Environmental Report The University of Freiburg 2022/2023

universität freiburg

Cover photo: A frog on a water lily leaf in the Botanical
Garden of the University of Freiburg. Photo: Sandra Meyndt

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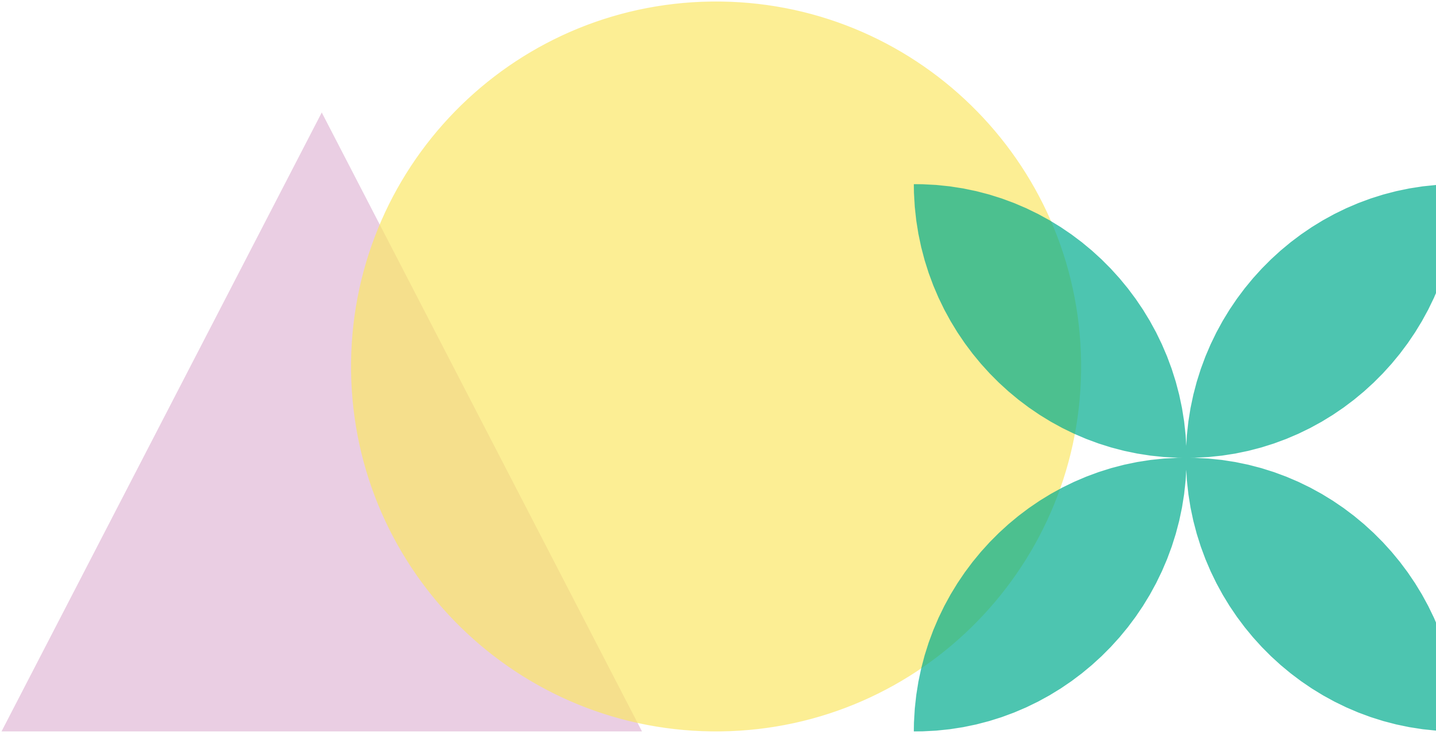


Photo: Sandra Meyndt

Dear readers,

The complex interplay of advancing climate change with energy shortages, the need for resource conservation, and the expansion of sustainable energy forms presents the University of Freiburg with the challenge of developing solutions for sustainable university operations. In this environmental report, we not only reflect on the measures taken to reduce energy consumption—especially in light of the acute energy crisis of 2022/23—but also on the efforts to raise awareness among our employees about this urgent issue. Energy conservation is not just a practical necessity but also an ethical responsibility to which our university is strongly committed. Despite the challenges and inconveniences sometimes associated with this, such as turning down the heating, all employees have made great efforts to save energy. We would therefore like to take this opportunity to express our sincere gratitude to each and every one who actively participated in this endeavor. Your commitment and support are essential for the success of our joint efforts towards a more sustainable future. In addition to the measures related to energy saving, this environmental report aims to provide an overview of the key measures for environmentally friendly and resource-efficient operations at the University of Freiburg.

We hope you have an exciting read

Christina Leib
Kanzlerin

University’s CO_2 Balance

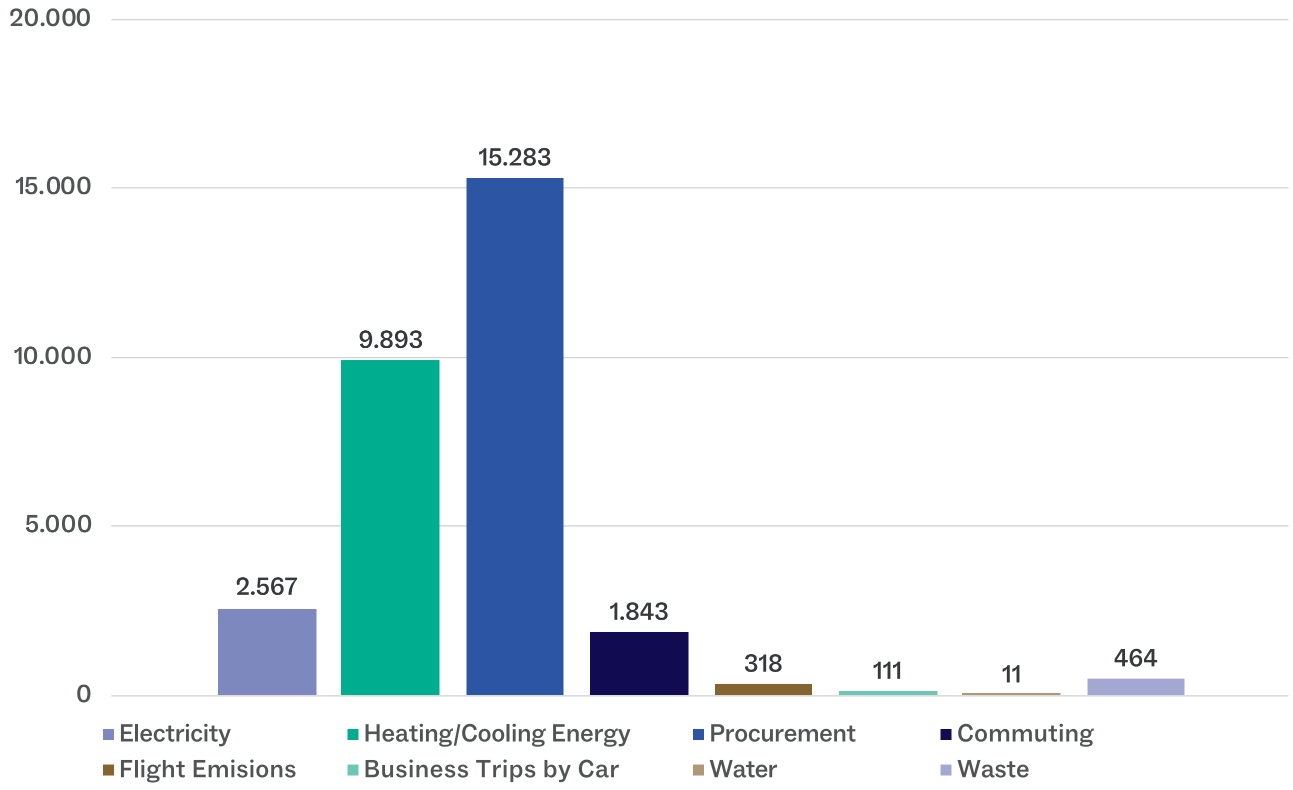
On the ambitious path to climate neutrality, the rectorate adopted a comprehensive climate protection concept for the building operations of the University of Freiburg at the beginning of 2022. It encompasses clear and concrete measures with which the goals specified in the Climate Protection Act can be achieved. The scenarios presented in the climate protection concept take up the targets set by federal and state policies for reducing climate-relevant emissions by 2030 and 2045, respectively, and concretize them for the University of Freiburg in the form of a 2030/2045 climate protection plan. The concept was developed in 2021 based on the new federal targets. Therefore, the four scenarios presented are designed to achieve climate neutrality by 2045. At the end of 2021, the state of Baden-Württemberg has set itself the goal of organizing the state administration in a net greenhouse gas-neutral („climate-neutral“) manner by 2030. This means that all the measures proposed in the concept must be implemented in a much shorter period of time.

In the development of the concept, the status groups of the university (students, academic staff and administrative employees), but also external parties, for example the state property and Baden-Württemberg Real Estate Management Authority and the University Medical Center Freiburg, were involved through stakeholder workshops and interviews. The university is highly dependent on other stakeholders, such as the Real Estate Management Authority and the University Hospital. The University Hospital is the operator of the power plant that supplies the university with heat and, to some extent, electricity. The involvement of these partners from the beginning, is of crucial importance for the creation and further implementation of the climate protection concept of the University of Freiburg.

Since 2013, the University of Freiburg has been using green electricity from certified hydropower plants. The use of green electricity results in over 35% fewer CO_2-eq emissions compared to the use of the German electricity mix. In the area of the Faculty of Engineering at the airfield, electricity is sourced from the University Medical Center‘s combined heat and power plant.

The photovoltaic (PV) system on the roof of the University Library produced 216,836 kWh in the year 2022, covering an average of around 10% of the building‘s electricity consumption. The solar university PV systems generated an additional 616,000 kWh of electricity, which was fed into the power grid.

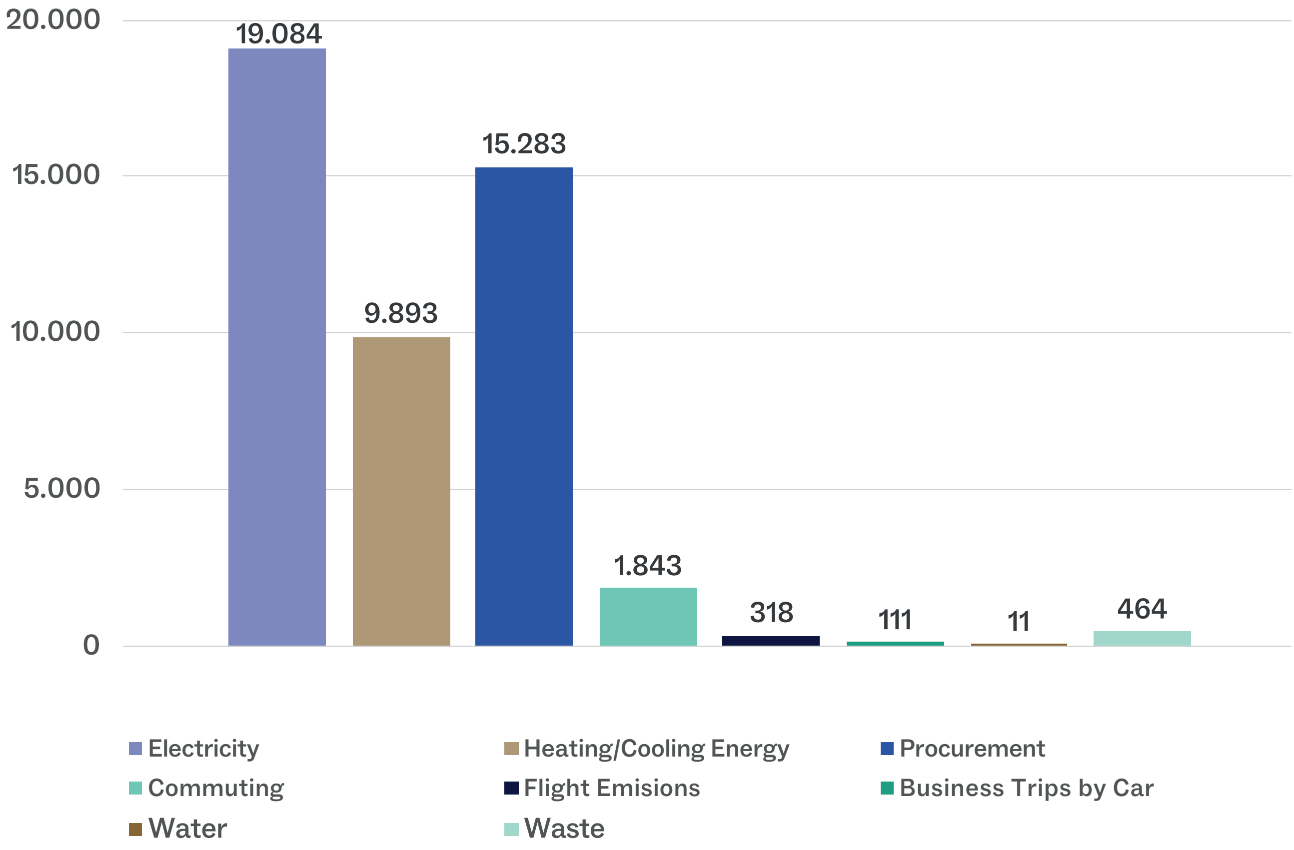
CO_2 balance Conventional Electricity



Total emissions 2022: **30.490 Tons of CO_2-eq**
Emissions per member of the university: **1 Ton of CO_2-eq**

Although certified green electricity is sourced, the actual electricity supply often consists of a conventional power mix. Therefore, both CO_2 balances – the German power mix and green electricity – are presented comparatively. In the scenario with certified green electricity, procurement accounts for the largest share of the CO_2 emissions at 50%, while heating and cooling energy account for about 32% and electricity for about 8% of the total emissions.

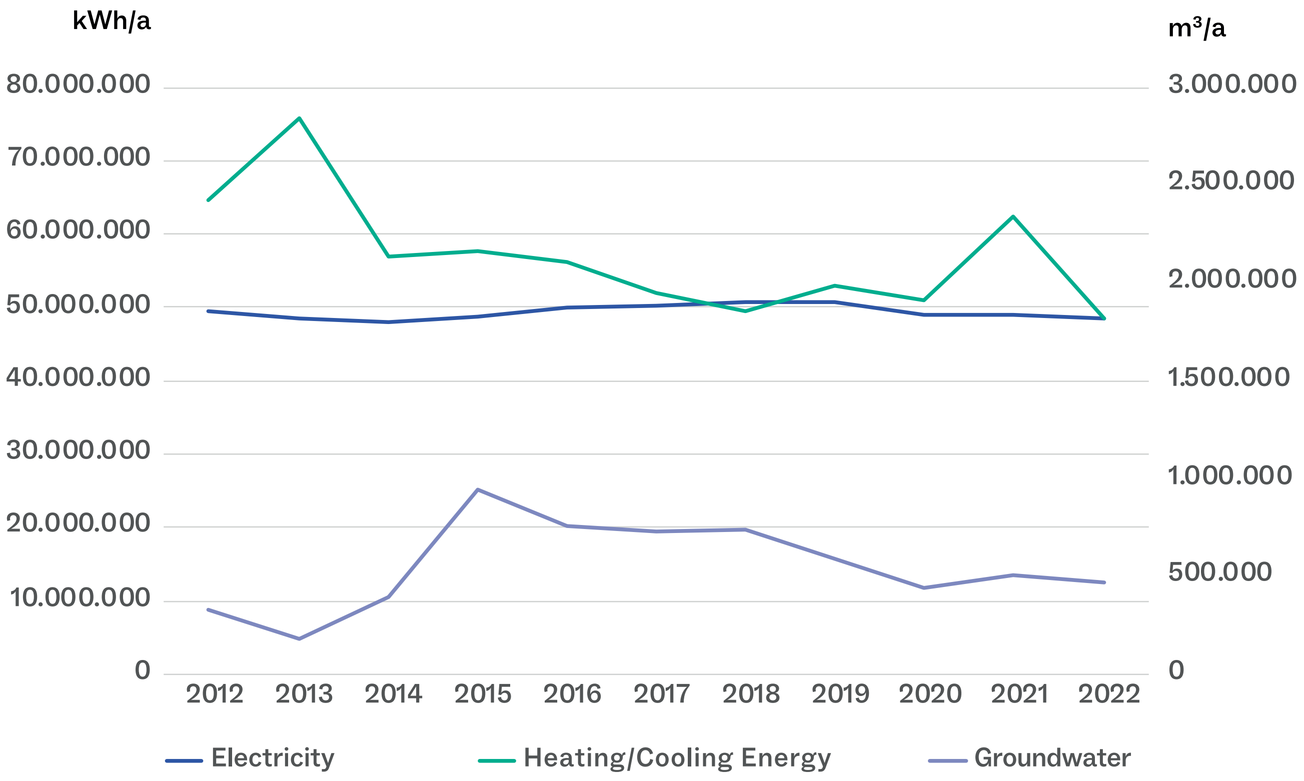
CO_2 balance Green Electricity



Total emissions 2022: **47.007 Tons of CO_2-eq**
Emissions per member of the university: **1,5 Tons of CO_2-eq**

In this scenario, electricity consumption is calculated based on the German power mix of 2022 (UBA) and accounts for about 40% of the university's total CO_2 emissions. Procurement contributes approximately 32% of emissions, while heating and cooling energy make up around 21%. This results in emissions of 1.5 tons of CO_2 equivalent per university member (students and employees).

Energy Graph: Heating-Cooling-Electricity-Groundwater



The overall energy consumption of the University of Freiburg also depends on the use of groundwater for cooling. If all groundwater systems are regularly in operation, significant amounts of electricity and steam are saved for cooling.


Photo: Mitchell Luo/unsplash

Photo: Sebastian Bender

Energy Consumption

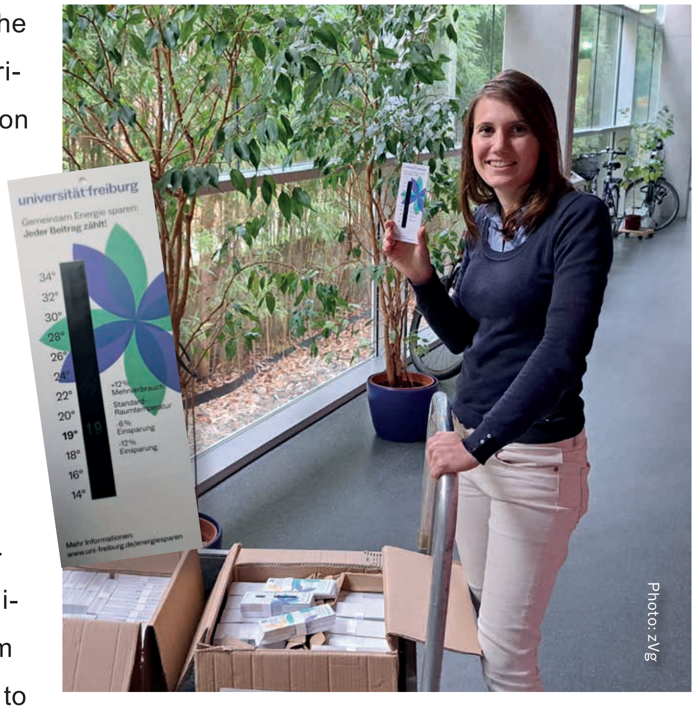
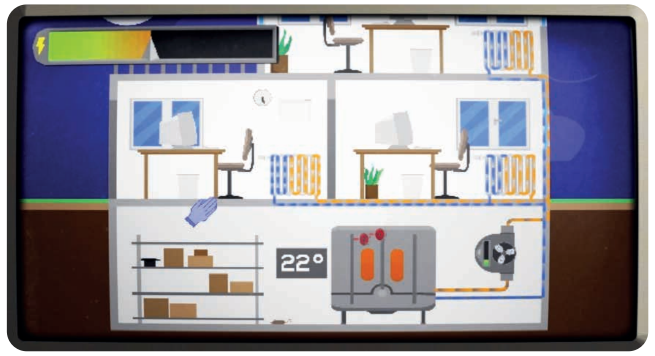


Photo: zVg

The efforts of all departments and members of the university to save energy have significantly contributed to reducing electricity and heat consumption in light of the energy crisis and the comparatively warm year. Through various energy-saving measures from June 2022 to July 2023, the university‘s electricity consumption was reduced by 16% and heat consumption by 6% compared to the same period the previous year.

University staff were thoroughly made aware of the issue of energy saving and actively contributed to reducing energy consumption. As a guideline and awareness tool, thermometers in the form of temperature strips were distributed to all staff to encourage efficient regulation of room temperature. Instead of turning up the heating, staff were encouraged to dress warmer, which also contributed to energy savings.

Newsletters and energy-saving tips were regularly communicated to raise awareness of energy-saving behaviors and provide practical implementation tips. In cooperation with the Media Center and the Working Group Sustainable University, a short informational video on proper heating and ventilation was produced and distributed within the university.



Working Group Research

The Working Group Research was established in 2022 with the goal of identifying and realizing energy-saving potential in all research areas. This included both organizational and technical measures. Energy coordinators were appointed for all institutes and areas of the university to coordinate and implement measures. For example, in various buildings, ventilation systems were adjusted to reduce air exchange rates as much as possible, leading to significant energy savings. The energy coordinators were also equipped with higher-quality thermometers to measure room temperatures more accurately and to raise staff awareness for more efficient use of heating and cooling. The working group remains active and continues to seek new opportunities to optimize energy consumption.

Drinking Water Consumption

In 2022, drinking water consumption increased significantly compared to the previous year, due to increased building usage following the COVID-19 pandemic and higher water consumption by cooling towers. During the pandemic, many buildings were only partially used or not used at all, which had reduced water consumption. The return to normal usage has reversed this pandemic-related effect. Additionally, it must be noted that water consumption had already been optimized many years ago. This means that the university operates close to a possible optimum. Therefore, operational changes, such as the mentioned return to increased building usage or the heightened activity of cooling towers, immediately lead to noticeable fluctuations in water consumption..

Annual Drinking Water Consumption

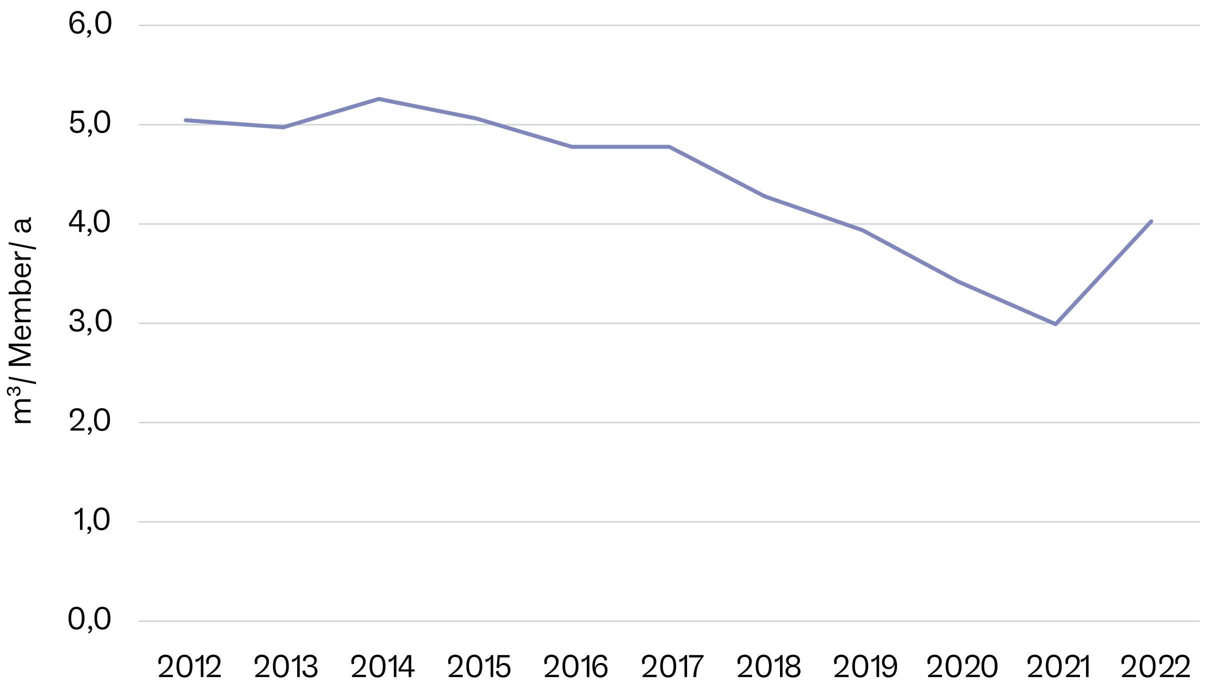
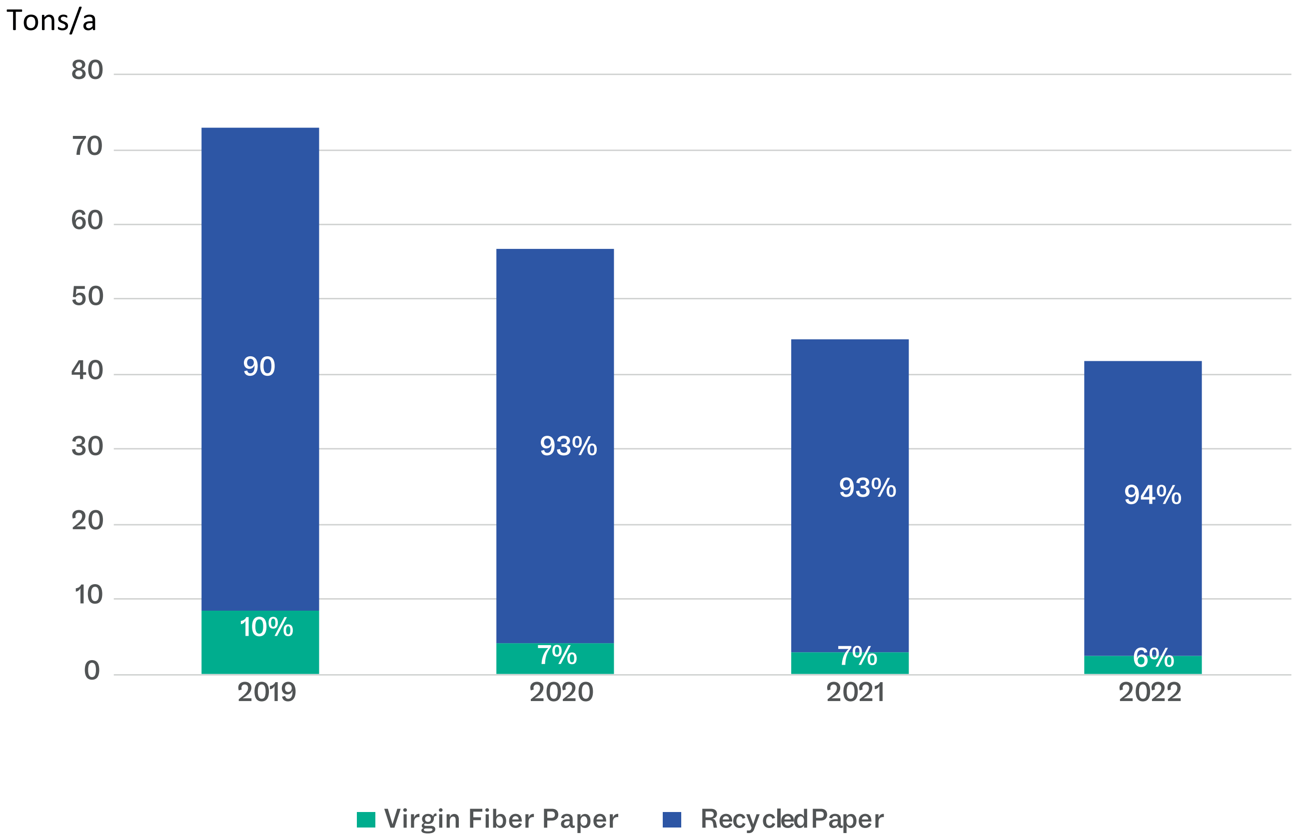


Photo: brandi_redd/Unsplash

Paper Consumption

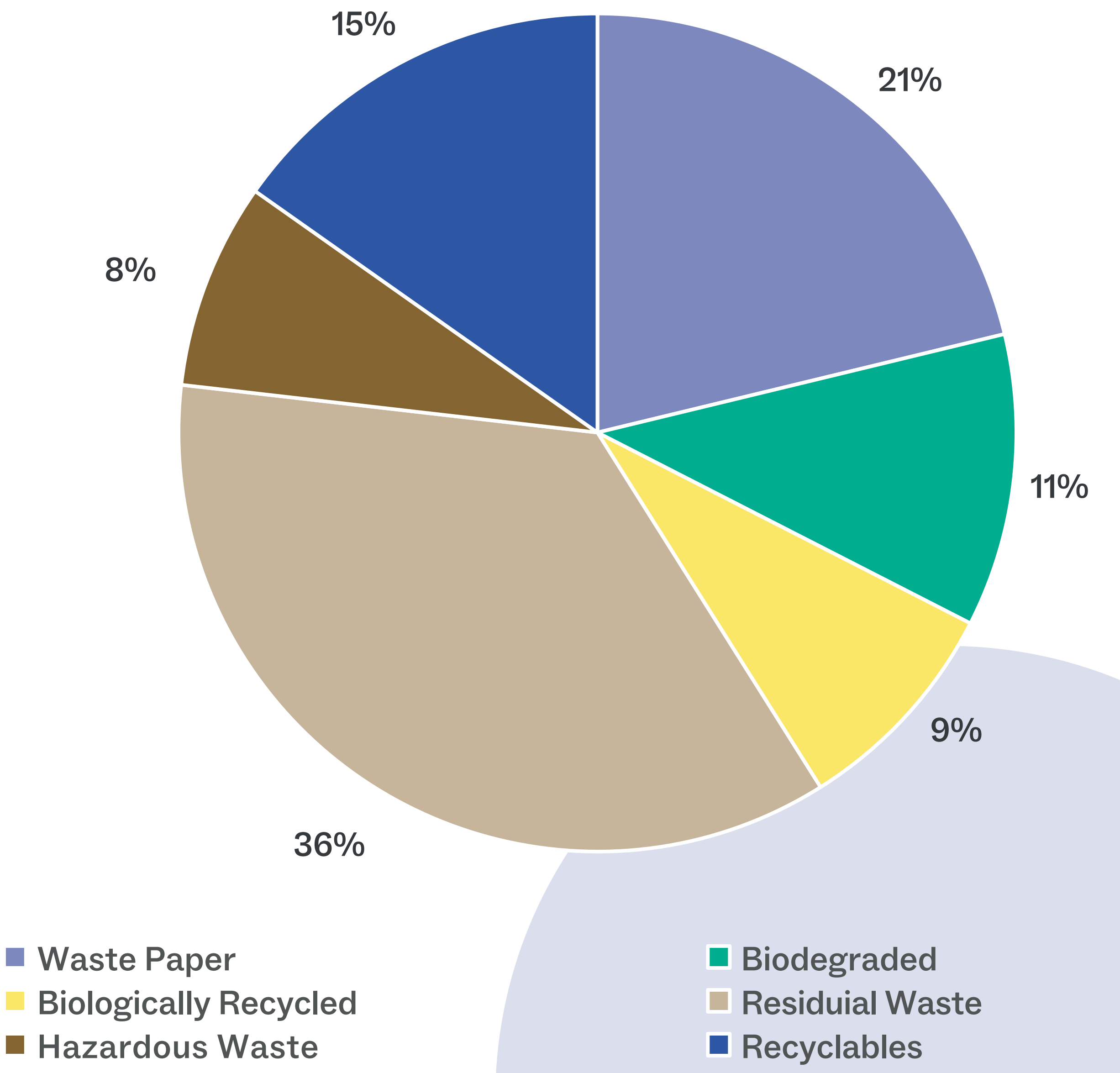


Compared to the previous year, the university increased the use of Blue Angel-certified recycled paper from 93% to 94% and reduced total paper consumption by 5% to 42 tons per year. For A4 paper with a weight of 80 g/m², the proportion of Blue Angel-certified recycled paper is 96%. By switching to Blue Angel recycled paper instead of virgin fiber paper and other environmental certifications, the university saved a total of 1,649,397 liters of water and 372,136 kWh of energy (Paper Atlas, 2022). (Paper Atlas, 2022).

Waste

In 2022, the amount of waste generated was 867 tons. For social and ecological reasons, electronic waste is not exported by the university but is recycled exclusively in Germany, France, or Switzerland. The thermal recovery of bio-waste takes place in a biogas plant that generates its electricity exclusively from such waste, not from energy crops, and uses all the heat generated to dry compost. Garden and park waste is composted.

Amount of Waste by WasteType



Data Basis

The calculation of emissions from waste and water (Ecoinvent 3.6) are based on the Master's thesis of Benjamín Elizalde. The emission factors for electricity and the vehicle fleet are based on the sources of the German Federal Environmental Agency (UBA). The emissions from heating and cooling energy were calculated based on GEMIS and the emission factors of the combined heat and power plant were provided by the University Hospital. The calculation of emissions from procurement is based on the results of the master's thesis by Marcel Eichler, who conducted an input-output analysis for the year 2017 based on the university's costs and the product categories to which these costs are distributed.

Photo: Jürgen Gocke

Impressum

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