



Institut des Sciences
de la Terre



GHG balance 2022

Emissions trends between 2017, 2019 and 2022

Electricity consumption of the ISTerre Grenoble building

Report done in July August 2023 by Patricia Romero Quineche,
Supervised by G. Sarret and Ph. Lesage

Methodology

GHG balance and perimeter

Year	Building consumption	Travel	Commuting	IT purchases	All purchases	Outsourced servers, synchrotron experiments, seismological stations
2017						
2019						
2022						

GESTerre



+ GESTerre for servers, synchrotron, and seismo stations

GHG assesement 2017: Internship Maxence Morel in 2019

GHG assesement 2019 2022: Internship Patricia Romero Quineche in 2023

Methodology

KWh elec and gaz, L refrigerant fluids
 Km for each transport mode
 Price in € for purchases
 Type of IT material

x

Emission Factors
 (and uncertainty)



Kg of eCO2 for
 each activity

Total emissions,
 total emissions/pers

See web site



Year	Building consumption	Travel	Commuting	IT purchases	All purchases	Outsourced servers, synchrotron, seismo stations
2017		With contrails	Questionnaire in 2019			
2019		With and without contrails				
2022		With and without contrails	Questionnaire in 2023			

Not taken into account

- *externally managed activities (Floralis)* (9% of total purchases in 2019 , 10% in 2022)
 (4% of travels in 2019 et 7% in 2022)
- *Use of satellite data*

Methodology

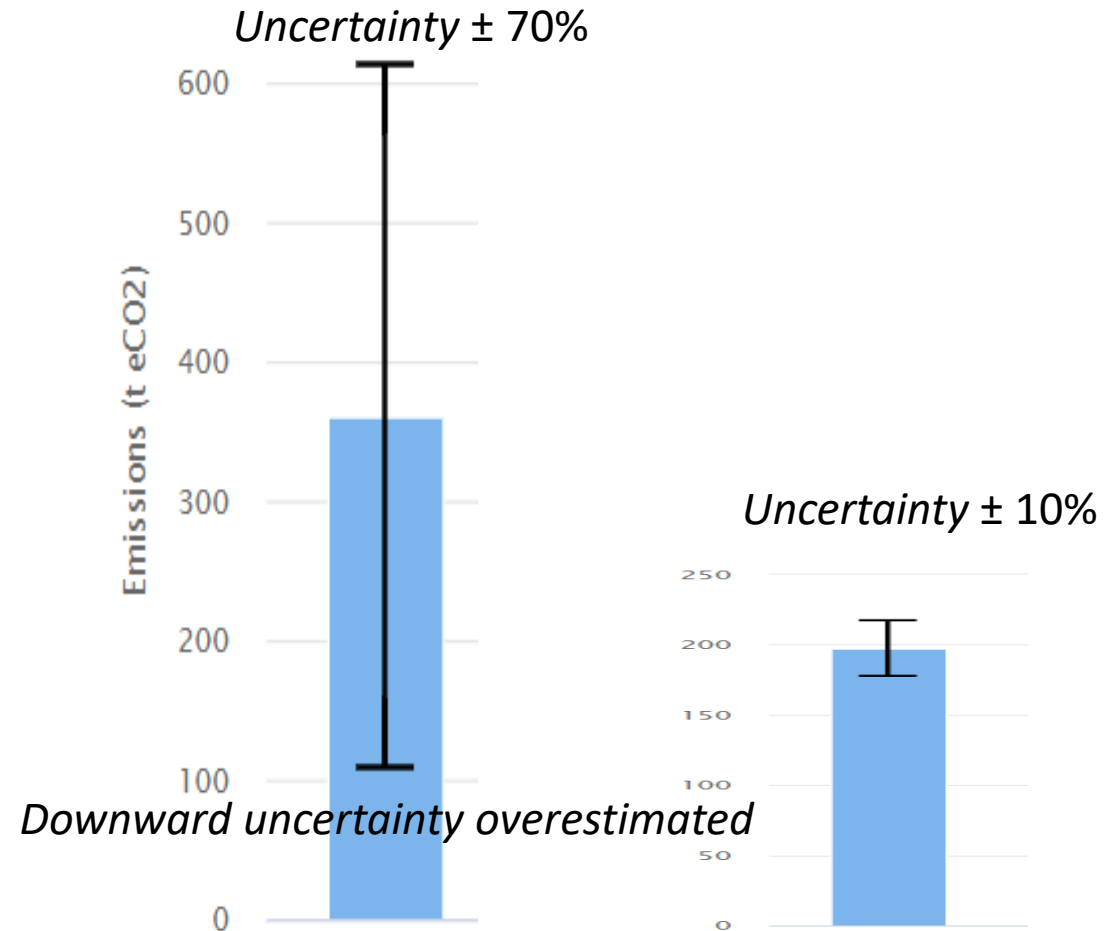
Taking into account the contrails or not

« For air travel, French regulations require that GHG emissions linked to combustion and upstream fuel be taken into account, without including emissions linked to condensation trails. The radiative forcing of these trails is significant, even if their precise extent is uncertain. For this reason, GES 1point5 allows you to include or exclude contrails in your calculations. »

Air Travel in 2022

With contrails

Without contrails



Methodology

Taking into account the contrails or not

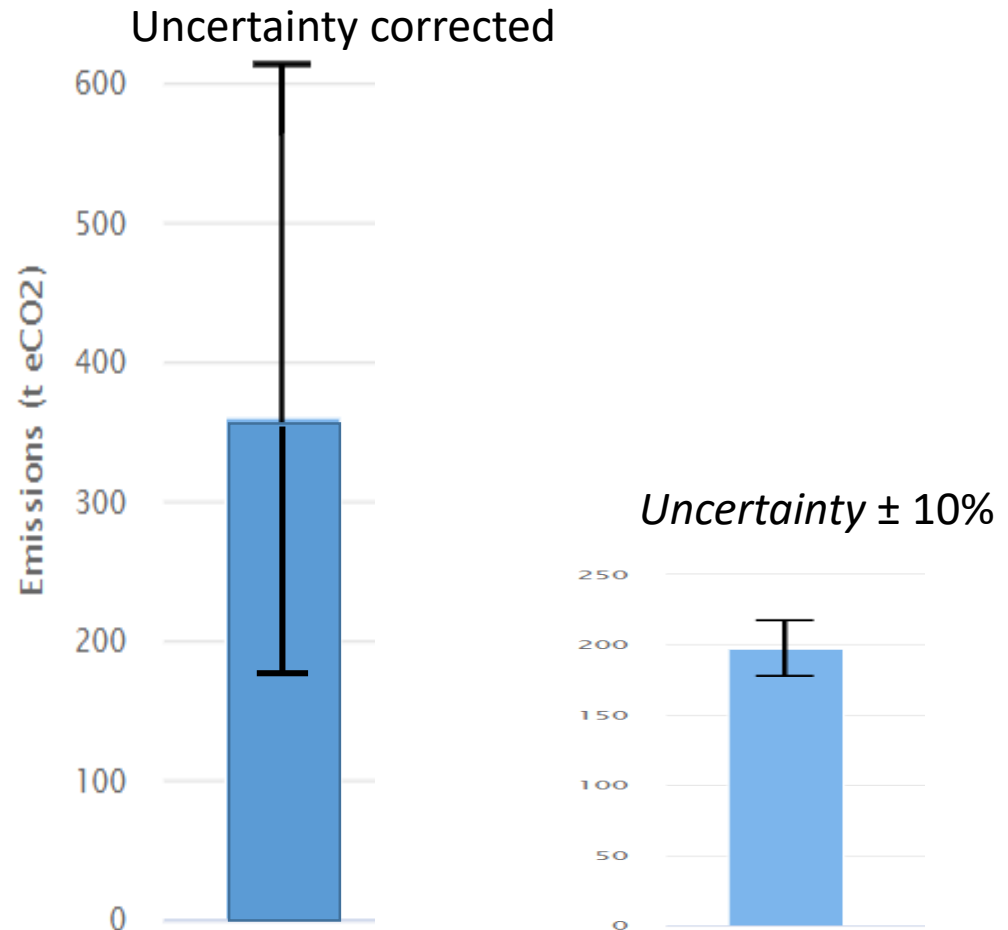
Air Travel in 2022

With contrails

Without contrails

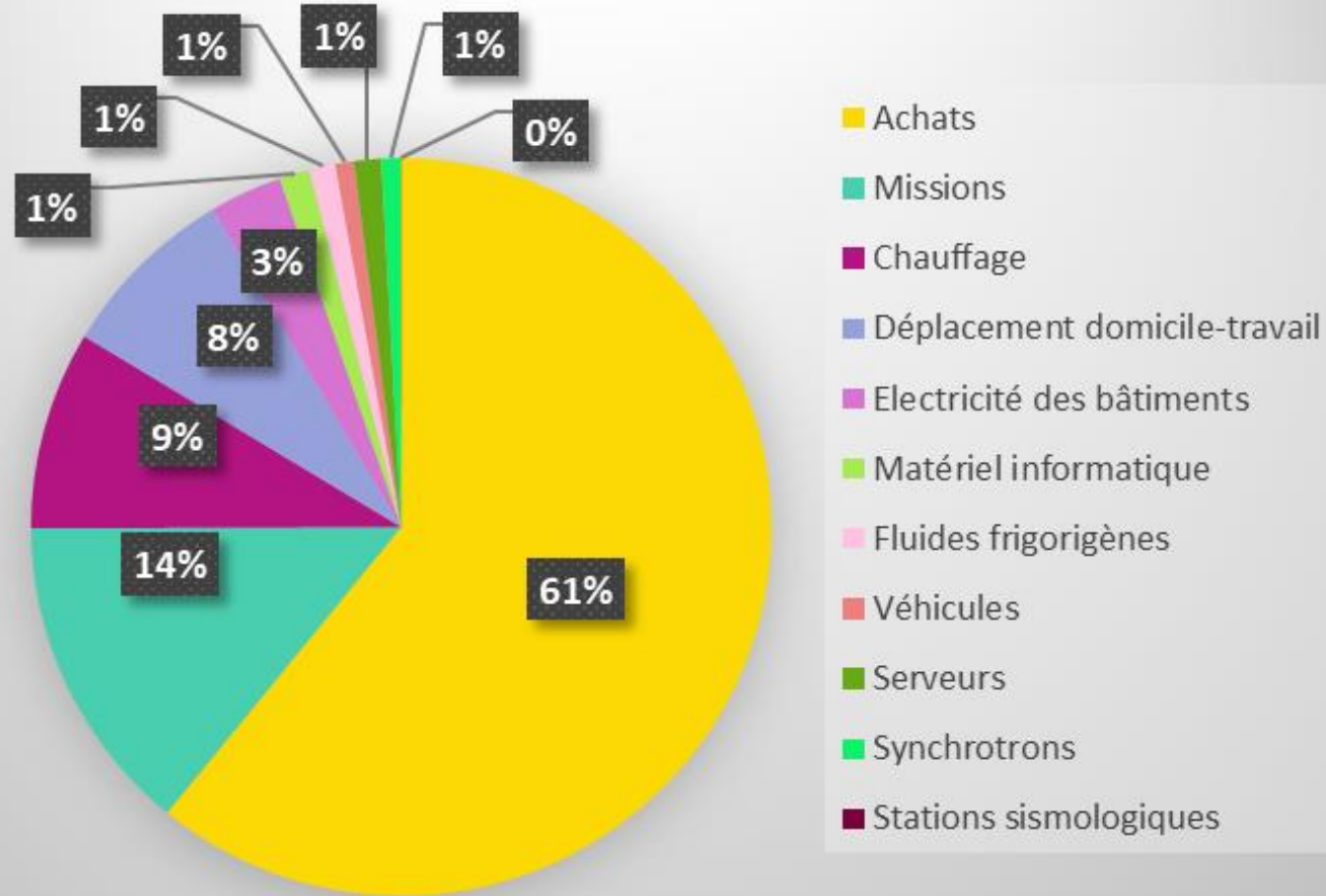
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- In this présentation:
Without contrails, unless specified
- In full report: with and without



Results for 2022

Emissions totales en 2022

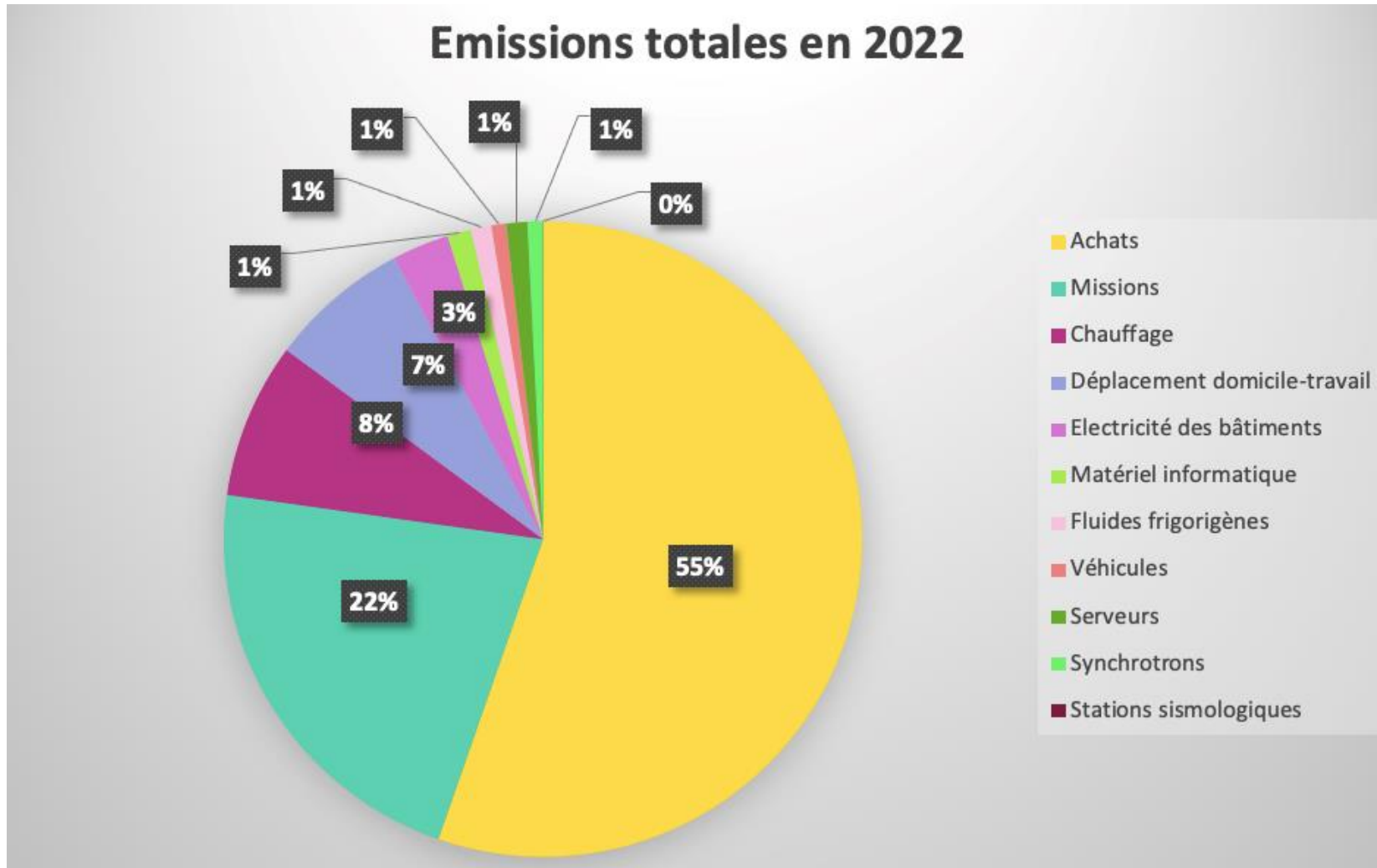


Without contrails

1615 tons eCO₂

5.3 tons eCO₂/person

Results for 2022



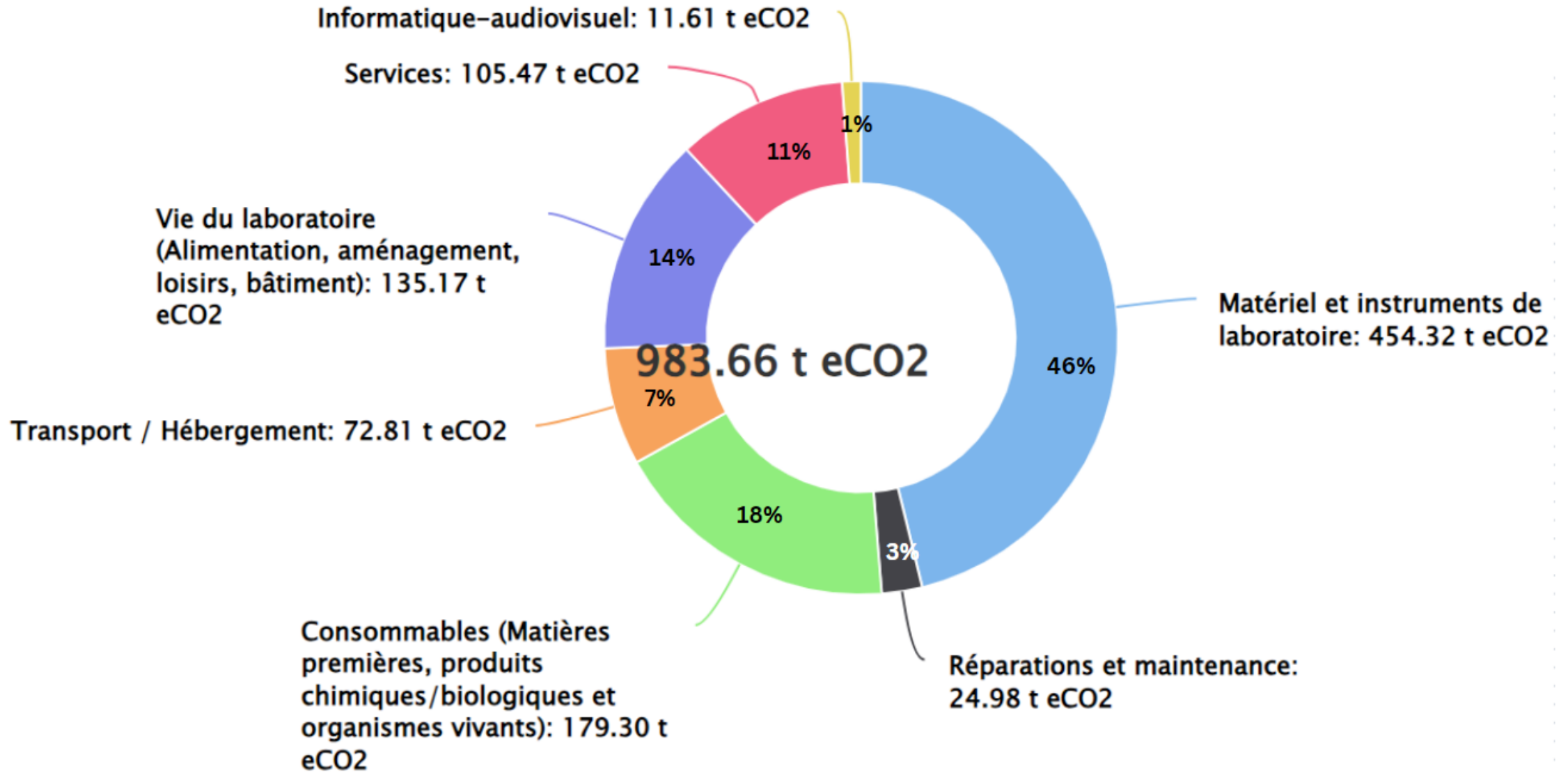
With contrails

1778 tons eCO₂

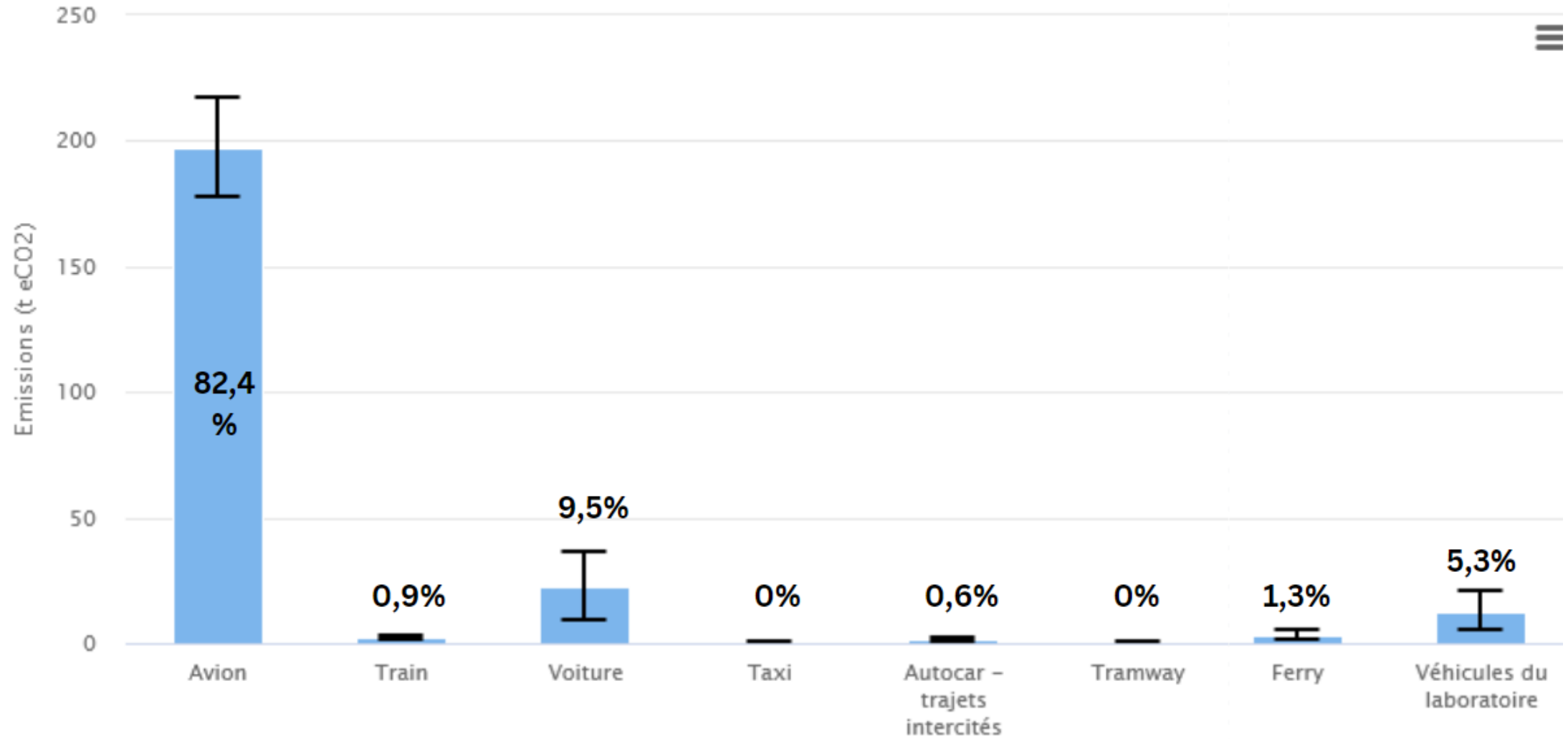
5.8 tons eCO₂/person

As a comparison, in 2017, without taking into account purchases: 4.2 tons eCO₂/pers

Purchases in 2022 (61% of the total)



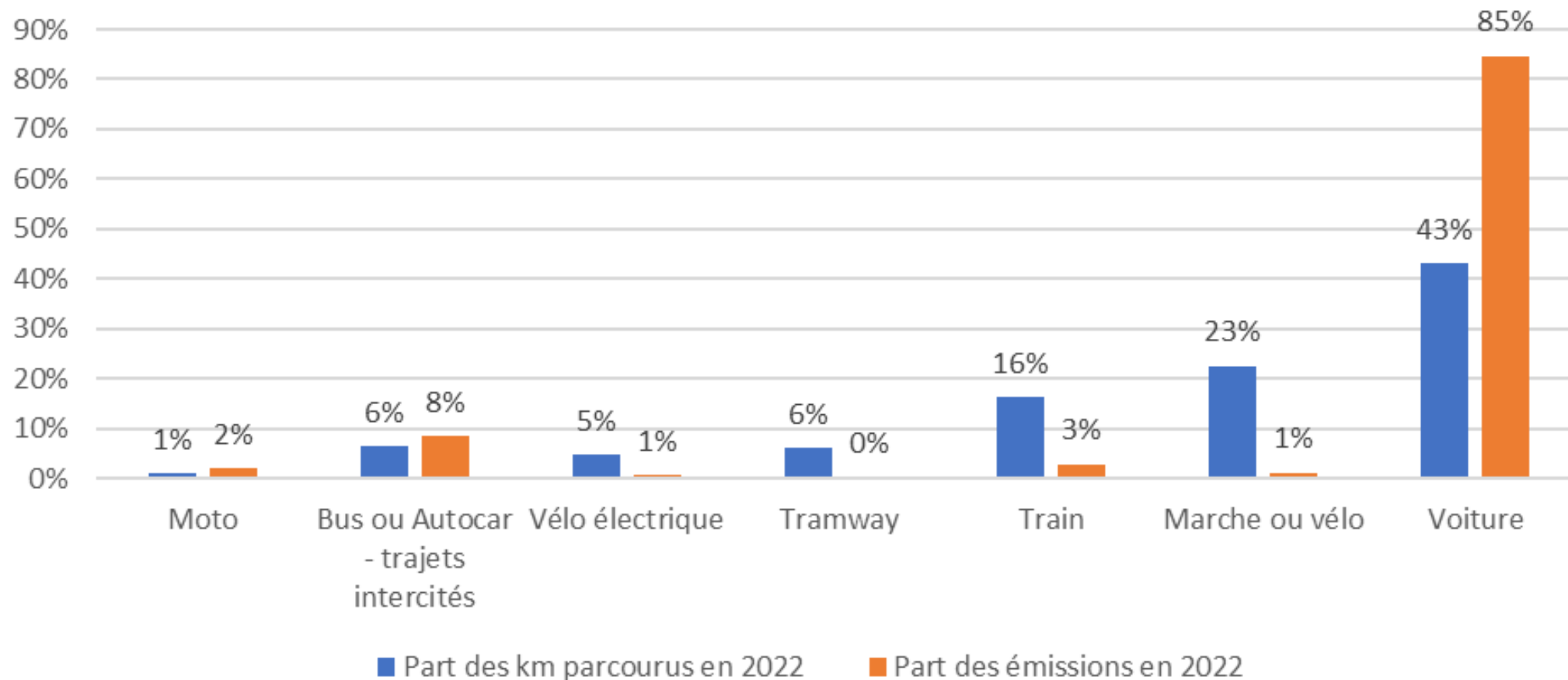
Travel in 2022 (14% of the total)



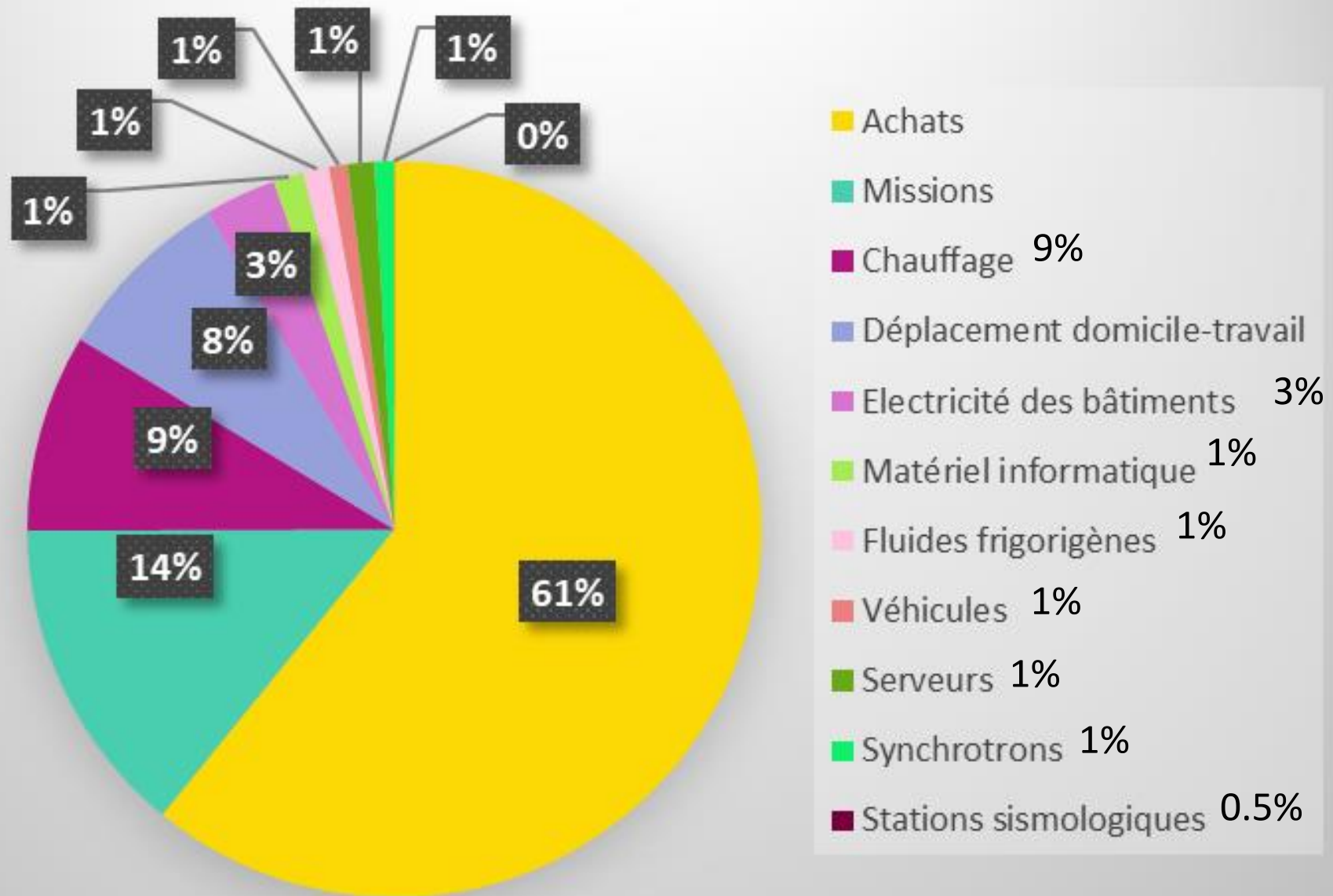
Commuting in 2022

8% du total, et environ la moitié des missions

Part de la distance parcourue et des émissions en 2022 en fonction du mode de déplacement (domicile-travail)



Other activities in 2022:



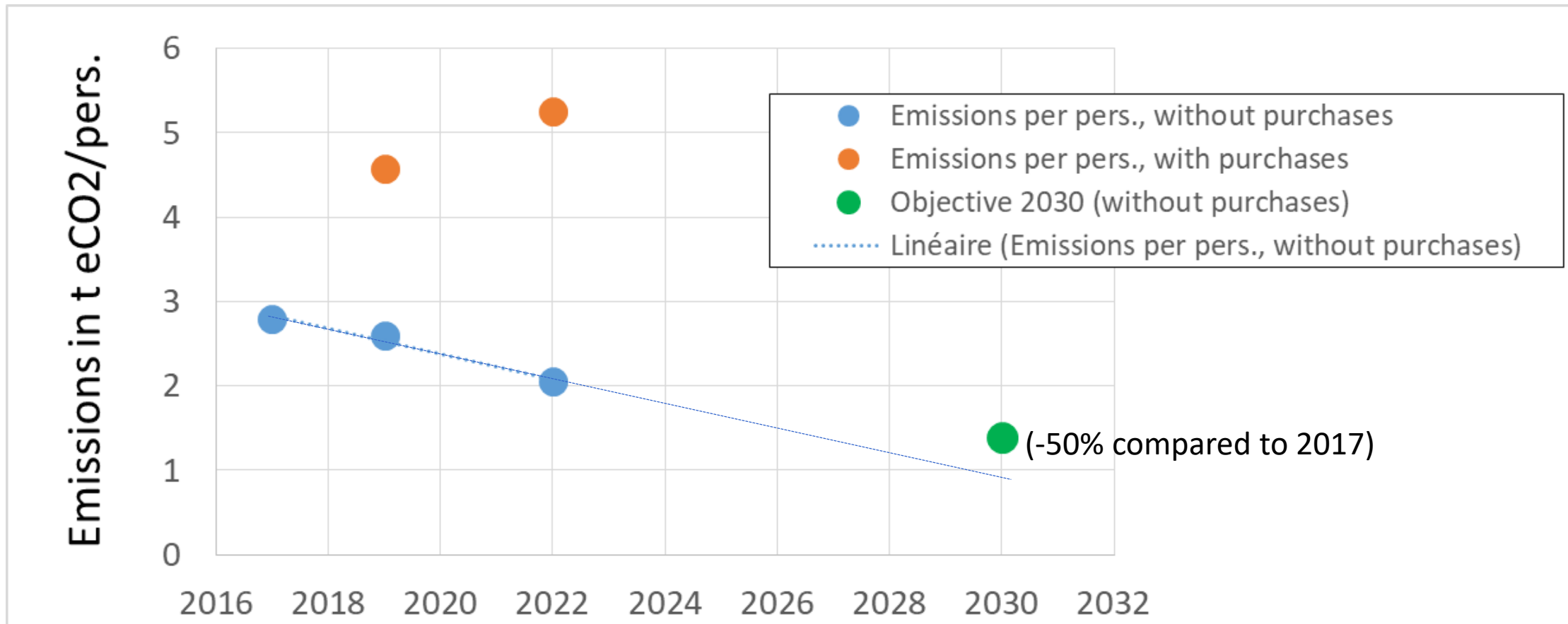
Evolution of emissions between 2017, 2019 and 2022

Year	Nb employees	Without purchases			With purchases		
		Emissions in t eCO2	Emissions in t eCO2/personne	Evolution in % par an	Emissions en t eCO2	Emissions in t eCO2/personne	Evolution in % par an
2017	253	706	2.8		-	-	
2019	277	720	2.6	-3.40	1269	4.6	
2022	307	632	2.1	-10.4	1615	5.3	+5.0

Excluding purchasing: an encouraging and growing decrease.

However, this decrease is offset by the increase in purchasing from 2019 to 2022.

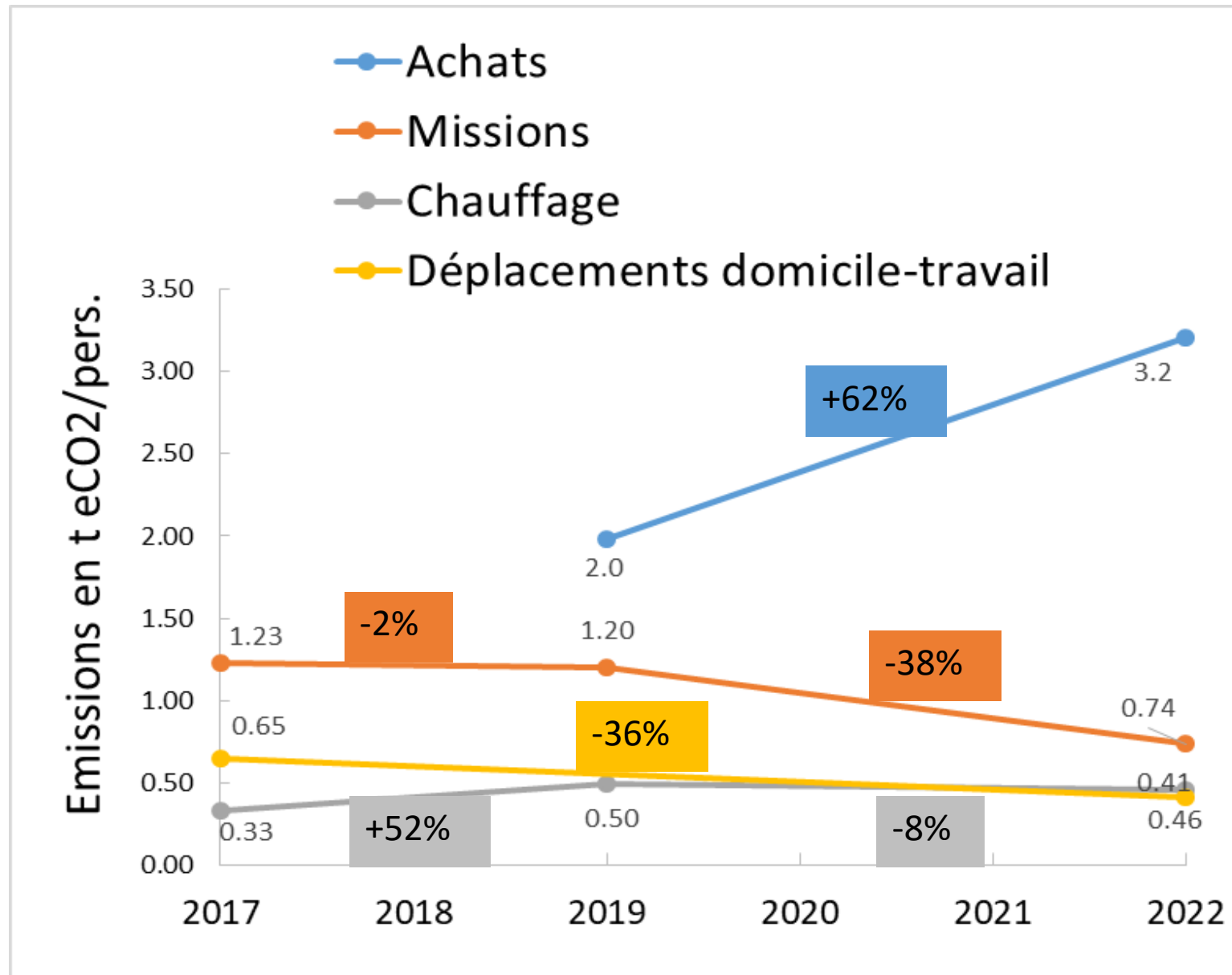
Evolution of total emissions between 2017, 2019 and 2022 and trajectory



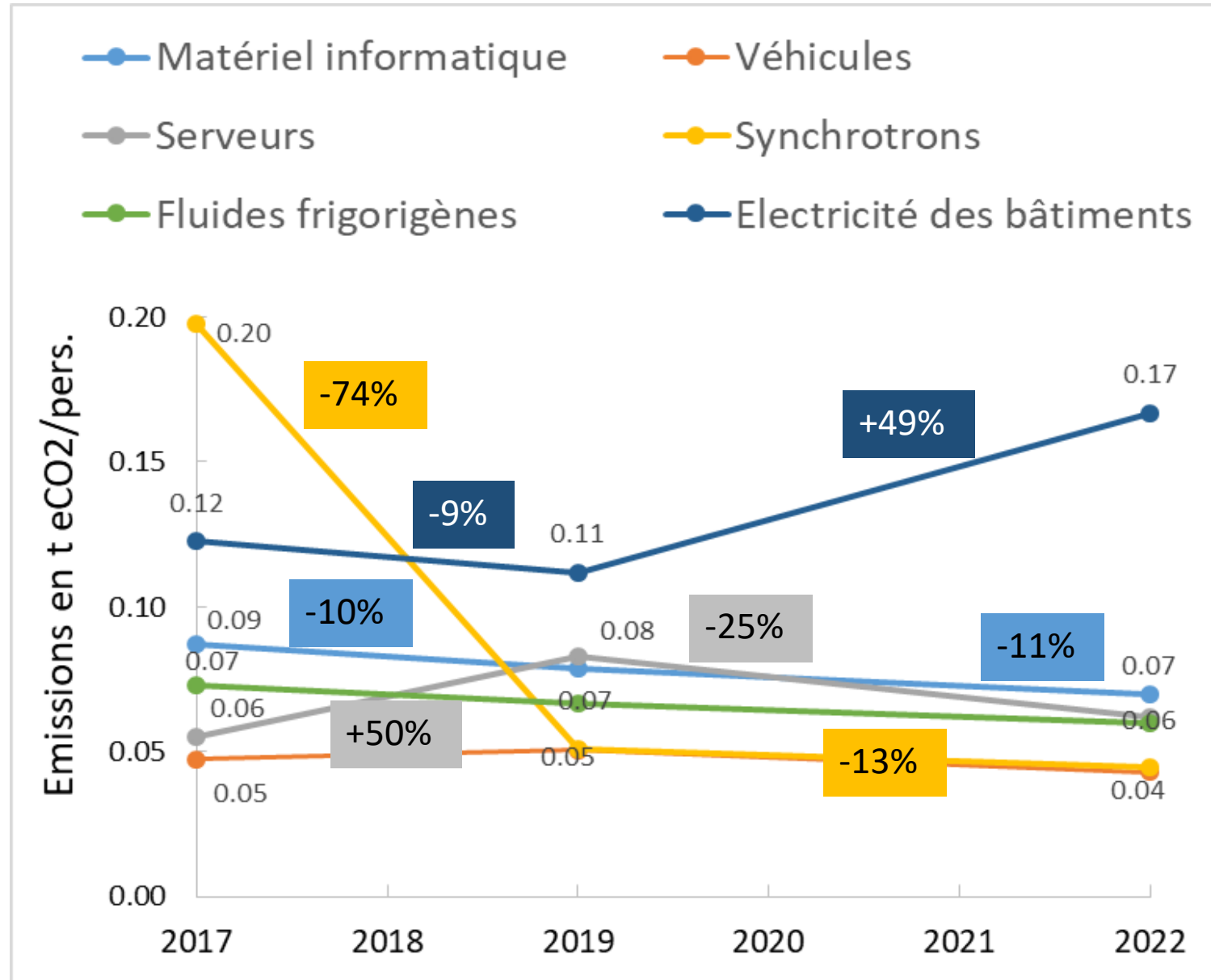
Purchasing aside: we're on the right track

BUT: The reduction in emissions is cancelled out by the weight of purchasing, which has increased from 2019 to 2022.

Evolution of emissions for each activity between 2017, 2019 and 2022

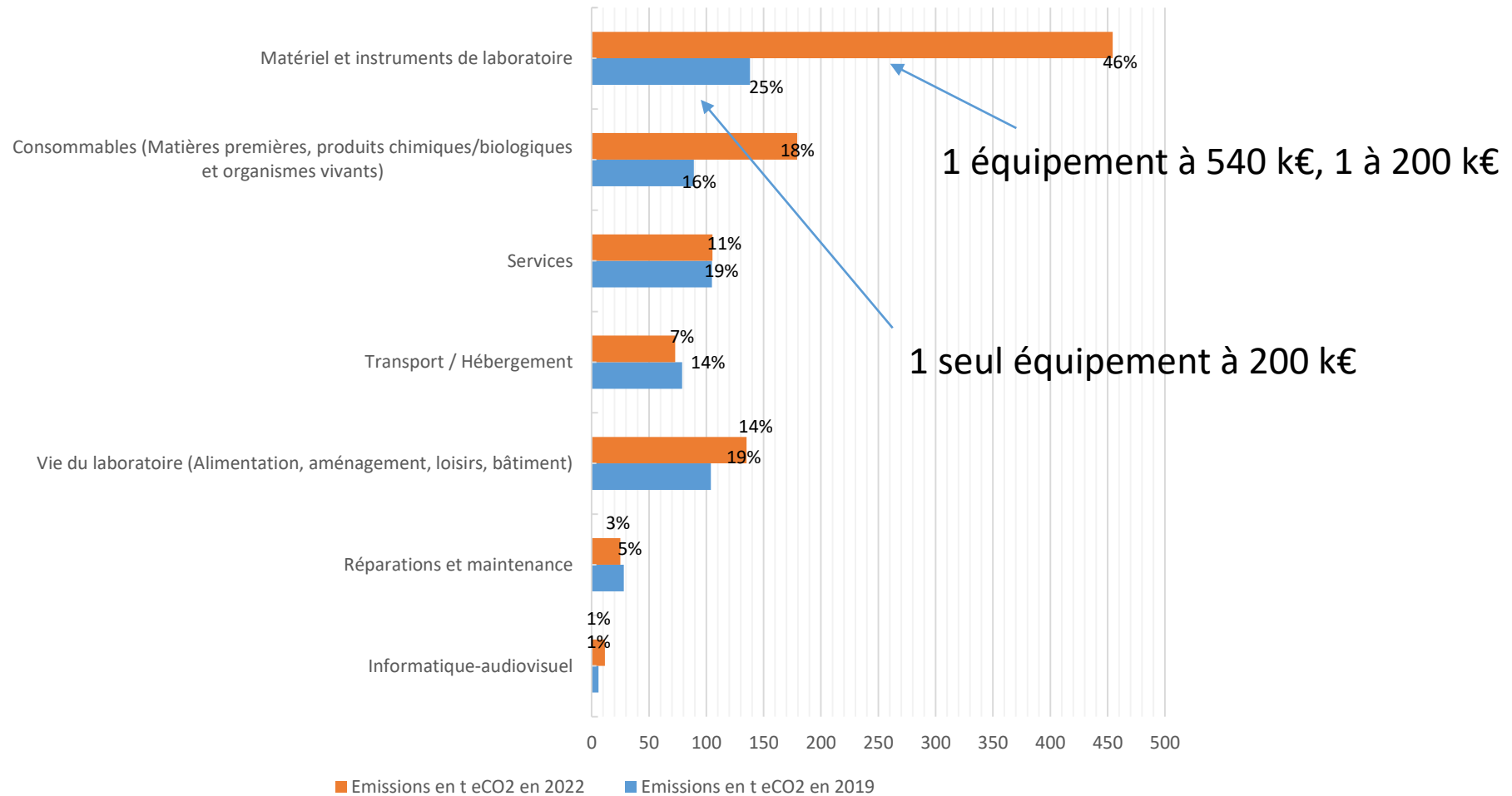


Evolution of emissions for each activity between 2017, 2019 and 2022



Comparison of purchases between 2019 and 2022 (+62%)

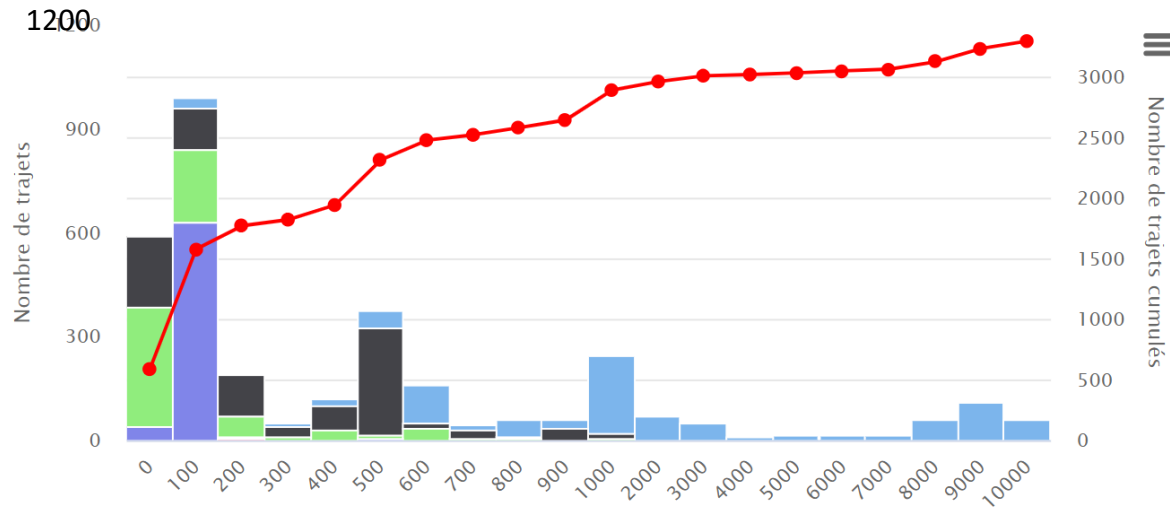
Comparaison des émissions en t eCO2 en 2019 et 2022



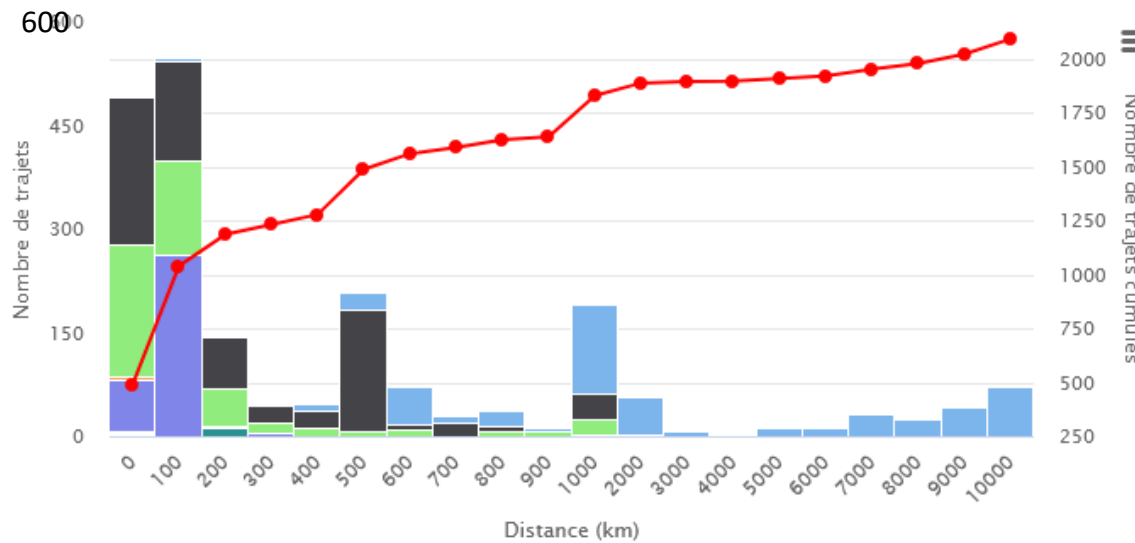
2022 is an above-average year for equipment purchases

Travel between 2019 and 2022

2019



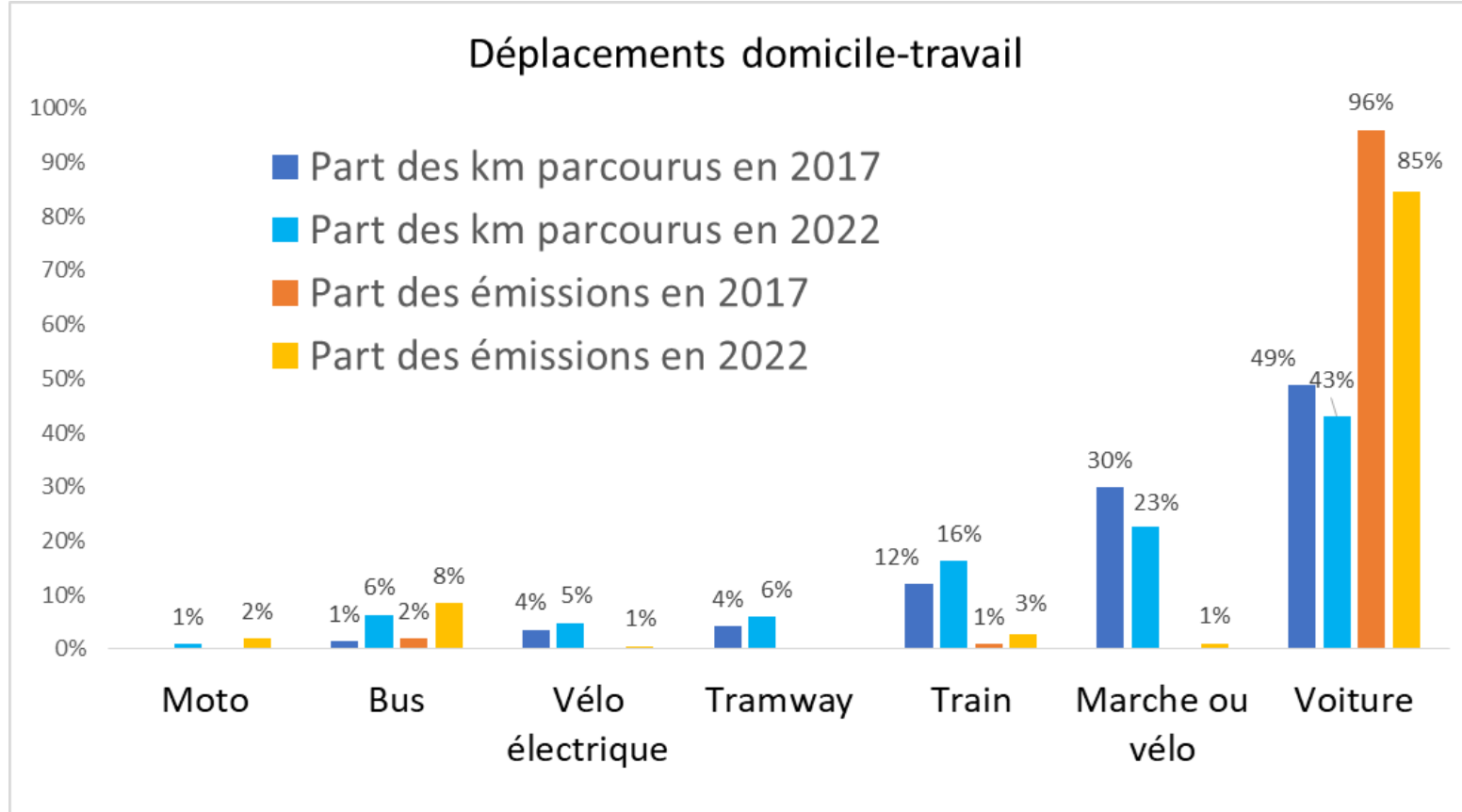
2022



- Avion
- Train
- Voiture
- Taxi
- Autocar – trajets intercités
- Tramway
- Métro
- Ferry
- Cumul des trajets

- Number of missions almost halved by 2
- Shift from car to train for journeys < 300 km
- Decrease in air travel in favor of rail for journeys of 1000-2000 km

Commuting (-36% between 2017 and 2022)



- Changing modes of transport: Fewer cars
More public transport
Walking and cycling down, but electric bikes up
- Decrease in commuting probably due to telecommuting

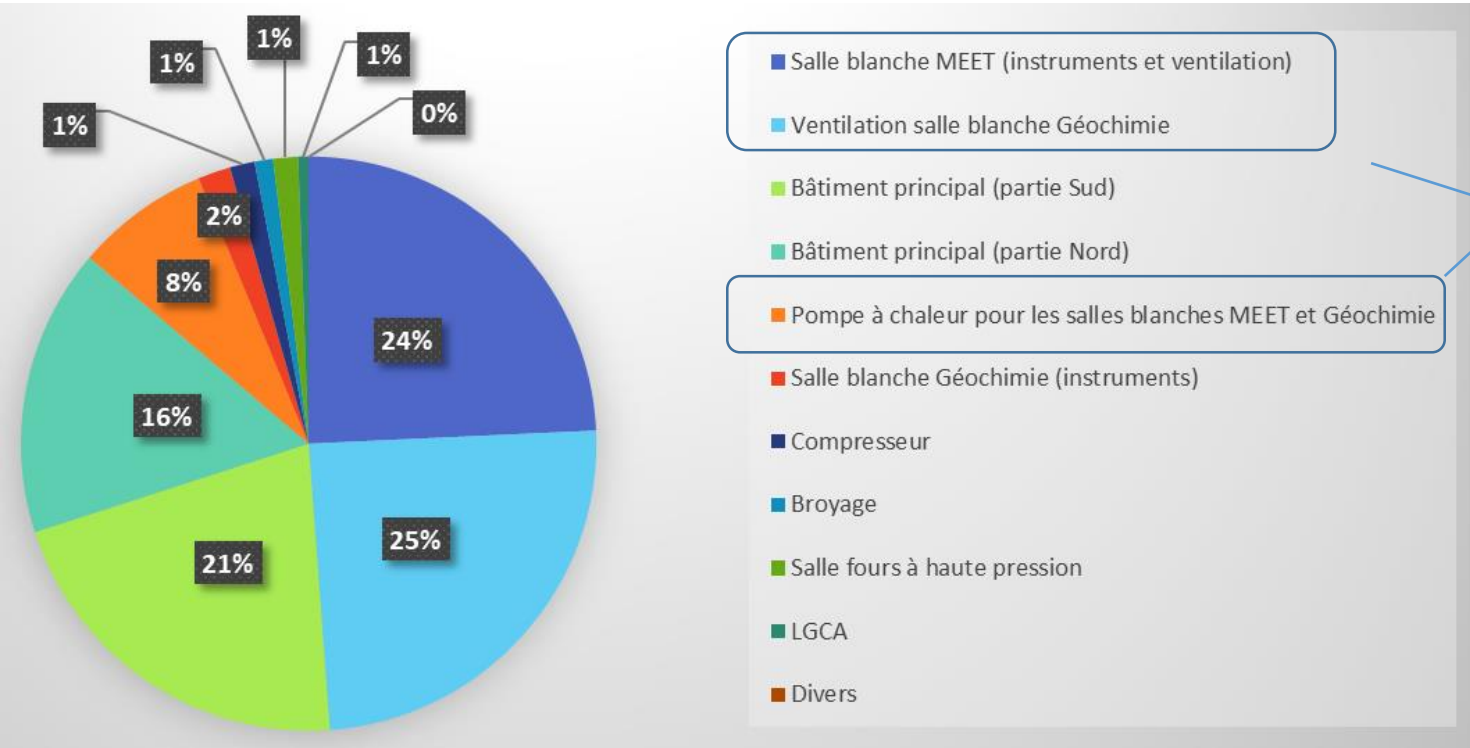
Synchrotrons (-74% then -13%)

- Different calculation method (all sessions taken into account in 2017, sessions as main propose only in 2019 and 2022).
 - Lower response rate in 2019 2022 Possible
- => Possible overestimate in 2017, underestimate in 2019 2022**
- Effect of synchrotron closure => more sessions in 2017
 - Better planning of requests?

Electricity consumption buildings (+49% between 2019 and 2022)

Strong increase mainly due to 67% increase for OSUG C

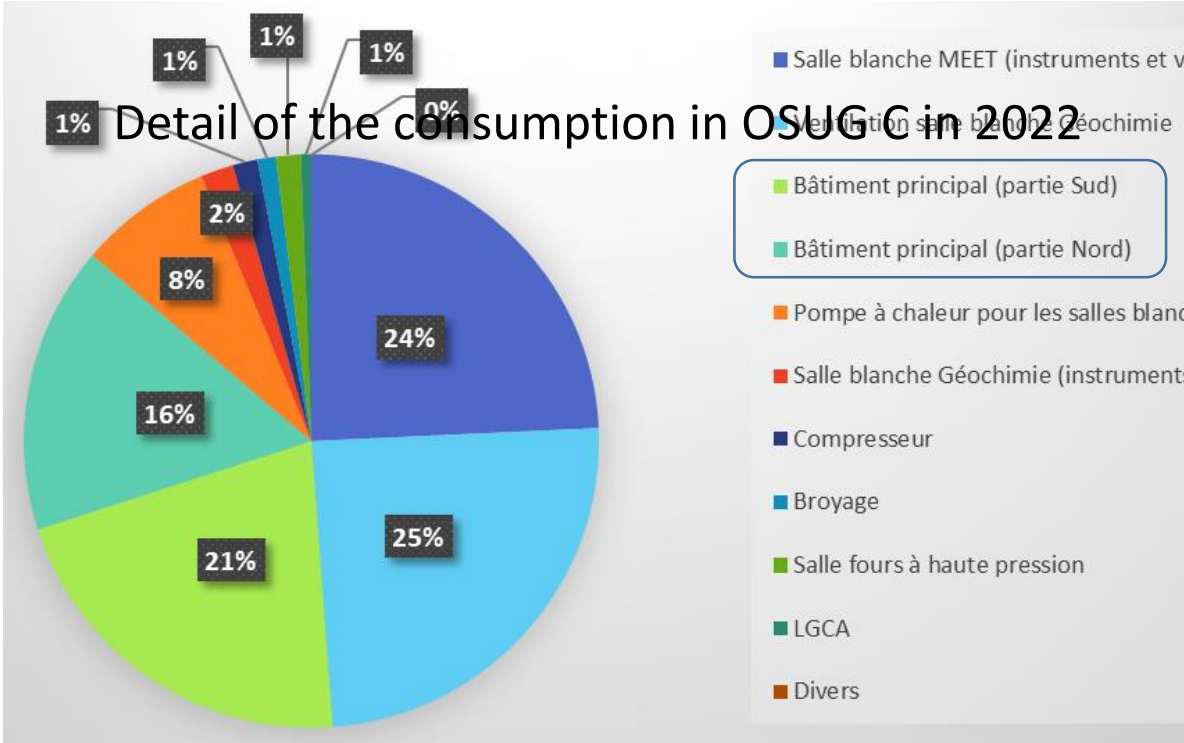
Detail of the consumption in OSUG C in 2022



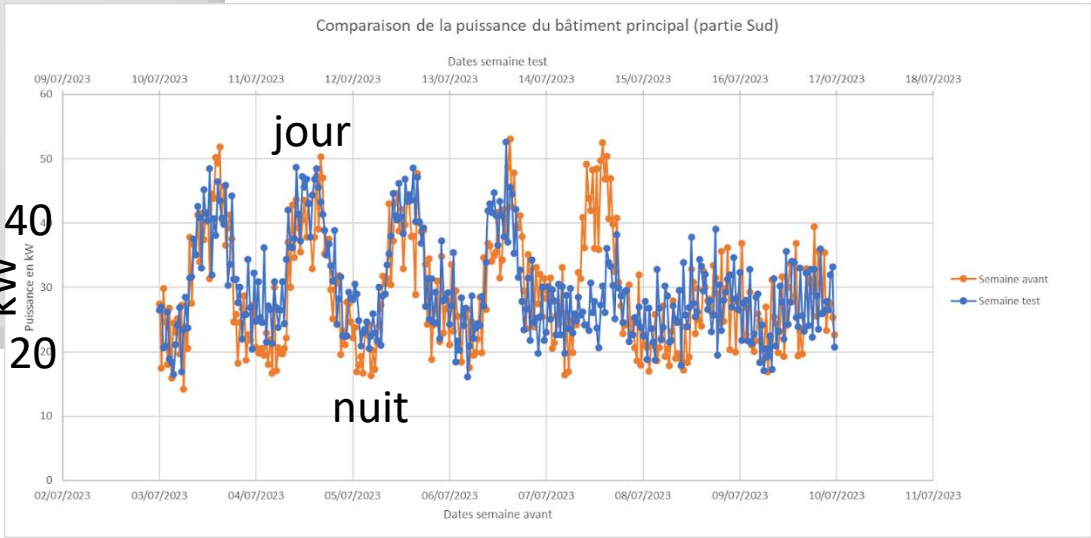
57% air extractions (7000 m³/h), and heating/filtrating incoming air

Ideas for discussion:
Reduce heating, regulate heating?
Extract less at certain times of the year?

Electricity consumption buildings (+49% between 2019 and 2022)



37%. Offices + other experimental rooms

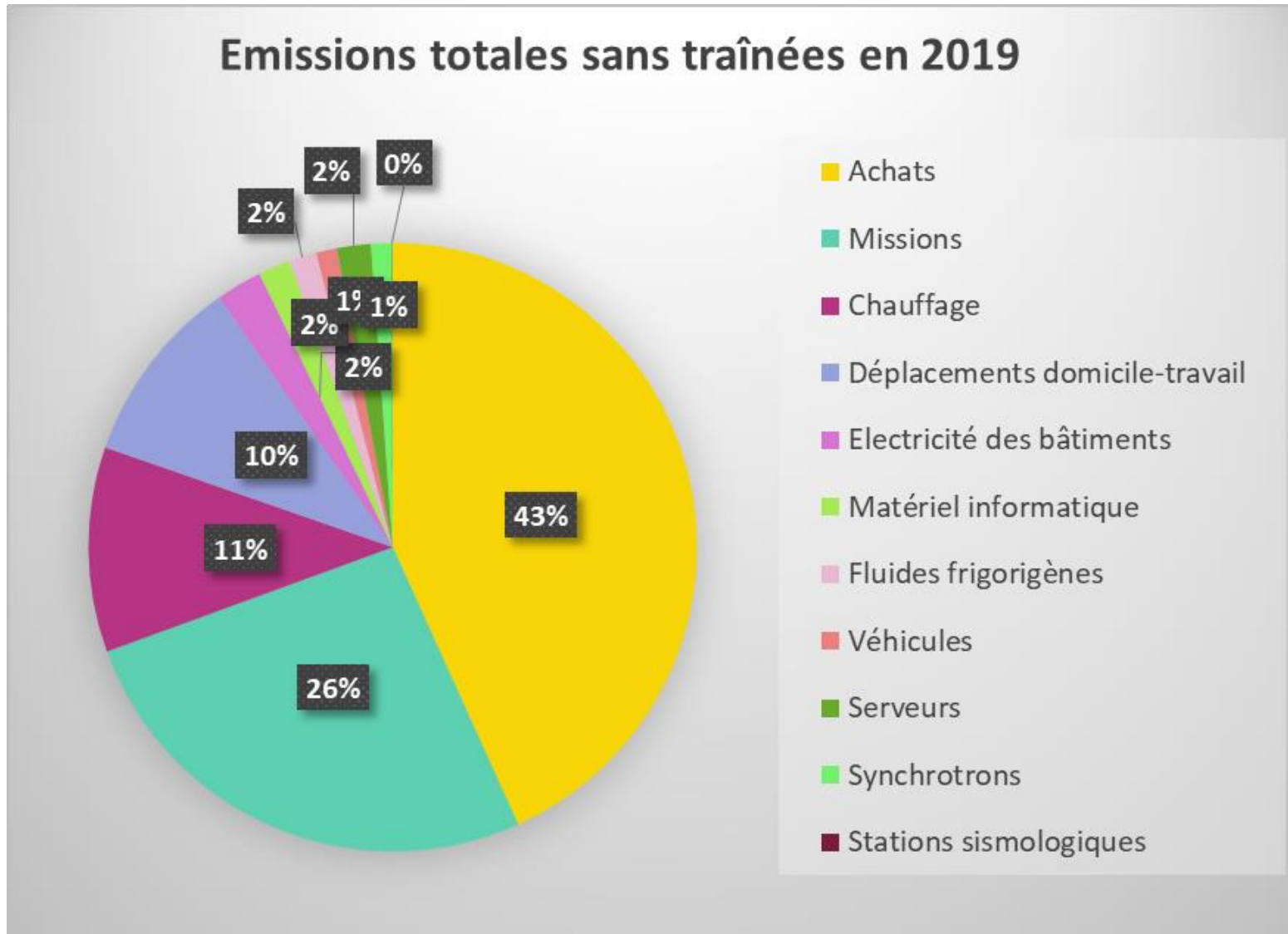


Ideas for discussion:
Switch off more equipments at night ?

Full GHG assessment (in french)

<https://www.isterre.fr/french/l-institut/engagement-eco-responsable/>

Resultats for 2019



Without contrails

1269 tons eCO₂

4.6 tons eCO₂/person

Commuting: results of questionnaire 2022 was used

Evolution of emissions due to commuting

Année	Emissions in t eCO2	Emissions in t eCO2/person
2017	164	0.65
2022	127	0.41