SEE PROGRAMME ANNUAL REPORT 2024

SUSTAINABILITY ENERGY ENVIRONMENT PROGRAMME

B.MARECHAL

MARCH 2025

UNIVERSITY OF TWENTE.

SEE Programme

Sustainability Energy Environment Programme

2025

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SEE PROGRAMME

DATE
19 March 2024

REFERENCE

VERSION
1.2

STATUS
Concept

PROJECT
SEE PROGRAMME

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https://www.utwente.nl/sustainability

FILENAME
2024 SEE Annual Report.pdf

REGISTRATION DETAILS

PHOTO CREDIT
Brechje Maréchal

DOCUMENT MANAGEMENT

History

VERSION	DATE	AUTHOR(S)	CHANGES	APPROVED NAME
1.0	28 January 2025	B. Maréchal	Initial document	SEE, WG-SEE, MT-CFM, SG, UCB
1.1	3 March 2025	B. Maréchal	Final version including comments from Steering group SEE, EB	EB
1.2	19 March 2025	B. Maréchal	Updated figure 1, CO2 data added	EB

Distribution

NAME	DATE	ORGANISATION
SEE PT	04-02-2025	UT
SEE WG	04-02-2025	UT
SEE SB	05-02-2025	UT
MT-CFM	11-02-2025	UT
SEE SG	11-02-2025	UT
UCM	04-03-2025	UT
EB	24-03-2025	UT
University Council	14-05-2025	UT

PREFACE

The 2024 SEE Annual Report shows what actions have been taken during 2024 to reduce the impact of the activities of the University of Twente on our changing climate, on the pollution of our air, water and soil. It shows where we made improvements to reduce our CO_2 emissions, to reduce the number of resources we use daily and how we contributed to strengthening biodiversity on campus.

The report describes what initiatives were taken across UT. We acknowledge that the SEE Programme is not aware of all actions that are taken across UT to work towards a better world. Therefore we call upon you to share your activities and ideas via sustainability@utwente.nl in order to include these into this report in future and help us spread the word of best practices. It will help to illustrate what each and everyone of us can do to help reduce our impact on the planet.

A sustainable organisation sounds like a broad concept. We refer to reducing CO_2 emissions from using less energy, travelling to work and for work sustainably like cycling or using the train, to using fewer products for whose productions CO_2 emissions were needed (carbon neutrality). We refer to avoiding waste by taking this into account while purchasing products, recycling well so resources can be reused (circularity). We also refer to strengthening biodiversity by maintaining our campus in such a way it improves the habitat for species. And we refer to minimizing the impact of UT's activities on the soil, air and water. What does not get polluted, does not need to cleaned up.

This document also reports on the legislative obligations we comply with on the topics Energy and Environment.

MANAGEMENT SUMMARY AND HIGHLIGHTS 2024

The SEE Programme manages and works on continually and structurally improving UT's sustainability, energy and environmental performance. The team does this by enabling, facilitating and supporting colleagues to incorporate sustainability in their daily work. The 2024 Annual Report reflects on the progress made in 2024 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 2024.

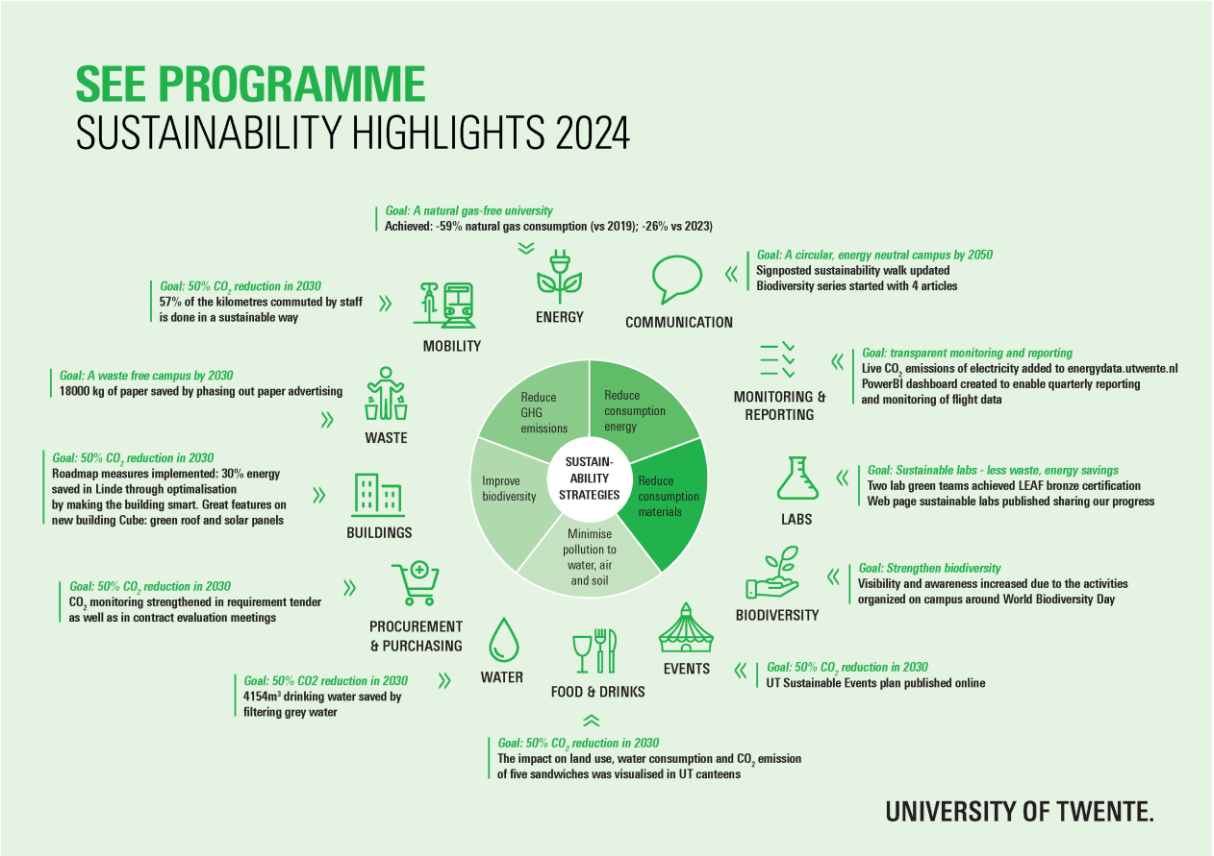

Figure 1. UT sustainability goals and highlights 2024

HIGHLIGHTS 2024

Energy

- The first step taken to work towards a gas-free campus: The closed distribution system (GDS) is kept by UT.
- Discussions continue on ventilation optimisation (day/night settings), a high impact change
- Recognised energy saving measures list (EML) – obligation for UT to comply with (inspections ODT ongoing)
- 2064 solar panels provide ~1.4% of UT's electricity needs

Travel & Mobility

- A CO_2 reduction-pricing-compensation plan was developed. As decided by the SEE steering group June 11, 2024, plans to implement CO_2 compensation will be put on hold for two years.
- HR survey: 57% of the kilometres commuted is done in a sustainable way

Waste

- Waste separation visualization boards were successfully tested at the ITC building.
- The Digital Clean Up Day was a success and will be continued in 2025.
- Procurement initiated phasing out paper advertising, saving 18000 kg of paper

Buildings

- The decision was made to focus on more efficient use of existing buildings rather than building new buildings.

Procurement

- Focus on sustainability in tender processes and contracts
- More sustainable options in web shops
- Collaboration on strengthening CO_2 emission data from suppliers (with student AT)

Water

- Saxion student researched where UT can make water savings to meet the goals of -20% in 2035
- 4154 m^3 of drinking water was saved by filtering grey water.

Food and Drinks

- The impact on land use, water consumption and CO_2 emission of five sandwiches was visualised in UT canteens together with UT start-up MiSt. This influenced the choice of a third of the respondents of the survey.

Events

- A sustainable events plan was written and is now online after approval by MT-CFM
- The form to submit an application to the Green Hub's Green certificate was updated

Biodiversity

- Several activities were held in honour of World Biodiversity Day, May 22.
- 1023 unique species were observed during the BioBlitz on campus

Sustainable Labs

- The energy saving protocol for labs is tested in Meander enabling ventilation to be adjusted according to the presence of lab users with an automatic night reduction setting
- Alarms on fume hoods have reduced energy consumption and substantial financial savings
- Two lab green teams achieved LEAF bronze certification and created awareness on lab sustainability
- Webpage containing sustainable lab information on energy, water, vegan science, procurement, chemicals etc.

Communications

- Sustainability exhibition (travelling through all buildings)
- The Sustainability walk website received an extensive update
- 30,000 views of utwente.nl/sustainability and /duurzaamheid in 2024
- Start of the Biodiversity Series of articles

Reporting

- Live CO2 emissions of UT's electricity consumption can be viewed on https://energydata.utwente.nl/ (based on the emission factor of the Dutch national energy mix from the Dutch National Energy Dashboard)
- PowerBI dashboard created to enable quarterly reporting and monitoring of flight data

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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	Polystyrene
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 2024 can be found online via this link.

1.2 SEE ORGANISATIONAL STRUCTURE

In 2023, a new Strategic Sustainability Coordinator position was created to strengthen the strategic coordination between the SEE Programme and the management across UT as well as the SEE Sounding Board and the to be initiated SEE Sustainability Panel. Unfortunately, this position was not continued after January 2024. Below the updated organisational structure that was current in 20924 is shared. The members of the SEE Programme groups can be found on the website[1].

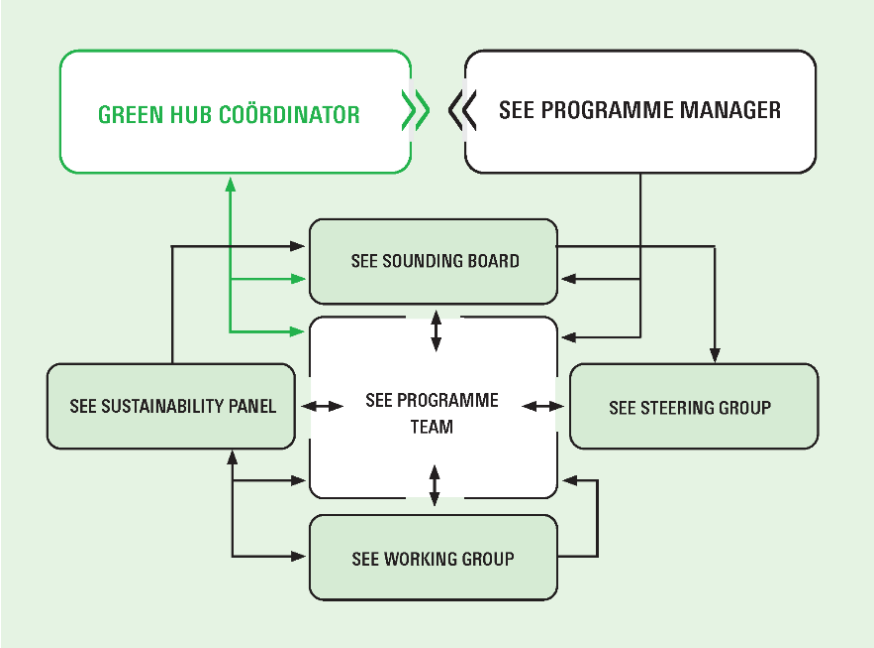


Figure 2. Organisational structure of SEE-Programme 2024

At the time of writing it is unclear how the collaboration with the Green hub will be shaped as the Green hub coordinator resigned and will not be filled. In 2024, there were no topics that required a sustainability panel. Therefore this has not been initiated yet.

[1] https://www.utwente.nl/en/sustainability/sustainability-on-campus/organization/see-programme/

1.2.1 Linkages SEE with other UT initiatives and programmes

Green Hub collaboration

Until summer 2024 SEE-Green Hub monthly meetings were held to discuss the progress of running projects and identify opportunities to support each other. Green Hub focussed their staff time primarily on developing and supporting the faculty Green Hubs and on finding ways to generate funding for the continuation of Green Hub.

Green Hub's initial funding of four years came to an end in 2024. Green Hub aims to continue in a slimmed down manner, with student volunteers (instead of being able to pay students for 8h of their time). If this is possible while being able to fulfil the original idea behind the Green Office concept is yet unclear. They will try to achieve as much as possible with the reduced capacity.

Faculty Green hubs

The Faculty Green Hubs at ITC, ET and S&T were in operation from September 2023 until July 2024. They ceased to exists as student assistants contracts could not continue due to the financial measures taken by UT.

In 2024, Green Hub collaborated with various other organisations, such as Climate Centre, SEE programme (sustainability walks), EA Altruism Twente (workshop), VSA (Vegan Cooking workshop), Amnesty Utwente (Men-Struation challenge), UIF (sustainability awareness raising), Sustain (sustainability awareness raising and volunteer recruitment), SU (sustainability fund), ESN (thrift markets), Flora Nova (plant library and plant exchanges), SOS UK, Circular Economy Platform Twente (organised events and created content for newsletter), Ministry of OCW – (Green Office meeting to inspire and learn - how GO's can think like a business), SV Dimensie (SDG pub quiz).

Highlights

- Green Hub mapped where sustainability is included in the curriculum at ET, S&T and ITC.
- Green Hub co-organised Climate Café's with Climate centre and hosted the PhD poster market at the Climate centre's Climate Event.
- Green Hub provided advice to various large events on how they can make the events more sustainable and handed out the Green certificate to the organisations.
- Green Hub organised with the Green Office Movement a three-day event at UT in March 2024 with more than 120 international visitors
- Green hub facilitated the speaker Maartje Bregman for a Studium Generale lecture
- Green Hub shared knowledge to visitors such as the University of the Visayas, Philippines, Aveiro University and multiple Dutch universities.
- Green Hub organised seven events at a well attended Sustainability Week 2024.
- Green Hub organised an event for students looking for a sustainable internship
- Green Hub supported promoting sustainable commuting by promoting the Cycle to work day (May 17) on their social media (link).

Climate Centre alignment

Periodic alignment meetings were held between Climate Centre, Green Hub and SEE, initiated by SEE. The idea behind this was that our activities touch upon each other and can strengthen each other. By knowing what the other party focusses on, we can help promote each others activities and increase our collective reach.

SEE has submitted news articles to Climate Centre who included these in their newsletter. SEE also shared information to Green hub who shared it on their social media outlets. The SEE travelling exhibition has decorated the Climate Event.

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 first companies required to report in 2025 over the year 2024.

The CSRD provides standards that organisations 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. It is the intention of the Dutch legislator that the CSRD and associated European Sustainability Reporting Standards (ESRS) are not applicable for public sector organizations such as universities.

A working group from the Ministry of Education, Culture and Science on sustainability reporting is currently working on a handbook how educational institutes could do their sustainability reporting (on a voluntary basis). Universities of The Netherlands collaborate on this to form a joint approach. When all universities report in the same manner it will also be possible to benchmark the organisations more accurately. 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.

To illustrate what information will be reported on for the CRSD, the European Sustainability Report Standards (ESRS) 'Environment' (E)[2] 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[3] -> 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

[2] https://www.efrag.org/Activities/2105191406363055/Sustainability-reporting-standards-interim-draft
[3] 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)

- Whether, how and to what extent UT contributes to Green Deal's ambitions for fresh air, clean water, a healthy soil and biodiversity

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[4] is Dutch higher education sustainability ranking involving 33 institutes for higher education. This benchmark analyses the implementation of sustainability at universities (of applied science) on the themes of education, research, operations and the integral approach between these. It is organised by the organisation Studenten voor Morgen[5] 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.

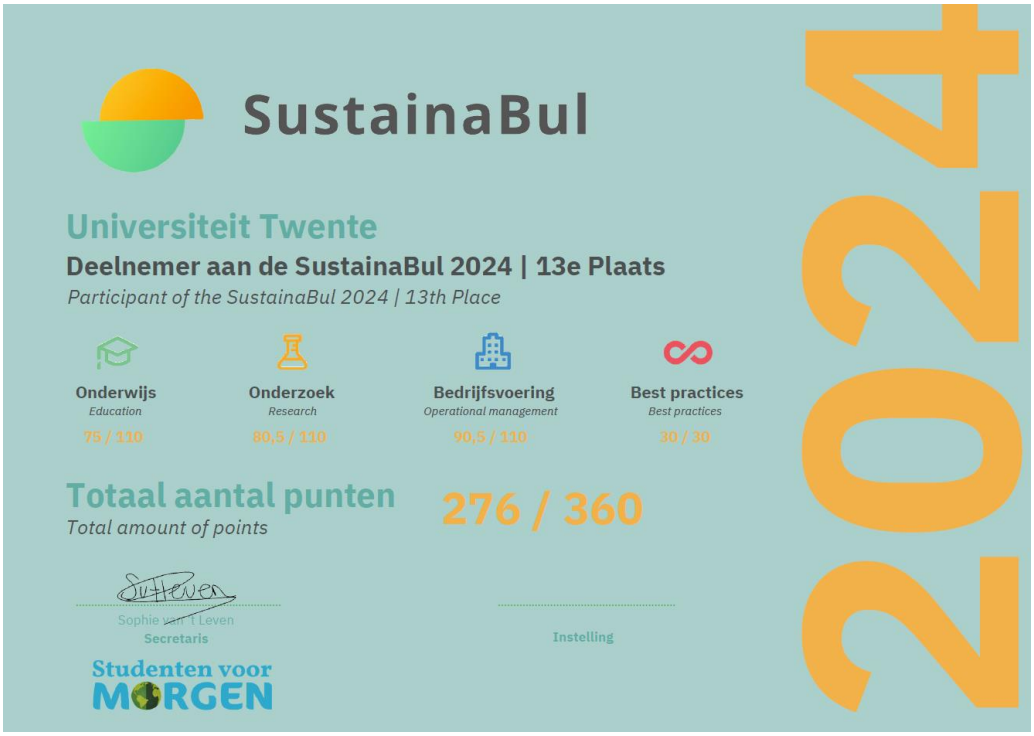


Figure 3. SustainaBul ranking certificate 2024 University of Twente

[4] https://ho.sustainabul.com/
[5] https://www.studentenvoormorgen.nl/

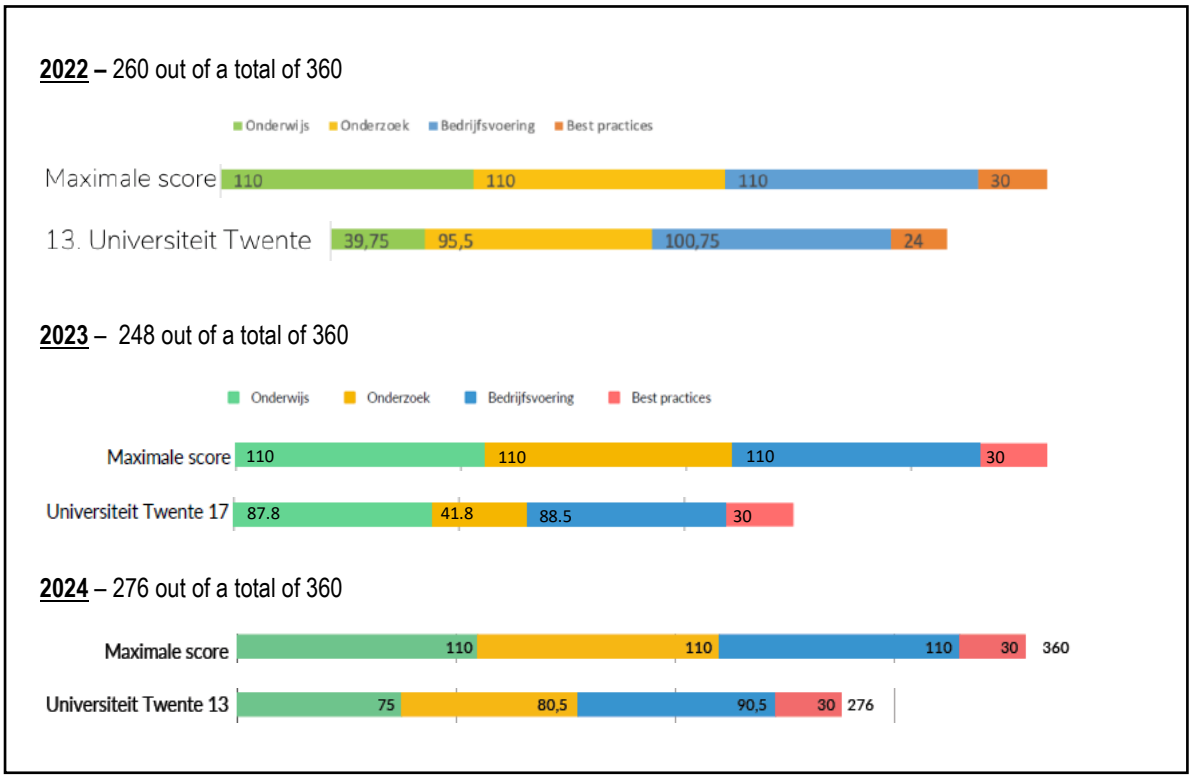


Figure 4. SustainaBul scores 2022-2024 University of Twente

Green Hub analysed the outcome and came up with the following recommendations:

Education: Improve information on sustainability in courses both for BSc and MSc, minors and electives on the website. Show the link to the relevant SDG's when courses give relevant attention to these connections.
To support this, from a strategic perspective, include sustainability in the educational strategy and show how curricula can be adjusted to structurally include sustainability in the courses. Share this strategy on the website.
On operations: share your strategy to reduce impact of food consumed on campus. Share a strategy how to use fewer animal products and how to reduce food waste. Plan actions up to 2030 on this topic. Share in your reporting what you do to strive towards in a new contract after 2028. Increase the generation of solar energy and share what your limitations are. Share the UT's strategy in this. Explain your choices for the bank and insurance companies UT uses and how sustainable these companies are.
On mobility communicate about the travel movements and write an active policy on this (HR). Share this policy online.

The higher ranking in 2024 attributed Green Hub to more effort that went into collating the information on sustainability in research.

Every year there are questions on whether to continue with the ranking as non standard assessment in scoring methodology due to each student interpreting data differently leads to questions of institutions on the validity of the results. As UT does do a lot but has difficulty making this visible on the website, SEE encourages the continuation with the ranking provided there is collaboration and alignment with S&P on the collation of information which is already gathered for other rankings.

1.4 SEE ANNUAL PLAN 2024 OVERVIEW

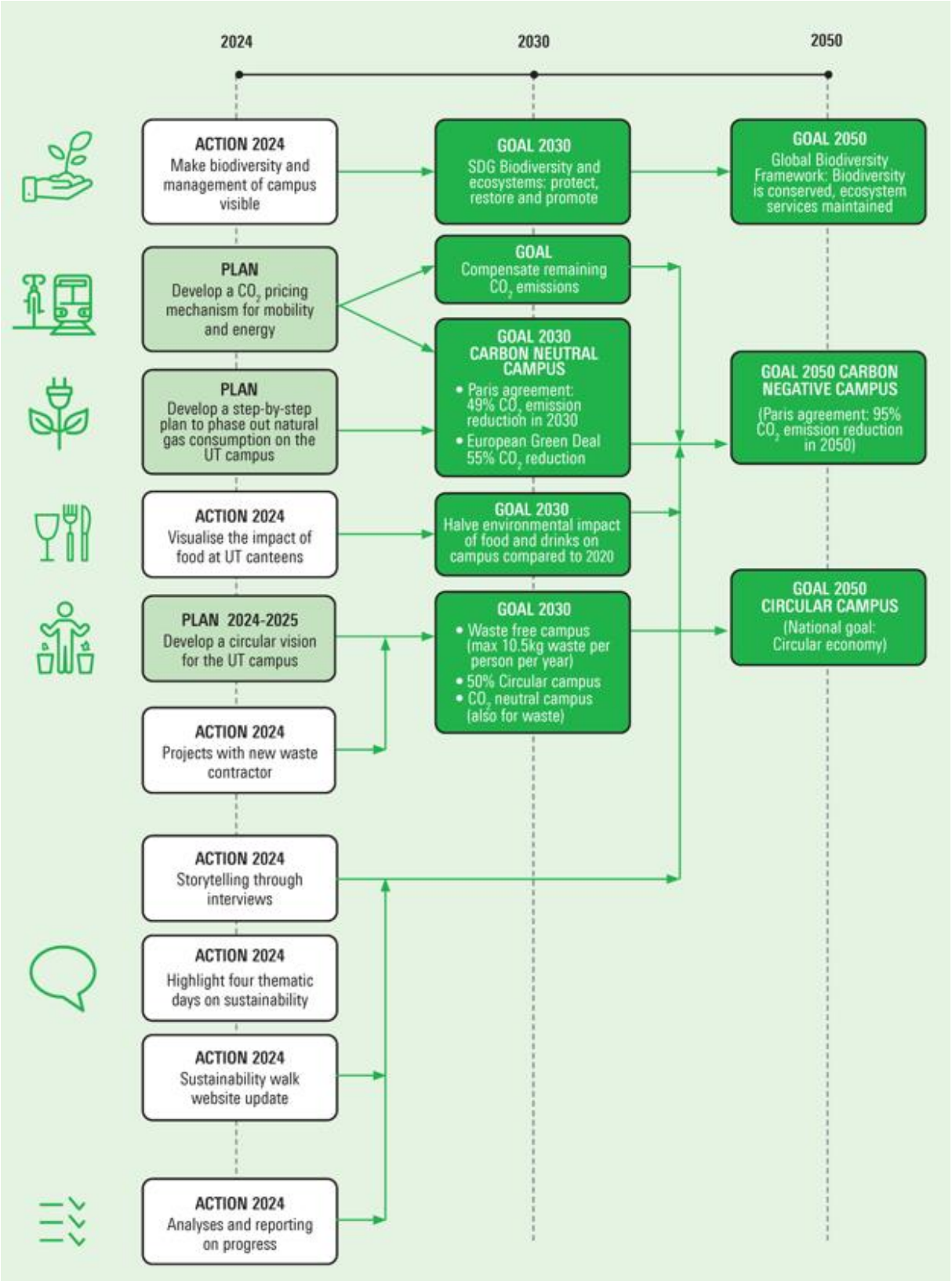


Figure 5. SEE Annual Plan 2024

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 sustainable organisation means keeping in mind that we cannot make progress on one aspect and ignore the other challenges. In the SEE annual plan, 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 2024 annual plan visualisation above. The goals primary aim is to contribute towards reaching the goals agreed to in the Sustainability Policy for operational management in May 2020[6].

[6] https://www.utwente.nl/en/sustainability/sustainability-on-campus/resources/plans-and-policies/

2. EVALUATION PROGRESS SUSTAINABILITY IN OPERATIONAL MANAGEMENT

2.1 SUMMARY PROGRESS ON THE SET GOALS

Table 1 shows a summary of the progress made in 2024 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 2024 was 8.1kt CO_2. This is 70% less than the CO_2 footprint in 2019 (27kt CO_2). The total energy consumption decreased by 10.8% compared to 2019 with a decrease in electricity of 0.2% and an increase in district heating of 1.6% resp. compared to 2019. Compared to 2023 the total 2024 energy consumption decreased by 7.5% (electricity by -1.7%, district heating by -10% and gas by -26%).	3.1.1 and 3.12
(energy)	A natural gas-free university	Compared to 2019 gas consumption has been reduced by 59%. This is not an actual reduction of energy consumption as many buildings have been transferred to district heating. The goal to develop a plan to phase out natural gas consumption is in progress.	3.1.1 Table 3
	Energy reduction in 2024 (vs 2023)	Looking at all energy sources, the total reduction in energy is 7.5%. For electricity, this reduction is 1.7%.	3.1.1 Table 6
(energy/mobility)	Carbon neutral campus in 2030 (compensate remaining CO_2eq emissions)	The SEE steering group gave the assignment to develop CO_2 pricing scheme in 2024. As the financial situation had changed when the plan was presented in June 2024, CO_2 compensation plans were put on hold for two years.	3.2.7
(mobility)	-50% CO_2 reduction of flights in 2030	The emissions of flights just stay below the trendline, a reduction of 300 tonnes CO_2 (~10%) compared to 2023.	3.2
(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 progress towards the goal. Applied circularity measures are not yet structurally recorded.	3.4
(procurement)	CO_2 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. 61 companies did provide CO_2 emissions data.	3.5

Subject	Goal	Progress	Chapter
(mobility)	Cycling Mission: increase number of people that cycle to UT by 10%	The survey done by HR in 2024 on commuting follows a different process making it difficult to compare to the survey from 2022. As kilometres travelled are recorded, the number of people who cycle is not known.	3.2.1
(mobility)	Stimulate choosing least environmental impactful travel option (or no travel)	HR conducted a survey to comply with the Work-related mobility of persons decree. This showed 57% of travelled kilometres are done so sustainably by bike, on foot or by public transport.	3.2.1
Water	-20% drinking water consumption in 2030	The consumption of drinking water was reduced by 4% compared to 2019 and by 14% compared to 2023. Total water consumption (incl. use of filtered rainwater) increased by 0.2% vs 2019 and decreased by 14.5% vs 2023 partly due to a lower need for irrigation.	3.6
(food & drinks)	Halve impact food and drinks on campus in 2030 (vs 2019)	CO_2 emissions increased by 35% compared to 2019.	3.7
		Visualisations of impact of meal options contributed to more informed choices.	3.7

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

Subject	Goal	Progress	Chapter
(events)	Increase recycling	The events Bata and Kick-In have worked with a cup coin	3.8
(waste)	A waste free campus[7] by 2030 and a recycling rate of 90%	The recycling percentage was lower than in previous years. The current tender ensures joint responsibility for reaching the goals. This percentage is expected to improve rapidly after the start-up phase of the new waste company in 2024.	3.3
(waste)	Reduce residual waste to 10.5kg per person/year by 2030	Compared to 2019 residual waste per person has gone down from 58kg to 45kg per person per year. This is a reduction of 22%.	3.3
(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	No progress due to lack of staff capacity	3.3

Biodiversity: we support and strengthen the biodiversity on our campus

Subject	Goal	Progress	Chapter
(Biodiversity)	Improve biodiversity	Awareness on biodiversity increased through activities around World Biodiversity Day. A community built of experts and wannabe experts on biodiversity.	3.9

Environment:

Subject	Goal	Progress	Chapter
Environment	Minimise pollution to air, water and soil	Quarterly reporting on water pollution	4.1.3

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.

[7] The qualification of waste free follows the Regional Twente Afvalvrij goal, where waste free refers to max 50kg waste a year and a recycling rate of 90%. We translated this goal to 10.5kg of residual waste considering the time people spend on campus.

Table 2. Changes in CO2 emissions for the themes food, water, waste, travel, and energy between 2019, 2023-2024

Theme	**CO_2 emissions 2019 (tonnes CO_2 eq)**	**CO_2 emissions 2023 (tonnes CO_2 eq)**	**CO_2 emissions 2024 (tonnes CO_2 eq)**	**Increase (+) Decrease (-) 2024 vs 2019**
Energy total	16,482	1,526	1,099	-93%
Scope 1 (natural gas + petrol/diesel + cooling agents)	1,761	1,056	789	-55%
Scope 2 (electricity + district heating)	14,721	470	310	-98%
Mobility total	9,067	5,277	5566	-39%
Business travel	3,938	3,212	2852	-28%
Commuting	4,999	2,065	2713	-46%
Waste	631	948	501	-21%
Buildings	No data	95	105	-
Procurement°	797	1,646	888	11%
Water	150[8] 40[9]	39	37	-9%
Food	340.6	199	459	35%
Events	No data	No data	No data	-
Biodiversity	61.4	-135	-152	-344%
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.

[8] 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.

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

2.2 CONCLUSIONS

Energy:
The project to develop a plan to phase out natural gas consumption is still in progress. The permit was granted to continue managing our own Closed Distribution System leaving UT in charge instead of having to rely on external parties.
There still is a lot of potential to reduce the energy consumption of UT resulting in lowering the structural operating costs.

Mobility:
Besides a survey to collect the data needed to comply with the Work-related Mobility of persons decree not much activity has taken place at UT in the area of sustainable mobility. The main progress was the PowerBI dashboard where flight data are shared to management four times a year enabling monitoring and steering towards the goals.

Waste:
Renewi started its contract in March. This is a partnership contract where Renewi together with UT will work towards the sustainability goals. First, the basic operations needed to be optimised, therefore not much progress can be reported on over 2024.

Buildings:
The roadmap towards CO_2 neutral real estate continues to be implemented.

Procurement:
The procurement department have focused on sustainability in tenders and in contract evaluation meetings. An Advanced Technology student researched the underreporting and/or absence of emission data by suppliers which resulted in a gap in the CO_2-reporting of the UT. A method has been agreed how to take this into account and work towards reducing this gap. This will contribute to a continual improvement of the CO_2 footprint reporting and of the sustainability performance of UT.

Water:
UT has been filtering rain and pond water to use instead of drinking water. This reduced the drinking water demand by 4.2%.

Food:
A pilot to test the visualisations of the CO_2 footprint, water and land usage of five different sandwiches in the canteens was conducted. 36% of customers indicated that they had changed their buying behavior after seeing the visualizations. These visualisations will help UT work towards its goal to reduce the impact of food and drinks.

Events:
A Sustainable Events Plan was written as well as guidelines for committees on how to contribute. Four Green Certificates have been awarded (2 bronze, 1x silver, 1x gold): Business Days, UIF Global Summit and the Week of Inspiration.
All information is in place for committees to make their events more sustainable as well as monitor their progress.

Biodiversity:
World Biodiversity Day activities raised a lot of visibility and awareness around the biodiversity on campus. During the month-long inventory a small group of very dedicated people made 4084 observations and identified 1023 unique species.

Sustainable labs:
Guidance by a dedicated Sustainable Lab Coordinator helped in speeding bottom-up activity around sustainability topics. The Sustainable Lab Coordinator has been in the lead of projects that will generate substantial savings through smarter ventilation of the lab spaces as well as the introduction of day/night settings.

Data:
SEE contributes to transparent reporting where reliable data is available: energy data, carbon data and flight data. Internal audit started assessing the data on energy and water and their advice on how to improve will be taken on board.

Communication:
The most eye-catching communication products continued to be the travelling sustainability exhibition and the sustainability walk route guiding people along a walk across campus where signs explain which sustainability measure can be seen. There is a lot of information to be shared and it remains difficult to reach a wide audience within UT.

2.3 WHAT DOES UT DO WELL

- The consumption of natural gas has reduced by 59% since 2019 and by 26% compared to 2023
- Transparent reporting and creating awareness of the impact of electricity by showing live CO_2 emissions on https://energydata.utwente.nl/
- The number of (supporting) staff actively engaged with sustainability is growing
- A partnership tender was agreed with the waste collection company ensuring a joint approach to reaching the waste reduction goals
- (Social) sustainability is a priority within the procurement department leading to more attention in tenders for stronger sustainability criteria and in contract evaluation meetings with suppliers
- Reusing filtered rain and pond water has saved 4154m^3 of drinking water
- The visualisations of the impact on land use, water consumption and CO_2 emission of five sandwiches led to people changing their choice
- Thanks to quarterly flight data reporting faculties are able to more closely monitor the impact of their flight behaviour and steer towards reducing this impact
- Two lab green teams achieved LEAF bronze certification
- Pilots on energy saving in labs (night setting/sash alarm) have continued in 2024 contributing to great energy savings
- The sustainability exhibition and the signage for the sustainability walk greatly continued to contribute to making the UT community aware of what is being done to make UT operations sustainable.

2.4 WHAT UT COULD DO BETTER

The responsibility for sustainability also needs to come from above, in the line at the relevant department. Employees should be assessed based on achieving set goals. This can not be left to a small group at the lower levels of the organisation.

We observe the need for more involvement and support from management layers for sustainability.
This can be shown by setting concrete goals and ask people to justify the progress made, by being proactive and to treat sustainability as ‘a precondition for everything we do’. Put the topic on the agenda and ask why progress has been made (or not been made). When you do not structurally apply sustainability in operations, while you research these issues, this will affect the reputation of UT. As sustainability is a evolving subject area, ensure staff are knowledgeable on sustainability throughout, not only in the small sustainability team. Show your involvement to the topic.

In the organisation a coordinating role is needed to bring together sustainability in research, education as well as operations. This role should be filled from a strategic perspective and not within the Campus and Facility Management department.

Set concrete goals such as phasing out gas and reducing water consumption and ensure someone is responsible for the goal.

Besides monitoring (such as flight emissions), take action to reduce the emissions. For commuting this can be done by increasing the kilometre allowance for cyclists and reducing it for motorists.

Energy savings are not made within the same financial year but the return on investment is fast. Long term trends (10 years) which will have an impact on society, are all linked to sustainability.

So most importantly, look ahead further, long-term when making choices.

3. ANNEXES

3.1 ENERGY

3.1.1 Energy consumption 2024

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.

Goal Annual Plan 2024: Develop a step by step plan to phase out natural gas consumption on the UT campus.

A gas-free campus aims to transition all buildings connected to the closed distribution system for gas away from using natural gas for heating, hot water, and air humidification to other renewable energy sources.

The campus is defined as including all UT buildings on the UT campus.

Gas consumption is primarily used for air humidification of laboratories in the buildings Carré, Horst and Nanolab (as well as heating for a small number of minor buildings).

UT manages its own distribution system. In 2024, the request to renew this permit was granted to UT. Maintaining the Closed Distribution System (GDS) is important for the process to become gas-free.

The second step is to align the gas-free plans with the multi annual maintenance planning (MJOP) and the long term housing strategy (LTSH). The roadmap to CO_2 neutral real estate (see chapter 3.4.1) also focusses on a strong reduction of natural gas consumption between now and 2050. It is most realistic to use 'natural moments' to phase out gas use, which is when a building is scheduled to be renovated. This plan is in progress and will be finalised in 2025. The goal to become CO_2 neutral in 2030 cannot be achieved without CO_2 compensation. The focus will remain on reducing consumption and not on compensation.

Table 3. Energy consumption in 2019, 2023 and 2024 at UT

UT Energy Consumption[10]	2019	2023	2024	Increase (+), Decrease (-)	
				2024 vs 2019 (%)	2024 vs 2023 (%)
Electricity [kWh]	22,220,046	22,631,812	22,253,431	0.2	-1.7
Electricity per m² [kWh]	114	99	97	-15	-2.5
Natural Gas [m3]	907,402	499,996	369,701	-59.3	-26.1
Natural gas per m² [m3]	4.65	2.19	1.61	-65	26.7
District Heating [GJ]	54,571	61,462	55,431	1.6	-9.8
District heating per m² [GJ]	0.28	0.27	0.24	-14	10.6
PV Generation [kWh]	28,382	206,774	325,407	1047	57.0
PV generation per m² [kWh]	0.15	0.91	1.4	872	56

The total surface area at UT used here is for 2019 - 195,000, 2023 - 228,000 and 2024 - 230,000m² (data CFM)

[10] Energy data is provided by CFM. This includes manual registrations as well as the meters linked to energydata.utwente.nl. This excludes the student housing, employee houses and buildings used by external companies. It includes, Pakkerij, ITC Hotel, as well as student team buildings at Capitool 25 and Lonnekerbrugstraat 86. For 2024 'The Frauenhofer Innovation Platform accommodation has not been included. Temporary housing for BMS at Capitool 15 is excluded as energy costs cannot be measured specifically for BMS, it is included in the service costs. Also Design Lab is excluded as the building is not managed by UT.

Table 4. CO_2 emissions energy sources 2019, 2023 and 2024

CO_2 emissions (in tonnes CO_2)	**2019**	**2023**	**2024**	Increase (+), Decrease (-)	
				2024 vs 2019	2024 vs 2023
CO_2 emissions of electricity [t]	14,439	0*	0*	-100%	-
CO_2 emissions of natural gas [t]	1,715	1,039	789	-54%	-24%
CO_2 emissions of district heating [t][11]	300	470	310	3%	-34%
Total	16,436	1,509	1,099	-93%	-27%

*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.

Live CO_2 emissions data at energydata.utwente.nl
All energy consumption data can be found at https://energydata.utwente.nl/. In 2024, a new feature[12] was added to this dashboard. You can now see the live CO_2 emissions of UT's electricity consumption, based on the emission factor of the Dutch national energy mix. The data on CO_2 emissions comes directly from the Dutch National Energy Dashboard. Because all electricity is not created equal: for example, on a beautiful sunny day more solar power is available, which lowers the emission factor of the electricity produced at that moment. This data is useful to give us insight in how we can act to lower our impact when using electricity. This dashboard can also be used by researchers, students and others.

Table 5. Student and employee numbers 2019-2024

Year	2019	2020	2021	2022	2023	2024
Employees	3249	3543	3748	3930	4136	4177
Students	11796	12632	12979	12548	12209	12019
Total number of people^	15045	16175	16727	16478	16345	16196

^These figures had been calculated with incorrect numbers of students and staff. In this report these have been adjusted for all years.

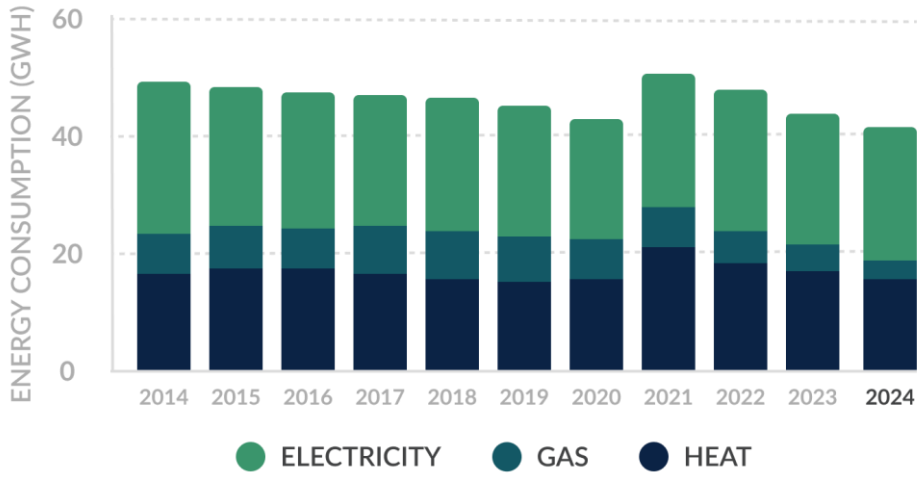


Figure 6. Energy consumption at UT from 2014-2024[13]

Compared to 2019 gas consumption in 2024 has been reduced by 59%. If you consider the floor surface in m^2, the reduction in gas consumption becomes 65%. Compared to 2023 gas consumption decreased in 2024 by 26% compared. This is not an actual reduction of total energy needs as many buildings have been transferred to district heating.

[11] The certificate detailing the CO_2 emissions over the year 2024 is usually only provided in May/June the following year by Ennatuurlijk. For these numbers the CO_2 emission factors of the previous years are used.
[12] https://www.linkedin.com/posts/university-of-twente_***Our-campus-is-a-beautiful***-activity-7252611833772085248-uuS8

It is complicated to draw conclusions when looking at changes in energy consumption while some buildings are sold and others are being renovated. 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, 2023 and 2024

				Increase/decrease in %	
Joules [TJ]	**2019**	**2023**[21]	**2024**	2024 vs 2019	2024 vs 2023
Electricity	80.0	81.5	80.1	0.15	-1.7
Natural Gas[14]	28.7	15.8	11.7	-59.2	-25
District Heating	54.6	61.5	55.0	1.5	-9.9
Total	163.3	158.7	148.5	-10.8	-7.5

Compared to the base year of 2019 the consumption of electricity has gone up by 0.2%. Compared to 2023 electricity consumption has been reduced by 1.7%.

In total energy consumption is reduced by 9% compared to 2019 and is reduced by more than 6% compared to 2023. No precise target for energy reduction was set in 2024.

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).

3.1.2 Legislative obligations on energy reduction

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

Energy Measures List (EML)

As of 1 December 2023 UT has complied with the 'informatieplicht (obligation to provide information) on energy saving, and report to RVO (Netherlands Enterprise Agency). This obligation is for buildings that use more than energy consumption of more than 50.000 kWh electricity or 25.000 m^3 natural gas (equivalent). This is monitored and assessed by the ODT (environment agency for Twente). They use the Recognised Measures list (EML)[15] to see if UT is doing all that can be expected. These measures include process and buildings related situations.

A Recognised Measures list includes measures 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 seven 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 (Horst complex, Carré). Energy-intensive processes take place in these buildings requiring additional reporting.

For these two buildings, a four-year energy reduction plan was submitted to in the RVO online reporting tool in 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.

The Environment Agency (ODT) conducted inspections of the UT buildings and shared a list of improvement points. They conclude that some energy saving measures with a return on investment of 5 years, based on the recognised energy saving measures list of RVO (EML), have not yet been applied. This list of measures is taken into consideration by the Real Estate and Maintenance department in their planning as budget and staff capacity needs to be made available. Reporting on this progress is done to RVO.

[14] To calculate the energy consumption in Joule, a conversion factor is used. For gas this conversion factor is the lower value 31.65. The reason the lower value is taken is that at UT most gas is used for air humidification and not all heat in exhaust fumes can be condensed.
[15] https://www.rvo.nl/onderwerpen/energiebesparingsplicht/eml

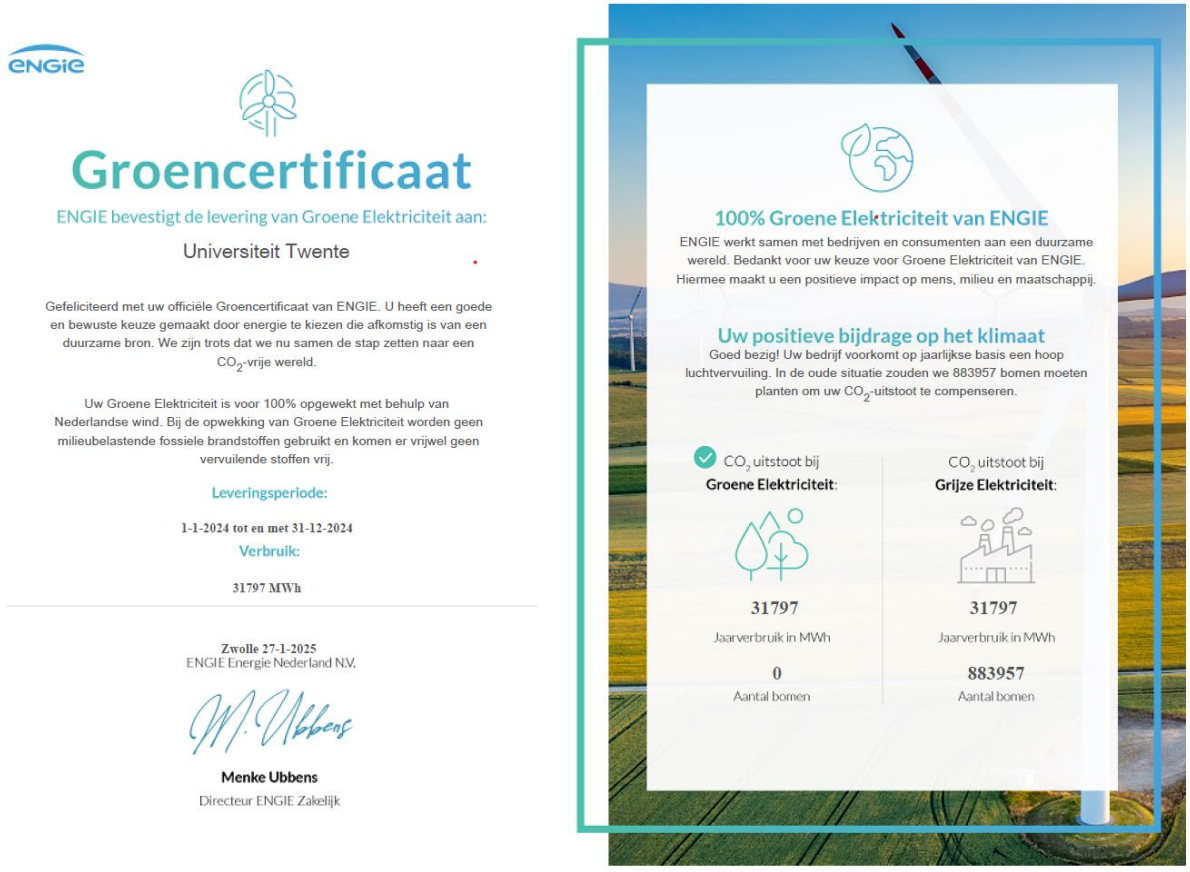
3.1.3 Energy labelling

All UT buildings have been assessed and awarded an energy label. All labels can be viewed on the website[16]. Energy labels are valid for 10 years. From 1 January 2023 all office buildings need label C. A table with the overview can be found on page 78 in the SEE Annual Report 2023[17].

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.

3.1.4 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.


ENGIE

Groencertificaat

ENGIE bevestigt de levering van Groene Elektriciteit aan:

Universiteit Twente

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

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

Leveringsperiode:

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

Verbruik:

31797 MWh

Zwolle 27-1-2025
ENGIE Energie Nederland N.V.

Menke Ubbens
Directeur ENGIE Zakelijk

100% Groene Elektriciteit van ENGIE

ENGIE werkt samen met bedrijven en consumenten aan een duurzame wereld. Bedankt voor uw keuze voor Groene Elektriciteit van ENGIE. Hiermee maakt u een positieve impact op mens, milieu en maatschappij.

Uw positieve bijdrage op het klimaat

Goed bezig! Uw bedrijf voorkomt op jaarlijkse basis een hoop luchtvervuiling. In de oude situatie zouden we 883957 bomen moeten planten om uw CO_2-uitstoot te compenseren.

CO_2 uitstoot bij Groene Elektriciteit:	CO_2 uitstoot bij Grijze Elektriciteit:
31797	31797
Jaarverbruik in MWh	Jaarverbruik in MWh
0	883957
Aantal bomen	Aantal bomen

Figure 7. Certificate of Origin for renewable electricity

[16] https://www.utwente.nl/nl/duurzaamheid/duurzaamheid-op-de-campus/themas/gebouwen/eep/
[17] https://www.utwente.nl/en/sustainability/attachments-forms/2023-see-annual-report.pdf

3.1.5 Solar on campus

Currently, there are 2064 solar panels on campus (Citadel 78, Cube 229, Drienerburght 77, Fietsenstalling Spiegel 6, OostHorst120, Langezijds 845, Carport at Paviljoen 69, scoreboard 4, Technohal 594, cabins next to Boerderij Bosch 42). In 2025 the roof of Carré will be covered by 955 panels. P4 and Spiegel are possible locations to become solar covered car parks.

Their electricity production covers around 1.4% of UT's annual electricity consumption (see 3.1.1, table 3).

Since the sustainability policy 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. The surface area of all roofs and car parks is not sufficient to cover a substantial percentage of the energy intensive research conducted at UT. The ambition is to include solar panels whenever roofs are renovated and to continue working on getting car parks covered by solar panels.

Slim Park[18]

At the solar panel covered carpark next to Paviljoen scientists of EEMCS tested how to make most use of the solar energy generated here to charge electric cars. Via an app you could indicate what time you wanted to leave. Also you listed how much energy you needed to receive, with other words, how many kilometres you needed to drive. Thirdly, you could say if you wanted fast charging or sustainable charging. This resulted in a time slot in which the car needed to be charged to the desired amount. The users also got to know their cars better, initially overestimating their energy needs. This way of charging also has a social aspect: This system provides energy to those cars needing to leave first instead of first come, first serve.

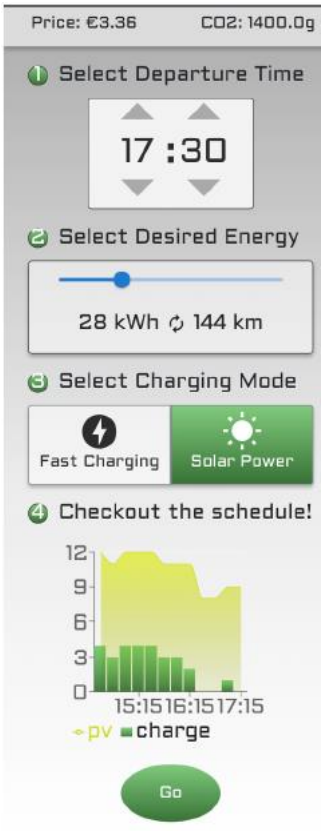


Figure 8. Interface charging app Slim Park

The results show that this proactive way of charging leads to more of the generated solar energy directly being used in the parked cars. Many people arrive at similar times. If all cars start charging immediately, this leads to a peak in energy demand as early mornings do not produce enough solar energy to fulfil this demand. By postponing the charging of the cars to the moment when there is more sun, in the middle of the day, which is possible as most cars only leave at the end of the afternoon, more renewable energy was used. Compared to the average emissions of the national grid, one third of those emissions were avoided here. This scenario is possible in spring, summer and early autumn. When it gets too cold, cars require more energy while less solar energy is produced[19].

Figure 9. Solar covered carport at Paviljoen

[18] https://www.utwente.nl/en/eemcs/energy/projects/current/TKI-urban-energy-slimpark/, https://elaad.nl/projecten/smoothems-met-gridshield/

[19] Information from Gerwin Hoogsteen, https://people.utwente.nl/g.hoogsteen

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%.

Goal Annual Plan 2024: Develop a CO2 pricing mechanism for mobility and energy

CO2 pricing mechanism
A project group was established consisting of representatives of faculties and service departments. A proposal was developed which built on the information gathered in previous consultation rounds (Link Waaier consultation, article Waaier consultation). This was presented to the SEE Steering group on June 11, 2024. Advice had been gathered from the SEE Sounding Board, Portfolio holders operations of the five faculties, Departments M&C and S&P and the business controllers.

The ambition was voiced that UT does want to adhere to the Paris agreement which means a 50% reduction in CO_2 emissions by 2030 compared to 2019. Figure 8 shows a gradual decrease in CO_2 emissions between 2019 and 2030 necessary to reach the set target. In 2024 we just stayed below this trendline. This is a 29% decrease compared to 2019 and a 10.6% decrease compared to 2023. In 2020, 2021 and part of 2022 travel was affected due to the COVID pandemic.

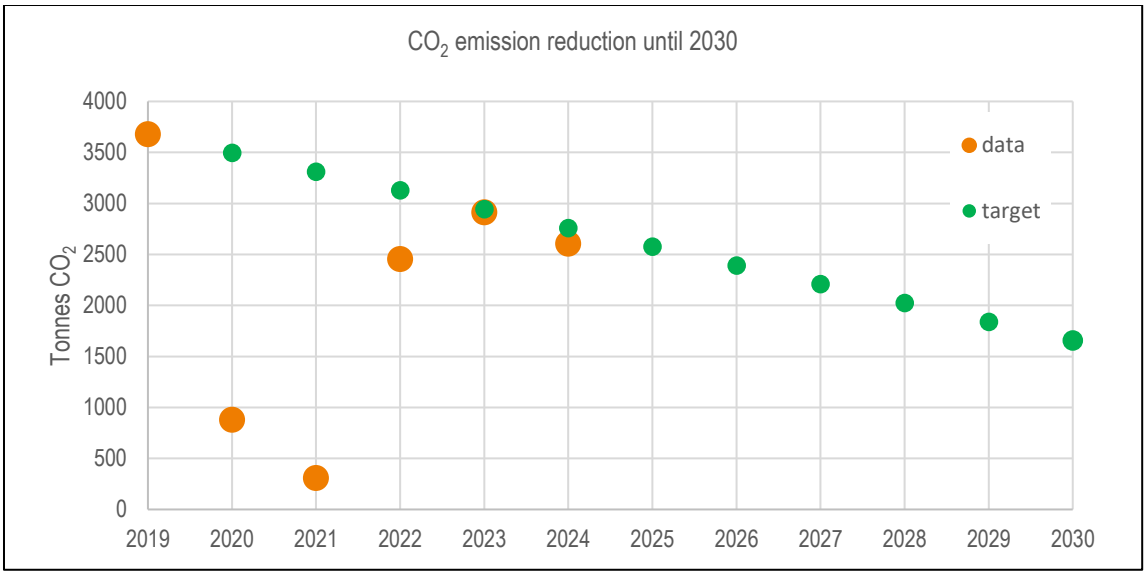


Figure 8. Trendline towards -50% CO2 emissions in 2030 and the actual CO_2 emissions from 2019-2024

Table 7. The CO2 emissions to date and the trendline towards -50% CO2 emissions in 2030

year	Tonnes CO_2 data	Tonnes CO_2 target
2019	3677.8	
2020	876	3494.2
2021	307.3	3310.31
2022	2453.3	3126.42
2023	2912	2942.53
2024	2602	2758.64
2025		2574.75
2026		2390.86
2027		2206.97
2028		2023.08
2029		1839.19
2030		1655.01

The steering group SEE prefers to take the approach to steer more on flight reduction using the monitoring data (made possible by the BI Studio dashboard where flight data per faculty/department is shared quarterly), to continue the dialogue and to encourage addressing colleagues on this topic. They concluded that the collected advice was not unanimous which indicates the support and execution of the plan may not be omnipresent. They expressed worries of administrative time and capacity to start up this pricing scheme and potential extra work pressure.
It has been agreed faculty boards will conduct the monitoring of their faculty. This will be discussed in the UCB and CvB-D. Every quarter once data is uploaded the link will be actively shared with the relevant people.

This discussion led to the decision to put this CO_2 pricing scheme to be put on hold for two years.

3.2.1 Commuting - Work-related Mobility of Persons Decree

HR together with FIN have been working on a plan to comply with new legislation on work-related mobility of persons that came into force on July 1,2024. The first annual monitoring was done in November/December 2024. The survey invite is sent to all employees who have a contract for 20+ hours/week. 80.5% of employees (3363) completed the survey. AFAS extrapolates this data to all employees to come to the results for all personnel. The employee numbers may slightly differ from the number of employees used in the UT Annual Report 2024.

Table 8. Results survey on commuting 2024

Description	Kilometres per week	Kilometres per year	Extrapolated numbers to all personnel
(Elektric) bicycle (not speed-pedelec) or walking	80,620.63	3,627,928.35	4,507,131.92
Car 100% electric	34,529.30	1,553,.818.50	1,930,375.76
Car other fuel	5,44.,07	245,028.15	304,409.04
Car petrol	106,166.70	4,777,501.50	5,935,296.24
(plug in) hybrid cars	19,650.10	884,254.50	1,098,547.52
Car diesel	30,108.96	1,354,903.20	1,683,254.70
Scooter 100% electric (incl. pedelec)	1,217.11	54,769.95	68,043.07
Scooter petrol or diesel	71.61	3,222.45	4,003.39
Motorbike petrol or diesel	8,403.71	378,166.95	469,813.12
Motorbike electric	0.00	0.00	0.00
Public transport	188,180.50	8,468,122.50	10,520,313.95

Source: HR, AFAS survey

Table 9. CO2 footprint commuting 2019 and 2024

CO_2 emissions (in tonnes CO_2)	2019	2024	2024 vs 2019 in %
Commute students	3,049	621	-0.8
Commute employees	1,950	2,092	0.07
Total	4,999	2,713	-0.6

To calculate the impact of commuting of UT staff, data from the recent survey was used (table 8). As this new legislation only focusses on staff mobility, to calculate the student impact the survey data from 2022 was still used.

For the student commuting figures the calculation considered 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).

3.2.2 **Flights in 2024**

The following tables show the CO2 emissions, number of flights and the number of kilometres flown by UT staff in 2024 as recorded by the travel agent VCK.

Table 10. CO2 emissions from 2019, 2023-2024 flights by UT staff

	CO_2 emissions (tonnes CO_{2eq})			2024 vs 2019 (%)	2024 vs 2023 (%)
Distance flight	2019	2023	2024		
0-700km	189.6	127	106	-43.9	-16.3
700-2500	538.5	590	603	12.0	2.2
2500+	2949.7	2,195	1,892	-35.9	-13.8
Total	3677.8	2,912	2,602	-29.3	-10.7

Table 11. The number of bookings and flights 2019, 2023-2024 by UT staff

	Number of bookings	Number of flights	
Distance flight	2019[20]	2023	2024
0-700km	805	1136	957
700-2500	1543	2640	2624
2500+	1433	1919	1661
Total	3781	5695	5242

Table 12. Flight kilometres 2019, 2023-2024 by UT staff

	Flight kilometres			2024 vs 2019 (%)	2024 vs 2022 (%)
Distance flight	2019	2023	2024		
0-700km	638,238	541,320	454,476	-29	-16
700-2500	2,692,438	3,432,933	3,506,891	30	2
2500+	20,066,237	13,981,618	12,051,997	-40	-14
Total	23,396,913	17,955,871	16,013,364	-32	-11

[20] 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.

In 2024 BI Studio of S&P built a PowerBI dashboard to enable more frequent reporting of flight data. Every quarter the data is received from the travel agent and updated into this dashboard. The dashboard is available to specific staff from each faculty to enable them to monitor their flights. The dashboard is available on the sustainability website[21].

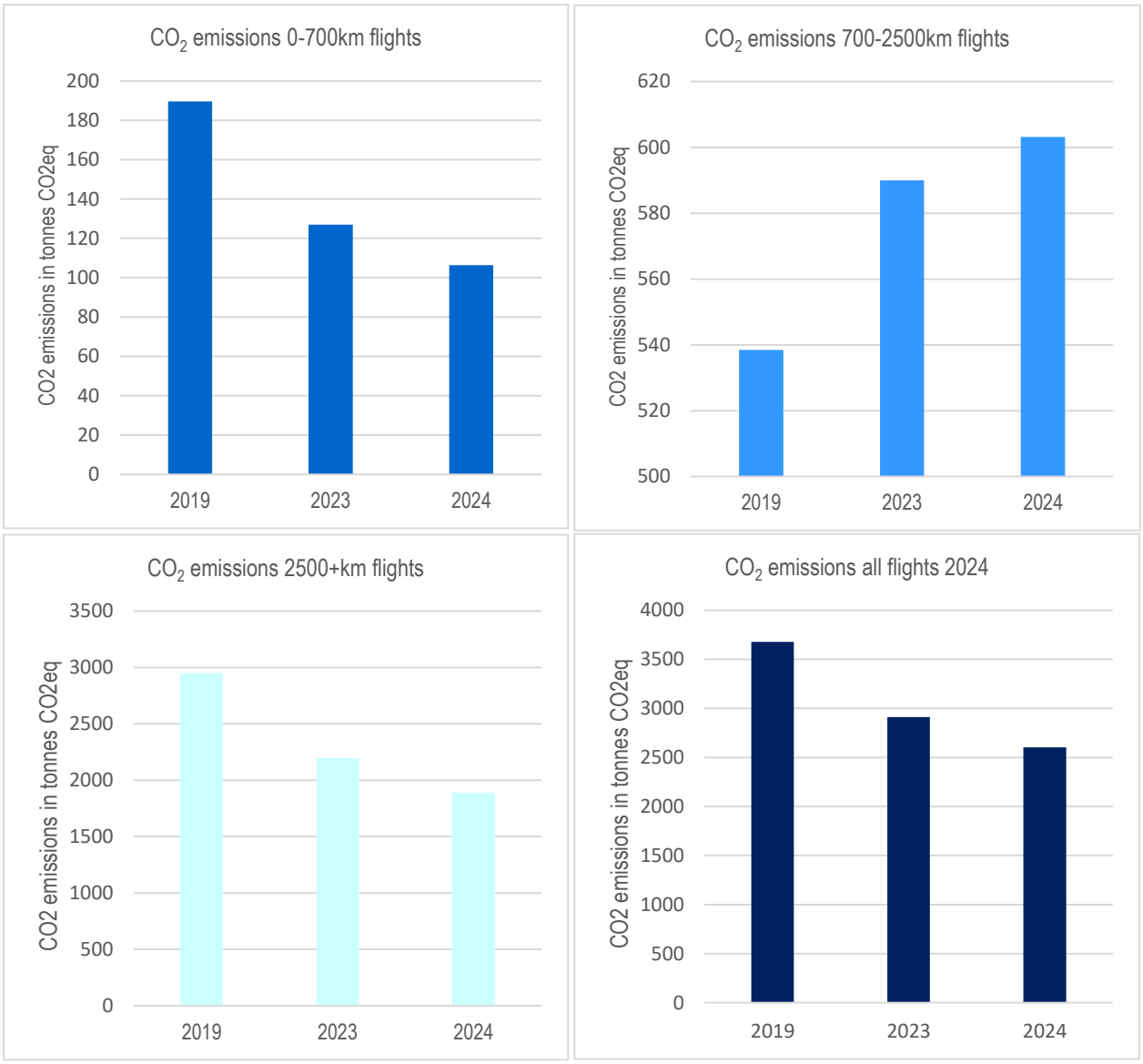


Figure 9. CO_2 impact of flights over the years 2019-2023-2024

Table 13. Emission factors 2019, 2023, 2024

Flight distance	CO_2 Emissiefactoren.nl 2019 (kg/km)	CO_2 Emissiefactoren.nl 2023+2024 (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 shows 957 flights were taken that were less than 700km. It is unknown if these flights were the first section of a

[21] https://www.utwente.nl/en/service-portal/reporting-monitoring/sustainability log in required

longer journey, making it a difficult trip to avoid. Using an alternative for these short distance flight would have saved around 106 tonnes of CO_2 emissions.

The CO_2 emissions of flights have decreased by 29.3% (compared to the baseline year of 2019). Compared to 2023 flight emissions were reduced by 10.7%: a reduction of 16% in short flight emissions, a 2% increase in mid range flight emissions and 14% reduction in long distance flight emissions.

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 2023 and 2024 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. 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

This section shows the flight data per faculty for 2024.

Table 14. Tonnes CO2 a faculty contributes to the CO2 emissions per category (2024)

	Flight distance	BMS	EEMCS	ET	ITC	TNW	Supporting departments incl EB	Unknown	Total UT
2019		CO_2 emissions (tonnes CO_2)							
	0-700	35.7	33.6	26.2	29.7	45.5	7	11.7	189.6
	700-2500	115.1	103.8	72.8	75.2	96.1	35.2	40.3	538.5
	2500+	427.2	479.3	320.2	967.1	555.3	62	138.6	2949.7
	Total	578	616.8	419.2	1072	696.9	104.3	190.5	3677.8
2024		CO_2 emissions (tonnes CO_2)							
	<700	14	25	20	18	24	5	0	106
	700-2500	106	132	88	122	111	45	0	603
	2500+	255	424	219	463	448	77	6	1892
	Total	376	581	326	603	583	127	6	2602

Notes:

- Unknown are flights that could not be allocated to a faculty or service department due to the manner they had been recorded.
- 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 15. Total CO_{2eq} emissions per faculty and percentage of flights per faculty

	CO_2 emissions (tonnes CO_2)		Percentage	
	2019	2024	2019	2024
BMS	609.6	376	16	8
EEMCS	650.5	581	17	13
ET	442.2	326	11	7
ITC	1130.6	603	29	13
TNW	735	583	19	13
Service dpts	110	133	3	3
unknown	190.5	6	5	0
Total	3868	4632	100	100

Based on table 15, BMS is responsible for 8% of the CO_2 emissions from flights, EEMCS 13%, ET 7%, ITC 13%, TNW (S&T) 13% and the service departments including EB combined for 3%.

When looking at the flight categories, table 16 below shows that the percentage of CO_2 emissions of short distance flights was 5% in 2019 and this reduced to 4% in 2024. The percentage of CO_2 emissions of mid-distance flights was 15% in 2019 and this increased to 23% in 2024 while the percentage of CO_2 emissions of long-distance flights was 80% of all flight emissions in 2019 and this reduced to 73% in 2024.

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 most impact can be made by reducing long distance flights.

Table 16. Percentage a distance category contributes to the faculties' CO_2 emissions

	Flight distance	BMS	EEMCS	ET	ITC	TNW	Supporting departments incl EB	Unknown	Total
2019		Percentage of CO_2 emissions per category per faculty							
0	0-700	6	5	6	3	7	7	6	5
0	700-2500	20	17	17	7	14	34	21	15
0	2500+	74	78	76	90	80	59	73	80
2024		Percentage of CO_2 emissions per category per faculty							
0	0-700	4	4	6	3	4	4	1	4
0	700-2500	28	23	27	20	19	35	0	23
0	2500+	68	73	67	77	77	61	99	73

- Unknown are flights that could not be allocated to a faculty or service department due to the manner they had been recorded.

Table 17. Complete overview number of flights (bookings), flight kilometres and CO2 emissions for the distance categories

	Flight distance	BMS	EEMCS	ET	ITC	TNW	Services	Unknown	Total
2019		Number of bookings							
	0-700	131	127	105	129	161	30	122	805
	700-2500	289	280	190	200	254	96	234	1543
	2500+	199	196	133	437	226	25	217	1433
	Total	619	603	428	766	641	151	573	3781
2024		Number of flights							
	0-700	130	228	169	173	203	53	1	957
	700-2500	427	570	407	489	509	222	0	2624
	2500+	220	347	190	473	356	70	5	1661
	Total	777	1145	766	1135	1068	345	6	5242
2019		Number of flight kilometres							
	0-700	120,348	113,288	88,287	99,974	153,287	23,710	39,344	638,238
	700-2500	575,278	518,893	364,198	376,169	480,353	176,057	201,490	2,692,438
	2500+	2,906,203	3,260,880	2,178,136	6,578,724	3,777,733	421,934	942,627	20,066,237
	Total	3,601,829	3,893,061	2,630,621	7,054,867	4,411,373	621,701	1,183,461	23,396,913
2024		Number of flight kilometres							
	0-700	61,725	108,600	84,405	74,910	101,796	22,674	367	454,476
	700-2500	616,786	765,066	510,177	707,897	647,717	259,247	0	3,506,891
	2500+	1,625,405	2,701,413	1,393,766	2,950,685	2,854,743	489,429	36,558	12,051,997
	Total	2,303,915	3,575,079	1,988,348	3,733,492	3,604,256	771,350	36,925	16,013,364
2019		CO_2 emissions (tonnes CO_2)							
	0-700	35.7	33.6	26.2	29.7	45.5	7	11.7	189.6
	700-2500	115.1	103.8	72.8	75.2	96.1	35.2	40.3	538.5
	2500+	427.2	479.3	320.2	967.1	555.3	62	138.6	2949.7
	Total	578	616.8	419.2	1072	696.9	104.3	190.5	3677.8
2024		CO_2 emissions (tonnes CO_2)							
	0-700	14	25	20	18	24	5	0	106
	700-2500	106	132	88	122	111	45	0	603
	2500+	255	424	219	463	448	77	6	1892
	Total	376	581	326	603	583	127	6	2602

- Unknown are flights that could not be allocated to a faculty or service department due to the manner they had been recorded.

3.2.4 **Business travel table international train trips**

Staff are encouraged to travel by train within Europe. 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 Train travel

Per January 2022 all employees can travel to work for free using public transport[22].

Total number of kilometres travelled by train was 8,171,476 km in 2024 (7,019,999 km in 2023; 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.

In 2024, 72% more kilometres were travelled by train in the Netherlands than in 2019 (16% more than in 2023).

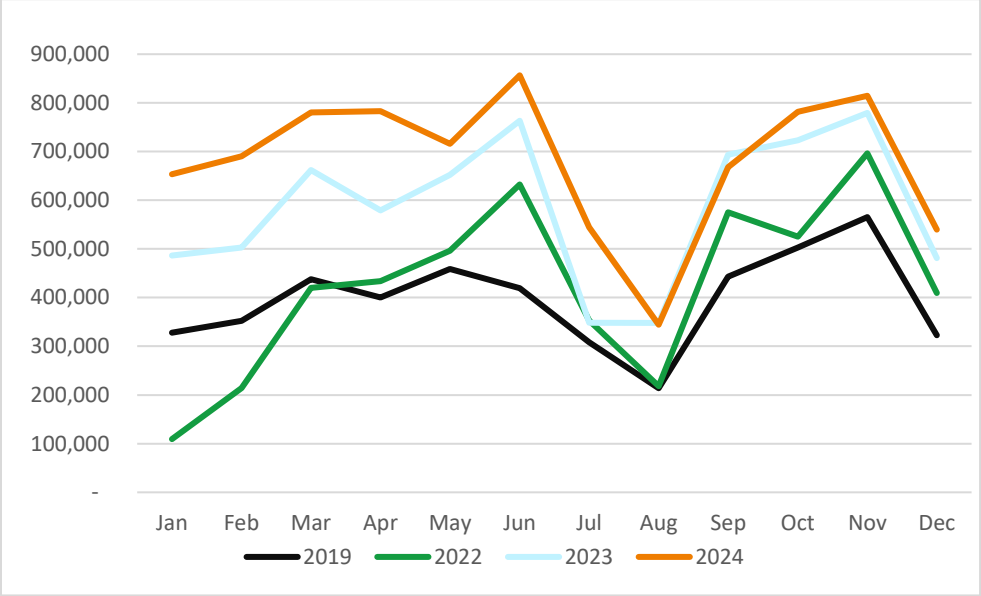


Figure 10. Train kilometres travelled by UT employees for commuting in 2019, 2022 -2024

3.2.6 CO_2 compensation business travel

No data was available on CO_2 compensation was available as of March 2025.

3.2.7 Other mobility projects

Green Hub supported promoting sustainable commuting by promoting the Cycle to work day (May 17) on their social media (link).

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.

[22] 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

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.

Goal Annual Plan 2024: Develop a circular vision for the UT campus

Due to staff capacity this project was postponed. A first step will be an inventory of how circular options are applied and implemented on campus. This inventory will be used to increase awareness on the broad concept of circularity.

Action Annual Plan 2024: Projects with new waste provider

Renewi started their contract on March 1st, 2024. The start-up phase was used to analyse UTs waste and research why at UT there is a lot of residual waste and why waste separation is not always successful yet.

Some results from the analysis from 2024:

- 10% of UTs residual waste comes from the ITC hotel
- We did not collect construction and demolition waste (from smaller projects) separately, this resulted in an increase in residual waste
- Asito had a workshop to increase waste separation and some more facilities have been created (for example, correct usage of colours of waste bags, purchasing swill waste containers for Linde Boerderij Bosch locations)
- Some staff members see PD waste bags laying outside and dispose them in the residual waste container to clean up. However, they are placed outside by Asito's staff so it could be picked up and brought to the press container

Additional to the waste analysis, many steps have been taken in 2024 from coalition building between various stakeholders to forming a PD working group. In 2025, projects to reduce waste and improve waste separation will be developed.

Table 18 provides the overview of all waste streams. The recycling percentage for 2024 so far contains the recycling numbers from Renewi only, so the percentage is not calculated from the total waste from 2024, but only from the total waste collected by Renewi from March 1st, 2024 onwards. The waste amount of the different waste streams does contain the numbers from PreZero (January-February) and Renewi (March onwards).

Renewi also provided the kilograms of waste streams of which benefits are gained. These benefits can be for example reuse (downcycling), fermenting or incinerating with energy recovery. The number of kg in 2024 used in this category is 384.777, which is 52.7% of the waste collected by Renewi since March.

Total waste in 2024 reduced from 816,336 to 731,805 kg (see table 18), a 10% reduction. The CO_2 emissions reduced a lot more: 47%. This is mostly due to changes in the recycling process of Renewi compared to our former waste processing company PreZero.

Table 18. Waste data 2019-2024

Waste stream	2019 (in kg)	2020 (in kg)	2021 (in kg)	2022 (in kg)	2023 (in kg)	2024 (in kg)	Recycling rates for 2024
Residual waste	594,024	409.152	431.639	501.427	466.548	451,698	1.4% recycling, 94.5% incinerated with energy recovery
Paper & Cardboard	167,892	104.985	126.691	200.273	146,058	95,324	99.9% recycling
Swill (fruit and vegetable waste)	37,922	17.553	12.150	31.207	30.881	53,280	96% is fermented with energy recovery
Glass	18,197	7,899	9,204	17,942	19,237	18,553	99% is recycled
E-waste	14,601	9,128	13,687	7,044	19,158	10,876	recycled for 77% and 23% is incinerated with energy recovery[23]
PD (Plastic, Beverage containers)	42,320	6,600	8,605	32,173	18,992	9,564	57% is recycled, 43% other benefits of waste stream[24]
B-quality wood	46,880	24,920	37,140	34,200	38,300	29,020	0.5% recycled, 99.5% is incinerated with energy
Coffee Grounds	4,877	2,392	3,281	14,874	18,297	1,529	
Construction& demolition	2,200	2,140				2,640	68.5% recycled, 31.5% other benefits of waste stream
Hazardous waste	37,248	36,714	41,212	42,177	50,426	52,334	Recycling is not applicable to this waste stream
EP (expired products)	11,060	8,229	9,855		4,627	2,666	92% is fermented with energy recovery, 8% is incinerated with energy recovery
EPS			60	126	162	17	
Hard plastics				560	3,650	2,432	60% recycled, 40% other benefits of waste stream
Plastic film						1,872	98% recycled
Other waste streams	7,864	8,227	5,971	21,210			
Total waste	**985,085**	**637,939**	**699,495**	**903,213**	**816,336**	**731,805**	
Construction& demolition LTSH projects			3,898,650	239,250	280,800	679,360[24]	100% is recycled
Total kg recycled waste streams	333.072		212.639	346.064	299,362	159.157	
Recycling rate	34%		30%	38%	37%	28.5%	

[23] 30% is sold/given to employees (not included in these numbers)

[24] General conversion rates for construction and demolition are used to convert the waste per m^3 to kg. Construction and demolition waste contains different types of waste that is collected separately including wood, paper and plastic.

The total amount of waste as well as the amount of residual waste has gone down by resp. 26% and 24% vs 2019. Since we started collaborating with Renewi since March 2024, some waste streams are collected or recycled in a different way. Coffee grounds are for example not recycled separately any longer but are now part of the swill waste stream. E-waste is now recycled for 77% instead of only recycling the metal components. EPS waste is still collected separately but in the table below it is part of plastic film.

Total waste has gone down in 2024 but we see an especially large difference for paper waste. 18.000kg of paper waste has been reduced by prohibiting flyers and magazines. The remaining reduction could be because we have less printers, so people might work more digitally and we ask many suppliers to return their waste.

Table 19. Total waste and residual waste 2019, 2023 and 2024

Year	2019	2023	2024	Amount of waste in 2024 compared to 2019	Amount of waste in 2024 compared to 2023
Total waste (kg)	985,085	816,336	731,805	-26%	-10%
Waste per capita (kg/staff and students)	58	44	45	-22%	2%
Residual waste	594,024	466,548	451.698	-24%	-3.2%
Residual waste per capita (kg/staff and students)	35	25	27.9	-20%	10%

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. CO2 emissions of waste 2019, 2023 and 2024

	CO_2 emissions 2019 (tonnes $CO2_{eq}$)	CO_2 emissions 2023 (tonnes CO_{2eq})	CO_2 emissions 2024 (tonnes CO_{2eq})	Increase/decrease 2024 vs 2019	Increase/decrease 2024 vs 2023
Waste	631	948	501	-21%	-47%

Benchmark|
In 2024 the waste benchmark for higher educational institutions using 2023 also included the hotel sector. But the conclusions of the report were made anonymously and separated per sector. All technical universities create a lot more waste than non-technical universities and universities of applied sciences. When looking at the average waste in kg per student, we do notice that the UT creates 58kg per student, which was the highest for the 3 technical universities which had a range from 47-58kg. For universities of applied sciences, the however was 11.5kg, for non-technical universities it was 21.3 kg and for technical universities the average was 52.8kg. However, if we look at the average waste in kg per m^2 floor, we score a lot better with 2 kg. The range for technical universities and for universities of applied sciences was 1.7-3.0 kg/m^2 and for non-technical universities this was 1.9-2.7. So, UT did a lot better than the average. The waste separation percentage of UT was 39% (meaning that 61% of our waste was residual waste), the average of all 17 participants was 38%, so we scored average.

Several initiatives have been conducted to work towards the waste reduction goals:

Prevention of waste
Phasing out paper versions of promotional materials by the procurement department is one example of preventing waste. 18tonnes of paper has been prevented by this measure.

Waste separation outdoors:
A UT industrial Design Engineering thesis student researched how UT could increase waste separation of the waste separation islands outdoors on campus. He created an informative banner inspired by the Green Hub visualisation boards. He conducted waste analyses on the outside bins and compared it to inside waste islands. His results were limited due to the small size of his research. It did show a positive impact when people receive more visual information when disposing their waste. There was a decrease of residual waste in the PD waste stream from 35% to 27%m but the total amount of incorrect waste in the paper bin increased from 32% to 36%. A second analysis would be needed to prove the positive impact.

Figure 11. Information sign waste separation

Waste separation indoors (Green Hub project)
Students from the Green Hub created a visualisation that they located above a waste separation island. They placed it in the new Langezijds building because ITC just moved in and the waste separation on campus differs from their old location.

All different boards had similar results, but the boards with boxes with waste had an overall slightly better result for all four waste streams, the boards with drawings also worked well and the boards with text only had the smallest improvement. Although the samples taken were very small and had lots of differences, so new analysis could have different outcomes. The organic waste stream had benefited most from the visualisation boards. The contents of most paper bins (except for paper plates and containers and used tissues) and PD (Except for metal cans) improved a lot. Residual waste was still considered the most problematic as people use it to dispose all their waste if they don't have time or knowledge to correctly dispose it. These information boards will continue to be used.

Next steps are to move the visualisations around on campus so everyone will see them for a couple of weeks a year.

Figure 13. Waste separation visualisations indoors

3.3.1 E-waste/ICT

The department LISA organised the Digital Clean Up Day in the week leading up to March 16. This is a day dedicated to cleaning up our digital life. This global day means to raise awareness about digital pollution and the impact this has on our environment, and what you can do to reduce your – and UT's – impact.

A lot of data is stored and not accessed. 23% of data saved on the M-drive has not been accessed for more than five years. Creating and storing data uses raw materials for our computers and servers, and once stored, data constantly uses energy.

The Digital Clean Up Day was a successful action and will be continued in 2025.

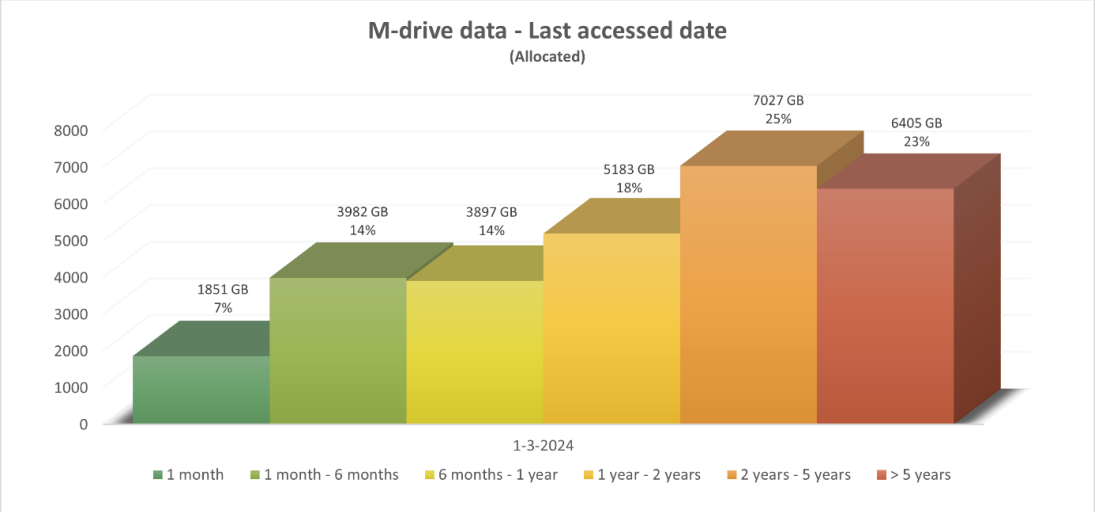


Figure 14. Data less accessed on UT staff's M-drive

E-waste is the fastest growing waste stream. LISA also records the number of appliances purchased and returned for reuse or recycling. The tables below show the numbers since 2019. In 2024, 731 laptops were purchased, and 396 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 has increased[25]. These are appliances that have been written off but can still be suitable for personal use. Of the remaining e-waste 10.876 kg is processed as e-waste where the metals are recovered, and the plastics are incinerated.

Table 21. Number of electronic devices purchased 2019-2024

Purchased items	2019	2020	2021	2022	2023	2024	Increase/decrease 2024 compared to 2019
Desktop	275	141	179	86	137	34	-88
Laptop	686	837	738	770	841	396	-42
Smartphone	248	302	168	145	194	63	-75
Tablet	50	58	55	43	19	29	-42

Table 22. Number of electronic devices in e-waste regulation 2019-2024

Items e-waste	2019	2020	2021	2022	2023	2024	Increase/decrease 2024 compared to 2019
Desktop	34	22	27	29	26	157	362
Laptop	156	170	173	210	292	731	369
Smartphone	13	16	13	23	36	87	569
Tablet	12	14	20	19	18	15	25
Participation to hand in e-waste	21%	23%	18%	22%	30%	46%	

[25] Data from reusage personal IT devices - Power BI. E-waste: These are items which after end of life at UT are taken over by staff for personal use

Other sustainability steps at the ICT department LISA

Sustainability was a criteria in the tender for network components and server storage. This included: Less packaging materials (no cardboard but crates that are reused by the supplier), the last mile principle was applied where there is no dedicated transport of the supplier to UT but deliveries are combined with other deliveries in the area, and the supplier provides a container where replaced components can be collected for recycling.

At the new tender for printers, the number of printers were reduced by half.

- The settings of hardware components were adjusted leading to energy savings.
- 70% of energy costs saved of high performance computers (rekennodes) used for calculations of research data to automatically use the standby option when not in use.'
- 30 old servers (12+years) replaced by energy efficient ones (some were not replaced)

These steps together saved 80MW in the data centres.

Also the library arranged a book exchange event where students could exchange books stimulating reuse. The library also participated in a water saving pilot.

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.

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[26].

LTSH
The decision was made in 2024 to focus on more efficient use of existing buildings rather than building new buildings. The update on the roadmap towards CO_2 neutral real estate is expected in 2025.

3.4.1 Annual evaluation roadmap towards 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

[26] 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

minimisation requirements for 2050, provided the measures are technically and financially possible. Details on applied measures from the roadmap in buildings project can be requested from the real estate and maintenance department of CFM.

The roadmap was reassessed yearly by RHKDHV. From 2025 the reassessment will be done via the Integral Housing Network (HOI) of real estate managers from all Dutch universities. The reassessment via Hevo is covered by a subsidy. The planning for this reassessment will be made early 2025.

Additional steps are needed to reach the 2050 target of reducing emissions by 95%.According to the projections of the CO_2 roadmap to CO_2 neutral real estate, a 87% CO_2 emission reduction is expected to be achieved by 2030 and a 91% CO_2 emission reduction by 2050. To achieve the required 95% reduction more will need to be done.

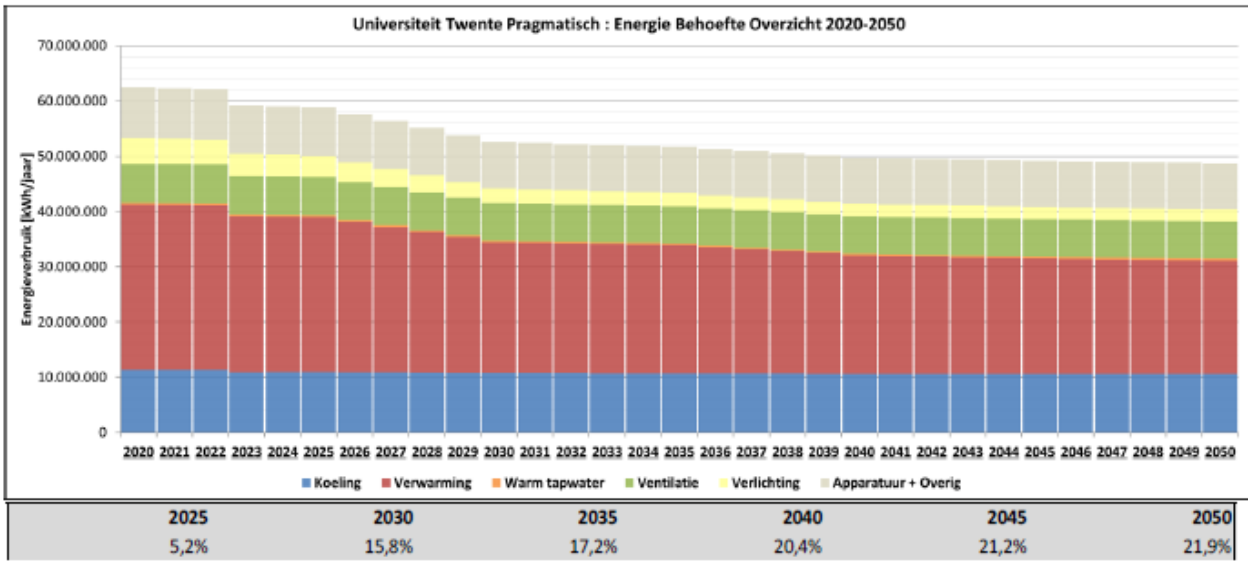


Figure 15. 2nd reassessment roadmap to CO2 neutral real estate (2023) – energy needs UT

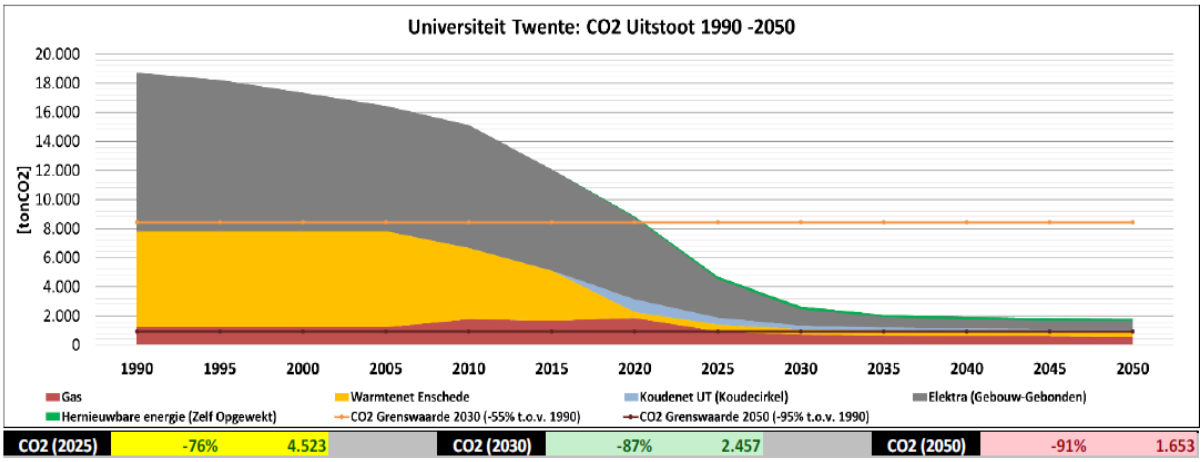


Figure 16. CO2 emissions after 2nd reassessment 2023

Many measures from the roadmap have been implemented. An example is the optimisation of the buildings installations in Linde resulting in a 30% reduction in energy consumption. Boerderij Bosch and the adjacent building were sustainably renovated.

3.4.2 **Paris-proof buildings**

A building is Paris Proof when its energy consumption is aligned with the goal of keeping global warming limited to 2°C and pursuing efforts to limit the global warming to 1.5°C. The assessment considers the actual energy usage of buildings. The Paris-proof model shows office buildings should maximise energy consumption to 70kWh/m^2/year. Both technical measures and our own behaviour has a big influence of the energy usage of a building.

For Paris-proof office buildings the energy consumption should not exceed 70kWh/m^2/year[27] . 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 (closest category for a fair comparison with labs) should not exceed 100kWh/m^2/year, industry with cooling/freezing facilities 85kWh/m^2/year. 70kWh/m^2/year also counts for indoor sports accommodations, except a swimming pool (210kWh/m^2/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”. The department explicitly is profiling itself as a department that values (social) sustainability.

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.

The **procurement department**’s teams have been working on the following sustainability projects

1. Sustainability in tenders and contracts

Sustainability criteria in tenders have been strengthened. The European tender on chemicals included sustainability criteria, as well as the tender on flowers. The goal is for contract managers to check what sustainability criteria can be included when involved in a tender. Contract managers are putting sustainability high on the agenda during contract evaluation meetings. Suppliers are asked to provide sustainable alternatives.

2. Promotional materials

Since 1 February 2024 UT stopped the deliveries of paper advertising materials. Promotional materials are also available online. Often people do want to continue receiving journals/magazines. This saved 9000kg of paper which often ended up in the paper bin immediately. This also reduces transport movements on and towards campus.

[27] https://www.weii.nl/weii-klassen-11

3. Sustainable design web shops in Proactis

UT suppliers with web shops were asked to improve how they highlight sustainable options (ecolabel), the suppliers were reminded of the sustainability ambitions of UT. More and more sustainable products are available in the web shops.

4. Strengthening data collection scope 3 for CO2 footprint

As far as data collection is concerned, the UT is mainly dependent on third parties(suppliers) to deliver this data. An Advanced Technology student, Sanne Streekstra, conducted her BSc thesis on this topic and found out that underreporting and/or absence of emission data by suppliers results in a gap in the CO_2-reporting of the UT. Sanne carried out a spend-analysis for the reporting of the scope 3-emissions where emissions are allocated to each euro spent in a certain sector using a database. The spend-analysis showed a significant gap compared to the existing data of suppliers.

The gap between provided data and the spend analysis will be assessed annually to gradually support suppliers in providing better and more detailed data to strengthen the UT CO2 footprint.

This analysis is supported by monitoring what suppliers agreed to report on at the time the contract was signed and what is annually shared with UT.

At the same time conversations with suppliers will be instigated to work on improving the data provision to UT.

Other procurement projects included adjusting the frequency of deliveries to UT and combining deliveries which reduce transport movements, the feasibility to stimulate orders to be delivered to UT in less or reusable packaging materials. The department also worked to increase regional procurement.

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[28].

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.

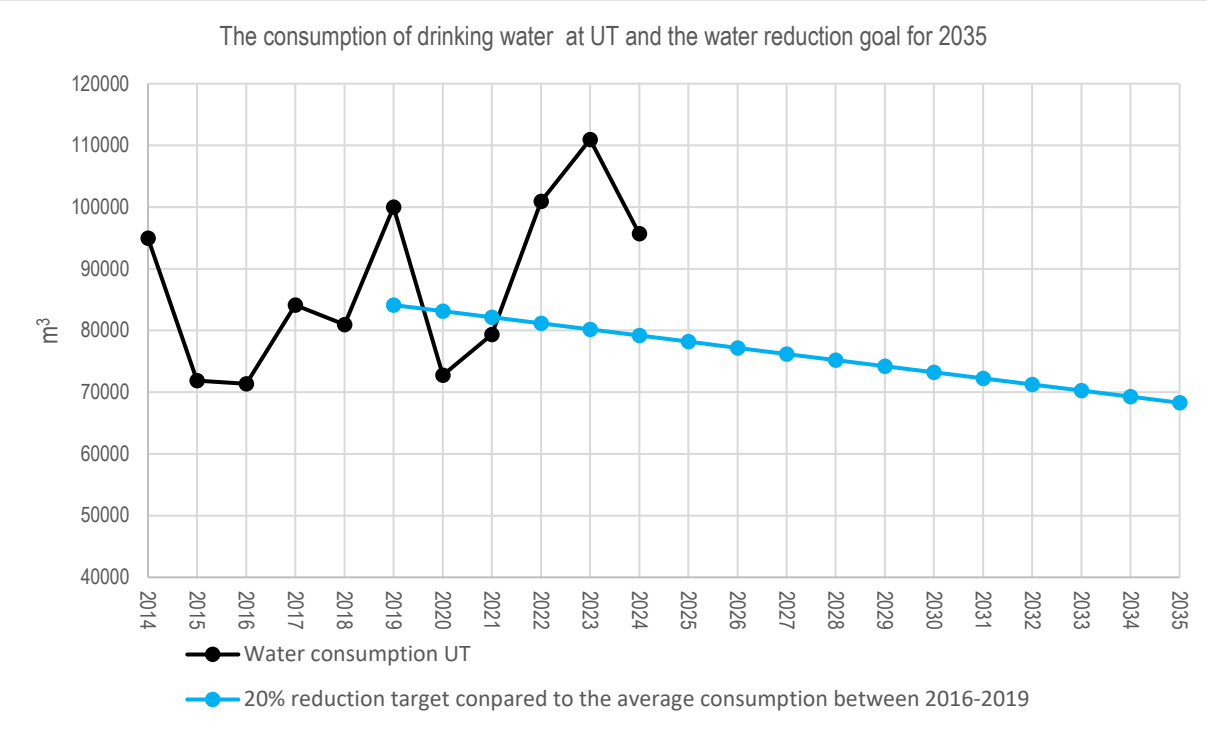


Figure 17. The consumption of drinking water in m3 at UT and the water reduction goal for 2035

A 20% lower water consumption compared to a reference period of 2016-2019 (average consumption 84,124m³) means UT consumes only around 68,000m³ of drinking water in a year in 2035. In 2023 110,962 m³ drinking water was consumed and in 2024 95,681 m³.

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

- Using the Water Lab's WaterMiracle 4154 m³ of rainwater was filtered and used for irrigation instead of using drinking water (equals 4.2% of total water consumption). In 2024 there was a lower than usual need for irrigating the sports fields due to the weather. Also the water of the XXL rain water buffer was used to water young trees and flowering plants around campus. Grass is not irrigated during droughts.
- Road cleaning machines use filtered rainwater instead of drinking water (consumption 3-5m³/day).
- Weeds are removed using hot water. The water used for this is now also filtered rainwater.
- Water used to clean the boats at rowing association Euros is filtered canal water (filtered by a NX Filtration system).
- Toilets in Technohal are flushed with rainwater stored in 20m³ storage cellars next to the building.
- A Saxion student Facility Management conducted her thesis on water saving within the SEE programme at UT. She researched how UT can save water in its buildings to contribute to the water reduction targets of -20% in 2035 as stated in the government letter.

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

Interesting observations include:

Using drinking water for cooling equipment should not occur as the cooling circle is available for that but the suspicion is this is still happening. This needs to be investigated and if so, a UT wide ban on doing so, as has been instigated at other universities, could help reducing water consumption.

One high water using facility is the men's multi-person through urinal in Bastille where during parties water runs continuously. During quiet times when one person uses it all taps will come on automatically as well, using a lot of water.

The conclusion is that UT has several options to save drinking water to meet the required 20% reduction. These options include technical measures and improved monitoring as well as behavioural change.

Her recommendations include installing water meters to differentiate between drinking water and water used in laboratories in order to determine better what measure to save water will be most impactful. A quick win would be to place water nozzles at toilet sinks.

Table 23. Water consumption UT 2019,2023-2024

		2019	2019 recalculated	2023	2024	Comparison 2024 vs 2019	Comparison 2024 vs 2023
Drinking water consumption[29]	m^3	100,022	100,022	110,962	95,681	-4%	-13.8%
Water consumption per capita	Litre/person/yr		6,648	6,789	5,908	-11%	-13%
CO_2 emission factor water[30]	Kg CO_2/m^3	1.5	0.397	0.350	0.382		
CO_2 emissions water	Tonnes CO_2	150	40	38.8	36.6	-9%	-6%

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.

3.7 FOOD AND DRINKS

Action Annual Plan 2024: Visualise the impact of food at the canteen.

Several initiatives have been conducted:

A pilot to visualize the CO_2 footprint, water and land usage of five different sandwiches in the canteens was conducted in collaboration with MiSt Sustainable Solutions and the Green Hub.

This includes the impact on land use (how much land is used to produce this product), the impact on water consumption (how much waster is

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.

[29] The water consumption numbers contain only the amount of drinking water used. On top of that 4,154m^3 filtered rainwater was used.
[30] The CO_2 emission factor is provided by water supplier Vitens.

needed) and the impact on CO2 emissions (how many emissions are a result of this product). Many people are interested in health aspects therefore calories, carbohydrates, protein and fat are listed as well.

The aim was that people would make more sustainable choices when being well informed. This would help the UT to reach her goals of halving the impact of food and drinks by 2030. During the pilot, 36% of customers indicated that they had changed their buying behavior after seeing the visualization.

Also suggestions were made to make the design clearer. New visualisations were made of which an example can be found below (designed by Green Hub). The pilot will be continued in 2025 with all sandwiches and 5 types of warm beverages from the coffee machines.

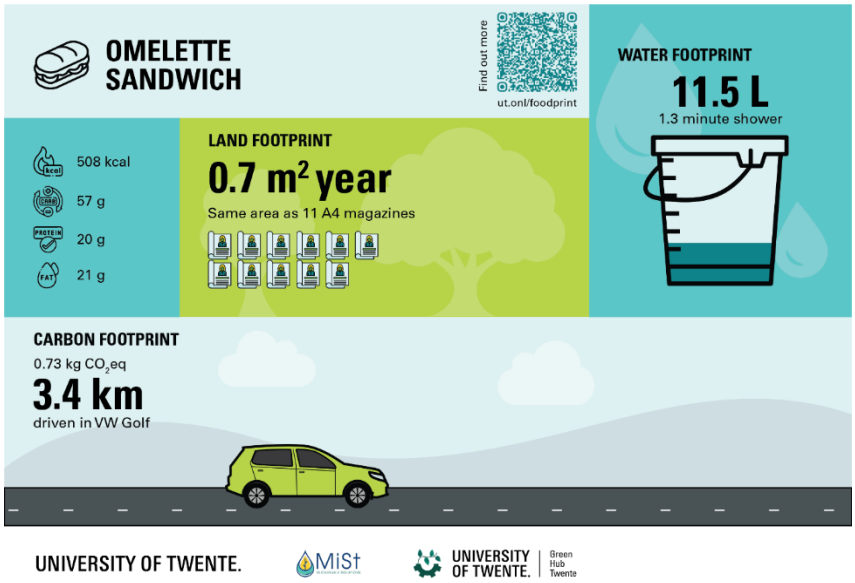


Figure 18. Impact of an omelette sandwich

Since October 2022 the default work lunch has been vegetarian. In 2024, the EB decided to stop allowing ordering work lunches due the financial situation at UT. Therefore, it is not possible to make a relevant comparison on the percentage of ordered vegetarian work lunches in 2024 compared to previous years. However, we can monitor on percentage of plant based and animal based protein from the total sales of Appèl. In 2024, 35.7% of protein was plant based. In 2023 this was 40% and in 2022 this was 19.6%.

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 increased by 35% in 2024 compared to 2019. This change is mostly due to an increase in meat and cheese consumption. There are plans to stimulate food consumption with a lower CO_2 footprint in 2025.

Table 24. CO_2 footprint of food at canteens 2019-2024

CO_2 footprint of food	2019	2022	2023	2024	Increase / decrease 2024 vs 2019
CO_2 footprint food (tonnes CO_2)	340.6	382.3	429.5[31]	458.9	35%
CO_2 footprint food (kg CO_2) per capita*	22.6^	23.2^	26.3^	28.3	25%

*Per capita means it is divided by the number of students and the number of employees (see table 5)
^These figures had been calculated with incorrect number of students and staff. In this report these have been adjusted.

[31] Last year we have reported that the total CO2 footprint for 2023 was 199.1 tonnes CO2. This has later been corrected to 429.5 tonnes CO2.

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:

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.

- The Sustainable Events plan has been published online as well as the new UT events policy from CFM. Alignment between both documents is ensured through collaboration.
- To make it easier for event organisers to comply with the goals set in the Sustainable Events plan, the SEE program and Green Hub collaborated to write a Sustainable Events Guide. This provides a step-by-step guide to comply with all new goals.
- The SEE program and Student Union collaborated in creating a sustainability fund to make associations more sustainable. One-time partial funding is available when associations want to become more sustainable by buying more sustainable clothing, promotional material or by implementing sustainability during events.
- A form has been published online[32] so event organisers can provide the SEE program with extensive sustainability information about their event. This information is used to report on sustainability of events and to formulate measures to become more sustainable.
- *Student Committees Network meetings:* these meetings with Kick-In, Bata, Company Fair etc. were temporarily paused due to different priorities of the committees.

rPET and return system
All drinking cups at large festivals on UT campus are made of recycled PET.
Kick-in used a pin-only system for which a new banner was produced to explain how returning your cup worked in practice.

Figure 19. Return system banner with PIN only option

[32] https://www.utwente.nl/en/sustainability/green-hub-twente/green-guides/for-events/

The Green Certificate was completed and awarded for the following events: Business Days Kick Off 2024, Business Days Career Fair, UIF event 2024, Week of Inspiration. The form that you need to fill in can be found at the end of this page (Green Certificate Questionnaire) https://www.utwente.nl/en/sustainability/green-hub-twente/green-guides/for-events/.

Table 25. Overview 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
Business Days Twente	Business Days Kick Off 2024	Networking event	Bronze
Business Days Twente	Business Days Career Fair	Networking event	Silver
University Innovation Fellows	UIF Global Summit 2024	UIF meetup	Gold
UT Week of Inspiration 2024 team	Week of Inspiration	All events during the week of Inspiration	Bronze

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

Action Annual Plan 2024: Make biodiversity and management of campus visible.

To celebrate **World Biodiversity Day** several activities were organised to raise awareness about biodiversity on campus.

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.

May 21: Biodiversity Quiz Walk where the local field biologists associations led a group across campus
May 22: Start BioBlitz with multiple joint sessions scheduled on World Biodiversity Day
May 23: Bird watching excursion by bird watcher Rolf de By from ITC
May 31: Dragonfly excursion by expert Wim Bakker from ITC
June 4: Plants identification by Petra Budde from ITC
June 15: Water creatures inventory by Kevin Collins from Saxion
June 19: A nighttime moth inventory

A bioblitz is a competition to make the most observations of unique species in a month. At UT a small group of very dedicated people made 4084 observations and 1023 unique species. UT came second after WUR.

Figure 20. Bioblitz activities

In April 2024 a **biodiversity council** was established. In this council UT (scientific) staff members with biodiversity knowledge join the manager terrain and real estate and maintenance on discussing how biodiversity can be supported by specific measures or ways to conduct maintenance.

A scan was made of the campus by Green Label NL to provide insight into the quality and risks concerning climate adaptation, healthy living environment and biodiversity. The aim is to use and update this information in a Geographic Information System (GIS) which we will manage on campus.

Together with Eelerwoude and supported by an ecologist from Krinkels, the green maintenance company at UT, a SMP is still being drafted. A SMP is a Species Management Plan. This is required when you are building to avoid negatively affected the local biodiversity.

Nectar Index: As mentioned in the SEE Annual Report 2023 a baseline survey was held on May 3, 2023 to assesses the value of vegetation for flowers and pollinators. This was repeated on May 15, 2024. 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. Three (relatively small) areas were assessed (the 4th one was closed off due to building works) that met the requirements of extensive management and covered a sufficient surface area. One area had a score of 1, one a score of 2 and one area a score of 3. The conclusion states that the variability of the nectar index shows improvements are possible. Monitoring across more years should be continued. The advice is given to expand the areas on campus where grassland is managed in an extensive way (less mowing) to help increase the diversity and nectar on offer for insects can increase.

Another initiative of the green maintenance manager is to use salt combined with olivine for gritting the road to prevent frost and ice forming. Olivine reacts with CO_2 and water (rain, snow) to form silicate, bicarbonate and magnesium. It removes the CO_2 from the atmosphere and contributes to de-acidification of the soil when the mixture containing bicarbonate washes into the verges of the roads.

The Climate Centre fund granted the **Biodiversity Insights** projects with a subsidy of €3200.

Campus biodiversity and natural values are not broadly known to or shared amongst people that live, work and study on campus. This project hopes to spur interest in the many life forms that our campus hosts, and that can be witnessed while people are at work, in study or are just making a lunch walk.

This project will build awareness and make information on the campus' natural values available online (TECHNO). Maps with area designations of observations of flora and fauna will be shared (GEO). The availability of this information will enable us to increase awareness on biodiversity and involve the UT community in its management (SOCIAL).

The output of this project will be a website with maps, seasonal short stories that elicit interest and other information on biodiversity at the UT campus and immediate surrounding areas. The biodiversity series published four articles[33] in 2024 with many more to follow in 2025.

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 CO_2 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 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.

[33] https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/Biodiversity/#biodiversity-series

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 CO_2 footprint.

In order to make laboratories environmentally safe and sustainable the sustainable lab coordinator has been working to implement the Laboratory Efficiency Assessment Framework certification method in several labs.

This is a process where a lot of people need to be informed and involved. The main impacts of this process so far have been listed below:

- Sharing of expertise on how to make labs more sustainable upon request (number of presentations at conference, universities and companies such as the Dutch Hart Foundation, Batavia Biosciences, Isogen, ProQR)

– we built a webpage and a UT sustainable labs plan, to share best practices and make information available for others to get actively involved.

- Energy saving protocol for labs – ventilation can be adjusted according to the presence of lab users. This project in Meander entails that technical adjustment are made requiring an initial investment. Simultaneously discussions were held with users to ensure tailor-made solutions per lab to ensure both optimal working conditions and energy savings. This pilot was held in Meander and can be rolled out throughout all lab buildings for further energy savings. A pilot lab was run over summer 2024 and at the end of 2024 all labs in Meander will follow the energy saving protocol for labs.

- Waste separation in collaboration with the Faculty Green Hub has continued where more PD (Plastic packaging) containers were placed inside the labs (with the agreement for Asito to empty these separately via the contract managers CFM). This reduces the volume of residual waste from labs and enables better recycling and reuse of plastic materials. PD waste is collected for free (national legislation) reducing waste collection costs for UT.

- Awareness has been created for vegan science. This entails the reduction of the use of animal by-products (such as joints coming from a butcher to serum and antibodies for which animals are specifically reared) for which a vegan alternative is available. The reason for a focus on vegan science is that two million calves are killed for the collection of serum to use in science globally. The impact of these calves could be avoided (impact of land use (fodder cultivation, water use, CO2eq emissions) plus the unethical fact that a calf is reared only for extracting serum for which there is alterative.

The vegan alternative is often better -in the scientifically sense- as animal by-products are less uniform. And it has an ethical advantage as well as strong profiling (PR) topic for UT.

- Alarms on fume hoods continue to work well. The sustainable lab coordinator monitors the implementation. From April 2023 to May2024 ~€23,000 has been saved in energy. The Faculty Green Hub supported this project by informing users why the alarms are necessary to ensure behavioural change is maintained.

- The Faculty Green Hub organized a Freezer Challenge supported by the sustainable labs coordinator. In their inventory options came to light for energy savings, such as using a -80C freezer as a back up instead of having it on 24/7, saving 6000kWh/year (~2 x annual electricity consumption of a household).

- Discussions held together with procurement and suppliers on how to reduce waste, what alternatives there are for substances of very high concern and fixed delivery moments. This is a longer term process before effects are visible.

- Two lab achieved the bronze level LEAF certification. More labs will be requested to join this. The Faculty Green Hub students will play an essential role in this process.

All what has been done up to December 2024 is explained in this presentation by Rolf Slaats.

3.12 DATA - CO_2 FOOTPRINT

A key challenge which contributes to be able to become 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.

Action Annual Plan 2024: Analyses and reporting on progress

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

Carbon Data platform
Together with UT Start-up Realised a Carbon Platform has being developed to more easily collate the information required to calculate the CO2 footprint of the UT.

BI Studio flight data dashboard
A new dashboard was developed with BI Studio to show quarterly flights data per faculty and per department: https://www.utwente.nl/en/service-portal/reporting-monitoring/sustainability

Working group SEE members, SEE steering group members, portfolio holders operations, deans and members of the CO_2 reduction-pricing-compensation project group have access to this data.

Energy data platform
The platform now showcase the live CO_2 emissions of our electricity consumption for every building as well as the electricity, district heating, cooling, gas and water consumption in each building. The data on CO_2 emissions comes directly from the Dutch National Energy Dashboard.

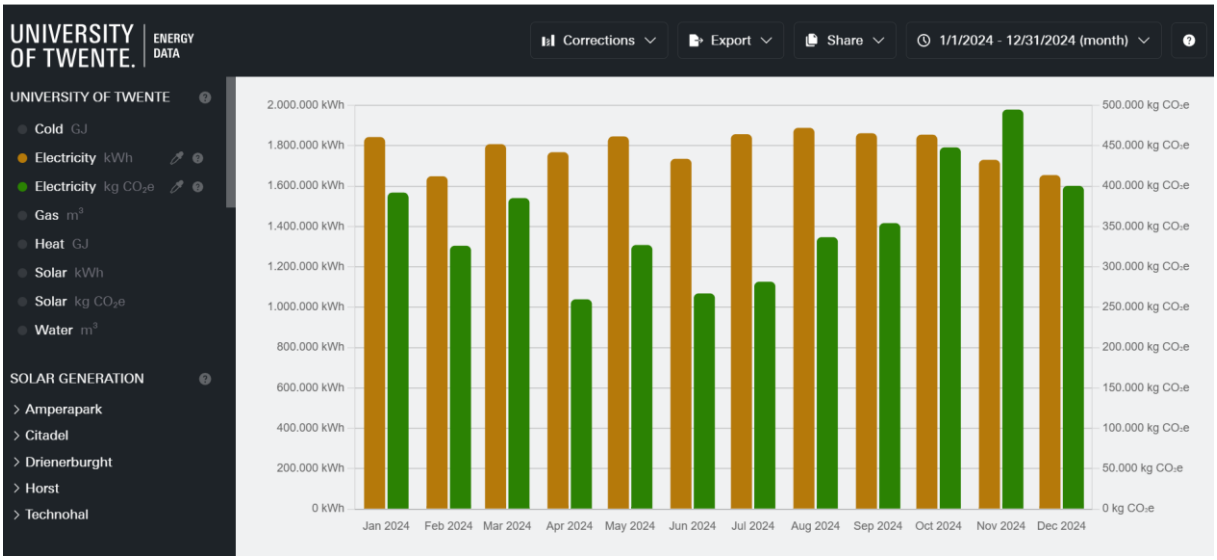


Figure 21. UT energy dashboard including actual CO_2 emissions

CO_2 footprint 2024 University of Twente

The 2024 CO_2 footprint report is published on this website: link. This has been generated through the carbon platform. This provides input to the EU CSRD reporting standard ESRS E1.

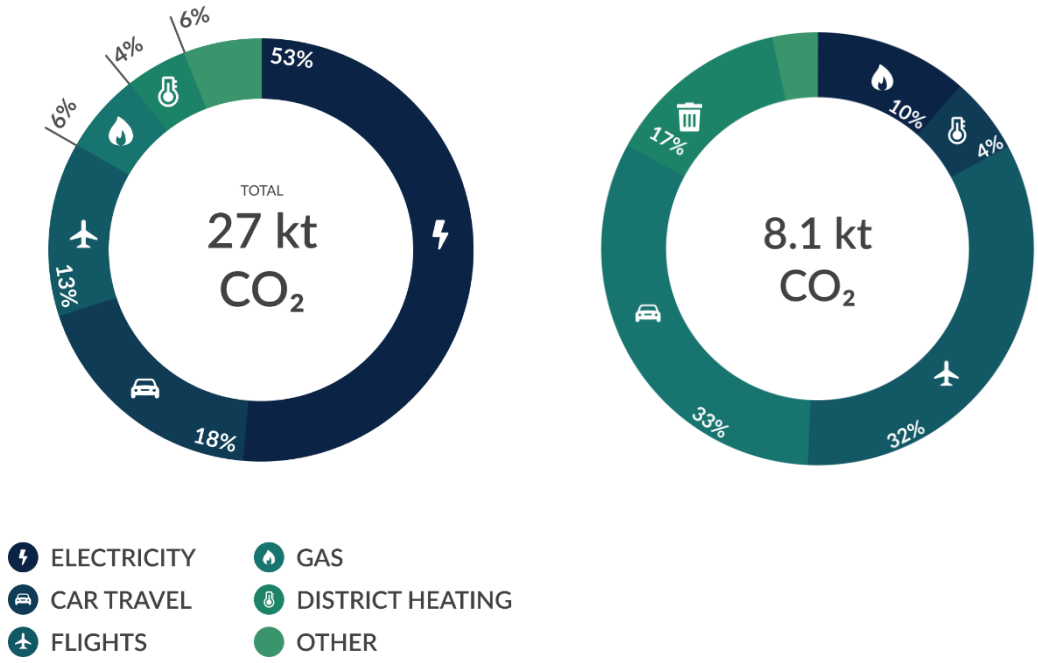


Figure 22. CO_2 footprint of 2019 (left) and 2024 (right)

The 70% reduction from 27kt in 2019 to 8.1kt in 2024 that can be observed in figure 27 should be interpreted with caution as the CO_2 footprint calculation is not yet able to include the full extent of the impact of the activities of UT as suppliers do not provide all the necessary data in order to calculate this.

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.

The CO_2 emissions that occur in the supply chain 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. The emissions from UT's suppliers of goods often omit emissions during the mining and production phase as this is outsourced to countries in the global South. It is important to continue the gap analysis and narrow the gap as well as take steps to reduce the CO_2 emissions.

Around 61 companies were contacted and CO_2 data was received from around 36 suppliers of goods and services (59%), 20% of suppliers did not react to the request to share CO_2 emissions data, 16% 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 59% of suppliers that provided data, 22% 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), 28% calculate a CO_2 footprint and can determine what percentage can be allocated to the services or products delivered to UT. In 2023 this percentage was 17%.

Gap analysis 2024

In 2024 an Advanced Technology student [34]researched the underreporting and/or absence of emission data by suppliers which results in a gap in the CO_2-reporting of the UT. A method has been agreed how to take this into account and work towards reducing this gap. A spend-analysis for the reporting of the scope 3-emissions allocates emissions to each euro spent in a certain sector using a database.

Data from suppliers totalling 7.5 million euros of UT spending will still be added to the CO_2 footprint in Q2, they are dependent on their suppliers and are not able to provide the data before the UT deadline of mid-March. There is still a group of suppliers (with a totalling 1.5 million euros of UT spending) of whom no data has been received yet (as of March 2025). Based on this value and category of product or service provided, a spend analysis will be done. This data will give an indication of the gap between the current UT CO2 footprint and the desired one. This analysis is conducted by the

[34] https://www.utwente.nl/en/sustainability/sustainability-news/2024/7/1658289/student-thesis-helps-improve-carbon-footprint-reporting-at-ut

information management team of the procurement department. The results will be used by contract managers in their quarterly meetings with suppliers to improve the data provisions.

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 becoming a sustainable organization.

Actions Annual Plan 2024:

- Storytelling through interviews
- Highlight four thematic days on sustainability
- Sustainability walk website update

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.

In 2024, the communication strategy of the SEE programme was refreshed. The core message stayed the same: with Shaping2030 as its starting point, UT is working to become a sustainable organization. The SEE programme takes action to achieve this, with the help of many others throughout CFM and the rest of the organization. Everyone's help is needed to achieve this goal.

What has changed is that UT/SEE has succeeded in beginning a culture change at UT: it is clear now that sustainability is not the responsibility of a small group (e.g. the SEE programme) but the responsibility of all. This is reflected in actions taken by various departments within CFM, such as the Procurement department, LISA and the events office. The Programme Team SEE is shifting from a leading to a supportive and more facilitating role, also driven in part by reduced staffing.

The organizational change that we of course still strive to achieve through communication is instead pursued through two change strategies based on the book 'interne communicatie bij verandering' (internal change communication) from Huib Koeleman. These strategies are the planned strategy, which aims for top-down decisions for change, and the development/interaction strategy, which aims to strengthen bottom-up changes.

Accordingly, SEE aims to support bottom-up initiatives within the UT organization, helps them to develop and, when successful, spreads them beyond where they started. On the other hand, SEE asks for top-down decisions to start sustainability projects, where responsibility is clearly assigned and SEE is in a supporting role. The Programme Team SEE no longer focusses its lobby on an operational level to get things done, as it has done in the past.

Relevant examples of a top-down successful process are the lowering of natural gas usage, as well as the ongoing work to make UT laboratories more sustainable, which started as a bottom-up initiative that is now receiving the management support it needs to be successful.

The role of management and thought leaders in these strategies is very important. Personal interaction and support from management is essential for successful change, while means of communication – such as articles on the service portal- play a supporting role. For this reason, the new strategy was presented to the SEE Working Group and the management team of CFM, as well as broadly discussed in more informal settings, including with natural allies such as the Climate Centre and the Green Hub. It was also discussed within MC, as support from communication advisors/officers elsewhere in the organization is important as well.

Active communication from the Programme Team SEE includes supporting top-down decision with articles, highlighting positive examples of top-down initiatives, celebrating successes and supporting relevant sustainability-focused theme days within UT.

Highlights

Sustainability Exhibition
The Sustainability Exhibition that was created in 2023 has been displayed in the TechMed Centre, Horst and Langezijds/ITC during 2024.

Figure 23. The Sustainability Exhibition on display in Langezijds/ITC

Public friendly Annual Report
A public-friendly version of the 2023 SEE Annual Report was created. This was supported by a news article and a month-long campaign on the coffee machine screens and narrowcasting screens. Thousands of community members saw these screens, while almost 300 people visited the public friendly report.

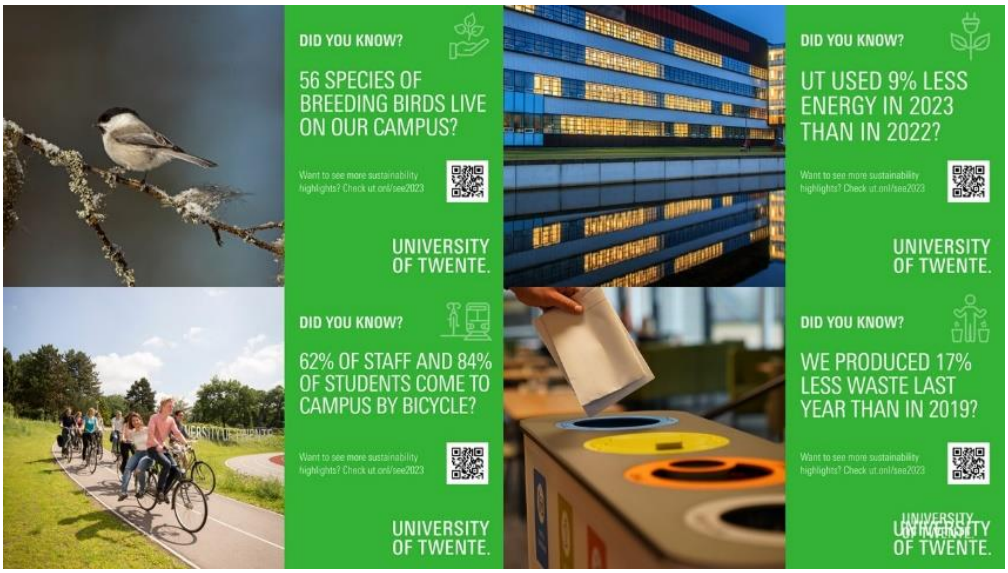


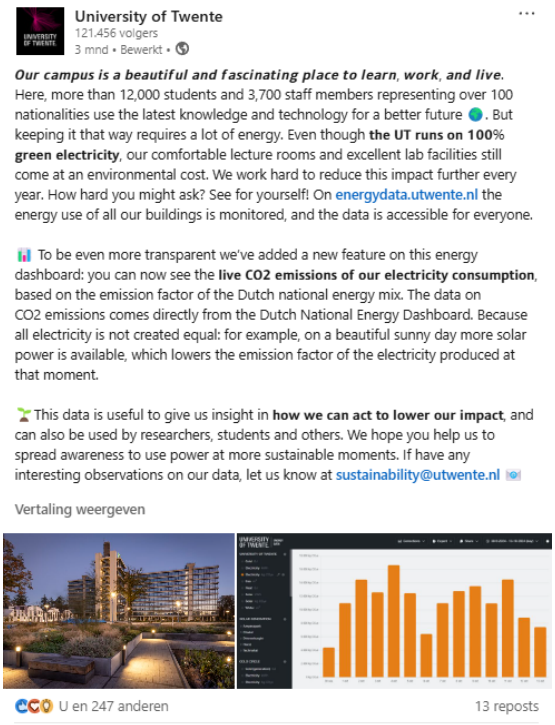
Figure 24. The slides highlighting facts from the 2023 annual report

LinkedIn

Several sustainability-related posts on UT's LinkedIn account were created.

Show your Stripes-day

Live CO2-emissions on UT's energy data platform



News articles

- Calling attention to Digital Cleanup Day (March 16 2024) in collaboration with LISA, asking people to take action to prevent digital waste through an article and the coffee machines/narrowcasting.
- Feel like a lunch walk? Do the Sustainability Walk! Published on the first beautiful spring day of 2024
- Article about UT's 2023 carbon footprint: lower energy use, but more business travel
- Article highlighting Show your Stripes-day on June 21, in collaboration with Green Hub Twente
- SEE received a grant from Climate Centre on a Biodiversity Insights project
- Student thesis on carbon footprint reporting in collaboration with the SEE Programme, ET and the procurement department.
- Student thesis on the effectiveness of sustainability measures and communication at UT
- Articles surrounding the World Biodiversity Day with a Biodiversity Walk and a month-long inventory called a BioBlitz where we shared the results of in this article.
- Understanding bird migration: the first article in the Biodiversity Series
- The environmental impact of food choices, calling attention to the pilot about showing the 'foodprint' of food choices in UT canteens
- Life in miniature: lichens on our campus: the second article in the Biodiversity Series
- Article calling on the UT community to join the nature photography exhibition
- Carp fishing on campus: third article in the biodiversity series
- Sustainable labs: first LEAF-accreditations for sustainable labs awarded at UT
- Pinetum the Horstlanden, the fourth article in the biodiversity series

All news articles on sustainability can be found here.

All in all, three thematic days were highlighted (Digital Cleanup Day, Show your Stripes Day, World Biodiversity Day) and the storytelling goal was achieved through the interviews with students and the biodiversity series. The Sustainability Walk website was updated as planned.

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.

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[35], 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

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

4. ENVIRONMENT

Until 2023, annual reporting on the environmental performance was 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 was done by the energy coordinator. Environmental reporting includes besides energy also reporting on waste, water usage and emissions to air, water and soil. Earlier, reporting on the environmental performance was done as part of Health, Safety and Environment reports written by HR and these were submitted to the Executive Board.

Considering the importance and relevance of environmental issues, it is included in this report.

4.1 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.

4.1.1 Impact introduction of the new legislation for the environment (Omgevingswet)

The new Environment and Planning Act (Omgevingswet) has come into force on January 1, 2024. The act aims to better use and protect the physical living environment. A large number of laws will be transferred to the Environment and Planning Act, such as acts on air pollution, soil protection, nature protection, spatial planning.

The environmental impact in the new act is assessed per activity that may cause environmental impact. It is no longer based on the geographic boundaries of the campus.

Activities no longer included in national legislation
Some activities are no longer mentioned in the new law and instead will fall under local regulations, such as noise pollution, littering, energy saving, smell and sport facilities. These will have to described in a new physical environment plan (omgevingsplan) by the municipal council. Until then, the old rules remain valid.

Deviation from standard rules
In the environmental permit UT was granted some exceptions to standard regulations. An example is having more than 2 fire safety cabinets per fire compartment with fire resistance of at least 90 min and a maximum amount of highly flammable substances (max 150kg) and 150kg of other hazardous substances (total 300kg). In terms of noise, customisation has also been agreed, namely the number of events (12 days per year) with a alternative immission level, the 4 exceptions on immission level and the 4 exceptions to the maximum end time. Compliance with an equivalent level of safety regarding tanks is also included in the current permit.
It is important to be aware when the local council develops the new physical environment plan to ensure these agreements are included to enable UT to continue their work as usual.

Overview of new situation where activities are conducted
To comply with the request of the Environment Agency an overview was made and provided to the ODT by July 2024 detailing what company conducts which activity with impact on the environment (MBA) at which location. UT confirmed that the

Agreements with external parties on campus
The main action for UT to take was to formalise the agreements with external parties, who have activities with potential impact on the environment on campus. This is important in order to be able to monitor efficiently that all maintain their compliance to the existing regulations and to maintain safety on campus. Meetings have been held with High Tech Factory and Gallery owner a.s.r. as well as its occupants who have laboratories (Nobian and LioniX).

For external parties the lease hold agreements are updated and an addendum is added. The changes in the leasehold refer to the compliance to environmental legislation, the obligation to report on new occupants of the buildings that will conduct activities with an impact on the environment (predominantly lab activities) for which UT will submit the notifications to the authorities (Via the digital system DSO), to adhere to a notification system where a form is completed when an incident

occurs. Also third parties commit to providing information necessary for reporting on environmental status and will monitor waste water where laboratories require it. This enables UT to be able to act in the safety for its students and personnel a well as for the environment.

4.1.2 Environmental inspection

The Environment Agency (Omgevingsdienst Twente, ODT) announced the environmental inspection in October. Maintenance reports of gas powered installations, extraction hoods, safety cabinets as well as an inventory of stored chemicals and gasses amongst others were provided to them. On December 16-17 a on-site inspection was carried out in laboratories and PGS15 cabinets (hazardous materials) in Carré and Zuidhorst and we looked at the gas turbine and flare testing facility in the Kleinhorst, as well as a visual check of the grease pits at the Linde building and Erve Holzik. The second day we visited the companies Nobian, who recently started their operations in the Gallery and Lionix and checked the facilities at the Nanolab. The assessment report was received in December 2024. In general, everything looked good at UT, however, 2 types of documents were still missing and the ODT also wanted to receive documentation that the grease pit was emptied after the inspection from Waterschap. The two missing documents were emission measurements from 2 steam boilers and yearly inspection documents of all fire protection installations in buildings with PGS 15 cabinets (for hazardous materials). Some of the documents were older than 1 year. These three issues were violations of our environmental permit and need to be remediated before February 16th.

In the same period the Waterboard (Waterschap Vechtstromen) conducted an inspection of all the grease pits on campus. This included the locations at the Linde and Erve Holzik (blusplaats and wasplaats). Additionally, many documents had to be provided. One of the grease pits needed repairs and the other needed to be emptied. These issues have been resolved.

4.1.3 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 26. Waste water analysis 2023 – 2024: metals

Metals	Chrome	Copper	Lead	Nickel	Zinc
Month	ug/l	ug/l	ug/l	ug/l	ug/l
2023-02	<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
2024-02	<2	150	1.7	4.4	120
2024-06	2.1	140	6.9	4.8	150
2024-09	<2	150	2.5	3.2	120
2024-11/12	<2	130	2.1	4.2	99

Table 27. Waste water analysis 2023 – 2024: flow, COD, N, pollution

	Average flow	Average Chemical oxygen demand	Average sum N	Pollution count
Date	m3/d	mg/l	mg/l	
Feb-23	626	458	71.3	3268
Jun-23	759	562	90.12	4928
Sept-23	786	450	90.36	4564
Nov-23	842	412	79.96	4372
Feb-24	861	644	86.54	6125
Jun-24	732	556	85.76	4656
Sept-24	755	470	89	4425
Nov/dec-24	843	478	86	3785

The environmental permit states the following threshold values. So far UT has not exceeded those. In February 2024 we had one day higher values, leading to a higher than average value for chemical oxygen demand. This occurred as the sewage pumping station had received maintenance on the same day as sampling.

Table 28. 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 29. Waste water in 2024

Month	Total (m^3) of waste water
January	18,547
February	17,599
March	19,173
April	18,795
May	18,501
June	17,305
July	13,596
Augustus	15,133
September	19,074
October	18,382
November	17,439
December	14,895
Total	**208,439**

4.1.4 Substances of Very High Concern (ZZS)

Substances of Very High Concern (ZZS: Zeer Zorgwekkende Stoffen) with an impact on the environment as well as CMR substances (carcinogenic, mutagenic and reprotoxic) with an impact on human health are used in our laboratories. People working with ZZS are informed all dangerous substances are kept separate and disposed off as dangerous waste.

During past inspections, ODT had asked UT to further work on the estimation of the emissions of the substances of very high concern 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.

As part of the approach for sustainable labs, meetings have taken place with the companies producing the lab chemicals. The companies do not have a ready-made list of more environmentally-friendly alternatives (non-ZZS or non-CMR, CMR substances - carcinogenic, mutagenic and reprotoxic) as this also depends highly on how the substance is to be used in the experiments. The best approach is to consult with research groups and together with them try to identify alternatives and to start using these alternatives in new experiments.

Table 30. 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.

4.1.5 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. It may be possible to use the facilities of the Water Lab may for this.

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

4.2 PERMIT LAW ON NATURE PROTECTION

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

From 2022 UT has been exempt from reporting to the Province on its contribution of nitrogen deposition.

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.

4.3 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.

5. BUDGET

The budget of €421,000 - approved when the sustainability policy was adopted in May 2020 -, was divided into three categories: staff time (€222,000), communication & promotion (€44,000) and training & development (€155,000). In 2020 this was 0.1% of the UT budget. In June 2021 the staff costs were allocated to CO (centrale ondersteuning).

Table 31. Financial overview 2024

Original categories	SEE budget	2024	Categories 2024
Staff	222,000	334,600	Staff costs
Communication & Promotion	44,000	18,000	Materials and project development, memberships
Training & Development	155,000	11,000	Housing costs
Unexpected expenses		95,500	External communications support and framework contract Realised
		-3,200	Grant Climate Centre
Structural budget	421,000	455,900	Total

Table 31 shows due to changes to the salaries there has been a shortfall.

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