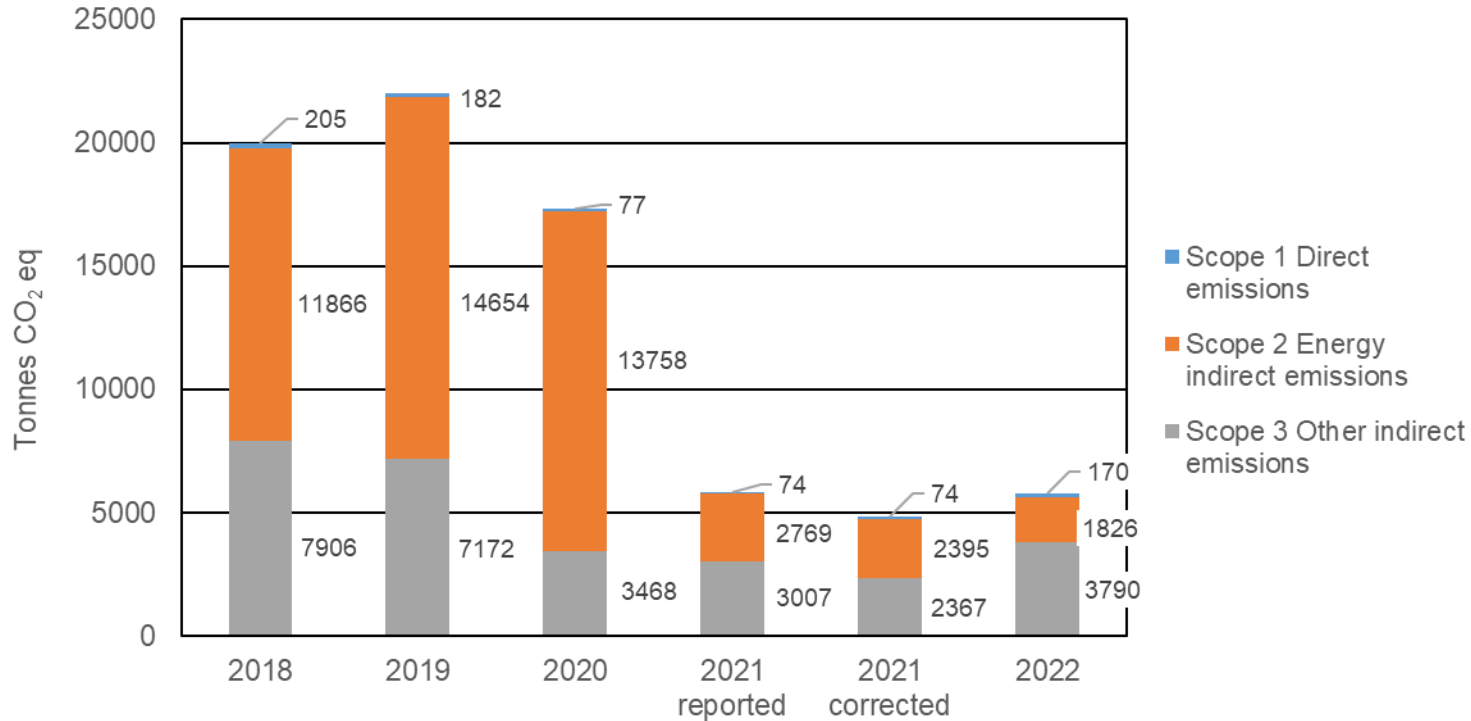
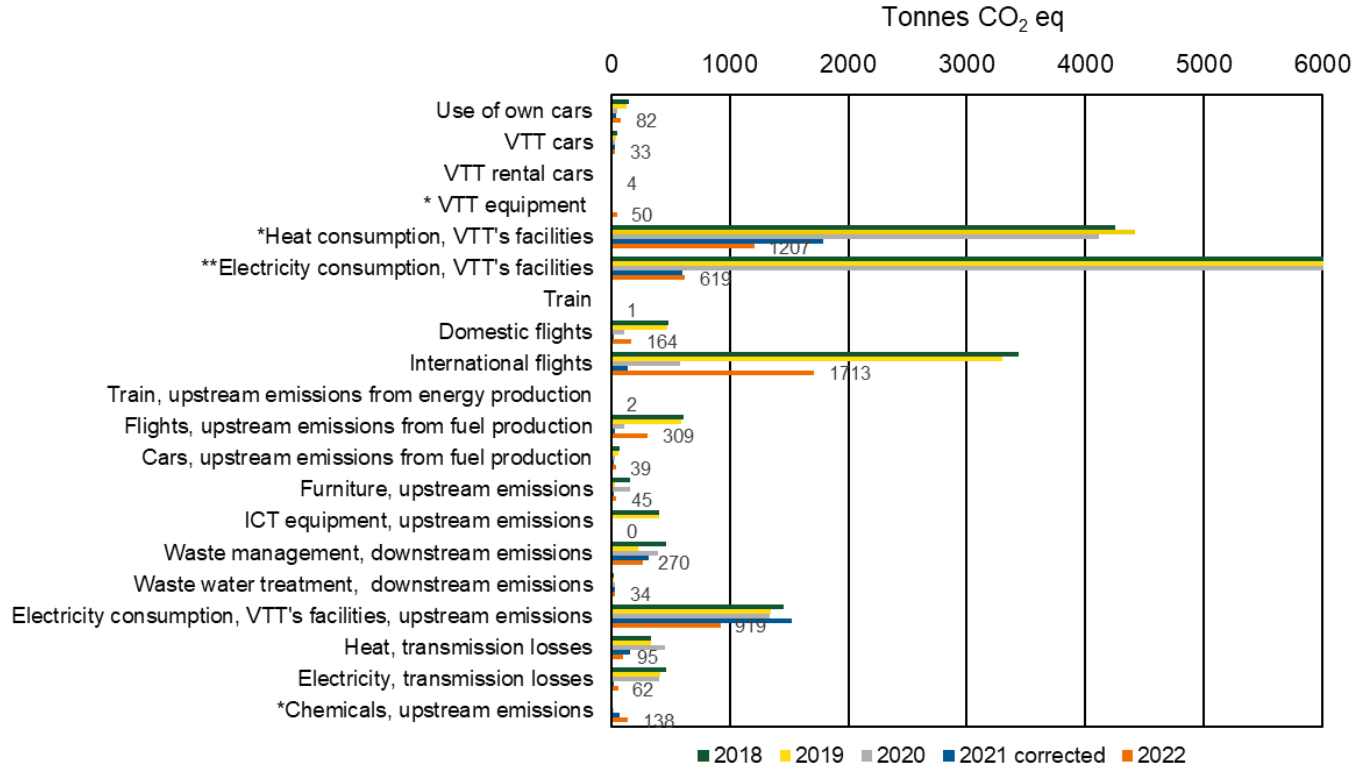


GHG emissions 2022



GHG emissions from different sources 2022



** changes in calculations compared to previous years, see slide 4*

*** Total emissions related to electricity consumption in VTT's facilities were
 2018: 7613 tonnes
 2019: 10236 tonnes
 2020: 9642 tonnes*

Scopes included in the assessment

GRI	ISO 14064-1 2019: Categories	Included emissions
Scope 1 Direct GHG emissions	1) Direct GHG emissions and removals	Use of VTT cars
		Use of rental cars
		Use of own cars at work
		Direct emissions from selected research facilities
Scope 2 Energy indirect GHG emissions	2) Indirect GHG emissions from imported energy	Electricity consumption, VTT's facilities
		Heat consumption, VTT's facilities
Scope 3 Other indirect GHG emissions	3) Indirect GHG emissions from transportation	Travel by train
		Flights (domestic & international flights)
		Upstream emissions from production of used fuels (flights, cars, train)
	4) Indirect GHG emissions from products (goods and services) used by organization;	Chemical consumption, upstream emissions
		Furniture, upstream emissions
		Upstream emissions, electricity production
		Waste management, downstream emissions (industrial, mixed and energy waste)
	5) Indirect GHG emissions associated with the use of products from the organization;	Waste water treatment, downstream emissions

6) Indirect GHG emissions from other sources.	---	
		Transmission losses, purchased electricity & heat

Results and main conclusions 1/2

- Calculation and reporting of VTT's GHG emissions is conducted according to the main principles of ISO14064-1 and the GHG Protocol. Year 2018 is used as a baseline. Reported emissions cover direct (Scope 1), indirect emissions from energy (Scope 2) and other indirect emissions (Scope 3) (see slide 3). Emissions are reported as tonnes of fossil CO₂ equivalents.
- Calculations and data sources are updated annually. Main findings and changes compared to previous years are briefly described here, focusing on most relevant topics.
- Overall, VTT's total GHG emissions increased slightly compared to 2021 due to increase in Scope 3 emissions. Compared to year 2021, the other indirect emissions (Scope 3) grew mainly due to increased business travelling after covid-19 situation improved. This increase can be seen in emissions related to international and domestic flights and in upstream emissions related to fuel production. Even if the amount of travelling increased, related GHG emissions remained on a lower level compared to years before covid-19 (2020 & 2019).
- In 2022, Scope 2 emissions continued to decrease since carbon neutral or low-emission district heating was used in most of our facilities, and regionalized or producer specific emission factors were used for the assessment.
- The share of renewable electricity (verified with guarantee of origin) was 93% of all purchased electricity. Total amount of consumed electricity and heat remained on the same level as in 2021, and so did the share of renewable electricity.
- Results for year 2021 were corrected since two mistakes were found that affected the total amount of GHG emissions reported for 2021. Mistakes were due to too high heat consumption figure reported for one of VTT's facilities. Additionally, a mistake related to calculation of upstream emissions and transmission losses in Scope 3 was detected and corrected. For year 2021, both values previously reported and values corrected are reported.

Results and main conclusions 2/2

- For 2022, selected emissions from VTT's research activities (mainly lime kiln related) in Jyväskylä were added to Scope 1 direct emissions. Together with increased use of own cars for work related purposes, this led to increase in Scope 1 emissions compared to previous year. In future, the aim is to improve coverage of direct emissions from our research activities. This is expected to increase Scope 1 emissions. On the other hand, emissions from use of cars are expected to decrease due to changes in vehicles and use of more low-carbon fuels.
- In Scope 3, the upstream emissions from purchased furniture increased since more furniture were purchased compared to last year. However, emissions related to furniture can be considered as indicative only, since data availability for purchased furniture was quite poor. Consumed chemicals' upstream emissions grew because more chemicals were added to the assessment.
- Significant reductions in the Scope 3 emissions were seen in upstream emissions related to electricity consumption because the production profile of renewable electricity changed to include significantly more wind power instead of hydropower. Minor emission decreases took place in waste management downstream emissions because the amount of waste reduced. This may be partly due to improved sorting. In future, more waste streams should be added in the assessment.
- After 2019 the upstream emissions related to ICT equipment and paper were excluded from the assessment. This was due to lack of proper data for ICT equipment manufacturing and the diminishing number of consumed office paper.
- Electricity consumption from servers located in VTT's facilities is included as part of purchased electricity. Servers located in VTT's IT service provider's facilities used renewable electricity (assuming no emissions from the use phase), but no specific emissions related to its upstream production was available, and thus it was excluded from the assessment.
- For the following years, increasing the accuracy and coverage of reported Scope 1 (research related) emissions and Scope 3 (purchased goods and services) emissions will remain one of the development topics, together with more accurate definition of VTT's carbon neutrality target and emission reduction targets.

Data sources

- Consumption data was mainly based on measured information.
- Main sources for emission data in 2022 were: Hansel (preliminary 2022 profile for renewable electricity for renewable electricity with guarantee of origin), Energy Authority (2021) for the share of electricity which was not source certified (latest confirmed residual energy mix 234,9 g/CO₂/kWh); energy companies and MOTIVA (local and national emission factors for district heating from years 2021 & 2022), ecoinvent database (upstream emissions for energy & fuel production); VTT LIPASTO, ALIISA (emissions from fuels used in cars); travel agency (GBT) (emissions related to flights); WWF Climate calculator (upstream emissions for furniture production); HSY 2019 (waste management, waste water treatment).