ultimately about the cumulative emissions in the atmosphere. This will logically be at its lowest in 2030 once the UU achieves major reductions.

In scope 1, particular attention is required for the use of natural gas (linked to the renewal of property) and emissions from agricultural activities. The university has less influence on scope 2 and 3, but can still focus as much as possible on real reductions and then compensate the remaining emissions as adequately as possible. Real reductions can be achieved by positively stimulating sustainable alternatives. The campaign aimed at fewer flights, more online collaboration and the use of trains is a good example of this. After all, commuting and air travel together make up 27% of the total footprint.

These recommendations and a clear direction towards 2030 are included in the CO_2 strategy 2020-2025 that the UU is drawing up this year.

APPENDIX I

Explanation of the data

	DIRECT EMISSIONS
Scope 1	Natural gas consumption Fuel consumption of own feed/ implements, general Fuel consumption own feed/ implements, De Tolakker Fuel consumption emergency generators Refrigerants Emissions from agriculture Indirect emissions from energy generation
Scope 2	Electricity consumption (Residual) heat consumption Other indirect emissions
Scope 3	Fuel consumption commuting public transport Fuel consumption commuting private cars (incl. scooter) Fuel consumption business traffic private cars Fuel consumption air travel employees Fuel consumption air travel exchange students Emissions from waste processing Emissions catering Emissions from energy and fuel generation (WTT)

SCOPE 1

Natural gas consumption

Natural gas has been the largest category since 2014 and is largely consumed in the cogeneration plant and boiler houses in Utrecht Science Park. The cogeneration plant consists of six engines, each with 2.2 megawatts of power. The power station uses natural gas, generating both heat (primary) and electricity (secondary). This gives higher efficiency than conventional, separate production of heat and electricity, and is therefore a responsible way of converting energy using fossil fuels. This is the third pillar of the Trias Energetica.

Nowadays, the combined heat and power plant is also required by legislation and regulations due to its efficient energy generation. Moreover, efficient generation gives the university a tax advantage. In addition to the combined heat and power plant, the university also has two boiler houses[10] that only produce heat.

Fuel consumption of own feed and implements

The university has its own fleet of cars. The ambition is to have a 100% electric fleet by 2020. In addition, the De Tolakker farm from the Faculty of Veterinary Medicine uses fuel with their tools necessary for the operation of the farm.

10 Boilerhouse West: 3x10,666 kW; Boiler house Veterinary Medicine : 3x6000 kW

Fuel consumption emergency generators
Many buildings have emergency generators to cope with voltage differences in the grid. These emergency generators can also be used in the event of calamities. The generators are refilled annually.

Refrigerants
Refrigerants are used for cooling rooms. Leaks in the cooling system can cause some of these refrigerants to leak and enter the atmosphere. Due to the chemical composition of refrigerants, they have a high global warming potential (GWP). In this way, they can contribute significantly to the CO_2 footprint (equivalent).

Agriculture
This concerns emissions caused by keeping animals on the university farm, the Tolakker and the clinic for farm animals.

SCOPE 2

Electricity consumption
Electricity at the university has two sources. (1) Combined Heat and Power (CHP), where electricity is generated from natural gas (scope 1), and (2) wind turbines purchased from Eneco. Scope 2 electricity consumption is 100% wind, with no direct emissions. However, CO_2 emissions are released during the construction and maintenance of wind turbines and electricity networks. These emissions are included in the heading 'generation of energy Well-To-Tank (WTT)'.

(Residual) heat consumption
This category refers to the use of the district heating by the city centre and Utrecht University College (UCU) campuses. This network is connected to Enecos BioHeat Installation in Lage Weide, Utrecht. In the absence of an emission factor from Eneco, an emission factor has been determined on the basis of the following three emission categories: Steam and Gas Turbine (CCGT, 75%), Bioheat (10%) and boilers (15%).

SCOPE 3

Fuel consumption commuting public transport and private cars
Fuel consumption for commuting is an approximation based on the 2017 mobility study. It expresses the means of transport (%) used to travel to the USP and the city centre, broken down into staff and students. To arrive at the fuel consumption for commuting between home and work, the number of employees and students is multiplied by the contribution as a percentage of each motorized means of transport. Because paid parking will be introduced in 2020, a new mobility study is still pending. As soon as more recent data is available, this will be implemented in the calculation.

Fuel consumption business traffic in private cars
Employees who make business trips in private cars can invoice this to the university. With these invoices, the number of kilometres driven and the corresponding fuel consumption is approximated. Although this corrects the varying fuel consumption per car, it does not correct for the fluctuating fuel price. The calculation is based on a fee of €0.19 per kilometre.

Fuel consumption air travel employees
The fuel consumption of air travel is based on the mobility study from 2017. It calculates where employees fly for a business trips, and whether this is a regional, continental or international trip. The proportion of employees flying for a business trip is multiplied by the current number of employees and by the proportion of regional, continental or international trips. Because the proportion of employees flying for business travel may have changed after 2017, these numbers are an approximation. In addition, the CO_2 emissions for air travel are also very generalized by dividing all air travel into three categories.

Fuel consumption air traffic students
All exchange students' trips are included in the fuel consumption for student air travel. It is assumed that all students going on exchange from or to the UU take a return flight. As with employee air travel, flights are divided into three categories, based on the distance as the crow flies.

Waste processing
These are emissions caused by the processing of waste. Six waste streams are mapped: residual, paper, cardboard and archive waste, organic waste, plastic, glass and SWILL (wet organic waste).

Catering
The emissions caused by catering have many different causes. For example, emissions from meat are mainly caused by cattle feed production and methane emissions from ruminants. For fruit and vegetables, the lion's share of emissions originate from diesel tractors and greenhouses or pesticide use--. The catering footprint is based on the most popular products and therefore does not (yet) give a complete picture of the emissions.

Generation of energy and fuel (Well-To-Tank)
Energy and fuel generation concerns the emissions released during the production of, for example, natural gas and wind energy. In accordance with the Greenhouse Gas Protocol (see Appendix II), the university wants to consistently capture all emissions up to and including scope 3. The emissions are calculated on the basis of Well-to-Tank emissions, where 'Well' stands for the original source of the energy, and 'Tank' for the final fuel or means to make energy. The Tank-To-Wheel emissions are calculated and categorized under scope 1.

APPENDIX II

Methode

METHOD

The Greenhouse Gas Protocol (GHG) method is leading in the design of this CO_2 footprint. This organisation has developed a comprehensive and standardised global framework for calculating the CO_2 footprint in a wide range of sectors. This is the most reliable and transparent way of calculating a CO_2 footprint. In addition, an external agency specializing in sustainability reporting checks the university's CO_2 footprint.

The GHG protocol uses three scales for greenhouse gas emissions. Figure 1 shows a schematic representation of the classification of these three scales, adapted to the scopes of a university. CO_2 in this report always means the emission of all greenhouse gases, converted to CO_2 equivalents. CO_2 emissions are calculated as much as possible on the basis of local emission factors, which take the Dutch context into account.

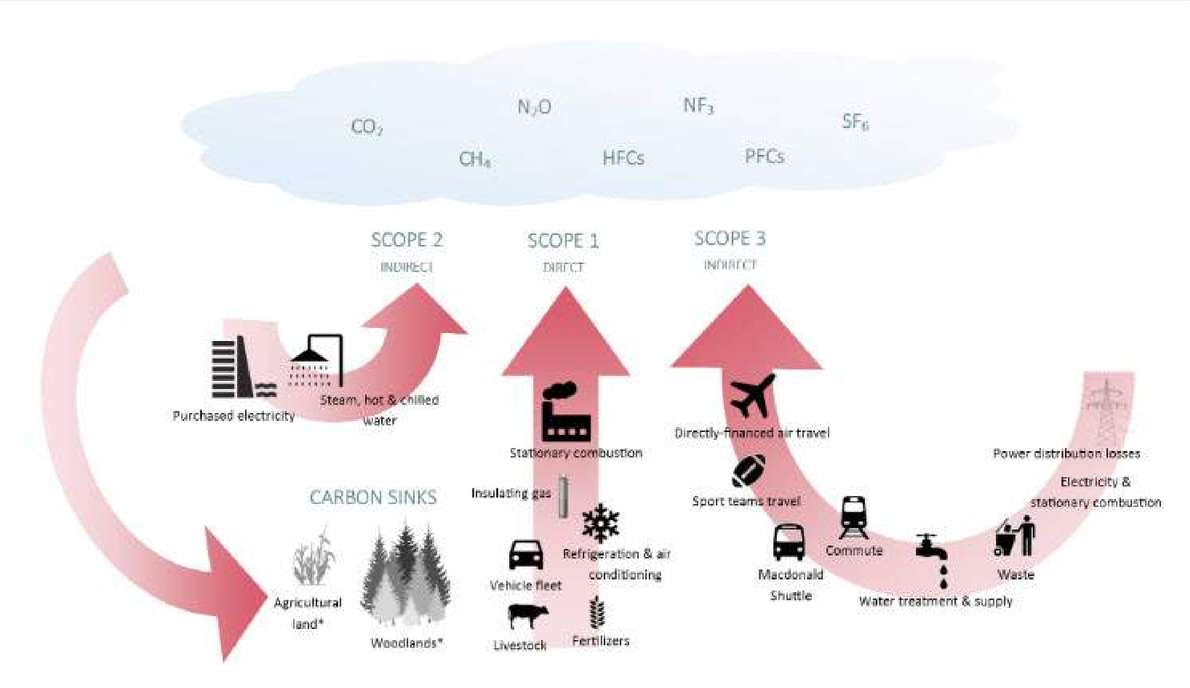

Figure 1. A customized visualisation of the different scopes, specific for a university. A university does not produce any material, so the classical scopes are adapted.

SCOPE 1

This concerns CO_2 emissions on which organisations have a direct influence, for example fossil combustion on location. In theory, we as a society would be CO_2 neutral if scope 1 for every organization and household was net zero.

SCOPE 2

This concerns CO_2 emissions that are indirectly influenced by an organisation and where the emission of greenhouse gases takes place elsewhere. Scope 2 of the university only includes purchased energy.

SCOPE 3

This concerns CO_2 emissions over which an organisation can have indirect and limited influence. For a company that produces products, this includes 'end-of-life' processing. At the university, it includes subjects such as commuting, work and study related air travel, and emissions related to food.

Utrecht University aims to map all emissions in the three scopes as completely as possible. In a Reporting Manual, the University's Sustainability Programme keeps a detailed record of how the information is collected.