CARBON NEUTRAL UNIVERSITY OF HELSINKI BY 2030

ROADMAP

UNIVERSITY OF HELSINKI

CONTENTS

CLIMATE VISION OF THE UNIVERSITY OF HELSINKI

The University of Helsinki will be carbon neutral by 2030. We are committed to responding to the global climate crisis in all our operations. Our climate action is founded on our shared values of truth, freedom, inclusivity and Bildung.

TRUTH

All climate action stems from research-based knowledge. In our climate efforts, genuine impact is key. We examine and take into consideration any conflicts in our climate action with other important goals, such as the promotion of biodiversity and the sustainable use of natural resources.

BILDUNG

We are committed to identifying solutions to global problems. We will serve as a pioneer and leader in creating new knowledge and the preconditions for mitigating climate change and biodiversity loss through our research and teaching.

FREEDOM

We openly and boldly develop our calculation models, reporting and measures. We carry out extensive collaboration to achieve our climate goals on the local, national and international levels.

INCLUSIVITY

Our entire community contributes to climate action. We move, eat and consume in ways that are sustainable and as low-carbon as possible, taking into consideration the planetary boundaries and moderation.

1 INTRODUCTION

1 INTRODUCTION

This roadmap is the first document dedicated solely to carbon neutrality published by the University of Helsinki. The University wishes to be a leader in sustainability and responsibility, which sets the standards high in terms of carbon neutrality. For this reason, in autumn 2021 the University launched a project to draw up a roadmap for a carbon neutral university by 2030. The goal of the project was to calculate the University's carbon footprint, define focus areas for reducing climate emissions as well as investigate a range of carbon offset models. One task in the project was to identify the positive climate impact of the University, also known as the carbon handprint. Carbon neutrality efforts constitute an important part of the University of Helsinki's sustainability and responsibility plan, published in 2022.[1]

Finland has ratified the Paris Agreement on climate change together with 193 other states.[2] The fundamental premise of the agreement is to reduce greenhouse gas emissions in a way that would halt global warming to 2 degrees Celsius by the end of this century, while setting the desired target of 1.5 degrees Celsius. However, the Intergovernmental Panel on Climate Change (IPCC) notes in its sixth assessment report that climate action is lagging behind the goals, and that, if we do not implement major global emission reductions in the coming decades, the target of either 1.5 or 2 degrees Celsius will remain a fantasy.[3] This is why the term 'climate disaster' has recently been adopted to describe climate change.

In itself, climate change poses new challenges to the University community as well, and in addition to curbing climate change, attention must be increasingly paid to adapting to it. Universities hold a key role in the study of matters related to adaptation as well as in the education of current and future generations. It is clear that research-based knowledge is central to the adaptation plans of communities and organisations. This must be the case at the University as well. At the moment, adaptation in the University's operations manifests predominantly in making buildings climate resilient, but direct and indirect effects can be assumed to increase as the climate crisis progresses. As one element of the whole, the University must identify climate measures from the perspective of global justice.

In its strategic plan, the University of Helsinki has set the goal of becoming carbon neutral by 2030. In addition, the Ministry of Education and Culture expects Finnish higher education institutions to be carbon neutral by the same year. Moreover, Universities Finland (UNIFI) has published 12 theses on sustainable development, of which the seventh describes the path of universities towards carbon neutrality.[4] Universities have been given significant opportunities to influence what must be reported to the Ministry on their emissions and activities and according to which criteria.

It is important to keep in mind that our University's climate action has been ongoing for a long time, and that in recent years particular attention has been paid, alongside research and teaching, to the energy efficiency of properties and independent energy production, with several solar power plants and geothermal heating solutions having been built on University properties. In recent years, operators of student and staff cafeterias have also invested considerably in reducing the carbon footprint of food.

The purpose of this roadmap is to identify major policies through which significant emission reductions can be achieved by 2030. The roadmap is divided into four themes: Carbon-neutral facilities, Sustainable procurement, Low-emission travel and transport, and Sustainable eating habits. Extensive sets of measures have been identified under these themes, to be further elaborated on over time into concrete measures or projects.

As the basis of the roadmap, the carbon footprint of the University of Helsinki was calculated for 2019, 2020 and 2021. In the future, the University's carbon footprint will be reported annually in the spring. This schedule is based on the fact that data collection is dependent on the reporting and financial statements of several operators.

2 CARBON FOOTPRINT IN 2019–2021

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CARBON FOOTPRINT – Describes the climate load caused by a product, activity or service, or the total amount of greenhouse gas emissions generated during the lifecycle of the product, activity or service.

In addition to carbon dioxide, other greenhouse gases have been taken into consideration in the carbon footprint calculation. Other greenhouse gases have been made commensurable by adjusting their climate-warming effect in relation to carbon dioxide. For example, 1 kg of methane is roughly 28 kg of carbon dioxide equivalent (CO_2e). Since determining the effects of other factors affecting global warming, such as fine particles generated by operations or changes in Earth's radiation balance, on an organisational level is not possible in practice, they have been excluded from the calculation.

The carbon footprint of the University of Helsinki was 77,777 tonnes of CO_2e in 2019, 58,167 tonnes of CO_2e in 2020 and 58,217 tonnes of CO_2e in 2021. To facilitate reading the report, mentions of the carbon footprint refer to the year 2019, unless otherwise stated. This is because 2019 was a normal year for University operations before the changes brought about by the coronavirus pandemic. It is interesting to see that there are no significant differences in the University's overall carbon footprint between 2019 and 2021, with the exception of travel, transport and food. The decline in the carbon footprints of these areas can be explained by telecommuting and a radical reduction in work-related travel caused by the pandemic.

On the basis of the figures for 2019, the University of Helsinki's emissions amount to 1.96 tonnes of CO_2e per person, taking into consideration staff, students and pupils of the teacher training schools (39,710 people in total).

Another commonly used form of reporting is based on the total floor space used by the organisation. For the University of Helsinki, this figure is 175 kg of CO_2e per 1 m^2 (451,696 m^2 of floor space in total). In contrast, the figure based on the University's annual turnover is 115 kg of CO_2e per €1,000 (€676.6 million in total). The figures compare relatively well with the results published by other universities, although the calculation methods used vary. The results will be more comparable in the coming years, as Finnish universities will have developed common principles for calculating their carbon footprint and will have harmonised the related reporting. This work is carried out in a coordinated manner under the direction of a sustainability and responsibility working group set up by UNIFI.

Table 1 shows carbon footprints according to the emission categories defined by the Greenhouse Gas Protocol (GHG).[5] The GHG Protocol is the most commonly used way for organisations to describe their emissions. In the classification, emissions are divided into three categories: Scope 1, Scope 2 and Scope 3 (Figure 1). Scope 1 encompasses the organisation's own direct emissions. This category includes emissions from independent energy production and, for example, the organisation's own vehicles. Scope 2 encompasses emissions from the production of purchased energy, while Scope 3 encompasses other indirect emissions generated in the value chain. Emissions under Scopes 1 and 2 are relatively easy to calculate, but Scope 3 is much more challenging, with the margin of error for calculating the emissions much higher.

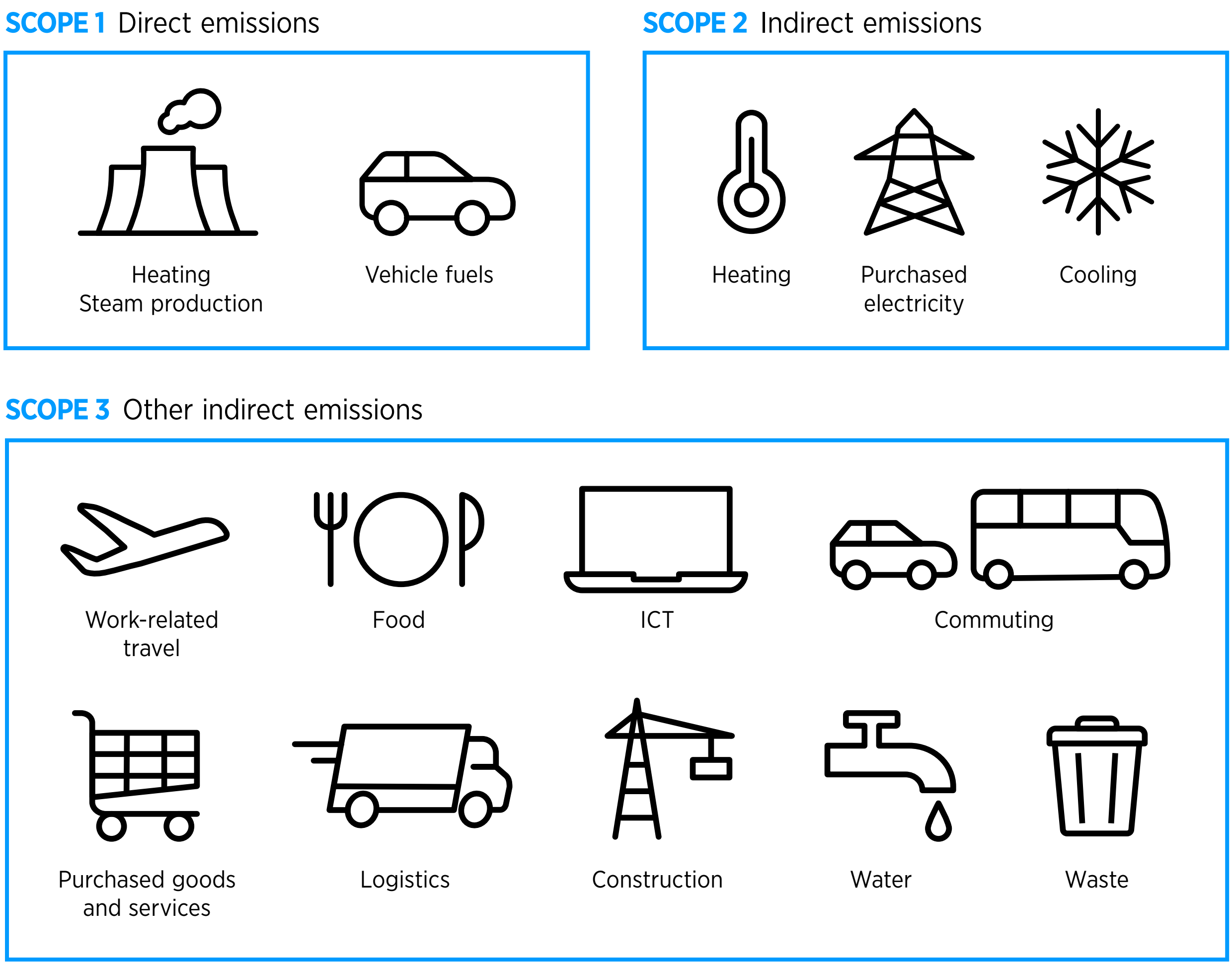

Figure 1 Categories (Scopes 1–3) according to the GHG Protocol

Table 1 The University's carbon footprint as presented in accordance with the GHG Protocol

Carbon footprint		2019	2020	2021
SCOPE 1 **Direct emissions from University operations**	Heating oil	713	602	644
	Natural gas	320	261	237
	Fuels and vehicles	560	393	425
	Total	**1,593**	**1,256**	**1,306**
SCOPE 2 **Indirect emissions from University operations**	Electrical energy	14,200	13,235	9,269
	Heating energy	17,112	13,750	16,999
	District cooling	57	0	0
	Total	**31,369**	**26,985**	**26,268**
SCOPE 3 **Other indirect emissions**	Travel and transport	11,172	2,333	2,382
	Procurement	23,468	20,372	21,901
	Food	5,429	2,491	1,927
	Property maintenance	4,746	4,730	4,433
	Total	**44,815**	**29,926**	**30,643**
Carbon footprint tonnes of CO_2e		**77,777**	**58,167**	**58,217**

The share of emissions belonging to Scope 1 in the overall emissions of the University is only roughly 2% per year. These emissions originate primarily in oil boilers used at research stations, as well as in the use of natural gas in steam production and the dryer in use at the Viikki research farm. Climate emissions generated by the vehicles owned by the University are also included.

Scope 2, or emissions from the production of purchased energy, includes in practice thermal energy, cooling and electricity purchased from external providers. With roughly 40–45% of the annual emissions, the weight of these factors in the University of Helsinki's net carbon footprint is considerably larger than those in the previous category. The biggest emissions are generated by the production of district heating and electricity, while district cooling emissions are low. In the case of the University of Helsinki, the carbon footprint of district cooling dropped to zero from the beginning of 2020 when the district cooling provided by Helen Oy became carbon neutral.

Scope 3, or other indirect emissions, accounted for 58% of the overall carbon footprint of the University of Helsinki in 2019. The most significant emissions are generated by the University's procurement, travel, transport and food, as well as property upkeep and maintenance.

Alongside the GHG Protocol, we have devised an almost identical table presenting the same figures in a slightly different way (Table 2). Four categories that will be examined in slightly more detail in the future have been selected for the table. The categories are directly linked to the operations to be targeted with measures. The categories are facilities, procurement, travel and transport, and food.

Below is a closer look at the carbon footprint of these categories. Further information on carbon footprinting and the methods used can be found in a separate appendix.

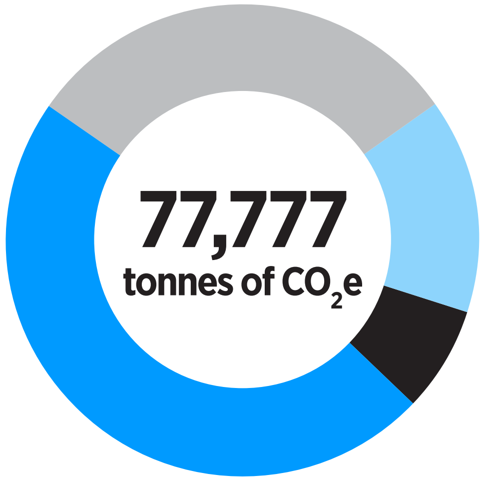

Figure 2 UH carbon footprint in 2019

Targets in the roadmap towards carbon neutrality	2019	2020	2021
Facilities	37,148	32,578	31,582
Procurement	23,670	20,526	22,081
Travel and transport	11,530	2,572	2,627
Food	5,429	2,491	1,927
Total tonnes of CO_2e	**77,777**	**58,167**	**58,217**

Table 2. Carbon footprint divided into independently selected categories

2.1 FACILITIES

In 2019 the total floor space of facilities used by the University of Helsinki was 451,696 m². To a large extent, the facilities comprise teaching, laboratory and research facilities as well as offices. In addition, there are a number of housing and accommodation facilities as well as cafeteria facilities. The majority of the University's facilities are located in Helsinki, with less than 10% of the facilities located elsewhere in Finland. Actual operational facilities are found in 16 locations. In addition, there are small unmanned seismographic stations and other similar facilities in 21 locations.

The University operates mainly in facilities owned by the University of Helsinki Group, with approximately 90% of the facilities rented from properties directly owned by the Group or incorporated properties. The carbon footprint of the University of Helsinki's facilities has been calculated as a share of the overall carbon footprint of the properties of the University of Helsinki Group (see section 2.5 Carbon footprint of the University of Helsinki Group properties). In other words, the carbon footprint of the operations of the University of Helsinki is presented under the heading "Carbon footprint of facilities", while the carbon footprint of the entire property group is presented under "Carbon footprint of University of Helsinki Group properties". In part, the figures overlap.

In 2019 the carbon footprint of facilities was 37,148 tonnes of CO_2e, which accounts for 48% of the University's total emissions (Table 3). The single biggest source of carbon emissions was district heating: 17,112 tonnes of CO2e (46% of the carbon footprint of facilities). This corresponds to approximately 86 GWh of energy consumption. Helen Oy, the district heating producer in the Helsinki region, still produced district heating largely with fossil fuels in 2019. Nearly 90% of district heating production was carried out with coal and natural gas. Only roughly 3% of district heating was generated with wood-based biomass.

Other emissions related to the heating of properties (1,033 tonnes of CO_2e) were mainly generated by oil-fired boilers located at research stations as well as natural gas use. Natural gas was primarily used in the production of steam. In 2019 the University's first geothermal heating system was completed at the student building of the Tvärminne Zoological Station. At Tvärminne, geothermal heat replaced oil consumption. In 2021, geothermal heating and cooling were introduced at Viikki's Info Centre Korona. In addition, a woodchip powerplant operates at the Lammi Biological Station.

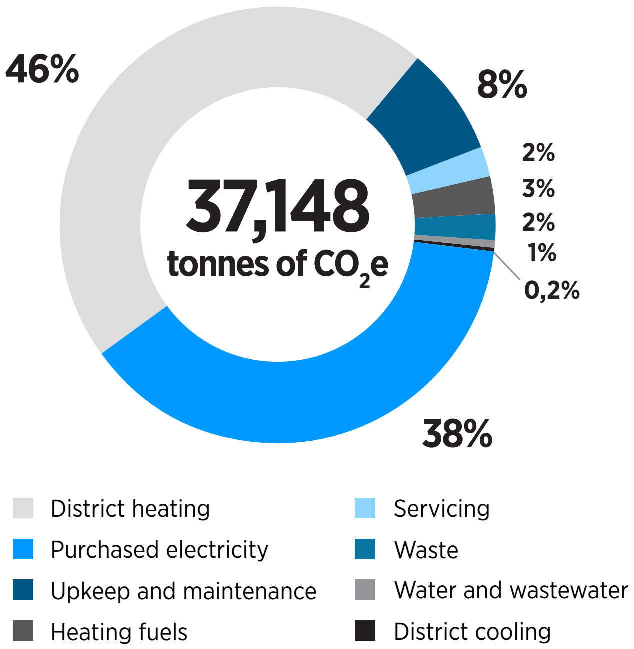

Figure 3 Carbon footprint of facilities in 2019

Table 3 Emissions from facilities

Facilities	2019	2020	2021
Purchased electricity	14,200	13,235	9,269
District heating	17,112	13,750	16,999
Upkeep and maintenance	2,949	2,806	2,770
Servicing	876	1,227	1,042
Heating fuels	1,033	863	881
Waste	688	598	516
Water and wastewater	233	99	105
District cooling	57	0	0
Total tonnes of CO2e	**37,148**	**32,578**	**31,582**

In 2019 another significant source of emissions related to facilities (14,200 tonnes of CO_2e, or 38% of the carbon footprint of facilities) was purchased electricity. The production methods of the electricity used by the University of Helsinki are presented in Table 4. Some of the purchased electricity includes certified guarantees of origin, which naturally reduces the carbon footprint. In 2020 and 2021, electricity consumption was nearly identical, but the carbon footprint for 2021 was roughly 30% lower, mainly because of the larger number of guarantees of origin. In the analysis period, the solar energy produced at University properties accounted for roughly 1% of the annual electricity consumption.

The share of property services (maintenance, cleaning, waste management, lobby services, etc.) as well as building maintenance and operational changes is roughly 10% of the carbon footprint of facilities. The emission figures for waste include ordinary waste and hazardous special waste. In 2019 a total of 1,464 tonnes of recyclable and mixed waste sorted into eight different fractions were collected from the facilities of the University of Helsinki. In addition, approximately 350 tonnes of hazardous and special waste were collected, of which the largest share was composed of chemical and biological hazardous waste generated by the University's research operations as well as waste under the animal by-products regulation of the EU. Water and wastewater account for less than 1% of the emissions of properties.

Table 4 Origin of electricity used in University of Helsinki properties

Electricity production method	2019	2020	2021
Fossil fuels and peat	36.5%	34.1%	23.4%
Nuclear power	37.0%	40.4%	29.8%
Renewable energy without a guarantee of origin	6.8%	4.1%	4.6%
Hydroelectricity (guarantee of origin)	18.7%	20.2%	10.3%
Wind electricity (guarantee of origin)	0.0%	0.0%	20.6%
Solar electricity (guarantee of origin)	0.0%	0.0%	10.3%
Solar electricity produced in properties	1.0%	1.2%	1.0%
Total	100%	100%	100%
Electricity consumption MWh	**71,719**	**68,577**	**68,158**

2.2 PROCUREMENT

Procurement is a very significant source of carbon emissions in the University's operations. The carbon footprint of procurement is also without a doubt the most challenging category to calculate. In calculating the carbon footprint of procurement, information obtained from suppliers of goods and services was utilised as comprehensively as possible. The rest of the calculations were carried out using the openLCA lifecycle assessment software. The calculations were based on the EXIOBASE 3.4 database, which organisations commonly use for carbon footprinting. Further information on the above software and database is available in Appendix 1. These calculations are founded on the principles that carbon footprints are calculated for various goods and services over their lifespan, resulting in emission factors in the form of 'kg of CO_2e per €'. These coefficients are applied to the monetary amounts recorded in the University's accounts, resulting in a carbon footprint for each area.

The carbon footprint of procurement in 2019 totals at 23,670 tonnes of CO_2e, corresponding to 30% of the overall carbon footprint of the University. Table 5 describes the University's procurement in four main categories: i) Materials and supplies, ii) Machinery, equipment and investments, iii) Purchased services, and iv) Other expenses.

i) Materials and supplies (7,101 tonnes of CO_2e, 30% of procurement)

The University of Helsinki has a number of laboratories in the natural sciences, medicine and biosciences for which a wide range of research supplies is purchased. The chemicals and supplies used in laboratories alone generated emissions of 4,849 tonnes of CO_2e. Literature and printed matter broadly encompass printed books and publications as well as electronic materials. It is difficult to identify accurate means of calculating the carbon footprint of electronic publications in particular, possibly resulting in a fairly big margin of error in their case. The item 'Other materials and supplies' also includes a large number of different products, as well as fuels purchased for University vehicles and equipment. The emissions generated by driving are included in the 'Travel and transport' category.

ii) Machinery, equipment and investments (7,325 tonnes of CO_2e, 31% of procurement)

In the case of laboratory and research equipment, direct purchases and depreciations of equipment have been included in the carbon footprinting. Accordingly, the carbon footprint of equipment is split across several years according to depreciation, instead of being assigned solely to the date of acquisition. However, this does not affect the net carbon footprint of equipment. The information on ICT equipment collected from suppliers was exceptionally comprehensive. The calculations were based on the carbon footprint reports of the devices most commonly used at the University of Helsinki. This applies to desktop and laptop computers, display screens, and tablets. In addition, a decision was made to include mobile phones in the ICT equipment category. Unfortunately, there are still significant deficiencies in terms of data traffic and cloud-based services in the climate reporting of the ICT sector, even on the international level. Estimates of the share of emissions from telecommunications networks and data centres from the overall emissions of the ICT sector range from 20% to 40% (networks, content production and data centres). The share of ICT emissions in the global carbon footprint is most commonly reported between 3% and 7%. It would be a reach to assume that the University, as a data-intensive community, would not achieve at least the same figures. Of course, the University's data use can be assumed to not focus as heavily on the consumption of videos and other entertainment content as that of the average Western individual. At the same time, large amounts of data are processed and a significant number of emails are sent at the University. In other words, this calculation does not cover emissions from data traffic and cloud-based services, but efforts will be made to rectify the situation in the coming years. An exception to this are the digital services and servers maintained by the University. Their emissions are partly included in this category, partly in the following category, as well as in the emissions from facilities in the form of electricity consumption.

The "Other machinery and equipment" section includes machinery, some small equipment purchased with supplementary funding, and equipment with no further breakdown. Depreciation of computer software and licensing fees for IT software were listed together under investments.

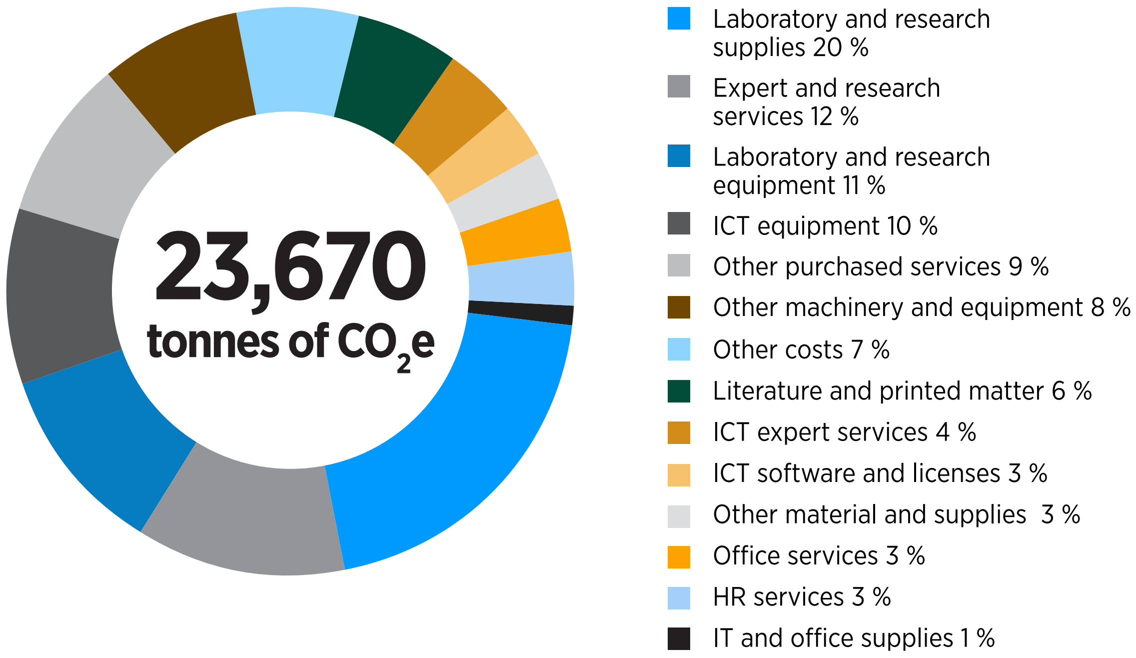

Figure 4 Carbon footprint of procurement in 2019

Table 5 Carbon footprint of University of Helsinki procurement

Procurement	2019	2020	2021
Materials and supplies	**7,101**	**6,766**	**7,093**
Laboratory and research supplies	4,849	4,398	4,739
Laboratory supplies	985	919	916
Chemical products	3,310	2,940	3,287
Other	555	539	537
Literature and printed matter	1,366	1,635	1,531
Other materials and supplies	718	631	706
IT and office supplies	168	102	117
Machinery, equipment and investments	**7,325**	**5,996**	**6,235**
Laboratory and research equipment	2,521	2,302	2,233
ICT equipment	2,372	1,246	1,160
Other machinery and equipment	1,798	1,794	2,126
IT software and licenses	634	654	716
Purchased services	**7,511**	**6,464**	**6,839**
HR services	818	448	648
Office services	652	554	543
ICT expert services	1,077	865	918
Expert and research services	2,916	3,213	2,990
Other purchased services	2,048	1,384	1,740
Other expenses	**1,733**	**1,300**	**1,914**
Total tonnes of CO_2e	**23,670**	**20,526**	**22,081**

iii) Purchased services (7,511 tonnes of CO_2e, 32% of procurement)

The carbon footprint of purchased services has been primarily calculated on the basis of the factors obtained from the lifecycle assessment software. However, their share of procurement is so high that the goal is to increase the accuracy of carbon footprinting in the coming years. Most of the businesses from which the University of Helsinki purchases services are already pursuing low-carbon operations through their own efforts, and their carbon footprint reporting is advancing from year to year. In the future, more attention will be paid to this, and direct information on the actual emissions of services will be sought at least from major service providers.

One example is occupational healthcare under HR services. Using the lifecycle assessment software, its carbon footprint was calculated at 259 tonnes of CO_2e (see Appendix 1). At the same time, the current service provider is committed to a sustainability programme of its own, which includes carbon footprinting, its related monitoring and reduction targets. In other words, the business aims to make the actual carbon footprint of the service visible to the customers, making it possible to avoid complex and error-prone lifecycle calculations. Other human resources services in Table 5 include the participation of staff in events (carbon emissions from events only, not related transport) and recreation.

Office services include phone and postal services as well as printing, publishing and binding, external advertising, and marketing. However, in this classification ICT expert services include purchased IT expert services as well as operations services. The latter includes activities related to, among other things, the maintenance and support of various software programs.

In the category of purchased services, two high carbon emission values are allocated to expert and research services as well as other purchased services (totalling at 4,964 tonnes of CO_2e, 21% of procurement). These services consist largely of purchased laboratory analyses, commercialisation services and various collaboration projects where services are purchased from partners such as other universities, university hospitals and the Finnish Institute for Health and Welfare. Most of consultation, including internal audits, also falls under this category. This category also partly encompasses the ICT consultation services purchased by individual units or projects, which would, according to their nature, be better placed under ICT expert services. However, this would have required an extremely granular itemisation of the accounts, which was not considered necessary at this point.

iv) Other expenses (1,733 tonnes of CO_2e, 7% of procurement)

The ‘Other expenses’ category includes a large number of extremely varied expenses, from insurance and participation fees to patent and licence fees.

2.3 TRAVEL AND TRANSPORT

In 2019, the carbon footprint of travel and transport was 11,530 tonnes of CO_2e, or 15% of the overall emissions of the University. A natural way of categorising travel and transport is to divide them into two modes of travel: work-related travel and commuting. The calculation for work-related travel is relatively straightforward, as information on trips made by members of the University community can be compiled from both the information provided by the travel agency and the University's accounts, in particular the credit card details. Calculating the carbon footprint of commuting is more of a challenge, as no actual databases are available for it. Using an electronic form, a survey was conducted in late 2022 for carbon footprinting related to commuting. A total of 1,041 individuals responded to the survey. Unfortunately, the survey did not reach students well, with only a handful of responses received from them. As a result, the emissions from students' commuting had to be assessed on the basis of the information provided by University employees. However, significant assumed reductions were made to, for example, the use of one's own car and the number of days of attendance in the case of students' carbon footprint. For future carbon footprint reports, the aim is to conduct a survey with better student coverage. At the same time, the response rate of the staff can be considered relatively good, with roughly 13% of the total staff responding..

Table 6 Carbon footprint of travel and transport

Travel and transport	**2019**	**2020**	**2021**
Commuting	**5,151**	**1,462**	**1,500**
Car	3,341	1,226	-
Car + public transport	212	43	-
Bus	1,363	165	-
Train	120	27	-
Metro and tram	116	13	-
Work-related travel	**6,379**	**1,110**	**1,127**
Flights	5,442	708	729
Hotels/accommodation	306	52	45
University vehicles	358	239	245
Using one's own car	114	87	82
Ship travel	85	4	9
Taxi and rental car	51	10	10
Train and bus	23	10	7
Total tonnes of CO_2e	**11,530**	**2,572**	**2,627**

2.3.1 Commuting

The vast majority of commuting emissions were caused by travelling by car between home and work. Of the survey respondents, 15% used a car as their primary mode of transport, while the combination of car and public transport was used by 5% of respondents. Roughly 10% of drivers indicated that they only use their car in the winter months. The survey also investigated the number of on-site workdays in 2019, 2020 and 2022. Those who most often took the car to work were the same people who also worked most often on site. This trend was particularly evident at the height of the coronavirus pandemic. The bus was the most widely used mode of transport among the University community (26% of respondents).

In the calculation, the aim was to distinguish between people using commuter buses and those using long-distance buses, as the differences in their emissions are surprisingly high. Roughly 38% of respondents used trains, metros and trams, but their carbon footprint was low due to the low emissions of rail traffic. A little over 15% reported riding a bike or walking all year round. In the summer, this figure increases markedly to almost 30%. The survey form did not include questions on travel and transport in 2021, but the figures were expected to be comparable to 2020 as in the case of work-related travel. While the emission figure for commuting in 2021 is entirely derived from transport in 2020, the impact on the plans included in the roadmap is negligible, as the emissions in 2019 will serve as the benchmark in the future.

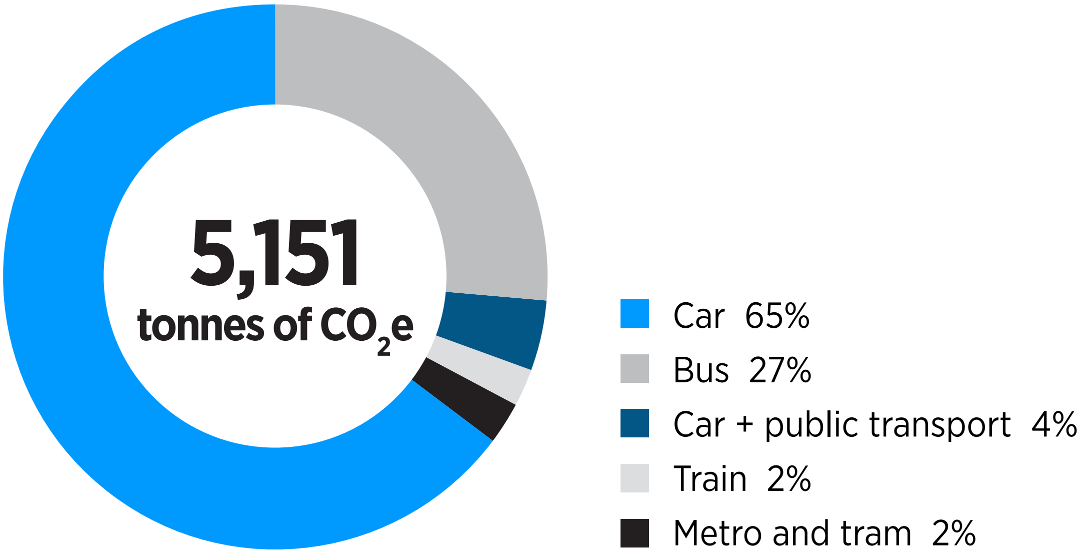

Figure 5 Carbon footprint of commuting in 2019

2.3.2 Work-related travel

The majority of emissions from work-related travel were generated by air travel. Air travel alone generated a total of 5,442 tonnes of CO_2e emissions, corresponding to just over 7% of the overall emissions of the University and nearly half of the total emissions of travel. As an exception to the title of the category, this also includes the economy-class return flights of exchange students arriving at the University of Helsinki. The share of exchange students in total flight emissions was 13% (714 tonnes of CO_2e, 1,320 exchange students in 2019).

The emission data for the flights were primarily obtained through the CWT travel agency used by the University of Helsinki. The remaining flight emissions were calculated using the carbon emissions calculator of the International Civil Aviation Organization (ICAO) of the UN. In the case of emission calculations for flights purchased from sources other than CWT, the relevant travel information was obtained from the University's credit card data and, in the case of exchange students, from Teaching and Learning Services. It is important to note that a number of calculators based on different data are used for flight emission calculations. In other words, the results could vary greatly depending on the calculator used.

Of the emissions generated by actual work-related flights, 10% were caused by short-haul or domestic flights, while medium-haul and European flights as well as intercontinental flights generated 45% of the emissions each. The total amount of flight kilometres was 54 million, most of which (97%) were accumulated in economy class. However, first- and business-class flights accounted for 7.5% of the total emissions for air travel. The higher emissions for these classes are mainly the result of the large space required per passenger. Other emissions related to work-related travel are composed of other modes of transport: ship, taxi, rental car, train and bus. The climate emissions of the above-mentioned modes of transport were calculated on the basis of factors obtained from the lifecycle assessment software. In addition, some people use their own cars for certain work-related trips. The emissions from the use of cars were calculated on the basis of the kilometre allowances in the accounts, which were correspondingly converted into kilometres driven. These figures were used as the basis for calculating the emissions generated by driving. The emissions associated with accommodation were also calculated with factors originating in the lifecycle assessment software. In the case of vehicles owned by the University, some of the data were collected on the basis of kilometres driven. However, the University has a significant number of vehicles other than cars, such as tractors and motor boats. Consequently, some of the figures were calculated on the basis of the fuel used. The emissions generated by fuels before end use (cradle-to-gate) have been taken into consideration under 'Other materials and supplies'.

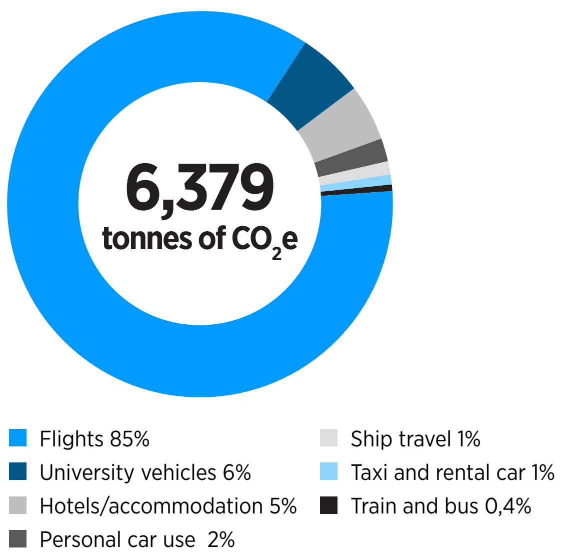

Figure 6 Carbon footprint of work-related travel in 2019

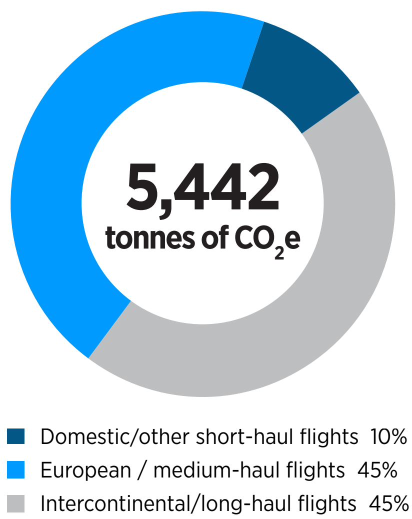

Figure 7 Distribution of flights in 2019

2.4 FOOD

In 2019 the carbon footprint of food was 5,429 tonnes of CO_2e, or just over 7% of the overall emissions of the University. The figure is similar, for example, to the footprint of the University's air travel. The emissions generated by the student and school cafeterias operating on University premises were included in the University's carbon footprint for food. Some of the staff also regularly eat at these establishments. The lunch cafeterias at the University of Helsinki are primarily operated by three companies: Ylva Oy (UniCafe) owned by the Student Union of the University of Helsinki, Sodexo Oy and Compass Group Finland Oy. In addition, Compass Group operates school cafeterias in the Viikki Teacher Training School and the Helsinki Normal Lyceum teacher training school. Unfortunately, there was not enough time to include in this report the carbon footprint of the canteens at the University of Helsinki's research stations. The figures for the lunch cafeteria operated by HUS at Biomedicum are also missing. In addition to the carbon footprint of lunch cafeterias, catering at the University's own events and other food products purchased at the University were included in the overall emissions of food. In the case of meals taken outside the University, only restaurant visits paid through University accounts were taken into consideration. Moreover, most of them have been included in the category for purchased services (e.g., staff recreation).

Table 7 Carbon footprint of food

Food	2019	2020	2021
UniCafe	2,859	1,563	1,104
Other lunch cafeterias	1,581	621	523
Meeting and event catering	989	307	300
Total tonnes of CO_2e	**5,429**	**2,491**	**1,927**

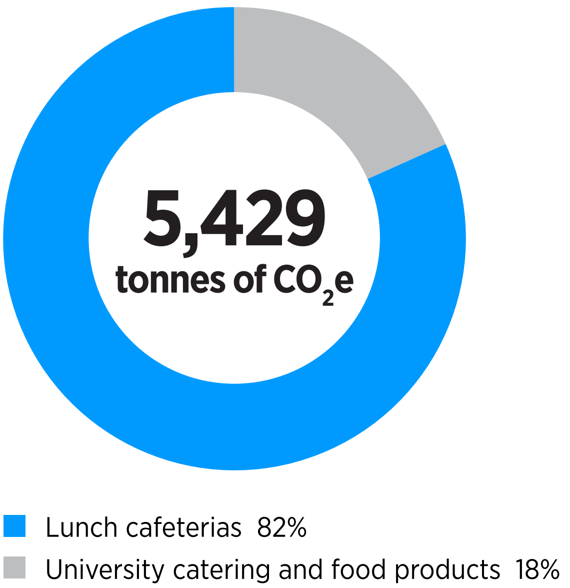

Figure 8 Carbon footprint of food in 2019

2.5 CARBON FOOTPRINT OF UNIVERSITY OF HELSINKI GROUP PROPERTIES

The total floor space of the facilities controlled by the University of Helsinki Group is approximately 615,000 m2. Helsinki University Properties Ltd and the University of Helsinki Funds are operators associated with real estate ownership. Most of the facilities have been rented to the University of Helsinki and Group-owned businesses, but also partly to external tenants. The majority of the building stock is located on four campuses in Helsinki. In other words, the figures overlap with section 2.1.

Property owners have a significant role in reducing the carbon footprint associated with the University's facilities, particularly in investments related to energy efficiency and the green transition. Since 2019 the properties owned by the University of Helsinki Group have been parties to the national Energy Efficiency Agreement for the Property Sector (2017–2025). The agreement obliges the Group companies to implement measures that will reduce energy consumption in their properties. A central goal in completed renovations and new construction projects has been the enhancement of energy efficiency and the promotion of renewable energy production on site.

Property services for the University community and other tenants in properties owned by the Group are provided by University of Helsinki Property Services Ltd (HY247), which is owned by the University of Helsinki. HY247 is committed to promoting carbon neutrality in its services and annually publishes a responsibility report on its operations.

Annually, the emissions from construction vary greatly, depending on the number and scope of ongoing projects. Ongoing projects in 2021 included the renovation of the University's Main Building and the Info Centre in Viikki as well as the new construction projects at the Hyytiälä Forestry Field Station and a new building for the Helsinki Upper Secondary School of Natural Sciences under construction in Kumpula. As a result, the carbon footprint of construction grew nearly threefold in 2021 (14,835 tonnes of CO2e) compared to 2019.

Project-specific carbon footprints have been calculated for the renovations of the Main Building of the University and the Info Centre in Viikki as well as the new building constructed in Kumpula. The carbon footprint of buildings during use and construction has been reduced, for example, by energy efficiency and renewable energy solutions as well as timber construction. In summer 2022, a preliminary survey was conducted as a student assignment on carbon sinks and storage based on land use. The aim is to advance this effort further to obtain sufficiently accurate information on the calculated sinks and storage.

Table 8 Carbon footprint of University of Helsinki Group properties

Carbon footprint of University of Helsinki Group properties		2019	2020	2021
SCOPE 1 Direct emissions from University operations	Heating oil	713	602	644
	Natural gas	320	261	237
	Total	**1,033**	**863**	**881**
SCOPE 2 Indirect emissions from University operations	Electrical energy	17,109	15,946	11,168
	Heating energy	20,616	16,567	20,481
	District cooling	69	0	0
	Total	**37,794**	**32,513**	**31,649**
SCOPE 3 Other indirect emissions	Maintenance and upkeep	1,899	1,772	1,645
	Waste	688	598	516
	Water and wastewater	233	99	105
	Construction	5,567	10,436	14,835
	Total	**8,387**	**12,905**	**17,101**
Carbon footprint tonnes of CO_2e		**47,214**	**46,281**	**49,631**

2.6 UNIVERSITY INVESTMENT ASSETS

The University of Helsinki has extensive investment assets (€587 million on 31 December 2022). Investment assets are managed in accordance with the principles for responsible investment activities established for the University. The investment activities are reported on the University website on an annual basis, and the reports monitor the carbon intensity of investments in relation to the relevant indexes.[6] The long-term goal is to eventually make the University's investment portfolio carbon neutral. The climate effects of investment activities will continue to be reported through a separate document.

3

PATH TO CARBON NEUTRALITY

3 PATH TO CARBON NEUTRALITY

Four categories were used in carbon footprinting: Facilities, Procurement, Travel and transport, and Food. In terms of measures, we have named four related themes on which to base our climate action. The themes are Carbon-neutral facilities, Sustainable procurement, Low-emission travel and transport, and Sustainable eating habits. We have set the year 2030 as the target level for all of these categories, identifying measures that can already be determined at this stage of the roadmap process. In the future, we will also publish more detailed lists of measures openly. In addition, all members of the University community can propose measures to be added to the list. All relevant proposals will be discussed and their implementation potential assessed both by the group coordinating climate action and in the various sectors affected by the proposals.

To begin with, it should be noted that all consumption contributes to the carbon footprint. For example, wind power is often referred to as an emission-free form of energy, but this only encompasses energy production. It does not take into consideration emissions from the construction and maintenance of wind power plants associated with the entire logistics chain. This is why it is important to keep in mind that reducing consumption is often almost as important as redirecting consumption to lower-carbon alternatives. In terms of climate action, it is important to identify measures that can directly reduce our emissions and over which the University has decision-making power. In addition, a considerable amount of emissions are generated in chains over which we have no direct control. For example, in terms of procurement there are a great deal of goods and services for which emission-free alternatives are not even available, even if we were willing to invest in them. However, we wish to guide our entire operating environment and partners towards low-carbon solutions, and strive to achieve our goals through, among other things, continual market dialogue. At the same time, we can clearly see that almost all of the goods and services we procure already show evidence of a reduced carbon footprint from year to year. This is particularly evident, for example, in the carbon footprint of computers, which has as much as halved in the last four or five years. However, we cannot, nor do we wish to, depend in our climate action on others. Rather, we present reduction plans for each emission category.

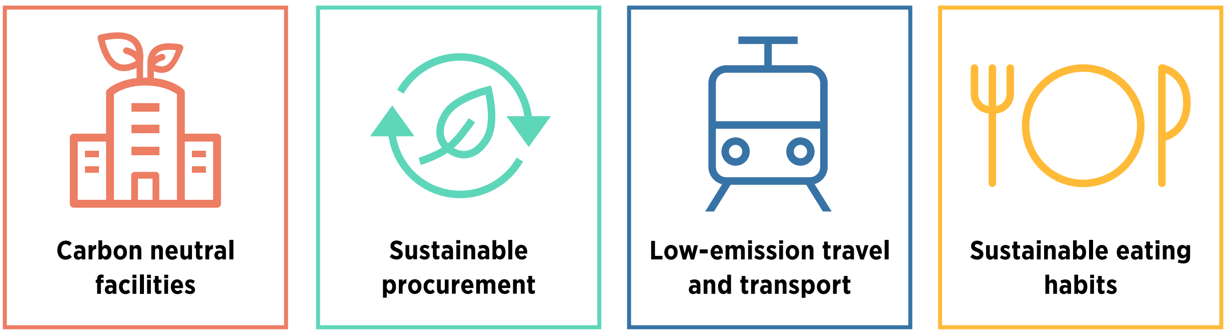

Figure 9 Climate action categories

3.1 OVERVIEW OF EMISSION REDUCTIONS

The emission reductions achieved through the measures and their classification in different categories are described below in Figure 5. It is important to note that we have not taken into account many of the measures taken by others in the reductions to emissions. While we rely heavily on our district heating provider to provide carbon neutral heating by 2030, for example, we will ensure the realisation of our climate strategy by separately procuring, if necessary, carbon-neutral district heating. In the worst-case scenario, we will purchase direct carbon offset products to eliminate the carbon footprint of district heating. By concentrating on carrying out the above-mentioned climate action, we can reduce our carbon footprint by nearly 50,000 tonnes of CO2e per year. In terms of emission reductions, procurement is the most difficult category to assess. Most of our procurement originates in large international logistics chains, making it extremely difficult to take into consideration the changes in emission factors occurring in these chains. Moreover, the databases used for carbon footprinting are not updated frequently enough. It should also be noted that a very substantial share of our procurement is targeted at carrying out the University's core duties, making significant reductions in such procurement challenging. However, we are extremely confident that, by 2030 at the latest, we will gain a comprehensive understanding of actual procurement-related emissions and that we will be able to systematically steer procurement towards low-carbon solutions.

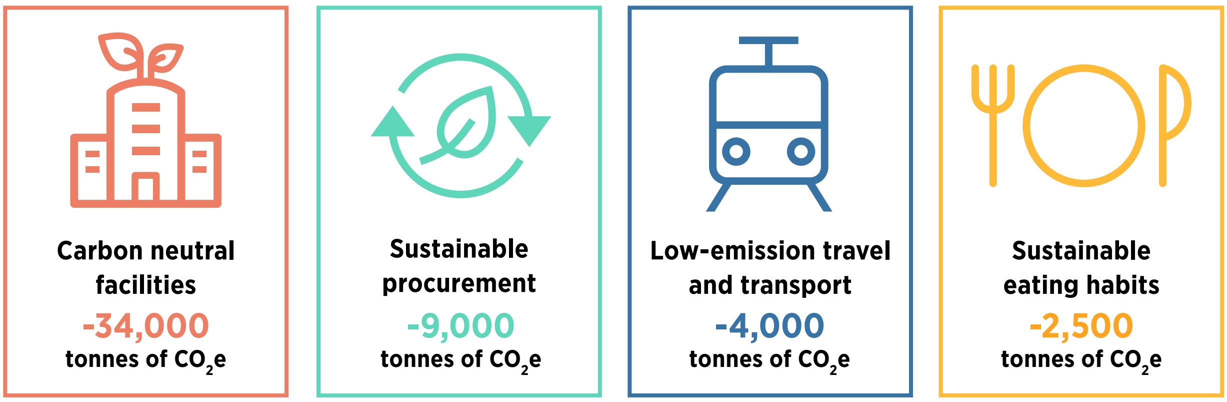

Figure 10 Emission reductions achieved through measures

Figure 11 shows emission reductions on a timeline. The aim is to include the planning of offsets and small-scale piloting in the carbon footprinting for 2025. From then on, the goal is to calculate financial figures for the annual cost of carbon offsets. Another goal is to initiate partial offsetting before 2030.

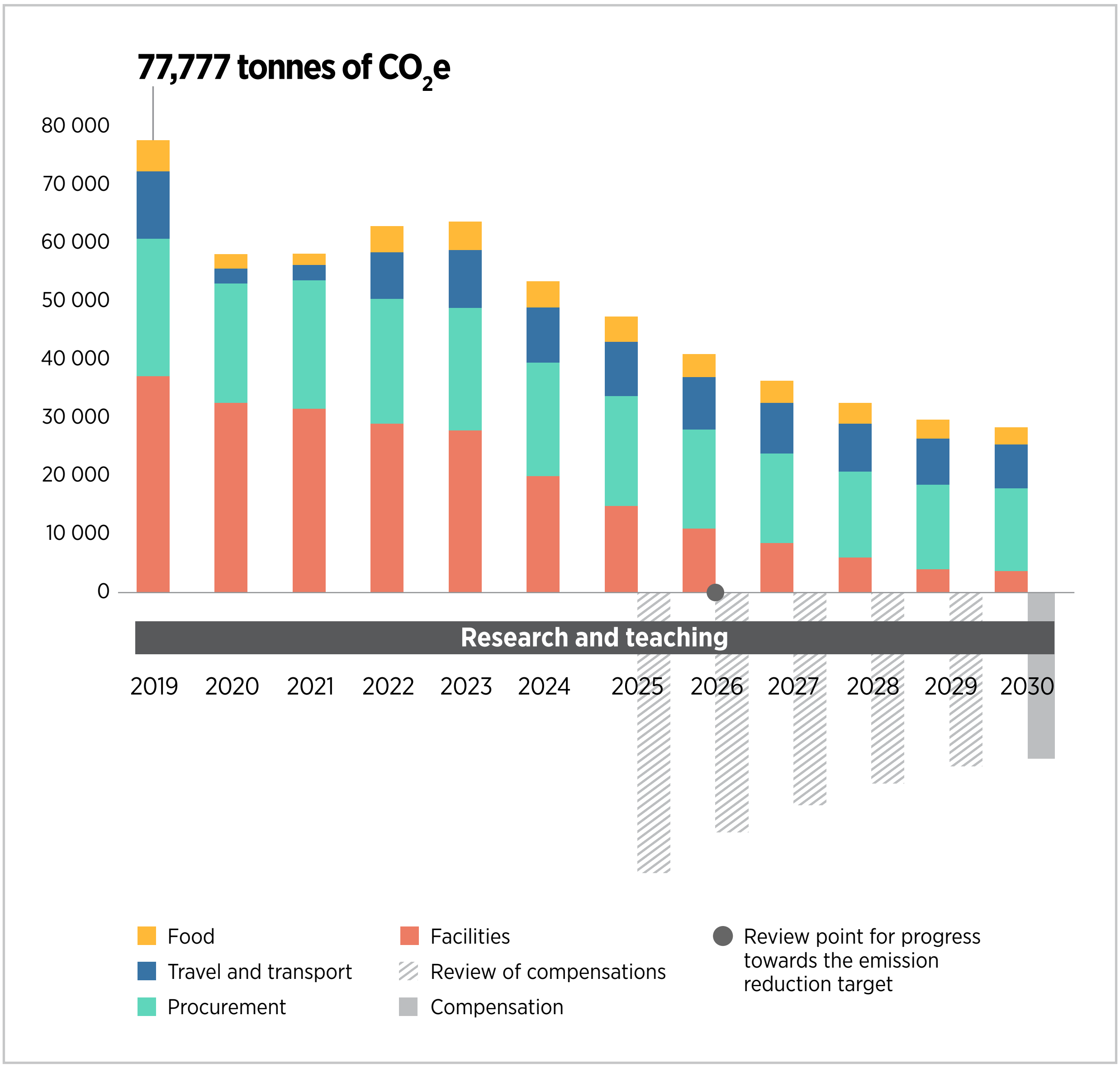

Figure 11 Emission reductions

In the next section, we take a closer look at the goals of the four emission reduction categories we have chosen.

4

EMISSION REDUCTION MEASURES

4.1 CARBON NEUTRAL FACILITIES

Purchased electricity and district heating are clearly the largest individual emission sources of the University of Helsinki. Combined with emissions from fossil fuels used in heating and steam production, energy consumption accounted for 42% of the total climate emissions in 2019. In the future, it will also be important to draw up contingency plans in anticipation of challenges associated with the energy transition, which may include marked fluctuation of energy prices, electricity shortages and resulting demand responses.

Even if purchased energy were carbon neutral, reducing energy consumption is also one of the most central goals for global sustainability. Further, reducing energy consumption has significant long-term economic effects. This section encompasses a great deal of measures related to sustainable construction and facility use. With regard to energy efficiency, matters related to energy transitions are often taken into consideration. In addition, this category examines the energy consumption directly caused by operations and related savings.

- The district heating purchased by the University of Helsinki is carbon neutral.
- All purchased electricity is carbon neutral.
- Ten per cent of energy consumption is covered by independently produced renewable energy.
- Fossil heating fuels have been abandoned.
- The total energy consumption of University facilities is reduced by 15% compared to 2019.
    a) Properties, energy efficiency
    b) Energy conservation
- The University complies with its programme for sustainable construction.
- The total amount of waste will be reduced by 10% and the recycling rate will increase
  by 25% (from 2019).
- Carbon-neutral facilities; total emission reduction **34,000 tonnes of CO_2e** (from 2019)

CURRENT SITUATION

In terms of district heating, the University of Helsinki is dependent on the district heating provided by Helen Oy, owned by the City of Helsinki. Most of the University properties are connected to Helen's district heating network, with the exception of units operating outside the Helsinki Metropolitan Area. Some research stations have already transitioned from oil heating to geothermal heat. Geothermal heating solutions have also been developed for sites located within the district heating network. Whenever possible, new geothermal heating sites will be considered and examined on a case-by-case basis.

In 2021 the total amount of renewable energy produced independently by the University was 3,109 MWh, which amounts to 1.6% of the total energy consumption of all properties.

Energy consumption of facilities in 2019: district heating 86,422 MWh, electricity 71,719 MWh (University share)

For a long time, the University of Helsinki has been paying attention to the energy efficiency of its properties, actively working to identify new initiatives. The University is also publicly committed to a number of sustainable development measures, including the pledge to reduce energy and water consumption by 10% by 2025, compared to the figures for 2014. Energy savings have been promoted through various national campaigns, including the 'Down a degree' campaign. Efforts for energy efficiency and energy conservation will be continued by permanently redesigning operations towards a lower overall energy consumption.

TARGET FOR 2030

The district heating purchased by the University of Helsinki is carbon neutral.

DESCRIPTION

Helen Oy has taken considerable strides towards lower-carbon district heating. At the same time, it has pledged to make its energy production entirely carbon neutral by 2030. The University closely monitors Helen's actions and, through climate collaboration with the City of Helsinki, aims to influence Helen's climate action also by way of corporate governance.

Helen offers two different emission-free district heating solutions: Eco Heat Flow and Eco Heat Bio. At the moment, the University considers their purchase to be partly problematic; purchasing the Eco Heat Flow option does not boost sustainable production (no emission reduction additionality), and at the same time, the role of biomass as an emission-free source is still disputed on the international level. Because of the goals set, the possibility of purchasing these district heating forms will be closely monitored in the University's property sector. All independently produced thermal energy (see below) reduces the need for purchased district heating

Schedule: 2023–2030. While the goal is to achieve zero-emission district heating well before 2030, the situation will be actively monitored and the University's district heating strategy fixed accordingly.

Responsibility: Facilities and Properties and HY247

Monitoring: The carbon footprint of district heating is reported annually. Concurrently, the necessity of the measures taken is monitored.

Potential risks: Helen Oy does not reach its emission reduction targets as planned, and certified district heating with a high surcharge or carbon offsets will have to be purchased for University properties.

Costs: Significant costs if district heating is to be carbon neutral before 2030. At the list prices for December 2022, it would cost €635,000 per year (€5.9 per MWh) for the Eco Heat Flow option and roughly €311,000 per year (€2.9 per MWh) for Eco Heat Bio. Savings in heating can reduce costs.

Examples of measures: Regular collaboration meetings with Helen Oy

TARGET FOR 2030

All purchased electricity is carbon neutral.

DESCRIPTION

The University of Helsinki has systematically increased the amount of electricity produced by renewable means. In 2019 the share was still under 20%, but in 2021 it reached 42%. Almost all of this electricity is procured with guarantees of origin. Low-carbon electricity would already be favoured before achieving this goal: the University will continue to acquire guarantees of origin for exchange electricity, verifying the origin of electricity as produced with either renewable energy sources or nuclear power. The energy sources for guarantees of origin are determined annually, and the University conducts a tendering process for guarantees of origin on an annual basis. Unfortunately, the current energy crisis and geopolitical situation hinder the setting of interim goals, as the indicative prices of guarantees of origin for various clean production methods have more than doubled in autumn 2022. Power purchase agreements (PPA) and direct carbon offsets are alternatives for guarantees of origin. PPA agreements denote long-term and fixed-price electricity agreements for the purchase of low-carbon electricity. The challenge with PPAs is to identify a suitable time to commit for a long time to a specific price for electricity, while the challenge with direct offsets continues to be the identification of sufficiently reliable and reasonably priced operators. The starting point for achieving carbon neutrality in electricity, step by step, by 2030, is to rely on the above measures or their combinations. The aim is to tighten the schedule when the global energy policy situation is clearer and estimating the pricing of various operating models is easier. Including nuclear power in the framework for guarantees of origin will make it easier for the University of Helsinki to reach its goals.

Schedule: 2023–2025. The situation will be actively monitored, amending the University's strategy accordingly.

Responsibility: Facilities and Properties and HY247

Monitoring: Emissions from electricity consumption are reported annually. At the same time, the price of guarantees of origin is actively monitored.

Potential risks: The European energy crisis is prolonged, and the prices of guarantees of origin continue to rise. At the moment, these risks do not appear to be very high, as domestic clean electricity production has been steadily growing. In the future, guarantees of origin may not be available even if the University is willing to purchase them, as an increasingly large part of society wants to acquire them.

Costs: Significant costs. For example, at the assumed prices of guarantees of origin for 2023, the amount of electricity consumed in 2019 would generate an additional annual expenditure of approximately €400,000–650,000 for the University of Helsinki. If nuclear power is an option for electricity provided with a guarantee of origin at the time of purchase, the price is considerably, as much as 5 to 10 times, lower. If the energy crisis is not prolonged, the prices of guarantees of origin are expected to decrease markedly, resulting in lower costs. Achieving the University's energy saving targets would also reduce electricity consumption, which also has direct effects on costs related to guarantees of origin.

Examples of measures:
Sustainability efforts by the Facilities and Properties sector: carbon-neutral purchased electricity

TARGET FOR 2030

Ten per cent of energy consumption is covered by independently produced renewable energy.

DESCRIPTION

In 2021 the total amount of renewable energy produced by the University reached 3,109 MWh, corresponding to 1.6% of the total energy consumption of the building stock. Even the amount of solar energy exceeded the share of 1% of the electricity consumed. The University of Helsinki has already built several solar power plants, and a decision has been made to build several more. In addition, geothermal heating solutions have been implemented, with additional ones to be realised in several locations.

All of the Group properties will be reviewed, exploring the potential for new solar power plants or geothermal heat production. The University is also preparing for the construction of its own biogas plant in connection with the teaching and research farm in Viikki. This project is also part of a larger goal of making Viikki Campus energy self-sufficient by 2040.

Schedule: By 2025 the interim goal is to cover over 5% of energy consumption with independently produced renewable energy.

Responsibility: Facilities and Properties and HY247

Monitoring: Independent energy production is continuously monitored and reported on.

Potential risks: The global energy crisis has considerably increased the cost of constructing solar power plants, prolonging the payback periods of investments. Similarly, solar panel shortages are predicted to occur, as the energy crisis has resulted in a major wave of investment in solar energy.

Costs: The payback period of investments will be calculated to estimate their profitability. A long-term plan would ensure that investments do not put an excessive strain on the University's finances.

Examples of measures: Low-carbon efforts by the Facilities and Properties sector: production of renewable energy.

TARGET FOR 2030

Fossil heating fuels are abandoned.

DESCRIPTION

The University of Helsinki still has a handful of properties heated with oil. However, a decision has been made to give up oil as the primary heating mode of these sites. For example, some of the research stations are so geographically remote that oil-fired boilers may be left in reserve. The University of Helsinki consumes natural gas primarily for steam production, but also for the grain dryer at the Viikki teaching farm. The aim is to replace natural gas with biogas. Alongside the planning of the biogas plant in Viikki, consideration will be given to whether all of the gas produced can be used by the University.

Schedule: By 2025 oil-fired boilers will have been replaced with renewable energy. In the case of natural gas, the plan will be elaborated on further in 2023.

Responsibility: Facilities and Properties and HY247

Monitoring: Building energy reporting

Potential risks: No direct risks

Costs: These investments also include a payback period, the duration of which is always project specific. Included in the regular investment programmes for properties

TARGET FOR 2030

The total energy consumption is reduced by 15%.
a) Energy efficiency

DESCRIPTION

Through its property group, the University of Helsinki invests in long-term solutions reducing its energy use and carbon footprint. Some of the energy savings will be achieved through technical building-services measures, whereas others require changes in user habits. The University aims to use facilities more efficiently and monitor their utilisation rates in a smart way. It will adapt its facility needs to the culture of remote work that expanded during the pandemic, paying particular attention to the versatility and flexibility of facilities. Energy efficiency will be improved through measures such as the upgrading of building automation. At the same time, other measures with a more limited scope will be taken in areas such as lighting by increasing the use of LED lights. The goal is to investigate all properties for heat leakage and repair any leaks discovered. Changes in energy consumption will be monitored concurrently. It is essential for this measure that the University introduce methods to obtain as real-time information on energy consumption as possible and make the information available to users. The University will enhance its current practice of surveying the potential to improve energy efficiency during construction and renovation projects and produce renewable energy on site. Water use will be reduced by prioritising water-saving or waterless flushing devices.

Schedule: The interim goal is to reduce energy and water use in buildings by 10% by 2025 (from the 2014 level). The University of Helsinki has publicly committed to this goal by signing both a commitment to sustainable development and the Energy Efficiency Agreement for the property sector. In addition, although the University wishes to commit to any future social agreements, it will develop the energy efficiency of its buildings regardless of such agreements being concluded.

Responsibility: Facilities and Properties and HY247

Monitoring: Building energy reporting

Potential risks: Most of the straightforward energy efficiency and savings measures have already been taken in the property and building sector. This makes it difficult to identify new measures. New technologies, such as IoT, may help.

Costs: The payback period of investments will be calculated to estimate their profitability.

Examples of measures:
- Flexible facilities
- Flexible and efficient facility use
- Inclusion of energy issues in facilities programmes
- Efficient planning and control of lighting
- Repairs of heat leakage
- Maximum heat recovery from ventilation

TARGET FOR 2030

The total energy consumption is reduced by 15 %.
b) Energy conservation

DESCRIPTION

To save energy, the above technical solutions must be supplemented with changes in the actions of the University community. Community members will be encouraged to participate in various energy-saving campaigns and projects through effective communication and consistent leadership. Community members have already been involved in the nationwide 'Down a degree' campaign, and lower room temperatures will become the new normal. The aim is to achieve a considerable reduction in the amount of electricity used for non-heating purposes through various projects, ranging from switching off individual devices for the night to adopting new guidelines and solutions for laboratory refrigeration. Building-specific energy managers will be trained who know about the research conducted in the building and can use this knowledge to identify potential energy-saving measures. The University will seek direct incentives for energy savings as well as means of rewarding individuals and units implementing successful energy-saving projects. Various measures will be taken to reduce the consumption of service water too.

Responsibility: Facilities Properties and HY247, all University community members

Monitoring: Building energy reporting

Potential risks: No actual risks have been identified, but as the responsibility for operations is divided between many individuals, effective coordination may prove difficult.

Costs: Depends greatly on the measure

Examples of measures:
- Design and construction of new cryogenic storage facilities
- Ten degrees higher (refrigerated storage)
- Appropriate control of quantities of samples requiring refrigeration
- Energy manager training
- Report on the replacement of circulating-water devices and cooling solutions with other solutions
- Devices switched off in the evenings and on weekends
- Community competition for energy-saving ideas

TARGET FOR 2030

The University has its own comprehensive guidelines for low-carbon construction.

DESCRIPTION

Proactive maintenance extends the lifecycle of buildings; they are subject to systematic and regular repairs based on the principles of low-carbon development. Where possible, energy efficiency and facility-efficient solutions will be implemented in protected sites of cultural and historical value. Quality materials and solutions with a long lifecycle will be used in construction, and the long lifecycle and flexibility of buildings will be taken into account in architectural engineering. If suitable, climate-smart timber construction will continue to be promoted. Carbon storage in timber buildings will be monitored on a project-specific basis.

Construction will be examined on a project-specific basis, setting ambitious targets for the low use of plastic, the utilisation of construction waste and the use of certified materials. Recycling targets will be set for all project stages. Projects will use suitable environmental classification systems and strive for low-carbon construction, and adaptation to extreme weather events will be increasingly considered.

Schedule: A framework of guidelines for low-carbon construction will be provided in 2024, to be updated and developed during each construction project. Comprehensive guidelines for low-carbon construction will be completed by 2027.

Responsibility: Facilities and Properties and HY247

Monitoring: Building responsibility reporting

Potential risks: -

Costs: The guidelines as such will not increase costs. The principles of sustainable construction may increase construction costs, as estimated for each project.

Examples of measures: Updating building maintenance and upkeep guidelines

TARGET FOR 2030

The total amount of waste will reduce by 10%, and the recycling rate will increase by 25%.

DESCRIPTION

Waste accounts for under one percent of the University's carbon footprint, but its significance should not be underestimated. The community is interested in recycling waste. The aim is to reduce the total amount of waste steadily each year. In 2019 just over 50% of all waste generated in facilities (1,464 tonnes) ended up in mixed waste, while the rest was sorted into eight different components. The biggest components were organic waste, paper and cardboard. The sorting system will be developed further, and sorting points will be added as extensively as possible to all facilities. As for organic waste, the University collaborates closely with companies providing cafeteria services to reduce food waste. A significant share of waste consists of packaging materials. The aim is to increase efficient procurement so that products are purchased in as large quantities as possible to reduce the use of such materials. Their reduction is also continuously discussed with suppliers.

In addition, the University produces a significant amount of hazardous chemical and biological waste as well as waste from electrical and electronic equipment. Principles for the sustainable use of materials will be drafted for laboratories to reduce use and increase shared use, where possible. For electrical and electronic waste, new methods of recycling will be developed together with approaches based on a circular economy.

Schedule: Continuous

Responsibility: Facilities and Properties and HY247

Monitoring: Building responsibility reporting

Potential risks: -

Costs: No significant direct costs

Examples of measures:
- Improvement of waste sorting in all properties
- Sustainable procurement and consumption in laboratories
- Enhancement of circular economy and recycling

4.2 SUSTAINABLE PROCUREMENT

With an annual procurement of approximately €150 million, the University of Helsinki is a significant buyer of goods and services. Emissions resulting from procurement account for 30% of the University's overall carbon footprint. Significantly for procurement, the carbon footprinting of, in particular, services involves a high degree of uncertainty. Likewise, the University has been unable to determine the share of data traffic. To achieve the reduction targets for this category, carbon footprinting must be simplified, and the uncertainty involved in double counting must be resolved. The basic premise for all the above is that the University's procurement is aligned with actual needs and sustainability criteria.

- Only suppliers committed to low-carbon operations are used for procurement.
- The carbon footprint of all purchased goods and services can be monitored easily.
- Procurement is sustainable and reasonable. We have efficient recycling and circular economy models in place.
- We have a strong culture of sharing equipment.
- Total emission reduction: **8,000 tonnes of CO_2e**

CURRENT SITUATION

The University of Helsinki procures a significant share of goods and services from contractual suppliers and through competitive tendering. Although over 7,000 suppliers are used each year, 80% of all contracts in 2022 were awarded to just 224 suppliers. This means that the University is able to influence the sustainability, responsibility and low-carbon policies of procurement in a relatively efficient way by developing related criteria and guidelines.

While engaging in active market dialogue with the biggest supplier groups, we wish to emphasise the significance of low carbon and sustainability in procurement. We have already taken steps in this direction and will highlight these themes increasingly in our procurement requirements. Moreover, it should be noted that some of our contractual suppliers are already either carbon neutral or have published goals and measures to achieve carbon neutrality.

TARGET FOR 2030

Only suppliers committed to low-carbon operations are used for procurement.

DESCRIPTION

Achieving this target requires a long-term plan. When setting out our procurement requirements, we must ensure that suppliers can generally meet them so as not to distort our procurement decisions in unintended ways. Consequently, we will begin to require certain information on low-carbon considerations from all suppliers. We will utilise proactive market dialogue with our collaboration partners to survey our suppliers' ability to meet our requirements. At present, although we can pose requirements for the carbon footprint of some procurements, they remain in the minority. We will continuously monitor the market to be able to increase the number of such competitive tendering processes in a sensible way. This also necessitates more expertise from the persons carrying out individual procurement processes: what can we demand and when?

Together with other major public purchasers, such as the City of Helsinki and other higher education institutions and research institutes, we will communicate about the increasingly important role of low carbon in tendering in the near future. This will enable suppliers to respond proactively.

In 2023 the University of Helsinki will tentatively begin to survey the ability of suppliers to describe their carbon footprint, while drafting a target programme for scheduling our minimum requirements. We wish to ensure that standards remain as high as possible and are reasonable in each market situation.

Schedule: Our target is to obtain, by 2025, information from suppliers participating in tendering processes about their low carbon commitments and goals. By 2030 we will require that the carbon footprinting provided by suppliers is based on an industry-approved standard or protocol.

Responsibility: Procurement team

Monitoring: The procurement team will submit an annual report on the status of market dialogue and procurement requirements to the climate coordination group. The achievement of the target for 2025 will be monitored.

Potential risks: The suppliers of goods and services are unable to provide acceptable information on their carbon neutrality. The University has difficulty verifying the information provided, unless more detailed climate standards are introduced and supervised in the field. Overly strict procurement requirements may lead to situations in which few suppliers meet them. The risk is then that the prices of goods are too high compared to the climate benefits achieved. Increased procurement requirements may also lead to more appeals being lodged against tendering with the Market Court. This risk is considerable, particularly if no standards have yet been commonly agreed.

Costs: The impact on costs may stay within normal inflation rates because low-carbon solutions are expected to be included in the basic offerings of all suppliers. Cost estimates will also be easier when we have a more comprehensive idea of the differences between the carbon footprints of goods, particularly the price difference between low-carbon and regular products. The University must also clarify its procurement policy regarding price vs carbon footprint.

Examples of measures:
- Active market dialogue
- Market monitoring of low-carbon solutions
- Planning, scheduling and implementing minimum procurement requirements
- Finding new logistical solutions in collaboration with suppliers

TARGET FOR 2030

The carbon footprint of all purchased goods and services can be monitored easily.

DESCRIPTION

As a rule, the carbon footprint of goods and services procured is calculated using lifecycle emission factors. This causes problems for the monitoring of measures, as the lifecycle calculations for most emission factors are based on relatively old data and, in terms of euros, the benefits of low-carbon suppliers are not apparent. At its worst, it means that a climate-friendly product is more expensive than a regular one and its emissions are deemed higher. In addition, the emission factors obtained from the EXIOBASE database are usually of the 'cradle to grave' type, which means the user is deemed responsible for the carbon footprint of the product throughout its lifecycle. However, many suppliers consider some part of the production and logistics to be attributable to the manufacturer and themselves. Consequently, detailed product information must be obtained and the footprint must be attributed to the relevant parties. It is important to ensure that the above does not result in negative double counting, or a situation in which the producer, the intermediaries and the end user independently decide that a specific amount of emissions is attributable to them, leading to a higher total carbon footprint than the emissions generated over the product lifecycle. To be sure, this is not a climate problem, but may, for cost-related reasons, reduce the willingness to act in a climate-responsible manner.

We wish to collaborate with our suppliers in creating a system in which the total carbon footprint of a product or service is directly visible or can even be integrated directly into invoicing. Several commercial services currently enable software to calculate the carbon footprint based on purchase details. The problem is, however, that these services use average carbon emission factors instead of the actual carbon footprint of the product or service in question. More detailed information is required, particularly for service procurement, where the actual carbon footprint varies considerably depending on the sector and parties involved. Even so, it should be noted that a number of suppliers in the market, including some of our contractual suppliers, are able to report the carbon footprint of their products to clients.

More information is required about emissions generated by the ICT sector. For equipment, the carbon data provided by the sector are among the best emission calculations, but information on data traffic and data centres is highly deficient. Recently, public pressure has been put on service providers to make the above data available in more detail. We can expect to be able to calculate the sector's actual emissions during the roadmap period.

Schedule: Continuous development. The aim is to obtain, by 2025, actual carbon data about goods and services from suppliers. The target for 2030 is to obtain accurate and real-time data about the carbon emissions of all goods.

Responsibility: Procurement team

Monitoring: The procurement team will submit an annual report on the status of market dialogue and procurement requirements to the climate coordination group. The achievement of the target for 2025 will be monitored.

Potential risks: Suppliers are unable to define the share of the carbon footprint of their goods and services that is attributable to the end user. The risk is that the client is attributed too high a share of emissions. In addition, it is difficult to verify suppliers' emission data if standards and monitoring are not sufficiently reliable by the deadline.

Costs: The impact on costs may stay within normal inflation rates. In addition, the basic assumption here is that the carbon footprint attributed to the end user of goods or services will be smaller. This will also reduce the costs of decreasing emissions, meaning that the financial impact may be small.

Examples of measures:
- Active market dialogue to reduce the carbon footprint of goods and services
- Report on the actual carbon emissions of individual goods and services
- Detailed survey of the emissions generated by data traffic

TARGET FOR 2030

Procurement is sustainable and reasonable. We have efficient recycling and circular economy models.

DESCRIPTION

In the future, sustainability will be considered in all University of Helsinki procurement processes, and information about sustainability must be made available to all participants as described above. We will increase staff awareness of the flow of goods, circular economy and recycling. We will ensure in centralised procurement that climate issues are comprehensively considered in framework arrangements. We will need to apply more means testing to the procurement of new equipment and supplies. For the procurement of goods, we will enhance our own logistics to reduce inefficient interim storage. We will examine the lifecycle of research equipment comprehensively and extend this lifecycle through effective maintenance and repair plans. We will increase the in-house recycling and reuse of equipment and goods. We will increasingly sell usable resources to external parties too.

Schedule: Continuous development from 2023 to 2030

Responsibility: Procurement team, academic units, laboratory services

Monitoring: The climate coordination group will assess the impact of measures.

Costs: No changes to overall costs. Fewer and more centralised purchases will save money. On the other hand, more sustainable choices may increase costs slightly. Costs can be reduced by optimising the equipment lifecycle and maintaining and recycling equipment effectively.

Potential risks: Procurement is based primarily on criteria other than sustainability and responsibility. In this case, we must ensure appropriate internal procurement guidelines to prevent climate issues from being disregarded in procurement. Increasingly centralised procurement also requires well-managed and effective internal investment.

Examples of measures:
- A one-computer policy
- Extending the service life of computers and enhancing recycling
- Designated supply storage and stores
- Designated recycling centres
- Survey of alternatives to single-use products (laboratories)
- Centralised tendering of equipment repairs and maintenance

4.3 LOW-EMISSION TRAVEL AND TRANSPORT

The University is a community that values international activities. This requires travel and transport, often by air. At the same time, Finnish universities wish to be at the forefront of sustainability, which means that emissions from travel and transport must be examined critically. We must reduce climate emissions resulting from these activities too and adapt to the new normal of reduced air travel. Because of our remote location, we cannot replace all flights within Europe with train travel, as our partners in Central Europe will gradually do. But we must reflect more carefully on how to participate in various events and meetings. Digitalisation will naturally solve some of these problems, but traditional travel will also be necessary. The expansion of remote work has already reduced commuting considerably – a trend that is expected to continue.

TARGET FOR 2030

- Air travel significantly reduced
- Comprehensive guidelines for low-carbon travel
- Carbon footprint of commuting 45% below 2019 level
- Total emission reduction: **4,000 tonnes of CO_2e**

CURRENT SITUATION

The bulk of the carbon footprint associated with the University of Helsinki's transport and travel consists of air travel and commuting, which together account for 95% of all emissions in this area. Emissions from cars totalled 68% of all emissions from commuting, whereas air travel amounted to 90% of all emissions from work-related travel. It is relatively easy to see where emission reductions should concentrate.

TARGET FOR 2030

Air travel has been reduced, and the carbon emissions of the remaining flights have been offset.

DESCRIPTION

Air travel accounts for just over 6% of the University's overall emissions. Of this figure, work-related travel undertaken by staff amounts to 87%, while the remaining 13% of the carbon footprint can be attributed to incoming exchange students. As the reduction of the carbon footprint of exchange students is already being examined by student exchange programmes (such as Erasmus+), the University of Helsinki will focus on reducing emissions from work-related air travel. In particular, flights in Finland and other short-haul routes must be examined critically, and we aim to reduce such flights significantly. At the same time, we will discuss air travel from the perspective of fairness within the community: If this form of transport is to be reduced, who will be prioritised in being allowed to use it?

We will consider introducing an internal tax on, or budget for, air travel. The funds thus collected would be used to support positive climate action. Another simply identified measure is refraining from purchasing first- or business-class tickets.

Schedule: 2023: Amendment of the University travel guidelines for short-haul flights and first- and business-class travel. 2025: Considerable decrease in the number of short-haul flights. Decline in the number of European flights. Offset models in use. 2030: No total emissions as all emissions generated after the reductions have been offset.

Responsibility: Travel team, University community as a whole

Monitoring: Travel reporting

Costs and significance: The costs are not significant for the University as a whole. If the emissions for air travel in 2019 were offset using an external or internal model at the example price of €50 per tonne of CO_2e, the total sum would exceed €270,000. Because offset prices can be expected to rise continuously as we approach 2030, the price may easily be doubled. The University must also carefully consider whether internal offset models can achieve climate effects comparable to those reached through external offsetting.

Potential risks: The community cannot reach consensus on the criteria for future air travel.

Measures:
- Survey on internal tax and budget models for air travel
- Reduction of air travel in Finland and other short-haul flights to 50% of the level in 2019 (included in travel guidelines)
- Elimination of first- and business-class air travel (included in travel guidelines)

TARGET FOR 2030

Comprehensive guidelines for low-carbon travel

DESCRIPTION

We wish to offer better advice on sustainable travel. This includes proposing alternative forms of travel and their combinations at the planning stage. Travellers should be automatically provided with information on the carbon emissions of different options. For example, when travelling in Europe, it may make more sense from the perspective of both time and emissions to switch from plane to train than to select a flight with a stopover. Unfortunately, systemic problems still affect this target, as no service provider currently uses a system in which flights and, for example, train tickets can be purchased with a single booking. In other words, the traveller must go to some trouble, or the service must be purchased from a travel agency. In addition, low-carbon travel is often considerably slower and more expensive.

Guidelines are required for travel means testing too. In the future, we must choose more carefully which events to attend in person. We hope the University community as a whole will participate in discussion on means testing and on who should be given priority in travel. The principle of low-carbon solutions will also be followed in all forms of transport and travel in Finland.

Schedule: The drawing up of general guidelines for low-carbon travel will begin immediately. In addition, more flexible travel booking systems will be discussed with travel agencies. The carbon footprints of alternative forms of travel should be readily available. Guidelines for means testing will be planned when the topic has been discussed with the community.

Responsibility: Travel team

Monitoring: -

Costs and significance: No significant costs

Potential risks: Some people may oppose low-carbon travel options for reasons including longer travel times. If alternative forms of travel are difficult to arrange, few people will explore them.

Examples of measures:
- Flights without stopovers
- Review of the use of one's own car for work-related travel
- Preparation of guidelines for means testing
- Development of travel reporting
- The University to switch to electric cars

TARGET FOR 2030

The carbon footprint of commuting will be 45% below the 2019 level.

DESCRIPTION

To achieve its own reduction targets, the University must examine emissions from commuting too. Community members will be encouraged to choose low-carbon commuting options. The University must immediately launch a survey on how best to support low-carbon travel and transport. Commuter cycling will be supported by offering better quality and safer storage and locking options. Where possible, the accessibility of dressing rooms will be enhanced. We will strive to highlight the perspective of low-emission commuting in the urban planning of campus areas. A significant share of emissions from commuting can be attributed to the use of cars, and concrete measures are needed to reduce these emissions as well. In addition, the effects of remote work on the carbon footprint should be monitored closely and taken into account when outlining recommendations for remote work.

Schedule: Continuous

Responsibility: Travel team, Facilities and Properties, University community as a whole

Monitoring: -

Costs and significance: Costs depend largely on the measures the University wishes to take to promote low-carbon travel and transport within the community.

Potential risks: We cannot influence people's travel behaviour sufficiently if we cannot support climate-positive choices.

Examples of measures:
- Developing bicycle parks
- Increasing charging stations for electric cars
- Offering cheaper parking for low-emission vehicles

4.4 SUSTAINABLE EATING HABITS

The University community must bear responsibility for the carbon footprint of its meals. Here we will explore emissions only from the cafeterias operating on University premises and from the food served and purchased by the University. Staff meals served during recreational and other events have been calculated separately under procurement. The University has already taken significant steps towards low-carbon meals; it has served vegan food at evening events since 2019. In addition, in new tendering processes, low-carbon considerations are taken into account in the scoring of suppliers.

TARGET FOR 2030

- The lunch cafeterias operating on our premises must have a transparent low-carbon and sustainability programme.
- The University's catering services are oriented to plant-based food.
- Our food procurement has strong sustainability and environmental criteria.
- Total emission reduction: **2,500 tonnes of CO_2e**

CURRENT SITUATION

Three companies currently operate cafeterias on University of Helsinki premises. In addition, an external partner operates school cafeterias at the University's two training schools, and the University's research stations have smaller canteens. This summary shows that, in terms of catering and meals, the University is strongly dependent on external service providers. The University's own catering and food procurement accounts for just 20% of the total carbon footprint of meals.

TARGET FOR 2030

The lunch cafeterias operating on our premises must have a transparent low-carbon and sustainability programme.

DESCRIPTION

The University collaborates continuously with service providers to promote sustainability and climate issues. Although the cafeteria operators have set their own ambitious climate targets, we will also demand systematic information on them, as separately agreed. As a community, we wish to share our views more actively with the service providers to explain the climate solutions we hope the cafeterias will adopt. As our biggest cafeteria operator is owned by the Student Union of the University of Helsinki, an active communications channel is already in place.

Schedule: Continuous

Responsibility: Facilities and Properties
Monitoring: Based on annual corporate responsibility reporting and direct dialogue

Costs and significance: No costs for the University

Potential risks: No actual risks

Examples of measures:
- Organising campaigns with collaboration partners, for example, active reduction of food waste
- Encouraging cafeteria operators to switch to climate-neutral processes
- Increasing awareness about the carbon impact of food by creating a culture in which University community members can easily verify the environmental effects (e.g., climate emissions and the water footprint) of the food they purchase

TARGET FOR 2030

The University's catalogue services are oriented towards plant-based food.

DESCRIPTION

The University provides catering at its own events through purchases from external partners or meeting organisers. Plant-based and locally produced food are prioritised at meetings and receptions.

Schedule: 2023–2024

Responsibility: -

Monitoring: Catering guidelines

Costs and significance: No costs for the University

Potential risks: No actual risks

Measures: Guidelines will be updated

TARGET FOR 2030

Our food procurement will be based on strong sustainability and environmental criteria.

DESCRIPTION

Our food purchases will comply with sustainability and responsibility criteria.

Schedule: 2023–2024

Responsibility: Procurement team

Monitoring: Procurement criteria

Costs and significance: No significant costs for the University

Potential risks: Difficult to determine

Measures:
- Setting out sustainability and responsibility criteria
- Engaging in market dialogue with suppliers

5

THE UNIVERSITY AS A PROMOTER OF A CLIMATE-SMART FUTURE

Our roadmap describes the role of research and teaching in a fairly limited way. This is a conscious choice on our part because the scholarly community must be given the chance to define its own criteria for climate action. This report focuses primarily on describing operations and the reduction of operational emissions. However, as a community and as part of society, our future climate efforts depend entirely on research-based solutions, in-depth knowledge, and the skills developed through education. We wish to believe that research innovations will play a major role in addressing climate change. Together with our collaboration partners, we can exert a greater influence than our size would allow on building a climate-smart future. The above issues and our action plans can be directly connected through our aim to draw on research knowledge in all our climate-neutrality efforts.

5.1 WHAT IS THE UNIVERSITY'S CARBON HANDPRINT?

A carbon handprint can be defined in many ways. However, the definitions are all based on the idea that a solution offered by a company or community reduces the carbon footprint of another. Often, the solution refers to a product, service or process, but for the University, this solution is difficult to define because we have no clear products or services to offer external parties. Then again, we create new knowledge and innovations and educate new experts on a daily basis, all of which contributes either directly or indirectly to the reduction of emissions elsewhere. Although the qualitative examination of this topic is difficult, it is even more difficult to calculate the University's carbon handprint quantitatively.

The role of the carbon handprint in higher education is being investigated at several universities. We intend to play a prominent role and be at the forefront of developing this challenging perspective. Above all, we wish to help define it together with our national and international partners. It is, of course, clear that some of our research and teaching relate directly to climate action and can in a relatively straightforward manner be defined qualitatively as our carbon handprint. But we also conduct a great deal of research and teaching that are only indirectly linked to climate action, and their impact must be better recognised. Moreover, this topic involves considerable public engagement and direct participation in decision-making on climate issues. We commit to recognising all of the above comprehensively. Although the definition of a carbon handprint remains inadequate, we wish to promote it by enhancing awareness of climate issues within our community. We are keen to encourage our community members to contribute actively to public debate on the effects and prevention of climate change. Here too, the University community must have the courage to defend the significance of research knowledge. Adaptation to climate change is key for many types of research, teaching and innovation, all of which can fall under this heading.

- We will continue to raise the profile of our research and teaching on climate and climate change.
- To plan actions that have a positive impact on the climate, we will establish a working group with strong academic representation.

5.2 EMISSION OFFSETTING

Even in the best-case scenario, the University of Helsinki is unable to operate without generating some climate emissions. This is why we must adopt various voluntary offset mechanisms. Several international carbon offset standards have been developed, but the activities and results of carbon offset projects, including certified ones, have also been questioned and criticised, sometimes harshly. We wish to offset our emissions in ways that have been effectively accredited. We will also explore the adoption of internal offset models, in which the community 'taxes' certain activities internally, such as air travel. The funds thus collected are used for climate action to either directly reduce or offset emissions. If piloting an internal offset model, it is crucial that its actual efficiency and impact be compared to external offset models. For voluntary emission offsetting, we wish to establish strict criteria for our own offset activities. Although we are, of course, continuously monitoring the regulations and standards being developed, we wish to set the following internal criteria:

1. **Measurable**
   All climate effects of the project can be verified reliably.
2. **Additional**
   The project would not be implemented without carbon offset funding.
3. **Permanent**
   The promised climate impact must be permanent or last at least 100 years.
4. **Leakage minimised**
   The project must not indirectly increase emissions or reduce sinks outside its boundaries.
5. **Not double counted**
   The sequestered carbon must not be double counted.

The University of Helsinki is conducting research on offsetting and will use the knowledge derived in its offset plans as effectively as possible. External offsets must also be piloted promptly on a smaller scale so that we can monitor the criteria and reporting before committing to large-scale offsets. Moreover, we will consider the acquisition of land for carbon sinks and storage. A major concern affecting carbon offset is the difficulty of forecasting offset prices in the long term.

Measures
- Offset models will continue to be monitored actively.

5.3 COORDINATION AND DEVELOPMENT OF CLIMATE ACTION

This roadmap for a carbon-neutral University examines the University's most important emission sources and sets out the primary measures required to achieve carbon neutrality. However, we cannot reach this target or actual emission reductions without a significant number of individual measures and projects, which, in turn, require continuous monitoring and coordination at a higher level. Our carbon footprint must be calculated systematically, and the effects of measures must be monitored. This work will be based on the PDCA model familiar from the University's quality assurance work. The carbon footprint itself will be calculated once a year. More extensive reviews involving the monitoring of measures and the revision of strategic guidelines should be scheduled for 2026 and 2029. By the latter year, our concrete carbon-neutral measures should be largely completed. As we wish the University community as a whole to participate in our climate work, communication is key.

Coordination:

- A coordination group will be set up to monitor the University's climate action. The group will meet regularly and be responsible for linking climate action to other sustainability and responsibility efforts. Particular attention will be paid to the link between biodiversity loss and climate efforts.
- We will develop monitoring of the University of Helsinki Group's carbon emissions and required measures and enhance their link to the actions set out in this roadmap.
- The University will organise events for the community to discuss the roadmap themes and develop the value base that will underpin our climate action. Carbon neutrality will be explicitly included in the communications plan for the University's sustainability and responsibility efforts to ensure that the community and collaboration partners can easily monitor the progress.

5.4 CONSIDERATIONS FOR THE FUTURE ELABORATION OF EMISSION CALCULATIONS

More information is required about actual emissions from data traffic and cloud-based services. Although Microsoft currently offers tools for carbon calculation for the Microsoft 365 and Azure solutions used by the University, they have been found insufficient at this stage. However, their development should be monitored and their use piloted at the University as soon as they have been found sufficiently reliable. If these calculators are considered accurate enough for emission calculation, this part of the problem can be easily solved. We will also explore the carbon footprint of other software and services for data traffic, such as Zoom and FUNET. The aim is to include the carbon footprint of ICT as a separate category in the calculations as early as 2023. At the same time, we will highlight climate-smart ICT as a new focus area in our future climate action. We are living in a period of continuous digital transformation, with each obsolete technology being replaced by at least two new ones. The University of Helsinki must ensure that it carries out its own digital transformation as sustainably and with as low carbon emissions as possible, in all areas from research and teaching on green coding to the efficient data management of its own digital platforms and the deployment of AI applications.

As mentioned in the section on procurement, we need more detailed information on the actual carbon footprint of services and, if possible, individual procurements. The built-in problem of emission factors based on euros is that if we wish to purchase sustainable and climate-friendly products, they are likely to cost more. When using emission factors, a higher price is equated with higher emissions. In the long term, we and all other organisations calculating their emissions must stop using this calculation method. Despite the oft-repeated claims that even approximate calculations are better than nothing, inaccurate calculations may have a significant financial impact on an individual organisation. This, in turn, may dampen the enthusiasm of communities to strive to build a low-carbon culture.

6 SOURCES

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