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UNIVERSITÄT BERN

Greenhouse gas report 2022 of the University of Bern

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1. Background

The University of Bern is known worldwide for its research and teaching on the topics of sustainable development and climate studies. Yet sustainability and climate protection aren't just topics addressed in the University's research and teaching – they're actually a matter of special concern with respect to its operations, as well: the University is aware of its responsibility and makes every effort to minimize its operations-related CO_2 emissions. It has therefore set itself the goal of becoming a climate-neutral institution by 2025 in all areas in which it has direct influence.
The University of Bern calculated its carbon footprint for the first time in 2019 to take stock of where the University stands on the matter and to establish a base year for measures implemented in the future to reduce and offset carbon dioxide emissions. The 2022 carbon footprint described in the following is the fourth carbon footprint calculated for the University.

2. 2022 carbon footprint of the University of Bern

2.1 System boundaries of the carbon footprint

The University of Bern's carbon footprint considers all relevant greenhouse gases and expresses them in terms of carbon dioxide equivalents (CO_{2eq}).[1]
The carbon footprint is geared toward the GHG Protocol, which distinguishes between direct emissions (Scope 1), indirect energy-related emissions (Scope 2) and other indirect emissions (Scope 3).[2] The University's carbon footprint factors in emissions from the following sources:

- Scope 1:
  - Heating oil
  - Natural gas
  - Fuels (university's fleet of vehicles)
  - Laboratory gases, experimental areas, livestock

- Scope 2:
  - District heating
  - District cooling
  - Electricity

- Scope 3:
  - Paper (Uniprint)
  - Water
  - Waste disposal (garbage and special waste)
  - Air travel

[1] All greenhouse gases were converted to carbon dioxide equivalents (CO_{2eq}) based on their specific global warming potential and using a time horizon of 100 years.
[2] The Greenhouse Gas Protocol. A Corporate Accounting and Reporting Standard, Revised Edition. World Business Council for Sustainable Development (WBCSD), and World Resources Institute (WRI).

Due to a lack of available data, the footprints for 2019 to 2022 do not yet include business travel via public transportation and by car. Going ahead, the University aims to document these emissions as well and report them in its carbon footprint.
Emissions generated through the procurement of consumables and furnishings (laboratory equipment, furniture, IT devices, laboratory and office consumables) were not included in the carbon footprint due to a lack of data.
Operation of the student cafeteria, which is managed by an external company – ZFV-Unternehmungen – was excluded from the carbon footprint of the University of Bern since ZFV-Unternehmungen prepares its own carbon footprint.

2.2 Results of the 2022 carbon footprint

The University of Bern produced a total of around 6,291 tons of CO_{2eq} emissions in 2022. With 5,076 employees expressed in terms of full-time equivalents (FTE), this corresponds to average emissions of 1.24 t CO_{2eq} / FTE per year.
The direct emissions (Scope 1) of the University of Bern account for around 15% of total emissions. 30% of overall emissions are related to district heating, electricity and district cooling (Scope 2), while the remaining 55% can be attributed to other indirect emissions (Scope 3).

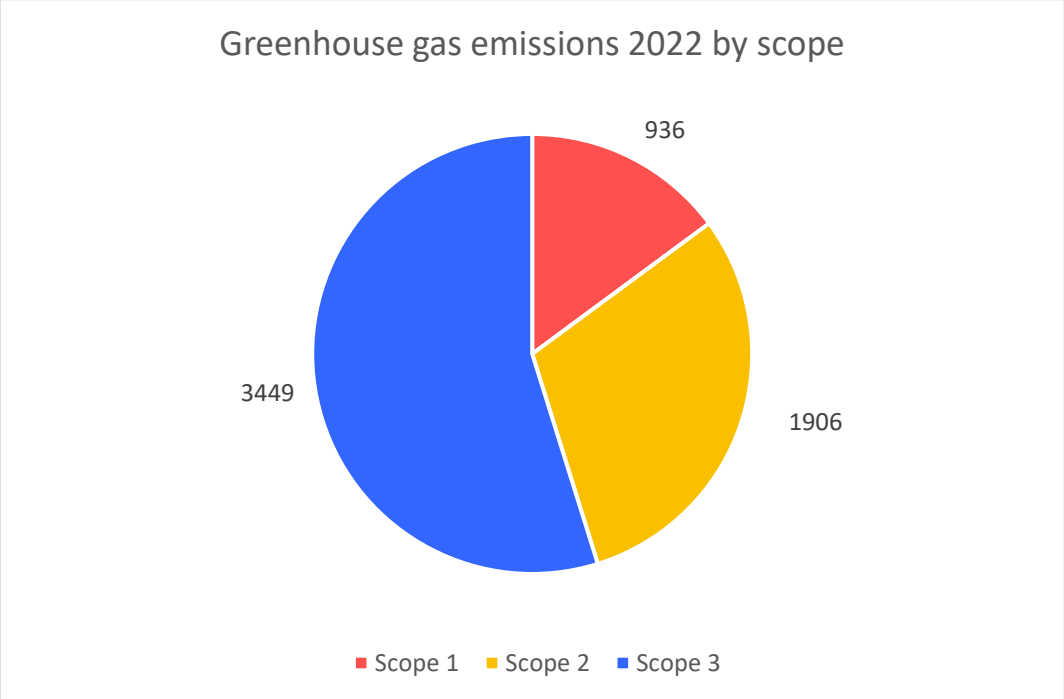

Figure 1: Greenhouse gas emissions of the University of Bern, 2022. Scope-based presentation of greenhouse gas emissions in t CO_{2eq}

Nearly 50% of total emissions are caused by work-related air travel, just under 25% were generated by the suppliers of district heating and 10% of emissions were caused by the natural gas supply. After the restrictions caused by the coronavirus pandemic in 2020 and 2021, work-related air travel will once again account for the largest share of emissions in the 2022 carbon footprint.

Expressed as a percent of total emissions, smaller shares were produced in connection with electricity procurement (approx. 5.5%), the disposal of garbage (approx. 4%), heating oil consumption as well as the operation of the vehicle fleet and special waste disposal (approx. 2% each). Emissions from laboratory gases, experimental areas, livestock farming, the purchase of drinking water, the use of paper and the purchase of district cooling only account for a marginal share of the overall footprint, which amounts to less than 0.4% in each case.

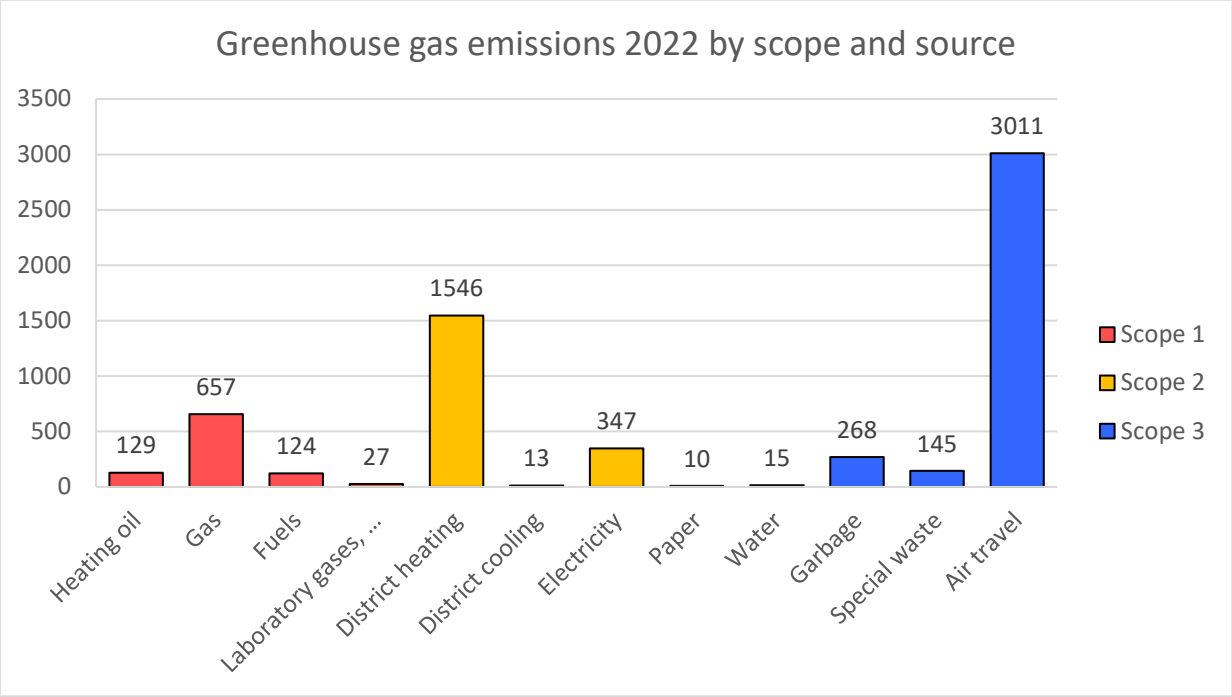

Figure 2: Greenhouse gas emissions of the University of Bern, 2022. Greenhouse gas emissions shown by source, expressed in t CO_{2eq} and attributed to the various scopes by color.

3. Conclusion

While the 2022 carbon footprint was no longer as strongly impacted by pandemic-related restrictions, it was influenced by measures taken to curb the impending energy shortage in the fall and winter of 2022. Total emissions in 2022 amounted to over 6,291 t CO_{2eq} (compared to 4,094 t CO_{2eq} in the previous year and 7,958 t CO_{2eq} in the 2019 base year[3]). The differences mainly arose due to the fact that air travel is on the rise again following the coronavirus pandemic: while emissions from air travel in the 2019 base year totaled 4,734 t CO_{2eq}, they amounted to 616 t CO_{2eq} in 2021 – approx. 13% of the base year emissions – due to pandemic-related restrictions, while the figure for 2022 was 3,011 t CO_{2eq}, which corresponds to approx. 65% of the base year emissions. Due to the increase in work-related air travel in 2022, the percentage of emissions allocated to Scope 3 is again the largest overall.

Direct emissions (Scope 1) rose from 2019 to 2022, which is largely attributable to natural gas consumption data: Data for two buildings that had not been available for the year 2019 was included in the 2020 footprint. Consumption data for a newly occupied lab building with a gas-fired autoclave was included in 2021. The data for the newly occupied building resulted in a corresponding increase in natural gas consumption and emission figures in both the 2021 carbon footprint and the current carbon footprint for 2022, since total annual consumption for this building was depicted for the first time in 2022.

The buildings were heated with heating oil, natural gas and district heating, which was impacted by the federal government's energy-saving measures to curb the impending energy shortage in 2022. Consumption data, and therefore the resultant emissions, declined in these areas; the reduction in the consumption of heating oil and district heating is also partly attributable to the milder winter and the decrease in the number of heating degree days reported. With respect to natural gas, the impact of the energy-saving measures was overshadowed by the increase in consumption caused by the newly occupied laboratory building (as described above).
Electricity consumption rose slightly. The effects of the savings measures announced for large consumers were probably overshadowed by the increasing degree of technologicalization (which was intensified by pandemic-related restrictions) as well as the fact that short-term measures for saving electricity were very difficult due to the high base load required for the IT, research and refrigeration infrastructure.
Direct emissions from the vehicle fleet rose again after pandemic-related restrictions were eliminated. Emissions from laboratory gases and experimental areas as well as indirect emissions that arise in connection with the purchase of drinking water, the use of paper and garbage disposal remained at a lower level than in 2019. The amount of special waste rose sharply compared to previous years, which could be attributable to both the renewed increase in the number of internships and research projects following the pandemic-related restrictions as well as clean-up work done (for retirements, renovations and moves).

The figure below is a multi-year comparison for 2019-2022 showing

- the renewed rise in the share of emissions caused by work-related travel,
- the increase in emissions related to the natural gas supply, which is attributable to the addition of new buildings,
- the decrease in emissions caused by heating oil and district heating due to the energy-saving measures enacted to prevent the impending energy shortage.

Due to the stark change in the conditions, a comparison of the 2019-2022 footprints is not meaningful.

[3] The figure published in the 2019 report was 7,861 t CO_{2eq}, since negative emissions from recycling were offset against it. These are no longer offset within the carbon footprint due to more recent information.

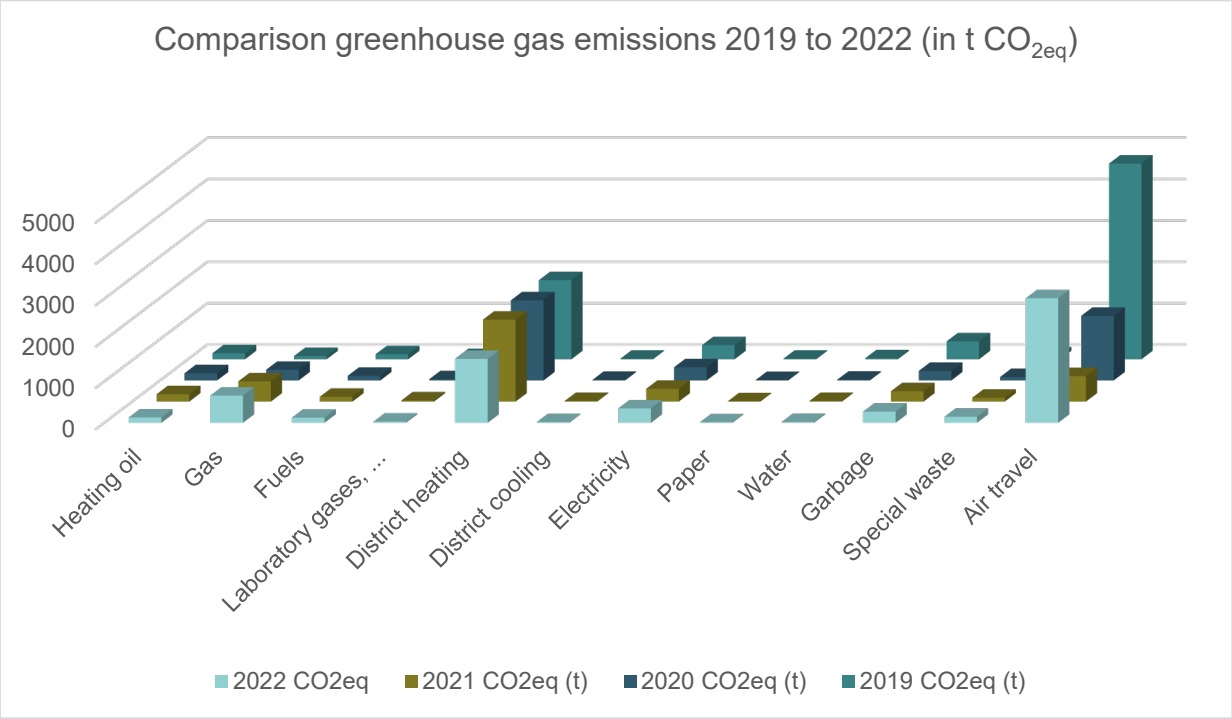

Figure 3: Greenhouse gas emissions of the University of Bern, 2022. Greenhouse gas emissions shown by source, expressed in t CO_{2eq} and attributed to the various years by color.