# UCPH Climate Account 2018-21

27. of march 2023

UNIVERSITY OF COPENHAGEN

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# 1. Purpose, goal and approach

# Purpose and approach

- UCPH's Climate Account can be used for:
  - estimating if UCPH are collectively headed in the right direction as per our 2030 Sustainability Goals: reduction of the overall climate footprint per full-time equivalent (FTE) by 50% in 2030. The baseline is 2018.
  - adjusting the efforts, which includes prioritising actions in the Main Categories of the climate footprint.

*For at more precise effect estimation of each of the partial actions, alternative specific methods for each category are needed. There is a continuing need to evolve data and methods for scope 3 emission categories (UCPH Purchasing) especially.*

- Approach
  - Overall climate footprint is calculated with the GHG protocol calculation tools.
  - The applied methods are based on an approach developed by a climate account task force under Danish Universities.
  - UCPH develops methods and approaches to make them better each year. The latest account is therefore the most precise.
  - Baseline is continuously updated as better methods and more precise data are developed, so consistent methods are used throughout the period.

*Further detail on methods, see chapter 5.*

# UCPH's climate goal 2030

**UCPH will reduce its overall climate footprint (Scope 1-3) per full-time equivalent (FTE) by 50% in 2030. The baseline is 2018.**

UCPH's climate goals for 2030 have been decided in "Knowledge and Responsibility – Sustainable Institution 2030" Goal for Sustainable Institution 2030 – University of Copenhagen (ku.dk)
The goals were approved by the UCPH board in December 2020.

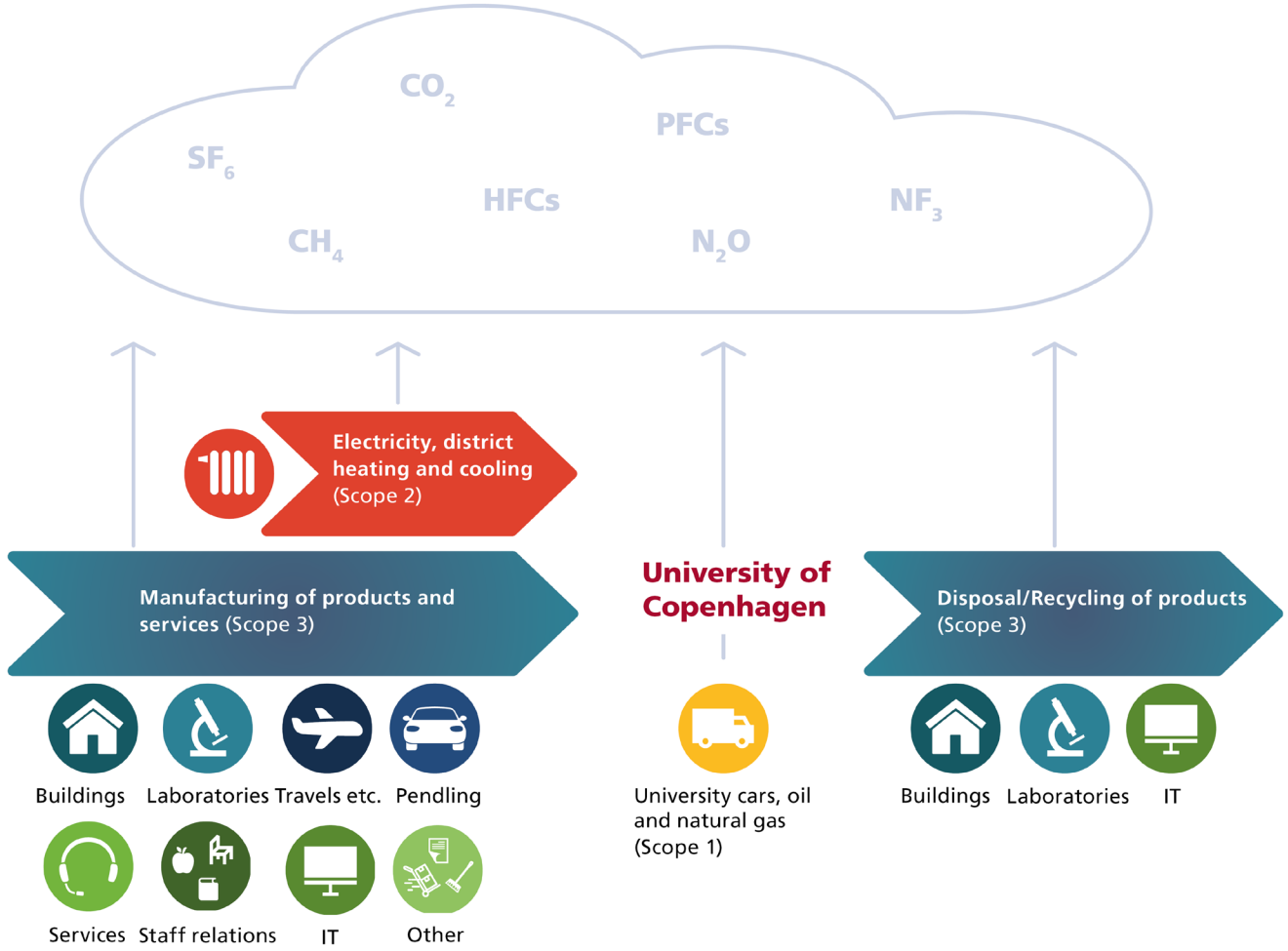
Besides climate goals, UCPH set goals for resources, biodiversity, chemistry, collaboration and global knowledge sharing.

# About GHG-Protocol

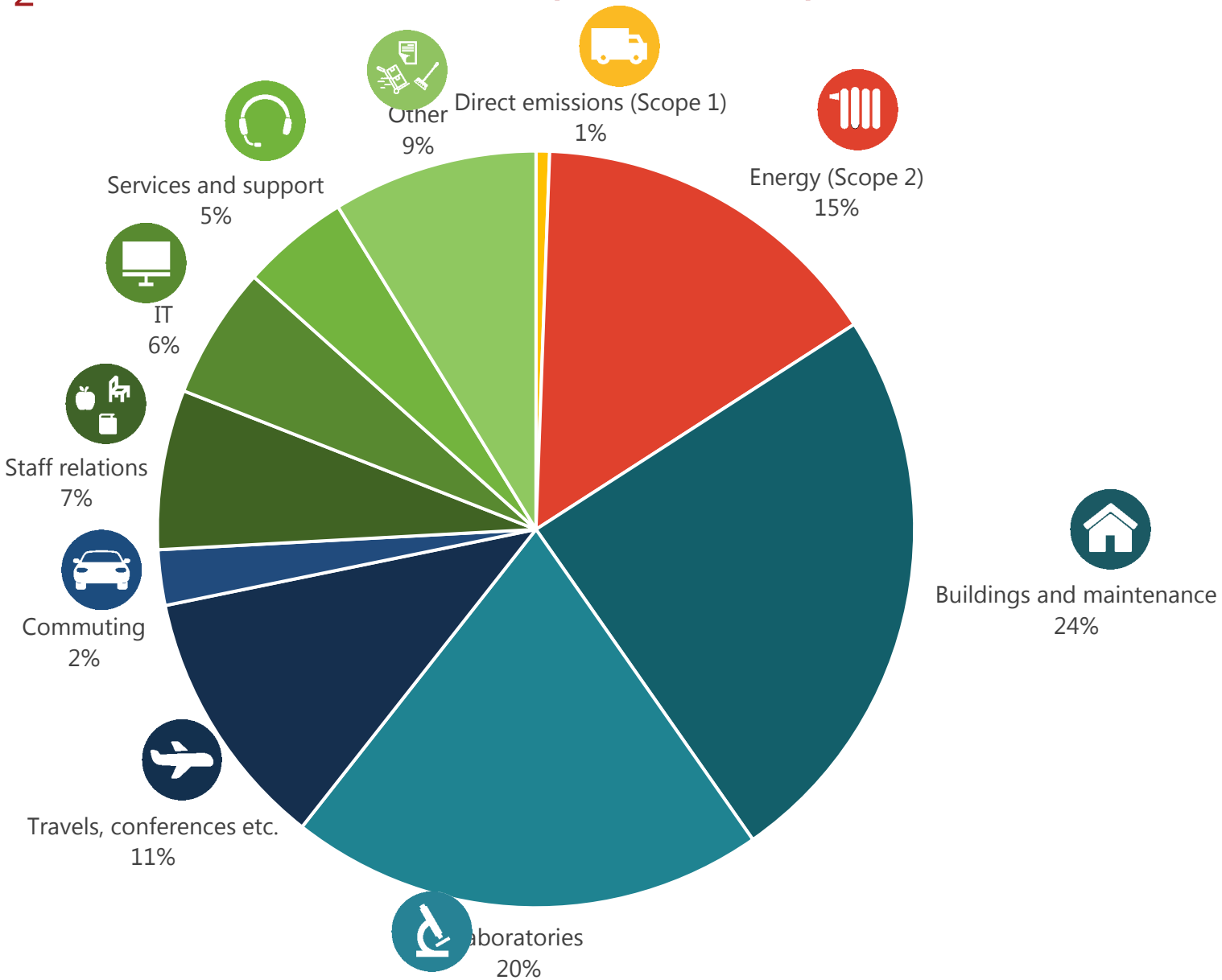
UCPH uses the GHG protocol's internationally recognized approach as a reference point. Greenhouse Gas Protocol (ghgprotocol.org).

The approach divides emissions into categories ascribed to businesses in 3 scopes (sources of emission)

- **Scope 1**: Direct emission e.g. from petro for own cars and ships or oil and natural gas boilers.
- **Scope 2**: Indirect emission from energy consumption i.e. district heating, electricity and district cooling.
- **Scope 3**: Upstream and downstream emissions connected to products and services used by UCPH.



# UCPH's $CO_2$e-emission 2018 (baseline) on main categories



# 2. Main Results

# Main results - summary

UCPH have reduced our climate footprint per FTE from 2018 to 2021 with 18%.

A considerable amount of UCPH's collective reduction is due to the Covid pandemic (2020-2021) where:

- Flight travel was reduced by 86% from 2018 to 2021 (subcategory in Travels, conferences etc.)
- Canteen operations and food and drinks has collectively been reduced with 62% from 2018 to 2021 (subcategory in Staff Relations)

Energy consumption (scope 2) has been reduced with 38% from 2018 to 2021. This is primarily due to the transition to sustainable energy sources in the energy supply.

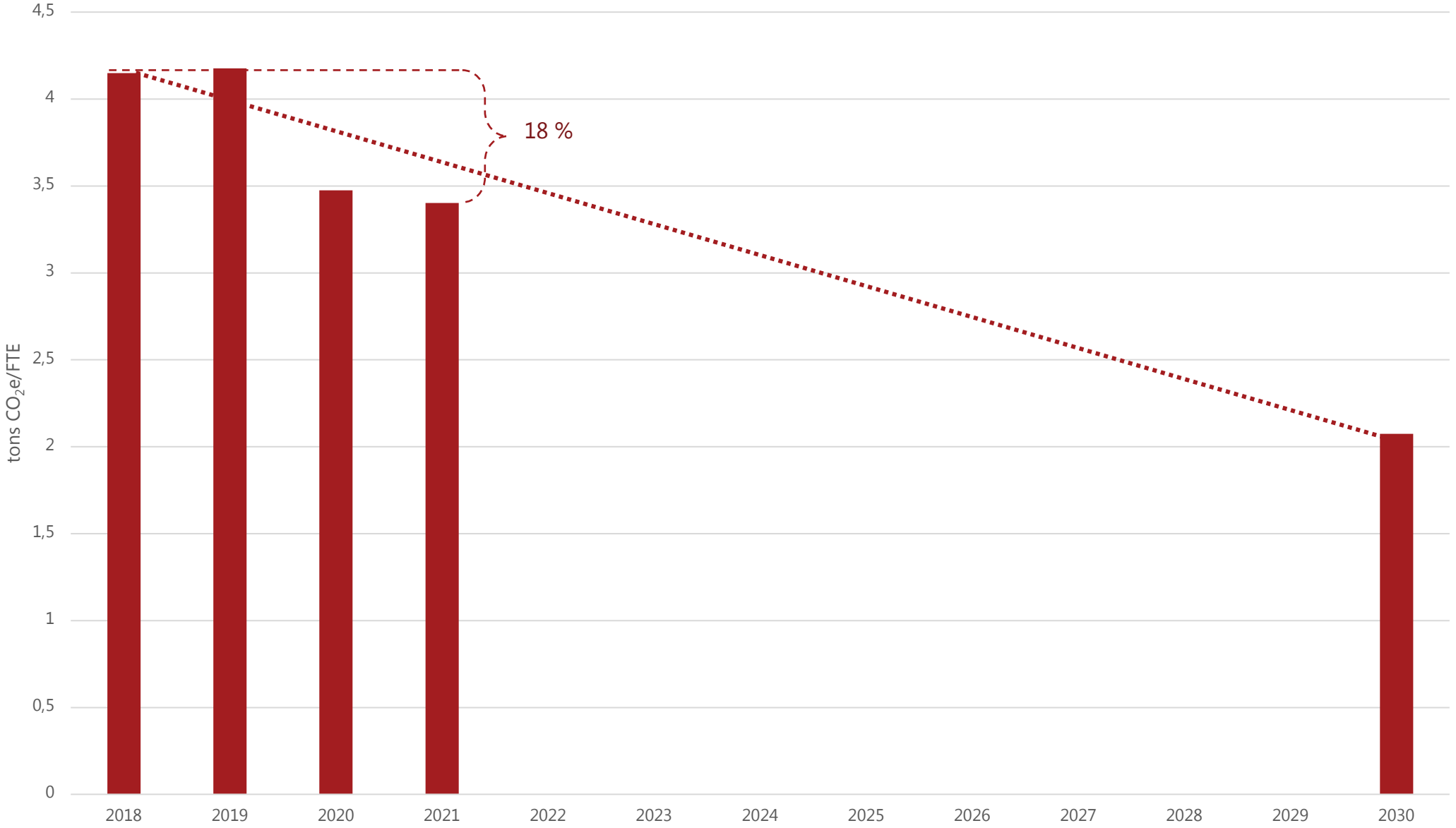
The 2 most essential main categories in the climate footprint have grown:

- Buildings and maintenance: 2%
- Laboratories (especially equipment and consumer goods): 7%

A considerable growth in the categories after Covid (2022) is to be expected, and the current collective reductions are not expected to last. The climate account for 2022 is expected to show a more accurate average year.

The collected climate account for UCPH 2018-2021 is a lot more accurate than the baseline calculation 2018 version 1 compiled in 2019.

# UCPH's total $CO_2$e-emissions per FTE




The goal set by UCPH for 50% reduction in CO2e per FTE in 2030 held together with 2018 (4.2 metric ton) amounts to **2.1 tons** CO2e per FTE in 2030.

The collective reduction in UCPH's climate footprint per FTE for 2018-2021 is **18%.**

The collective number of FTEs at UCPH has grown **3%** over the period.

In 2021 the collective footprint for UCPH is **3.4 tons CO2e per FTE.**

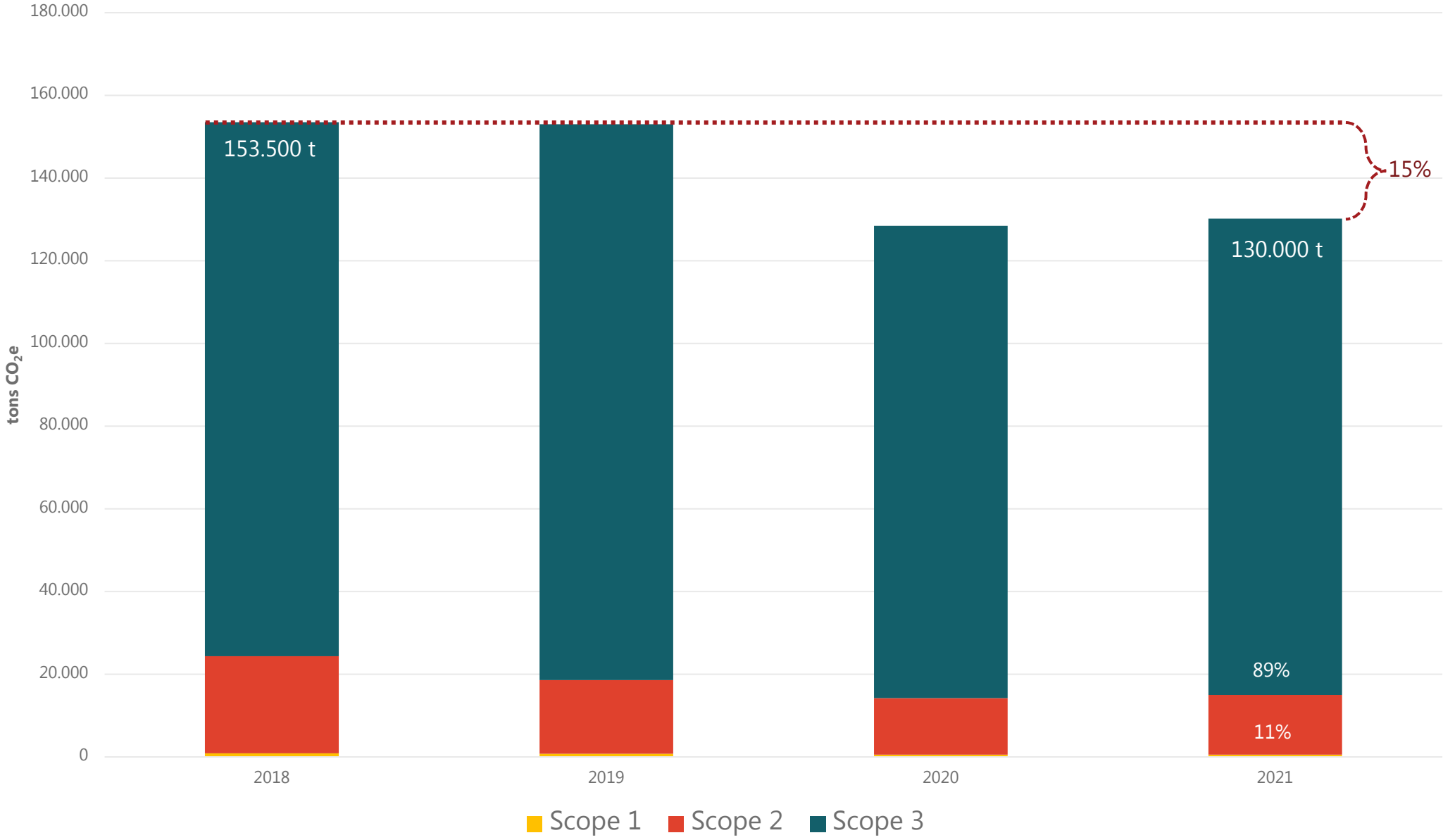
# Development in FTE at UCPH

UCPH's climate account is calculated per FTE employees and students. There has been a slight growth in the collective FTE at 3% from 2018-2021.

| | 2018 | 2019 | 2020 | 2021 | Development 2018 – 2021 |
|---|---|---|---|---|---|
| FTE – Students (STÅ) | 27.660 | 27.238 | 27.392 | 28.303 | +2% |
| FTE – Personel (ÅV) | 9.348 | 9.405 | 9.575 | 9.982 | +7% |
| Total | 37.008 | 36.643 | 36.967 | 38.285 | +3% |

Source: Students - facts and figures – About the Universty of Copenhagen (about.ku.dk), Employees - facts and figures – About the Universty of Copenhagen (about.ku.dk)

# UCPH's total $CO_2e$ emission distributed by Scope 1-3




UCPH's collective climate footprint in 2021 comes to **130.000 tons.**

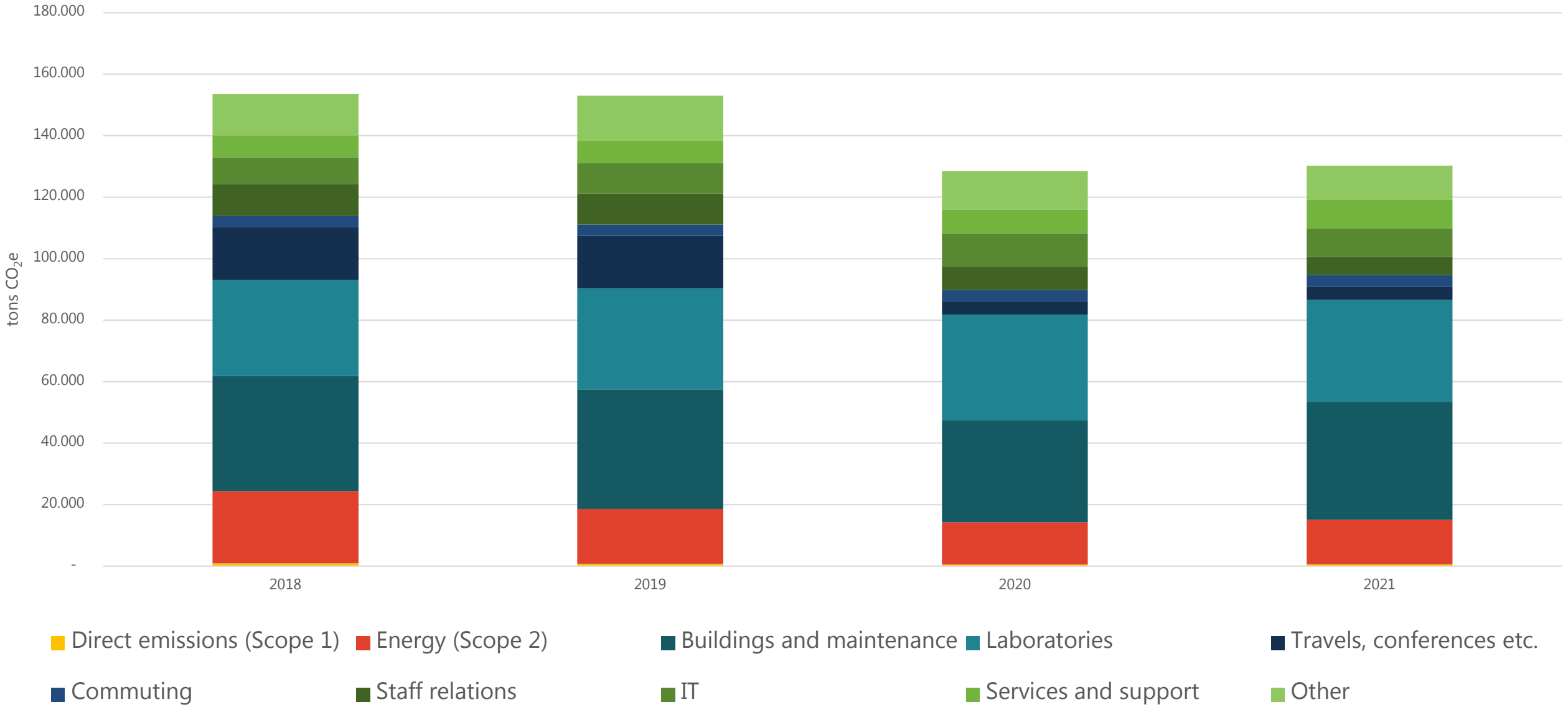
- Baseline (2018) is at 153.500 tons

The collective reduction in UCPH's footprint from 2018-2021 is -**15%.**

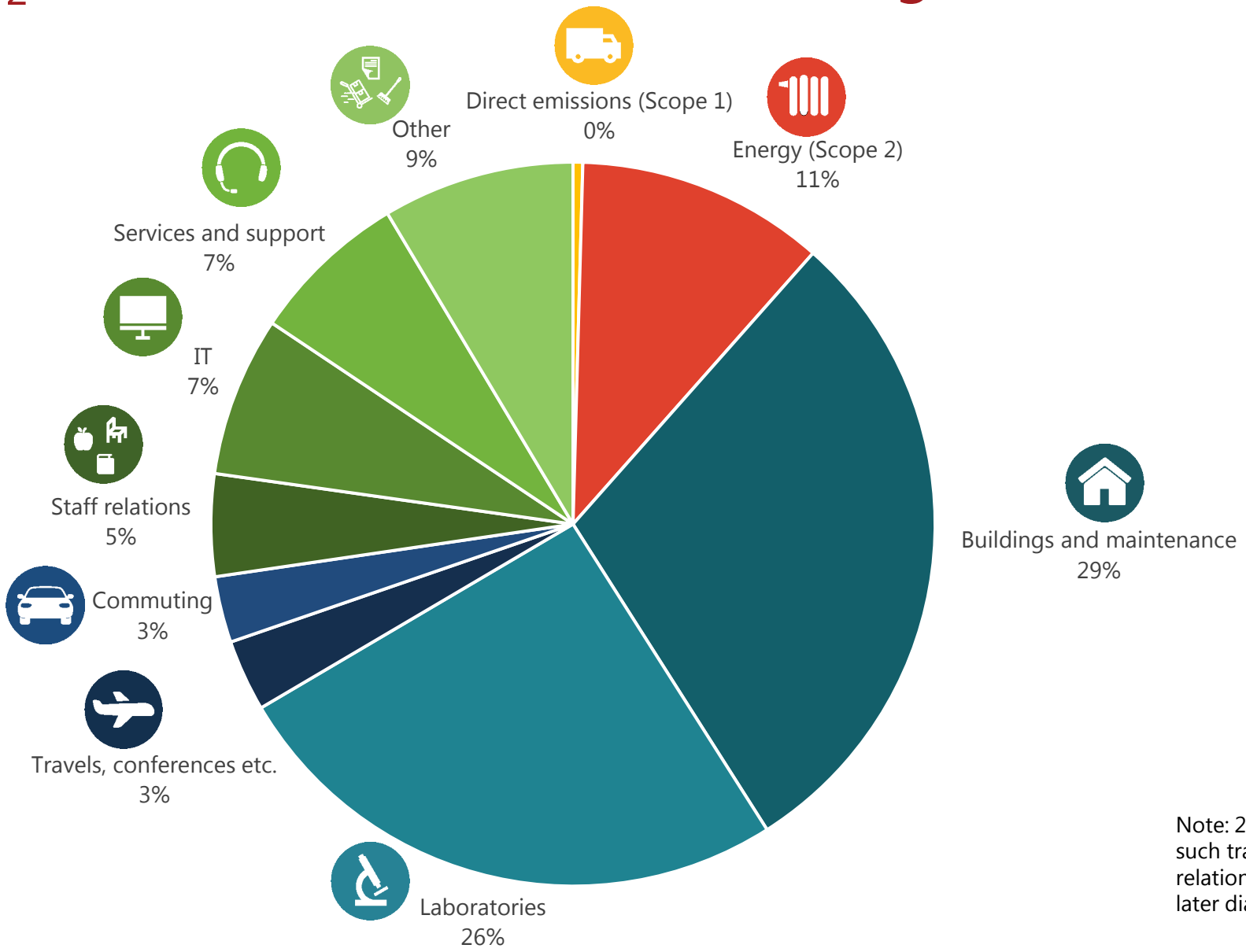
Developments for scope 1-3 from 2018-2021 are:

- Scope 1: -36%.
- Scope 2: -38%.
- Scope 3: -11%.

# UCPH's total $CO_2e$ emission distributed by categories



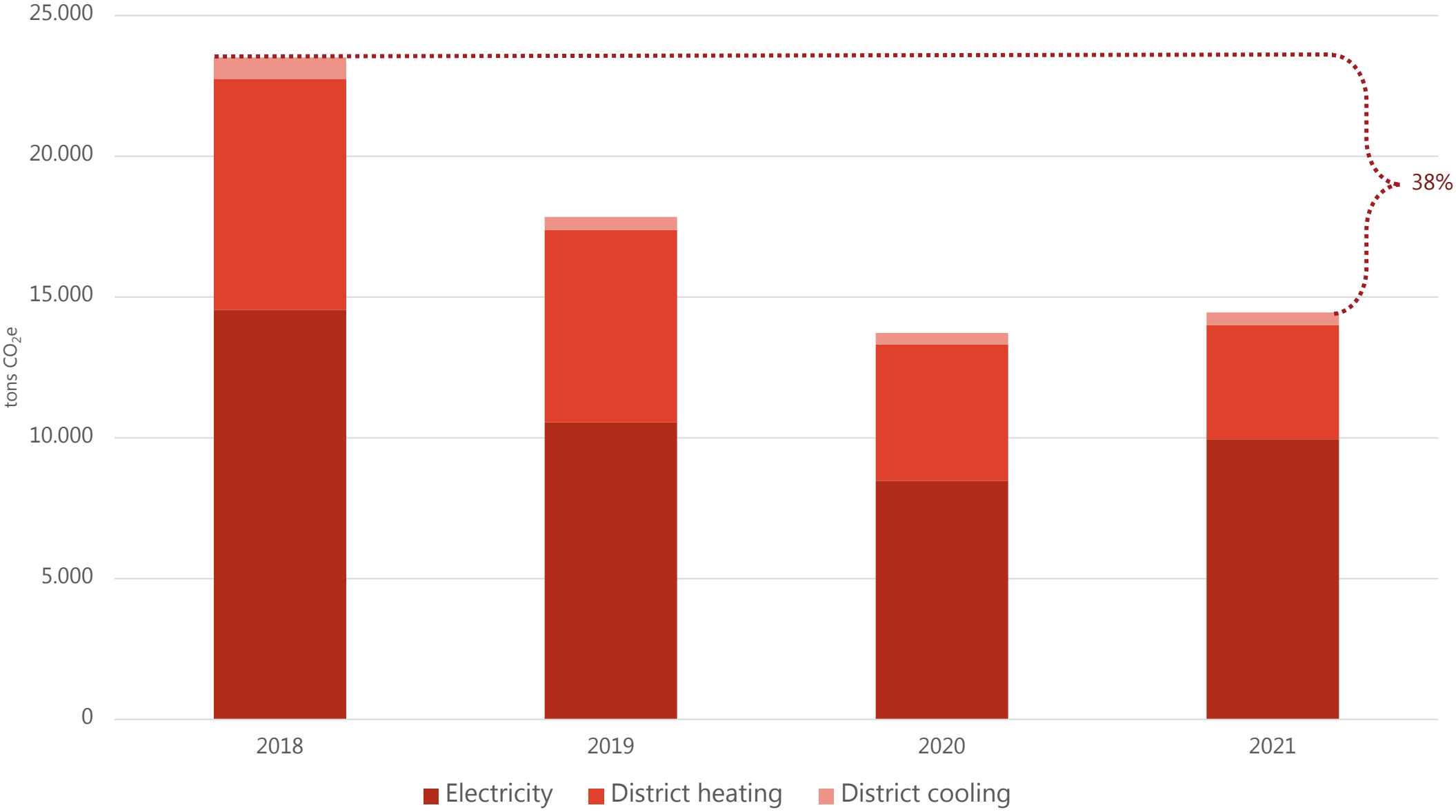
# UCPH's $CO_2e$ emissions 2021 in main categories




Note: 2021 was a Covid year and as such travelling, conferences and staff relations were extraordinarily low. See later diagrams.

# 3. Scope 2

# Scope 2 – Distribution of $CO_2e$ on delivered energy




The collective CO2e emission at UCPH from scope 2 is **14.457 tons**

The collective reduction from 2018-2021 is **-38%**. The development is due to improved emission factor for electricity, heating and district cooling.

Of this, the reductions are distributed thus:

- Electricity **-32%**
- District heating: **-51%**
- District cooling: **-41%**

# Development in emission factors and energy consumption

Electricity, heating and district cooling are supplied by external supply companies. The transition to more climate friendly means of production contributes to a continued reduction in the emission factor per MWh. Through this a significant reduction in UCPH's scope 2 emissions. A reduction in the emission factor is expected towards 2030.

UCPH has not achieved significant reduction of the scope 2 emissions within the period.

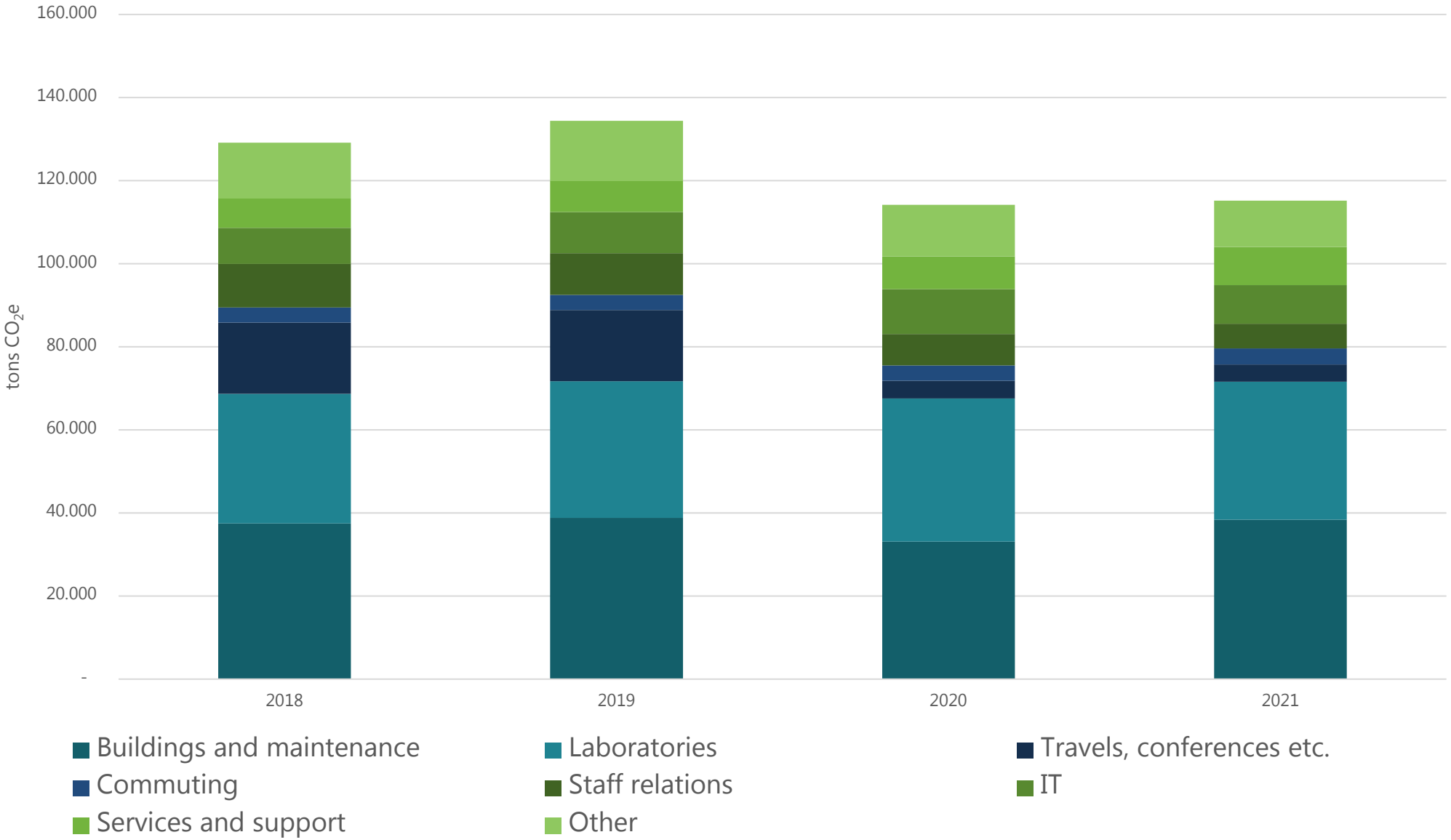
| KU energy consumption MWh | 2018 | 2019 | 2020 | 2021 | Development 2018 – 2021 |
|---|---|---|---|---|---|
| Electricity | 73.056 | 72.774 | 69.491 | 71.564 | -2% |
| District heating | 91.504 | 85.029 | 77.653 | 92.793 | +1,4% |
| District cooling | 12.334 | 11.932 | 12.210 | 12.801 | +3,8% |

| Emissions kg $CO_2e$ per MWh | 2018 | 2019 | 2020 | 2021 | Development 2018 – 2021 |
|---|---|---|---|---|---|
| Electricity | 199 | 145 | 122 | 139 | -30% |
| District heating | 90 | 80 | 62 | 44 | -51% |
| District cooling | 61 | 39 | 33 | 35 | -43% |

*Biomass is calculated by the supply companies according to current international standards such as 0 kg CO2eq. The current consensus is that it is inaccurate. If it were to be changed, the emission factors would rise significantly and as a consequence so will UCPH's scope 2 emissions.*

# 4. Scope 3

# Scope 3 – Distribution of $CO_2e$ emissions on main categories




The collective reduction for scope 3 from 2018-2021 is **-11%.**

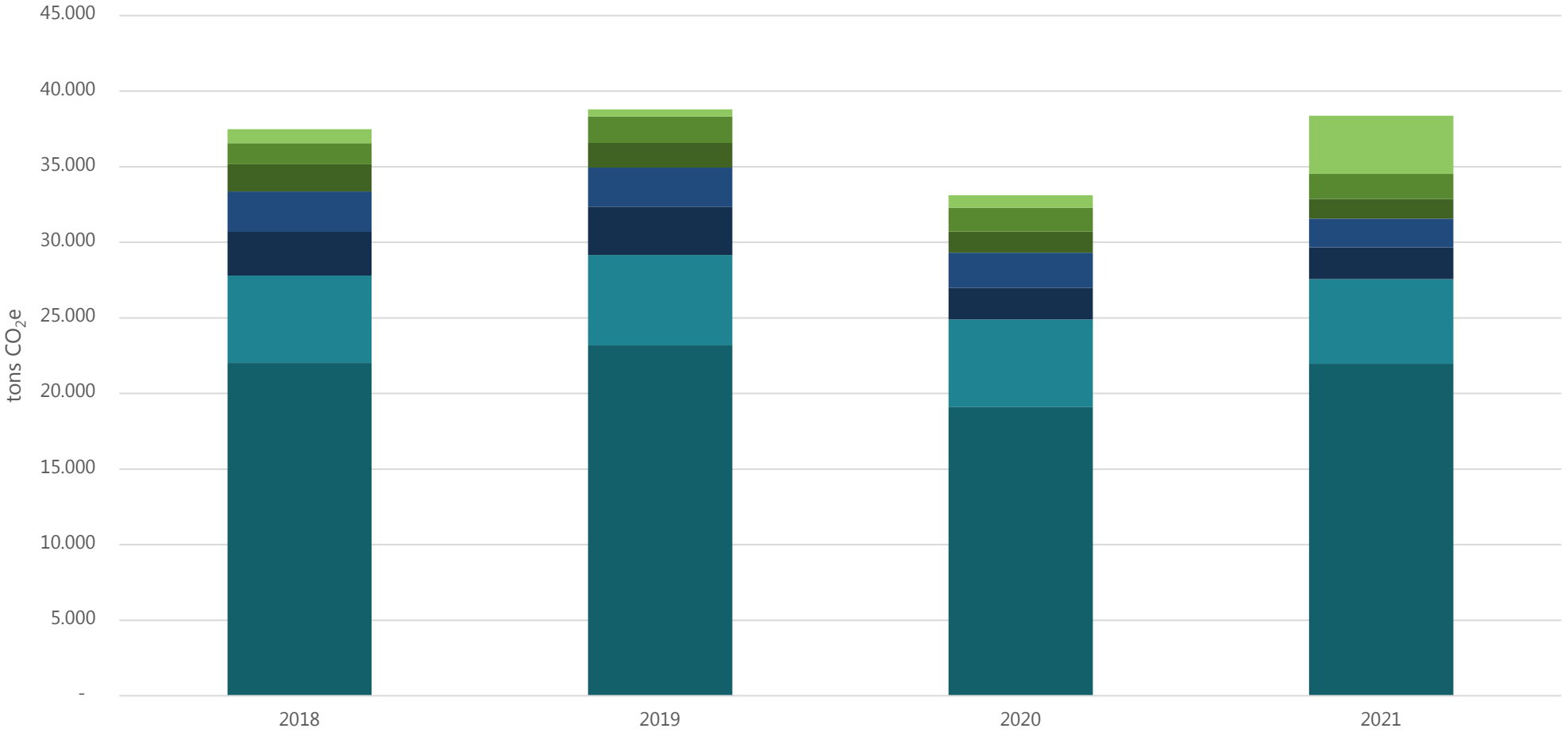
The primary reason for the reduction is related to the Covid-19 pandemic: reductions of flight travels, conferences, and a drop in staff relations with reduction in canteen services (feeding).

# Overview of Scope 3-categories

The overview clarifies the content of sub-categories under UCPH's scope 3-emissions.

| Sub-category | Content in sub-category | Development 2018-2021 |
|---|---|---|
| Buildings and constructions  | Enterprise & construction workers (external with attached building material consumption), Building materials and equipment (internal), engineers and architects, security area, Interior decoration, Elevator Service, VVS- and sewer services, etc., Other (machines and service within special equipment), Buildings (Building Stock, among these the collective number of m2 rented). | + 2% |
| Laboratories  | Apparatus, Equipment, Consumption goods, Livestock (feed, litter, animals and equipment), Chemicals, Gasses, Pharmacology, Laboratory furniture, Laboratory inventory, Services. | + 7% |
| Travels, conferences etc.  | Travels via plane, car, train, taxi, bus and ferry. Hotel stays, conferences, meeting facilities, restaurants and expenses for travel agencies. | - 76% |
| Pendling  | Car travels to work or studies. | + 6% |
| Interpersonal relations  | Canteen services, food and drinks, Published products, furniture and inventory, Education and courses, Work place environment services, Other. | - 43% |
| IT  | Hardware (pc, screens, servers, etc.) , AV-equipment, Printers & multifunctioning machines, Software, Counselling, Service. | + 7% |
| Services and contributions  | Administrative assistance, and services within education, insurance, policies etc. | + 30% |
| Other  | Office upkeep (paper), cleaning, expenses for libraries, Real estate taxes, public administration, and other unspecified sub-categories, communication (equipment, graphics, advertising etc.), Delivery (moving expenses and delivery). | - 17% |

# Scope 3 – Buildings and construction

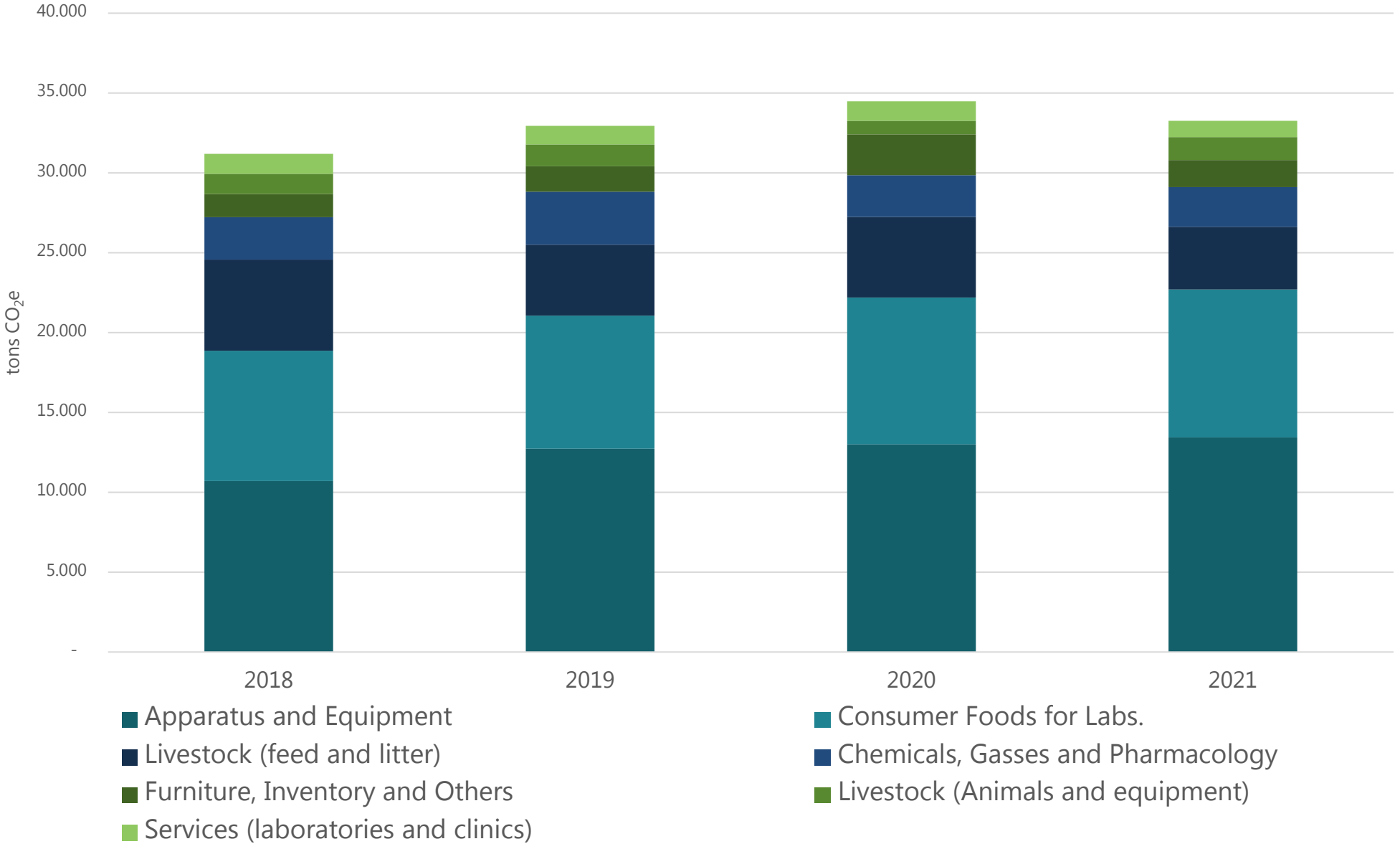



The category "Buildings and construction" has from 2018-2021 grown **+2%**

Development in the sub-categories is as follows:

- Internal decoration, elevator services, plumbing etc.: **-29%**
- Buildings: **-3%**
- Enterprise and construction workers: **0%**
- Building materials and equipment:**-27%**
- Engineers and architects **-28%**
- Other: **+320%**
- Security: **+18%**

# Scope 3 – Laboratories




The category "Laboratories" has from 2018-2021 grown +**7%.**

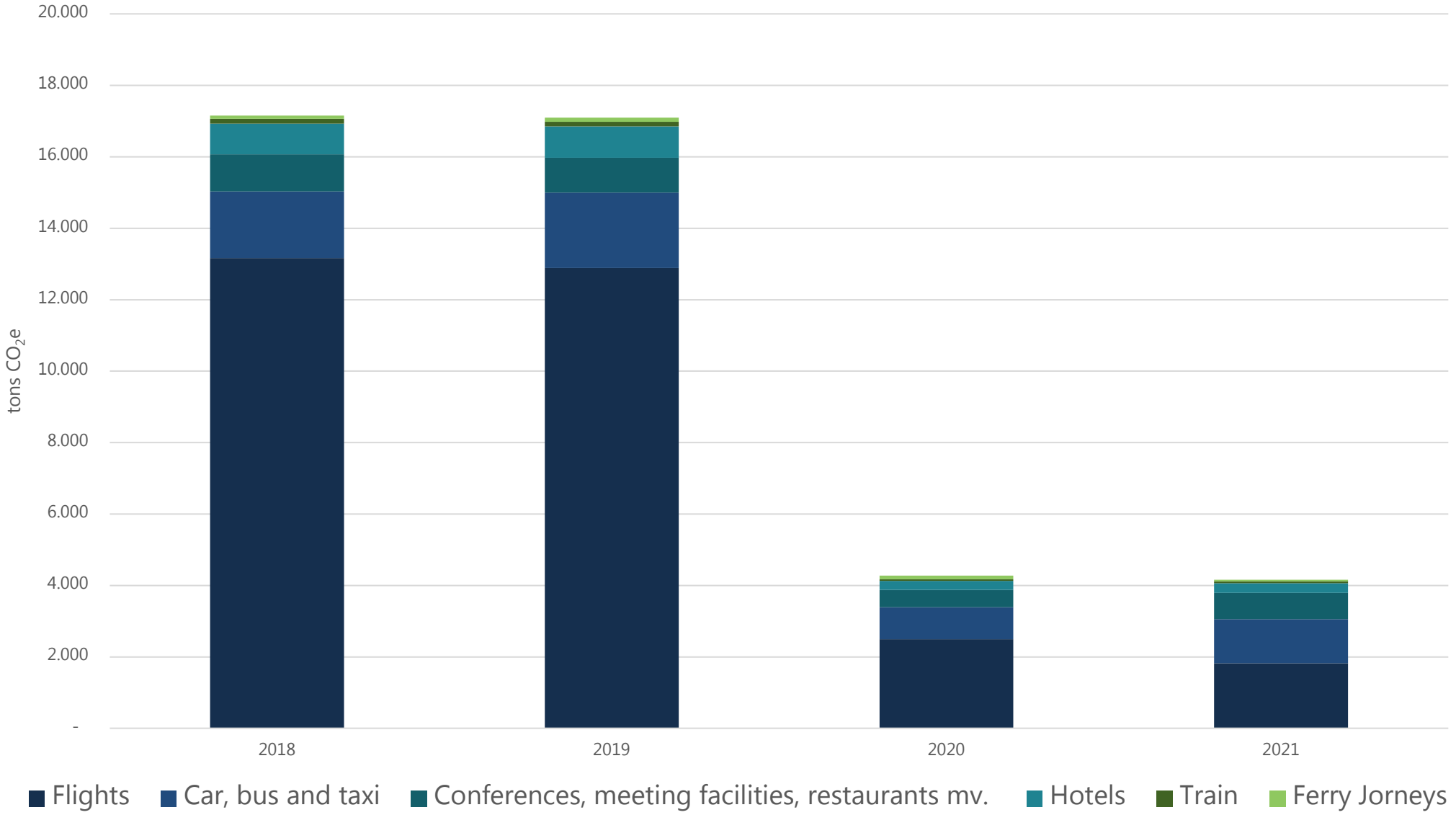
Here within following categories have grown:

- Apparatus and equipment: **+25%**
- Consumer goods for labs.: **+14%**
- Furniture, inventory and others: **+18%**
- Livestock (Animals and equipment): **+13%**

The remaining categories have been reduced with:

- Livestock (Feed and litter) **-31%**
- Services (laboratories and clinics): **-19%**
- Chemicals, Gasses and Pharmacology: **-7%.**

# Scope 3 – Travels, Conferences etc.

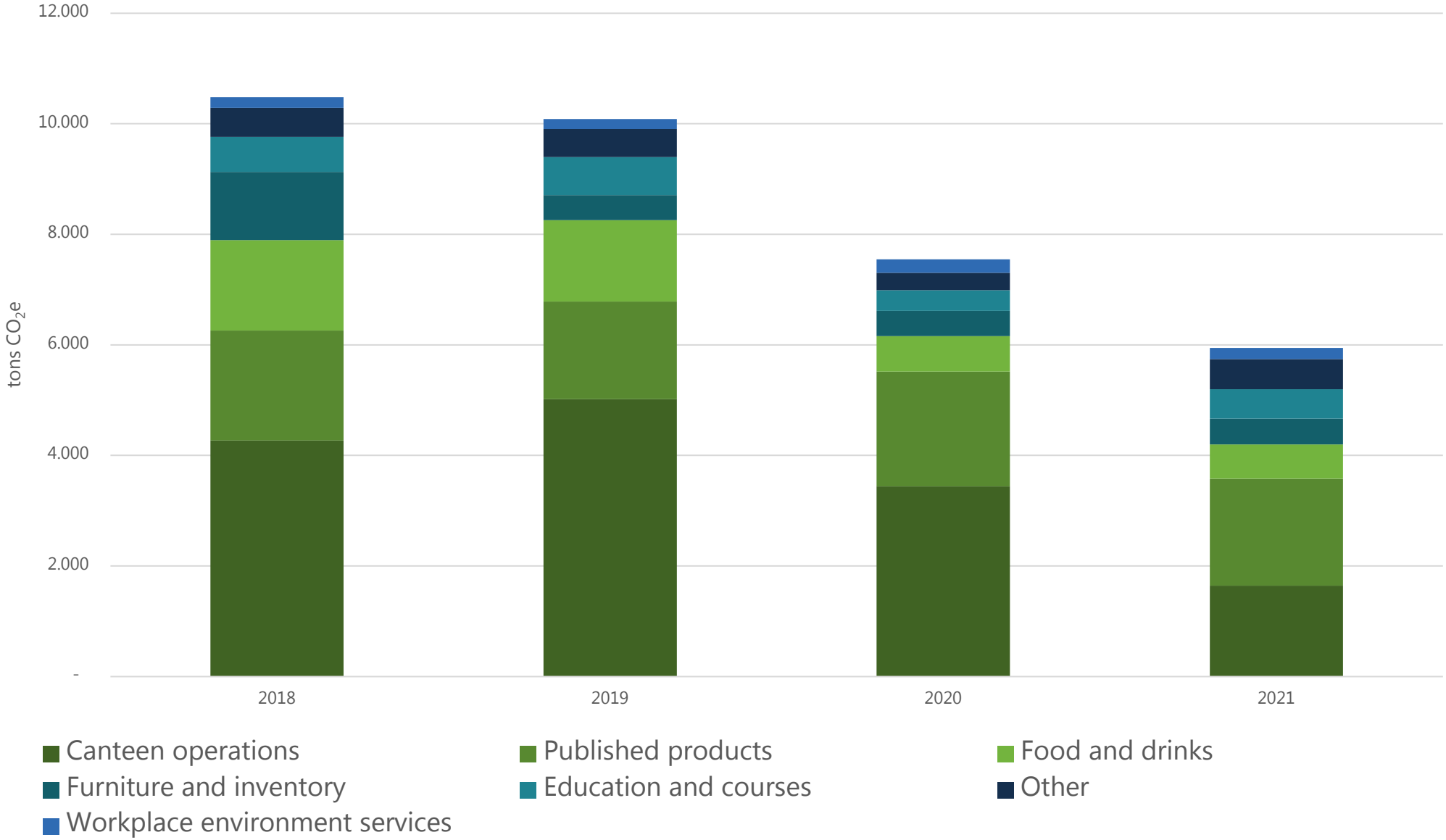



The category "Travels, conferences etc" has been reduced by **-76%.**

The reductions in the sub-categories are as follows:

- Plane journes: **-86%**
- Car, bus and taxi: **-34%**
- Conferences, meeting facilities, restaurants etc.:
- **-30%**
- Hotels: **-68%**
- Train: **-63%**
- Ferry journes: **-50%**

# Scope 3 – Staff relations

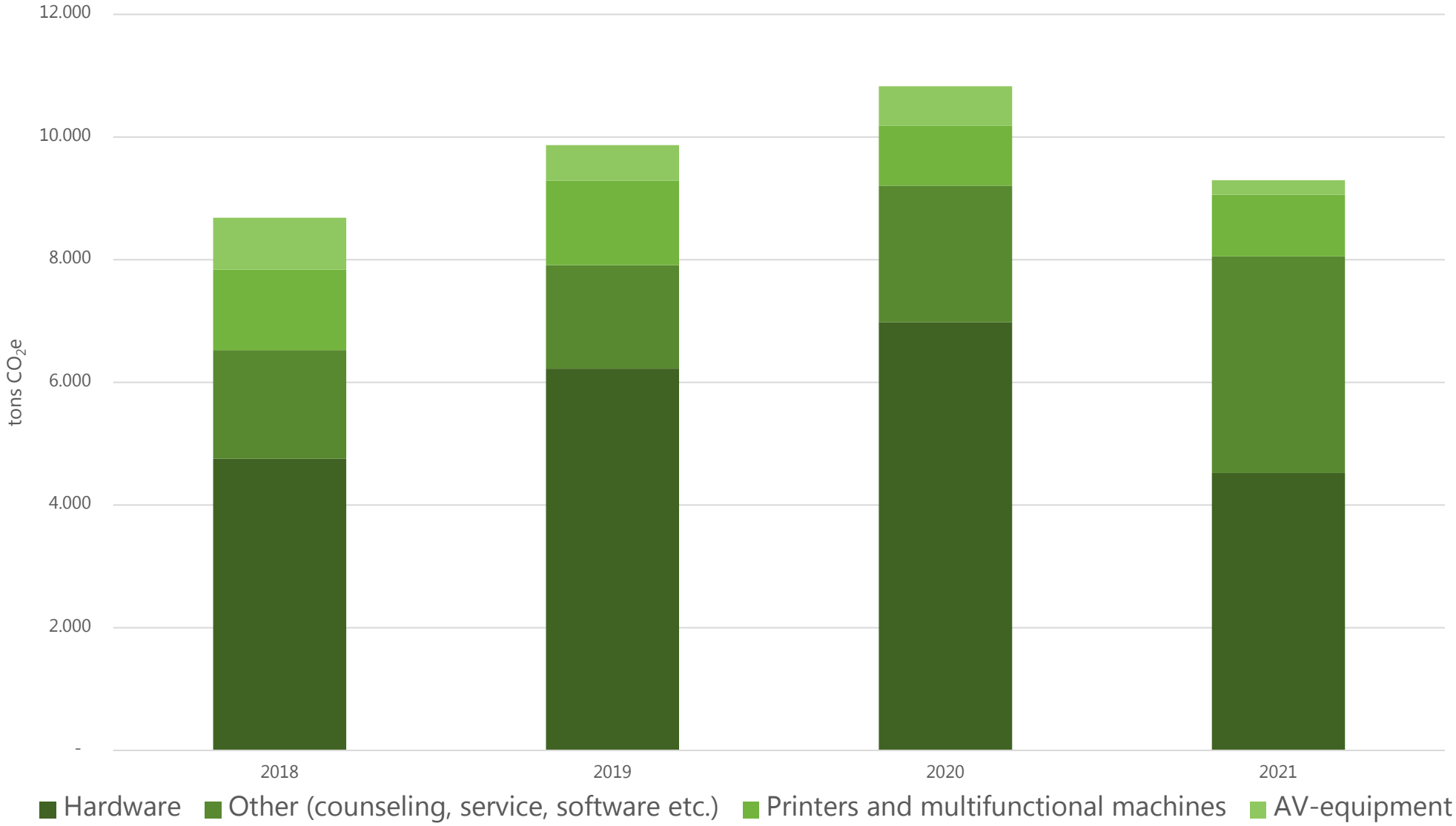



The category "Staff relations" has been reduced by **-43%**.

The development in the sub-categories is as follows:

- Canteen operations: **-62%**
- Published products: **-3%**
- Food and drinks: **-62%**
- Furniture and inventory: **-62%**
- Education and courses: **-16%**
- Other: **+4%**
- Work place environment services: **+6%**

# Scope 3 – IT

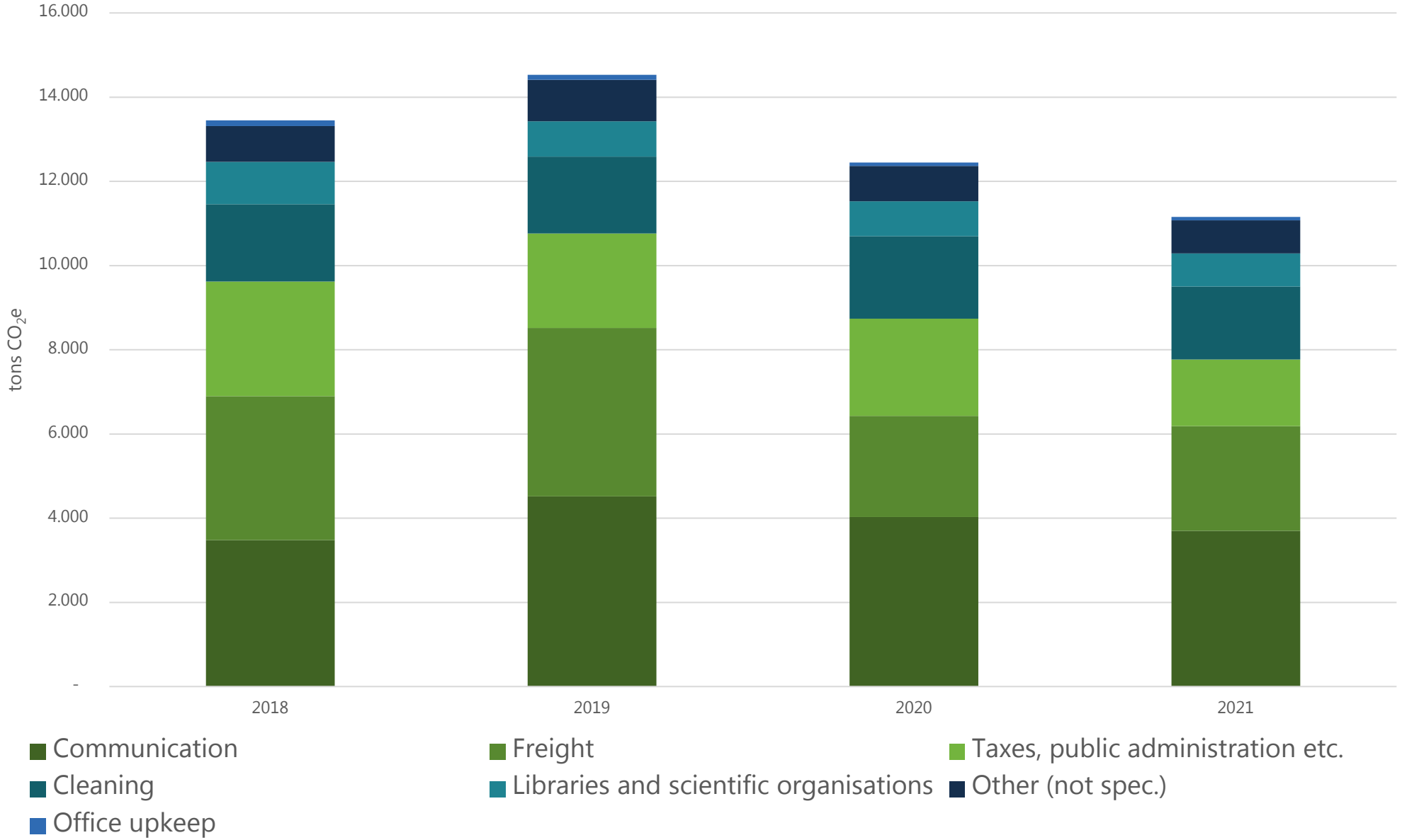



The category "IT" has grown by **+7%.**

The development in the sub-categories is as follows:

- Other (counselling, service, software etc.): **+100%**
- Hardware: **-5%**
- Printers and multifunctional machines: **-23%**
- AV-equipment **-72%**

# Scope 3 – Other




The category "Other" has been reduced by **-17%.**

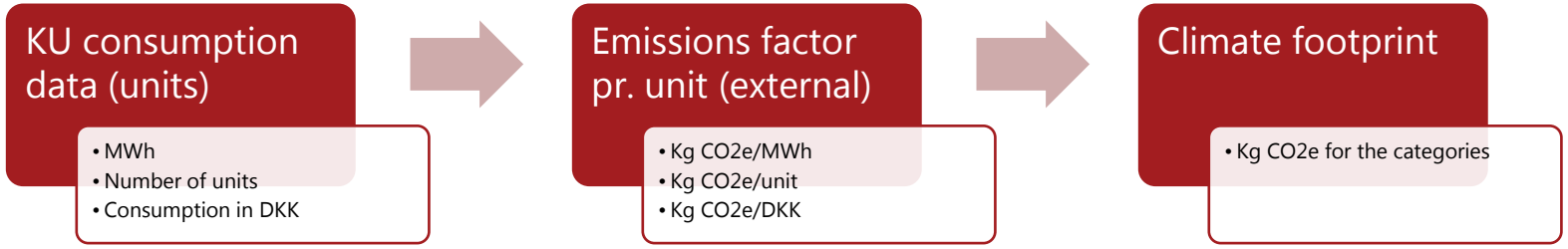
The development in the sub-categories is as follows:

- Communication: **+6%**
- Freight: **-27%**
- Taxes, public administration etc.: **-42%**
- Cleaning: **-6%**
- Libraries and scientific organisations: **-22%**
- Other (not spec.): **-7%**
- Office upkeep: **-40%**

# 5. Methods

# Method

- UCPH's approach is based on the GHG-protocol, the internationally recognised approach, which is used by companies and organisations across the globe. Greenhouse Gas Protocol | (ghgprotocol.org)
- UCPH is participating in a task force from Universities Denmark to develop a collective approach to climate accounting. The approach used by UCPH here is in accordance with this work, which is based on the GHG-protocol as well.
- The area is currently under development and methodical change both in DK and internationally. There are still large methodical uncertainties, especially on most of the scope 3 categories (upstream).



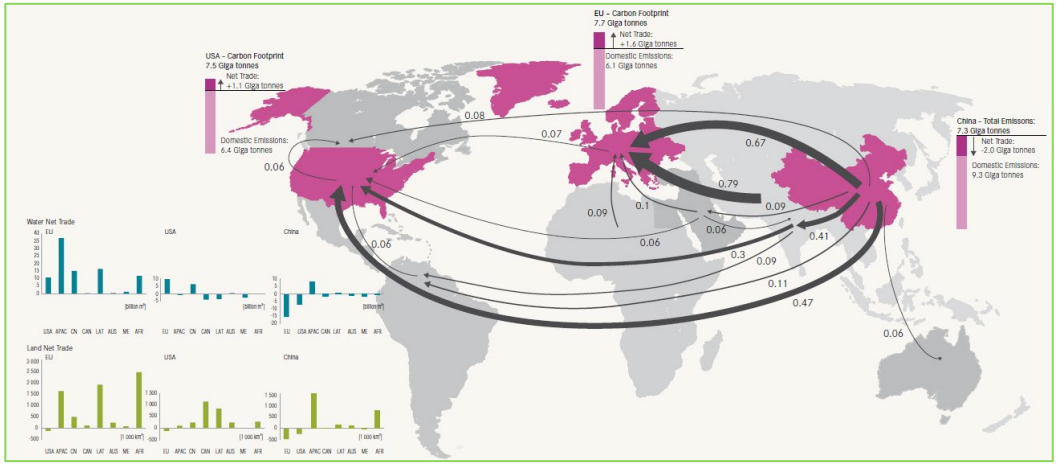

*The figure illustrates the principal approach for calculation of climate footprint. UCPH's consumption data varies in quality and type for each consumption area. The emission factor is procured from the most true external source according to UCPH.*

The climate account is based on a combination of methods and data:

- Quantitative UCPH consumption data (amounts) is used, wherever possible.
- Economical UCPH data (procurement data), where other UCPH consumption data are unavailable.
- Scaling at the best possible basis, where UCPH data are not precise/complete

# Method

EXIOBASEv4 is used on a number of scope 3 categories as the best possible equipment for delivery of emission factor.




*https://www.exiobase.eu/*

Description of EXIOBASEv4:

- Global, detailed, multi regional climate and environment database.
- The primary tool for collective calculation of climate footprint for scope 3 in DK.
  - Nationally (Global Reporting, Klimakompasset, National green purchasing strategy).
  - Used by recognised climate advisors (NIRAS, VMAS, Concito and others).
- Further development supported by KR foundation with approx. 39 mil. DKK, so further improvements are expected in the coming years.
- New version 4 has been developed I 2021-2022 and UCPH is amongst the first to use it. Improvements compared to v3:
  - Better statistical basis. Global statistics from 2016 towards 2011 in EXIOBASE v3.
  - Multiple production categories (from 164 to +400).

*When estimating the effect of the concrete actions within the sub-categories other data/methods than DKK and EXIOBASE are needed. Product specific LCA accounts are estimated to be the best approach for a number of scope 3 categories, but are not available for a number of product areas at present.*

# Method - overview

| | KU data source | Emission factor | Remarks |
|---|---|---|---|
| **Scope 1** | Calculated consumption is collected from UCPH Economy and Data Acquisition (MinEnergi2) | Official factors from utilities (town gas), and VRI- and GHG Protocol (fuel, natural gas and oil).<br>DK-Uni method | |
| **Scope 2**<br>- electricity<br>- district heating<br>- district cooling | Measured consumption at UCPH (MWh), collected from Data Acquisition (MinEnergi2) | Official factors from the utilities' environmental declarations.<br>DK-Uni method | National change in the emission factor for biomass from 0 CO2e today. This can mean considerable growth in UCPH's scope 2 emissions. |
| **Scope 3** | Consumption (DKK) in purchasing Units<br>External sources | EXIOBASE v4<br>DEFRA<br>EcoInvent<br>The Big Climate Database | |
| Buildings and construction | Consumption (DKK) | EXIOBASEv4 | Moving forward there will be a need to calculate UCPH's consumption in physical units, to monitor more precise yearly development. |
| Laboratories | Consumption (DKK) | EXIOBASEv4 | Moving forward there will be a need to calculate UCPH's consumption in physical units, to monitor more precise yearly development. |
| Travels, conferences etc. | Consumption (DKK), and CWT data | EXIOBASEv4 and CWT | |
| - Plane journeys | CWT data + scaling on account of Economic data | DEFRA, with RF factor | Precise data for purchasing via CWT. Scaling via UCPH's purchasing data. |
| Interpersonal relations | Consumption (DKK), and canteen operator data | EXIOBASEv4 and | |
| - Food | Compass Group (+scaling for other canteen suppliers) | The Big Climate Database (based on EXIOBASEv3) | Forward there will be a need to calculate the climate footprint for the food used by canteen operators. |
| IT | Purchased units + Consumption (DKK) | EcoInvent + Supplier LCA+ EXIOBASE v3 | Calculated by external advisor |
| Other | Consumption (DKK) | EXIOBASE v4 | Real estate tax is included |
| Commuting | The Danish National Travel Survey (DTU) | Danish Energy Agency | Was not disclosed in climate account v1 (2019) |

*Detailed picture of the applied data sources, methods, emission factors and sources for these can be seen in 'Databilag for KU's Klimaregnskab 2018-21' (in danish).*

# Limitations

UCPH's climate account is under continued development. The following categories are not included in this account due to lacking resources and imprecise methods for calculation at the current time. None of the sub-categories are considered vital in UCPH's climate account.

- Waste (scope 3.5). Expected to be in the next climate account.
- Water (scope 3.5). Expected to be in the next climate account.
- HFC gasses (scope 1). Calculated for 2020 and expected to be in the next climate account
- Commuting by train bus and car (scope 3.7). Expected to be in the next climate account.
- Investing (scope 3.15). Expected to be in the next climate account.

# Contact

Developed under UCPH's program for sustainable transition in November-January 2022

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