SEE PROGRAMME ANNUAL REPORT 2023

SUSTAINABILITY ENERGY ENVIRONMENT PROGRAMME

B.MARECHAL

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UNIVERSITY OF TWENTE.

SEE Programme

Sustainability Energy Environment Programme

2024

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Preface

The average global temperature in 2022 was 1.2°C higher than in the pre-industrial era. The warming is not evenly spread across the planet. The Artic areas are warming up much faster. In the tropics rainfall patterns are changing. The KNMI'23[1] Climate scenario's detail the Netherlands has already warmed up by 2°C since pre-industrial times. Precipitation (in the form of more extreme showers) has increased by 20%. And the likelihood of heatwaves has increased. These changes are impacting people locally and globally. Western countries have historically emitted more and we need to reduce our emissions rapidly. The pledges countries made to reduce their greenhouse gas emissions are insufficient to meet the target of staying below 1.5°C. It is important to have examples, to have leaders who show how to structurally reduce our greenhouse gas emissions to minimise the climate crisis as well as reducing our impact on resources to reduce the resources crisis and use our own campus to strengthen biodiversity to help address the biodiversity crisis. Universities are well positioned to take a leadership role.

This SEE Annual report 2023 contains information on what UT colleagues and SEE Programme members have been working on in 2023 with the aim of making the operational management at the University of Twente more sustainable.

A sustainable organisation means working towards carbon neutrality, circularity, strengthening biodiversity and minimizing the impact of UT's activities on the soil, air and water. This is complemented by work that has been done on Energy and Environment (compliance with legislation).

Feedback
Feedback received on previous reporting has been addressed in this document. We specifically refer to the feedback from the University Council, the EB and the SEE programme steering group, the SEE sounding board and the SEE working group.

The University Council provided feedback on the 2022 SEE Annual Report. They encouraged continuing the involvement of students in sustainability-related projects on campus to increase the visibility of sustainability to students and involve students in the process. The UC emphasized the importance of support at the central to the coordination of the plan and the monitoring of its goals and at the decentral level to pick up the topic of sustainability within their faculty or department. Thirdly, they advise to market and communicate about sustainability to prospective and current students to create awareness of what UT is doing on sustainability.

Feedback requested on the SEE programme's halfyearly internal report in June 2023 mentioned the need for a more concise and less detailed report. The big picture needs to be visible and this is getting lost in the level of detail. Details will be made available in an annex. Overall, the story and structure were very clear.

Other comments were received on the CO_2 report referred to the CO_2 compensation being deduced (following GHG protocol while still mentioned the energy consumption) which might result in readers thinking the total emissions are low. Therefore in future reports emissions will all be visualized and if compensation is applied this will be indicated.

The Executive Board asked SEE to make a division between behavioural goals contributing to raising awareness in which the EB members can play a role and operational goals part of technical projects. The EB also requests data to be visualized in graphs where possible.

In the reporting on sustainability in operations we will follow the ten themes of the Sustainability Policy for operational management: energy, water, waste, food & drinks, travel & mobility, biodiversity, procurement, buildings, events, finances are complemented by update chapters on sustainable labs, data and communication.

We invite you to read and react to this report and to become engaged and get involved with the sustainability challenges.

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

[1] https://www.knmiprojects.nl/projects/climate-scenarios

Management summary and highlights 2023

The SEE Programme manages and works on continually and structurally improving UT's sustainability, energy and environmental performance. The 2023 Annual Report reflects on the progress made in 2023 towards the set goals and reports on the actions required to comply with the energy and environment legislation applicable to UT.

The progress we report on is linked to the goals that have been set. Figure 1 shows the goals for each theme accompanied by the highlights of what was achieved in 2023.

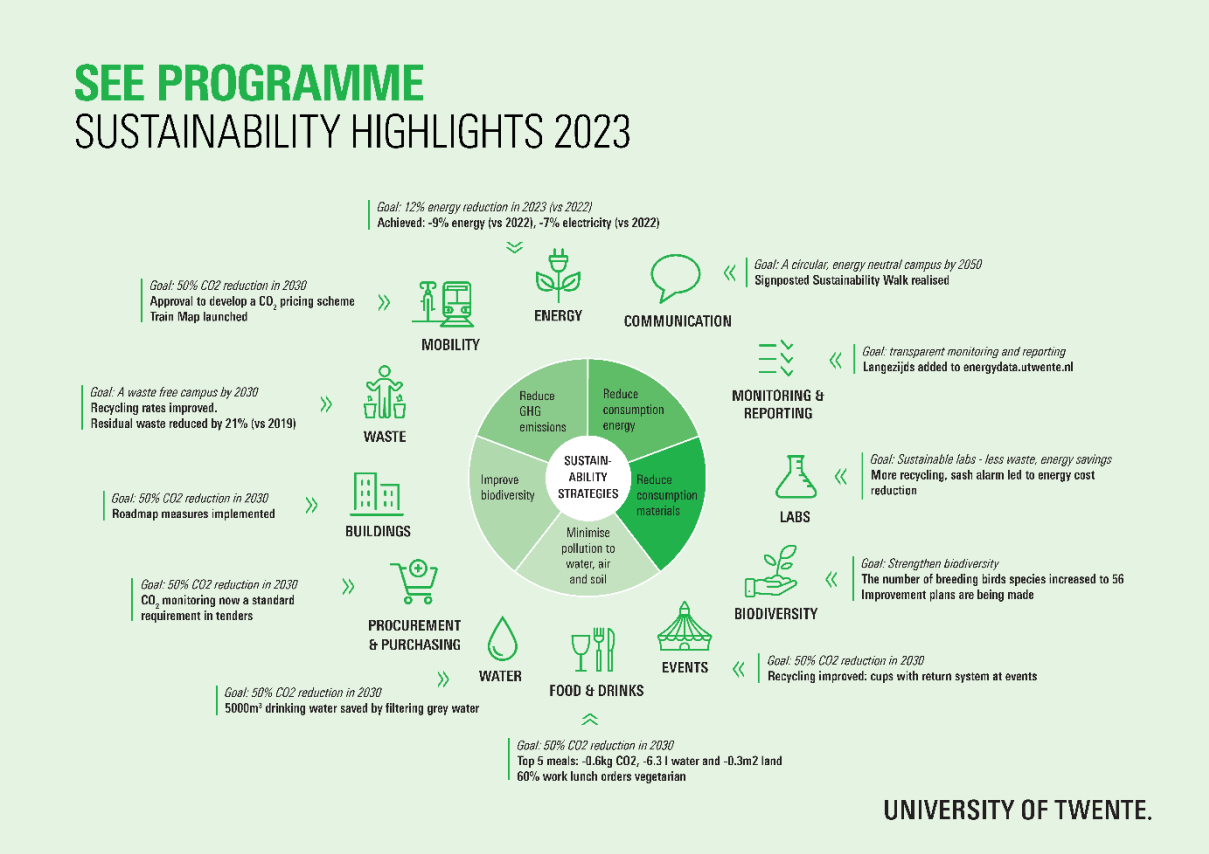

Figure 1. UT sustainability goals and highlights

During 2023, the SEE Programme Team has started the transition from the project leader role to a role where the focus is enabling colleagues to integrate sustainability in their work to realise a change. Sustainability initiatives, activities and measures are organized and implemented all over UT resulting in more responsibility being taken up in the line organisation for reporting on progress and a more facilitating and supporting role from the SEE Programme Team.

The updates on the ten themes of the Sustainability Policy for operational management energy, water, waste, food & drinks, travel & mobility, biodiversity, procurement, buildings, events, finances are complemented by update chapters on sustainable labs, data and communication. These include technical and organizational, process or behavioural change updates. These are difficult to separate as for technical measures to make a sustainability impact, these often need to be complemented by a change in behaviour in how to use them. Other times behavioural changes need to be acceptable before technical adjustments can be initiated. All in all it relies on the priority given to sustainability in projects where all managers and directors can take a role in expressing and supporting an ambitious stance.

Changes in legislation related to energy and environment led in 2023 to the obligation to comply with the 'informatieplicht' (obligation to provide information) on energy saving; for environment UT is preparing itself for the introduction of the Omgevingswet and the changes that may bring for the organisation and campus.

Below, this management summary will describe the things UT does well and what UT could do better.

UT's focus on reducing energy is paying off. Total energy consumption has gone down by 9% in 2023 compared to 2022. Compared to 2019, the **electricity** consumption in 2023 has gone up by 1.9% (**total energy** has been reduced by 2.8%). There still is a lot of potential to reduce the energy consumption of UT. Reducing ventilation by closing the sash of fume hood made a big impact. The impact of **mobility** has increased: The number of flights increased by 51% compared to 2019 (and +13% vs 2022), while the CO_2 emissions decreased by 21% compared to 2019 (+19% compared to 2022). The Train Map only focusses on replacing short distance flights by journeys by train. No target was set for reducing business flights yet. The amount of **waste** has been reduced by 17% compared to 2019, residual waste by 21%. Hard plastic became a separate waste stream. More hazardous waste was registered - most likely due to the tidying up during the inventory for the introduction of the new software for the registration of chemicals. The roadmap towards CO_2 neutral **real estate** is integrated into the LTSH and many buildings are disconnected from the natural gas. **Water** consumption has gone up by 11% compared to 2019 (10% vs 2022). UT has been filtering water using the WaterMiracle in the Water Lab. That had an impact on the total usage of 4.3%. In the **canteens** a reduction of CO_2 emissions from the top 5 meals was realised and the ordered vegetarian work lunches has gone up. Four **hot beverages** machines piloted oat milk which was received very well. At Bata and Kick-In **events** rPET cups were collected separately, to enable recycling and avoid incineration. The number of breeding birds increased to 56 species, good for our **biodiversity**. Many steps have been taken in making **labs** more **sustainable.**

UT has been **performing well** in many areas. Transparent monitoring via https://energydata.utwente.nl/and improvements to reporting are important to keeping track of the progress made towards the set sustainability goals. We observe that the number of (supporting) staff actively engaged with sustainability is growing. UT set the financial goal of reducing **energy** by 12%. Based on consumption (not cost) electricity consumption has been reduced by 7% compared to 2022 (total energy consumption - 9% compared to 2022). This is a good step – though you have to be aware that the figures are influenced by the removal/addition of buildings and that outside conditions (temperature, humidity) influence consumption. UT is capable to continue on reducing energy demand. When the **Train Map** was published, this resulted in many discussions on how to travel and whether to travel, unfortunately not leading to a CO_{2eq} reduction overall for travel. In 2023, steps have been taken on improving **waste** separation and waste reduction (also in prevention via procurement). The roadmap to work towards CO_2 neutral **real estate** is integrated with the LTSH programme ensuring measures to improve insulation or energy efficiency are standard criteria in a building renovation plan. The **procuremen**t department integrated sustainability criteria in tender processes. Campus management implemented innovative ways to reuse rain**water** avoiding the need to use drinking water. The nudge via the default vegetarian work **lunch** led to 60% of the work lunches being ordered vegetarian. And after 30 years of discussion the removal of disposable **cups** from coffee machines went smoothly. Large UT **events** piloted the use of a return system for disposable cups, reducing the mount of residual waste. In the maintenance of green areas **biodiversity** is an important factor, more flower bulbs and wildflowers areas are established as well as extensive maintenance of grassy areas. Thew new position of the Sustainable Lab Coordinator enabled targeted **lab sustainability** improvements, reducing energy and waste. We tried to share more about what is being done on sustainability on campus through the **sustainability exhibition** showing on 9 banners information on all themes and signposts were designed for the **sustainability walk** which contribute to making the UT community aware of what is being done to make UT operations sustainable.

There are always **areas in which improvements are possible**. Continued and reinforced effort to reduce energy consumption are possible and necessary. Rapid decision making is paramount. Working towards a gas-free campus and energy savings through day/night settings for laboratories are great opportunities for UT. These are also measures that contribute to the reduction of greenhouse gas emissions which we need to bring down to 0 as soon as possible to reduce the impacts of climate change. UT can become a frontrunner in for example our ambition in becoming gas-free and setting ourselves a CO_2 price, so decisions are taken based on the true price taking into account the negative environmental impact of a decision or activity.

Joint mobility ambitions with clear HR regulations to stimulate sustainable travelling behaviour will be needed to reduce the CO_2 emissions from commuting. A goal on CO_2 emission reductions from business travel should be set to have a goal to strive towards. To continue making reductions in waste to reach the targets of max 10.5kg residual waste and 2kg PD (plastic packaging and cartons) waste per person per year, continued efforts are needed, in prevention via procurement and in the behaviour of us all. For building renovation plans, the principle of total cost of ownership remains important. The success of the mission of the Procurement department "we help you to purchase sustainably" relies on the cooperation of the internal customers. Support at the management level of all faculties and departments to ensure sustainability criteria are taken into consideration will be of great help.

Twente has a drinking water shortage resulting in businesses being refused a connection locally. Reducing our water footprint needs more priority. Using rainwater as a source for demineralised water and closing the 2nd basement for water storage, adding another 1000m^3 of storage volume are steps are being discussed. When the current catering contract ends,

sustainability criteria and a joint responsibility for reducing the impact of the canteens need to be taken into consideration. For hot beverage machines in a new contract the requirement for 50% oat milk can be a criteria to reduce the impact.

Sustainability is a precondition for everything we do – at events the UT norm and default options should be the standard as not doing this leads to complaints and contributes to disillusionment among staff and students driven to make UT more sustainable. Displaying sustainability at UT events in contrast leads to increased enthusiasm. Making visible what we do on the maintenance of the campus to strengthen biodiversity would be a first step in engaging the UT community on this topic. On financial matters, UT can best emphasize the importance of sustainability to the bank, insurances and other financial services suppliers remind them of the need to stop investing in the fossil industry.

The sustainable lab coordinator position needs to be continued and broadened for more faculties to benefit from a coordinated approach on making labs more sustainable. On engaging and informing the UT community, SEE plans to use a large and inspiring goal to focus our communications and strengthen the personal communications from our network to their colleagues and students.

The CO_2 footprint of 2023 is 8.1 kt. This is a reduction of 70% compared to 2019. Half of this reduction is due to the purchase of renewable electricity. The full report can be read here: (link)

HIGHLIGHTS 2023

Energy

- Discussions started on ventilation optimisation (day/night settings), a high impact change
- Governmental energy information obligation and energy reduction investigation requirement for UT buildings
- Energy reduction target of -12% set
- Standard winter temperature 19°C, energy savings made
- 100% green electricity
- 1811 solar panels (incl. 916 Langezijds) provide ~1% of UT's electricity needs
- Roadmap Energy neutral real estate integrated in LTSH

Travel & Mobility

- 2nd version Train Map published stimulating train travel instead of flying within Europe
- A test drive day was organized to encourage the rental of electric and hybrid cars
- Mobility survey 2022; 62.3 % of the employees and 84% of students cycle, both an increase compared to survey 2011.
- Social media Green Hub video Cycle to work-day

Waste

- On July 1st, 2023, the UT removed all disposable cups from the hot beverage machines.
- Green Hub and SEE produced a video to show the process of waste recycling from UT waste.
- Green Hub students created poster boards to inform the UT community about what waste stream goes where.
- Business Days stopped using flyers in 2023: 60-70.000 flyers avoided.

Procurement

- A workshop "How to apply sustainability in your daily work" was held with the procurement department.
- Four projects started to obtain data on the current performance of sustainable procurement.
- New mission: "We help you to purchase (socially) sustainably".

Water

- A XXL smart rainwater buffer has been realised collecting rainwater from the Sports Centre
- 5000 m^3 (about twice the volume of an Olympic-size swimming pool) drinking water saved by filtering grey water.

Food and Drinks

- Green Dish collaboration: caterer Appel worked together with Green Dish to minimize food waste and to increase the amount of plant-based protein in their dishes. The changes made to the top 5 best-selling meals lead to a reduction of greenhouse gas emission (based on the consumption over 1 year) of 0.6 kg CO_2, 6.3 L water and 0.3 m^2 land. This corresponds with 1363 fewer trips by car from Utrecht to Enschede, 6569 showers and 1672 car parking spaces.

- All warm drinking machines are now in stand-by mode overnight
- Default work lunch vegetarian since October 2022, in 2023 60.6% of work lunches were ordered vegetarian, compared to 33.9% in 2022 and 10.3% in 2019
- The oat milk pilot resulted in 22.300 drinks that were consumed with oat milk instead of cow's milk.

Events

- the UT-triathlon organizers (ALOHA) piloted edible pouches to replace disposable cups – waste of 2000 cups avoided
- During the Bata post-consumer waste separation was tested.
- The Bata party worked with a return system to ensure the return of the rPET cups enabling high quality recycling.
- Fifth edition Sustainability Week (UT-Saxion-ROC) was held from 27 November -1 December 2023

Biodiversity

- On World Biodiversity Day, a biodiversity walk was organised where KNNV members guided a group of people across campus while conducting a biodiversity quiz.

Sustainable Labs

- Sustainable Lab coordinator appointed within the faculty S&T
- Substantial progress towards substantial energy savings using day/night settings for labs and good fume hood closing practices, already saved €25.000 in 2023.
- LEAF and MyGreenLabs pilots undertaken to create awareness on lab sustainability

Communications

- Sustainability exhibition (travelling through all buildings)
- Sustainability walk: signs and route across campus
- Almost 50,000 views of utwente.nl/sustainability and /duurzaamheid in 2023 (including subpages & news)
- Inspirational interviews about sustainability
- Many participants in the Sustainability Dialogues

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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	Nitrogen deposition calculator
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
CO_{2eq}	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
KNMI	Royal Netherlands Meteorological Institute
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	Vrije Universiteit (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 Very High Concern

List of Figures & Tables

List of collaborators

Green Hub is the central point where actionable knowledge and initiatives across a holistic spectrum of sustainability matters converge and reinforce each other. Founded in August 2020, Green Hub plays an active role in the change management for sustainability at UT. SEE collaborates with Green Hub and with its operations officers on making the operational management more sustainable.

Realised is a start-up from the University of Twente that assists organisations in the energy transition. Their vision is that by opening up data and generating insight in carbon footprints we can accelerate your transition. Their strength is the combination of our drive for sustainability, domain knowledge and strong IT experience. Realised supports the SEE Programme by calculating its CO_2 footprint and has developed the Energy data Platform and the Carbon Platform.

UT Climate Centre was launched in 2023 and has as its mission is to empower students, staff, and society to maximize their impact on the world's climate challenges. Their strategic goal is to foster and connect the University of Twente's climate-related research and educational strengths, collaborate with stakeholders to enhance impact, facilitate a sense of community, and represent and provide a clear ear, face, and voice to the world. SEE collaborates with the Climate Centre to apply students' knowledge to make our organisation and campus more sustainable and in other situations where interests align.

Scientists4Future, enables 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. SEE keeps connections to S4F and provides information on the progress made at UT.

1. Introduction

1.1 SEE Programme

The SEE Programme is a university-wide programme for managing and continually and structurally improving its sustainability, energy, and 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 through organisational and technical measures.

After setting up the programme, the team developed a framework to facilitate the integration of sustainability within many aspects of the organisation. This Sustainability Policy for operational management was approved in May 2020.

The Sustainability Policy for operational management can be found online via this link.

The Annual Plan 2023 can be found online via this link.

1.2 SEE organisational structure

This organisational structure has been developed following recent changes. This organisational structure shows the new Strategic Sustainability Coordinator position[2], the collaboration with Green Hub Coordinator and new and to-be-implemented working units: SEE Sounding Board, SEE Sustainability Panel.

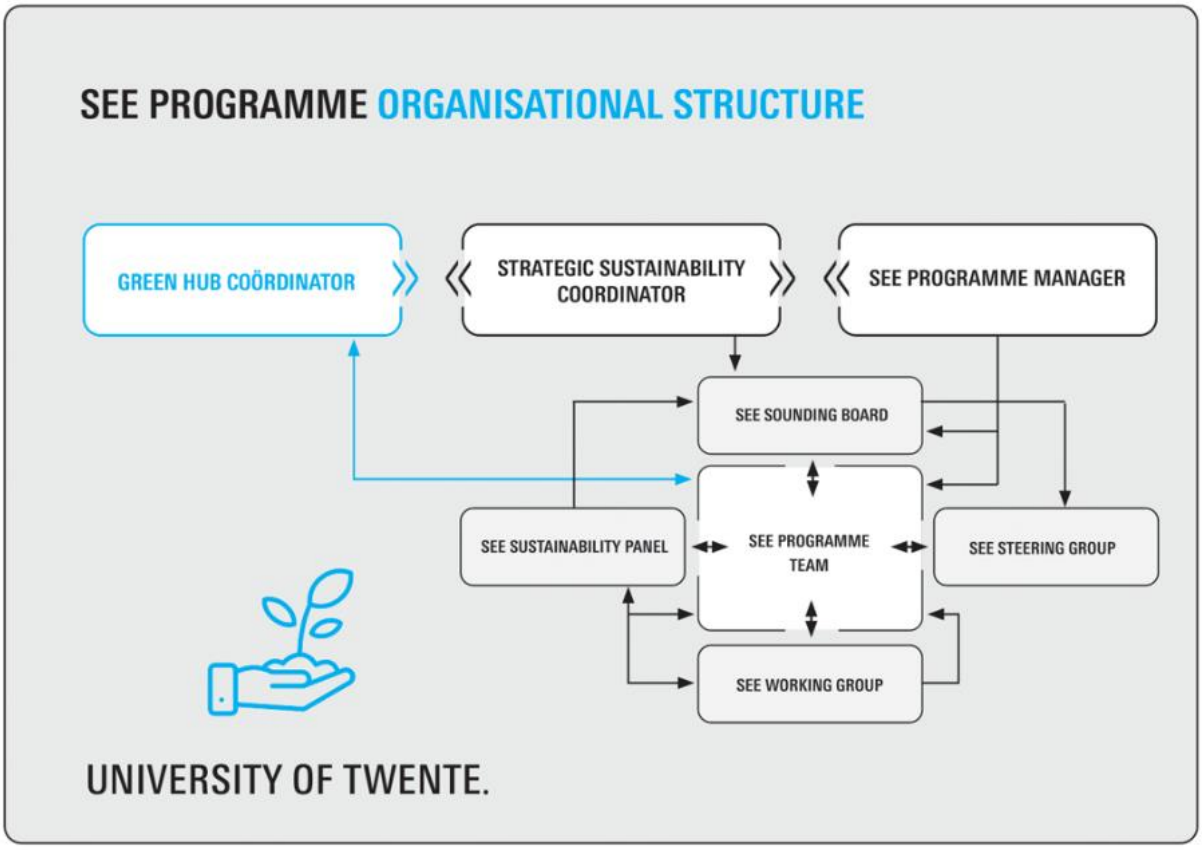


Figure 2. Revised and streamlined organisational structure of SEE-Programme

Strategic Sustainability Coordinator position:
Due to increasing demands for strategic coordination, process facilitation, and cross-functional team leadership of various staff and students working on sustainability in the UT, a new position was created in late 2022. This position was intended to

[2] This position will not be refilled when the current sustainability coordinator leaves his contract on 31-01-2024.

organise, facilitate and streamline work processes within and around both SEE-Programme and Green Hub to strengthen the strategic embedding of both programmes within the organisation (see Figure 2). Formally starting in January 2023, the position co-shapes the emerging sustainability strategy of the UT. Its focus is on process facilitation, streamlining UT-wide decision-making on sustainability for the SEE Programme and Green Hub.

Originally not included in the job description, the facilitation of organisational transformation of the university to achieve lasting impacts and actionable outcomes for sustainability was picked up to cease the opportunity to contribute to an overarching and meaningful sustainability strategy for the UT community. This may have impacted the task of strategically strengthening the SEE Programme and Green Hub, as organisational transformation demands a lot of time and focus. However, the role was key to bring community members together around the SEE-Programme, Green Hub, as well as Climate Centre and Design Lab, consolidating efforts and building partnerships in the face of the UT financial crisis. Against this backdrop, the coordinator strove to create an emerging vision, facilitating teams from the bottom-up through coalition-building, stakeholder engagement and community dialogues, whilst lobbying and advising leaders on participatory governance needed to realise ambitions from the top-down.

The University needs a knowledgeable facilitator for this organisational transformation and it is important to formally allocate these tasks to a role. This makes the role division clear and ensures SEE and Green Hub can take steps to possibly meet the requirements for strategic support in another way.

This position is not continued in 2024 after the resignation of the current strategic sustainability coordinator due to budget restrictions and lack of organisational capacity. This does leave a gap to lead on transformational change; more strategic coherence across the main actors working on sustainability in the UT is still needed.

SEE-Sounding Board

The sounding board is primarily a challenge-focussed, solution-generating forum of representatives of SEE-Programme stakeholder groups who have subject-matter expertise. Concerned about our university's progress on sustainability, they proactively provide advice as effective problem solvers. Both students and staff brainstorm together in this group on barriers, bottlenecks, dilemmas, and challenges, so that solutions have broad support and can be implemented rapidly.

Sustainability Panel

The sustainability panel is intended as a participative and democratic assembly for invested community members to openly contribute to the governance and policy of UT sustainability matters across portfolios.

SEE Programme Team

Formerly called the SEE Support Group, the SEE Programme Team is adjusting its focus to best facilitate the transition to sustainable operational management (‘making sustainable choices the obvious choices’). Sustainability is now more visible in people’s daily work. Therefore the focus shifts from a project leader role to enabling colleagues to integrate sustainability in their work to realise a change. Integrating sustainability in one’s work also requires behavioural changes. The importance of doing so needs to trickle down through the organisation so that line managers for example remember to include it in their performance reviews. This aspects is part of the SEE focus of activating colleagues, but the SEE programme needs to help from the entire organisation to realise this.

1.2.1 Linkages SEE with other UT initiatives and programmes

Integrating sustainability into the organisation is something everyone at UT plays a role in, not only the SEE programme. Essential for this is to connect initiatives and to strengthen and align communication. Then sustainability can be seen as a precondition to everything we do at UT.

12% energy reduction task group

Parallel to the energy reduction goals set out in the Sustainability policy, an additional challenge was set to the organisation due to rapidly increasing energy prices. Coordinated by CFM, intensive discussions were held with portfolio holders operations and Health, Safety, Environment coordinators of the faculties on how significant and lasting energy savings could be made. Alignment with other initiatives was essential to avoid parallel processes. Current status will be described in chapter 3.1. This project group will be discontinued in 2024 as the responsibility lies with the faculties and departments. Through existing bodies, the topic of energy reduction will remain on the agenda.

Green Hub collaboration

In the first part of 2023, SEE-Programme and Green Hub[3] held plenary meetings to evaluate how best to work together. Facilitated by the Strategic Sustainability Coordinator, each agency was encouraged to be clear what they wanted to achieve with these meetings, and how they wanted each other to help, and what each party could do. This built on pre-existing periodical meetings held in 2022 to help align and structure each of SEE-Programme's and Green Hub's operational activities.

It was agreed that the meetings should focus on knowledge transfer for shared areas of operations that fall under SEE-Programme's responsibility for implementation of the sustainability policy. Green Hub has had an operations portfolio since it began in 2020. This team focusses on similar projects, and SEE-Programme needs to be aware of the details of these projects

Sometimes operations Green Hub officers can support SEE, where SEE defines specific areas that bridge its own programme. Sometimes SEE can help Green Hub with knowledge, expertise and advice, as well as providing hands-on experience to the young student professionals (a core purpose of Green Hub)

These regular meetings create time by which SEE and Green Hub can coordinate and organise such overlapping and mutually valuable activities to ensure continuity and complementarity. Further work is needed to define boundaries, decide on whether focussed working groups might be more effective than long plenaries, and focus on action and implementation.

Green Hub also collaborates with Student Union, student association Sustain, VSA, EA (Effective Altruism Twente) who also focus on sustainability. Also, IUF, Design Lab are important collaborators where Green Hub is helping to strengthen the sustainability efforts. With Climate Coalition (Scientists Rebellion, University Rebellion, VSA, Students4Future, Sustain)

Green Hub has supported the project to develop a definition on sustainability for UT.

Green Hub collaborated with Climate Centre on mapping sustainability in education. With ET a blueprint was developed on how to collect and visualise the necessary information which can be applied to other faculties in future. Simultaneously students are asked how UT can increase the findability of sustainability in courses. A Central Sustainability Intelligence Platform (CSIP) has been built. The platform[4] will be used to interact on the available knowledge of sustainability at UT.

Faculty Green Hubs[5] - Green Hub launched Faculty Green Hubs in September 2023. They are mixed teams of students and staff (professors, researchers, study advisors, or any other staff members) who will operate at the faculty level and make existing sustainability initiatives as visible as they should be. On the other hand, to increase sustainability aspects in research, education, and raise awareness about social and environmental sustainability, new initiatives are required. Faculty Green Hubs will be able to scan the sustainability status of the faculty from the ground up, and report back to the Faculty Board.

Current Status:

- Faculty of Science & Technology (S&T)[6] – projects started, commitment and financial support of Faculty Board
- Faculty of Geo-Information Science & Earth Observation (ITC) – projects started, commitment from Faculty Board
- Faculty of Engineering Technology (ET) – internal relationships established with student associations [and educational programs], in talks with Faculty Board on support.
- Faculty of Behavioural, Management and Social Sciences (BMS) – interest to start a Faculty Green Hub.
- Electrical Engineering, Mathematics, Computer Science Faculty (EEMCS)- interest to start a Faculty Green Hub. Meeting planned in January 2024.

Sustainability Dialogues

The Sustainability Dialogues were a broad, high intensity, high stakes series of community-focussed events that started in February 2023, intent on finding a shared action pathway to transform the UT to a becoming a university that meets its sustainability targets as well as fighting the climate crisis.

The Sustainability Dialogues were triggered in late 2022, when the EB became concerned with constructively involving a coalition of different youth and staff activist groups (Climate Crisis Coalition) calling for the UT to the 'Cut the Ties' with Fossil Fuels companies in its research and partnerships to make progress towards its sustainability goals. In a very short time, this

[3] https://www.utwente.nl/en/sustainability/green-hub-twente/
[4] https://greenhub.utwente.nl/
[5] https://www.utwente.nl/en/sustainability/green-hub-twente/About/meet-the-team/faculty-green-hubs/
[6] https://www.utwente.nl/en/tnw/organization/ST-Green-Hub/

(verbal) assignment was translated by Green Hub and the Strategic Sustainability Coordinator who took the lead in organising these community-focussed dialogues. SEE-Programme was consulted, and after some work to reduce parallel processes, became more involved as the series progressed, since community queries also concerned the environmental, operational, and organisational aspects under its purvey.

There were five structured dialogues each focussing on a theme defined by the community in attendance at the first kick-off.

1) Education for Climate & Sustainability
2) Research, Partnerships & Divestment
3) Societal Impact & Behavioural Change
4) The Campus Metabolism
5) UT System Transformation

Participants were made up of concerned professors and scientists, student activists and students who are simply curious and want to know more, and administrative and support staff already doing the work on sustainability on campus (SEE-Programme, CFM B&P colleagues included).
What became clear early on was the need to culminate the talks with action and decisions on what the EB would take the lead on. This was the intention of the Executive Action Breakfast meeting in late June. The Dialogues took an extreme amount of time, work and dedication from all involved, whilst generating trust and expectations that continue to require the upper management's action on.

Green Hub plans to take this forward with SEE-Programme, DesignLab and the UT Climate Centre by asking for a shared formal mandate from the EB in late 2023/2024. SEE-Programme's plans to set up a Sustainability Panel directly link to the Dialogues' outcomes as something the community has been asking for: a citizen climate assembly of sorts that upgrades the UT's sustainability governance.

One of the sessions "*the Campus Metabolism* "was designed to specifically focus on becoming a sustainable campus and organisation. This session was prepared together with SEE-Programme. Various colleagues presented aspects of its plans and actions. The new Sustainable Lab Coordinator presented for example on how to make labs sustainable; Green Hub and Student Union on how to organise events sustainably and certifying student organisations' sustainability efforts, how to become carbon neutral, and SEE's mobility, food, and waste plans. Participants asked for effective monitoring of progress towards the set goals, more promotion of choosing sustainable travel and commuting options

A major comment made in multiple dialogues referred to the importance and the need to show what we do "to practice what we preach." By ensuring the campus is UT's calling card on sustainability to show UT taking the leading role in the region as well as to attract staff and students. This is done by showing our research on campus instead of elsewhere.

Another point raised which may help strengthen the impact of the SEE Programme is to reduce workload for students and staff. This would ensure they have more energy and space to contribute to sustainability projects on campus during work time, but which fall outside the staff's regular tasks (TAS code for sustainability projects for staff with a specific number of hours per faculty/service department and ECTS credits for students for sustainability projects).

More information with in-depth notes of the proceedings can be found on the Dialogues website[7].

[7] https://www.utwente.nl/en/sustainability/sustainability-dialogue/#overview-of-all-sessions

As a result of these dialogues, the Executive Board issued a statement[8] on November 6 on future collaboration with industry, calling on partners to commit to the Paris Agreement to stay below 1.5C of global warming.

> At the University of Twente, we take our role in contributing to a sustainable world seriously. We take a proactive and responsible approach to developing solutions that sustain our planet and the people who live on it. We do this together with others all around us. Our position is not to exclude anyone without good reason and to engage in an ongoing dialogue with a view to encouraging cooperation.
> For us, active participation in the energy transition also means that we do not initiate research projects that encourage the use of fossil fuels. New cooperation agreements with the fossil industry are only entered into with those parties that show a substantial change in their working method to make the transition from fossil to alternative, renewable sources. We also ask parties in the fossil industry and energy sector to explicitly express their commitment to the Paris Climate Agreement and the goal of limiting global warming to 1.5°C. We will continue to bring these values to the attention of these parties in the form of an ongoing dialogue.

Climate Centre

The UT Climate Centre[9] was launched in 2023 as an outcome of the SEG Sustainability. Its mission is to empower students, staff, and society to maximize their impact on the world's climate challenges. It welcomes all students, staff and partners who want to contribute to climate solutions through concerted actions, knowledge and expertise development. As such, while the Climate Centre is focused on research and education, its interests often align with the SEE programme.

In the SEE Sounding Board, communications and how to resolve its dilemmas, was often on the table. This resulted in discussion about how to develop a coherent sustainability communications strategy based on a clear (leadership-driven) shared vision. It was agreed that, given the EB's prioritisation of the Climate Centre, it also made sense to align SEE-Programme's own communications to the Climate Centres' focus.

S4F

Scientist4Future[10] is a large group of UT scientists who enable scientifically trained professionals and students (in all scientific fields) - that are concerned about the future - to connect with each other. S4F also aims to empower citizens and organisations 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.

More information can be found on the website Sustainability at UT.

1.3 Sustainability reporting and benchmarking

1.3.1 Corporate Sustainability Reporting Directive

On January 5th, 2023, the Corporate Sustainability Reporting Directive (CSRD) entered into force. The CSRD provides standards that organisations can/should use to report on their sustainability performance. 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.

Just like other reporting developments, UT actively follows this in the process of continuously improving its operation and related accountability. The SEE programme 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. From a national

[8] https://www.utwente.nl/en/news/2023/11/1222827/ut-calls-on-collaboration-partners-to-commit-to-paris-agreement
[9] https://www.utwente.nl/en/sustainability/climate-centre/
[10] https://twente.scientists4future.nl/

perspective, we are participating in working groups on the future of reporting and the implementation of the CSRD.

The Commission adopted the first set of standards mid-2023. 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. At this point the focus of the Dutch government is on identifying the preferred scope of the legislation to, among others, Dutch universities and other public organizations and institutions of social interest. Therefore, an internet consultation on embedding the CSRD in national legislation was open for response until 18 December 2023. Social responsibility and competitive considerations only justify rapid compliance of the University of Twente with CSRD.

As UT is intrinsically motivated to perform in the field of sustainability, a gap analysis has been done to prepare and to identify low hanging fruits in our reporting. A few examples of these related to environmental aspects of the reporting are: adding some more information from the SEE annual report on the justification of UT's sustainability performance into the UT annual report. Also when data is shared this should be compared to the baseline data to be able to assess the UT's performance. Concerning the energy usage details of the energy mix (percentage fossil vs renewable) can be added. UT does already well to report on scope 1,2 and 3 in their Annual Report where other universities limit their reporting to emissions from energy consumption (scope 1,2) and omit the reporting on upstream and downstream greenhouse gas emissions (scope 3). Reporting on internal CO_2 pricing is a topic that can be added in the near future.

To illustrate what information will be reported on for the CRSD, the European Sustainability Report Standards (ESRS) 'Environment' (E) [11] 1 till 5 are listed below.

ESRS E1: Climate Change
ESRS E2: Pollution
ESRS E3: Water & Marine resources
ESRS E4: Biodiversity & Ecosystems
ESRS E5: Resource use & Circular economy

ESRS E1: Climate Change

- How does UT influence Climate Change: CO_{2eq} emissions[12] -> CO_2 footprint and analysis
- Are our current and future efforts in line with the Paris Agreement? -> No data from 1990, instead UT uses 2019 as baseline. UT's Sustainability Policy for operational management.
- The intention and ability to adjust to the transition to a sustainable economy and limit global warming
- All measures (including the results of the measures) UT takes to prevent, to limit or to mitigate acute and potential negative consequences of climate change and to address risks and opportunities climate change poses to the university? -> adaptation, use of renewable energy, energy efficiency, actions and allocated resources to implement measures to limit climate change (on campus and upstream and downstream)
- What are the financial consequences of risks and opportunities with regards to climate change on the short-term, mid-term and long-term for UT?

ESRS E2: Pollution

- Impact of UT activities to soil, water and air
- Plans and capacity to adapt operations to prevent, control, reduce and eliminate emissions and thus pollution
- Disclosure on substances of concern to provide users an understanding of the potential and actual impact from their use.

ESRS E3: Water & Marine resources

- Impact of UT activities on water and marine resources
- Actions taken to prevent or mitigate negative impacts and to protect water and marine resources
- Whether, how and to what extent UT contributes to Green Deal's ambitions for fresh air, clean water, a healthy soil and biodiversity

[11] https://www.efrag.org/Activities/2105191406363055/Sustainability-reporting-standards-interim-draft
[12] CO_{2eq} emissions are emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PCFs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3)

ESRS E4: Biodiversity & Ecosystems

- Impact of UT activities on biodiversity
- Actions taken to prevent, mitigate or remediate actual or potential adverse impact and to protect and restore biodiversity and ecosystems
- Plans and capacity to adapt operations to preserve and restore biodiversity

ESRS E5: Resource use & Circular economy

- Impact of UT activities on the depletion of non-renewable resources and the regeneration of renewable resources
- Plans and capacity to adapt operations in line with circular economy principles including the elimination of waste, the circulation of products and materials at their highest value, and the nature's regeneration

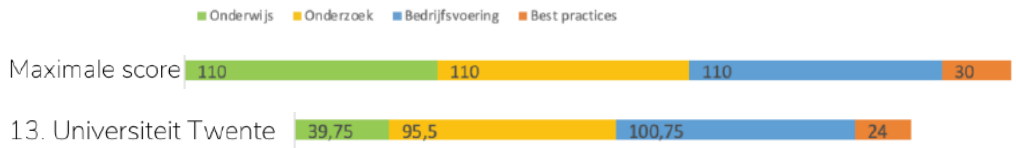
1.3.2 SustainaBul

The SustainaBul[13] is Dutch sustainability ranking involving 33 institutes for higher education. It is organised by the organisation Studenten voor Morgen[14] in order to stimulate sustainable development in higher education institutes. Studenten voor Morgen strives to integrate sustainability in higher education and student life to realise systemic change for current and future generations. By doing this they contribute to SDG 4 Quality Education, SDG 13 Climate Action and SDG17 Partnerships for the goals.

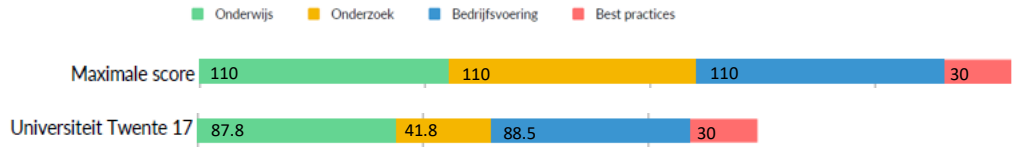
Since 2020, UT participates in this ranking where independent rankers assess the available information in the first round. In the second round the institutes themselves can contribute additional information. Green Hub has been collating this information since 2021. In 2020 SEE Programme collected the information across UT.

Figure 3. SustainaBul certificate UT 2023

2022 - 260/360



2023- 248/360



[13] https://ho.sustainabul.com/
[14] https://www.studentenvoormorgen.nl/

The overall performance of UT on the SustainaBul ranking is all right. It is surprising that a lot of initiatives are not yet brought together sufficiently centrally or not put in the limelight adequately in order for rankers and the Green Hub to find and collate this.

The Green Hub analysis of the UT's performance of 2022 brought forward recommendations which are still valid when assessing the 2023 performance: "Key areas UT misses out on are the absence of clear strategic policies and plans for various areas in research as a whole, but also in certain areas of its operations". The rankers also could not find concrete information to back up claims made by the UT in its planning documentation and communications.

The main conclusion is: It is imperative for UT to better coordinate and disclose its sustainability and climate education and research efforts.

The reason for a lower score on operations is down to them seeing no concrete policy or strategic action plan that in some cases was promised in previous years (the rankers do reference previous years' submissions). UT needs to work on:

- A clear goal on energy (SustainaBul focusses on becoming self-sufficient. UT's focus could be becoming gas-free)
- More collaboration with stakeholders and involving students in the process of reducing energy
- Clear information on the number of vegetarian and vegan options available and the need for a clear strategy on catering also including food waste and other waste streams
- A clear strategy on biodiversity
- A policy document on procurement regulations (algemeen inkoopvoorwaarden does not mention sustainability criteria)
- A long-term vision or implementation plan on sustainability in finance

Overall, the performance of the ranking can be improved by a collaborative approach by for example Strategy & Policy, Climate Centre and Green Hub on making the available information visible to the rankers.

For more information, the analysis of the SustainaBul performance can be requested from the Green Hub.

1.4 SEE Annual Plan 2023 overview

A sustainable organisation has low CO_2 emissions, a minimal use of raw materials to reduce the UT's impact on the depletion of natural resources and deforestation combined with a focus on reuse and recycling resources. It also minimises pollution and strengthens biodiversity. Reducing CO_2 emissions, becoming circular and minimising pollution as well as strengthening biodiversity are interrelated: these influence one another and are connected. Becoming a circular organisation thus also means keeping in mind that we cannot make progress on one and ignore the other challenges. This interrelationship is always considered even though priorities and boundary setting had to be made based on available staff time as can be seen in the 2023 annual plan visualisation below. The goals primary aim is to contribute towards reaching the goals agreed to in the Sustainability Policy for operational management in May 2020.

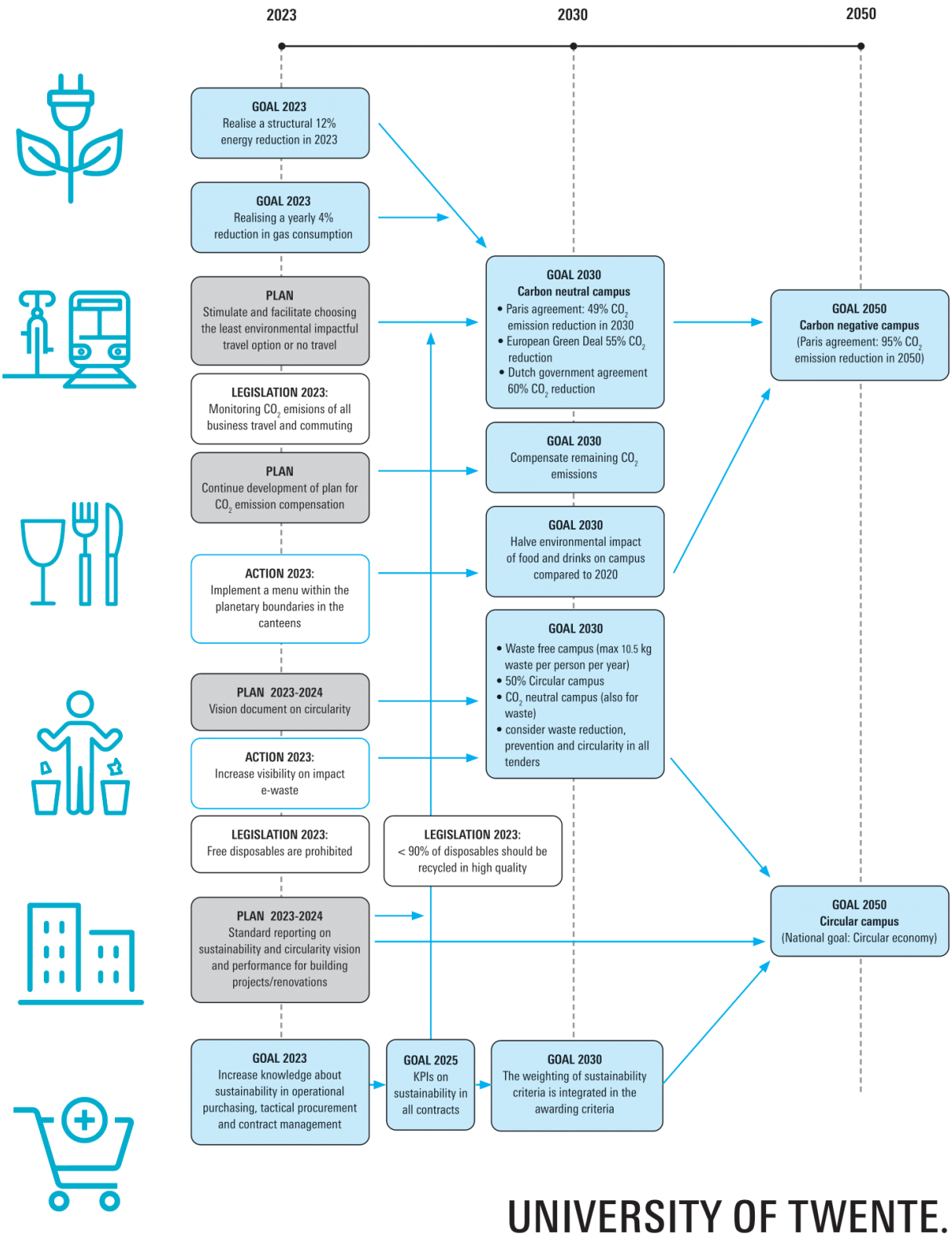


Figure 4. Overview SEE Annual Plan 2023

Besides these priorities, also all other themes (events, water, biodiversity, labs as well as communication and reporting) UT works to reduce CO_2 emissions. Facilitating the new legislation on disposables at events, raising awareness on water consumption, compliance with new legislation for energy reporting, provide waste separation for lab waste streams and awareness raising on biodiversity on campus were sub-goals for 2023.

2. Updates Sustainability

The ten themes of the Sustainability Policy for operational management are: energy, water, waste, food & drinks, travel & mobility, biodiversity, procurement & purchasing, buildings, events, finances. In 2023, the priority themes were mobility and energy. These themes are complemented by updates on data and communication, considering the importance of reporting and communication in raising awareness and reporting progress. Also, the topic of Sustainable Laboratories has taken great steps forward of which updates will be shared.

The progress is a result of collaboration of SEE with colleagues from faculties, service departments as well as the Green Hub (Operations & Consulting Portfolio student officers). The projects resulting from these collaborations are integrated in the updates of the various themes.

In the following subchapters a concise summary of the progress made towards becoming a sustainable organisation is provided. In the annexes the full details are shared. This division was done to make it easier for the reader to obtain the main points quickly and where desired to read more in the annexes.

Technical measures as well as the needed behavioural changes are interlinked. In some situations, the technical measures have been implemented and need to be complemented by using the installations in a different way (change of behaviour) to make energy savings. Other times behavioural changes need to be acceptable before technical adjustments can be made. Also depending on how much sustainability is prioritised within a project (depending on the importance the team attributes to it or whether managers/clients consider it a precondition) will depend on how ambitious sustainability criteria are framed (for example in a tender), or how much budget is made available. Behavioural and technical measures are very much interlinked and influence one another.

In project teams discussions on complex issues need to take place: Assessing the various aspects of sustainability are complex and sometimes conflicting: energy needs of a product during production and during the use phase, water consumption, impact on biodiversity, impact of chosen materials on the environment (pollution, depletion) as well as impact on human rights. Discussing this will help UT to *ensure sustainability is a precondition for everything we do.*

2.1 Summary progress on the set goals

Table 1 shows a summary of the progress made in 2023 towards the set goals for 2030 and 2050.

Table 1 Summary of progress towards the set goals

Subject	Goal	Progress	Chapter
Paris Agreement max 1.5 C (all themes)	55% CO_{2eq} reduction in 2030 (vs 2019)	The total CO_2 footprint of 2023 was 8kt CO_2. This is 70% less than the CO_2 footprint in 2019 (26kt CO_2). The total energy consumption was reduced by 2.8% compared to 2019 with an increase in electricity and district heating of 1.9% and 12.6% resp. compared to 2019. Compared to 2022 the total 2023 energy consumption has gone down by 9% (electricity by 7%, district heating by 6% and gas by 22.6%).	3.1.1 and 3.12
(energy)	4% annual gas reduction	Compared to 2019 gas consumption has been reduced by 45%. This is not an actual reduction of energy consumption as many buildings have been transferred to district heating. In 2022 ITC hotel was disconnected from the gas, in 2023 ITC moved from a building heated by gas to one heated by district heating.	3.1.1 Table 3
	12% energy reduction in 2023 (vs 2022)	Looking at all energy sources converted to Terra Joule, the total reduction in energy is 9%. For electricity, this reduction is 7%.	3.1.1 Table 6

Subject	Goal	Progress	Chapter
(energy/mobility)	Carbon neutral campus in 2030 (compensate remaining CO_2eq emissions)	The SEE steering group gave their approval received to develop CO_2 pricing scheme in 2024.	3.2.8
(buildings)	Strengthen reporting on sustainability and circularity for building projects/renovations	The annual re-evaluation of the roadmap towards CO_2 neutral real estate provides the information on sustainability for buildings. Applied circularity measures are not yet structurally recorded.	3.4.2
(procurement)	CO2 footprint reporting obligation in all contracts	The analysis on which companies do or do not report on their CO_2 footprint while it is a requirement in their contract is not yet available.	3.5
	Increase knowledge on sustainability in procurement teams	Workshops held followed by team projects to strengthen sustainability in daily work procurement department.	3.5
(mobility)	Stimulate choosing least environmental impactful travel option (or no travel)	Train Map launched in 2023.	3.2.1
(food&drinks)	Halve impact food and drinks on campus in 2030 (vs 2019)	CO_2 emissions reduced by 42% compared to 2019. Ingredients changed for top 5 selling meals in canteen to reduce impact; 60% of work lunches vegetarian.	3.7
		Efforts to have more vegan & vegetarian offer in canteens have been made but this is not yet a structural change.	3.7

Materials: we reduce the amount of materials we need and improve re-use through recycling

Subject	Goal	Progress	Chapter
Circularity (food&drinks)	Phase out disposables	Cups have been removed from all warm drink machines	0
(events)		The events Bata and Kick-In have worked with a cup coin	3.8
(waste)	Increase visibility on impact e-waste	Monitoring devices purchased and re-used in e-waste regulations	3.3.1
(waste)	Vision document on circularity	Two workshops held in collaboration with Circular Economy Platform Twente	0

Biodiversity: we support and strengthen the biodiversity on our campus

Subject	Goal	Progress	Chapter
(Biodiversity)	Improve biodiversity	Biodiversity plan	3.9

Environment:

Subject	Goal	Progress	Chapter
Environment	Minimise pollution to air, water and soil	Quarterly reporting on water pollution	5.1.3

Table 2, the summary table, shows the progress on CO_2 emission reduction across all ten themes. The aim is to reduce scope 1 and 2, but to increase scope 3 as there is not yet a complete overview of the impact of UT's activities. The CO_2 emissions of scope 3 are strongly influenced by the amount and quality of data provided by the suppliers.

Table 2. Changes in CO_2 emissions for the themes food, water, waste, travel, and energy between 2023, 2022 and 2019

Theme	**CO_2 emissions 2019 (tonnes CO_2 eq)**	**CO_2 emissions 2022 (tonnes CO_2 eq)**	**CO_2 emissions 2023 (tonnes CO_2 eq)**	**Increase (+) Decrease (-) 2023 vs 2019**
Energy total	16,482	1,896	1,526	-91%
Scope 1 (natural gas + petrol/diesel)	1,761	1,408[15]	1,056	-40%
Scope 2 (electricity + district heating)	14,721	488	470	-97%
Mobility total	9,067	4,510	5,277	-42%
Business travel	3,938	2,467	3,212	-18%
Commuting	4,999	2,043	2,065	-59%
Waste	631	1,112	948	50%
Buildings	No data	81.1*	95	17% vs 2022
Procurement°	797	2,103	1,646	107%
Water	150[16] 40[17]	38	39	-3%
Food	340.6	382.3	199	-42%
Events	No data	No data	No data	-
Biodiversity	61.4	-158.2[18]	-135	-316%
Finances	No data	No data	No data	-

* Building waste only

° Scope 3 where mobility, waste, water, food and biodiversity values have been deducted.

Using fossil fuel resources releases CO_2 as well as other greenhouse gas emissions into their air when burned. Therefore we use the term CO_2equivalent. Also particulate matter, sulphur, nitrogen are emitted when burning fossil fuels. These do not contribute to global warming but have a negative impact locally as they cause air pollution (especially fine particulate matter) affecting millions of people with lung issues, and exacerbate the nitrogen problem.

2.2 Conclusions

Energy:

There still is a lot of potential to reduce the energy consumption of UT. For example, measures to reduce energy consumption by closing labs at night (thus preventing the waste of energy for conditioned air) are being discussed. Compared to 2019 electricity consumption in 2023 has gone up by 1.7% (total energy has been reduced by 3.4%). It has been decided not to purely offset the CO_2 emissions from fossil energy sources by external CO_2 compensation schemes. A CO_2 pricing scheme will be developed for that, to be able to continue to work towards our goal of becoming carbon neutral. Without pricing carbon and allocating that budget to make the organisation more sustainable or for CO_2 capturing projects, this goal would be outside our reach.

Mobility:

The occupancy of the offices in the buildings on average is quite low, presumably due to people working from home. A correction factor has been applied to the data collected in the 2022 mobility survey held for staff and students to account for this. The HR department will start collecting annual data on commuting as part of the reporting obligation for work-bound staff mobility starting on 1 July 2024. This data will then be used to update the 2022 mobility survey data. The CO_2 footprint of

[15] In the Annual Report 2022 the compensated CO_2 emissions were subtracted resulting in a scope 2 of 72 tonnes CO_2. In this table these have been included to provide a complete overview of emissions caused by the university's activities. Energy total including compensation was 634.

[16] Calculated using a different methodology. Until 2019 a campus specific study from 2010 was used with an CO_2 emission factor of 1.5 km CO_2/m3. From 2020 onwards Vitens calculates their CO_2 footprint and provides those data to UT. The CO2 emission factor they use is 0.397 kg CO_2/m3 in 2020 and 0.380 kg CO_2/m3 in 2022.

[17] CO_2 emissions recalculated using CO_2 emission factor Vitens from 2020 to enable a comparison between 2019 and 2022.

[18] Due to composting and fermentation of green materials on campus the CO_2 captured there can be deducted from CO_2 emissions resulting from machinery use and transport movements for green maintenance.

business travel has increased. The number of flights increased by 51% compared to 2019 (and +13% vs 2022), while the CO_2 emissions decreased by 21% compared to 2019 (+19% compared to 2022). In 2022 the travel habits may still have been influenced by COVID (restrictions in countries). Some faculties decreased their impact, while others increased their CO_2 emissions from flying.

Waste:
Overall, the amount of waste has reduced by 17% compared to 2019, residual waste by 21%. Inventories and clean outs due to the change to a new software programme for the registration of chemicals most likely led to the increase in hazardous waste. Plastic waste has decreased, probably because the metal tins and plastic bottles now have a deposit scheme and are thus returned to stores/restaurants. A new waste stream for hard plastic (from labs) prevented 3,650 kg of hard plastic from being incinerated, instead this can now be recycled.

Buildings:
The roadmap towards CO_2 neutral real estate is being implemented. This is complemented by the cancellation of new building projects where the focus will now lie on renovating existing real estate by also improving insulation and disconnecting from natural gas. It is not easy to quantify this but not adding new floor surface has a positive influence on UT's CO_2 emissions as these extra square meters do not have to be heated, cooled thus avoiding additional energy consumption. In contrast, procurement found that in renovation projects sustainability aspects are often not specified yet.

Procurement:
The procurement department have focused on sustainability, and this resulted in an increase in data. More data from scope 3 may mean the CO_2 footprint will increase due to better data. This is a good thing even if it looks like UT is not reducing the overall CO_2 emissions. As we rely on data from our suppliers and for them obtaining data along their value chain, especially when these are very long, is complex. It shows we have been underrepresenting our impact from scope 3, at activities we do not have control over.

Water:
Water consumption has gone up by 11% compared to 2019 (10% vs 2022). UT has been filtering water using the WaterMiracle in the Water Lab. That had an impact on the total usage of 4.3%.

Food:
Between 2019 and 2022 the calculation method for the CO_2 footprint was changed by the caterer. Previously a generic CO_2 emission factor for the average Dutch lunch or dinner was used, while in 2022 the CO_2 calculation became more detailed. The number of vegetarian or vegan lunches ordered in 2023 compared to 2019 has increased. The collaboration with Green Dish to train staff and focus on developing a menu which remains within the planetary boundaries has been a major contributor in the reduction of CO_2 emissions from the top 5 meals.

Drinks:
Four warm drinks machines were supplied with oat milk instead of cow's milk. Expanding the pilot to half of the machines is currently not considered feasible as this would cost too much. Oat milk is 6 cents more expensive which would result in about €26.000 extra costs a year. Since we cannot increase the prices, a separate budget needs to be found. Additionally, it currently takes a lot of time to invoice the oat milk consumptions to the different faculties. Expanding the number of oat milk machines would also mean this method is changed or sufficient staff time is available. During the oat milk pilot, a survey was held that 202 persons filled out. In general, the oat milk products were received very well.

Events:
At Bata and Kick-In rPET cups were collected separately, to enable recycling and avoid incineration. SEE sustainable event initiatives fund has been received by the UT-triathlon organizers for a water bubbles pilot. The pilot was successful and will be followed up in 2024. Since July 2023, reusable cups are the norm at UT, rPET cups can only be used if reusables are not yet possible.
Five Green Certificates have been awarded (4x silver, 1x gold): Open Days (Silver), TEDx UTwente 2022 (Silver), Batavierenrace (Silver), Batavierenrace Barbecue (Organized by Ockham) (Gold), Week of Inspiration (Silver). The SU sustainability fund has been used for more sustainable clothing, catering alternatives and promotional materials.

Biodiversity:
The main numbers we can use for biodiversity are the emissions reported on by the contractor for the maintenance of our green spaces. Also the initial results for the Species Management Plan are in: The number of breeding birds increased to 56 species.

Finance:
There is no accounting of the impact of UT's financial processes conducted yet. The impact of the bank is requested for the CO_2 footprint analysis. The impact of insurances and other financial processes is not yet collected.

Sustainable labs:
Behavioural change by lab personnel to work in a more sustainable manner remains challenging. Pro-active effort by lab users is rare, even when enrolled in a program such as LEAF. Guidance by a dedicated Sustainable Lab Coordinator helps in speeding bottom-up approaches along. The creation of a network of Green Stewards in every research group by the Faculty Green Hub will help communicating bottom-up projects throughout the buildings. Next to this, the Sustainable Lab Coordinator has been in the lead of projects that will generate substantial savings through smarter ventilation of the lab spaces (the "Energy Saver Protocol, ESP). In Meander, the final technical requirements are being drawn up. In Carré, the inhabitants have agreed to collaborate on a similar "smart ventilation protocol." Substantial savings have been made by creating awareness on closing fume hoods when not in use, preserving an estimated air volume equivalent to €25.000, -. No separate CO_2 data is presented here as waste and energy data is included in those sections.

Data:
Reporting was conducted every 6 months resulting in an internal half yearly report and a public annual report. Several buildings were added to the energydata.utwente.nl facilitating insight into current and past energy consumption and generation.

Communication:
A lot of news articles were published. The more eye-catching communication products were the travelling sustainability exhibition and the route guiding people along a sustainability walk across campus where signs explain which sustainability measure can be seen.

2.3 What does UT do well

- Transparent monitoring via https://energydata.utwente.nl/and reporting
- The number of (supporting) staff actively engaged with sustainability is growing
- Compared to 2022 electricity consumption has been reduced by 7%. In total energy consumption is reduced by 9% compared to 2022.
- Publicity (Train Map) resulted in many discussions on how to travel and whether to travel
- Waste is separated in many different streams, new streams for lab waste have been added. The total amount of waste as well as the amount of residual waste has gone down by resp. 17% and 21% vs 2019.
- The roadmap to work towards CO_2 neutral real estate is integrated with the LTSH programme
- Sustainability criteria are incorporated in tender processes
- Filtering rain and pond water has saved at least 5000m^3 of drinking water (4.5% of total water consumption).
- The removal of disposable cups from coffee machines went smoothly (after 30 years of discussion)
- The default vegetarian work lunch nudge had led to 60% of lunches being ordered vegetarian.
- Large UT events piloted the use of a return system for disposable cups.
- In the maintenance of green areas biodiversity is an important factor, more flower bulbs and wild flowers as well as extensive maintenance of grassy areas.
- Sustainable Lab Coordinator position enables targeted lab sustainability improvements
- Substantial progress has been made on energy saving in labs (night setting/sash alarm) and will continue in 2024
- The sustainability exhibition and the signage for the sustainability walk greatly contribute to making the UT community aware of what is being done to make UT operations sustainable.

2.4 What UT could do better

Due to high **energy** prices, energy saving was on everyone's agenda. Now that prices are still high but less so, attention on reducing our energy consumption is waning. We need to ensure rapid steps continue to be taken. Where decision making is slow, attention needs to be paid to resolve the issues delaying decision making. Substantial impact changes are needed, e.g. alternatives for natural **gas** consumption, smart building settings to enable day/night settings avoiding energy wastage. The progress is slow.

The absolute amount of **CO_2 emissions** that enter the atmosphere need to be brought down to zero. As western countries have contributed more to the emissions that led to global warming, we should also take the responsibility to reduce the emissions to zero as soon as we can. Also, the Dutch energy mix is not yet 100% renewable (in 2022 15% was renewable[19]).

UT can become a frontrunner in for example our ambition in becoming gas-free and setting ourselves a CO_2 price, so decisions are taken based on the true price taking into account the negative environmental impact of a decision or activity.

No clear goal has been set yet on how much to reduce the UT's CO_2 emissions overall and to accept CO_2 pricing for the remainder. SEE lobbies to set clear goals which are incorporated in everyone's decision-making.

The updated 2022 **mobility** survey provided more accurate, up-to-date data resulting in a massive reduction in emissions of **commuting** of students and staff. Clear HR regulations to stimulate sustainable travelling behaviour will be needed to reduce the CO_2 emissions from commuting. So far, UT has nudged gently (promotion on cycle to workday) alongside optional model (fiscal) benefits when buying a bike. Other educational institutes, for example Saxion[20], have a mobility policy focussed on reducing greenhouse gas emissions.
Based on postal code analysis from 2019, there still is potential to reduce commuting by car. Combining measures which stimulate more sustainable commuting options (e.g. differentiated kilometre allowance or multimodal mobility: the option to receive compensation when using different travel options during the week) with pedestrian and cyclist-friendly design of public space can contribute to lowering our CO_2 footprint from commuting.
A good example of clear enforced regulations was the removal of disposable cups in 2023 (clear rule, clear approach). This went smoothly considering the anticipation many people had beforehand which had delayed this change for decades. The reporting obligation (from 1-7-2024) will ultimately lead to enforcement of measures when voluntary reduction is not reached. Let us not wait for additional legislation. Differentiated kilometre allowance or multimodal mobility are already implemented by other organisations. UT can still join these frontrunners and facilitate sustainable travel for more employees. The most important aspect is to ensure the various departments involved with aspects of mobility (HR, CFM, LTSH, etc.) align their plans and collaborate.

Business travel is hard to regulate. Every faculty has their own rules for when someone can travel. During the process of developing a CO_2 pricing scheme, these criteria will need to be shared. Only when it is clear when faculties and service departments approve travel, is it possible to discuss how to try to reduce the impact of travel. At the same time, the maximum possibility for reducing travel will have to be discussed, considering travel also benefits collaboration (for funding (proposals)) next to knowledge sharing.

Waste, waste separation and decreasing the amount of waste can both be improved. In order to reach the targets of max 10.5kg residual waste and 2kg PD waste per person per year, UT should make big steps in the upcoming years. Waste separation both indoors as well as outdoors need to be improved. Initial steps have been taken and plans for 2024 have been prepared.

The number of electronic appliances such as laptops and mobile phones that are returned to be disposed of as **e-waste** when a new appliance is ordered is (just) 30%. It is important for staff to return their devices in order for the precious materials in it to be recycled. Steps need to be taken for this percentage to go up, for example the obligation within one month of purchase to hand in your previous device.

In **building** renovation and maintenance projects sustainability is often included, but when unforeseen circumstances arise or when there is a rush, sustainability is still seen as a criteria that can more easily be omitted. For example if a team compromises on smart building installations, this will result in a worse Total Cost of Ownership. Initial costs may be lower for finishing the renovation but during the use phase of the building it will not be possible to facilitate day/night settings. The

[19] https://www.pbl.nl/sites/default/files/downloads/pbl-2023-klimaat-en-energieverkenning-2023-5243.pdf
[20] https://www.saxion.nl/over-saxion/visie/duurzaamheid/themas/duurzaamheid-thema-mobiliteit

energy consumption will then be high for the entire lifetime of the installations[21] resulting in a higher total cost of having this building in use. Financially it is wiser to consider TCO instead of separating costs in initial costs and running costs.

Return on investment is set to 7 years. With high energy prices and an ambitious climate goal, return on investment of more than 7 years also make sense when buildings last 30 years and installations have a lifespan of 15 years. Initial investments in order to save money during the lifespan of a building or installation are needed (assessing Total Cost of Ownership instead of only looking at initial investment costs) and sometimes forms a hurdle. As the ultimate goal is to save CO_2 and energy, setting the right priorities will allow this hurdle to be overcome.

As the budget for real estate is not sufficient to execute the roadmap to CO_2 neutral real estate, lobbying with the national government is needed to get funds allocated to help educational institutes.

The success of the mission of the **Procurement "**we help you to purchase sustainably" relies on the cooperation of the internal customers. Support at the management level of all faculties and departments to ensure sustainability criteria are taken into consideration will be of great help. Any person purchasing something can help by buying the more sustainable service or product.

The **water** consumption has increased by 11% in 2023 compared to 2019 (10% compared to 2022) while the Dutch government is requesting of large-scale users to reduce its consumption by 20% in 2035. A lot of steps on reducing consumption and reusing rainwater need to be taken. Plans for using rainwater as a source for demineralised water and closing the 2nd basement for water storage, adding another 1000m^3 of storage volume, as well as prohibiting the use of drinking water for cooling equipment - as the cool circle is available for this - are good first steps but a lot more is needed. Clear annual reduction targets needs to be set. Twente has a drinking water shortage resulting in businesses being refused a connection. Reducing our water footprint needs more priority.

The contract with the current caterer runs until 2028. During the course of the contract no substantial changes can be demanded of the caterer. Collaborations with external partners such as Green Dish are possible to stimulate change towards a more sustainable canteen. Until the next contract most changes on **food** will be based on nudging the customers towards choosing sustainable options in order for the caterer to get more demand for vegan and vegetarian options. Still 40% of work lunches are actively requested to be meat based (**default** is a **vegetarian lunch)** shows a clear rule is needed. When UT makes vegetarian the norm and will not reimburse order that contain meat, arrangements need to be made with other lunch providers such as the UPark hotel to avoid the regulation being avoided by going to order lunch elsewhere.

In a future contract for warm **drinks** machines, the requirement for 50% plant-based milk need to be included to avoid financial hassle when implementing a sustainable change, which is received well but for which it is not possible to change the pricing scheme for drinks.

The network meeting with all (student) event committee groups organising **events** sharing -their experiences with-sustainability measures applied needed to brought back to life at the end of 2023. This network will benefit from growing with the project groups organising the Open Days and the opening of the Academic Year to ensure basic measures are applied UT-wide. During some UT events (for example Open Days, Closing academic year, Tech Med event), the default vegetarian advice was not followed resulting in complaints and disbelieve whether UT is really supporting its own ambition to reduce the impact of its activities. For the Closing academic year event, **complaints** were received about the amount of waste. This shows intentions need to be put into practice better. More interaction between organising committees exchanging tips would be a first step to facilitate.

Our beautiful, green campus is full of life. We need to make the information about how green maintenance benefits the flora and fauna available. Making the information and hopefully also data available will increase awareness and involvement with **biodiversity** on campus.

Concerning the **financial** processes we aim to include the bank, insurances and other financial services into the CO_2 footprint. UT can emphasize the importance of sustainability to UT to these service suppliers and ask for when they will stop investing in the fossil industry.

After the recruitment of the **Sustainable Labs** coordinator in 2023, changes have been made regarding waste separation and energy savings. For these changes to be effective across UT, a Sustainable Labs coordinator for each of the faculties with a large number of labs (EEMCS, ET and S&T) would enable structural steps to be taken relatively quickly and to

[21] 15 years of depreciation period for installations, 30 years for buildings

become well embedded. Furthermore, initiatives that mostly reduce carbon footprint but not reduce cost are in danger of being neglected. It is important for the green image of the university it is important to not forget about these initiatives.

The SEE programme team can do more analysis on available **data** and set firmer priorities for 2024. Good data analysis shows where progress is made. Which priorities to focus on depends on where most impact can be made. Analyses help in prioritising what goals to pursue towards a sustainable organisation. The available staff capacity is a limiting factor. Therefore supporting colleagues in integrating sustainability into their daily work remains essential. Ultimately, the coordinating team will then be able to focus more on analysing progress and advising on the priorities.

We are often asked to do more **communication**. It is difficult to get the news articles, reports and activities to the staff and students. There is information overload and pressure for time. SEE aims to use a large and inspiring goal to focus our communications and strengthen the personal communications from our network to their colleagues and (fellow) students.

We all find change difficult. Especially change that asks us to **change behaviour**. But change is needed to better take care of our planet. We can do that by taking care of a small part of our globe, on our campus. We all can take responsibility for that what falls into our sphere of influence.

- As a manager you can ask in annual performance meetings on what the member of staff has done to integrate sustainability in their daily work.
- A manager can take the role as a leader by leading by example.
    - Commuting sustainably to work (cycle or train) and encourage staff to do so as well. Or ask how they travel to work whether they need information on sustainable commuting options which HR can provide.
    - Travel by train within Europe (< 800km)
    - Reduces business travel by attending meetings online
    - Enables recycling e-waste by returning old laptops/phones
    - Wears a sweater so office temperature can be lower
- When an event is planned, decide together on criteria.
    - Events without disposables
    - Plant-based or vegetarian food options (also in UPark and during team building events, Christmas dinner)
    - Choose a location that can be reached by public transport
- When purchases are made, either large or small ensure sustainability aspects are considered.
    - Appliances – check what requirements it has and whether these requirements are available in the space you plan to use the appliance (cooling etc.), whether there is a low wattage alternative
    - Small orders – can orders be grouped reducing transport movements and packaging materials. Can it be ordered in bulk? Is there a more sustainable alternative?
- Do you have another sustainable idea? Please let us know by emailing sustainability@utwente.nl
- All staff can proactively contribute updates on what faculties/departments do on sustainability in operations to make the SEE report on how UT is making its organisation more sustainable more complete. Just email sustainability@utwente.nl.

Often decision making is a lengthy process and ultimately not clear enough which leads to delays in projects. Clearer requirements of what information is required for decision making bodies to take a decision can help project groups do their work more effectively. Concerning sustainability, it is often said UT wants to become a sustainable organisation. At the same time decisions are made or allowed which contradict this. Adjusting ambitions based on actual actions will help communicate a more realistic ambition for staff to strive to.

3. ANNEXES

3.1 Energy

3.1.1 Energy reduction target 2023: -12% energy consumption

UT sustainability policy goals: 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 group coordinating the progress on the 12% energy reduction (see 2.2.1) has put together an overview (see 3.1.5) of what is already done at UT and what can be done to significantly save energy which are a long-lasting measures.

The priority at UT has been saving energy by reducing energy needs.

Examples are the use of sensors and LED lighting, reducing the room temperature to 19C in winter, reducing energy consumption of ports and ethernet as well as the warm drinks machines (see 3.1.6).

Table 3. Energy consumption in 2019, 2022 and 2023 at UT

				Increase (+), Decrease (-)	
UT Energy Consumption	**2019**	2022	**2023**	2023 vs 2019	2023 vs 2022
Electricity [kWh]	22,220,046	24,162,718	22,631,812	1.9%	-6.3%
Electricity per capita [kWh]	1302	1306	1,232	-5.4%	-5.7%
Natural Gas [m3]	907,402	641,149	499,996	-44.9%	-22.0%
Natural gas per capita [m3]	53	35	27	-48.8%	-21.5%
District Heating [GJ]	54,571	65,449	61,462	12.6%	-6.1%
District heating per capita [GJ]	3	4	3	4.6%	-5.4%
PV Generation [kWh]	28,382	210,210	206,774	628.5%	-1.6%
PV generation per capita [kWh]	2	11	11	576.8%	-0.9%

Per capita means it is divided by the number of students and the number of employees (see table 5)

Table 4. CO2 emissions energy sources 2019, 2022 and 2023

				Increase (+), Decrease (-)	
CO_2 emissions (in tonnes CO_2)	**2019**	2022	**2023**	2023 vs 2019	2023 vs 2022
CO_2 emissions of electricity [t]	14439	0*	0*	-100%	
CO_2 emissions of natural gas [t]	1715	1337**	1039	-39 %	-22%
CO_2 emissions of district heating [t]	300	488	470	56%	-4%
Total	16436	1825	1509	-91%	-17%

*green electricity is purchased

** 1042.5 t CO_2 was offset in 2022. To facilitate the comparison in emissions, this is not deducted in this table.

Table 5. Student and employee numbers 2019-2023

Year	2019	2020	2021	2022	2023
Employees	3249	3543	3748	3930	4136
Students	11796	12632	12979	12548	12209
Total number of people	17064	18195	18748	18500	18368

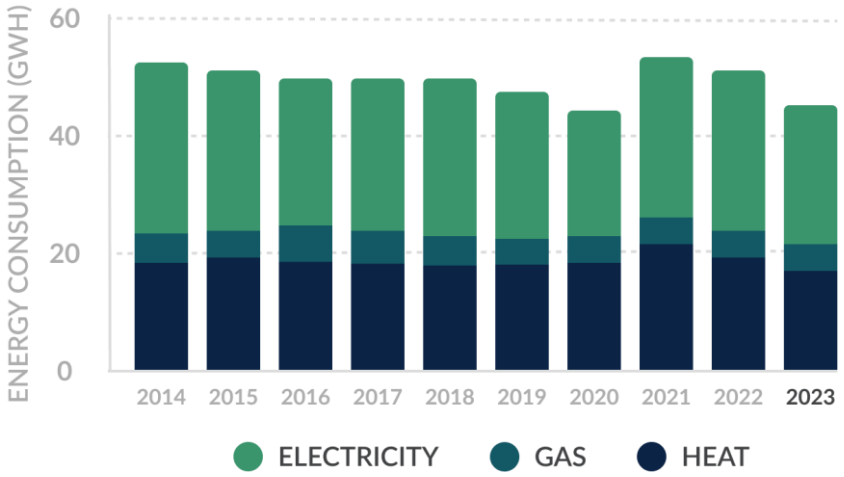


Figure 5. Energy consumption at UT from 2014-2023[22]

Compared to 2019 gas consumption has been reduced by 45%. This is not an actual reduction of total energy needs as many buildings have been transferred to district heating. In 2022 ITC hotel was disconnected from the gas, in 2023 ITC moved from a building heated by gas to one heated by district heating. The last months of 2023 were also very mild, reducing the demand for heating.

It is complicated to draw conclusions when looking at changes in energy consumption while some buildings are sold and others are being renovated. Next year the addition of Cube may increase demand. The situation is not stable therefore you have to be careful to draw firm conclusions based on the numbers provided whether a decrease in energy consumption is a structural reduction or a temporary one.

Table 6. Electricity, gas and district heating converted to GJ for 2019 and 2023

				Increase/decrease in %	
Joules [TJ]	**2019**	2022	**2023**[21]	2023 vs 2019	2023 vs 2022
Electricity	80.0	87.7	81.5	1.9	-7.1
Natural Gas	28.7	20.3	15.7	-45.3	-22.7
District Heating	54.6	65.4	61.5	12.6	-6.0
Total	163.3	173.5	158.7	-2.8	-8.5

Compared to the base year of 2019 the consumption of electricity has gone up by almost 2%. Compared to 2022 electricity consumption has been reduced by 7%. The reduction in gas consumption can be mainly ascribed to the ITC faculty moving from a building heated on gas to one heated by district heating (also the ITC hotel uses district heating instead of gas for heating).

In total energy consumption is reduced by almost 3% compared to 2019 and is reduced by 9% compared to 2022. The target of 12% has not been reached.

Details of what projects are being developed and discussed are listed in chapter 3.1.5.

All energy consumption data can be found at https://energydata.utwente.nl/.

In 2021, the energy usage in the faculties based on Gross Floor Surface used for office and labs was 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. Energy consumption in labs is another focal point and will be elaborated on further in the Sustainable Labs project (chapter 4.3).

[22] 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).

3.1.2 Energy sources

Electricity is procured from Engie, gas from Vattenfall and district heating from Ennatuurlijk. District heating from biomass is almost carbon neutral and currently still considered a sustainable source of energy. From January 2022 UT purchases green electricity through Certificates of origin for Dutch wind. In 2022 CO_2 emissions from gas were offset via Voluntary Emission Reduction (VER) certificates (Gold Standard). In 2023 it was decided not to continue this due to uncertainty of the accuracy of the monitoring methodology. An alternative will be investigated.

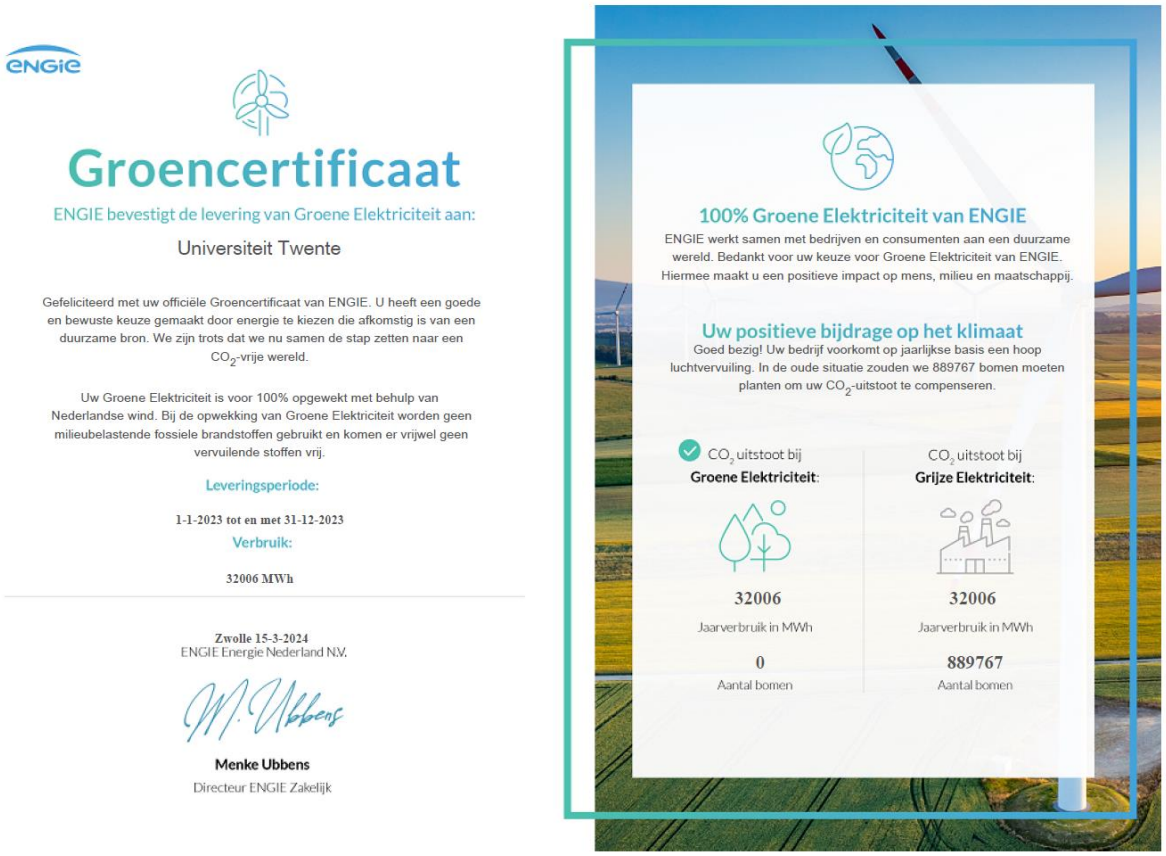


Figure 6. Certificate of Origin for renewable electricity

3.1.3 Solar on campus

Currently, there are 1811 solar panels on campus (incl. 73 on Citadel and 916 on Langezijds). Their electricity production covers around 1% of UT's annual electricity consumption (0.9%) (see 3.1.1, table 3).
The roofs of the Sport Centre, Carré and Nanolab are being inspected for suitability. P4 and Spiegel are possible locations to become solar covered car parks.

Since the goals were formulated in 2019, investigations have been carried out on how much energy can be produced on-site. It is unlikely UT can generate the amount of energy on-site needed to become energy-negative considering its energy consumption pattern and energy generation possibilities.

News article 23-03-2023: University of Twente is adding more solar panels to campus

3.1.4 Roadmap to CO_2 neutral real estate

The Roadmap towards CO_2 neutral real estate has been integrated in the long-term strategy for housing (LTSH) and the multiannual maintenance planning (MJOP) to ensure building work and renovations executed now are meeting the CO_2

minimisation requirements for 2050, provided the measures are technically and financially possible. Details on applied measures from the roadmap in buildings project can be found in chapter buildings 3.4.

The roadmap is reassessed yearly. This resulted in an updated graph showing the CO_2 reduction has slightly improved. Additional steps are needed to reach the 2050 target of reducing emissions by 95%.

3.1.5 Energy in the faculties and other UT buildings

The lighting in the public areas in buildings is 100% during opening hours and is reduced to 30% outside opening hours. Outside lighting is ~90% LED, the last 10% will be changed as well. Outdoor lighting is adjustable: the intensity goes gradually to 100% when it gets dark and is reduced to 20% after midnight. Between 6and 7am the intensity goes back up to 70%. The lighting of outdoor sport facilities automatically turn off at 23:00.

The standard winter temperature in buildings was set to 19°C early 2023. It is not very easy to measure the impact of this. The best approach would be to compare the same periods in 2022 with 2023. 14/11/2022-18/12/2022 and 13/11/2023-17/12/2023 were taken. Weather data from KNMI station Twente was used. The day temperature and/or wind speed are taken into consideration to facilitate the comparison between the 2022 and 2023. Looking at both calculation methods the impact of the lowering of the temperature ranges from - 2.7% to - 7.7%. We cannot state for certain this change is only due to the temperature lowering, but it will have contributed to this. The lower temperature also has an impact on comfort level for staff and students, where infrared panels have been provided to people needing a higher temperature due to medical reasons. If comfort level is broadly affected and people use electric heaters to make the offices warmer, it may need to be considered to change back the settings.

LISA's network management team has reduced energy consumption by 18 MW by reducing the energy consumption of unused ports and using Energy Efficient Ethernet saving 0.08 W per port (see 3.3.1).

All warm drinking machines are now in stand-by mode overnight, realizing a yearly energy reduction of 35kWh per machine (see 3.7).

Energy saving measures that have been discussed are:

- Adjustments to ventilation labs Meander, day and night setting
- Closing fume hoods when not in use / alarm system when left open
- Stickers -turn off when you leave – in locations where sensors are not desirable
- Transition to using electricity to regulate humidity in labs in Zuidhorst, smart building and day/night setting when climate installations are replaced due to end of life
- Humidity level reduction 30% instead of 40% has been considered, decision settled on 40%.
- Inventory Significant Energy Users (lab appliances) Horst
- Climate installations Carré labs (day/night setting)
- External sunshade Carré to keep the sun out
- Heat recovery climate installations Spiegel
- Outdoor lighting sports facility connection to booking system
- Potential UT wide closing hours for buildings to be able to reduce energy needs (ventilation, heating and cooling)

Zuidhorst and Meander optimisation on ventilation (day-night) are high-impact measures.

Other buildings with high energy wastage are Horst, ITC hotel and Pakkerij. For these buildings building specific measures will be discussed.

Horst

An ET/CFM Energy working group has carefully analysed the possibilities to reduce energy consumption within the Horst. Based on this analysis, no large energy savings can be realised due to, e.g. building or installation limitations. That doesn't mean we have not been making and identifying smaller improvements:

- After closing, no activities take place in the Westhorst, and the control technology has already been adjusted accordingly.

- A student-led pilot to counteract cold using moss walls has provided some promising results that ET will further explore in a second pilot.
- Stickers on the fume hoods in labs on their proper usage contribute to a safe and energy-aware mindset in the labs.
- ET continues to raise awareness among users to shut down lab appliances that are not in use. Room-specific suggestions have been gathered and will be further implemented in the second part of the year.
- Unnecessary ventilation with the study association spaces has been removed and the remaining ventilation is now being driven on reservation level, rather than fixed hours.
- The Horst entry uses the revolving doors when outside temperature is below 15 degrees. If larger groups require entry, the ServiceDesk can still open these doors temporarily.

Planned actions:

- Some point extraction units in the Westhorst operate 24/7. ET will be discussing if this can be reduced.
- The use of narrowcasting screens will be adjusted to the formal opening times of the building Horst.
- Meetings have been held for EEMCS and TNW on saving energy by evening/night closure of labs without limiting research/education. A decision will be taken soon.

Student efforts

The **Pakkerij** is a monumental building with four student associations. Electricity consumption of the individual associations and gas and water for the building can be viewed via https://energydata.utwente.nl/. The associations try to reduce their consumption through behavioural change of the members and the use of the bar. Large renovations are not yet included in the LTSH plans. Also more lighting could be changed (to LED) as well as a solution to improve the single glazed windows.

Audentis

- Wooden shutters are opened to let in sunlight avoiding the need for artificial lighting until 17:00. Only on days the bar is open the air conditioning is turned on.

Taste

- Draught strips have been placed on three locations funded by the foundation itself

AEGEE

- Airconditioning is only used when the bars are full
- The ventilation is linked to the opening hours of the bars

ALPHA

- A draught strip has been placed by the emergency exit door
- New fridge-freezer with reduced energy consumption will be purchased next year

Over 2023, **Future Factory**[23] (Capitool 25) housing student teams Solar Boat, Drone Team, Electric Superbike, Green Team, RoboTeam had more than halved their gas consumption by reducing their heating.

Most recently, the Study Association ConcepT initiated significant energy savings by requesting the ventilation to be turned off when not in use at the **bars in the basement** of building **Horst** ('Borrelkelders'). The climate installations for the bars are -outside office hours- linked to the reservation system. Study associations can make reservations via the service desk when they have evening activities.

Article: Demand-driven ventilation creates a win-win situation

[23] https://futurefactorytwente.nl/

3.1.6 Other projects on energy efficiency and data management

Energy efficiency – following the Trias Energetica – remains the mantra within the energy theme: limiting the demand for energy, using sustainably generated energy and looking at energy reduction throughout the chain.

A summary of projects planned and conducted in the first half of 2023 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 2022-2023:

- Investigations into alternatives for air humidification in laboratories through steam.
- Energy optimalisation Linde
- Fraunhofer, Boerderij, Langezijds energy monitoring will be added to Energydata
- Energy metering improvement at the ITC hotel

The following projects have been finalized in 2023:

- Energy optimalisation CV and air installation in Pakkerij
- Energy label and energy advice Holzik, Linde, Pakkerij
- Energy meter Technohal has been added to Energydata

Potential project

- Energy optimization of ventilation by users

Chapter 3.1 shows the contribution of the UT (sustainable energy purchase, solar panels) to the Sustainable Development (SDG) Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all and more specifically:
Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix and
Target 7.3: By 2030, double the global rate of improvement in energy efficiency

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

3.2 Travel and mobility

UT sustainability 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 CO_2 emissions from business travel by 2025 and a CO_2 neutral campus in 2030 (CO_2 negative in 2050). 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%.

Mobility is one of the two focus themes of 2023 due to its high impact on the CO_2 footprint of UT.

We focussed on business travel and especially on encouraging staff to take the most environmental option (the train when travelling within Europe). Secondly, we started the discussion on CO_2 compensation when flights are unavoidable with the aim of determining a target to work towards that faculties support.

3.2.1 Train zone map

In January 2023 , the Train Map[24] was launched[25]. This is a follow-up on the static train map[26] which was presented in June 2022.

The new Train Map, developed in collaboration with LISA's MENDIX team, offers a more complete picture of how a destination is reachable by train.

It divides cities into three categories: those where train travel is the default at UT, those where it's recommended and those where the train is considered a challenging option. The distinction between these categories is based on the distance, travel time and number of transfers as detailed in the text box to the right.

The calculation of the travel time considers travelling from city centre to city centre, departure from flights from Schiphol where travel to Schiphol is done from Enschede by train, check-in and security time is added and effective working time is assessed, for car travel time is given when driving non-stop; the CO_2 emissions are calculated using 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. CO_2 emissions for e-car are based on the electricity mix of the country travelled in. Unfortunately the ecopassenger calculation does not use the latest data on electricity mix of the countries (2013[27]).

Categories

Cities are categorized into three markers, according to the following criteria:

Train is the **default** mode of travel (blue marker):

- Travel distance is 800km maximum
- Travel duration is 8 hours maximum
- 3 train transfers maximum

Train is the **recommended** (green marker)

- Travel time by train is 12 hours maximum
- 4 train transfers maximum

Train is **challenging** (yellow marker)

- Train travel time is more than 12 hours

[24] https://travelcheck.utsp.utwente.nl/
[25] https://www.utwente.nl/en/sustainability/sustainability-news/2023/1/452323/ut-launches-new-train-map-to-encourage-sustainable-travel
[26] https://www.utwente.nl/en/news/2022/6/680877/ut-encourages-train-travel-with-train-zone-map
[27] https://ecopassenger.hafas.de/hafas-res/download/Ecopassenger_Methodology_Data.pdf

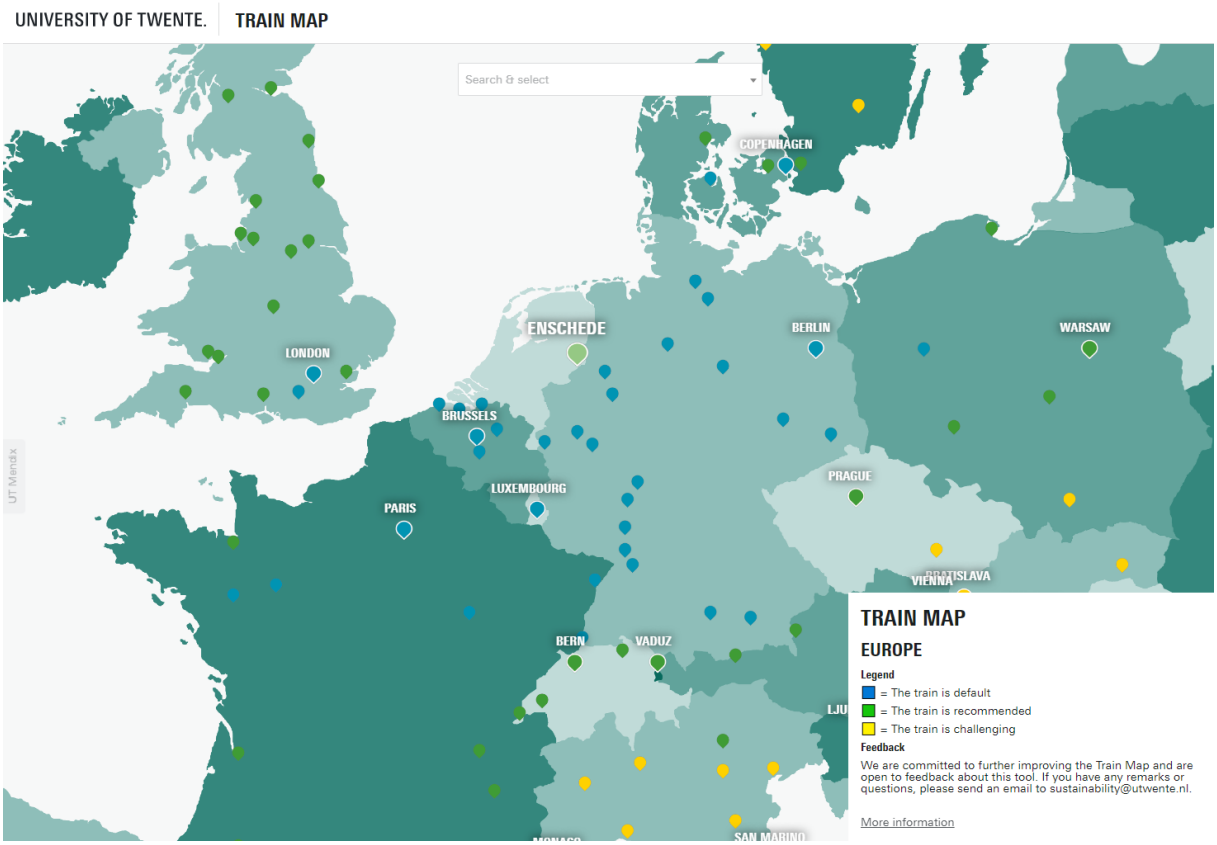


Figure 7. Train Map

When choosing Berlin, the following pop-up appears with the trip advice:

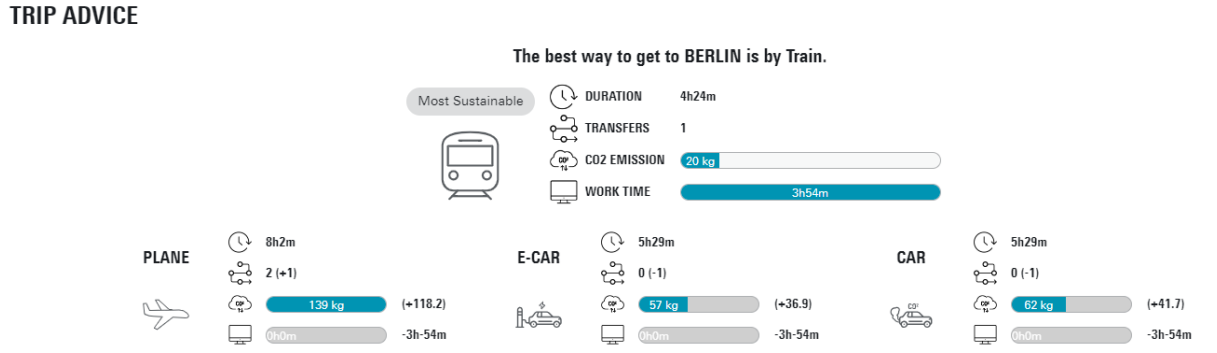


Figure 8. Trip advice from Train Map

The discussion on reducing the impact of travelling has led to this map being referred to a lot on social media, such as LinkedIn. The map is not perfect but it stimulated discussion and makes people think about sustainable alternatives to flying.

The promotion of the Train Map has also been integrated on the Travel Unit[28] webpage, promoted through their newsletters as well as in the AirGo software where the following message appears when booking a trip:

[28] https://www.utwente.nl/en/service-portal/employment-personal-development/terms-of-employment/ut-travel-unit-uttu

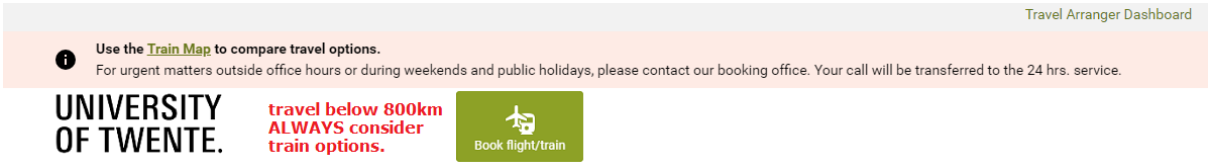


Figure 9. Travel advice in AirGo software

When people send in a Travel Request Form, and UT Travel Unit notices that the travel is within 800km, they always advice to take the train.

The functional management of the Train Map has been transferred to the application administrator of CFM. Unfortunately we cannot monitor how often the map is consulted as there are no cookies placed on sub-domains. However, as with the launch of the first version in 2022, the article about the launch of the new version was the best-read article about sustainability in 2023 (though not by as wide a margin as in 2022, when it was the best-read article on all of utwente.nl).

3.2.2 Flights in 2023

The tables below show the CO_2 emissions, the number of flights and the flight kilometres from all flights taken by UT staff in 2023. The CO_2 emissions are calculated in these three categories as the CO_2 emissions factors[29] use these categories. UT stimulates the use of the train below 800km (table 8).

Table 7. CO_2 emissions from 2023 flights

	CO_2 emissions (tonnes CO_{2eq})			2023 vs 2019	2023 vs 2022
Distance flight	2019	2022	2023		
0-700km	189.6	107.1	127	-33.0%	+18.6%
700-2500	538.5	578.0	590	9.6%	+2.1%
2500+	2949.7	1768.2	2,195	-25.6%	+24.1%
Total	3677.8	2453.3	2,912	-20.8%	+18.7%

Table 8. Flight data 2023

	Flights			2023 vs 2019	2023 vs 2022
Distance flight	2019[30]	2022	2023		
0-700km	805	936	1136	+41%	+21%
700-2500	1543	2481	2640	+71%	+6%
2500+	1433	1608	1919	+34%	+19%
Total	3781	5025	5695	+51%	+13%

Table 9. Flight kilometres UT business travel by employees

	Flight kilometres			2023 vs 2019	2023 vs 2022
Distance flight	2019	2022	2023		
0-700km	638,238	457,763	541,320	-15%	+18%
700-2500	2,692,438	3,360,473	3,432,933	28%	+2%
2500+	20,066,237	11,262,166	13,981,618	-30%	+24%
Total	23,396,913	15,080,401	17,955,871	-23%	+19%

[29] https://www.co2emissiefactoren.nl/lijst-emissiefactoren/
[30] In 2019 this was only recorded as number of bookings. For a booking it is unknown if it contains a single trip, a return flight or how many segments the trip consist of.

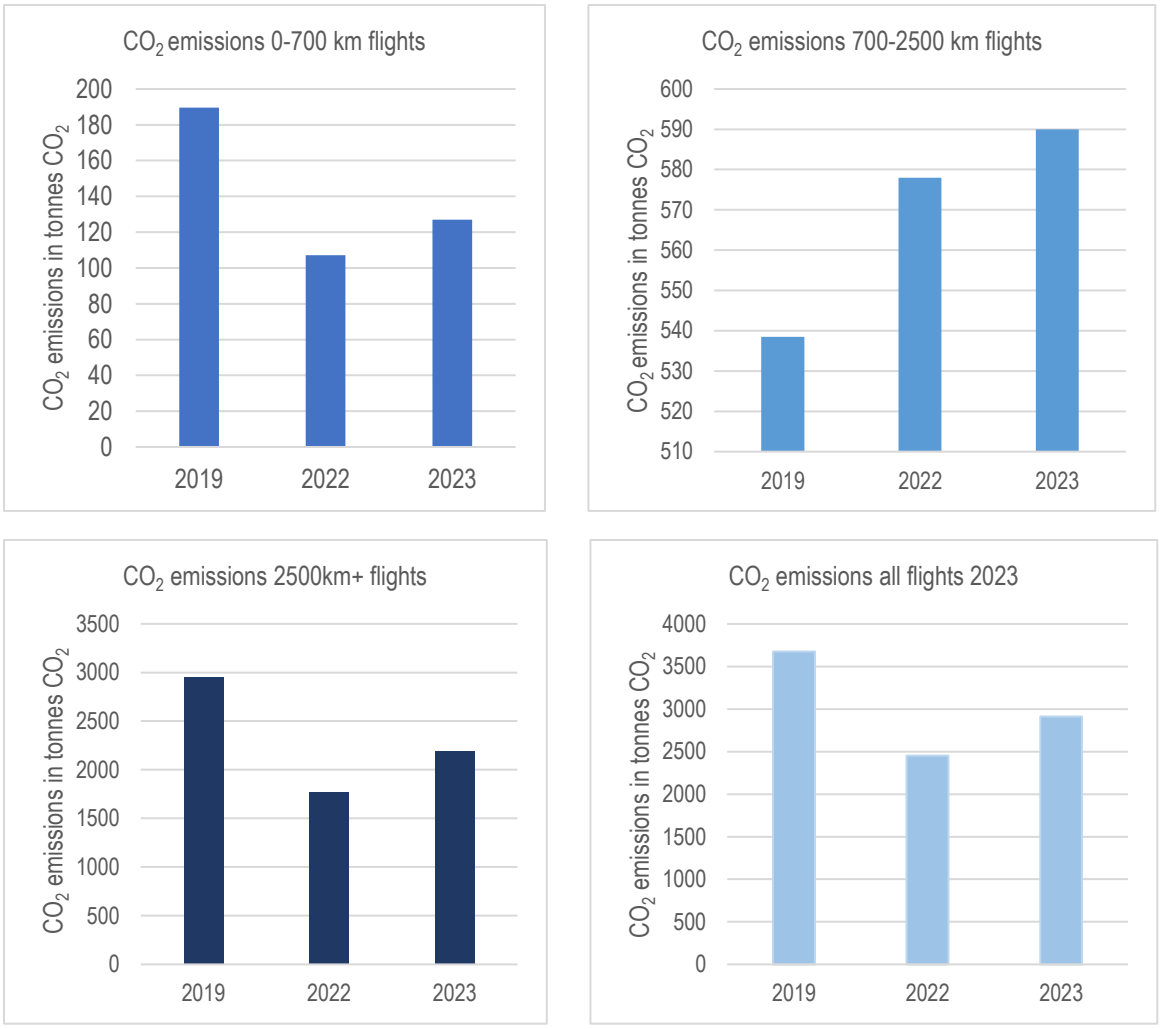


Figure 10. CO_2 impact of flights over the years 2019-2022-2023

Table 10. Emission factors 2019 and 2022

Flight distance	CO_2 Emissiefactoren.nl 2019 (kg/km)	CO_2 Emissiefactoren.nl 2022 +2023 kg/km)
Short 0-700	0.297	0.234
Mid range 700-2500	0.200	0.172
Long intercontinental 2500+	0.147	0.157

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

The data provided by the travel agent show that 1136 flights were taken with a distance below 700km. 26% of all these short flights were taken from Amsterdam. 28% of flights were short distance flights to Amsterdam. It is unknown if these flights were the first section of a longer journey, making it a difficult trip to avoid.

Using an alternative for these short distance flight would have saved around 127 tonnes of CO_2 emissions

The CO_2 emissions of flights have decreased by 20.8% (compared to the baseline year of 2019). Compared to 2022 an increase in CO_2 emissions is observed: 18.6% increase in short flights, 2% increase in mid range flights and 24% increase in long distance flights.

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.

Flight data categorized per faculty is shown in chapter 3.2.3.

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 CO_2 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. CO_2 compensation has not been deducted from the total in this table. That is only done in the CO_2 footprint reporting.

3.2.3 Impact of business travel 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 CO_2 footprint of UT business travel. This is a best estimate. There are also flights which are purchased elsewhere, for example when externals reimburse the trip. These emissions are unfortunately not known and cannot be taken into account here.

Table 11. Tonnes CO_2 a faculty contributes to the CO2 emissions per category (2023)

	Flight distance	ET	TNW	BMS	EEMCS	ITC	Supporting departments	Total UT
2019		CO_2 emissions (tonnes CO_2)						
	0-700	26.2	45.5	35.7	33.6	29.7	7.0	189.6
	700-2500	72.8	96.1	115.1	103.8	75.2	35.2	538.5
	2500+	320.2	555.3	427.2	479.3	967.1	62.0	2949.7
	Total	419.2	696.9	578.0	616.8	1072.0	104.3	3677.8
2023		CO_2 emissions (tonnes CO_2)						
	0-700	19.4	27.7	17.9	31.1	14.4	16.1	126.6
	700-2500	74.5	127.4	112.6	160.0	57.6	58.4	590.5
	2500+	239.6	580.4	307.9	560.8	398.4	108.1	2195.2
	Total	333.5	735.5	438.4	751.9	470.4	182.6	2912.3

Notes:

- The data of 2023 is divided into two sets. The first set provides details without allocation to a faculty or department. This set runs from 1 January till June. In order to monitor UT's progress towards the sustainability goals, the data provision had to improve. From July 2023 all data is available at faculty and faculty department level. This data will be provided to the faculties separately.
- Bookings made on workorder number could be allocated to faculty. For project numbers this was in some cases impossible. These flights have been allocated to faculties and service departments pro rata.
- Under supporting departments are included: all service departments (GA, CFM, CES,FIN, HR,LISA, MC, SBD, SP) as well as Design lab and Nanolab.

Table 12. Total CO_{2eq} emissions per faculty and percentage of flights per faculty

	CO_2 emissions (tonnes CO_{2eq})		Percentage of UT flights	
	2019	2023	2019	2023
ET	442.2	333.5	12%	11%
TNW	735.0	735.6	20%	25%
BMS	609.6	438.4	17%	15%
EEMCS	650.5	751.9	18%	26%
ITC	1130.6	470.4	31%	16%
Service dpts	110.0	182.5	3%	6%
Total	3677.8	2912.3	100%	100%

Based on <700, 700-2500, 2500+ categorization

Based on table 12, ET is responsible for 11% of the CO_2 emissions from flights, TNW 25%, BMS 15%, EEMCS 26%, ITC 16% and the service departments including EB combined for 6%. EEMCS, TNW and the departments grouped under service departments have increased their emissions compared to 2019.

When looking at the flight categories, table 13 shows that the percentage of CO_2 emissions of short distance flights was 5% in 2019 and this reduced to 4% in 2023. The percentage of CO_2 emissions of mid-distance flights was 15% in 2019 and this increased to 20% in 2023 while the percentage of CO_2 emissions of long-distance flights was 80% of all flight emissions in 2019 and this reduced to 75% in 2023.

Table 13. Percentage a faculty contributes to the CO_2 emissions per category

	Flight distance	ET	TNW	BMS	EEMCS	ITC	Supporting departments incl EB	Total
2019		CO_2 emissions (tonnes CO_{2eq})						
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%
2023		CO_2 emissions (tonnes CO_{2eq})						
0	0-700	6%	4%	4%	4%	3%	9%	4%
0	700-2500	22%	17%	26%	21%	12%	32%	20%
0	2500+	72%	79%	70%	75%	85%	59%	75%

Both promoting sustainable ways of travel (train instead of plane) and 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 CO_2 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 CO_2 footprint than removing all flights below 700km as this forms only 4% of all CO_2 emissions of flights.

Table 14. Flight bookings, number of flights, Flight kilometres and CO_2 emissions for the categories <700, 700-2500-2500+

	Flight distance	ET	TNW	BMS	EEMCS	ITC	Supporting departments	Unallocated	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
2023		Number of flights							
	0-700	172	243	171	278	135	137		1136
	700-2500	322	583	492	735	241	268		2641
	2500+	213	499	275	468	371	93		1919
	Total	707	1325	938	1481	747	498		5696
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
2023		Number of flight kilometres							
	0-700	82,838	118,540	76,590	133,091	61,639	68,621		541,319
	700-2500	433,120	740,977	654,388	930,275	334,680	339,493		3,432,933

	2500+	1,526,235	3,696,762	1,961,100	3,571,698	2,537,584	688,238		13,981,617
	Total	2,042,193	4,556,279	2,692,078	4,635,064	2,933,903	1,096,352		17,955,869
2019		CO_2 emissions (tonnes CO_2)							
	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
2023		CO_2 emissions (tonnes CO_2)							
	0-700	19.4	27.7	17.9	31.1	14.4	16.1		126.6
	700-2500	74.5	127.4	112.6	160	57.6	58.4		590.5
	2500+	239.6	580.4	307.9	560.8	398.4	108.1		2195.2
	Total	333.5	735.5	438.4	751.9	470.4	182.6		2912.3

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.

3.2.4 Business travel table international train trips

The norm is to travel by train to international destinations that are located around 800km from Enschede. Data to monitor this properly are not yet available.

NS does not yet provide a free service to collate this information. Also train journeys booked via other international providers than NS international cannot be extracted from our financial systems yet.

3.2.5 Commuting

Per January 2022 all employees can travel to work for free using public transport[31], 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). In 2023, 48% more kilometres were travelled by train in the Netherlands than in 2019 (38% more than in 2022).

Total number of kilometres travelled was 7,019,999 in 2023 (5,083,838 km in 2022; 4,752510 km in 2019).The distinction whether travel was for commuting or for business travel can unfortunately not be made based on this NS data.

[31] 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

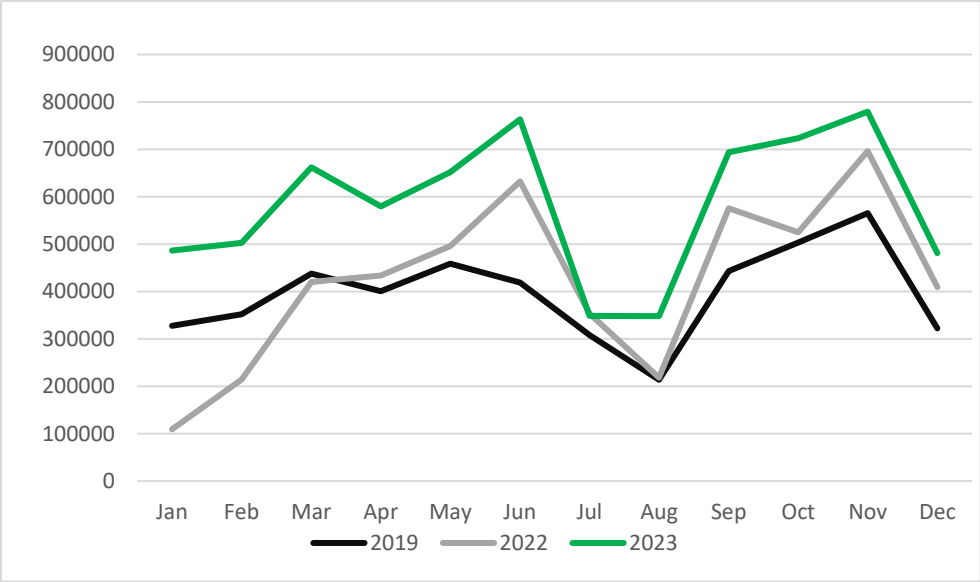


Figure 11. Train kilometres travelled by UT employees for commuting in 2019, 2022 and 2023

Working from home is now a structurally embedded in most employees work pattern.

UT employees are required to register which days they work at UT as commuting allowance and home working allowance is linked to this record. The number of days and – on average – which days employees people work from home can be seen in the tables below.

Table 15. The number of days UT employees travel to work

Nr of days	0	1	2	3	4	5
Nr of employees	1365	953	886	329	115	238
% employees	35%	25%	23%	8%	3%	6%

Source: AFAS, UT-HR

Table 16. The number of days employees working from home

	Monday	Tuesday	Wednesday	Thursday	Friday	Total nr of registrations
Number of people working at home	1077	808	1134	768	1575	3886
Percentage (%)	28%	21%	29%	20%	41%	100%

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

Table 17. CO_2 footprint commuting 2019 and 2022

CO_2 emissions (in tonnes CO_2)	2019	2023	Decrease in %
Commute students	3,049	632.9	-79%
Commute employees	1,950	1336.3	-26%
Total	4,999	2069.2	-70%

For the commuting figures the calculation considered 50 weeks, 4 days a week has been taken as an average for employees (i.e. 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. There is not sufficient insight in the number of days staff work in the office or at home/elsewhere. This will improve the coming years when work-related mobility of persons[32] needs to be assessed annually to comply with legislation.

3.2.6 Mobility survey

A mobility survey was held in June 2022. A junior SEE staff member (working at UT August '22- July '23) has produced the report detailing the results. This was due to be finalised in 2023 but has been delayed to due reduced capacity in the team. The data has already been used in the 2022 Annual Report and in the 2022 CO_2 footprint.

The need for a UT-wide mobility survey was to more accurately calculate the UT's CO_2 footprint, to collect annual data for reporting to the government in accordance to the 2019 Climate Agreement, and to measure progress towards the Cycling Mission Higher Education in accordance with the commitments of the UT.

The response rate of the 2022 survey among staff was 34.5%, for students it was only 6.4%. Detailed results and interpretation of the results including comparisons to the previous survey of 2010 will be shared at a later stage. Compared to 2010 the percentage of staff cycling to campus has increased, from 53% to 62.3%. Students from 66% to 84%.

The legislation on work-related mobility of employees will require UT to conduct a survey annually, starting in 2024[33]. The SEE Programme initiated the 2022 survey due to the need for updated data for reporting. HR will facilitate the data collection related to staff in future.

SEE Programme has written a memo detailing the mobility situation at UT which has been shared among stakeholders.

3.2.7 CO_2 compensation business travel

On June 29, 2022 a consultation meeting on CO_2 pricing of UT's business flights was held in Waaier 3. Considering the urgent need to reduce CO_2 emissions, this consultation was meant to start the conversation on how to. An overview of the event is given by this UToday article. Conclusions from the discussion are summarised as follows: Talks need to be started in faculties to determine criteria, reasons and relevance of travel with attention for early-career scientists. Attention has to be given to stimulating desirable behaviour and rewarding staff who do so. A cultural change is needed in which the role of supervisors and professors is essential.

A complete report of the event is available and has been shared with all portfolio holders operations early July 2022 with the following suggestions and the offer if any support in facilitating discussing sessions is needed, the SEE programme can be contacted for this.

The SEE programme advised the Faculty Boards in July 2022 to include the suggestions below in their annual plans for 2023.

- Start the conversation within the faculty on what people's criteria and reasons are for travel and flying. Discuss the role of supervisors/professors in stimulating sustainable choices.
- Start promoting: Replace with online, reduce the number of trips and refine by making your trip more worthwhile (combining multiple purposes). Promote the train map.
- Consider budget and (practical) implementation of suggested CO_2 reduction options.

In June 2023 a follow up meeting was held between SEE and the portfolio holders operations in which the portfolio holders operations committed themselves to jointly come up with a UT wide approach how to reduce business flights. This was the result of various suggestions made in faculty annual plans, most clearly in the S&T annual plan where CO_2 compensation fees were linked to the number of flights flown. It was agreed that separate plans with various ambition levels within one

[32] https://english.rvo.nl/topics/wpm
[33] https://www.rvo.nl/onderwerpen/rapportage-wpm

university will not lead to the required CO_2 reduction nor will it facilitate the monitoring and reporting on the progress when all faculties have different plans. The portfolio holders operations agreed they would come up with a joint proposal.

Following on from publicity on questioning the methods used to calculate the CO_2 emissions captured through tree planting, the steering group SEE decided against CO_2 compensation for the emissions of gas and business flights through purely these schemes.

For 2024 a CO_2 pricing scheme will be developed calculating the CO_2 emissions from flying and gas consumption and proposing a mechanism for using these funds to either make the university more sustainable or other mechanisms (to be assessed).

All emissions from flying in 2023 have been analysed per faculty and departments and service units (see chapter 3.2.2 and 3.2.3). Based on this analysis, a prediction is made what the impact of CO_2 compensation entails.

3.2.8 Other mobility projects

- **Shared mobility:** Designated zones have been established 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.
- **Car rental:** When UT staff rent cars they are reluctant to hire an electric car, UT's contract partner mentioned in 2022. In April 2023 a test drive day[34] was organised. In the parking lot near the Pavilion, eager use was made of the opportunity to take a seat in one of the other models (electric or hybrid) for a tour. Everyone who tested a car was enthusiastic about the possibilities and comfort that electric driving can offer.
- **Commuting:** As of 1/1/2022 all staff can use the NS Business card 2nd class to travel to work (previously only staff with temporary contracts). This encourages staff to more easily choose to travel by train. Flexible choices where a staff members travels a few days by train and on days where a car is needed for example for personal reasons is not yet possible. In these situations, the staff member is limited to choosing the kilometre allowance for driving.
- Green Hub students made a social media video on Cycling to Work day to encourage people to cycle more often to work.
- Green Hub students started on a project on **study travel data** to collect data via a survey on why, where, how and how often students travel and what transport mode they use. The survey was promoted together with the Student Union. Unfortunately the student had to discontinue the project.

Chapter 3.2 shows the contribution of the UT (Mobility Plan, Train Map, free card for commuting using public transport) to the SDG Goal 13: Take urgent action to combat climate change and its impacts, more specifically:
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

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

[34] https://www.utwente.nl/en/sustainability/sustainability-news/2023/5/834955/electric-car-testdrive-day-a-success

3.3 Waste

UT policy goals

The 2021 UT waste plan is ensuring a coordinated approach to the UT policy goals:

- A (single use) plastic-free campus by 2022
- Reduce CO_2 emissions resulting from all forms of waste of University of Twente employees and students (15%) by 2023
- A waste free campus by 2030
- A circular campus by 2050

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

In short, this means the amount of waste will have to be reduced and the recycling rate has to be improved. Reducing the amount of waste starts with the prevention of waste. Second aspect is to separate waste better to increase the recyclability of the resources.

In March 2024, a new waste processing company will start working with UT. In 2023 the tender process was completed with a strong focus on sustainability and collaboration. The new contract will be a partnership between the UT and the waste processing company were we will jointly work to prevent waste, increase awareness and improve waste separation.

While working towards these goals, several initiatives have been conducted:

Prevention of waste

- New legislation ensures that people should not use disposables when dining in. On July 1st, 2023, the UT removed all disposable cups from the warm drinking machines. Bring your own is the new norm at the UT. This change has been made without complaints, there were only minor practical issues in some buildings. This decreases the amount of waste the UT generates and will prevent a little less than one million disposable cups a year.
- From the removal of disposable cups, which was a legislation induced change, we have learned that sustainable change at UT is far easier to accomplish when legislation from outside UT forces us to change. Barring that, the SEE PT asks SG SEE and/or EB to stand in for such legislation by taking top-down decisions about concrete changes.
- ITC made known that all staff should use own cups when moving to campus.
- Business Days stopped using flyers in 2023: 60-70.000 flyers avoided
- ET reduces paper usage by enabling the use of tablets and Remarkables
- In the Noordhorst & Oosthorst, four water tap points will be realised, similar to the one in Vrijhof at the University Library facilitating refilling reusable bottles preventing waste
- Student association Taste designs their banners and merchandise with a timeless design to prevent the need to replace these annually

Increasing awareness

- Together with the students from the Green Hub, a video has been produced to show the process of waste recycling from the UT waste. The whole process from the moment that you throw away your waste at a waste separation island on campus, the waste processing and all the way to recycling it into new products will be visualised. The video is published on the University's website and can be seen by clicking the link.
- UT waste plan has been updated with more recent waste numbers and goals have been more specified. For example, the goal of minimizing plastic waste in the year 2030 has been made SMART to "reduce plastic waste to 2kg per person per year of which 0.1 kg that cannot be recycled".
- The tender for a new waste contract is ongoing. The waste plan is a reference document for the tender, for which it has been translated to Dutch. The new contract will focus on collaboration to jointly take responsibility to reduce waste, create more awareness and improve recycling rates.
- Nine groups of students of the module Business & Society for Advanced Technology worked on sustainable future scenarios on becoming a waste free university (link)
- The Green Hub created a Waste flow diagram, see figure 12, that was also published on utwente.nl/waste (link) and on utwente.nl/sustainability (link).

Improving waste separation

- Green Hub students created poster boards to inform the UT community about which waste streams should be disposed of in which bin. They have made different formats and analysed which way of communication works best. This was achieved through the creation of three posters by Green Hub's Design Portfolio, in consultation with CFM, that explained which waste should go in which bin. The project was divided into two phases: pre-intervention and post-intervention. During the pre-intervention phase, existing behaviour related to waste separation was analysed (by performing waste analysis) and compiled into a report. The posters were then strategically placed and the post-intervention phase analysed the impact on behaviour. Initially, the project was expected to take three months but unforeseen circumstances caused delays. Four new boards are produced which will be displayed in Langezijds at the most intensively used waste islands in 2024.
- In the Zuid-Horst we are now separating PMD waste inside a few labs, preparations are being made to include paper waste as well. Hard plastics are being separated in the locations were styrofoam was already being separated.
- Currently, the building managers of the new ITC building have requested the posters as the bins there do not have separation stickers.
- The study associations in Horst now have waste separation bins instead of 1 all-purpose bin.
- More styrofoam waste bins will be placed throughout the Host building as well.

Data

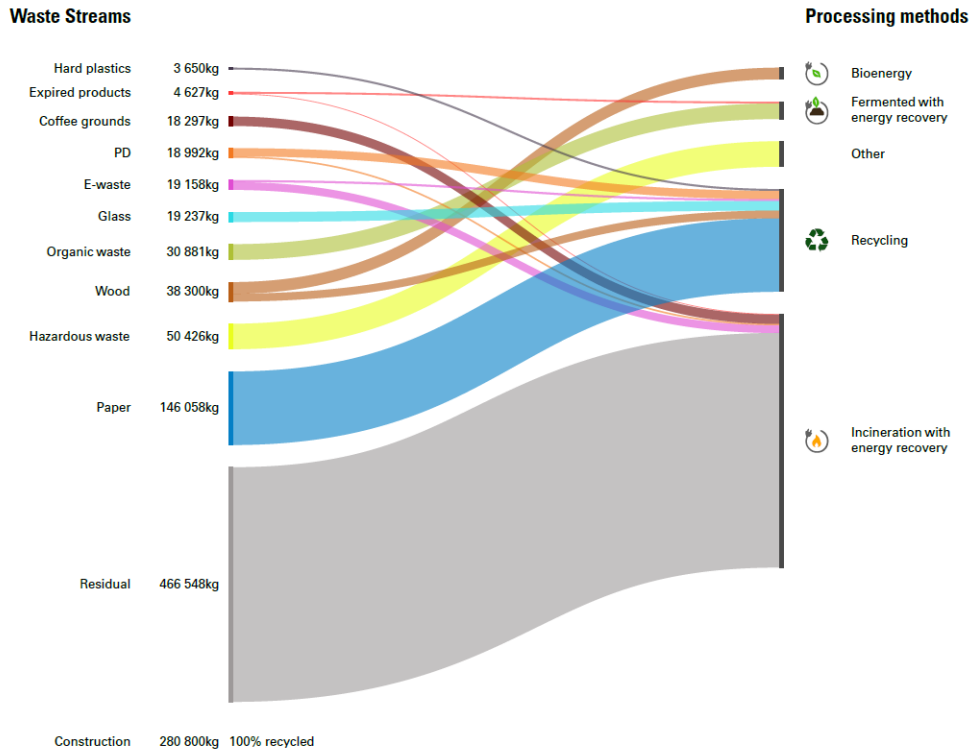


Figure 12. Waste flow diagram UT 2023 (made by GreenHub Twente)

The total amount of waste as well as the amount of residual waste has gone down by resp. 17% and 21% vs 2019. Coffee grounds have increased a lot. Hazardous waste increased by 35% vs 2019 and 20% vs 2022. Due to the change from software registration programme a lot of chemical cabinets have been sorted and materials thrown away. Plastic waste has decreased, probably because the metal tins and plastic bottles now have a deposit scheme and are thus returned to stores/restaurants by the user. The decrease is in total waste is likely due to factors such as the ban on disposable cups from July which over 6 months may lead to a reduction of 0.5 million cups which go in residual waste as well as 3000kg more hard plastic, mainly coming from lab waste, has been disposed off separately enabling recycling. The move from the ITC faculty in April 2023 to the campus may have contributed to a lot of paper and residual waste, which leads to the expectation that next year this numbers could go down again.

Table 18. Waste data 2019-2023

Waste stream	2019 (in kg)	2020 (in kg)	2021 (in kg)	2022 (in kg)	2023 (in kg)	Recycling rates
Residual waste	594,024	409.152	431.639	501.427	466.548	100% is incinerated with energy recovery
Paper & Cardboard	167,892	104.985	126.691	200.273	146.058	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	30.881	100% is fermented with energy recovery
Glass	18,197	7,899	9,204	17,942	19,237	100% is recycled
E-waste	14,601	9,128	13,687	7,044	19,158	30% 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
PD (Plastic, Beverage containers)	42,320	6,600	8,605	32,173	18,992	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	38,300	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	18,297	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	50,426	Recycling is not applicable to this waste stream
EP (expired products)	11,060	8,229	9,855		4,627	75% is fermented with energy recovery, 25% is incinerated with energy recovery
EPS			60	126	162	
Hard plastics				560	3,650	
Other waste streams	7,864	8,227	5,971	21,210		
Total waste	**985,085**	**637,939**	**699,495**	**903,213**	**816,336**	
Construction& demolition LTSH projects			3,898,650	239,250	280,800	100% is recycled
Total kg recycled waste streams	333.072		212.639	346.064	299,362	
Recycling rate	34%		30%	38%	37%	

Table 19. Total waste and residual waste 2019 and 2023

Year	2019	2022	2023	Amount of waste in 2023 compared to 2019	Amount of waste in 2023 compared to 2022
Total waste (kg)	985,085	903,213	816,336	-17%	-9.6%
Waste per capita (kg/staff and students)	58	49	44	-23%	-9%
Residual waste	594,024	501,427	466,548	-21%	-6.9%
Residual waste per capita (kg/staff and students)	35	27	25	-27%	-6.3%

Per capita means it is divided by the number of students and the number of employees (see table 5). This table excludes demolition waste, as it is only recorded from 2021 onwards. These data are shown in table 18.

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 20. CO_2 emissions of waste 2019, 2022 and 2023

	CO_2 emissions 2019 (tonnes $CO2_{eq}$)	CO_2 emissions 2022 (tonnes CO_{2eq})	CO_2 emissions 2023 (tonnes CO_{2eq})	Increase/decrease 2023 vs 2019	Increase/decrease 2023 vs 2022
Waste	631	1112	948	+50%	-15%

Looking at the CO_2 emissions associated with waste processing, UT has realised a reduction in 2023 compared to 2022 (same waste collector) of 15%. The comparison with 2019 is difficult to analyse as the contract was with a different waste collector and they used another way of monitoring.

Benchmark

UT participated in a benchmark for waste from the Ministry of Infrastructure and Water Management. This year they looked at all waste from 2022. All technical universities created more waste than other universities or universities of applied sciences. However, the UT did create even more waste than others, even though the UT had similar amounts of waste compared to other technical universities in 2021. A reason for this could be that the UT had some large internal relocations for which many archives have been cleared out. The table below shows the residual waste of the UT compared to the average of the other 11 universities and universities of applied sciences.

Table 21. Overview waste benchmark Dutch Universities using data 2022

	Kg waste per year per fte	Kg waste per year per student	Kg waste per year per m2
University of Twente	240	67.7	3.86
Average	141	29.2	2.18

The benchmark looked at the data from 2022. In the previous tables, we can see that the waste at UT declined again in 2023. The residual waste is almost similar to 2021 again. During the benchmark in 2021, the UT scored average compared to the other universities and universities of applied sciences. It is therefore expected that the next benchmark (over 2024) will show similar results as others again.

Circularity

A vision on circularity 'what does it mean to work towards a circular campus' will be developed by the SEE Programme Team in collaboration with UT experts. The first step was to participate in the Circular Economy Platform Twente workshops, an

initiative funded by the Climate Centre with the aim of creating a knowledge platform. Roundtable discussions were held on Circular business models and finance, Circular energy systems, Gamification and digital twins for circularity,

Circular product and supply chain design, Social and behavioural aspects of circular economy and Circular UT campus. In the table on Circular UT campus input was collected and a network built to use when writing a circular vision.

This vision and subsequent implementation plans will provides input to the EU CSRD reporting standard ESRS E5.

3.3.1 E-waste/ICT

In 2023 a sustainability scan was made of all universities. Questions focused on sustainability aspects in tenders as well as information management and architecture, e-waste policy, impact in the value chain, the material and energy efficiency of the housing of ICT infrastructure, of the computing infrastructure, of the network infrastructure, of the storage infrastructure, of ICT as used by end-user, of software and ICT services/applications. Also questions were asked whether ICT was used to reduce the number of travel movements, to optimize the use of spaces, to reduce energy consumption organisation, to reduce paper use and whether ICT is used to reduce energy use for education, research and valorisation processes.

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. There is a lot of attention for e-waste and ICT/energy use. Question on these topics range from the rules on frequency on laptop replacement, repair, how e-waste is dealt with, the gap in written-off items that get returned and energy consumption of chosen software, amount of storage of UT files (cold and hot).

In 2023, 841 laptops were purchased last year and only 292 laptops were returned for recycling or reuse. 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. Overall the participation in the e-waste regulation is 30%[35]. These are appliances that have been written off but can still be suitable for personal use. Of the remaining 70% 19,158 kg is processed as e-waste where the metals are recovered and the plastics are incinerated. Unfortunately these items are not itemised to enable comparisons.

Table 22. Number of electronic devices purchased 2019-2023

Purchased items	2019	2020	2021	2022	2023	Increase/decrease 2023 compared to 2019
Desktop	275	141	179	86	137	-50%
Laptop	686	837	738	770	841	+23%
Smartphone	248	302	168	145	194	-22%
Tablet	50	58	55	43	19	-62%

Table 23. Number of electronic devices in e-waste regulation 2019-2023

Items e-waste	2019	2020	2021	2022	2023	Increase/decrease 2023 compared to 2019
Desktop	34	22	27	29	26	-24%
Laptop	156	170	173	210	292	+87%
Smartphone	13	16	13	23	36	+177%
Tablet	12	14	20	19	18	+50%
Participation to hand in e-waste	21%	23%	18%	22%	30%	+43%

[35] Data from reusage personal IT devices - Power BI

- Spring 2023 LISA cleaned 25 Chromebooks and handed them over for free to a Montessori school in Enschede.
- With the new contract for Multifunctional Printers (MFPs) the number of machines will be reduced by 50%.
- In May 2023, LISA-MT made an action plan with a focus on e-waste, reducing energy consumption of computers, laptops and servers and on cooperation with other partners within the UT.
- LISA's network management team has reduced energy consumption by 18 MW (this is more than 7x the annual electricity consumption of an average Dutch household) by reducing the energy consumption of unused ports and using Energy Efficient Ethernet saving 0.08 W per port (UT has over 23000 network connections)[36].

Chapter 3.3 shows the contribution of the UT (waste separation, reducing non-recyclable and recyclable waste, waste plan) to the Sustainable Development (SDG) Goal 12: Ensure sustainable consumption and production patterns and more specifically:
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

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

3.4 Buildings

UT sustainability policy goals: Existing buildings: Energy Index (kWh/m2/year) 1.3, label C by 2022. Renovations: Shell insulation follows the Dutch building decree 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 CO_2 impact and circular options.

In 2023 the decision was made to not expand by building new buildings but instead optimise the use of current real estate. This financial decision contributes to the sustainability goals as new buildings will always demand more energy than more intensively using existing buildings. Improving existing real estate and making these more sustainable is the focus now. The limiting factor here is the lack of skilled personnel, especially mechanical engineers and buildings automation (staff and contracted), which limits the number of projects that can be initiated.

The LTSH programme is committed to make UT real estate sustainable. LTSH ensures alignment with roadmap to CO_2 real estate. Every housing initiative (new and renovations to existing buildings) will be aligned to the roadmap and will have to meet sustainability goals[37].

Building Langezijds was finalised in 2023[38]. The building's energy label went from G to A+++[39]. In chapter 3.4.2 the measures from the roadmap that are applied at Langezijds are listed. Building Vleugel was provided with a green roof.

Procedure renovations
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

[36] https://www.utwente.nl/en/service-portal/news-events/news/2024/1/1291871/be-more-efficient-with-energy-consumption-without-compromising-on-quality?lang=en
[37] P.14-15 LTSH long term strategy plan 2023-2032 https://www.utwente.nl/en/ltsh/#policy-plans and P.11 Annual Plan 2024 www.utwente.nl/en/ltsh/#policy-plans
[38] https://www.utwente.nl/nieuws/2023/3/545495/langezijds-opgeleverd-itc-trekt-in-gebouw-vanaf-april-2023
[39] https://www.utwente.nl/en/sustainability/sustainability-on-campus/sustainability-walk/langezijds/

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.

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 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 [40].

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 CO_2 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.

Besides the roadmap 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. Both are elaborated upon below.

3.4.1 Annual evaluation roadmap towards CO_2 neutral real estate

In 2020 a roadmap towards CO_2 neutral real estate was developed in collaboration with Royal Haskoning DHV. All building characteristics such as roof, floor, wall conditions) 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 will be reassessed in order for UT to monitor its progress towards the set goals as well as towards goals resulting from national legislation. Due to fast developments in the sustainability field, this plan will be reviewed and updated annually: additional measures reach the market and some proposed measures are not possible to apply affecting the progress towards the goal of becoming CO_2 neutral (more detail on UT website on energy roadmap for CO_2 neutral real estate). The progress the government makes towards the percentage of renewable energy in the Dutch energy mix are also included in the reassessment.

The required budget for this surpasses the maximum percentage of the UT budget that is reserved for real estate. In order to achieve CO_2-neutral real estate, financial involvement of the national government is needed. Lobbying will be required to achieve this.

The annual evaluation of the roadmap shows a 5.2% improvement in reduced energy needs in the period 2020-2025 (compared to 4.8% in the original roadmap). This is a result of the sale of two buildings (ITC and Sleutel). For the period 2020-2030 the calculated energy use reduction increased to 15.8%, a serious improvement compared to the original roadmap (12.7%) and the first evaluation (11.1%). The same trend can be observed for the period 2030-2050. In this period the energy need reduction increases to 21.9 (compared to 19.5% in the original roadmap).

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

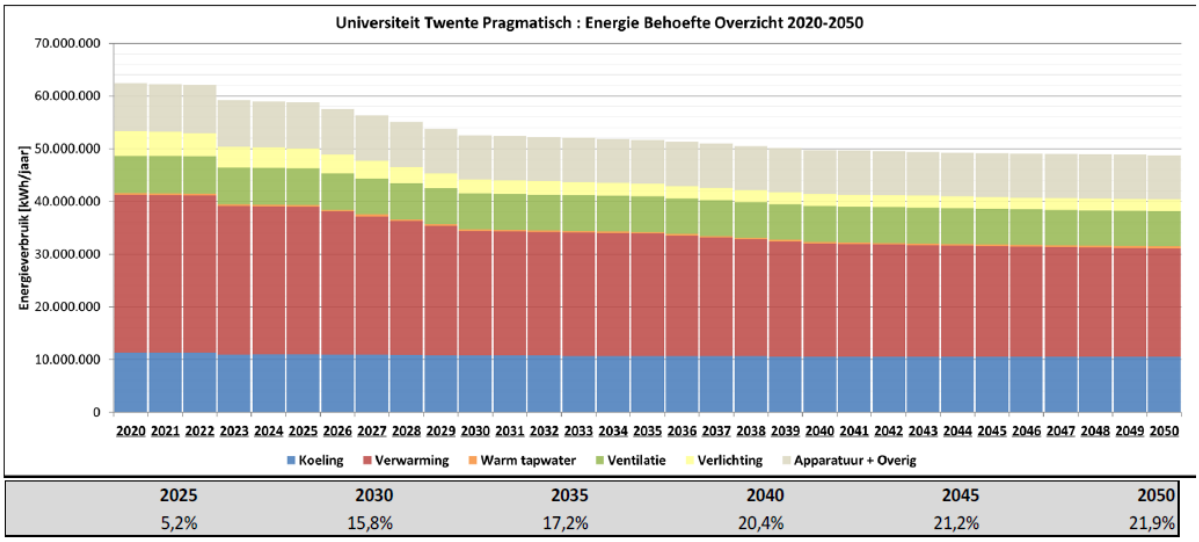


Figure 13. Reassessment roadmap to CO_2 neutral real estate (2022) – energy requirements UT

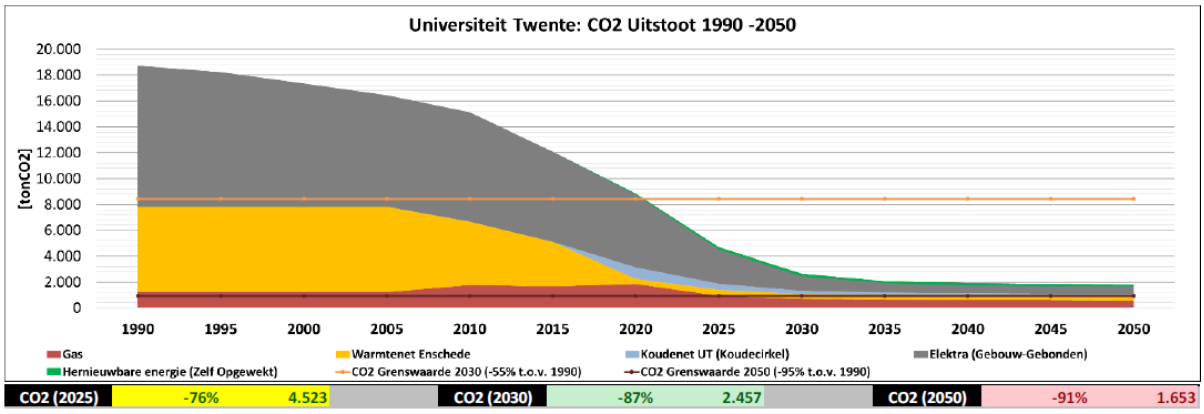


Figure 14. CO_2 emissions after reassessment 2022

In 2025 UT will emit fewer emissions (~521 ton CO2), in 2030 ~405 ton CO2 less compared to the original road map (a 87% reduction compared to 1990). The roadmap shows that in 2050 the 95% CO2 reduction target (~936 ton CO2) will not yet be reached as the predicted emissions will still be 1,653 ton CO2 (an excess of 7171 ton CO2). This would be a 91% emission reduction compared to 1990.

3.4.2 Progress measures roadmap UT buildings CO_2 neutral

CFM V&O provided an overview of the CO_2 reducing measures mentioned in the roadmap towards CO_2 neutral real estate. The roadmap helps to include sustainability in the integral approach in renovation projects. The following buildings have had improvements done in 2023: Spiegel, Vleugel, Vrijhof, Paviljoen, Meander, Sport centre, Boerderij, Bastille, Boerderij Bosch, Technohal, Erve Holzik, UPark, Hangar, Tennis pavilion.

Table 24. Roadmap measures per building

Spiegel/Vleugel

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Executed on Vleugel
M3 Insulate facade: Re-insulate to Rc 3.5	Awaiting update
M8 Single glazing: replace with HR++ glass, including removal of existing glass	Stairways (10% glass surface façade) has HR++

M9 Double glazing: replace with HR++ glass, including removal of existing glass	Awaiting update
M11 Replacing HR glass with HR++ glass, including removal of existing glass	Awaiting update
M21 WTW: HR heat wheel	Awaiting update
M23 Outdoor shading	Awaiting update
M27 Smart building techniques	Awaiting update

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 in 2022
M14 Presence detection	80% of spaces was suitable for presence detection

Paviljoen

This project is due to be carried out with the below mentioned Roadmap measures. It is starts after summer 2023.

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	More than 5.0 is not possible
M3 Insulate facade: Re-insulate to Rc 3.5	6.0 is not possible
M5 Insulate floor: Re-insulate to Rc 3.5	Planned for 2024
M12 Replacing HR glass with triple HR+++ glass, including removal of existing glass	Planned for 2024
M21 WTW: HR heat wheel	Planned for 2024
M22 Air Heat pump (heating)	Planned for 2024
M23 Outdoor shading	Planned for 2024
M25 Speed-controlled ventilators	Planned for 2024
M26 High Temperature Heating to Low Temperature Heating	Planned for 2024
M27 Smart building techniques	Planned for 2024
M28 From mechanical cooling to cool circle	Planned for 2024
PVD PV cells roof	Not yet known

Meander

Roadmap measures	Project plan renovation
M23 Outdoor shading	Executed
M27 Smart building techniques	Executed

Sportcentrum

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Executed (1200m^2 roof surface)

Boerderij/Faculty club

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Executed
M5 Insulate facade: Re-insulate to Rc 3.5	M5 Executed, not M4 (Rc 6.0)
M6 Insulate floor: Re-insulate to Rc 6.0	Executed
M9 Double glazing: replace with HR++ glass, including removal of existing glass	Executed
M13 Lighting (C-TLD/5 to LED 7 W/m2)	Executed
M14 Presence detection	Executed
M21 WTW: HR heat wheel	Executed
M23 Outdoor shading	Awaiting update
M27 Smart building techniques	Executed

M29 From district heating to air/water heat pump on cool circle	Heat pump supported by 6xdouble soil loops of 200m totalling 2.4km the temperature difference will be used to heat and cool the building

Bastille

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

Boerderij Bosch

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Executed
M4 Insulate facade: Re-insulate to Rc 6.0	Executed
M8 Single glazing: replace with HR++ glass, including removal of existing glass	Executed
M13 Lighting (C-TLD/5 to LED 7 W/m2)	Executed
M14 Presence detection	Executed
M21 WTW: HR heat wheel	Awaiting update
M22 Air Heat pump (heating)	Executed
M27 Smart building techniques	Executed
M29 From district heating to air/water heat pump on cool circle	Awaiting update

Technohal

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Executed
M12 Replacing HR glass with triple HR+++ glass, including removal of existing glass	Executed
M27 Smart building techniques	Executed
M30 From gas boiler to district heating	Carried out in 2020
PV PV cells roof	Carried out in 2020

Erve Holzik

Roadmap measures	Project plan renovation
M22 Air Heat pump (heating)	Executed

UPark Hotel

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Executed
M14 Presence detection	Executed
M23 Outdoor shading	Executed
M27 Smart building techniques	Executed

Hangar

Roadmap measures	Project plan renovation
M22 Air Heat pump (heating)	Executed
M27 Smart building techniques	Executed

Tennis Pavilion

Roadmap measures	Project plan renovation
M2 Insulate roof: Re-insulate to Rc 6.0	Executed
M9 Double glazing: replace with HR++ glass, including removal of existing glass	Executed

M13 Lighting (C-TLD/5 to LED 7 W/m2)	Executed
M14 Presence detection	Executed
M21 WTW: HR heat wheel	Executed
M27 Smart building techniques	Executed

Langezijds was finalized in 2023 but the building had not been included in the roadmap assessment. Below the roadmap measures that have been applied have been listed.

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

3.4.3 Paris-proof buildings

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 assessment considers the actual energy usage of buildings. The Paris-proof model shows office buildings should maximise energy consumption to 70kWh/m2/year.
Technical measures (see chapter 3.4.2) can improve energy efficiency greatly, but our own behaviour has a big influence of the energy usage of a building. This Paris Proof assessment focusses on both parts.

The 2015 Paris Agreement prompted the Dutch Green Building Council (DGBC) to develop a Sustainable Renovation Delta Plan[41] . 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.

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[42] . 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[43]) shows the energy consumption per square meter for a building. In the table below 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.

[41] www.deltaplanduurzamerenovatie.nl / https://www.dgbc.nl/
[42] https://www.weii.nl/weii-klassen-11
[43] https://youtu.be/bxrsCxDF7ZE Werkelijke Energie intensiteit indicator https://www.weii.nl/

Table 25. Energy consumption (in kWh/m2/year) based on user surface

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**

Notes
This table shows the energy consumption (in kWh/m2/year) 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.
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).

Chapter 3.4 shows the contribution of the UT (roadmap to CO_2 neutral real estate, phasing out natural gas usage) to the
SDG Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation, more specifically:
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

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

3.5 Procurement

The mission of the procurement department is: "We help you to purchase (socially) sustainably".

Many steps have been taken in 2023. The team started by making sure the available knowledge and expertise is present in the team. External and internal training was arranged to build up this knowledge.

Local Matters[44], an organisation that guides people and organisations towards integrating sustainability in their daily working life, provided an online learning module and a hands-on workshop to enable staff to start with sustainability projects themselves. Also study material is available via GoodHabitz[45,46].

Linda Pasqual, UT Policy and Communication advisor Diversity, Equity, Inclusion and Social Safety gave a workshop on social sustainability.

Following this, the department started sustainability projects per team:

UT sustainability 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.

- Tactical procurement:
  - Procurement criteria in the field of (social) sustainability are increased
  - Focus on procurement criteria in the field of (social) sustainability at multiple private tenders (€70k-220k)
  - Inclusion of SROI during tenders
  - Ensuring the commitment to the Uniform Social Return Covenant
- Operational team
  - The team is holding talks with various web shop suppliers to convince them to show the sustainable range. This can be done by flagging sustainable options in the web shop, creating a pop-up when a more sustainable alternative is available or by grouping all sustainable options on a separate page. This supports our internal customer in making sustainable choices during the ordering process.
    - Two suppliers, RS components and Conrad already highlight their more sustainable options.
  - Approximately 35 million of procurement expenditure is purchased outside contracts through operational procurement. A student has mapped out exactly what this is and how we can deal with it in terms of sustainability. The outcomes of her thesis on spend analysis and sustainability impacts of operational purchases are used to increase sustainable purchasing, also at the (relatively low-cost) expenses that remain below the threshold of €50,000.
  - Training in advisory skills is scheduled to provide the operational staff with the tools to advise the internal customer with sustainability criteria and advice. Also ensuring the advice is integrated in the work processes is part of the training scheduled.
  - The team constantly tries to manage the sustainability performance of contracted suppliers so that transport movements and the amount of packaging can be reduced.
- Information management team
  - In information management, the team is working on several sustainability focal points. In the context of regional procurement, the team is looking at the reliability of measurement, with the aim of monitoring whether UT's procurement volume within the Twente region has increased compared to the baseline measurement (2015). Furthermore, more data on the CO_2 footprint of suppliers will be collected.
  - The team is also developing reports that give us more insight and looking at which sustainability criteria can be applied in each procurement package.
  - The team has taken up the task of collecting the CO emission information for contracted suppliers for the UT's CO_2 report.
- Contract management team
  - The team is continually looking for improvements on sustainability and societal responsibility. They have arranged for the discontinuation of the distribution of advertising materials (per 01-02-2024). Suppliers

[44] https://www.local-matters.nl/
[45] https://my.goodhabitz.com/nl-nl/courses/16904-natuurlijk-duurzaam
[46] https://my.goodhabitz.com/nl-nl/courses/72531-duurzaam-ondernemen

are asked to cease sending promotional materials as these are also available online. This will reduce the paper waste stream.
    - Contract management will continue to focus on including and complying with sustainability aspects in contracts and tender preparations. They look at possible further in-depth reporting in consultation with the sustainability team.
    - In cooperation with the sustainable labs coordinator, the team has held meetings with suppliers of lab products to look into what, for instance, is possible in greening the purchases of chemicals (substances of Very High Concern).
    - All UT contract managers (based at CFM, LISA, HR) work on a joint approach to strengthen procurement criteria in the field of (social) sustainability. In January 2024 Local Matters will conduct a training to support this group.

Other interesting facts:

- An interview with Bert Kloppers of the procurement department about his and the department's sustainability goals was published in June.
- A circularity check has been conducted looking at the furniture for Langezijds. This showed that the revitalized and revived products placed in Langezijds resulted in CO_2 emissions savings of 93% (101.8 tonnes CO_2) compared to if all new furniture had been purchased.
- Waste tender
  Sustainability is taking up a large part of the tender for the new waste contract. Focus lays on a partnership between the waste processing company and the UT, where we jointly work to reduce waste, improve waste recycling rates and become more sustainable. For the first time, the UT decided to put the main focus of the tender on partnership, this to ensure collaboration and make optimal use of the knowledge of our partner to reach our goals.
- Tender Travel agency: sustainability criteria weighted substantially
- When improving the working and learning environment, ET reuse furniture where possible or otherwise invest in recycled furniture. An example is the reuse of ITC furniture within the Horst.

An overview was created in how many contracts sustainability was included and how many also reported on the agreements via the 2022 CO_2 footprint.19 contracts were assessed. Of those contracts 47% contained sustainability criteria.

CO_2 footprint
The CO_2 footprint of suppliers of goods and services is registered under scope 3 (for full CO_2 report: link and summary in 3.12). Differences in response of suppliers may have an impact on the level of emissions reported. We aim to increase the amount and quality of data provided by the suppliers as there is not yet a complete insight in the impact of UT's activities. Also the legislation on sustainability reporting increases for companies so the expectation is that the data and the quality of data will increase and improve in the coming years.
Some suppliers provide the data later in the year. To ensure we are able to include this data, a carbon platform (see chapter 3.12) was built which dynamically produces a CO_2 report which includes all available data. For this report all data provided until March 13 was included.

Chapter 3.5 shows the contribution of the UT (a.o. sustainability criteria in tenders, incl. the prevention of packaging) to the Sustainable Development (SDG) Goal 12: Ensure sustainable consumption and production patterns and more specifically:
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

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

3.6 Water

Drinking water is a scarce resource. The government is asking large-scale consumers, such as UT, to reduce their water consumption by 20% in 2035[47]. This is a big challenge considering the consumption has been increasing by 10% this year.

UT sustainability 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.

While working towards reducing our goals related to water, several initiatives have been conducted:

- A project collecting rainwater from the Sports Centre in a XXL smart rainwater buffer has been realised.
- 5000m3 drinking water saved by filtering grey water via Water Miracle in the Water Lab which is then used for irrigating the sports fields. This is 4.3% of the total water consumption in 2023.
- A creative technology student conducted his thesis research on water usage by flushing habits. He assessed water savings can be made when users are nudged to use the small button (link newsarticle). This showed that significant reductions in water consumption can be made when promoting using the small button more.
- Eight groups of students of the module Business & Society for Advanced Technology worked on sustainable future scenarios on becoming a water neutral university (link).
- A pilot on the use of water nozzles for sinks in bathrooms was not yet conducted to due lack of capacity.
- Waste water of scrubbing machines is disposed off properly, not mixing with rainwater flows.

Despite these projects water consumption at UT has gone up by 10% compared to 2022 and 11% compared to our baseline year of 2019. One part of this may be due to leaks (a leaky sprinkler pump has lead to increased water use in Zuidhorst of ~5000m^3; 4.3% of total consumption), another part due to the increased need of water for sports fields. Sports fields require a lot of water which benefits the performance of the game. A hockey match on the water field costs already around 30m^3 of water. Also a lot of demineralised water is used in labs. Drinking water is used to cool equipment while the cool circle is available for this. Some water saving options do not have a great impact as health regulations also result in water consumption for regular flushing the tubes to prevent legionella. Water consumption data is available per building therefore the distinction between water used in research or for toilet flushing can not be made unfortunately. In any case water use needs to be reduced everywhere.

Table 26. Water consumption UT 2023

		2019	2019 recalculated	2022	2023	Comparison 2023 vs 2019
Water consumption	m^3	100.022	100.022	104.594	110.962	11%
Water consumption per capita	Litre/person	5,862	4,000	5,694	6,041	0.031%
CO_2 emission factor water	Kg CO_2/m^3	1.5	0.397	0.380	0.350	
CO_2 emissions water	Tonnes CO_2	150	40	40	38.8	-2.9%

Chapter 3.6 shows the contribution of the UT (water recycling) to the Sustainable Development (SDG) Goal 12: Ensure sustainable consumption and production patterns and more specifically:
Target 12.2 By 2030, achieve sustainable management and efficient use of natural resources

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

[47] https://open.overheid.nl/documenten/ronl-c35e65eba0903d738ae26dab222462337b0d8de7/pdf

3.7 Food and drinks

Measures to reduce the CO_2 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.

UT sustainability policy goals: Halve the environmental impact (CO_2 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.

While working towards these goals, several initiatives have been conducted:

- The default vegetarian work lunch has been in place since October 4th, 2022. The results of the of 2019, 2022 and 2023 are compared in table 15 below. Even though the last three months of 2022 already had a default vegetarian work lunch, we can still see an increase from 33.9% vegetarian lunches to 60.6%. Kindly note that the work lunches that were ordered as meat/fish contain 50% meat/fish and 50% vegetarian sandwiches.
  For 2023, the percentage of vegetarian lunches can be compared perfectly. A comparison with 2022 can unfortunately not be made as the caterer made a change in their system and is now only recording the number of times a lunch order is made without registering for how many people lunch is ordered.

Table 27. Vegetarian and vegan work lunches ordered in 2019 and 2023

	2019	Percentage (%)	2022	Percentage (%)		2023	Percentage (%)
Total number of lunches ordered	54433	100	92035	100	Total number of lunch orders made	1449	100
Vegetarian	5583	10.3	31200[48]	33.9	Vegetarian	878	60.6
Vegan	182	0.3	660	0.7			

- The canteen in the Waaier has a sustainable fridge with only items that have one or more sustainable labels. This to increase awareness and stimulate customers in making more sustainable decisions in the canteens.
- A new water tap has been installed in the library. This tap has sparkling and still water with or without a flavour. Many people used the new water tap but unfortunately the tap could not handle the demand. This resulted in many errors, empty filters and flavours and overall it resulted in a machine that was mostly in error/off mode. Therefore, the water tap has been removed and the UT is currently looking for a new water tap that can handle the high demand.
- All warm drinking machines are now in stand-by mode overnight, this means that the machines will be put in stand-by one hour after it has been used last at night and it starts again one hour before the first consumption normally starts. This thus differs per machine and could differ per time of the year. If someone wants a drink while the machine is in stand-by mode, it takes longer to prepare the drink. Machines that are in stand-by mode between 19.00 and 6.00 have a yearly energy reduction of 35kWh per machine. No complaints have been received about this change.
- Oat milk pilot: in 2022 the UT started a pilot with oat milk in coffee machines. In 2023, we have analysed the success of these four machines with oat milk. In 2023, around 22.300 drinks with oat milk were consumed from the four oat milk machines, this equals to around 5.575 drinks with oat milk per machine. In total more drinks were consumed from these four machines since you can also use them for black coffee, tea, soup and water. In total at UT around 900.000 drinks containing milk (oat and cows milk) are consumed at UT annually. With a total of 139 coffee machines at the UT, this equals to around 6.500 drinks with cows milk per machine. Conclusion, currently the machines with oat milk are located next to a machine with cows milk and this leads to some lower 'milk' consumption in the oat milk machines compared to the average from the cows milk machines.
- During the Sustainability Week all food venders at the UT participated with a special deal on vegetarian, vegan or otherwise more sustainable food options. The Horst canteen from Appèl was fully vegan for the whole week, but this resulted in some complaints and a decrease in sales.

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

- During the National Week without Meat & Diary ("Nationale week zonder vlees en zuivel") caterer Appèl made the Horst canteen fully vegetarian as well. Together with the Vegan Student Association they added extra vegan option to the menu in all canteens.
- Since September 2023 there are only 2 warm dish options a day, 1 meat/fish option and 1 vegetarian option. From Monday until Thursday about 400 portions of meat/fish and 200 vegetarian portions are prepared. Appèl mentions that they have a bit more vegetarian leftovers than meat/fish.

CO_2 footprint of food at canteens

The caterer provides UT with a CO_2 footprint report with detailed emissions associated with their products. This has been reduced by 42% in 2023 compared to 2019.

Table 28. CO2 footprint of food at canteens in 2022 and 2019

CO_2 footprint of food	2019	2022	2023	Increase / decrease 2023 vs 2019
CO_2 footprint food (tonnes CO_2)	340.6	382.3	199.1	-42%
CO_2 footprint food (kg CO_2) per capita*	20	20.7	10.8	-46%

*Per capita means it is divided by the number of students and the number of employees (see table 5)

Green Dish collaboration

In 2023 our caterer Appèl worked together with Green Dish to minimize food waste and to increase the amount of plant-based protein in their dishes. Many recipes have been adjusted, Appèl focused on reducing food waste and reducing transport movements by buying locally as much as possible.

Over the past year, Appèl employees worked with Green Dish to look into the composition of its meals, with a special focus on the five best-selling dishes. After analysing the environmental impact of these dishes changes were made, with an emphasis on how healthy and tasty the dish is. To reduce the impact the amount of meat can be reduced and this can be replaced by lentils, improving the nutritional score of the meal, while decreasing the impact.

The main conclusion is that the climate- and environmental impact of the top-5 dishes in restaurant Waaier on the UT campus has gone down significantly over the past year, while guest satisfaction has increased (a survey was held in September). Figure 14 shows that the changes made to the top 5 best selling meals lead to a reduction of greenhouse gas emission (based on the consumption over 1 year) of 0.6kg CO_2, 6.3 l water and 0.3m^2 land. This corresponds with 1363 fewer trips by car from Utrecht and Enschede, 6569 showers and 1672 car parking spaces.

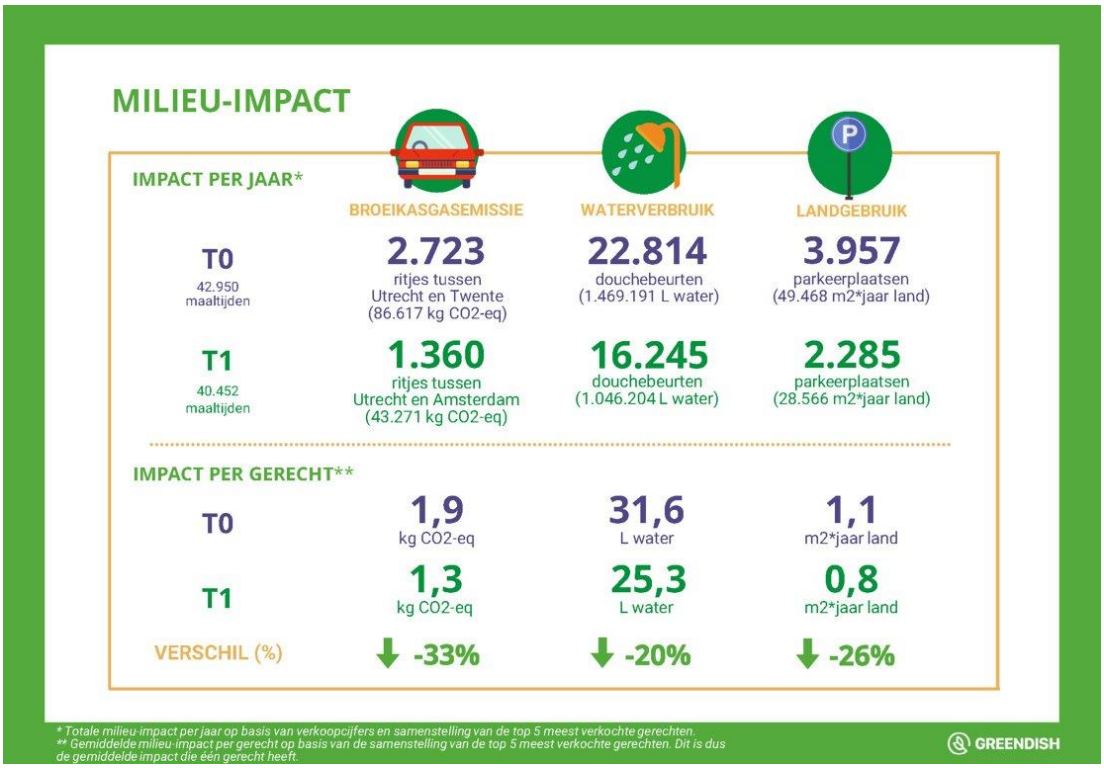


Figure 15 The environmental impact of the top 5 best selling meals at the UT caterer

More information can be read in this article.

Chapter 3.7 shows the contribution of the UT (reduction impact meals) to the Sustainable Development (SDG)

Goal 12: Ensure sustainable consumption and production patterns and more specifically:
Target 12.2 By 2030, achieve sustainable management and efficient use of natural resources
Target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

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

3.8 Events

While working towards these goals, several initiatives have been conducted:

- The SEE program is writing a **Sustainable Events plan** and simultaneously the CFM Policy and projects team has writing a new UT events policy. Alignment between both documents is ensured through collaboration.
- **Water bubbles**: Instead of using plastic cups to provide participants of the UT triathlon with water or sports drink during the race, a more sustainable alternative namely pouches from Notpla Ooho have been used. These pouches are edible bubbles filled with either water or sports drink. The bubbles are made of seaweed making them 100% plastic-free, vegan, and naturally biodegradable. Replacing plastic single-use cups by these pouches has reduced the amount of plastic ending up in the environment and is therefore a great way to make the UT events more sustainable. The waste of approximately 2.000 cups has been prevented.

UT sustainability 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.

Figure 16. Notpla bubbles pilot

- Agreement **Support Sustainable Event Initiatives Fund**: the UT-triathlon organizers (ALOHA) received funding from the SEE programme for their water bubbles pilot. The SEE programme supports these kinds of sustainable initiatives where the event organizer only needs one-off funding to kick-start a new sustainability measure. In return, an agreement will be filled out where the receiving party outlines how this measure can become standard practice and how sustainable funding will be found when the pilot is successful.
  The Triathlon association conducted a survey to find out how the bubbles were received by the participants.
- During a five month period, a Facility Management student from Saxion University of Applied sciences researched how to realize plastic free events. She wrote an advice to the UT for her graduation thesis. This advice was regarding the cups used at events on campus and how they can be returned in order to facilitate recycling. She researched the different types of cups that can be used for events and analyzed how suitable they are in different situations (outdoor vs indoor events).
  The new default at the UT is to use **reusable cups at all events**. This can be plastic hardcups or glass or ceramic. If this is not possible for an event, there is an alternative option to use rPET softcups with a deposit system to ensure a high return and recycling rate. Event organisers should ensure that the rPET cups will be returned as a monostream to ensure high-quality recycling. The student's advice comes with a decision tool to help event organisers choose between the different options if glass or hardcups don't seem a viable option. More information about her research can be found here.
- During the Bata we have tested with **post-consumer waste separation**. This led to the following results: 40% residual waste, 25% reusable paper, 5% metals, 30% contaminated PD waste. The PD waste stream was too contaminated to be recycled and thus got incinerated as residual waste. In 2022 the separated waste was too contaminated to be recycled, thus post-consumer waste separations did lead to higher recycling rates, but financial feasibility should be analyzed as the cost were quite high for a student committee's budget.
- The Bata party worked with a return system to ensure the return of the rPET cups. This way they could be recycled into new cups again. Everyone received a recycle token when entering the event, this token could be used to receive a cup at the bar. If you loose your cup or token, you had to buy a new cup for an extra drink token. The return system worked well and customer satisfaction has been measured by a student. Many visitors didn't understand who the return system worked, until they got their first drink at the bar, future events could inform their visitors a bit more before the event. 81% of people who filled out the survey mentioned that they would also like a return system with hard cups.
- 780kg of recycled PET cups have been collected separately during the Kick-In events through the use of return system using a coin.

Green Certificate

- The Green Certificate, created by Green Hub, is an immensely successful and highly popular initiative. Its primary objective is to evaluate sustainability measures taken by events through a specialized questionnaire covering Communication, Catering, Energy & Transit Footprint, Materials, and Waste. Student associations implement this checklist right from the start of the event planning process to obtain guidance on how to make their event more sustainable. By doing so, they can avoid future issues and set an example for other events, gaining recognition. The online release of the certificate has resulted in an outstanding response rate from student associations seeking certification for their sustainable measures, proving that sustainability awareness is increasing significantly. The Green Certificate has already been awarded to several associations, see table 30, The certificate handed out is hand-made seed paper which will germinate when put into the soil.

Table 29. Overview applications Green Certificate for events

Student/study associations/committees applied for Green Certificate	UT event project groups applied for Green Certificate	Kind of event	Level awarded
Bata race Committee		Relay sport race	Silver
Honours students study association Ockham		Batavieren Barbeque	Gold
TEDx TwenteU student team		TED event	Silver
	Open Days	Introduction days for prospective students	Silver
	Week of Inspiration	Presentations	Silver
Business Days Twente		Networking event	In process
W.S.G. Issac Newton and S.G. Daedalus		Business Days Twente	In process

- The Green certificate has also been updated with questions to cater for a broader audience, usable for small and large events to make it available for an even wider audience.

Updates Pakkerij:

- The type of tap used in the bars prevents spillage of beer.
- Waste is separated in plastic, glass, cardboard and residual.
- All plastic soda bottles and glass beer bottles are picked up by the supplier, as well as the Viper and Red Bull cans.
- Pilots with hard cups have been carried out as the use of soft cups is no longer permitted (Audentis and Taste).

Some complaints have been received with regards to the closing of the academic year where a lot of meat was seen to be on offer and a lot of waste was produced. It is important in the brief the organising committee received to specify the requirement to follow UT sustainability goals and hold waste-free events and provide default vegetarian food at UT paid events. SEE and Green Hub can advise but the responsibility should lie in the right place in the line organisation to ensure sustainability '*is a precondition for everything we do*'.

Chapter 3.8 shows the contribution of the UT (reducing residual waste via high grade recycling of cups) to the Sustainable Development (SDG) Goal 12: Ensure sustainable consumption and production patterns and more specifically:
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

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

3.9 Biodiversity

On World Biodiversity Day, a biodiversity walk was organised where KNNV members guided a group of people across campus while conducting a biodiversity quiz. The participants were very enthusiastic. Online, the Sustainability coordinators of universities and universities of applied sciences posted their achievements (UT) below a joint video emphasizing the importance on strengthening biodiversity.

UT sustainability 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 is being drafted. A SMP is a Species Management Plan. This is required when you are building to avoid negatively affected the local biodiversity. 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. Alongside this, a biodiversity plan is being developed. A concept version is now ready. Some initial results show that the number of breeding birds increased to 56 species in 2023 (45 in 2009; 51 in 2017). The increase in water birds is likely due to a change in the management of the banks of the ponds resulting in a more natural bank vegetation.

In the daily maintenance a lot of consideration is made to strengthen and improve the biodiversity on campus. Flower bulbs are followed by wild flowers to increase the availability of nectar and pollen for insects early In the season. Also, more areas are maintained in an extensive manner, where mowing takes place once a year or once every two years.

A baseline survey was held on May 3, 2023 (Nectar Index). The nectar index assesses the value of vegetation for flowers and pollinators. This is done in spring between May 15 and July 15. Based on species diversity and nectar value the nectar index is calculated. This index ranges from 1-5, 1 being a nectar poor area and 5 a nectar rich area. Four (relatively small)areas were assessed that met the requirements of extensive management and covered a sufficient surface area. Two areas had a score of 2 and 2 areas a score of 3. In the area scoring a 2, 17 nectar producing plant species were observed. Table 30 shows the details.
The advice accompanying this assessment indicated actions to improve the score for example by mowing once after summer, allowing seed to drop and then removing the grass clippings. Also phased mowing where 20% of vegetation remains could help improve the species richness.

Table 30. Nectar Index inventory species

Soortnaam	Found at location	Species name (English)
Akkerdistel	3	Creeping thistle
Akkervergeet-mij-nietje	2	Field forget-me-not
Akkerviooltje	4	Field pansy
Bijvoet	1,2	Mug wort
Duizendblad	1,2,3,4	Yarrow
Gewone / Glanzige hoornbloem	2,4	Common Mouse-Ear Chickweed
Gewone pastinaak/ Brandpastinaak (in)	3	Wild parsnip
Gewone raket	1	Hedge mustard
Gewoon biggenkruid	1,2,3,4	Flatweed
Glad walstro (in)	3	Hedge bedstraw
Grote brandnetel	2	Greater stinging nettle
Grote / Getande weegbree	1,2,4	
Heermoes	2,3,4	Field horsetail
Herderstasje	1,4	Shepherd’s purse
Hondsdraf	2,3,4	Ground ivy
Jakobskruiskruid/Duinkruiskruid	2	
Kaasjeskruid (in)	3	Mallow
Klein streepzaad	1,3	Smooth hawksbeard
Kleine veldkers	1,2,4	Hairy bittercress
Klein vogelpootje	1,4	Little white bird's-foot
Kluwenhoornbloem	1	Sticky Mouse-ear
Knoopkruid	3	Knapweed
Kruipende boterbloem	2,3,4	Creeping buttercup
Madeliefje	2,4	Daisy
Margriet	2,3,4	Daisy
Paardenbloem	2,3,4	Dandelion
Peen	4	Wild carrot
Pinksterbloem	2,4	Cuckoo-flower
Reigersbek	1	Common stork's-bill
Rolklaver	1,2,3,4	Common bird's-foot-trefoil
Schapenzuring	1,2,3,4	Sheep’s sorrel
Smalle weegbree	1,2,3,4	Narrowleaf plantain

Veelkleurig vergeet-mij-nietje	4	Multicoloured forget-me-not
Veldereprijs	1,2,3,4	Wall speedwell
Veldzuring	2,3,4	Sorrel
Vertakte leeuwentand	4	Autumn hawkbit
Vogelmuur	1,2,4	Common Chickweed
Winterpostelein	3	Winter purslane
Witte klaver	2,3	White clover
Zachte ooievaarsbek	2,4	Dove's-foot crane's-bill
Zandraket	1,2	Thale cress

Locations: 1 Boederijweg, 2 De Kepse, 3 Bee hotel, 4 Achterhorst

The feedback received in the SustainaBul ranking (chapter 1.3.2) show it is important to share these kind of updates on biodiversity widely.

Chapter 3.9 shows the contribution of the UT (biodiversity strengthening measures) to the Sustainable Development (SDG)

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 and more specifically:
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.

The plans on biodiversity including monitoring will provide input to the EU CSRD reporting standard ESRS E3 and 4.

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

3.10 Finances

The FIN department contributed to sustainability initiatives through their daily work. Participating in how to report on CO2 emissions or advising on the use of the NS Business card. The FIN department focus is on including sustainability aspects when contracts are drawn up and in tender processes (for example for insurances). It is not yet possible to change bank as the by law required low risk 'schatkistbankieren' is not yet offered by sustainable banks such as ASN or TRIODOS.

UT is discussing the CSRD directive (not obligatory yet for educational institutes) to see whether and how this reporting can be integrated in UT reporting cycles.

UT sustainability 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.

The lack of a long term vision or implementation plan on sustainability in finance has resulted in a low score on the SustainaBul ranking (see chapter 1.3.2).

3.11 Sustainable Labs

Laboratories have an exceptionally high impact on the environment due to their high energy demand and large amount of poorly recyclable, and potentially hazardous waste output. Due to the heterogeneous nature of the labs at the UT, a bottom-up or tailor-made approach is required to effectively reduce the CO2 footprint. Faculties are implementing their own initiatives

to reduce impact, but S&T (TNW) is the only faculty with a dedicated Sustainable Labs Coordinator (SLC)[49], who focuses on sustainability within the labs. This position was initiated in April 2023 and already attracted a lot of attention[50,51].

The Sustainable Labs Coordinator works with two main principles: **Line-in-the-Lead** and **facilitate change**

Focus: Line-in-the-Lead:

Activities that ensure that research groups take point in sustainability action within their own labs.

- **Implementation of Laboratory Efficiency Assessment Framework (LEAF[52])** in all S&T groups provides guidelines for better sustainable practices in the lab. It is also vital to create awareness and a collaborative community. All labs of the Zuidhorst are enrolled in the program. In Carré, two labs have joined so far, in Meander one. The program was presented to the technicians' network of the faculty S&T and received positive feedback. Further guidance and enrolment of the LEAF program will likely be outsourced to the Faculty Green Hub through their network of Green Stuarts.
- As a **member of the Faculty Green Hub,** the SLC collaborates with the student-driven staff-supported Green Hub to work on 5 aspects of sustainability within the faculty: Education, Research, Operations, Community, and Marketing. Bottom-up (behavioural) actions will be initiated through this network.

Sub-projects via Line-in-the-Lead:

- Improved waste separation in the labs. PD waste is now collected separately in the Zuidhorst; Carré and Meander will follow. The Faculty Green Hub under guidance of the SLC will continue this project in 2024.
- Shut down of appliances after use: Stickers have been designed to help remind users to turn off devices after use.
- Reduction of ZZS and CMR substances[53] through provision of safer alternatives.
- Shut the sash: remind users of Carré to close the fume hood windows for safety and energy savings. Alarms - to serve as a reminder to close the sash when the fume hood is not in use - were installed in the summer of 2023 by TCO. A flyer was designed to create awareness on the matter. See below the monthly average of daily open hours of all measured fume hoods in Carré and the effect of the alarm (from July onwards). Closing fume hoods preserved an estimated air volume equivalent to €25.000,- compared to the average of the period Dec 2022 – Mar 2023.

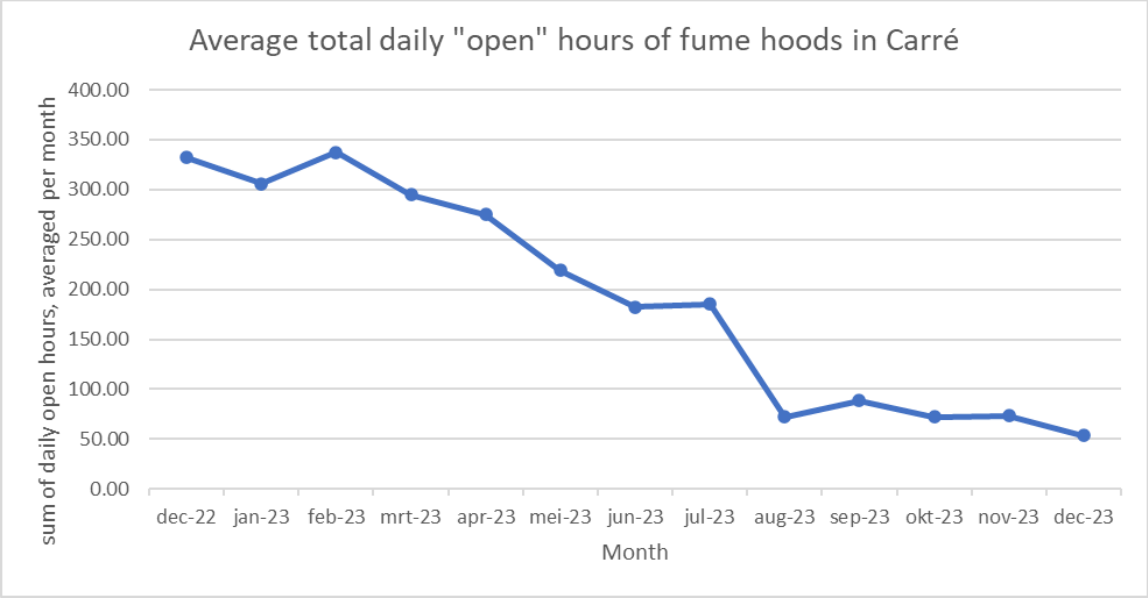


Figure 17. Fume hood usage analysis

[49] greenlabs@utwente.nl
[50] https://www.utwente.nl/en/service-portal/services/cfm/news-events/news/2023/7/1049285/sustainable-labs-coordinator-at-ut-working-towards-sustainable-labs-with-users
[51] https://www.utwente.nl/en/service-portal/news-events/news/2023/5/666657/laboratories-can-be-much-greener
[52] https://www.ucl.ac.uk/sustainable/leaf-laboratory-efficiency-assessment-framework
[53] ZZS: Substances of Very High Concern; CMR: carcinogenic, mutagenic and reprotoxic

Focus: Facilitate change:

Provide central support and facilitate change that is bigger than an individual group.

- Reducing lab ventilation after hours can significantly reduce the energy cost of a building. In collaboration with TCO, CFM, AMH and Bert Geerdink of group CPM, a test with overnight reduction of flow resulted in savings of €170,- in a single night. Extrapolated, a nightly reduction could save on energy cost around €250.000,- €400.000,- to per year for the entire Meander building, depending on energy price and duration of reduced ventilation. Implementation is planned for 2024. A similar plan is in development for building Carré, but this requires more technical adjustment.
- Reduction or elimination of entire GMO/ZSA waste stream through decontamination before collection by PreZero. A business case was prepared by the supplier of the SterilWave machine, which is currently used for the same purpose in UMC Utrecht. Financially, this machine is not viable because of our small volume of GMO waste. Other external services may be considered but are optional at this point.
- Discussions with lab material suppliers to improve recyclability of purchased products. Concrete example is the switch from non-recyclable to fully recyclable packaging on products from Greiner Bio-One. Two pilots will be started this year that will reduce the residual waste stream. 1) Nitrile gloves, previously not recyclable, will be collected by VWR through TerraCycle. These gloves will then be used for the production of other products. 2) A closed-loop recycling plan is drawn up for pipette tip boxes in collaboration with Isogen Lifesciences, where the boxes are collected and shipped back to the manufacturer to be used for the production of new boxes.

The plan is to have a permanent Sustainable Labs Coordinator position who can develop a Sustainable Labs Plan with concrete goals for the whole University to facilitate sustainable choices and behaviour.

In other faculties, the following actions are taken in relation to labs:

- Within the central BMS Lab facility, a focus policy is put in place to, where possible, perform local sourcing of lab supplies to reduce transportation overhead.
- New BMS Lab lab rooms commissioned in Ravelijn building containing maximum amount of reused furniture.

ET also aims not to reinvent the wheel themselves but learn from the (sustainability) initiatives of other faculties. That is why ET is aligning with S&T and their sustainable lab coordinator to learn from and look for common opportunities to reduce (lab) waste and energy consumption.

3.12 Data - CO_2 footprint

A key challenge to achieving a sustainable organisation is **data collection.** To build an accurate CO_2 footprint of all the impact the UT's activities have, we need accurate and complete data.

Awareness, consistent UT wide reporting, communication and transparency of UT's sustainability performance are imperative to build and maintain support for the necessary changes to become a sustainable organisation.

Monitoring, assessment, and reporting are an important aspects of the organisational change necessary. Setting goals and monitoring progress towards the goals enables the organisation to be transparent.

The Faculty Green Hubs proposal from Green Hub building student and staff teams into each faculty to support reporting, build awareness and connections, also for operational portfolios.

Carbon Data platform
Together with UT Start-up Realised a Carbon Platform has been developed to more easily collate the information required to calculate the CO_2 footprint of the UT.

Energy data platform

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 generation.

CO_2 footprint

The 2023 CO_2 footprint report has been published on the website: link. This has been generated through the carbon platform. This provides input to the EU CSRD reporting standard ESRS E1.

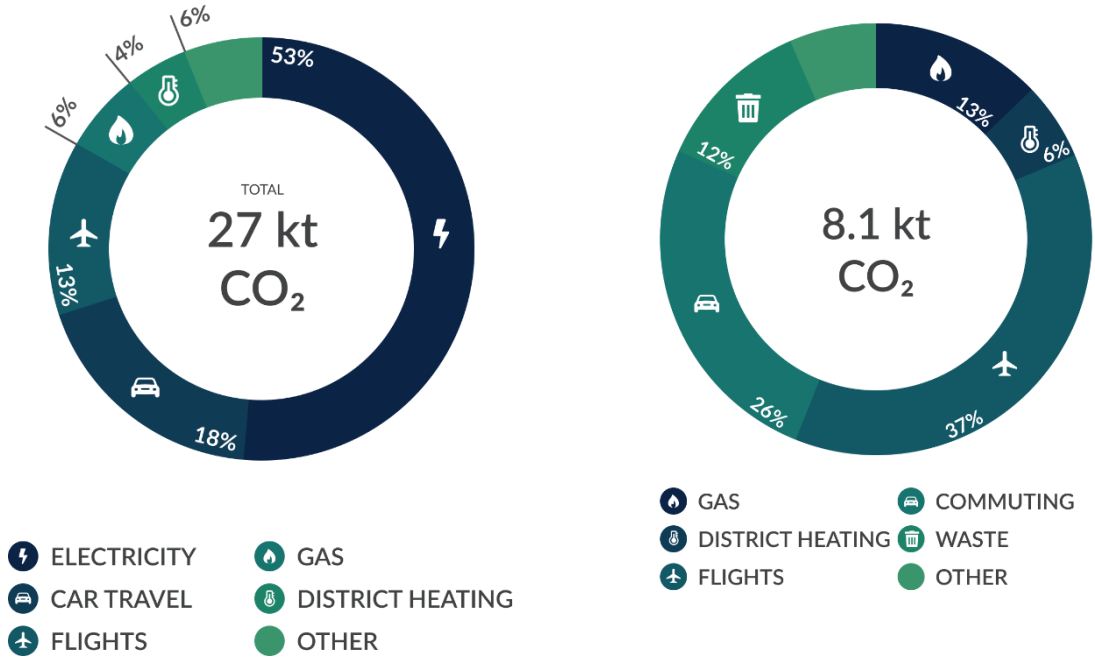


Figure 18. CO_2 footprint of 2019 (left) and 2023 (right)

The 2023 CO_2 footprint shows a significant reduction compared to the CO_2 footprint of 2019. Without deducting compensation this is a 70% reduction in four years. Half of this reduction is due to the purchase of renewable electricity.

The CO_2 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 77 companies were contacted and CO_2 data was received from around 35 suppliers of goods and services (45%), 44% of suppliers did not react to the request to share CO_2 emissions data, 9% will provide data later in the year (this will be processed and the UT CO_2 footprint will then be updated) and 5% indicated they could not provide any data. Of the 45% of suppliers that provided data, 26% 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), 17% calculate a CO_2 footprint and can determine what percentage can be allocated to the services or products delivered to UT.

This scope 3 CO_2 footprint calculation is the best we can do at this moment. We do realise we are underrepresenting scope 3 emissions as due to the lack of information that companies could not or did not provide. This includes the omission of emissions during the mining and production phase as this is outsourced to countries in the global South. Suppliers to UT often do not have this data as there are many players in their supply chains for us to be able to include this in our CO_2 footprint calculation.

CO_2 emissions of electricity are compensated via certificates of origin and thus subtracted from the CO_2 footprint. Flight compensation has not been deducted in both years to facilitate a fair comparison.

Chapter 3.12 shows the contribution of the UT (transparent reporting on UT performance, SEE Programme) to the Sustainable Development (SDG) 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 and more specifically:

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

More detail on the CO_2 footprint can be found on the Carbon Footprint website where the report is available to download.

3.13 Communication

Communication plays an important role in bringing about change. The goal of communication is to help achieve organizational goals, in this case becoming 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 actions from UT as an organization that help them achieve this. That way, it doesn't seem like UT is passing the responsibility on towards individuals. Communication cannot be as effective if the organization does not take action to achieve the sustainability goals.

The tone of communication is generally positive, where we celebrate successes and milestones. Whenever possible, means of communication connect to the ten 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 and support from managers and other ambassadors & role models positively influences colleagues and students.

In 2023, means of communication from the SEE programme focused mainly on two sub-goals:

- Showing measures that the UT as an organization has taken to become more sustainable, including calls to action for employees and students on what this means for them and how they can contribute;
- showing positive examples of UT employees who include sustainability in their day-to-day work as a matter of course, positioning them as ambassadors for sustainability and setting new norms.
- Celebrating successes and role models, and increasing visibility of sustainability measures and initiatives at UT.

Highlights

Sustainability Exhibition
An interactive sustainability exhibition was created that shows the many measures UT takes to become more sustainable, and that invites visitors to engage in dialogue about the subject, so they can bring in ideas and take inspiration back to their own work environment. The exhibition was premiered at UT's open day and gathered a lot of attention and resulted in pleasant talks with visitors and employees. Afterwards, it was put on display in the Waaier building. From September onwards, it was displayed at various locations on campus. This will continue through 2024.

Article 08-06-2023: Sustainability Exhibition now on display in the Waaier

Sustainability Walk
During Sustainability Week in November, the Sustainability Walk was launched. The walk is a route of about 4 kilometres across the UT campus that highlights sustainability measures taken at 13 locations. Through an information board, colleagues, students and visitors can learn about the many visible and invisible measures UT takes to become a sustainable organization.

Article 28-11-2023: UT launches Sustainability Walk

Interviews
As in previous years, several interviews with UT colleagues who take an active role in making our organization more sustainable were published. The goal is to highlight these positive examples to inspire others and so influence the norm at UT. We find that people are happy to talk about this subject, as it is naturally important to them, which leads to positive stories.

Leo Keekstra: making wise choices together to become more sustainable
Bert Kloppers: thinking in possibilities
Learning Centre realizes sustainability initiatives with colleagues and students

List of operations-related articles

- January 30: UT launches new train map to encourage sustainable travel
- March 6: Week without meat at UT: special plant-based selection in UT canteens
- March 16: Changes to the processing of metal waste (cans)
- March 23: Update: smart water reservoir pilot has started
- March 23: University of Twente is adding more solar panels to campus
- March 29: Reforestation project to offset CO_2 emissions from flight
- March 30: Leo Keekstra: making wise choices together to become more sustainable
- April 14: Unique waterlab opens on UT campus
- April 23: Faculty club S&T takes initiative for a clean and sustainable campus
- May 1: Laboratories can be much greener
- May 4: Electric car testdrive day: a success!
- May 30: Carbon footprint report 2022: substantial drop in reported emissions because of green electricity
- June 8: Sustainability exhibition now on display in the Waaier
- June 13: Bert Kloppers: thinking in possibilities
- June 13: No more free single-use plastics from July 1 onwards
- June 29: Reminder: no more disposable coffee cups as of July 1
- July 4: Innovative nudging intervention pilot reduces toilet water waste
- July 6: Sustainability insights of UT real estate
- July 13: Sustainable labs coordinator at UT: working towards sustainable labs with users
- August 7: New videographic helps UT-community recycle their waste properly
- September 25: ROC Twente, University of Twente and Saxion raise awareness of SDG's
- October 4: Innovative decision tree makes UT events more sustainable
- October 16: Learning Centre realizes sustainability initiatives with colleagues and students
- October 19: Demand-driven ventilation creates a win-win situation
- November 20: Sustainability Week: Saxion, UT and ROC work together for sustainability
- November 28: UT launches Sustainability Walk
- December 14: Project to make UT restaurants more sustainable bears fruit

All news articles on sustainability can be found here.

Other communication products

- The Green Hub has produced monthly newsletters. The impact was limited. The Central Sustainability Intelligence Platform will contain a news portal replacing the newsletter. The sustainability communications advisor supports the Green Hub communications officers with advice.
- The Green Hub has submitted the UT contribution to the **SustainaBul 2023** (public link). UT was ranked 17th.
- **UToday**'s news items on sustainability can be found here: link.
- Improving waste separation, Cycling4Climate, the removal of disposable plastics from campus and more was promoted via the coffee machine screens.
- The sustainability landing page on the Service Portal has been updated with current information and is now showing relevant news articles. It serves as a landing hub on the Service Portal for all sustainability-related groups at UT, not just the SEE programme.
- The SEE-programme landing page has been updated, including new members, information on new groups and ways of working together, as well as a new organogram.
- The Sustainability website was updated in various ways, including an overview of the main groups at UT that work on sustainability.
- A videographic to help the UT community properly separate waste created together with the Green Hub and the webpage updated, along with a new version of .

Communication officer

For most of 2023, the PT SEE was supported by a junior communication officer. After an onboarding period, this officer took up many tasks and projects. This allowed the communication advisor to focus on other, more strategic tasks, such as the Sustainability Dialogues, the Sustainability Week, cooperation between the various sustainability-focused groups at UT and organisational challenges.

Examples of the tasks and projects the communication officer helped accomplish include:

- updating the Sustainability website
- a project to reduce food waste in banqueting
- creating the Sustainability Exhibition
- Several interviews for the Sustainability Series
- Writing various news articles
- Create a decision tree for cup use at UT events
- A visual to better communicate the structure of the SEE programme
- A visual of the SEE facts and figures 2022
- The Sustainability Walk

3.13.1 UT-wide communication on sustainability

The SEE programme is not the only entity on campus communicating about this topic. In the past six months, more communication from others took place than ever before – requiring more coordination and finding an effective way of working together.

Collaboration on communications between Green Hub, Climate Centre, DesignLab and SEE, through the formation of a combined sustainability communications team, is perhaps the best way to avoid parallel processes and achieve impactful communications on sustainability, enabling UT to benefit from the role on sustainability it is taking. Currently, too much work is allocated to few people, preventing UT to benefit from publishing, promoting and communicating in a coordinated way what UT does on sustainability. Coordination is also taking place with other entities for whom sustainability is becoming a more important topic, such as the ET and ITC faculties, the Student Union and LISA. Talks about how to proceed from where we are now will continue in the coming period.

Green Hub
Green Hub[54] –With their own social media channels (Insta, FB, YouTube, LinkedIn) and their monthly newsletters, Green Hub Twente creates visibility on sustainability. Their activities, such as a podcast series, 'Green Talks', that interviews UT sustainability researchers and professors, and fun awareness raising activities such as the vegan lunch session on 'Towards a climate-neutral campus', in collaboration with ECIU, are well attended and bring people together to work 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/. This year the week ran from 27th of November till 1st of December 2023.

The SEE programme was involved in several activities during Sustainability Week, including a gathering about sustainability with members of the Enschede municipal council, answering questions about sustainability at UT with the Sustainability Exhibition in Technohal, the opening of the Sustainability Walk and two guided Walks.

[54] https://www.utwente.nl/en/sustainability/green-hub-twente/

Figure 19. The opening of the Sustainability Walk

Green Hub collaborates with Student Union, student association Sustain and VSA who have their own (social) media channels.

Climate Centre
UT's new Climate Centre (see website) was formally announced at the Dies Natalis in may 23. Already in the making before the official announcement, the Centre organized two Climate Cafés during the first half of 2023, mainly aimed at researchers and educators interested in finding solutions for the climate crisis. They will ramp up the amount of events they organize in the coming period.

While the Climate Centre mainly focuses on research and education, there is a lot of overlap with the SEE programme and operations, because sustainability issues often cross boundaries between these pillars. The Climate Centre cannot effectively and credibly operate if UT does not become a sustainable organization itself.

Sustainability Dialogues
In the first half of 2023 the Sustainability Dialogues took place, a conversation between the Executive board and the wider UT community about the role and responsibility of UT in the climate crisis. The immediate reason for organizing the Dialogues were demands and protests on campus from the Climate Coalition, a group of organizations at UT concerned about sustainability. The Dialogues aimed to give a space to all members of the UT community to bring their concerns and ideas to the EB and also to make connections amongst themselves. One of the sessions was explicitly about sustainability on campus, but the topic came up naturally in every session.

More information about the Sustainability Dialogues, an overview of all sessions and the final report can be found on the website.

MC colleagues
A key intermediary here are the communications staff of the UT. M&C advisors are spread across UT in all departments. They have an ideal position to integrate sustainability in their communications. The SEE sustainability communications advisor has set up a plan to inform and involve the M&C colleagues so all the activities, research and education on sustainability will be highlighted more.

3.14 Network of sustainability coordinators

This network of universities and universities of applied sciences focusses on making operations more sustainable. There are several working groups (Teams channels) on specific topics such as catering, biodiversity, mobility, waste, CSRD, circularity and sustainable labs. This network enables the sharing of knowledge and best practices as well as offers opportunities to collaborate on proposals to improve the operations of the educational institutes.

Via Universities of the Netherlands[55], UT played an active role in forming a working group on sustainability.

Chapter 3.14 shows the contribution of the UT (active role in network) to the

Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development, more specifically: Target 17.17: Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships

[55] https://www.universiteitenvannederland.nl/en

4. Energy

This chapter details the aspects of legislation on energy that is applicable to UT.

4.1 Energy Measures List (EML)

Since 2005 UT has committed to the Long-Term Covenant Agreement on Energy Efficiency (in Dutch: MJA) . This was an agreement between government and institutions to improve the energy efficiency of products, services and processes while reducing the use of fossil fuels. UT has performed well by reducing its energy consumption between 2005-2020 by 39%. Per 1 January 2021 the Multi Annual Agreement came to an end. This was replaced by the EML reporting. As of 1 December 2023 UT will have comply with the 'informatieplicht (obligation to provide information) on energy saving, and report to RVO (Netherlands Enterprise Agency). This is monitored and assessed by the ODT (environment agency for Twente).

A Recognised Measures list (EML) which lead to energy saving with a return on investment of maximum five years will be compared to the current situation. UT is already doing more than this EML requirement, having set the return on investment to 7 years.

At UT, 24 buildings are included in this reporting. Buildings that consume more than 170.000m3 gas/ 5380 GJ district heating/10 million kWh electricity have an additional obligation to investigate energy reduction options (Horstcomplex, Carré). Energy-intensive processes take place in these buildings requiring additional reporting. For these buildings, a four-year energy reduction plan needs to be developed which will be submitted to in the RVO online reporting tool by 1 February 2024. The goal of this plan is to create an overview of the current situation in order to identify cost-effective, energy saving and CO_2 reducing measures.

This reporting should include:

1. Location description
2. Description of processes taking place in the building and the installations present
3. A description and justification of conducted energy saving measures
4. An analysis of the energy consumption of the building
    a. Energy and process monitoring
    b. Display of energy consumption
    c. Details on unused heat sources
    d. And a conclusion on the energy consumption of the building
5. An analysis of appliances and installations, including a conclusion on the energy optimisation of appliances and installations
    a. A scan for technical insulation
    b. An analysis of the electrical driver systems
    c. A comparison with the base list energy saving measures
6. An inventory of cost-effective CO_2 reducing measures
    a. Including a calculation energy savings, CO_2 reduction and return on investment
7. Base check energy management
8. An implementation plan

4.2 Energy labelling

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.

Table 31. Overview energy label per building

Building	Label	Assess-ment done in	Energy usage MJ/m²	Electricity kWh/m²	Gas m³/m²	District heating GJ/m²	Energy usage CO_2 emission kg/m²	Remarks
Bastille	A	2019	538.2	32.3	0	0.2	39.3	Without district heating energy label also label A
Boerderij								New label assessment to be done
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 – New label assessment to be done after renovation
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 hotel	F	2019	1204.7	21.1	28.7	0	63.1	After assessment 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
Sport Centre								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
Building	Label	Assess-ment done in	Energy usage MJ/m^2	Electricity kWh/m^2	Gas m^3/m^2	District heating GJ/m^2	Energy usage CO_2 emission kg/m^2	Remarks
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.

4.3 Energy coordinators network of universities and universities of applied sciences

This network of energy coordinators exchanges information and best practices between universities. Despite the fact that there are now no sector specific KPI's to work towards instead, this group continues to exchange experiences twice a year.

5. Environment

Annual reporting on the environmental performance has been done through the online electronic environmental annual reporting tool. This was part of the (MJA) Long-term agreement on Energy Efficiency. This energy reporting requirements is done by the energy coordinator. Environmental reporting includes besides energy also reporting on waste, water usage and emissions to air, water and soil. In the past reporting on the environmental performance was done as part of Health, Safety and Environment reports by HR and submitted to the Executive Board. Considering the importance and relevance, it is from now also included in this report.

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 ODT (Omgevingsdienst Twente) was formed, all environment related tasks were transferred from the council to ODT (end 2020), including enforcement of the conditions of the permit.

5.1.1 Preparation for the introduction of the Omgevingswet

Per 1 January 2024 the Dutch legislation with regards to the environment change. The ‘activiteitenbesluit’ ceased to exist and instead the ‘omgevingswet’ (law for the surroundings) comes info force. This law combines 26 laws related to the physical living environment. It becomes one integral law.

The main change for UT is that environmental impact is now assessed per activity. Also some responsibilities divulge to the local government who have 10 years to develop a plan for the local surroundings. Until then a lot of the rules remain the same as when they fell under national rule to avoid a legislative vacuum.

An MBA is an activity that has an impact on the environment. Examples are storage tank for gasses, boilers using fossil fuels, storage of dangerous substances, laboratories.

Together with environmental coordinators of other universities and academic hospital (SaazUnie) we have worked to create an joint overview of the impact and have listed issues we need to keep an eye on. The environment agency will be the unit inspecting us and we keep in close contact with them to avoid confusion as there are issues that are not yet clear or are interpreted differently by different environment agencies.

5.1.2 Environmental inspection ODT 2023

In October 2023 the environment agency (ODT) visited the Langezijds building and the Gallery. For Langezijds it concerned the inspection of the new building which was passed with flying colours. The Gallery is extending its building and will house businesses which will have labs. This was discussed with the environment agency and steps need to be taken to ensure that UT is not taking the responsibility for companies that have no or insufficient functional, technical or organisations connections with UT. This is relevant when the new law ‘omgevingswet’ assesses environmental impact based on the specific activity and no longer based on whether it was geographically located without the organisational boundaries of the university.

There needs to be a line of communication with external companies with regards to the process to follow when calamities occur as an incident at the company may have impact on UT staff or students as well. Also, companies need to take the same responsibility as UT labs do with regards to preventing water pollution etc. In 2024 this needs to be agreed upon after which the environment agency needs to be informed of the new organisational boundary of UT.

5.1.3 Water quality monitoring and waste water

The permit obliges us to take water samples four times a year at the sewage pumping station on campus. This data also provides input to the EU CSRD reporting standard ESRS E2.

Table 32. Waste water analysis 2022 – 2023: 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
2022-12	<2	150	2.6	4.3	98
2023-03	<2	130	1.2	5.3	150
2023-06	5.5	150	<1	4.6	87
2023-09	<2	150	3.3	4.9	120
2023-11	<2	120	1.7	3.7	91

Table 33. Waste water analysis 2022 – 2023: flow, COD, N, pollution

	Average flow	Average Chemical oxygen demand	Average sum N	Pollution count
Date	m3/d	mg/l	mg/l	
Mrt-22	731	446	83.76	3067
Jun-22	871	750	85.45	4059
Oct-22	761	480	86.56	4373
Dec-22	786	462	86.56	4523
Mrt -23	626	458	71.3	3268
Jun-23	759	562	90.12	4928
Sep-23	786	450	90.36	4564
Nov-23	842	412	79.96	4372

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

Table 34. Threshold values waste water (environmental permit UT)

Waste water flow	Parameter	Max. concentration in single random sample
Waste water 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

The amount of waste water disposed off via the sewage pumping station towards the water purification installations of the waterboard are displayed in table 36. This includes all users of the campus, including students and external companies.

Table 35 Waste water

Month	Total (m³) of waste water
January	22,792
February	20,371
March	23,921
April	21,603
May	21,172
June	20,710
July	16,741
Augustus	17,556
September	21,439
October	23,234
November	25,153
December	26,278
Total	260,970

5.1.4 Substances of Very High Concern (ZZS)

An additional advice of the ODT included to research what substances of Very High Concern (ZZS: Zeer Zorgwekkende Stoffen) are present in our waste streams. People working with ZZS are informed all dangerous substances are kept separate and disposed off as dangerous waste. In the regular waste streams, there should be no ZZS present.

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, 2023 (de Omgevingswet).

Within the Health, Safety, Environment network of the UT the process and with the Sustainable Labs coordinator 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.

Table 36. Most used ZZS

	Top 10 Most used ZZS	Kg	%	% of 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 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. The Water Lab may offer this possibility.

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.

5.2 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 of 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 focussing on disconnecting buildings from natural gas used for heating and reducing gas consumption through applying efficiencies.

5.3 SaazUnie Environmental coordinators network

This network of environmental coordinators exchange information and best practices between universities and university hospitals. With the introduction of the ‘Omgevingswet’ combining all legislation on living, working, roads, environment, air, soil, nature and water, this group collaborates on finding out what these changes mean for the permits of the universities and how best to continue to comply with all legislation.

6. Budget

The budget of €421,000 - approved when the sustainability policy was adopted in May 2020 -, is now divided into two categories: staff time (€222,000), communication & promotion / training & development (€199,000). In 2020 this was 0.1% of the UT budget. In June 2021 the staff costs were allocated to CO (centrale ondersteuning).

The expenses in 2023 were €326,117, which led to a surplus of €94,932.

Table 37. Financial overview 2023

	2023	SEE budget	Balance	Remarks
Staff	259,998	222,000	-37,998	Travel costs are included here and one fte moved from CFM budget to SEE budget
Communication & Promotion	42,408	44,000	1,592	
Training & Development	22,500	155,000	125,883	Mendix, Realised, Route circulair etc.
Unexpected expenses	6,667			Commuting, office costs
Total	326,117	421,000	94,932	

The SEE Programme has been working on making sustainability more visible but more support in the area of communication was required. This had been temporarily solved (until 1-11-2023) by hiring consultant junior communications officer. A permanent solution is still needed. An internal junior communications officer is the preferred and most effective option as knowledge remains in-house.

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 CO_2 emissions better. The collaboration with Green Dish working on a menu that falls within the planetary boundaries falls under this category as well as funding for the pilot with oat milk.

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 this relatively small budget allocated for the implementation of sustainability initiatives as being able to take advantage of the momentum when this arises is key. 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.

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