SEE PROGRAMME ANNUAL REPORT 2022

SUSTAINABILITY ENERGY ENVIRONMENT PROGRAMME

B.MARECHAL

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UNIVERSITY OF TWENTE.

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PREFACE

This document contains extensive information on what UT colleagues and SEE Programme members have been working on in 2022 with the aim of making operational management more sustainable. The report reflects on the progress achieved and provides guidance on where more attention is needed.

The Sustainabul ranking benchmarking universities based on their sustainability performance showed UT had the 3rd highest score on sustainability in operational management, UT's overall ranking was 13th (May 2022). This shows UT is doing well compared to the other higher education institutes and sharing the information transparently for the rankers to find online.

Still, there remains a lot to do. Becoming a sustainable organisation is a big challenge.

The Paris Agreement goal to be carbon neutral in 2050 is a global average target. Jason Hickel in his book 'Less is more (p.20) states: 'High-income countries, given their greater responsibility for historical emissions, need to reduce emissions much more quickly, reaching zero by 2030'. In order to meet the Paris Agreement goals the energy consumption should be 70 kWh per square meter per year. In annex 7.10 you can see the actual state at UT. We are nowhere near. We need to reduce our energy demand. The current growth in green energy production cannot keep up with the growing need for energy due to growth.

World Overshoot Day[1] indicates the day that the world has used all the biological resources that Earth generates during the entire year. The Netherlands overshoot day fell in 2022 on April 12. As a nation we consume too many resources resulting in emissions to the air, pollution to the water and soil which the earth cannot absorb safely anymore. We are overshooting the boundaries. Our material footprint, including the resources that are imported (predominantly a flow from poorer nations into western nations) needs to be reduced.

The extraction and processing of natural resources is responsible for 90% of total global biodiversity loss and water stress impacts and around half of global greenhouse gas emissions[2]. To calculate the impact of an organisation on (global) biodiversity is difficult to do, and material flow (use of natural resources) is often used as a proxy. Knowing and monitoring UT's material flow is therefore very important in order to be able to take responsibility for the impact of UT's activities.

Considering all these huge challenges, with this SEE Annual Report we would like to show you what positive steps have been taken at UT in 2022 to make a start towards tackling these challenges.

Sustainability was named as the 7th UT priority for 2022 next to six topics which primarily focus on education: ECIU university, VU-UT and Apeldoorn Hubs, Personal Development, LLL proposition, strengthening our master and digital transformation. This shows the mandate to tackle these issues is there. We need the entire UT community to support, be aware and become involved in helping UT reduce our impact on global warming, on the loss of biodiversity and help reduce water-air-soil pollution.

Let us work on this all together!

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Via this link, you can find the members of the SEE working group, sounding board and steering group.

[1] https://www.overshootday.org/
[2] https://wedocs.unep.org/handle/20.500.11822/27518 UNEP, Global Resources Outlook 2019

MANAGEMENT SUMMARY

The Shaping 2030 goal of 'becoming a sustainable organisation' is an enormous challenge.

The UT aims to achieve a lasting reduction in its consumption of **energy** and **raw materials** and its **carbon emissions**, improve the **biodiversity** on campus and reduce air, water and soil **pollution** through organisational and technical measures. Organisational measures include improving processes and changes in our behaviour, while technical measures include improving insulation and making buildings gas-free.

The SEE Programme manages and works on continually and structurally improving UT's sustainability, energy and environmental performance together with many UT colleagues from service departments, faculties as well as students from the Green Hub and Student Union. This Annual Report reflects on the progress made in 2022 towards the goals defined in Shaping 2030 and in the Sustainability Policy for operational management (May 2020) and reports on the actions required to meet the energy and environment legislation applicable to UT.

CO2 emissions need to be brought back to zero. The sooner society manages that, the better it is for reducing the impact of climate change. As western countries have had a larger impact on the CO2 emissions historically, we (including UT) should reduce faster, reaching net zero by 2030 and allow developing countries to take a slightly slower pace towards net zero. The strengthened focus on equality (poorer nations suffering the worst climate change impacts while having contributed the least to CO2 emissions) demands that we remain focused on reducing CO2 emissions as fast as possible and only consider CO2 compensation as an in-between step to demonstrate our awareness of our own responsibility. At UT we consider CO2 compensation as an acknowledgement of taking responsibility of the impact caused by the CO2 emissions of UT's activities, while maintaining our focus on reducing emissions.

Following the Greenhouse Gas Protocol, the **CO2 footprint** of the UT has been reduced dramatically: 28kt CO2eq in 2019 to 6.6kt CO2eq in 2022. This enormous reduction has largely been achieved by switching from grey to green electricity and by compensating for the emission from our gas consumption. In 2019 the major contributors to the CO2 footprint were energy and mobility. In 2022, this is mobility and waste.

While purchasing green **electricity** and compensating for the emissions from the **gas** consumption is an achievement, UT acknowledges this is not a long-term solution to limit global warming as CO2 emissions are still emitted (the Dutch electricity mix is not yet 100% green).The offsetting of the CO2 emissions of gas does not prevent CO2 emissions being emitted, it captures already emitted emissions. A known amount of emissions to the atmosphere is compensated by an uncertain amount being absorbed by trees for example which most likely occurs at a lower speed than the CO2 was emitted. CO2 compensation is not a reason to reduce UT's efforts on minimising the **energy** consumption. UT wide plans are being made to make substantial, long-lasting reductions to the actual energy consumption. This is both due to a sustainability and a financial incentive.

Over the past 18 years, energy efficiency has been a focal point at UT. During the Multi-Year Agreements (MJA) with the government between 2005-2020 UT reduced its total energy consumption by 39% (surpassing the aim of 2% per year). Chapter 3.1 shows the UT wide energy consumption in GWh of electricity, gas and district heating over the last 9 years. UT has reduced its **gas consumption** by 29% compared to 2019 due to buildings being connected to the district heating and disconnected from the gas. Consumption of **district heating** has gone up by 17% and **electricity** by 6% compared to 2019. **Electricity generated** by solar went up by 641%. **Overall energy consumption** has gone up by **3.6%** in 2022 compared to 2019. UT needs to take additional steps to reduce the total amount of energy needed for its activities and generate more energy on-site.

The CO2 emissions associated with **mobility** were reduced by 50% compared to 2019, where an updated survey provided more accurate, up-to-date data resulting in a 59% reduction in emissions due to student and staff **commuting**. Data on business travel (by staff) showed a 37% reduction in emissions, although we need to note that covid measures abroad likely still influenced these figures and that it might take a lot of effort to maintain this reduced impact from travel over the coming years. The impact of mobility per faculty is visualised in chapter 3.2.1. and all details are in annex 7.4.

The emissions from **food** have increased. A collaboration with Green Dish commenced in September 2022 where the aim is to design a menu that falls within the planetary boundaries. This should start to become visible in the CO2 footprint for 2023. UT employees and students contribute to the goal of reducing the environmental impact of food by ordering plant-based lunches as these have a lower impact than dishes that include animal products. The number of vegetarian work lunches ordered (paid by a UT workorder number) has increased compared to 2019.

The prevention of **waste** and the reuse of resources contribute towards a circular campus. This is a topic that a lot of people in the UT community engage with. It is one of the topics the Green Hub has been collaborating on with the SEE Programme. The number of kilograms of residual waste has been reduced by 16% in 2022 compared to 2019 but due to more detailed reporting, the CO2 footprint does not reflect this (an increase of76%). Many initiatives that have been implemented such as separating specific lab waste and the introduction of the Billie cup at Appèl are described in chapter 3.4. Also available data on **e-waste**, the fastest growing waste stream globally, is shared in table 20, chapter 3.4. The balance between tools needed for work and reducing the demand for resources with their associated impact on nature, environment and the people working in mines is a topic for discussions we need to continue to facilitate at UT in order to strive towards structurally reducing all of our impact at all stages of this supply chain, including the 'hidden' stages happening abroad. Improving our performance in this area may reduce some of the pressure on biodiversity loss due to deforestation or pollution. UT has the aim of reducing the amount of virgin (non-recycled) resources where possible.

Green Hub students developed a checklist for assessing how sustainable your **event** is (see chapter 3.5) providing all organisers of events, large and small, with tips on what to do. During the Kick-In, a return system for plastic cups was successfully piloted, facilitating high quality recycling of rPET.

The energy roadmap developed to comply with national legislation to reduce CO2 emissions of UT **buildings** - by 49% in 2030 and by 95% in 2050 compared to 1990 - was updated and many measures were implemented in maintenance and renovation projects. This roadmap was integrated with the long term housing strategy (LTSH) and the multi annual maintenance planning (MJOP). Additionally, the Paris-proof model, to ensure energy consumption of a building (based on the quality of the building as well as the behaviour of its users), is aligned with reaching the Paris Agreement goals. This means that office buildings should reduce their energy consumption to 70kWh/m2/year. Annex 7.10 shows the energy consumption per square meter per year in 2022.

Data collection remains an issue to be able to build an accurate CO2 footprint of all the impact the UT's activities have. All UT contractors that provide services or goods are requested to provide CO2 emission data, but many contractors do not yet calculate their own CO2 footprint for their own operations nor for their products. Information about impact in the supply chain, concerning CO2 and resource use, is far from complete. The CO2 footprint offers the best estimate, but we need to keep in mind it is underrepresenting UT's impact on the environment. With the **procurement and purchasing** department we aim to improve the data and improve tender requirements related to sustainability year on year.

The CO2 emissions associated with the consumption of **drinking water** were reduced by 4%; when looking at water consumption per capita it has been reduced by 7%, while total water consumption has gone up by 1%.

In the area of **biodiversity** many actions are taken to support biodiversity on campus and preparations have been made for a species Management Plan and biodiversity improvement plan.

In the area of **energy legislation**, 2022 has been an in-between year. Due to the discontinuation of the Multi-Year Agreements, from 2023 the recognised Measures Lists needs to be complied with.

For the **Environmental permit**, inspections were held on campus and at the ITC building. Waste water monitoring is conducted and reported to the Waterboard.

Communicating about all the steps that are taken in the area of **Sustainability, Energy and Environment** is a challenge. News articles do not reach everyone. Messages on coffee machines reach more people but are not so useful for people who predominantly work from home.

The core message of **sustainability communication** is: *The University of Twente is working to become a sustainable organisation by 2030. We take action to apply sustainability in our daily business operations. We do so together with our students, employees and external partners, so that sustainability becomes a natural part of our daily lives at the UT.*

We welcome you to join us in this journey. Your feedback on the report and on the steps taken are very welcome.

HIGHLIGHTS 2022

Train Zone Map published giving insight in and stimulating train travel over flying in Europe. The article about the Train Zone Map was the best-read item in English on Utwente.nl in 2022.

Gas consumption has decreased by 29%, mainly due to buildings being connected to district heating

A water lab filtering rain- and pondwater was built on Hogekamp square. By filtering this pond water, around 1500-1600m3 (1600.000 litres) of drinking water has been saved

At the Boerderij (Contact Centre) soil loops have been installed: 6xdouble loops of 200m totalling 2.4km where soil heat is harvested for heating the building.

Since October 4th, 2022, the default work lunch (paid for by the UT, not the canteens) is vegetarian. This means that all lunch options in the banqueting system are default vegetarian Compared to 2019 the number of vegetarian lunches has tripled, contributing to reducing the CO2 footprint.

Total waste and residual waste on campus has decreased by 8.3% compared to 2019.

During Kick-In 2022, a pilot giving out free drinking tokens in exchange for 10 used cups was started. This led to over 10,000 cups (57%) being collected during the event, further reducing waste.

Four 80-year-old plantains have been transplanted to avoid felling due to the construction of the Cube.

77 solar panels were installed on Drienerburght providing 29.260wp

A 35000 liter former milk tank (35m3) is collecting water from four drainpipes of the roof of the sports centre. This water can be used for watering plant boxes and shrubs during dry spells. When heavy rain occurs, the smart rainwater buffer will help prevent overloading of sewage systems.

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LIST OF ABBREVIATIONS

4TU	Federation of the four Dutch universities of technology: Delft, Eindhoven, Twente and Wageningen
ABP	Pension fund for employees in the government and education sectors
Aerius	
AFAS	Personal HR/Payroll system
BENG	Bijna Energie Neutraal Gebouw (almost energy neutral building)
BIOS	UT faculty group bridging physics, biology and chemistry with lab-on-a-chip technology
BTEX	The chemicals benzene, toluene, ethylbenzene and xylene
BVO	Bruto Floor surface
CHC	Chlorinated Hydrocarbon
CMR	Substances classified as carcinogenic, mutagenic, or toxic for reproduction
CO2eq	Greenhouse gas emissions translated into carbon dioxide equivalent numbers
CSRD	Corporate Sustainability Reporting Directive
CURIOUS-U	UT international summer school
DGBC	Dutch Green Building Council
EB	Executive Board of the University of Twente
ECIU	The European Consortium of Innovative Universities
EFRAG	European Financial Reporting Advisory Group
EML	Energy Measures list of measures you are obliged to implement as these have a return time of 5 years
EMS	Energy Management System
EPS	Polystyreen
ESG	Environmental, Social and Governance
ESRS	European Sustainability Reporting Standards
GPR	Digital Instrument to measure the sustainability of a building
GWh / MWh	Giga Watt hour / Mega Watt hour
HTF	High-Tech Factory
ICT	Information and communication technologies
KPI	Key Performance Indicator
KLM	Royal Dutch Airlines
KNNV	Association for field biology = Koninklijke Nederlandse Natuurhistorische Vereniging
LLL	Life Long Learning
MJA	Multi-Year Agreements (with the Dutch Government)
NS	Dutch Railways
OFI	Workorder number under UT financial system before 2022
PMD	Plastic Metal and drink cartons
PVD	Photo Voltaic cells on roof (Dak)
rPET	Recycled polyethylene terephthalate (plastic)
RVO	The Netherlands Enterprise Agency / Rijksdienst voor Ondernemend Nederland
S4F	Scientists for Future
SaazUnie	Network of Dutch Universities and Academic university hospitals
SCIOS	Certification scheme for technical installations
SDGs	Sustainable Development Goals
SG	Steering Group
SME	Small and Medium-sized Enterprises
SMP	Species Management Plan
SU	Student Union
VANG	From Waste to Resource (Van Afval naar Grondstof)
VCK	Travel agent UT
VER	Voluntary Emission Reduction carbon credits
VSA	Vegan Student Association UT
VU	Free University (Amsterdam)
WEii	Actual energy intensity indicator
WOT	Student association for students with a passion for technology and development
WTW	Heat Recovery System
ZZS	Substances of High Concern

1. EVALUATION 2022

1.1 INTRODUCTION

The SEE Programme is a university-wide programme for managing and continually and structurally improving its sustainability, energy & environmental performance. With this programme, the UT wants to achieve a lasting reduction in its consumption of energy and raw materials and its carbon emissions, improve the biodiversity on campus and reduce pollution to air, water and soil through organizational and technical measures.

The goals are set in the Sustainability Policy for Operational Management (link) approved in May 2020. The goals are specified per theme: energy, water, waste, food & drinks, travel & mobility, biodiversity, procurement & purchasing, buildings, events and finances. Implementation plans (waste, mobility) and projects are developed to realise those goals. On the sustainability website project updates are shared.

This report reflects on the progress made in 2022 on the ten themes as well as on communications and transparent reporting on the progress. Legislation related to energy and environment (permit) and nature protection are described in separate chapters. Developments concerning strengthened legislation on sustainability targets, energy, nitrogen deposition will be followed closely and will be reported upon when relevant.

This report can in future be used as input for the non-financial reporting on environmental, social and governance factors (CSRD (EU).

1.2 DEVELOPMENTS IN SUSTAINABILITY REPORTING

A new European directive related to the sustainability performance of an organisation was developed. SEE is in close contact with the colleagues at GA and S&P who are involved in this reporting to ensure data collection and monitoring is in place to be able to provide the required information.

On January 5th, 2023, the Corporate Sustainability Reporting Directive (CSRD) entered into force. The Corporate Sustainability Reporting Directive (CSRD) regulates the provision of information about the sustainability of their activities. Just like other reporting developments, UT actively follows this in the process of continuously improving its operation and related accountability. The CSRD is part of the European Green Deal and EU Action Plan for Financing Sustainable Growth. They aim to improve corporate transparency and accountability around Environmental, Social and Governance (ESG) impacts and risks to promote sustainable economic growth and investment in the EU (more details in Annex 7.1). Social responsibility and competitive considerations justify rapid compliance of the University of Twente with CSRD.

The starting point in CSRD is stakeholder engagement and materiality assessment. Organizations have to report on how sustainability influences their business as well as the organization's impact on people and the environment. In order to track and disclose the required information, organizations first have to conduct a materiality assessment to identify which sustainable matters are most material to the organization and its stakeholders.

In a broader sense, the concept of double materiality ensures that sustainability reporting focuses on the topics that are most relevant for the organization and its stakeholders. Material topics also underpin the (sustainable) strategy. A report and strategy based on material topics create more transparency, contribute to better decision-making and ensure that time and resources are focused on those topics that matter most to both the organization, its stakeholders and society at large.

Under the double materiality concept, a sustainability matter can be material from an impact point of view and/or from a risk and opportunity perspective. Although the CSRD provides some guidelines for this, ultimately an organization will have to determine for itself if a subject is material or not, and it must substantiate the choices it makes.

1.3 SUSTAINABLE DEVELOPMENT GOALS

In Shaping 2030 University of Twente says the United Nations' Sustainable Development Goals (SDGs) are the reference point for our own sustainable development.

In annex 7.2 an exploratory assessment has been made between the measures conducted to reach the goals of the Sustainability for operational management and the SDG's. This assessment could be done more in-depth and holistic to analyse whether measures have side-effects by contributing positively to one SDG but unintendedly negatively to another SDG.

In this assessment, the UN goals and targets are listed followed by the UT context. By identifying or determining UT specific indicators for these goals, UT could start reporting on these as well aiding in the visibility of UT's efforts in becoming a sustainable organisation.

2. SHAPING 2030 GOALS

The University of Twente's mission, vision and strategy for 2020-2030 are described in Shaping 2030[3]. On sustainability in operational management the following strategic goals are described.

By 2030, full implementation of our strategy will have at least ensured that:

B. We have become a sustainable organisation. In order to realise these ambitions, we have determined the following goals and actions between now and 2023:

WHAT: Goal for 2023: 1. We have successfully implemented sustainable solutions on our campus in the areas of food, water, waste, travel and energy use, thereby reducing our carbon footprint by at least 15%[4].

HOW: Actions to be taken to reach these goals by 2023:

In order to reduce travel, our people will be fully accustomed to using digital technologies for conferencing. When travel is unavoidable, we will no longer use airlines for <800km trips.

This table shows the changes in CO2 emissions for the themes food, water, waste, travel and energy.

Table 1. Changes in CO2 emissions for the themes food, water, waste, travel and energy between 2022 and 2019

Theme	CO2 emissions 2019 (tonnes CO2 eq)	CO2 emissions 2022 (tonnes CO2 eq)	Increase (+) Decrease (-)
Food	340.6	382.3	+12%
Water	150[5] 40[6]	38	-4.0%
Waste	631	1112	+76%
Mobility total	9067	4510	-50%
Business travel	3938	2467	-37%
Commuting	4999	2043	-59%
Energy total	16501	634	-96%
Scope 1 (gas+fuel)	1761	72	-96%
Scope 2 (district heating)	14739	562	-96%

[3] https://www.utwente.nl/en/organisation/about/shaping2030/documents/shaping2030-fulldocument.pdf

[4] Due to the corona measures the data from 2020 does not provide an accurate base line for comparison, therefore the progress will be measured compared to 2019.

[5] Calculated using a different methodology. Until 2019 a campus specific study from 2010 was used with an CO2 emission factor of 1.5 km CO2/m3. From 2020 onwards Vitens calculates their CO2 footprint and provides those data to UT. The CO2 emission factor they use is 0.397 kg CO2/m3 in 2020 and 0.380 kg CO2/m3 in 2022.

[6] CO2 emissions recalculated using CO2 emission factor Vitens from 2020 to enable a comparison between 2019 and 2022.

Food
The CO2 footprint of food has increased and partly this is due to a change in the calculation. Previously a generic CO2 emission factor for the average Dutch lunch or dinner was used while now it is more detailed. When dividing the CO2 emissions per capita the emissions remain the same for 2022 and 2019 (see table 16). The number of vegetarian or vegan lunches ordered in 2022 compared to 2019 has increased sharply (see chapter 3.3)

Water
The CO2 emissions associated with the consumption of drinking water has reduced by 4%, when looking at water consumption per capita it has been reduced by 7%, total water consumption has gone up by 1%. Chapter 3.8 provides several examples of how drinking water has been reduced.

Waste
The CO2 emissions of waste have increased. The increase is mainly due to more detailed reporting by the waste collector. The increase due to the inclusion of demolition waste is 75 tonnes CO2. Steps taken to reduce residual waste and to improve waste separation are described in chapter 3.4.

Mobility
The CO2 emissions associated with mobility were reduced by 50% compared to 2019. In 2022 a mobility survey was held, and the data was used for the 2022 CO2 footprint. This was more accurate as it included more modes of transport and reflected changes in behaviour in commuting (more working/studying from home). For business travel data from the travel agent are used. It should be noted that also flights are missed as some people do not book via the official channels.

The UT community was encouraged to take a train where that alternative to flying was possible (in Europe). For this purpose a train map was made showing the destinations with a maximum distance to Enschede of 800 km where the difference in CO2 emissions, travel time and transfers of the travel options were displayed (see chapter 3.2 and annex 7.3)[7].

The map and topic appealed to a lot of people. The news article[8] was the best-read UT news article in English[9] in 2022.

More detailed data can be found in chapter 3, such as flight data, international train journeys, commuting data and information on the number of days employees travel to work.

Energy
The source of district heating changed from waste incineration to biomass resulting in heating source which is considered almost CO2 neutral. Since 2022 UT procures green electricity[10], which means certificates of origin are purchased (1 for each MWh consumed), where the allocated source of energy is Dutch sun and wind. The gas consumption of 2022 is compensated using voluntary Emission Reduction (VER)-carbon credits (1 per tonne CO2 emitted) from emission reduction projects which meet the Gold Standard[11] (see annex 7.5). For CO2 bookkeeping this results in strongly reduced emissions as electricity and gas are recorded as zero emissions.

2.1 OTHER THEMES

In the Sustainability policy for operational management 10 themes are mentioned, the other themes are biodiversity, procurement, buildings, events and finances. These themes were not mentioned in Shaping 2030 and for some it is complicated to record an accurate CO2 footprint.

[7] This version has been developed further into an interactive train map showing also destinations beyond 800km. You can find that map here: https://travelcheck.utsp.utwente.nl/ (launched in January 2023)
[8] https://www.utwente.nl/en/sustainability/sustainability-news/2022/6/680877/ut-encourages-train-travel-with-train-zone-map
[9] https://www.utwente.nl/en/news/2023/1/399753/these-are-the-best-read-news-items-of-2022
[10] https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/energy/#suppliers
[11] https://www.utwente.nl/en/sustainability/sustainability-news/2022/12/384438/ut-offsets-emissions-and-works-to-further-reduce-gas-consumption; https://www.goldstandard.org/

Table 2. Changes in CO2 emissions for the themes biodiversity, procurement, buildings, events and finances between 2022 and 2019

Theme	CO2 emissions 2019 (tonnes CO2 eq)	CO2 emissions 2022 (tonnes CO2 eq)	Increase/decrease
Biodiversity (green maintenance)	61.4	-158.2[12]	-258%
Procurement & purchasing (Scope 3 contractors)	9878	5995	-39%
Buildings (building waste)	No data	81.1	?
Events	No data	No data	?
Finances	No data	No data	?

The only numbers available concerning biodiversity are the figures of the green maintenance contractor who can deduct carbon captured by green waste from its CO2 footprint.

The reduction in CO2 emissions from UT's contractors and suppliers could be partly due to sustainability criteria included in European tenders as well as the efforts the contractors and suppliers make to make their own operations and products more sustainable.

The CO2 footprint is visualized in chapter 3.12.

2.2 ARE WE ON TRACK TOWARDS MEETING THE 2030 GOALS?

The data shows UT has made good progress in the area of **energy** by procuring green energy and offsetting gas emissions.

The journey to become a sustainable university and become carbon neutral is a long journey which is divided up in steps. Compensation of emissions is an in-between step (it is one way of taking responsibility for the environmental impact caused by UT activities) where the main goal remains minimizing UT's emissions, so compensation is no longer needed.

It is important to keep into account that CO2 compensation is not the solution for combatting climate change: it is necessary to reduce the absolute amount of CO2 emissions entering the atmosphere by reducing the energy consumption. Many CO2 compensation projects do not reduce/capture CO2 emissions at the same rate it is emitted. CO2 emissions need to be brought back to zero. This is an enormous challenge. The sooner society manages that, the better it is for fighting global warming. As western countries have had a larger impact on the CO2 emissions historically, we should reduce faster reaching net zero by 2030 and allow developing countries to take a slightly slower pace towards net zero. The strengthened focus on equality (poorer nations suffering the worst climate change impacts while having contributed the least) demands of us to remain focused on reducing CO2 emissions as fast as possible and only considering CO2 compensation as an in-between step to demonstrate our awareness of our own responsibility.

Also, there is not yet sufficient green energy for the Dutch market (the Dutch energy mix is not yet 100% green), therefore reducing our energy consumption remains a priority (also when energy prices do not remain high).

The CO2 emissions associated with **mobility** were reduced by 50% compared to 2019, where an updated survey provided more accurate, up-to-date data resulting in a -59% reduction in emissions of **commuting** of students and staff and **business travel** (by staff) data showed a -37% reduction in emissions, whereby we need to note that there is a strong suspicion covid measures abroad still influence these figures and that it might take a lot of effort to maintain this reduced impact over the coming years.

The emissions of **food** have increased. The collaboration with Green Dish commenced in September 2022 where the aim is to design a menu that falls within the planetary boundaries. This should start to become visible in the CO2 footprint for 2023.

[12] Due to composting and fermentation of green materials on campus the CO2 captured there can be deducted from CO2 emissions resulting from machinery use and transport movements for green maintenance.

Also, UT employees and students can contribute by ordering vegan/vegetarian lunches as these have a lower impact than dishes with animal products.

Prevention of **waste** and reuse of resources to work towards a circular campus are more and more on people's radar. The number of kilograms of waste has been reduced by 8% but due to more detailed reporting this the CO2 footprint does not reflect this.

Data collection remains an issue. All contractors of UT are requested to provide CO2 emission data, but many companies do not yet calculate their own CO2 footprint for their own operations nor for their products. Information about impact in the chain, concerning CO2 and resources, is far from complete. This reporting thus only shows the progress based on what is known. This is something to take into consideration when interpreting the report. Year on year improvements are made in this area and this will continue in the coming years.

3. PROGRESS PER THEME

3.1 ENERGY: WHAT HAS BEEN ACHIEVED IN 2022?

UT policy goals: UT policy goal: Trias Energetica: Increase efficient use of energy sources. Continue reducing energy consumption by 2% a year. Source all electricity renewably and apply CO2 compensation on remainder of fossil fuel usage from 2022 onwards. Become a carbon neutral campus in 2030. Strive towards a carbon negative campus in 2050.

The goal to source all electricity renewably and apply CO2 compensation on remainder of fossil fuel usage from 2022 onwards' has been achieved. Since 2022 UT procures green electricity, which means certificates of origin are purchased, where the allocated source of energy is Dutch sun and wind. The gas consumption of 2022 is compensated using voluntary Emission Reduction (VER)-carbon credits from emission reduction projects which meet the Gold standard.

Table 3. Energy consumption in 2019 and 2022 at UT

UT Energy Consumption	2019	2022	Increase (+), Decrease (-)
Electricity [kWh]	22,220,046	23,602,373	+6%
Electricity per capita [kWh]	1302	1276	-2%
Natural Gas [m3]	907402	641149	-29%
Natural gas per capita [m3]	53	35	-35%
District Heating [GJ]	54571	63880	+17%
District heating per capita [GJ]	3	3	+8%
PV Generation [kWh]	-28382	-210210	+641%
PV generation per capita [kWh]	-2	-11	+583%

Per capita means it is divided by the number of students and the number of employees (see Annex 7.13)

Energy consumption 2014-2022

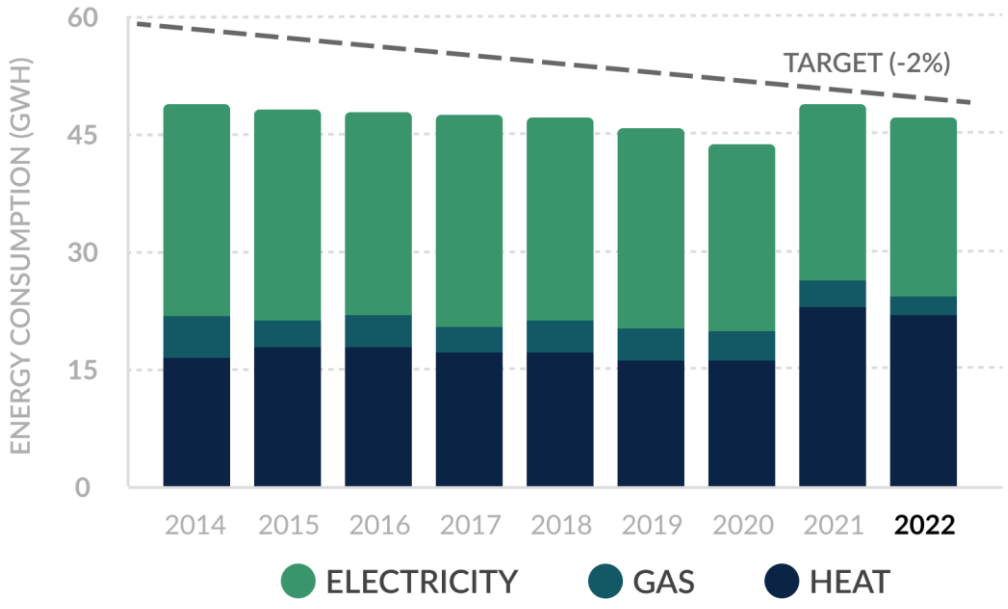


Figure 1. Energy consumption at UT from 2014-2022[13]

The target line shows an annual energy saving target of 2%.

[13] The target line visualizes the energy reduction target of the Multi Year Agreements (MJA) 2005-2020 of the government of 2% a year. In this graph this line has been continued until 2022 (https://www.rvo.nl/onderwerpen/mja3/mee/convenanten).

The gas consumption has decreased by 29% (achieving the goal of reducing at least 4% a year) while district heating increased by 17% in 2022 compared to 2019. When considering all energy sources in TJ, the energy demand has increased by 3.6%.

Table 4. Electricity, gas and district heating converted to GJ for 2019 and 2022

Joules [TJ]	2019	2022	Increase/decrease
Electricity	80.0	85.0	6%
Natural Gas	28.7	20.3	-29%
District Heating	54.6	63.9	17%
Total	163.3	169.1	3.6%

Energy efficiency projects

A summary of projects planned and conducted in 2022 are listed below. This list is non-exhaustive as in renovation projects also energy saving measures are applied.

The following projects have been started in 2022:
- Investigations into alternatives for air humidification of laboratories have been carried out and presented (Zuidhorst)
- Energy optimalisation CV installation in Pakkerij is awaiting implementation (lack of capacity at contractor level)
- Energy optimalisation Westhorst (EBT), i.e. night temperature increased from 16°C to 18°C.
- Energy optimalisation ventilation Nanolab. Proposal for automatic regulation extractor fume hood (wed bench)
- Energy optimalisation Linde. Proposal approved, awaiting materials (delivery time > 8 months).

The following projects have been finalized:
- Energy monitoring building WOT
- Energy monitoring Meander
- Insulation Pakkerij
- Energy label and energy advice Holzik, Linde, Pakkerij
- Several energy meters have been added to https://energydata.utwente.nl/ for example to be able to monitor energy usage at events as well as the WOT (windpark) terrain.

The following projects have been postponed:
- Assessment energy meters student housing (postponed till De Veste starts renovations)
- Assessment energy meters building Sleutel (user building will arrange this)

At the Boerderij (Contact Centre) soil loops[14] have been installed: 6xdouble loops of 200m totalling 2.4km where soil heat is harvested for heating the building.

3.1.1 Impact per faculty

The SEE working group has set up a sub-working group on energy in the faculties in 2022. Aim is to work on reducing unnecessary energy consumption and develop a concrete list of energy management measures. A proposal for making labs sustainable (Green Labs) has been presented within UT which includes besides energy efficiencies also other sustainability aspects such as waste separation and resource use (i.e. use of chemicals) and environmental aspects such as finding ways to minimise the use of substances of high concern and substances that are carcinogenic, mutagenic or toxic to reproduction (CMR) and other efficiencies for lab specific processes where required. SEE supports and facilitates an integrated approach to make labs more sustainable as this is most practical from a users' point of view. In Zuidhorst colleagues are conducting a Green Labs pilot, where six labs and ten colleagues are involved[15]. At the same time, research is being done to switch the source of air humidification from gas to electricity while inventorying what labs need what kind of air humidification. If this pilot shows it is possible to humidify the air in labs using electricity, UT could become the first gas-free university.

[14] https://www.utwente.nl/en/campus/campus-development/sustainability/#buildings

[15] The six labs involved are: Advanced Organ Bioengineering and Therapeutics lab, Applied Stem Cell Technologies lab, Developmental BioEngineering lab, Nanobiophysics-microscopy lab, Vascularisation lab and Zuidhorst Shared Labs.

All these efforts have been complemented with a need for energy saving due to high prices. All faculties have been given a task to reduce their energy consumption. A lot of ideas, initiatives and positive energy have come to the surface, ranging from inventorying what machinery is present in labs and what power demand these have to reducing opening times of buildings/labs when climate regulation can be scaled down. This is coordinated by Bertyl Lankhaar.

On energydata.utwente.nl building specific energy consumption can be viewed. Applying outdoor shading to Technohal has made an impact in the amount of cooling required to avoid having to 'remove' the heat during summer. In winter the shading is not used in the same automated way and sunlight is used to help warm up the building.

Carre is also a building with a high cooling demand and a lot of glass, outdoor shading on the east-south-west sides could be an energy reduction measure there.

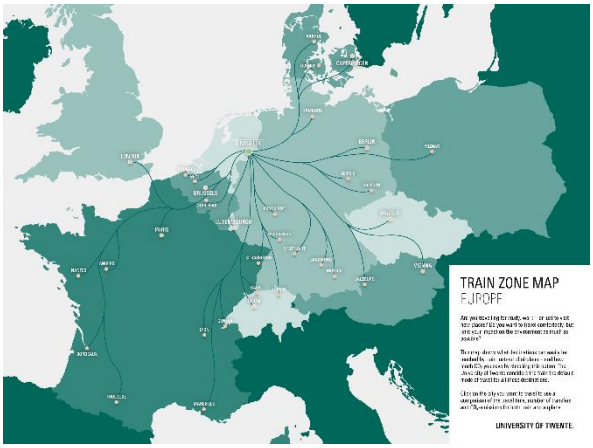
For more information on energy, have a look at the webpage on energy.

3.2 TRAVEL & MOBILITY: WHAT HAS BEEN ACHIEVED IN 2022?

UT policy goals: Strong promotion of reduction of travel and sustainable modes of travel. Train is the preferred option for work trips < 800km in 2022. 100% compensation of CO2 emissions from business travel by 2025. Increase usage of (e-) cycling & public transport. Strive towards a low traffic campus.

Goal Cycling Mission Higher Education (Ministry of Infrastructure and Water Management): to increase the number of people that cycle to UT by 10%[16].

Business travel
The UT community was encouraged to take a train where that alternative to flying was possible (in Europe). For this purpose a train map was made showing the destinations with a maximum distance to Enschede of 800 km where the difference in CO2 emissions, travel time and transfers of the travel options were displayed (see Annex 7.3)[17].



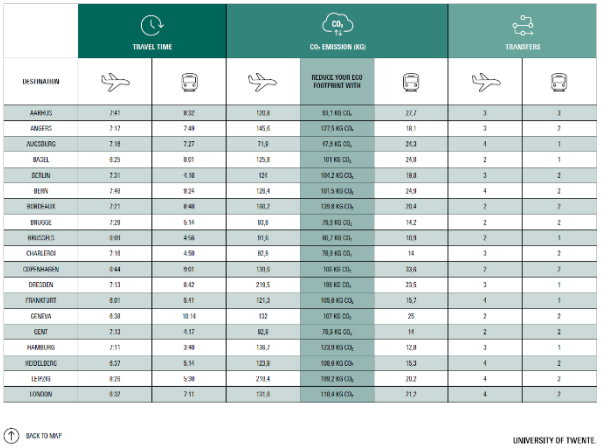


Figure 2. Train zone map (static version May 2022)

In 2022 COVID restrictions were minimalized and a lot of travel resumed.

Business flights
This section contains the data related to business flights made by employees.

Table 6 shows the number of flight kilometres flown in 2019 and 2022 and the increase or decrease in 2022 compared to 2019.

[16] https://www.utwente.nl/en/sustainability/sustainability-news/2020/11/855191/ut-commits-to-cycling-mission
[17] This version has been developed further into an interactive train map showing also destinations beyond 800km. You can find that map here: https://travelcheck.utsp.utwente.nl/ (launched in January 2023)

Table 6. Flight kilometres UT business travel by employees

	Flight kilometres		Increase/decrease
Distance flight	2019	2022	2022 compared to 2019
0-800km	1,020,468	683,640	-33
800-2500	2,310,208	3,134,595	36
2500+	20,066,237	11,262,166	-44
	23,396,913	15,080,401	-36

Flights are categorized in short, mid-distance and long flights (see annex table 7.4-4 for emission factors per category). The emission factors consider <700km to be short. At UT, a limit of 800km has been chosen for which the norm is travelling by train, therefore the table below shows the flights in categories <800, 800-2500 and 2500+km. In Annex 7.4 table 7.4-2 the data is also shows for flights <700km and 700-2500km.

In the short distance category (<800km) a reduction of 33% is observed, while the mid category (800-2500km) increased by 36% of flight kilometres. A reduction of 44% was observed in the long distance (2500+) category resulting in an overall reduction in flown kilometres by UT staff of 36%.

Table 7 shows the CO2eq emissions associated with the number of kilometres flown. The used emission factors can be found in annex 7.2, table 7.4-4

Table 7. CO2 emissions UT business travel by employees for 2019 and 2022.

Flight distance category	CO2 emissions		Increase/decrease 2022 compared to 2019
	2019	2022	
0-800km	238.8	160.0	-33
800-2500	397.4	539.2	36
2500+	3150.4	1768.2	-44
	3786.5	2467.3	-35

As short distance flights emit more per kilometres but are shorter, the CO2 emission reduction achieved is 33%. The CO2eq emissions increased by 36% between 2019 and 2022 for the mid distance flights and decreased by 44% for the long-distance flights, resulting in an overall CO2eq emissions for flown kilometres of 35%. The reduction in long distance flights may still have been affected by COVID measures abroad.

In 2019 data from the travel agent did not include segmented flights (Amsterdam-London- New York was provided as one flight even if it had a transfer), the data of 2022 does include this level of detail to more accurately calculate the emissions. In order to make comparisons, of the bookings between 700-800km the CO2 emissions have been calculated and added to the 0-800 category. This is an imperfect method as this is bound to omit short distance flights that were part of a longer distance booking.

All flight data is included in annex 7.4 table 7.4-5 and 7.4-6
Flight data categorized per faculty is shown in chapter 3.2.1.
This data misses flights that are not booked through the official travel agent. Even though the travel agent data provides a good overview it is not complete yet. Another company for example reports 104 tonnes CO2 for flights booked through them. As it is unclear if 4TU flights are booked for UT personnel or also the other universities, this data has been excluded.
CO2 compensation has not been deducted from the total in this table. That is only done in the CO2 footprint reporting.

Business travel table international train trips

Using NS Business card data, the number of trips could be calculated to destinations categorized as default, recommended and challenging. Unfortunately, distances are unavailable

Table 8. International train journeys

Train Map categories	Total number trips in 2022
default (below 800km, max 8h and max 3 changes)	1547
recommended (max 12h, max 4 changes)	620
challenging (travel time >12h)	23

Data from 2019 is not available for comparison; Source: Data NS international via HR

The flight data shows that 1239 flights were taken with a distance between 0-800km (annex 7.4, table 7.4-6). Some flights form part of a longer journey but this number shows there is room for improvement for changing from plane to train.

CO2 compensation

The discussions on CO2 compensation when flights are unavoidable were initiated with the aim of determining a flight reduction target to work towards that faculties support as well as to agree on a realistic CO2 price. On June 29,2022 a consultation session was held to discuss how CO2 emissions of flights can be reduced. UToday made a good summary article[18]. The session was well attended with 60 people present in Waaier and another 18 online.

The follow-up that was advised was to inform all faculty boards to start the conversation within the faculty on what people's criteria and reasons are for travel and flying and to discuss the role of supervisors/professors in stimulating sustainable choices. Faculties were asked to promote the train map and promote: Replace with online, reduce the number of trips and refine by making your trip more worthwhile (combining multiple purposes). Lastly, as faculties write their annual plans in summer to consider budget and (practical) implementation of suggested CO2 reduction options.

Current status is that in 2022, ITC compensates all their flights via Gold Standard projects in developing countries, the BIOS group compensated their flights buying Green sands certificates and via Travel Unit all UT flights with KLM and Lufthansa are compensated using Airmiles points. The certificates of the CO2 compensation can be found in Annex 7.5.

Most likely individual compensation has taken place; this information is not known and cannot yet be reported on. The SEE programme favours a UT wide approach for CO2 compensation facilitating the wishes of faculties for compensation projects options to enable accurate monitoring and reporting.

SEE emphasizes that accurate data availability and uniform processes across UT concerning flights are essential for achieving the sustainability ambitions of UT. When CO2 compensation in 2022 is done by faculty, sometimes per group, by some individuals as well as by using airmiles by the Travel Unit where CO2 calculation methods differ, it is impossible to report on this in an accurate way.

Applying CO2 compensation is not the solution, it is one way of taking responsibility for the environmental impact caused by travelling. Compensating CO2 emissions when business travel is unavoidable requires funds which the traveller will need to take into account when planning a journey.

The discussions on reducing flights have started in some faculties and some faculties have reduced the available budget for flying.

Commuting

In 2022 a mobility survey was held focusing on commuting, business travel, attitudes to transport modes and sustainability for staff and students.

This survey shows that the percentage of employees that cycles or walks to work has increased from 54% in 2011 (last mobility survey) to 60% in 2022. Students choice to cycle or walk to campus increased from 72% to 83%. With this increase we have made a good step towards reaching the goal to increase the number of people that cycle to UT by 10%.

In a separate report the results of the survey will be shared. 34.5% of employees completed the survey and 6.4% of students.

[18] https://www.utoday.nl/news/71666/ut-community-takes-critical-look-at-own-flight-behaviour

Per January 2022 all employees can travel for free using public transport[19], before this had been limited mainly to people with temporary contracts. Analysis of NS business card data shows after COVID measures relaxed after the first months of 2022 employees travelled more kilometres by train each month. 7% more kilometres were travelled in 2022 than in 2019 (5.1 million km compared to 4.8M km).

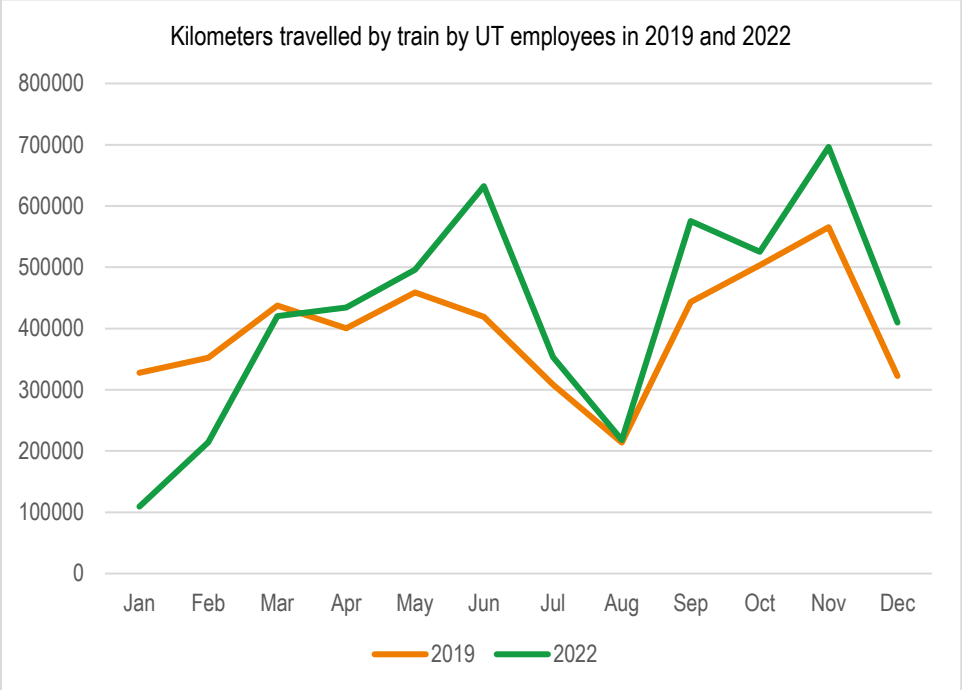


Figure 3. Train kilometres travelled by UT employees for commuting in 2019 and 2022

Additionally, the balance between working at home and in the office has shifted with fewer people travelling every workday to UT.

The 2022 UT mobility survey asked how many days employees travel to work: Just over a quarter of employees work at UT every day and between 18-21% work at UT 2, 3 or 4 days. Only 7.5% work one day a week at UT.

Table 9. The number of days UT employees travel to work

Nr of days	0	1	2	3	4	5	Other and no answer
Percentage (%)	0.4	7.5	21.2	21.4	18.4	26.4	5.5

Source: UT Mobility Survey 2022 (report not yet published)

UT employees are required to register which days they work at UT as commuting allowance and home working allowance is linked to this record. From this record it is not possible to deduct how many days employees travel to work, only what percentage of employees is at UT which day of the week.

Table 10. HR record of presence employees at UT

	Monday	Tuesday	Wednesday	Thursday	Friday
Number of people working at home	2257	1973	2128	1959	2296
Percentage (%)	44.8	39.2	42.2	38.9	45.6

Source: AFAS, UT-HR

Reduced travel movements help to reduce the environmental impact of mobility. The data on presence on campus can also be used to assess necessary workplaces, where effective workspace occupancy contributes to reduced resource use and efficient energy consumption as fewer offices may be needed avoided heating and cooling empty offices. As many staff work

[19] https://www.utwente.nl/en/service-portal/employment-personal-development/terms-of-employment/commuting-travel-temporary-accommodation-and-relocation and https://www.utoday.nl/news/70872/reiskostenvergoeding-voor-alle-ut-medewerkers

on campus on Tuesdays and Thursdays, allocating workspaces more effectively is a challenge as on the busy days desks are needed.

Table 11. CO2 footprint commuting 2019 and 2022

CO2 emissions (in tonnes CO2)	2019	2022	Decrease in %
Commute students	3,049	650	-78.7
Commute employees	1,950	1,393	-28.6
Total	4,999	2,043	-59.1

The data when employees are on campus and how often they travel is still very variable and no conclusive figures can yet be deduced. For the commuting figures the calculating has considered the updated division between modes of transport. For employees 50 weeks, 4 days a week has been taken as an average (200 commuting days for 260 working days and 40 leave days), for students 140 days (3.5 day in 40 course weeks). For the range indicated the average distance was taken for the calculation (range 0-5 km, the average of 2.5 km is used multiplied by 2 for home to work and vice versa). The 2022 survey provides UT with more precise data as the survey from 2010 was outdated.

Car rental
When UT staff rent cars, they are reluctant to hire an electric or hybrid car, UT's contract partner reported. In 2023 opportunity will be given to try out an electric automatic car to see if that will help staff overcome the hurdle to rent an electric or hybrid car.

Shared mobility
Designated zones have been chosen where e-bikes, e-scooters should be parked to avoid having all bikes, scooters parked everywhere. This was designed in collaboration with Enschede city council.

For more information on mobility, please have a look at the Sustainable Mobility Plan (June 2021) or the webpage on mobility.

3.2.1 Impact per faculty

To make an accurate assessment data from the <700km, 700-2500 and 2500+ categories are taken to analyse the impact of each faculty (and all service departments together) on the CO2 footprint of UT business travel.

Table 12. Percentage a faculty contributes to the CO2 emissions per category

	Flight distance	ET	TNW	BMS	EEMCS	ITC	Supporting departments incl EB	Unknown	Total UT
2019		CO2 emissions (tonnes CO2)							
	0-700	26.2	45.5	35.7	33.6	29.7	7.0	11.7	189.6
	700-2500	72.8	96.1	115.1	103.8	75.2	35.2	40.3	538.5
	2500+	320.2	555.3	427.2	479.3	967.1	62.0	138.6	2949.7
	Total	419.2	696.9	578.0	616.8	1072.0	104.3	190.5	3677.8
2022		CO2 emissions (tonnes CO2)							
	0-700	10.5	20.3	9.1	17.9	5.2	6.4	37.8	107.1
	700-2500	41.0	96.1	58.9	83.0	44.4	31.8	222.7	578.0
	2500+	154.1	230.0	105.4	285.0	305.6	57.6	630.4	1768.2
	Total	205.6	346.4	173.4	386.0	355.2	95.9	891.0	2453.3

The data of 2022 was very difficult to analyse as the travel agent's way of bookkeeping made it challenging to extract the

flight data per faculty. The change from OFI number to workorder numbers complicated things further. Bookings made on workorder number could be allocated to faculty. For project numbers this was in some cases impossible. This resulted in categorizing 5 million flight kilometres under unknown. This is 36% of all CO2 emissions from flying. The current way of providing data results in a large proportion of unallocated flight emissions. This needs to be fixed. In Annex 7.4 table 7.4-7 this table is shown with pro-rata numbers. In the table below the CO2 emissions of the unknown flight kilometres were proportionally allocated to the faculties/departments to have representative figures.

Table 13. Total CO2 emissions per faculty and percentage of flights per faculty (with correction pro rata)

	CO2 emissions (tonnes CO2)		Percentage of UT flights	
	2019	2022	2019	2022
ET	442.2	322.8	12%	13%
TNW	735.0	543.9	20%	22%
BMS	609.6	272.2	17%	11%
EEMCS	650.5	606.1	18%	25%
ITC	1130.6	557.7	31%	23%
Service dpts	110.0	150.5	3%	6%
Total	3677.8	2453.3	100%	100%

Based on <700, 700-2500, 2500+ categorization
Correction pro rata: the CO2 emissions of the unknown flight kilometres were proportionally allocated to the faculties/departments by taking the amount added with the amount as a proportion of the total multiplied by unknown CO2 emissions. In annex table 7.4-5 figures can be viewed with and without correction.

Based on table 13 ET is responsible for 13% of the CO2 emissions from flights, TNW 22%, BMS 11%, EEMCS 25%, ITC 23% and the service departments including EB combined for 6%.

In order to monitor UT's progress towards the sustainability goals, the data provision needs to improve. Based on this data BMS and ITC have reduced their emissions from flying since 2019 and the other faculties have not.

When looking at the flight categories, table 14 shows that the percentage of CO2 emissions of short distance flights was 5% in 2019 and this reduced to 4% in 2022. The percentage of CO2 emissions of mid-distance flights was 15% in 2019 and this increased to 24% in 2022 while the percentage of CO2 emissions of long-distance flights was 80% of all flight emissions in 2019 and this reduced to 72% in 2022. It is likely COVID measures contributed to this and that this may go up in 2023 again.

Table 14. Percentage a faculty contributes to the CO2 emissions per category (with correction pro rata)

	Flight distance	ET	TNW	BMS	EEMCS	ITC	Supporting departments incl EB	Total
2019		CO2 emissions (tonnes CO2)						
0	0-700	6%	7%	6%	6%	3%	7%	5%
0	700-2500	18%	14%	20%	17%	7%	35%	15%
0	2500+	76%	79%	74%	77%	90%	59%	80%
2022		CO2 emissions (tonnes CO2)						
0	0-700	5%	6%	5%	5%	1%	7%	4%
0	700-2500	21%	29%	35%	22%	13%	34%	24%
0	2500+	74%	66%	60%	73%	85%	59%	72%

Both sustainable ways of travel (train instead of plane) and promoting making conscious decisions whether there is an unavoidable need to travel or if online presence is sufficient are essential to raise awareness and reduce the CO2 footprint of business travel. This table shows the importance of focusing on reducing long distance flights as it has more impact on the UT's CO2 footprint than removing all flights below 700-800km as this forms only 5% of all CO2 emissions of flights.

3.3 FOOD & DRINKS: WHAT HAS BEEN ACHIEVED IN 2022?

UT policy goals: Halve the environmental impact (CO2 footprint) of food and drinks served on campus by 2030 compared to 2020. Default option for work lunches is vegetarian in 2020. Every canteen has a meatless day a week by 2022. Impact of food options is visualised in canteens by 2022.

Measures to reduce the CO2 emissions of Food & Drinks are to make the default work lunch vegetarian. Also, all menus of UT canteens will be within the planetary boundaries by 2030.

- Since October 4th, 2022, the default work lunch (paid for by the UT, not by the employees) is vegetarian. This means that all lunch options in the banqueting system are default vegetarian (also croquettes). If people still want to order meat option they can order this and receive 50% vegetarian 50% meat/fish (This used to be the default before October 2022). Prior to the changed default, all secretaries had been informed and invited to an information lunch meeting. Only positive feedback was received and only 2 people showed up for the information lunch meeting. Compared to 2019 the number of vegetarian lunches has tripled contributing to reducing the CO2 footprint.

Table 15. Vegetarian and vegan work lunches ordered in 2019 and 2022

	2019	Percentage (%)	2022	Percentage (%)	Difference between 2019-2022
Lunches ordered	54433	100	92035	100	
Vegetarian	5583	10.3	31200[20]	33.9	331% increase
Vegan	182	0.3	660	0.7	233% increase

- Vegetarian work lunch (basic and deluxe) options have been added to the banqueting system for the same price as the vegetarian/meat combination they previously solely sold. Currently both options can be ordered, and the vegetarian options are located first in the banqueting system to stimulate ordering this option. So far, people still often order the non-vegetarian option, so impact has been small.
- A collaboration with Green Dish[21] has started in 2022 to ensure that the canteens will stay within the planetary boundaries and thus lower their CO2 footprint according to the UT goals (kick-off of the collaboration started on September 5th, 2022). Green Dish conducted a baseline study on the menu of the canteens. This showed that 40% of meals are vegetarian, 40% poultry and 20% contain red meat. A healthy diet relies on a balance of the components of a (lunch or dinner) meal, the baseline shows 22.7% of meals consist of vegetables, 31.1% carbohydrates, 29.5% protein and 16.7% other where the average meal weighs 374 grams. And the percentage of weight of the various components is 20% vegetables, 30% poultry and 18% red meat. The top 5 meals and their impact (CO2 footprint, water footprint and land use footprint) are shared in Annex 7.6.
    - Green Dish also assesses food waste divided into kitchen waste (waste by cutting, overproduction) 5.1 gram per guest, fridge waste (spoiled food) 1.9 g per guest and plate waste (leftovers) 11.1 g per guest resulting in 18.0 gram waste per guest which accumulates to 2331 kg/year. This is a baseline assessed during one week and will be monitored after planned interventions. Food waste is already reduced by offering left over food via Too Good To Go and offering a day menu made from leftovers.
- A pilot has started where four warm drinking machines provide oat milk instead of cowmilk. These machines have been wrapped to indicate the change. Most customers are very enthusiastic, and the machines have been used frequently. A survey was held among 202 visitors and the responses were quite positive: 80% rate the taste very good or good. Only 14% people think the taste is worse than cow milk, the others like it equal 34% or better 45%. People buy a drink with oat milk for the following reasons: curiosity (52%), good taste (41%), vegan (48%), sustainability (66%), healthy (38%), lactose free (32%), gluten free (3%). Moreover 177 people (88%) would like more machines with oat milk on campus. The pilot will be continued but the exact locations and number of machines still has to be determined.
- During the Sustainability Week 21-25 November 2022, the canteen in the Horst building was 100% vega(n). Additionally, the canteen in the Technohal is always 100% vega(n). Our caterer wants to continue this way during future Sustainability Weeks and the yearly meatless week as well. Caterer Appèl says that their revenue is lower than during other weeks.
- Honours students calculated the footprint of a few dishes and visualized this in a video in Q4 2021-2022. Because of corona measures, this video has not been used.
    - As part of the Green Dish collaboration, they are calculating the impact of a few selected dishes from Appèl that are sold most to encourage Appèl to lower the impact of these dishes. The total impact of these changes will also be calculated and shared in 2023.

[20] Due to changes in the banqueting system the numbers from Oct 4 onwards are provisional and may be adjusted when final data is available.

[21] https://www.utwente.nl/en/sustainability/sustainability-news/2022/10/135541/appel-greendish-and-ut-join-forces-to-create-healthy-and-sustainable-menus

- First conversation took place with a company that can calculate and visualize the food print of all warm dishes and sandwiches in the canteens. As a pilot, UT canteens can show people the actual price and the true price of their dish and ask them which price they would like to pay. First steps will not be taken before the pilot with Green Dish is finished (September 2023, 2024 or 2025). This to prevent double work and to make sure we know which interventions have led to which outcome. During the Green Dish pilot many dishes are subject to change to decrease its impact, calculating the impact of the "old" dishes thus is not very relevant a few months later.

CO2 footprint of food at canteens

The caterer provides UT with a CO2 footprint report with detailed emissions associated with their products.

Table 16. CO2 footprint of food at canteens in 2022 and 2019

CO2 footprint of food	2019	2022	Increase / decrease
CO2 footprint Food (tonnes CO2)	340.6	382.3	+12%
CO2 footprint food (tonnes CO2) per capita	0.02	0.02	0

Per capita means it is divided by the number of students and the number of employees (see Annex 7.13)

For more information on food and drinks, have a look at the webpage on food and drinks.

3.4 WASTE: WHAT HAS BEEN ACHIEVED IN 2022?

UT policy goals: A (single use) plastic-free campus by 2022. A waste free campus by 2030. A circular campus by 2050.

While working towards these goals, several initiatives have been conducted (following on from the UT Waste Plan):

Prevention of waste

- Caterer Appèl started using the Billie Cup[22]. This is a reusable cup that people can use by paying a euro deposit. If they use the cup more often, they get a discount on their drinks. From March until September 2022 449 Billie Cups (2.4%) were used while 18.797 drinks where sold at caterer Appel. Currently conversations are taking place with caterer Appel to increase this number.
- New warm drinks machines are suitable for refilling own water bottle, preventing the need to buy disposable plastic bottles.
- Pilots are held to remove the cups from the warm drinks machines[23].
- In the library the water tap point and the water option in the coffee machines are stimulating the use of reusable bottles and mugs and preventing plastic waste.
- The SEE working group started a project on furniture and sustainability: Management of furniture in storage and circularity. The group proposes to set a standard for office furniture making it easier to exchange products.

Increasing awareness

- Together with the students from the Green Hub, an animation video is being produced to show the process of waste recycling from the UT waste.
- The waste page on the UT's service portal (www.utwente.nl/waste) was updated to give a comprehensive overview of what waste goes in which bin, and where less-common waste can be disposed of. The page is promoted on the screens of the UT's coffee machines.

Improving waste separation

- Waste bins have been purchased to provide outdoor waste separation. People will be able to separate their PMD, paper and residual waste on 4 different locations. A first waste analysis showed that the waste is not separated

[22] https://www.utwente.nl/en/news/2022/3/510685/coffee-corners-university-of-twente-introduce-billie-cup and https://www.utwente.nl/en/sustainability/sustainability-news/2022/3/510665/coffee-corners-university-of-twente-introduce-billie-cup

[23] https://www.utwente.nl/en/sustainability/sustainability-news/2022/11/288398/working-on-fewer-disposable-cups-towards-zero-waste

well. For the bins located near the Coop: The residual bin also contained 38% of plastic packaging (PMD), the PMD bin contained 46% of residual and the paper bin contained 27% of plastic packaging (PMD) and 27% residual waste. The bins at O&O square: The residual bin only contained residual waste, the PMD bin contained 50% of residual waste and the paper bin contained 18% of plastic packaging (PMD) and 39% residual waste. Another waste analysis and interventions are needed in 2023 to improve the recycling rates outdoors. The pilot is successful when recycling rates are similar to the indoor bins.

- During the Bata, a pilot was conducted to see if waste separation at large events is beneficial to our waste goals. During the Bata party and on the Bata camping, people could separate the PMD, paper and residual waste. Analysis showed that most paper waste was contaminated with food grease or sauce and could thus not be recycled anymore. Most PMD waste consisted of PET bottles or disposable cups or was contaminated with waste from other waste streams.
- Lab specific PMD waste inside a few closed-labs in the Zuid-Horst is now being separated.
- Hard plastics have been collected at a few locations in the Zuid-Horst in locations where styrofoam is currently already being collected separately. The pilot started in autumn 2022 and in a few months already 10m3 or 560 kg was collected. Beforehand this would have been residual waste and it can now be recycled.
- In 2021 the UT started separating styrofoam (EPS), mostly at the labs but also at other locations. In 2021 60kg of EPS was collected, in 2022 this has doubled to 126kg. As this is a very light type of waste, the volume was thus quite extensive.
- At UT in total 560 kg of hard plastic, 15.600 kg of foil and 126 kg of EPS (polystyrene) have been collected and processed in monostreams by the waste collector.

Data

- Improved waste data including waste from demolition and construction projects for which CO2 impact has been assessed.
- UT will join next benchmark for waste by Ministry of Infrastructure and Water Management

Detailed waste data can be found in Annex 7.7. Table 17 shows the waste as processed by our waste collector.

Table 17. Total waste and residual waste 2019 and 2022

Year	2019	2022	Amount of waste in 2022 compared to 2019
Total waste (kg)	985.085	903.213	-8.3%
Waste per capita (kg/staff and students)	57.7	48.8	-15%
Residual waste	594024	501427	-16%
Residual waste per capita (kg/staff and students)	34.8	27.1	-22%

Per capita means it is divided by the number of students and the number of employees (see Annex 7.13)This table excludes demolition waste, as it is only recorded from 2021 onwards. These data are shown in Annex 7.7.

The goal of becoming a waste-free campus means the amount of residual waste per person will have to be reduced in 2030 to 10.5kg per person/year.

Table 18. CO2 emissions of waste 2019 and 2022

	CO2 emissions 2019 (tonnes CO2eq)	CO2 emissions 2022 (tonnes CO2eq)	Increase/decrease
Waste	631	1112	+76%

The increase is mainly due to more detailed reporting by the waste collector. The increase due to the inclusion of demolition waste is 75 tonnes CO2.

E-waste/ICT

E-waste is the world's fastest growing waste stream. Here we provide an overview of the number of items purchased and processed as e-waste. Many items are given a second life. Not everyone registers this as such. In 2022, 770 laptops were purchased last year (20% of employees received a new laptop) and only 210 laptops were returned for recycling or reuse

(27% only). UT would like to improve this for data safety reasons as well as for sustainability reasons. It is important to return the resources to the market once the product is no longer in use by handing it in for recycling.

Table 19. Electronics purchased 2019-2022

Purchased items	2019	2020	2021	2022	Increase/decrease 2022 compared to 2019
Desktop	275	141	179	86	-69%
Laptop	686	837	738	770	12%
Smartphone	248	285	157	145	-42%
Tablet	50	58	55	43	-14%

Table 20. Electronics disposed of 2019-2022

Items e-waste	2019	2020	2021	2022	Increase/decrease 2022 compared to 2019
Desktop	34	22	27	29	-15%
Laptop	156	170	173	210	35%
Smartphone	13	16	13	23	77%
Tablet	12	14	20	19	58%

ITC and LISA conduct tests of the Framework laptop which is - like the Fairphone - modular, upgradable, using components that are replaceable (by the user) while it has a sustainable design and use of recycled materials. When this meets the UT quality and safety requirements, it will be offered through the self-service portal.

Multiple questions from the UT community have been posed on e-waste and ICT/energy use. The issues discussed range from the rules on frequency on laptop replacement, repair, how e-waste is dealt with and the gap in written-off items that get returned. Besides the e-waste questions ICT questions focus on energy consumption of chosen software, amount of storage of UT files (cold and hot).

Student projects

BSc student Industrial Design conducted research into creating a redesign of the function of the current banner on the Spiegel that will fit within the Waste plan. Promotional banners, like the banner on the Spiegel building, play a role in the created waste on the campus by their short lifetime.

A second BSc student Industrial Design looked at “how can the Kick-In of the University of Twente be made more sustainable to align with the UT’s sustainability goals?” The design phase led to the creation of a motion detector that is able to recognize whenever an item is thrown into the trash can and returns immediate feedback to the user. A visual of a campus that is slowly being cleaned up with each disposed-of item serves as further encouragement to users for changing their behaviour.

A Creative Technology BSc designed a waste separation guide service for UT community members. There are three types of screens in the prototype: 1. The primary selection screen is in which a user can choose four types of waste stream buttons and the “I am not sure” button. 2. An information screen presents requirements for a particular waste stream, the recycling process after waste disposal, and UT’s goals regarding the waste stream.3. A question screen that asks several questions when the user selects an “I am not sure” button.

Two Creative Technology students created a smart bin that is connected to a tv screen. The screen asks you what item you have (for example a coffee cup or yoghurt packaging) and then lights up the bin in which you should dispose the item as well as shows it in text on the screen. The screen will tell you whether you did it correctly.

An ITC researcher worked together with a researcher from the VU and the Green Hub to reduce plastic waste from the Coop supermarket on campus. As a result the plastic bags for fruits and vegetables have been changed to paper. It is unclear whether this is ultimately more sustainable as it is heavier and it becomes residual waste when dirty and it can then not be recycled.

Honours students of the programme Shaping the Future worked on a framework for a fully circular campus with a focus on building waste and e-waste.

For more information on waste, have a look at UT waste plan (2021) the webpage on waste.

3.5 EVENTS: WHAT HAS BEEN ACHIEVED IN 2022?

UT policy goals: UT organised events monitor and report on sustainability performance by 2020 based on criteria compiled by UT. Events organised by external parties monitor and report on sustainability performance based on UT criteria by 2022. First small plastic free by 2021, first large plastic free event by 2022. Waste free events by 2030.

Monitoring sustainability at large events
During the event season in 2022, several waste analysis have been performed to analyse the waste. It turned out that most waste is either plastic cups or food related. By introducing a cup return system, only residual waste will remain as food related waste is hardly ever clean enough to be recycled.

During the Bata waste separation was tested for all four waste streams. The organic bins had to be removed as not much food waste without food packaging was disposed of in those bins. On the campsite, the bins were not emptied quickly enough and people ended up disposing their waste in/next to any bin available. The PMD waste that was separated during the Bata party/campsite was therefore too contaminated and the UT got fined to dispose this waste stream as residual rather than PMD. For 2023 different ways to recycle and minimize waste are planned (for example researching the possibilities of testing post-consumer waste separation).

First test rPET cups
A pilot to collect the plastic rPET cups and to facilitate recycling[24] was held during Kick-In 2022. When collected as a monostream, the cups can be recycled into new rPET cups again. At the Kick-In Sports event on August 26th and at the Kick-In end party on September 1st, students could receive a free drinking token when returning 10 cups at the special desk at the bar (sports event) / next to the bar (end party). At the smaller Sports Festival, more than 70% of the cups were returned: 4770 out of a total of 6600 drinks. During the final party, over 10,000 cups were collected out of a total of 17,600 drinks sold, 57% of all cups. Promotion was only done at the event since promotion beforehand could have led to student bringing new cups from elsewhere to get free drinks. In 2023 the return system will be promoted beforehand as well, because it will be organized differently. For example by using a return system with a deposit on the cup or by increasing the price of a token that pays for the free drinks token if you return 10 cups. Added benefit was that students helped keep the terrain clean to obtain a free drinks token.
The recycling of the cups was arranged via another company then the UT waste collector as they could guarantee the rPET would be recycled as a monostream into new rPET.

Sustainable events on campus
A network meeting, between several organising student committees of the Kick-In, Bata party, Company Fair, CuriousU, Create Tomorrow where also Vestingbar, Events Office and sustainability officer SEE and terrain manager CFM were present was revived (was put on hold during COVID). It was initially led by the SU (portfolioholder external affairs, entrepreneurship and innovation (incl. sustainability)) and subsequently handed over to Green Hub.

Events policy and sustainability events policy documents
The SEE program is writing a Sustainable Events plan and simultaneously the CFM Policy and projects team is writing a new UT events policy. Collaboration will ensure alignment between both documents in 2023.

To ensure integration of the policy documents into the organization, a small checklist will be made. This checklist can be used by people organizing smaller events (drinks, BBQ's, teambuilding activities etc.) to include suggestions from the policy documents, including sustainability.

Sustainability Week
From 21-25 November 2022, the fourth edition of the Sustainability Week[25] was held. It was again successfully organized jointly by the UT, Saxion and the ROC van Twente. Green Hub is the lead for UT.

[24] https://www.utwente.nl/en/sustainability/sustainability-news/2022/9/58482/pilot-with-recyclable-cups-during-kick-in-step-towards-waste-free-events
[25] https://www.sustainabilityweek.nl/

Check list events & associations

Green Hub produced a Sustainability Guide[26] to help associations become more sustainable. Green Hub also created a Guide for organizing sustainable events and a checklist[27] for assessing how sustainable your event is. This checklist which - after having been downloaded and completed - shows what sustainability level your event has achieved. The list can be used to increase your (next) events ambitions. Green Hub will provide you with a certificate for the level achieved.

For more information on events, have a look at the sustainability webpage on events, the Green Hub page or the Events office site.

3.6 BUILDINGS: WHAT HAS BEEN ACHIEVED IN 2022?

UT policy goals: Existing buildings: Energy Index (kWh/m2/year) 1.3, label C by 2022. Renovations: Shell insulation follows the Dutch building decree60 for new buildings. New built: BENG, built in energy consumption meters, energy neutral by 2050. Maintenance: A Sustainable Multiple Year Maintenance Plan is operational by 2022 (Sustainable MJOP). Material usage – increased focus on low CO2 impact and circular options.

Energy roadmap

In 2020 a roadmap towards CO2 neutral real estate was developed in collaboration with Royal Haskoning DHV to comply with national legislation to reduce CO2 emissions by 49% in 2030 and by 95% in 2050 compared to 1990. All building characteristics were inserted into a model (from current insulation status to last maintenance conducted). This was aligned with a list of measures that improve the sustainability of buildings. This roadmap was updated in September 2022 and will continue to be updated every year in order for UT to monitor its progress towards the set goals as well as towards goals resulting from national legislation. The yearly review is necessary as changes do occur: additional measures reach the market and some proposed measures are not possible to apply affecting the progress towards the goal of becoming CO2 neutral (more detail on UT website on energy roadmap for CO2 neutral real estate). The 2022 update shows LTSH plans ensure the goals for 2030 (-49% CO2 emissions) are met, but the 2050 goal (-95% CO2 emissions) is not yet met as the expected reductions remain at -91%. Future developments and new efficiency options will be considered in the annual update and will hopefully contribute to reaching the 2050 goal.

Long-Term Strategic Housing Plan (LTSH)'s approach for renovations or new building projects

When renovating a building the following aspects are considered: the shell of the building (roof, walls, floor, window frames and glass) to improve the insulation value to avoid heat loss. Then, sustainable sources for heating and cooling are assessed: The source of heating is changed to district heating – depending on the distance of the building to the piping infrastructure – and the cooling source is changed to the cool circle or a heat pump – depending on the cooling demand of the building and the remaining capacity of the cool circle. Options to reduce the cooling demand are assessed and smart building measures included to enable building users to have an overview of their consumption pattern enabling users to act on that.

Concerning the use of materials, materials with low impact are selected (paving stones without concrete are the standard items used) or materials that can be reused very well (such as baked brick which has been used for the elevated road crossings) or circular materials. In tender documents these requirements are frequently included, and an architect can be instructed to take into account the desire for circular materials.

The LTSH programme is committed to make UT real estate sustainable. LTSH ensures alignment with roadmap to CO2 real estate. Every housing initiative (new and renovations to existing buildings) will be aligned to the roadmap and will have to meet sustainability goals[28].

For large renovation projects such as Langezijds, a GPR building label score is made. This label visualizes the sustainability status of a building based on five themes: energy, environment, health, user quality and future value. Each theme receives a

[26] https://www.utwente.nl/en/sustainability/green-hub-twente/more-sustainable/

[27] https://www.utwente.nl/en/sustainability/green-hub-twente/more-sustainable/for-events/

[28] P.13 LTSH long term strategy plan 2023-2032 https://www.utwente.nl/en/ltsh/#policy-plans

score where a 6 reflects the current legislation (Dutch Building Decree). For Langezijds, an average score of 8 was maintained for sustainability and a 9 for energy. The target use of water is maximum of 4.5 m3/fte for employees and 3 m3/student and at least 50% of the total predicted water need is served from a grey water system consisting of rain water [29].

These scores depend on various factors. For some buildings building aesthetics, monument status (municipal monument) or architectural demands limit the implementation of sustainability measures. Price fluctuations and budget restraints may limit the level of energy reducing measures or circularity of materials applied. Besides CO2 and material use, other considerations such as the sustainable use of a building by realising optimum use of space and a healthy environment (e.g., available day light, air circulation) are also taken into account.

Sustainability measures

In renovation projects several of the following measures from the Roadmap to CO2 neutral real estate have been implemented. For more information, the LTSH and campus development website can be consulted. The LTSH long term strategy plan 2023-2032 has been updated and due to changes the roadmap needs to be recalculated to be able to monitor progress towards the CO2 neutral goal. This is scheduled to be finalized in 2023. The list of measures that was used to develop the roadmap to CO2 real estate can be found in annex 7.8.

CFM V&O provided an overview of the CO2 reducing measures from the roadmap towards CO2 neutral real estate that have been implemented and have been included in project plans to be implemented. The roadmap helps to include sustainability in the integral approach in renovation projects. This overview is included in annex 7.9.

Paris Proof buildings

Besides the roadmap to CO2 neutral real estate which focusses on the application of sustainability measures, another assessment called Paris-proof buildings is conducted by the energy coordinator to assess the actual energy usage of buildings.

The 2015 Paris Agreement prompted the Dutch Green Building Council (DGBC) to develop a Sustainable Renovation Delta Plan[30]. The aim of this organisation – which was initiated by request from the building and real estate sector - is to work towards future-proof buildings by making the built environment Paris Proof by 2040. This means energy consumption of the built environment should reduce by two thirds. This reduction is based on the predicted availability of renewable energy in 2040. The energy consumption has to go down for us to be able to function on purely renewable energy.

Thus, a building is Paris Proof when its energy consumption is aligned with the goal of keeping global warming limited to 2C and pursuing efforts to limit the global warming to 1.5C. The energy consumption is influenced by the sustainable measures present that improve energy efficiency as well as by the behaviour of the users. For Paris-proof office buildings the energy consumption should not exceed 70kWh/m2/year[31]. Translated to energy labels, this means that from 2040 office buildings should have a A+++ label. There is no specific category for laboratories mentioned but for example hospitals should not exceed 100kWh/m2/year, industry with cooling/freezing facilities 85kWh/m2/year. 70kWh/m2/year also counts for indoor sports accommodations, except a swimming pool (210kWh/m2/year).

The actual energy intensity indicator (in Dutch: WEii[32]) shows the energy consumption per square meter for a building. In the table in annex 7.10 All buildings are listed with their energy consumption in kWh/year and what the maximum consumption should be per square meter when meeting the Paris Agreement goals. No office buildings remain with their energy consumption under de limit of 70kWh/m2/year, despite most buildings having label C (see annex 7.11).

Soon, there will be a dynamic system where daily consumption is compared with the paris-proof level of consumption. This overview will also show the cost-saving due to reduced energy consumption.

For more information on buildings, have a look at the webpage on buildings, campus development or LTSH.

[29] https://www.utwente.nl/en/campus/campus-development/sustainability/#buildings
[30] www.deltaplanduurzamerenovatie.nl / https://www.dgbc.nl/
[31] https://www.weii.nl/weii-klassen-11
[32] https://youtu.be/bxrsCxDF7ZE Werkelijke Energie intensiteit indicator https://www.weii.nl/

3.7 PROCUREMENT & PURCHASING: WHAT HAS BEEN ACHIEVED IN 2022?

UT policy goals: All new contracts contain a list of UT sustainability criteria by 2022. The weighting of sustainability criteria is increased in 2022 and integrated in the awarding criteria by 2030. Requirements for CO2 monitoring in all new contracts from 2022. KPIs on sustainability in all contracts by 2025. Focus on sharing and service economy options from 2020 onwards. Focus on circular ('design-for-recycling'), products and services and modular products from 2020 onwards. Increased attention for monitoring compliance by service and product suppliers.

A series of workshops was held in Q1, 2022 to increase awareness and knowledge on sustainability in purchasing and procurement processes by Copper8. This led to good discussions. The workshops were attended by the purchasing and procurement department, a contract manager, a building project manager, Saxion procurement staff and members of the SEE support team.

To support the purchasing and procurement department, hold monthly meetings with SEE were initiated to discuss upcoming tender processes where support on sustainability is required. Also reporting on sustainability criteria will be part of these meetings.

Sustainability in contracts

Sustainability in contracts: In the tender for the Christmas gifts sustainability criteria have been added with a weight of 20% including the obligation to provide CO2 data. The tender for workspace hardware included sustainability requirements such as Energy Star classification, insight in energy consumption of workspaces, and an e-waste policy and obligation to provide CO2 emission data. In the tender for furniture ITC sustainability criteria were given a weight of 20%, for the tender building Cube 10% and company clothing 40%. The requirements in the tender for company clothing included amongst others adhering to ISV conditions which contribute to banning malpractices in the value chain, no use of plastic and limited packaging. The tender for removals included requirements to conduct 80% of transport within Enschede electrically, and focus on packaging (no plastic, no excess packaging). Rental cars: The contract prioritises the use of electric and hybrid cars. Petrol cars are optional for last-minute bookings. In 2022, 491 cars were rented and 127 vans (diesel). 5% of cars rented were electric, 59% hybrid and 36% petrol. The number of petrol cars rented can still be further reduced.

For more information on procurement and purchasing, have a look at the webpage on procurement and purchasing or the service portal page on procurement.

3.8 WATER: WHAT HAS BEEN ACHIEVED IN 2022?

UT policy goals: Reduce water consumption by 5% in 2022 compared to 2020, zero water footprint (water neutral) in 2030. Full recycling of water used on campus in 2050. Trias Aqua: reduce water consumption, use rainwater, reuse water.

Table 21. Water consumption, CO2 emissions 2019-2022

		2019	2019 recalculated	2022	Comparison 2022 vs 2019
Water consumption	m3	100.022	100.022	100.953	+1%
Water consumption per capita	Litre/person		5.86	5.65	-7%
CO2 emission factor water	Kg CO2/m3	1.5	0.397	0.380	
CO2 emissions water	Tonnes CO2	150	40	38	-4%

Per capita means it is divided by the number of students and the number of employees (see Annex 7.13)

The term 'water neutral' is still open for interpretation. Does water neutral mean: UT reuses/harvests as much as the amount of drinking water obtained through Vitens? This definition will need to be developed.

Water lab Hogekampplein and water storage in basement, irrigation sports fields

The water lab was finalised early 2023. This is a water purification lab (used by the membrane cluster). Water is filtered by the water miracle to drinking water quality (not allowed to use it for that purpose as it would need certifications). It is stored in the reinwaterkelder (concrete basement) to be used for irrigating the sports fields (artificial sports field need to be watered quite a bit to be able to use it comfortably).

By filtering this pond water, around 1500-1600m3 (1600.000 litres) of drinking water has been saved. In 2023, a meter monitoring the water flow will be added to the energy data platform.

There is infrastructure below ground where rainwater, water from the reedbed filter and water from ponds can be analysed separately. Also, samples can be taken from waste water from Hogekamp and HTF to analyse this separately on for example medicine rests which is a problem in surface water.

From the water basement (reinwaterkelder) water pipes run to the sports fields. At the football field and the multi-purpose field three underground containers of 30m3 are filled with filtered water. No pump is needed to transport the water, the water pressure is sufficient. When pumping from the underground container to irrigate a small pump is sufficient. Irrigating the field behind Bastille also still requires a pump but this pump now can operate on electricity, no more diesel needed.

Water meters are now used for the sport fields. By measuring the humidity, there is no need to standard water 3x/week. This has reduced the water consumption. UT does not want to use tap water for irrigating sport fields. Drinking water quality needs to be used as rainwater has impurities causing algae growth, for which you would need chemical substances such as chloride to remove those. Currently, the algae are removed using natural anti-algae substances. Also watering on campus during drought is minimized to young trees and plants that are suffering to reduce water consumption.

Despite all these measures on terrain management to reduce water consumption, the total amount of water consumed has increased in 2022 compared to 2019. Due to a lower CO2 emission factor the CO2 emissions have been reduced by 4%.

Retention pond

A retention pond is a pond which collects the overflow of the Roombeek and lets the water slowly infiltrate to replenish the groundwater table. This water can also be used in the terrain management to water sensitive plants and trees. The banks of the Roombeek behind Zilverling have a section where they are a little lower. When the Roombeek is transporting water after heavy rainfall, at this section the water will flow over to the retention pond and reduce the water flow in the Roombeek contributing to reduced flood risk.

XXL smart rainwater buffer[33]

A 35000 liter former milk tank (35m3) is collecting water from four drainpipes of the roof of the sports centre. This water can be used for watering plant boxes and shrubs. When code yellow is declared and a heavy storm is coming, the tank will empty itself (into the drain which is no longer connected to the sewage system, this can overflow and the water ends up in the flowerbeds around the milk tank) to prevent sewage systems not being able to cope with heavy rain and to prevent flooding of the sports centre.

At Langezijds, infiltration crates of 25m3 per garden store rainwater. This is used for drip irrigation. There is surplus storage from which plants can be watered that are present elsewhere in the building.

Student projects

A creative Technology student is analysing toilet flushing behaviour. Using pressure sensors, the number of times the small and big button were used was monitored. Then using an intervention, a potential change of behaviour was researched. Final results are expected in 2023.

For more information on water, have a look at the webpage on water.

[33] https://www.1twente.nl/artikel/1876676/melktank-van-acht-meter-hoog-wordt-omgebouwd-tot-enorme-slimme-regenton-op-ut-campus

3.9 BIODIVERSITY: WHAT HAS BEEN ACHIEVED IN 2022?

UT policy goals: Report on the application of biodiversity criteria in all green maintenance decision-making by 2022. Improve biodiversity at two selected sites by 2025.

Together with Eelerwoude and supported by an ecologist from Krinkels, the green maintenance company at UT, a SMP will be drafted. A SMP is a Species Management Plan. This is required when you are building. As the housing cooperation is building on terrain that is currently greenery, the Forest Law requires the project to compensate for lost greenery. This compensation means the value of the square meters of greenery needs to recreated elsewhere.

The local association for field biologists (KNNV) shared an extensive report based on field work with suggestions for improving the biodiversity on campus. This association has volunteer members from UT, Saxion and ROC staff making it a good partner for staff engagement on biodiversity.

Several sustainability measures are applied in the green maintenance of the campus. A circular application in green maintenance is that leaves that need to be removed (for safety on paths or on grass to prevent the grass from dying) are fermented using Bokashi and reused as fertilizer for shrubs and trees. Four 80-year-old plantains have been transplanted to avoid felling and 500 m2 of flower seed mixtures have been seeded to follow the flower bulb fields to increase the availability for insects over a longer period.

For more information on biodiversity, have a look at the webpage on biodiversity or campus development.

3.10 FINANCE: WHAT HAS BEEN ACHIEVED IN 2022?

UT policy goals: UT banks with a sustainable bank by 2022. From 2020 UT starts the discussion with University Fund, pension fund ABP and investment and banking partners on increasing their sustainable portfolio. Return on (sustainable) investment is extended to end of life by 2022, this is 15 years on installations and 30 years on buildings.

Following on from the decision from ABP to divest in fossil fuels, Scientists4Future and Young Academies of the Dutch universities called on universities and universities of applied sciences to move to sustainable banking.

Due to the required 'Schatkistbankieren' where the Ministry of Finance acts as the bank for UT but uses the services from ABNAMRO, it is not possible to change bank. Sustainable banks such as Triodos and ASN do not offer this way of working.

Sustainability will be a criterion when new tenders for insurances are issued.

3.11 COMMUNICATION: WHAT HAS BEEN ACHIEVED IN 2022?

Communication plays an important role in bringing about change.

All means of communication initiated by the SEE Programme support one of more of the following goals:
- Inform the target groups about the actions the UT takes to become a sustainable organization
- Create awareness & change the mindset about the importance of sustainability in our daily operations
- Connect, activate & involve target groups: participate and collaborate in making the UT a sustainable organization

An important aspect in communication about sustainability is activating individuals to incorporate sustainability in their own daily lives at the UT. However, this should always be combined with what the **UT as an organization is doing** to help them achieve their goals and how their actions fit into the organization goals. That way, it avoids the perception that UT is passing the responsibility on towards individuals. The tone of communication is generally positive, where we celebrate successes and milestones. Whenever possible, means of communication connect to the 10 themes of the SEE programme. The effectiveness of the message is strengthened when managers actively promote and support initiatives and measures (e.g. via social media such as LinkedIn) as ownership by management positively influences staff. In communication items often a quote will be used from a relevant manager to support this.

The ideal situation is that communication surrounding sustainability on campus creates a 'snowball effect': visibility leads to more enthusiasm, the generation of new ideas and more support for measures the SEE programme takes, where the focus on sustainability becomes the usual way of working for both the individual and the UT as a whole.

The core message of sustainability communication is:
The University of Twente is working to become a sustainable organisation by 2030. We take action to apply sustainability in our daily business operations. We do so together with our students, employees and external partners, so that sustainability becomes a natural part of our daily lives at the UT.

News stories, Sustainability Week, activating colleagues, Collaboration ROC, Saxion for Sustainability week

- In 2022 24 **news items** published on the website and the employee portal with news surrounding sustainability: link. All news items that were published on the corporate main page were accompanied by posts on twitter, facebook and linkedin. Of those, LinkedIn has the most reach and impact. To better reach students, Instagram should be used more in the future. Also, when relevant the screens of the coffee machines will be used as well.
    - LinkedIn posts are the most effective by far. Interest in operational sustainability is high there. We made 6 posts through the UT account. The highest score was the one about the train zone map with 63,000 impressions, nearly 6% engagement rate, almost 700 reactions and 4,000 click-throughs. Full stats Annex 7.12.
    - The article about the Train Zone Map was best read article on Utwente.nl in 2022 (in English; Dutch 4th best read item), with 4,600 unique pageviews. The vast majority came from the LinkedIn post.
    - The announcement the default work lunch (paid by UT) will become vegetarian generated a lot of attention on social media (LinkedIn) with many colleagues from other educational institutes and other organisations calling on their organisation to follow suit. Tubantia wrote about it too.
- To structurally pay attention to days such as Earth Day we have made a 'sustainable days-calendar' that will be used as a guide. Not all of these will be taken up by (just) the SEE programme; we will discuss this with the Green Hub and others at UT when appropriate.
- **UTwente** news articles on sustainability can be found here: link
- **UToday**'s news items on sustainability can be found here: link.
- A survey was conducted to measure the response to the pilot with oat milk-products in four student coffee machines on campus (see news article). 202 persons filled out the survey, with largely positive responses. The results were bundled in a report to support decision-making about if and how the pilot should be continued or expanded.
- The updated waste page www.utwente.nl/waste has been promoted via the coffee machine screens.
- A sticker was placed above the water tap at the Vrijhof to promote the use of (free) tap water instead of water in plastic bottles, with the aim of reducing waste and CO_2-footprint.
- Several interviews were published with members of the UT community about how they integrate sustainability into their daily work. Example: Rob Nengerman, Eline Kikkert from SU, Mirjam Nijhuis-Morshuis from M&C.
- The Green Hub has produced monthly newsletters. The sustainability communications advisor supports the Green Hub communications officers with advice.
    - Collaboration with the Green Hub was focused on helping them to execute their own projects and support their officers. On bigger projects, mainly the Sustainability Week, collaboration was focused on maximizing visibility for sustainability at UT.
- The Green Hub has submitted the UT contribution to the **Sustainabul**. (link for SG SEE members, public link)

The https://www.utwente.nl/en/sustainability/ website received 50% more page views in 2022 compared to 2021, the Dutch version received 15% more page views in 2022 compared to 2021. The growth is likely largely explained by the Train Zone Map article.

Wider impact
Several of UT's sustainability measures have had impact on other organizations in the region – and elsewhere. For example, after UT introduced the Billie Cup, Saxion asked us for information and soon followed suit. When UT introduced the standard vegetarian lunch, a motion was introduced in the municipality council of Enschede to do the same in their organization that explicitly mentioned UT as inspiration. The motion was voted down, but it did get the topic on the agenda. The article about the Train Zone Map got various people to ask if they could use the UT's train map.

3.11.1 Connections UT-wide

Communication on sustainability is not only carried out by the SEE programme. The importance of connecting initiatives and strengthening and aligning the communication is essential to obtain the goal of integrating sustainability in the organisation and having sustainability as a precondition to everything we do at UT.

Green Hub – https://www.utwente.nl/en/sustainability/green-hub-twente/. With their own social media channels Green Hub Twente creates visibility on sustainability. Their activities, such as sustainability lecture series and fun awareness raising activities such as warm sweater day are well attended and bring together people to work together for a better future.

The Green Hub also coordinates the Sustainability Week jointly organised with Saxion and ROC van Twente which raises a lot of publicity for sustainability: https://www.sustainabilityweek.nl/. Green Hub collaborates with student association Sustain and VSA who also focus on sustainability.

SEG – https://www.utwente.nl/en/organisation/about/shaping2030/organisation/seg-sustainability/ Initiatives coming from the SEG sustainability are the eco-challenge and the sustainability card game 'Your sustainability journey' as well as the Climate Initiative.

M&C colleagues –. Integrating sustainability in communications UT wide
M&C works to integrate sustainability in events and projects it is involved in as a matter of 'hygiene': i.e. not as a Unique Selling Point but as a matter of course. Most of this happens in the background, but when appropriate, this is shown to the outside world; for example through working with the Green Hub checklist to make the Open Days more sustainable.

S4F – https://twente.scientists4future.nl/ Scientist4Future is a large group of UT scientists who enable scientifically trained professionals and students (in all scientific fields) who are concerned about the future, to connect with each other, and to empower citizens and organizations in Twente (and beyond) by strengthening 'climate literacy' and advocating for a science- and evidence-based approach to the climate emergency and other environmental crises. They hold regular lunch meetings, lectures, discussion sessions to bring together concerned UT staff and students. On September 14 the discussion was on: *How to influence UT sustainability policy: what are (y)our ideas, where could the UT play a larger role, how to speed up, what should immediately change, how can we foster sustainable change at the UT?*

3.12 DATA: WHAT HAS BEEN ACHIEVED IN 2022?

Monitoring and reporting is an important aspect of becoming a sustainable organisation. Setting goals and monitoring progress towards the goals enables the organisation to be transparent.

A CO2 footprint is produced via the carbon platform built to facilitate the entry of manually collected data from suppliers and colleagues.

More buildings have been connected to the energy data platform, https://energydata.utwente.nl/ enabling its users easy access to monitoring data on electricity, gas, district heating, water, cooling, solar electricity production.

Many buildings are used by more than one faculty. To enable the monitoring of energy usage per faculty, a new site was created. The energy usage in the faculties based on Gross Floor Surface used for office and labs has been estimated and visualised here (pilot version by Realised): https://energydata-faculties.utwente.realised.nl/ where a formula has been applied approximating the energy consumption in an office or laboratory environment. Data on assigned floor space in m2 per faculty in the various buildings was used for this. These are not identical to the bills as this platform has to make some assumptions, it is meant to provide an indication of the energy consumption per faculty.

CO2 footprint 2022 (link)

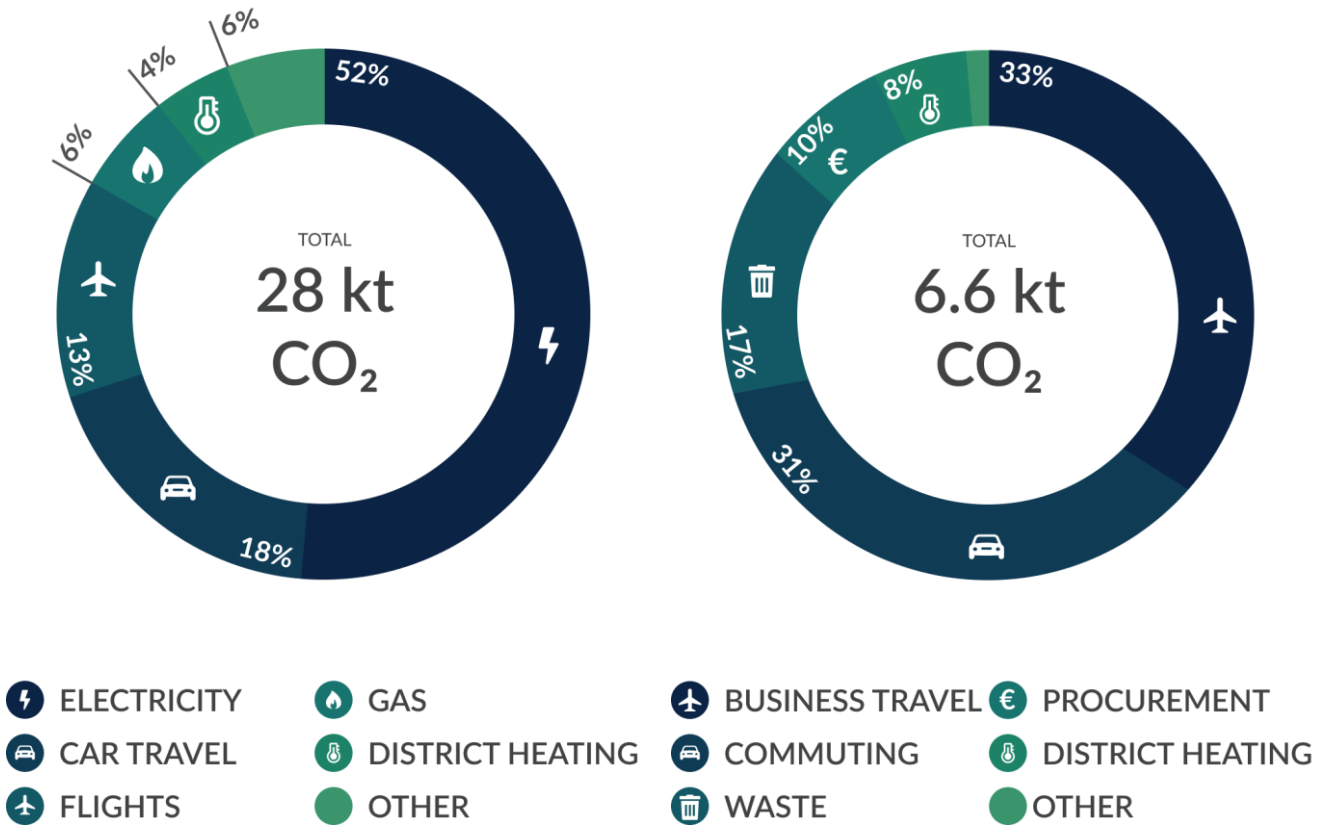


Figure 4. CO2 footprint of 2019 (left) and 2022 (right)

After two years of not representative CO2 footprints due to COVID-19 measures, the 2022 CO2 footprint reflects a relatively normal year again.

The CO2 emissions that occur in the supply chain are included in scope 3. These are emissions associated with the products and services UT uses throughout the year as well as mobility such as business travel or travel from home to work. Around 90 companies were contacted and CO2 data was received from around 45 suppliers of goods and services (50%), 34% of suppliers did not react to the request to share CO2 emissions data, 9% will provide data later in the year (this will be processed and the UT CO2 footprint will then be updated) and 3% indicated they could not provide any data. Of the 50% of suppliers that provided data, 23% only provide transport movement data (kilometres driven to provide the service or to

deliver the products to UT, excluding the impact of the product itself), 25% calculate a CO2 footprint and can determine what percentage can be allocated to the services or products delivered to UT.

This scope 3 CO2 footprint calculation is the best we can do at this moment. We do realise we are underrepresenting emissions as due to the lack of information that we do not take into account the emissions during the mining and production phase as this is outsourced to countries in the global South. Suppliers to UT often do not have the data as there are many players in their supply chains for us to be able to include this in our CO2 footprint calculation.

CO2 emissions of electricity, gas and the flights of ITC are compensated and thus subtracted from the CO2 footprint. More flights have been compensated by individuals and the BIOS group which are mentioned in Chapter 3.2 and the proposal is to develop a UT wide approach for compensation to be able to include these easily in the carbon footprint reporting.

More detail on the CO2 footprint can be found on the Carbon Footprint website where the report is available to download.

4. ENERGY

As part of the MJA3 (multi annual agreements with the government) UT was obliged to set up an Energy Management System (EMS): A system that recorded the energy consumption and monitored it. This EMS is part of the SEE program. Per 1 January 2021 the Multi Annual Agreement came to an end. As there is no sector wide agreement at this moment, the legislative reporting reverts back to the local council or ODT (Omgevingsdienst Twente). As of 1 January 2023, UT will have comply with the 'informatieplicht (obligation to provide information) on energy saving. UT will have to report on the implementation of measures listed on the EML (recognised energy saving measures list of RVO).

4.1 EML (RECOGNISED ENERGY SAVING MEASURES LIST)

EML (Erkende Maatregellijst/ recognised energy saving measures list) for energy saving for educational institutes, sport facilities, offices and hotel/restaurants have been formulated. This list includes measures for which the return on investment (payback time) is 5 years or less. This legislation came into force on 1 January 2023 and will be reported on to RVO (Netherlands Enterprise Agency) every four years, with the first report due before July 2023.

4.2 ENERGY LABELING

All buildings have been assessed and awarded an energy label. All labels can be viewed here. Energy labels are valid for 10 years. From 1 January 2023 all office buildings need label C.

A list detailing the energy labels of UT buildings can be found in Annex 7.11.

4.3 ENERGY PERFORMANCE BUILDINGS

The Dutch Climate legislation[34] states to reduce CO2 emissions by 49% in 2030 and by 95% in 2050 compared to 1990. New buildings require since 2021 a BENG label (almost energy neutral), aligned with the EU Energy Performance of Buildings Directive[35]. Existing offices require an energy label C from 2023.

4.4 ENERGY COORDINATORS NETWORK OF UNIVERSITIES AND UNIVERSITIES OF APPLIED SCIENCES

This network of energy coordinators exchange information and best practices between universities. The energy coordinator participates in this network.

[34] https://wetten.overheid.nl/BWBR0042394/2022-03-02

[35] https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en

5. ENVIRONMENT(AL PERMIT): WHAT HAS BEEN ACHIEVED IN 2022?

Environmental reporting includes reporting on energy, waste, water usage and emissions to air, water and soil. In the distant past reporting on the environmental performance was done as part of Health, Safety and Environment reports by HR and submitted to the Executive Board. This reporting is now reinstated as part of the SEE annual reporting cycle.

5.1 ENVIRONMENTAL PERMIT

UT is required to have an environmental permit. This permit was renewed in 2017 and was granted 3 April 2018 (def. date 15 May 2018) by the council of Enschede. When the environment agency ODT (Omgevingsdienst Twente) was formed, all environment related tasks were transferred from the council to the ODT (end 2020), including enforcement of the conditions of the permit.

5.1.1 Environmental inspection ODT 2022

In January 2022 the environment agency ODT, charged with monitoring the environmental permit for UT announced their second inspection. Due to COVID they did again not conduct the inspection on-site but requested all information in writing and through photos. Together with the Health, Safety and Environment coordinators, mechanical engineers from CFM this information was collated and shared with the ODT. In addition, on February 22, 2022, the ODT paid a site visit. Together with the environment and sustainability policy officer the Health, Safety and Environment coordinators of the faculties provided the inspector with the necessary information and gave a guided tour along the labs and cooling and heating installations (technical areas).

Shortcomings resulting from the 2022 inspection have been resolved.

5.1.2 Environmental inspection ODT 2021

Two follow-up action resulting from the 2021 inspection still had to be resolved. SCIOS inspections were not carried out on heating installations of Paviljoen and Citadel as they were due for removal. Before June 1, 2022, the latest information was provided to ODT.

5.1.3 Water quality monitoring

Four times a year water samples are taken at the sewage pumping station on campus.

Table 22. Wastewater analysis 2022 – 2021: metals

Metals	Chrome	Copper	Lead	Nickel	Zinc
Month	ug/l	ug/l	ug/l	ug/l	ug/l
2022-03	2	130	1.4	5.2	100
2022-06	8.1	370	15	11	470
2022-10	<2	110	2.7	5.4	110
2022-11	<2	150	2.6	4.3	98

Table 23. Wastewater analysis 2022 – 2021: flow, COD, N, pollution

	Average flow	Average Chemical oxygen demand	Average som N	Pollution count
Date	m3/d	mg/l	mg/l	
Mrt-22	731	446	83.76	3167
Jun-22	871	750	85.45	4059
Sept-22	761	480	86.56	4373
Dec-22	786	462	86.56	4523

The environmental permit states the following threshold values. So far UT has not exceeded those.

Table 24. Threshold values wastewater (environmental permit UT)

Wastewater flow	Parameter	Max. concentration in single random sample
Wastewater laboratories	Mercury Hg	10 µg/l
	Cadmium	20 µg/l
	Sum of 5 metals*	2.0 mg/l***
	Chlorinated hydrocarbons**	0.1 mg/l
	BTEX (benzene, toluene, ethylbenzene and xylene)	01 mg/l

* sum of five metals from the following list: Ni, Cr, Pb, As, Mo, Sn, Ba, Be, B, V, Co, Ag.
**This includes 11 CHC's
***Max. concentration is 1 mg/l when taking a 24h sample

5.1.4 Substances of high concern (ZZS)

In December 2020 UT submitted a report to the environment agency ODT detailing the use of substances of high concern (ZZS: Zeer Zorgwekkende Stoffen) as a requirement for the environmental permit UT was given in 2019. We continue to work on alternatives for these substances and the minimisation of its uses. Especially for new research the use of ZZS should be discouraged.

An additional advice of the ODT included to research what substances of high concern (ZZS: Zeer Zorgwekkende Stoffen) are present in our waste streams. UT's waste collector incidentally takes samples to check. UT's waste disposal procedures need to ensure no ZZS end up in regular waste streams.

ODT also asks the UT to further work on the estimation of the emissions of the substances not as a legal requirement but as part of the role a university has as a role-model and societal responsibility. ODT encourages UT to continue the work on alternatives for these substances and the minimisation of its uses. Especially for new research the use of ZZS should be discouraged. The regulations around substances of high concern, especially when used in small quantities as UT does, is expected to be exempted in the new legislation coming into force on January 1, 2024 (de Omgevingswet).

Within the Health, Safety, Environment network of the UT the process will be discussed on how the question on using alternatives to ZZS (as well as CMR substances - carcinogenic, mutagenic and reprotoxic) can be integrated in existing processes. Most likely this will be included in the sustainable labs approach as this offers the opportunity to talk to individual labs as a generic approach is impossible for this topic. This may mean a slow but effective process.

Table 25. Most used ZZS

	Top 10 Most used ZZS	Kg	%	% van total
1	1-METHYL-2-PYRROLIDINONE	287	46%	46%
2	N,N-DIMETHYLFORMAMIDE	155	25%	72%
3	WHITE SPIRIT LOW AROMATIC	30	5%	76%
4	PETROLEUM BENZINE	30	5%	81%
5	STODDARD SOLVENT	25	4%	85%
6	N,N-DIMETHYLACETAMIDE	21	3%	89%
7	FORMALDEHYDE	9	1%	90%
8	1,2-DICHLOROETHANE	8	1%	91%
9	1,2-DIMETHOXYETHANE	6	1%	92%
10	BENZYL BUTYL PHTHALATE	5	1%	93%

Based on the UT registration of dangerous substances in a period of 2 years (2018-2019) 618 kg of ZZS was used. 72% can be attributed to the two most used substances.

5.1.5 Other issues

Pollutions such as microplastics and medicine residue form a problem for surface water quality and nature. There are no regulations yet for this. The SEE programme would like to look into the possibility to collaborate with research departments to start monitoring the impact of UT on this.

There are two locations with water monitoring equipment currently not being used, near Nanolab and in Meander. These installations can be used for more detailed monitoring pollution from labs, when required.

5.1.6 Permit law on Nature protection

In February 2018 permit for the law on nature protection was granted to UT for an indefinite period. Based on our current nitrogen emissions UT was given the permission to consume 3,511,120 m3 gas/year with NOX emissions of 4,278.42kg/year and NH3 emissions of 72.75 kg/year. For the calculation, the gas consumption (heating and air humidification) and the transport movements on campus (staff, public bus services and goods deliveries and waste collection, parking for Twente matches, activities trial terrain) were taken into consideration. This data is recorded quarterly and reported on annually.

The reason for the permit is the proximity to a Nature 2000 area, Lonnekermeer. The threshold value for this area is 0.05 mol N/ha/yr. An AERIUS calculation was made indicated that UT emitted 0.06 mol thus requiring a permit.

With the current focus on reducing N emissions, UT is on the right path to continue reducing the N emissions by focusing on disconnecting buildings from gas, reducing gas consumption through applying efficiencies and investigating alternatives for air humidification on electricity instead of gas.

5.1.7 Events and neighbours

At all large event sound measurements are taken to monitor the compliance with the set dB(A) and dB(C) limits in the environmental permit.

An annual gathering for the neighbours was organized to share issues related to the environmental permit and updates on campus developments on November 8, 2022.

6. SEE PROGRAMME IN 2022

Plans were made to restructure the programme organisation. The SEE support group changed its name to Programme Team which better reflects the variety of tasks that lie with the team members. The SEE steering group was reduced in size and a permanent Sounding Board was established. In 2023, a sustainability panel will become part of the SEE programme structure to enable regular input of UT community members, students and staff, to be included in the projects and plans. A new environment and sustainability officer started on August 1,2022.

The SEE Programme continues to collaborate a lot with the Green Hub. For these projects please have a look at their reporting over 2022 on their website.

SEE members participate in the following:

- Network on waste and circularity organized by VANG Buitenshuis of the executive agency of the Ministry of Infrastructure and Water (NL: Rijkswaterstaat) including the benchmark
- SaazUnie Environment group
- Sustainability coordinators network Universities and Universities of Applied Sciences in which SEE takes the lead organizing online exchange of best practices and projects on several topics.
- Cycling Mission (Ministry of Infrastructure and Water Management)

Regular meetings with the sustainability coordinator from Saxion were held. Internally regular meetings between SEE, LTSH and Maintenance and Real Estate were set up.

Sustainability walks around the UT campus were organized for the vice chair of the EB, the director of CFM, several UT groups, such as the Student Union, Scientists4Future and ITC students of the elective Ecosystem Services.

6.1 SEE BUDGET

The budget of €421,000, approved when the sustainability policy was adopted in May 2020, is divided into three categories: staff time, communication & promotion and training & development. In 2020 this was 0.1% of the UT budget. The budget for staff is allocated to primary budget and the remainder to strategic budget.

Table 26. SEE budget 2023

Category	Budget	Total 2022
Staff	222,000	197,431
Communication & Promotion	44,000	82,704
Training & Development	155,000	
	421,000	280,135

Communication and promotion is a category that includes products and services linked to communications such as photography and design. Information sessions on sustainability topics with lunch to encourage attendance, waste prevention projects and sustainable events fall under this category as well.

The category training and development includes the development of the carbon platform enabling SEE to monitor CO2 emissions better and for waste and flying produce quarterly reports. The collaboration with Green Dish working on a menu that falls within the planetary boundaries falls under this category.

Most large projects are implemented in the line of the organisation, meaning that building projects are covered by LTSH or maintenance budgets and biodiversity plans are included in the terrain management. SEE is mainly using its budget for staff, essential for initiating projects, supporting, motivating and encouraging colleagues to integrate sustainability in their way of working as well as ensuring all efforts are reported on and recognized. It is essential to continue to have a budget allocated for the implementation of sustainability initiatives (even though in 2022 not all budget was spent) as being able to take advantage of the momentum when this arises is key. Often ideas for making the organisation more sustainable require a start-up budget which often is difficult to find within the regular budgets. This budget enables UT to support the enthusiasm in the organisation contributing to increased support and awareness on sustainability and make steps towards the set goals.

7. ANNEX

7.1 CSRD

The Corporate Sustainability Reporting Directive (CSRD) regulates the provision of information about the sustainability of their activities. Just like other reporting developments, UT actively follows this in the process of continuously improving its operation and related accountability.

On January 5th, 2023, the Corporate Sustainability Reporting Directive (CSRD) entered into force. The CSRD is part of the European Green Deal and EU Action Plan for Financing Sustainable Growth. They aim to improve corporate transparency and accountability around Environmental, Social and Governance (ESG) impacts and risks to promote sustainable economic growth and investment in the EU. The CSRD is the intended successor of the European Non-Financial Reporting Directive (NFRD). In November 2022, the European Parliament and Council approved an agreement to expand and replace the NFRD with the CSRD. The new rules will need to be implemented by member states of the European Union 18 months later. Companies subject to the CSRD have to report according to European Sustainability Reporting Standards (ESRS). Draft standards are developed by the EFRAG and tailored to EU policies, while building on and contributing to international standardization initiatives. The Commission should adopt the first set of standards by mid-2023, based on the drafts published in November 2022. Besides Large Public Interested Entities already subject to the NFRD (which must begin reporting in 2025 on the Financial Year 2024), (other) large companies (as of Financial Year 2025) and listed SME's (as of FY 2026) are impacted, among others. The expectation is that the Dutch government will also declare this legislation applicable (wider effect) to, among others, Dutch universities and other public organizations and institutions of social interest. Social responsibility and competitive considerations only justify rapid compliance of the University of Twente with CSRD.

The starting point is stakeholder engagement and materiality assessment. Organizations have to report on how sustainability influences their business as well as the organization's impact on people and the environment. In order to track and disclose the required information, organizations first have to conduct a materiality assessment to identify which sustainable matters are most material to the organization and its stakeholders. A so-called double materiality is mandatory under CSRD. It refers to the fact that companies reporting on sustainability must consider the relevance of a sustainability matter from two perspectives. On the one hand, organizations have an impact on people and the environment (the inside-out view). Think of damage to nature or violations of human rights. On the other hand, sustainability-related developments and events create (new) risks and opportunities for organizations (the outside-in view). Examples of this are reputation risk in case of incidents of corruption, the introduction of new carbon taxes or opportunities for development of new circular and sustainable products.

In a broader sense, the concept of double materiality ensures that sustainability reporting focuses on the topics that are most relevant for the organization and its stakeholders. Material topics also underpin the (sustainable) strategy. A report and strategy based on material topics create more transparency, contribute to better decision-making and ensure that time and resources are focused on those topics that matter most to both the organization, its stakeholders and society at large. Under the double materiality concept, a sustainability matter can be material from an impact point of view and/or from a risk and opportunity perspective. Although the CSRD provides some guidelines for this, ultimately an organization will have to determine for itself if a subject is material or not, and it must substantiate the choices it makes.

An assessment of which topics are the most relevant (or: material) for an organization, and therefore must be included in its sustainability reporting, is an essential early step towards CSRD-compliance. The outcomes of such an assessment determine, in CSRD-specific terms, which reporting standards, disclosures and data points should be included in an organization's sustainability reporting, and which ones can justifiably be left out.

7.2 ASSESSMENT SDGS AND UT SUSTAINABILITY POLICY

All 36 universities of applied sciences have signed the SDG charter. In Shaping 2030 University of Twente says the United Nations' Sustainable Development Goals (SDGs) are the reference point for our own sustainable development.

SDGs

UN member states adopted the 2030 agenda for sustainable development in 2015. The 17 sustainable development goals are the core of this agenda. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies

that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests[36].

What are these about?
This set of 17 global goals unites global stakeholders in the work towards a better and more sustainable future for everyone. The 17 goals have targets and indicators attached to them.

It is essential to take a holistic approach when aligning sustainability in operational management along the SDGs. The impact of measures compared to all SDGs, positive and negative, as some activities may contribute positively to one SDG and negatively to another.

For this assessment, only the individual SDGs are assessed compared to the UT's sustainability policy for operational management.

For the SEE Programme, goal 7, 9, 12, 13, 15 and 16 include the activities we work on, with a greater emphasis on SDGs 12 and 13.

Below the UN goals and targets are listed followed by the UT context. By identifying or determining UT specific indicators for these goals, UT could start reporting on these as well aiding in the visibility of UT's efforts in becoming a sustainable organisation.

[36] https://sdgs.un.org/goals

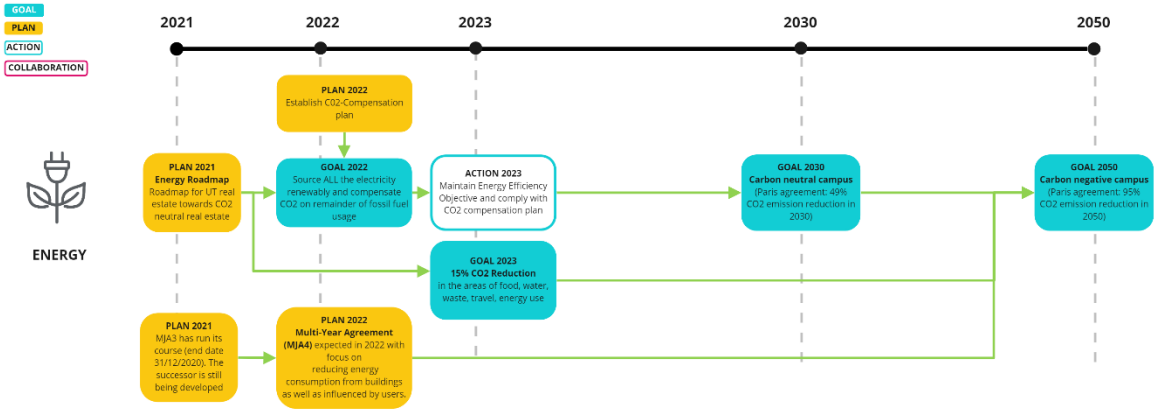
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix

Target 7.3: By 2030, double the global rate of improvement in energy efficiency

UT context: theme ENERGY
https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/energy/

Goals: CO2 neutral (2030) and CO2 negative (2050). This means either a 49% reduction in CO2 and CO2 compensation for the remainder or more reduction and less compensation.



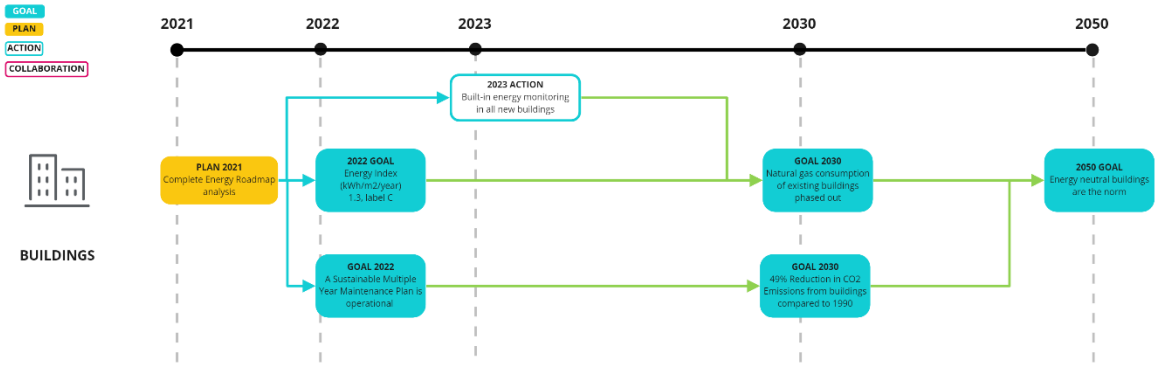
- ➔ UT procures sustainable electricity and district heating and procures gas from a company not contributing to geopolitical instability. It offsets the gas CO2 emissions.
- ➔ UT actively looks for expansion of electricity generation on-site (roof, covered car park etc.)
- ➔ UT has a strong focus on Trias Energetica and has realised a 39% reduction in energy consumption between 2005-2020.

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Target 9.4: By 2030, upgrade infrastructure to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies

UT context: theme BUILDINGS
https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/buildings/

Goals: Energy neutral buildings, phasing out usage of natural gas and reduced kWh/m2/year consumption), sustainable MJOP and LTSH.



- ➔ UT real estate and maintenance department always considers best available techniques and materials for renovations and new built projects contributing to more sustainable materials and technologies (transition from gas heating to district heating, improving efficiency at air humidification).
- ➔ The SEE working group has initiated a plan for the re-use or refurbishment of furniture internally or in collaboration with the furniture contractor to reduce resource use.
- ➔ In the new LTSH strategy is aligned with the roadmap towards CO2 neutral real estate and sustainability is a core principle for building projects.

Goal 12: Ensure sustainable consumption and production patterns

Target 12.2 By 2030, achieve sustainable management and efficient use of natural resources

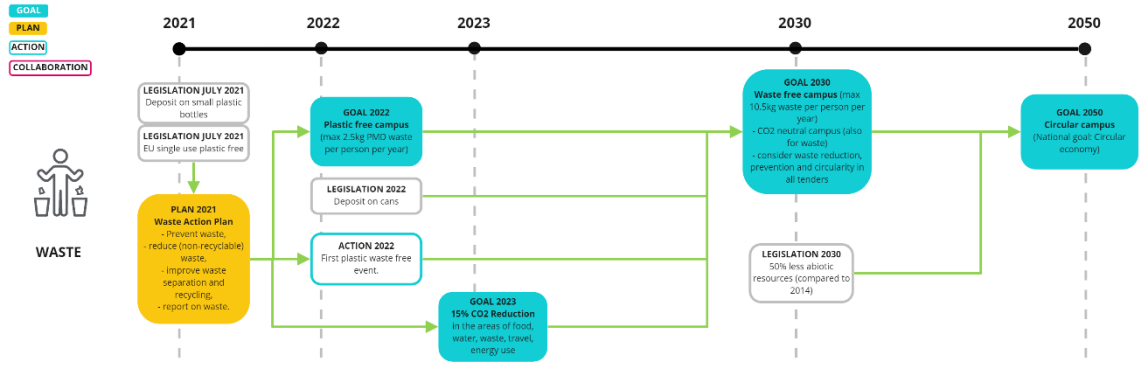
Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle

Target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

Target 12.7: Promote public procurement practices that are sustainable, in accordance with national policies and priorities

UT context: theme WASTE
https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/waste/

Goals: circular campus (2050), waste free campus (2030), 15% CO2 reduction (2023)

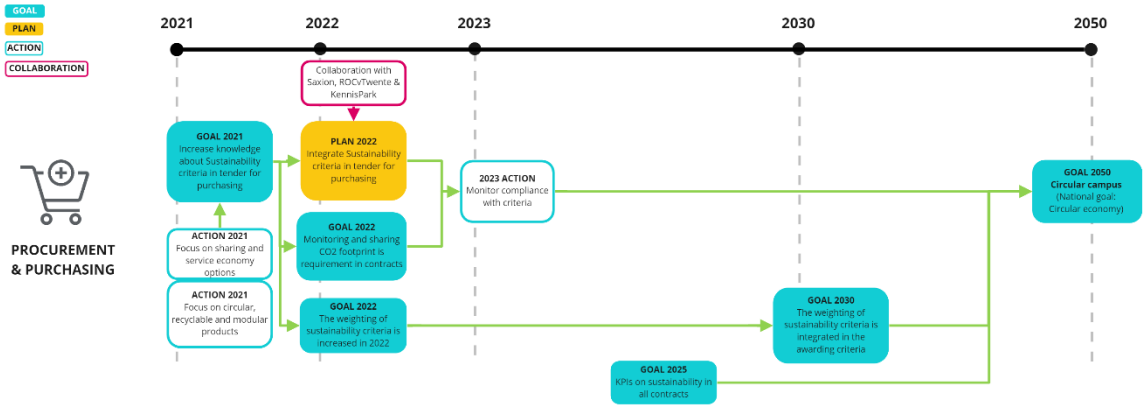


- ➔ Collaborate with waste collection and processing contractor on proper processing of waste streams, expand the number of waste streams for improved recycling and monitor percentages of separated waste streams that get recycled
- ➔ In every tender aspects of sustainable production and consumption can be considered
- ➔ Reduce the amount of non-recyclable waste
- ➔ Reduce the amount of recyclable waste
- ➔ A waste plan has been written[37]

UT context: theme PROCUREMENT AND PURCHASING
https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/procurement/

Goals: Provision CO2 data from contractors, Sustainability criteria in tenders (increase weighting), KPI's on sustainability, circular campus 2050.

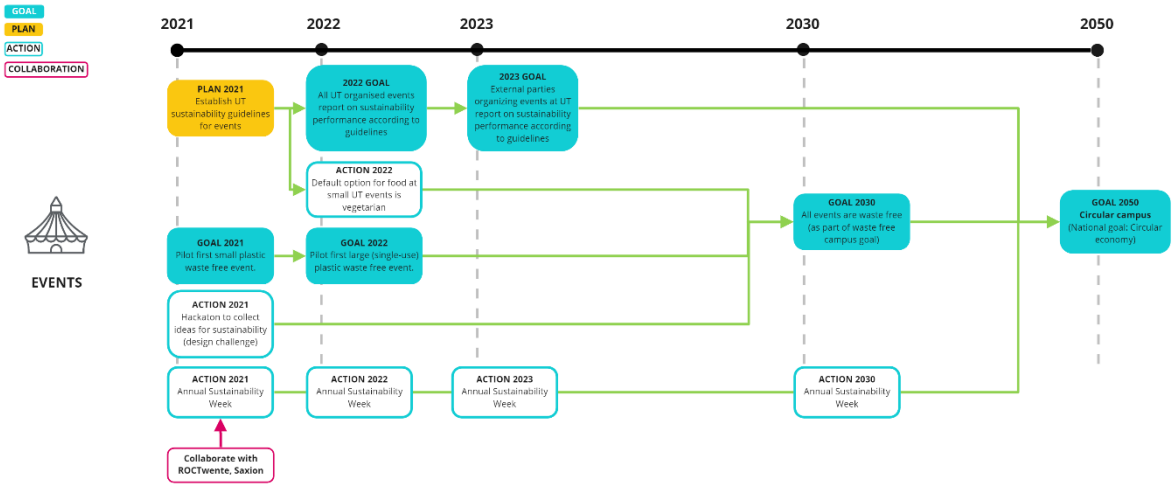
[37] https://www.utwente.nl/en/sustainability/sustainability-on-campus/organization/see-programme/#plans-policies



➔ In several tender processes sustainability aspects are included.
➔ Procurement department takes a leading role in supporting its customers procuring and purchasing sustainably by training its staff on sustainability.

UT context: theme EVENTS
https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/events/

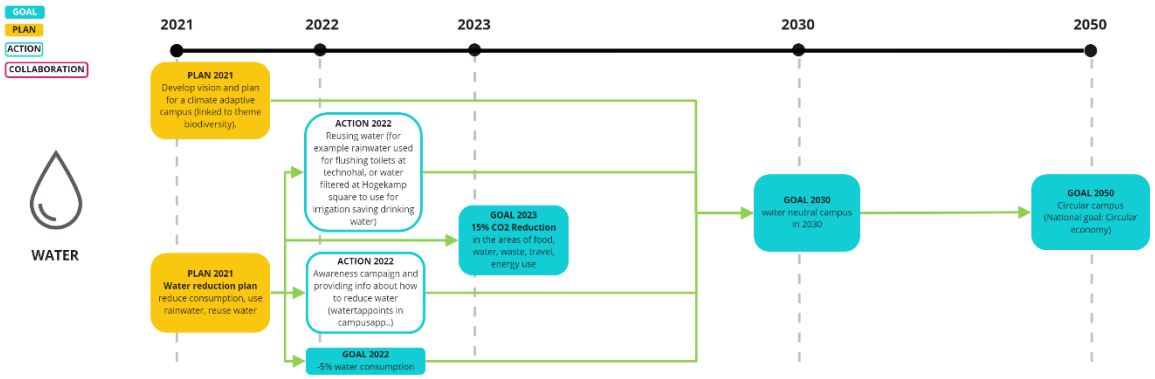
Goals: Waste free events, circular campus in 2050.



➔ A Sustainable Events Plan is being written[2]
➔ Recycled PET cups are used instead of virgin PET in 2022 which can be recycled into rSDGSPET
➔ Waste free options such as the use of hard cups with return system are piloted.

UT context: theme WATER
https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/water/

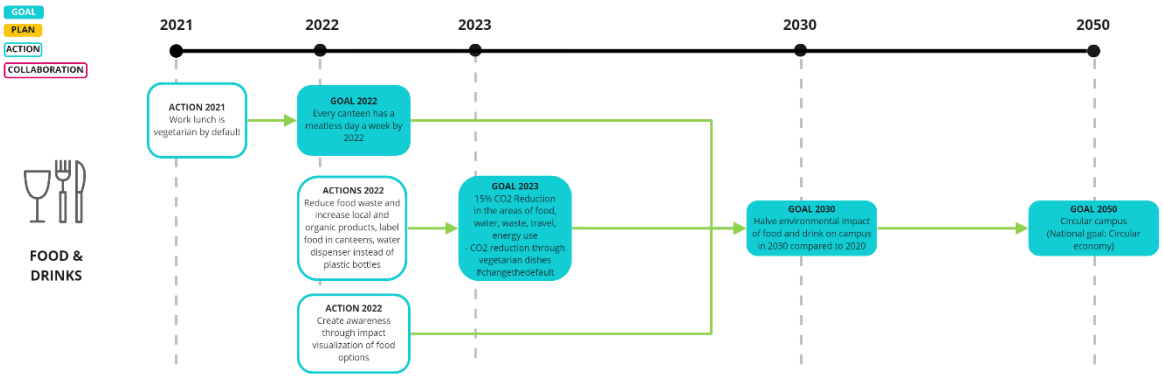
Goals: water reduction and water neutral campus



- ➔ Drainpipes of most buildings have been disconnected and slow into surface water bodies.
- ➔ Water filtration takes place at Hogekampplein leading to water of drinking water quality which is stored and used for the irrigation of artificial sports fields saving a lot of drinking water.
- ➔ Through the SEE programme a pilot will be initiated to reduce water consumption in sinks at toilet blocks.

UT context: theme Food and drinks
https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/food-and-drinks/

Goals: Halve impact of food and drinks on campus in 2030 compared to 2020, circular campus 2030.



- ➔ During sustainability week 2022 vegetarian dishes were promoted at all food outlets
- ➔ Week without meat was held in the Horst canteen in 2023
- ➔ A pilot with oat milk in coffee machines was received very well
- ➔ The default work lunch order has become vegetarian on October 4, 2022
- ➔ Many departments always only order vegetarian for work lunches
- ➔ A collaboration with Green Dish started in September 2022 to work towards a menu within planetary boundaries.

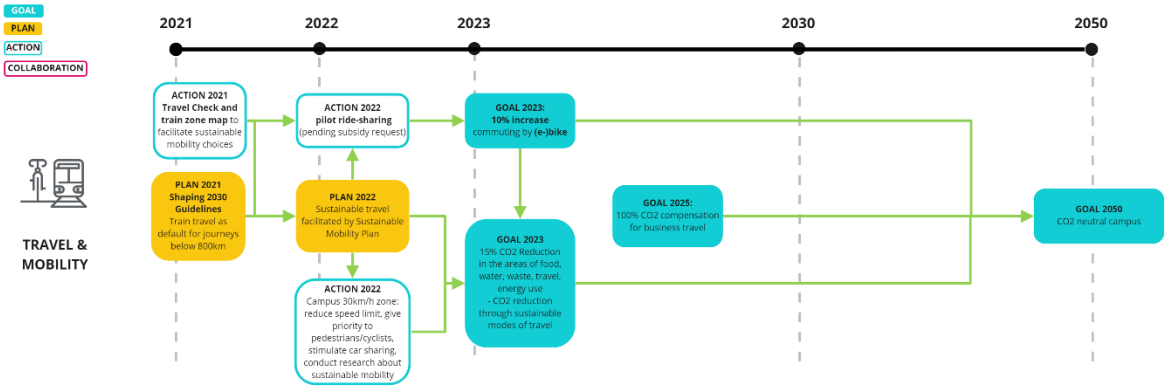
Goal 13: Take urgent action to combat climate change and its impacts

Target 13.2 Integrate climate change measures into policies, strategies and planning

Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

UT context: Theme Travel and mobility
https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/mobility/

Goals: 10% increase commuting by bike, 15% CO2 reduction in 2023, 100% CO2 compensation business travel (2030), CO2 neutral campus in 2050.



- ➔ A sustainable mobility plan was written.
- ➔ A mobility survey was held to obtain more up-to-date data on travel modes.
- ➔ Travel allowances for commuting were adapted enabling all staff to use the train for free.
- ➔ The tax-free amount for purchasing a bike was increased.
- ➔ A consultation was held on CO2 pricing and compensation for business travel.
- ➔ A train map was introduced guiding people to use the train for destinations within Europe (adaptable version in January 2023).

Goal 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

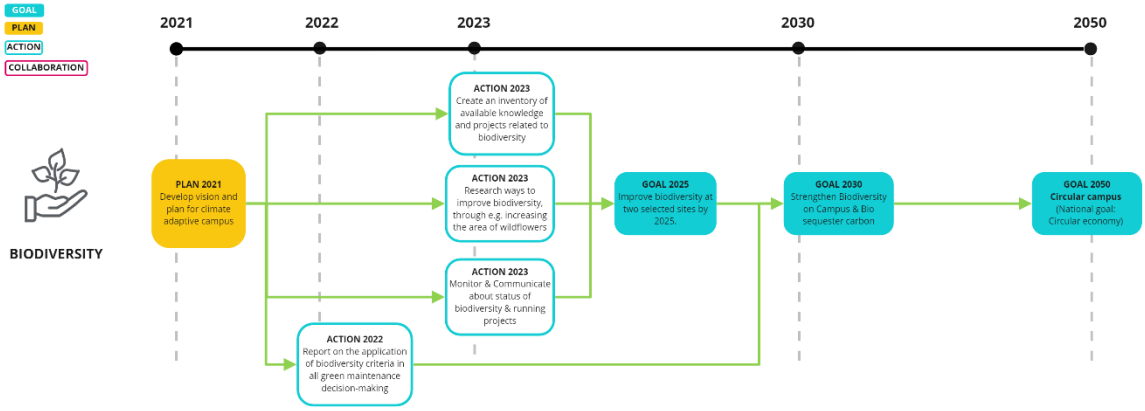
Target 15.5: Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species

Target 15.9: By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

Target 15a: Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems

UT context: theme BIODIVERSITY
https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/biodiversity/

Goals: improve biodiversity on campus

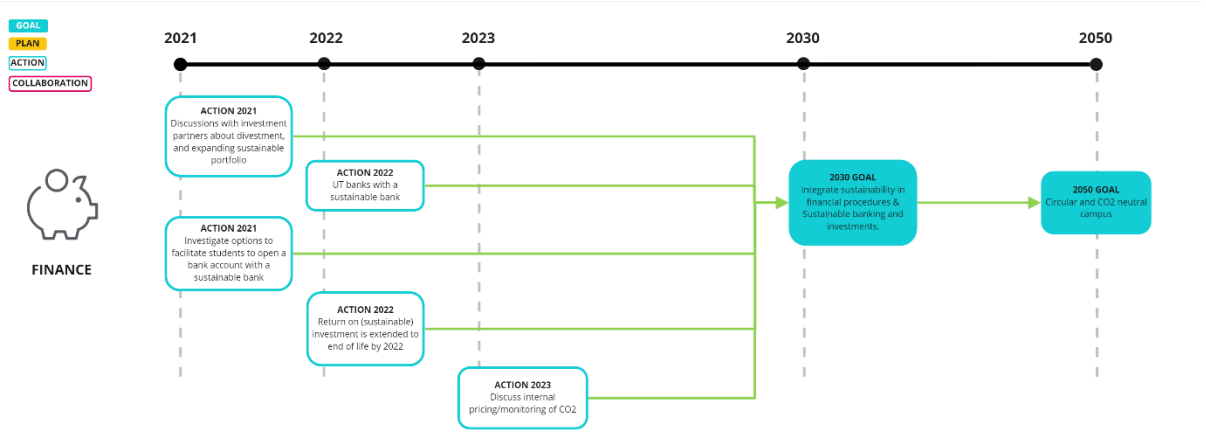


- ➔ A plan is being developed with the ecologist of contractor Krinkels to strengthen the biodiversity on site. A Species Management plan will be written as well.
- ➔ Green maintenance includes planting trees (also when old trees are cut down or trees have to be cut down for building), flower bulbs providing food for insects, fermenting leaflitter as natural fertiliser etc.

Goal 16 Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Target 16.6: Develop effective, accountable and transparent institutions at all levels

Target 16.7: Ensure responsive, inclusive, participatory and representative decision-making at all levels



UT context:

- ➔ Sustainable aspects of finances (sustainable bank, insurers, pension fund ABP)
- ➔ CSRD/ESG reporting (via internal audit team)
- ➔ SEE programme, transparent reporting on performance UT
- ➔ SEE sounding Board / University Council / Green Hub involvement students in decision-making on sustainability

Goal 17 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

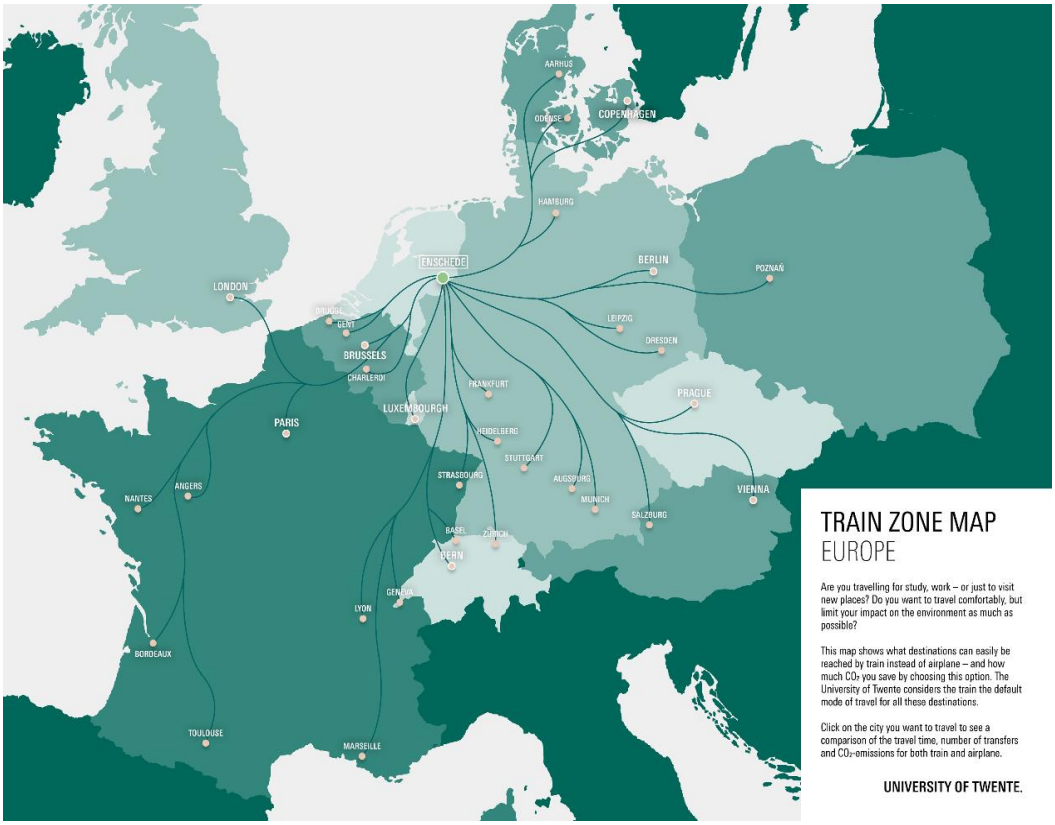
Target 17.17: Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships

UT context:

- ➔ Between universities and universities of applied science a network has been created (September 2018) that proves more and more effective, where information is shared, best practices exchanged and joint projects initiated.
- ➔ Within Twente there is close collaboration between UT, Saxion and ROC. Jointly the sustainability week is organized (at UT coordinated by the Green Hub).
- ➔ SaazUnie network for environmental coordinators of universities and academic hospitals
- ➔ UT is a member of the International Sustainable Campus Network

7.3 TRAIN ZONE MAP (STATIC VERSION MAY 2022)

This version has been developed further into an interactive train map showing also destinations beyond 800km. You can find that map here: https://travelcheck.utsp.utwente.nl/



	TRAVEL TIME		CO_2 EMISSION (KG)			TRANSFERS	
DESTINATION	✈	🚆	✈	REDUCE YOUR ECO FOOTPRINT WITH	🚆	✈	🚆
AARHUS	7:41	8:32	120,8	93,1 KG CO_2	27,7	3	3
ANGERS	7:17	7:49	145,6	127,5 KG CO_2	18,1	3	2
AUGSBURG	7:16	7:27	71,9	47,6 KG CO_2	24,3	4	1
BASEL	6:25	8:01	125,8	101 KG CO_2	24,8	2	1
BERLIN	7:31	4:18	124	104,2 KG CO_2	19,8	3	2
BERN	7:46	9:24	126,4	101,5 KG CO_2	24,9	4	2
BORDEAUX	7:21	8:40	160,2	139,8 KG CO_2	20,4	2	2
BRUGGE	7:29	5:14	93,8	79,6 KG CO_2	14,2	2	2
BRUSSELS	6:09	4:56	91,6	80,7 KG CO_2	10,9	2	1
CHARLEROI	7:16	4:50	92,9	78,9 KG CO_2	14	3	2
COPENHAGEN	6:44	9:01	139,6	106 KG CO_2	33,6	2	2
DRESDEN	7:13	8:42	219,5	196 KG CO_2	23,5	3	1
FRANKFURT	6:01	5:41	121,3	105,6 KG CO_2	15,7	4	1
GENEVA	6:38	10:14	132	107 KG CO_2	25	2	2
GENT	7:13	4:17	92,9	78,9 KG CO_2	14	2	2
HAMBURG	7:11	3:40	136,7	123,9 KG CO_2	12,8	3	1
HEIDELBERG	6:37	5:14	123,9	108,6 KG CO_2	15,3	4	2
LEIPZIG	8:26	5:30	219,4	199,2 KG CO_2	20,2	4	2
LONDON	6:32	7:11	131,6	110,4 KG CO_2	21,2	4	2

BACK TO MAP

UNIVERSITY OF TWENTE.

TRAIN ZONE MAP
EUROPE

ABOUT THIS TOOL
Commuting and business travel together contribute around 31% of the CO_2-footprint of the University of Twente. Therefore, mobility is one of the priority areas to focus on for improving the sustainability of our organisation. The Train Zone Map was developed as an easy-to-use guide to help members of our community reduce their footprint.

ABOUT THE MAP
This map shows a selection of cities to which the University of Twente considers the train the default mode of travel. The criteria for this are the distance to the cities, travel time and number of transfers required. Cities that are around 800km or less from Enschede, that require a maximum of 3 transfers and that have good rail connections fall into this category. The cities on the map are selected based on the number of times a work trip was booked through the University of Twente's travel agency, plus cities where the University of Twente has a partner institution (Erasmus, ECIU, CASEAR, etc.). This list is not meant to be exhaustive, but to give a good overview of the possibilities of train travel.

TRAVEL TIMES AND EMISSIONS
The CO_2-emissions in this document are calculated with www.ecopassenger.org, an online tool that compares the energy consumption, CO_2 and exhaust atmospheric emissions for planes, cars and trains for passenger transport. All travel times and emissions are based on the fastest option from the city centre of Enschede to the city centre of the destination. They include time for transfers, check-in time, security check, boarding time, luggage retrieval and travel to/from the airport. The number of transfers includes transfers from train to plane and from plane to train, car or taxi at the destination. Travel times and emissions are an indication: they may differ based on the day and time of travel and the exact route.

FEEDBACK
We are committed to further improving the Train Zone Map and are open to feedback about this tool. If you have any remarks or questions, please send an email to sustainability@utwente.nl

DYNAMIC TRAIN MAP
The University of Twente is working on a dynamic version of this tool. This version will include more destinations, including cities that are more difficult to reach by train, and will be continuously updated so it remains accurate when travel times or emissions change over time.

Version: May 2022

UNIVERSITY OF TWENTE.

7.4 FLIGHT DATA 2022

Table 7.4-1 Total number of bookings and flights at UT in 2022 per category

UT	Number of bookings	Number of flights	Increase/decrease 2022 compared to 2019		Number of flights
Distance flight	2019	2022		Distance flight	2022
0-700km	805	936	16%	0-800km	1239
700-2500	1543	2481	61%	800-2500	2178
2500+	1433	1608	12%	2500+	1608
Total	3781	5025	33%	Total	5025

For a booking it is unknown if it contains a single trip, a return flight or how many segments the trip consist of. Therefore, the observed increase is understandable as in 2022 all segments of the journey were taken into account. The following table contains all flight kilometres. Comparing these gives a more accurate comparison.

Table 7.4-2

UT	Flight kilometres		Increase/decrease 2022 compared to 2019		Flight kilometres		Increase/decrease 2022 compared to 2019
Flight kilometres	2019	2022		Distance flight	2019	2022	
0-700km	638,238	457,763	-28	0-800km	1,020,468	683,640	-33
700-2500	2,692,438	3,360,473	25	800-2500	2,310,208	3,134,595	36
2500+	20,066,237	11,262,166	-44	2500+	20,066,237	11,262,166	-44
Total	23,396,913	15,080,401	-36		23,396,913	15,080,401	-36

The difference between categorizing flights <700 or < 800km into the short distance category results in 303 additional flights being categorized as short distance which encompasses 5% of flight kilometres.

The table below shows the difference in CO2 emissions.

Table 7.4-3 UT CO2 emissions per flight category

Flight distance category	CO2 emissions		Increase/decrease 2022 compared to 2019	Flight distance category	CO2 emissions		Increase/decrease 2022 compared to 2019
	2019	2022			2019	2022	
0-700km	189.6	107.1	-43	0-800km	238.8	160.0	-33
700-2500	538.5	578.0	7	800-2500	397.4	539.2	36
2500+	2949.7	1768.2	-40	2500+	3150.4	1768.2	-44
Total	3677.8	2453.3	-33		3786.5	2467.3	-35

Table 7.4-4 Emission factors 2019 and 2022

Flight distance	CO2 Emissiefactoren.nl 2019 (kg/km)	CO2 Emissiefactoren.nl 2022 (kg/km)
Short 0-700	0.297	0.234
Mid distance 700-2500	0.200	0.172
Long 2500+	0.147	0.157

Source: VCK travel, travel agent and https://www.co2emissiefactoren.nl/.
Emission factors are developed for the flight distances of 700-2500-2500+ kilometres.

Table 7.4-5 Total CO2 emissions per faculty and percentage of flights per faculty (without and with correction pro rata)

	CO2 emissions		with correction pro rata				with correction pro rata	
	(tonnes CO2)		CO2 emissions (tonnes CO2)		Percentage of UT flights		Percentage of UT flights	
	2019	**2022**	2019	2022	**2019**	**2022**	**2019**	2022
ET	419.2	205.6	442.2	322.8	11	8	12	13
TNW	696.9	346.4	735.0	543.9	19	14	20	22
BMS	578	173.4	609.6	272.2	16	7	17	11
EEMCS	616.8	386	650.5	606.1	17	16	18	25
ITC	1072	355.2	1130.6	557.7	29	14	31	23
Service dpts	104.3	95.9	110.0	150.5	3	4	3	6
Unknown	190.5	891	-	-	5	36	-	-
Total	3677.8	2453.3	3677.8	2453.3	100	100	100	100

Table 7.4-6 Percentage a faculty contributes to the CO2 emissions per category

	Flight distance	ET	TNW	BMS	EEMCS	ITC	Supporting departments incl EB	Unknown	Total
2019		CO2 emissions (tonnes CO2)							
	0-700	6%	7%	6%	5%	3%	7%	6%	5%
	700-2500	17%	14%	20%	17%	7%	34%	21%	15%
	2500+	76%	80%	74%	78%	90%	59%	73%	80%
2022		CO2 emissions (tonnes CO2)							
	0-700	5%	6%	5%	5%	1%	7%	4%	4%
	700-2500	20%	28%	34%	22%	13%	33%	25%	24%
	2500+	75%	66%	61%	74%	86%	60%	71%	72%

Table 7.4-7 Percentage a faculty contributes to the CO2 emissions per category (with correction pro rata)

	Flight distance	ET	TNW	BMS	EEMCS	ITC	Supporting departments incl EB	Total
2019		CO2 emissions (tonnes CO2)						
0	0-700	6%	7%	6%	6%	3%	7%	5%
0	700-2500	18%	14%	20%	17%	7%	35%	15%
0	2500+	76%	79%	74%	77%	90%	59%	80%
2022		CO2 emissions (tonnes CO2)						
0	0-700	5%	6%	5%	5%	1%	7%	4%
0	700-2500	21%	29%	35%	22%	13%	34%	24%
0	2500+	74%	66%	60%	73%	85%	59%	72%

Correction pro rata: the CO2 emissions of the unknown flight kilometres were proportionally allocated to the faculties/departments by taking the amount added with the amount as a proportion of the total multiplied by unknown CO2 emissions.

Table 7.4-5 Flight bookings, number of flights, Flight kilometres and CO2 emissions for the categories <700, 700-2500-2500+

	Flight distance	ET	TNW	BMS	EEMCS	ITC	Supporting departments incl EB	Unknown	Total
2019		Number of bookings							
	0-700	105	161	131	127	129	30	122	805
	700-2500	190	254	289	280	200	96	234	1543
	2500+	133	226	199	196	437	25	217	1433
	Total	428	641	619	603	766	151	573	3781
2022		Number of flights							
	0-700	94	158	81	160	51	63	329	936
	700-2500	182	376	260	368	170	143	982	2481
	2500+	130	219	89	246	287	41	596	1608
	Total	406	753	430	774	508	247	1907	5025
2019		Number of flight kilometres							
	0-700	88,287	153,287	120,348	113,288	99,974	23,710	39,344	638,238
	700-2500	364,198	480,353	575,278	518,893	376,169	176,057	201,490	2,692,438
	2500+	2,178,136	3,777,733	2,906,203	3,260,880	6,578,724	421,934	942,627	20,066,237
	Total	2,630,621	4,411,373	3,601,829	3,893,061	7,054,867	621,701	1,183,461	23,396,913
2022		Number of flight kilometres							
	0-700	45,028	86,695	38,795	76,415	22,009	27,428	161,393	457,763
	700-2500	238,186	558,677	342,213	482,781	258,413	185,151	1,295,051	3,360,473
	2500+	981,421	1,465,008	671,410	1,815,516	1,946,346	366,894	4,015,571	11,262,166
	Total	1,264,634	2,110,381	1,052,418	2,374,712	2,226,768	579,474	5,472,015	15,080,401
2019		CO2 emissions (tonnes CO2)							
	0-700	26.2	45.5	35.7	33.6	29.7	7.0	11.7	189.6
	700-2500	72.8	96.1	115.1	103.8	75.2	35.2	40.3	538.5
	2500+	320.2	555.3	427.2	479.3	967.1	62.0	138.6	2949.7
	Total	419.2	696.9	578.0	616.8	1072.0	104.3	190.5	3677.8
2022		CO2 emissions (tonnes CO2)							
	0-700	10.5	20.3	9.1	17.9	5.2	6.4	37.8	107.1
	700-2500	41.0	96.1	58.9	83.0	44.4	31.8	222.7	578.0
	2500+	154.1	230.0	105.4	285.0	305.6	57.6	630.4	1768.2
	Total	205.6	346.4	173.4	386.0	355.2	95.9	891.0	2453.3

Where fields have been left blank, no data was available or could not be deducted from provided data.
Unknown refers to flights that could not be allocated to a faculty or department due to the manner these had been recorded.

Table 7.4-6. Flight bookings, number of flights, Flight kilometres and CO2 emissions for the categories <800, 800-2500-2500+

	Flight distance	ET	TNW	BMS	EEMCS	ITC	Supporting departments incl EB	Unknown	Total
2019		Number of bookings							
	0-800								
	800-2500								
	2500+								
	Total								
2022		Number of flights							
	0-800	129	196	108	219	59	88	440	1239
	800-2500	147	338	233	309	162	118	871	2178
	2500+	130	219	89	246	287	41	596	1608
	Total	406	753	430	774	508	247	1907	5025
2019		Number of flight kilometres							
	0-800								1,020,468
	800-2500								2,310,208
	2500+								20,066,237
	Total								23,396,913
2022		Number of flight kilometres							
	0-800	70,771	114,434	59,309	120,736	27,801	45,332	245,257	683,640
	800-2500	212,443	530,939	321,699	438,460	252,621	167,247	1,211,186	3,134,595
	2500+	981,421	1,465,008	671,410	1,815,516	1,946,346	366,894	4,015,571	11,262,166
	Total	1,264,634	2,110,381	1,052,418	2,374,712	2,226,768	579,474	5,472,015	15,080,401
2019		CO2 emissions (tonnes CO2)							
	0-800								238.8
	800-2500								397.4
	2500+								3150.4
	Total								3786.5
2022		CO2 emissions (tonnes CO2)							
	0-800	16.6	26.8	13.9	28.3	6.5	10.6	57.4	160.0
	800-2500	36.5	91.3	55.3	75.4	43.5	28.8	208.3	539.2
	2500+	154.1	230.0	105.4	285.0	305.6	57.6	630.4	1768.2
	Total	207.2	348.1	174.6	388.7	355.5	97.0	896.2	2467.3

Where fields have been left blank, no data was available or could not be deducted from provided data.
Unknown refers to flights that could not be allocated to a faculty or department due to the manner these had been recorded.

7.5 CO2 COMPENSATION

CO2 compensation electricity

Groencertificaat

ENGIE bevestigt de levering van Groene Elektriciteit aan:

Universiteit Twente

Gefeliciteerd met uw officiële Groencertificaat van ENGIE. U heeft een goede en bewuste keuze gemaakt door energie te kiezen die afkomstig is van een duurzame bron. We zijn trots dat we nu samen de stap zetten naar een CO_2-vrije wereld.

Uw Groene Elektriciteit is voor 100% opgewekt met behulp van Nederlandse wind. Bij de opwekking van Groene Elektriciteit worden geen milieubelastende fossiele brandstoffen gebruikt en komen er vrijwel geen vervuilende stoffen vrij.

Leveringsperiode:

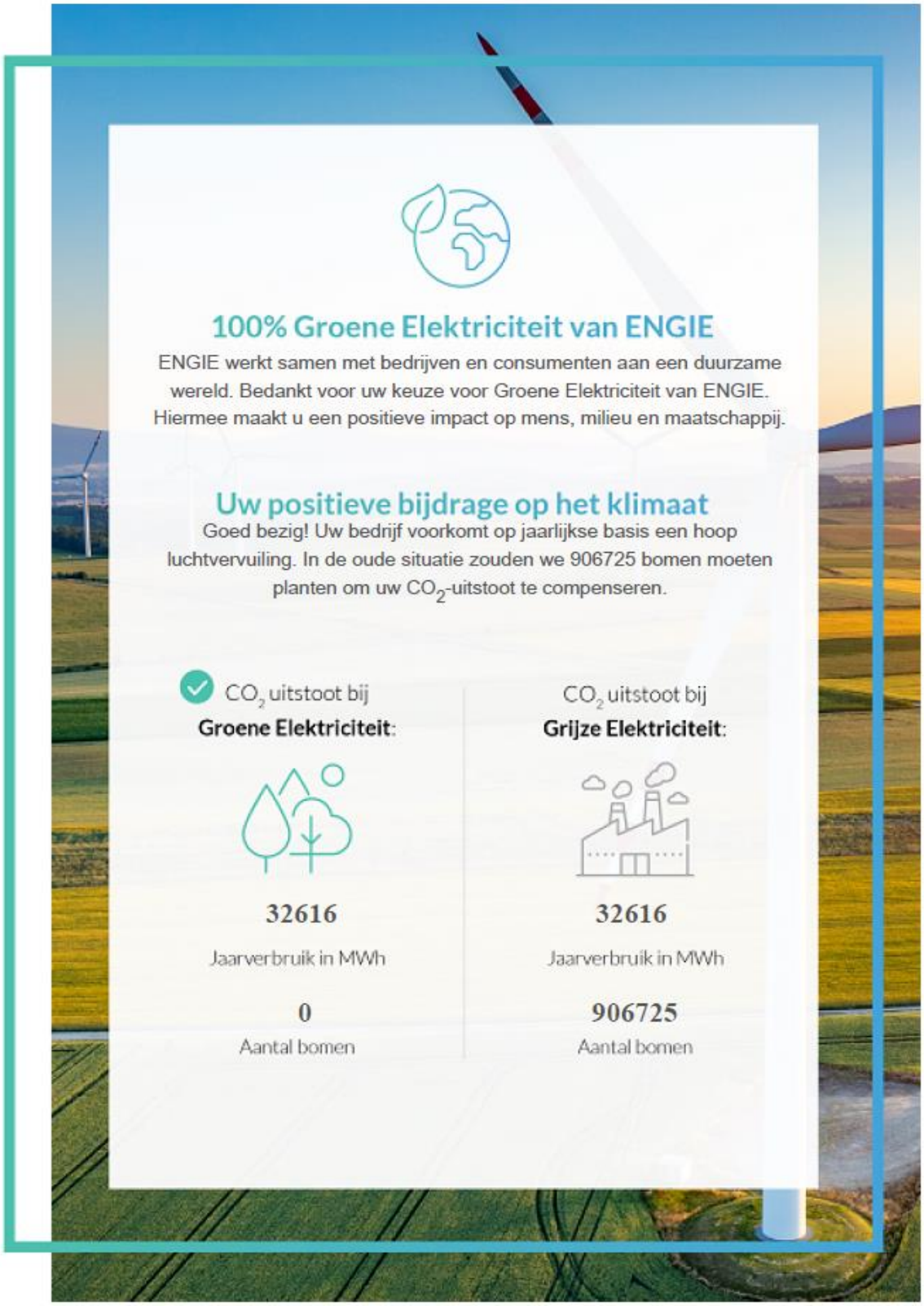
1-1-2022 tot en met 31-12-2024

Verbruik:

32616 MWh

Zwolle 14-4-2023
ENGIE Energie Nederland N.V.

Menke Ubbens
Directeur ENGIE Zakelijk


100% Groene Elektriciteit van ENGIE
ENGIE werkt samen met bedrijven en consumenten aan een duurzame wereld. Bedankt voor uw keuze voor Groene Elektriciteit van ENGIE. Hiermee maakt u een positieve impact op mens, milieu en maatschappij.
Uw positieve bijdrage op het klimaat
Goed bezig! Uw bedrijf voorkomt op jaarlijkse basis een hoop luchtvervuiling. In de oude situatie zouden we 906725 bomen moeten planten om uw CO_2-uitstoot te compenseren.
CO_2 uitstoot bij
Groene Elektriciteit:
32616
Jaarverbruik in MWh
0
Aantal bomen
CO_2 uitstoot bij
Grijze Elektriciteit:
32616
Jaarverbruik in MWh
906725
Aantal bomen

CO2 compensation energy: voluntary Emission Reduction (VER)-carbon credits to offset CO2 emissions gas consumption

Bewijs van compensatie

Wattanders verklaart hierbij dat ze voor Universiteit Twente
de benodigde Emissiereductiecertifciaten heeft aangekocht en afgeboekt.

UNIVERSITY
OF TWENTE.

Details Emissiereductiecertificaten

Type:	VER Gold Standard
Aantal:	895 - (500.000 m³)
Duurzame bron:	Wind - India
Leveringsperiode:	2022

Eindhoven, 21 maart 2023

Wattanders BV

Jeroen Setz
Directeur

wattanders

CO2 compensation flights

PartnerPlusBenefit LUFTHANSA GROUP

Lufthansa Group herewith awards

I.T.C.

as CLIMATE SUPPORTER

For journeys of employees of **I.T.C.** the **CO_2 emissions** resulting from the combustion of jet fuel have been **offset with Sustainable Aviation Fuel** (SAF) on flights operated by the following Lufthansa Group Airlines:

Austrian Airlines, Brussels Airlines, Lufthansa and SWISS

Herewith, I.T.C. has helped to accelerate the progress towards a more sustainable future.

Compensated CO_2 amount: 790 kg

Austrian brussels AIRLINES Eurowings Lufthansa SWISS

This certificate refers to ITC as ITC is recorded as the customer's name but it entails all UT flights. Dated 5 January 2023.

The estimated CO_2 emissions of ITC on Air France, KLM, and Delta Air Lines flights made in the past 12 months (November 2021 - October 2022) are 532000 kgs. This can be compensated with a contribution of 8778 blue credits/EUR, which we will invest in the certified reforestation project “CO2OL Tropical Mix" in Panama. Dated 21 December 2022

Certificaatnummer:23620018 Factuurdatum:31-01-2023

greenSand

greenSand Stock NV

Goedkeuring bij Koninklijk besluit de Naamloze Vennootschap
opgericht 15 februari 2012 te Amsterdam.
Het beoogde doel is alle CO_2 wat de mensheid uitstoot te binden
met het mineraal greenSand olivijn.
Om tijd te winnen voor onze planeet.

GREENSAND CO_2 Opruim Certificaat

BIOS, the Lab on a Chip group

ruimt op:

25 Ton CO_2

Ondergetekende verklaart dat greenSand Stock NV
het CO_2 vastlegt door het uitstrooien van
het mineraal greenSand.

Eddy Wijnker, Founder

ACCOUNTING • OPEN NATURAL CARBON REMOVAL
oncra
CERTIFIED

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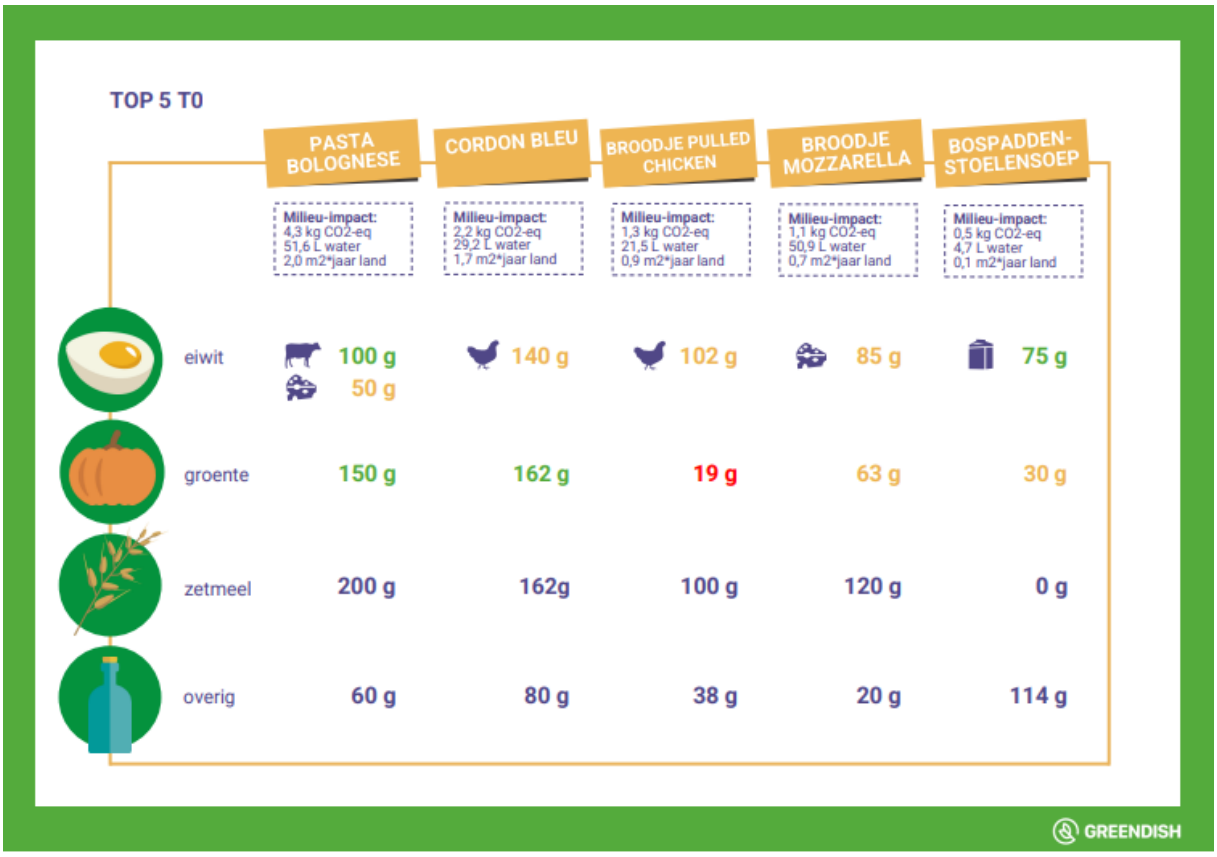
greenSand

7.6 ENVIRONMENTAL IMPACT TOP 5 MEALS UT CANTEENS

This figure shows the top 5 meals at the UT canteens (Source: Baseline analysis September 2022, Green Dish)



7.7 WASTE DATA 2019-2022

Waste stream	2019 (in kg)	2020 (in kg)	2021 (in kg)	2022 (in kg)	Recycling rates
Residual waste	594.024	409.152	431.639	501.427	100% is incinerated with energy recovery
Paper & Cardboard	167.892	104.985	126.691	200.273	100% recycled (95% for new paper & cardboard, 5% for toilet paper and paper towels)
Swill (fruit and vegetable waste)	37.922	17.553	12.150	31.207	100% is fermented with energy recovery
Glass	18.197	7.899	9.204	17.942	100% is recycled
E-waste	14.601	9.128	13.687	7.044	80% is sold/given to employees (not included in these numbers), of the other 20%, only metals and metal compound are re-used. Rest material is incinerated with energy recovery
PMD (Plastic, Metal, Beverage containers)	42.320	6.600	8.605	32.173	85% is recycled (7.5% PET, 7.5%PP, 12.5% PE, 20% plastic film, 40% mixed materials), 15% is incinerated with energy recovery
B-quality wood	46.880	24.920	37.140	34.200	40% is recycled into MDF and chipboard, 60% is shredded and used in Bioenergy Power Plants with energy recovery
Coffee Grounds	4.877	2.392	3.281	14.874	Mostly incinerated with energy recovery, small amounts are reused for circular products (% depends on demand from market)
Construction& demolition	2.200	2.140			100% is recycled
Hazardous waste	37.248	36.714	41.212	42.177	Recycling is not applicable to this waste stream
EP (expired products)	11.060	8.229	9.855		75% is fermented with energy recovery, 25% is incinerated with energy recovery
EPS			60	126	
Hard plastics				560	
Other waste streams	7.864	8.227	5.971	21.210	
Total waste	**985.085**	**637.939**	**699.495**	**903.213**	
Construction& demolition LTSH projects			3.898.650	239.250	100% is recycled

7.8 SUSTAINABILITY MEASURES ROADMAP CO2 NEUTRAL REAL ESTATE

Type	Roadmap measures
Structural	M1 Insulate the roof: Re-insulate to Rc 3.5
	M2 Insulate roof: Re-insulate to Rc 6.0
	M3 Insulate facade: Re-insulate to Rc 3.5
	M4 Insulate facade: Re-insulate to Rc 6.0
	M5 Insulate floor: Re-insulate to Rc 3.5
	M6 Insulate floor: Re-insulate to Rc 6.0
	M7Single glass: use secondary windows
	M8 Single glazing: replace with HR++ glass, including removal of existing glass
	M9 Double glazing: replace with HR++ glass, including removal of existing glass
	M10 Double glazing: replace with HR++ glass, including removal of existing glass
	M11 Replacing HR glass with HR++ glass, including removal of existing glass
	M12 Replacing HR glass with triple HR+++ glass, including removal of existing glass
Installation	M13 Lighting (C-TLD/5 to LED 7 W/m2)
	M14 Presence detection
	M15 Replace instantaneous water heaters with solar water heaters
	M16 Remove humidification
	M17WTW: from half twincoil to full twincoil (70%)
	M18WTW: from twincoil to HR twincoil
	M19WTW: HR twincoil
	M20WTW: from heat wheel to HR heat wheel
	M21 WTW: HR heat wheel
	M22 Air Heat pump (heating)
	M23 Outdoor shading
	M24 CHP + Heatpump (based on very low temperature heating)
	M25 Speed-controlled ventilators
	M26 High Temperature Heating to Low Temperature Heating
	M27 Smart building techniques
	M28 From mechanical cooling to cool circle
	M29 From district heating to air/water heat pump on cool circle
	M30 From gas boiler to district heating
PV	PVD PV cells roof
	PVG PV cells facade

7.9 2022 PROGRESS MEASURES ROADMAP CO2 NEUTRAL REAL ESTATE

This annex shows all sustainable roadmap measures implemented per project.

Vrijhof

Roadmap measures	Project plan renovation
M13 Lighting (C-TLD/5 to LED 7 W/m2)	In roadmap scheduled for period 2025-2030 but already executed

Paviljoen

This project is in the tender phase and due to be carried out with the below mentioned Roadmap measures.

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Planned
M4 Insulate facade: Re-insulate to Rc 6.0	Planned
M5 Insulate floor: Re-insulate to Rc 3.5	Planned
M12 Replacing HR glass with triple HR+++ glass, including removal of existing glass	Planned
M21 WTW: HR heat wheel	Not yet known
M22 Air Heat pump (heating)	Not yet known
M25 Speed-controlled ventilators	Not yet known
M26 High Temperature Heating to Low Temperature Heating	Not yet known
M27 Smart building techniques	Not yet known
M28 From mechanical cooling to cool circle	Not yet known
PVD PV cells roof	Not planned

Citadel

Roadmap measures	Renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Done
M9 Double glazing: replace with HR++ glass, including removal of existing glass	Done
M21 WTW: HR heat wheel	Done
M23 Outdoor shading	Done
M25 Speed-controlled ventilators	Done
M27 Smart building techniques	Done
M28 From mechanical cooling to cool circle	Done
M30 From gas boiler to district heating	Done
PVD PV cells roof	Done

Drienerburght

Roadmap measures	Renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Done
M8 Single glazing: replace with HR++ glass, including removal of existing glass	All glass replaced by HR++
M13 Lighting (C-TLD/5 to LED 7 W/m2)	Lighting LED (except rooms)
M14 Presence detection	Done
M23 Outdoor shading	Done
M27 Smart building techniques	Demand driven ventilation, Direct Current (DC) installation
M30 From gas boiler to district heating	Done
	C02 neutral carpet, saving 21 tonnes CO2 during lifecycle carpet
PVD PV cells roof	Done 77 panels at 380wp per panel

Langezijds was not included in the roadmap analysis. Below the roadmap measures that have been applied during the renovation of Langezijds.

Langezijds

Roadmap measures
M2 Insulate roof: Re-insulate to Rc 6.0
M4 Insulate facade: Re-insulate to Rc 6.0
M5 Insulate floor: Re-insulate to Rc 3.5
M8 Single glazing: replace with HR++ glass, including removal of existing glass
M13 Lighting (C-TLD/5 to LED 7 W/m2)
M14 Presence detection
M21 WTW: HR heat wheel
M23 Outdoor shading
M25 Speed-controlled ventilators
M26 High Temperature Heating to Low Temperature Heating
M27 Smart building techniques
M28 From mechanical cooling to cool circle
M30 From gas boiler to district heating
PV PV cells roof

Faculty Club/Boerderij

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Done
M4 Insulate facade: Re-insulate to Rc 6.0	Done
M13 Lighting (C-TLD/5 to LED 7 W/m2)	Done
M14 Presence detection	Done
M21 WTW: HR heat wheel	Done
M23 Outdoor shading	Done
M27 Smart building techniques	Done

Boerderij Bosch

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Planned
M4 Insulate facade: Re-insulate to Rc 3.5	Planned
M8 Single glazing: replace with HR++ glass, including removal of existing glass	Planned
M13 Lighting (C-TLD/5 to LED 7 W/m2)	Planned
M14 Presence detection	Planned
M21 WTW: HR heat wheel	Planned
M22 Air Heat pump (heating)	Planned
M27 Smart building techniques	Planned

Bastille

Roadmap measures	Project plan renovation
M13 Lighting (C-TLD/5 to LED 7 W/m2)	Done

Technohal

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Done
M12 Replacing HR glass with triple HR+++ glass, including removal of existing glass	Done

M27 Smart building techniques	Done
M30 From gas boiler to district heating	Done in 2020
PVD PV cells roof	Done in 2020

Erve Holzik

Roadmap measures	Status
M22 Air Heat pump (heating)	Done

UPark hotel

Roadmap measures	Status
M2 Insulate roof: Re-insulate to Rc 6.0	Done
M23 Outdoor shading	Done
M27 Smart building techniques	Done

Hangar

Roadmap measures	Status
M22 Air Heat pump (heating)	Done
M27 Smart building techniques	Done

Tennis Pavillion

Roadmap measures	Status
M2 Insulate roof: Re-insulate to Rc 6.0	Done
M8 Single glazing: replace with HR++ glass, including removal of existing glass	Done
M13 Lighting (C-TLD/5 to LED 7 W/m2)	Done
M14 Presence detection	Done
M21 WTW: HR heat wheel	Done
M27 Smart building techniques	Done

Linde

Roadmap measures	Status
M14 Presence detection	Done

7.10 PARIS-PROOF BUILDING ASSESSMENT

A building is Paris Proof when its energy consumption is aligned with the goal of keeping global warming limited to 2C and pursuing efforts to limit the global warming to 1.5C.

Building	GO 2021	GO 2022
Linde	192	173
Middenspanningsverdeelstation	29	23
Bastille	196	199
Paviljoen	319	278
Vrijhof	196	180
Seinhuis	4579	4604
Nanolab	3495	3459
Carre	603	574
Zilverling	302	270
Citadel	146	84
Waaier	287	297
Facultyclub/Boerderij	165	64
Cubicus	262	286
Tennispaviljoen	788	980
Hoge Druk Lab	1242	1130
Boerderij Bosch	148	91
Teehuis	5559	5177
Spiegel	319	272
Holzik	163	124
Sportcentrum	279	274
Ravelijn	206	182
Drienerburght	174	167
Pakkerij	368	327
Garage	339	293
Logica	113	120
BMC	216	173
Hogenkamp U-park Hotel	361	452
ITC Hotel	400	344
ITC Gebouw	194	187
Hangar	79	79
Windpark	100	118
Watersportcomplex	89	109
Schuur - productiekeuken	377	495
Boortoren	159	246
Stall	116	119
Blokhutten	48	53
Schuur - groenvoorziening	178	138
Horstcomplex	466	428
Afvalstoffendepot	122	148
Sanitair gebouw Blokhutten	257	379
Zwembad	1600	1124
Reinwaterkelder	382	349
Rioolgemaal	123	133
Technohal	290	184
Totalen	**426**	**400**

This table shows the energy consumption based on GO (user surface), the surface area that is actually used (gebruikersoppervlak). BVO is the bruto floor surface (Bruto vloer oppervlak). As there are transit spaces the energy consumption using GO is higher than when considering BVO as it is divided by fewer square meters.

The Paris-proof model (more on this in chapter 3.6) shows office buildings should maximise energy consumption to 70kWh/m2/year.

As there is no specific category yet for laboratories we share maximum energy consumption for comparable categories here:
hospitals 100kWh/m2/year, industry with cooling/freezing facilities 85kWh/m2/year.
70kWh/m2/year also counts for indoor sports accommodations, except a swimming pool (210kWh/m2/year).

7.11 ENERGY LABELS UT BUILDINGS

Building	Label	Assess-ment done in	Energy usage MJ/m2	Electricity kWh/m2	Gas m3/m2	District heating GJ/m2	Energy usage CO2 emission kg/m2	Remarks
Bastille	A	2019	538.2	32.3	0	0.2	39.3	Without district heating energy label also label A
Carre	A	2020	441.5	44.7	0	0	27.8	Without district heating energy label also label A
Citadel	B	2019	673.9	23.3	13.0	0	36.4	Assessment done April 2019 – will be repeated after renovation 2021/2022
Cubicus	A	2018	393.5	24.5	0	0.2	28.5	Without district heating the energy label would be E
Drienerburght	A+++ A	2022	298 407 405 498 1608					A+++ for education/offices environment (ground floor); A for residential floors (floor 1,2,3)
Erve Holzik	A+	2022	608.5	48.8	4.5			
Horstcomplex	A	2019	522.4	48.4	0	0.1	34.0	Label A due to district heating
Horst Meander	A	2019	408.7	39.1	0	0	26.3	
ITC gebouw	A	2017	561.9	34.3	7.0	0	31.8	Hengelosestraat
Building	Label	Assess-ment done in	Energy usage MJ/m2	Electricity kWh/m2	Gas m3/m2	District heating GJ/m2	Energy usage CO2 emission kg/m2	Remarks
ITC hotel	F	2019	1204.7	21.1	28.7	0	63.1	After assessment heating source changed to district heating
Linde	A+	2022	995.2	82.7	0	0.23		Without district heating the energy label would be E
Pakkerij	E	2022		44.5	28.7			Monument
Paviljoen	G	2018	1301.1	21.3	31.4	0	68.0	
Ravelijn	A	2018	332.9	30.6	0	0.1	21.7	Without district heating energy label also label A
Spiegel	A	2018	501.9	36.2	0	0.2	35.2	Without district heating the energy label would be F
Sportcentre								Label is not legally required as the building has only 5% office space

Technohal	A++	2019	493.0	15.3	0	0.3	40.3	Without solar panels the label would have been B
Vrijhof	A	2018	361.6	32.5	0	0.1	23.8	Without district heating energy label also label A
Waaier	A	2020	627.2	56.3	0	0.1	41.3	Without district heating the energy label would be E
Zilverling	A	2017	421.4	28.6	0	0.2	30	Without district heating the energy label would be C

A high energy label is not the main goal of UT as this is a theoretical assessment and does not show the real energy efficiency status of a building. Once a building is connected to district heating, the labelling is generally improved by two steps.

7.12 CC LINKEDIN POSTS STATISTICS

Disposable coffee cup:

Video views

Targeted to: All followers

10,152
Total

Organic stats

32,420 Impressions	176 Reactions	1.81% Click-through rate
13 Comments	12 Reposts	586 Clicks
2.43% Engagement rate		

Appèl/Greendish:

Organic stats

Targeted to: All followers

13,852 Impressions	100 Reactions	2.21% Click-through rate
3 Comments	5 Reposts	306 Clicks
2.99% Engagement rate		

Pilot kick in:

Organic stats

Targeted to: All followers

9,422 Impressions	37 Reactions	1% Click-through rate
0 Comments	1 Repost	94 Clicks
1.4% Engagement rate		

Train zone map:

Organic stats

Targeted to: All followers

62,940 Impressions	687 Reactions	4.68% Click-through rate
13 Comments	25 Reposts	2,943 Clicks
5.83% Engagement rate		

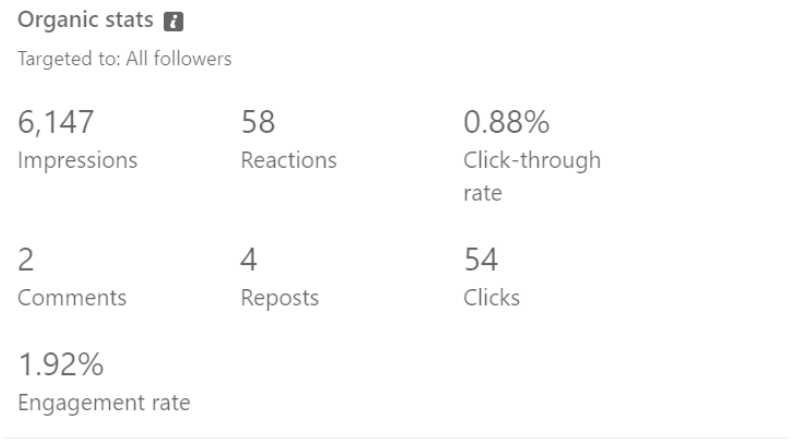
SlimPark Living lab

Organic stats

Targeted to: All followers

17,510 Impressions	229 Reactions	2.24% Click-through rate
4 Comments	7 Reposts	393 Clicks
3.62% Engagement rate		

Interview Mirjam:



7.13 NUMBER OF STUDENTS AND EMPLOYEES

Year	2019	2020	2021	2022
Employees	3251	3544	3751	3933
Students	11796	12632	12981	12543
Total	17096	18196	18753	18498

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