

Green Office report

UG Flight Travel 2016-2022

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Commissioned by and in cooperation with the Green Office

Analysis of travel data 2016-2022

1. Introduction

Data of business travel of the University of Groningen (UG) have been recorded in annual reports of the travel agent since 2016. The data files that are provided by the travel agent contain:

- The departure and destination of flights;
- The total distance of the flight;
- The CO₂ emissions related to the flight.

Regarding the last point, it is unclear how the travel agent calculated this. It is also not clear whether or not the emissions include only the emissions of carbon dioxide, or if it encapsulates all emissions (and hence represents the emissions in CO₂-equivalent). Lastly, it is unknown if different emissions for business and economy class flights are accounted for. Since business class seats take up more space on an aeroplane, they cause the plane to transport passengers with lower efficiency, leading to higher emissions per passenger. Business class tickets cause 1.3 to 4 times as much emissions as economy class [1], [2]. For the sake of transparency and consistency, we will therefore calculate the CO₂ emissions from flights by using the same emission factors that are used in the CO₂ footprint programme of the UG. These are listed in the table below.

Type	Distance	Emission factor (gCO ₂ -e/km)
Short	< 800 km	300
Middle	800 - 2500 km	200
Long	> 2500 km	150

Table 1. Flight distance categories and emission factors

Analysis of the flight data in the first place is done because the total emissions due to business travel by aeroplane need to be recorded to calculate the yearly CO₂ footprint of the University. It is also used to estimate the impact the newly updated travel policy of the UG will have in terms of emission reduction (section 4), and to calculate a CO₂ budget for each faculty/department (section 5).

The data files provided for each year do not all contain the same data. For the years 2016 and 2020, only a summarised version is available, where only the total number of flights, flight distance and emissions are reported. For other years the file contains information on each individual flight that was booked. In this category, 2018 stands out as it only lists the distance and emission of each flight. The remaining years (2017, 2019, 2021 and 2022) have the “full” information of each flight and also mention through which department the flight was booked. In parts of this analysis, only the years 2017, 2019 and 2022 are treated, because of the reasons mentioned above. 2021 is omitted in these cases due to its covid-related abnormality.

2. Results - University

Figures 1 and 2 below show the total flight distance and CO₂ emissions of all flights between 2016 and 2022 combined. Clearly visible is the significant decrease in flights in the years 2020-2021, which is a direct consequence of the global covid pandemic.

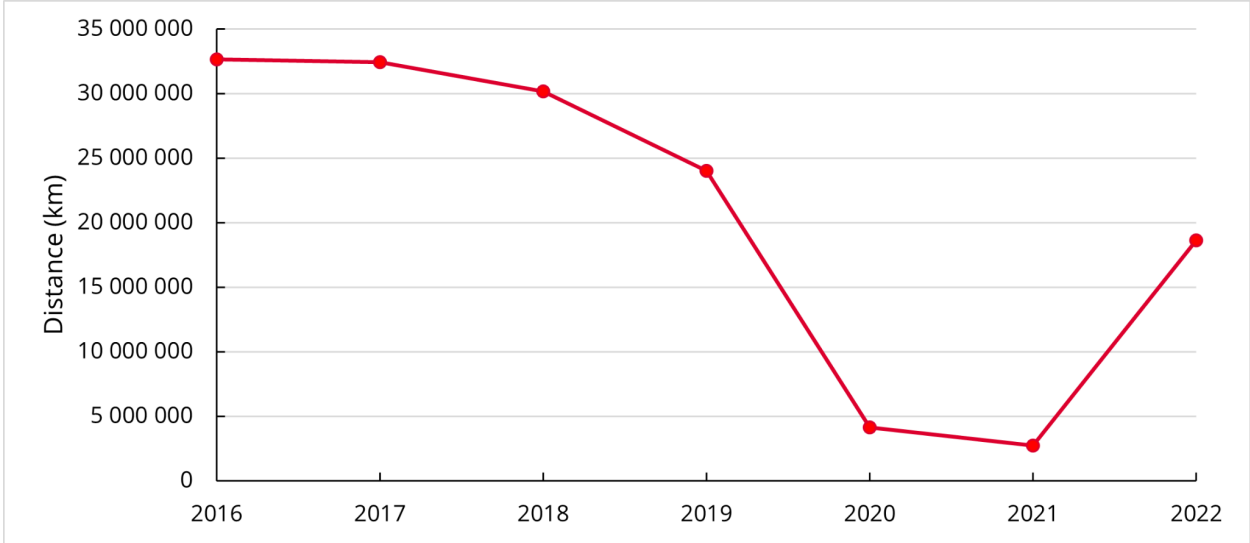


Figure 1. Total distance flown by UG

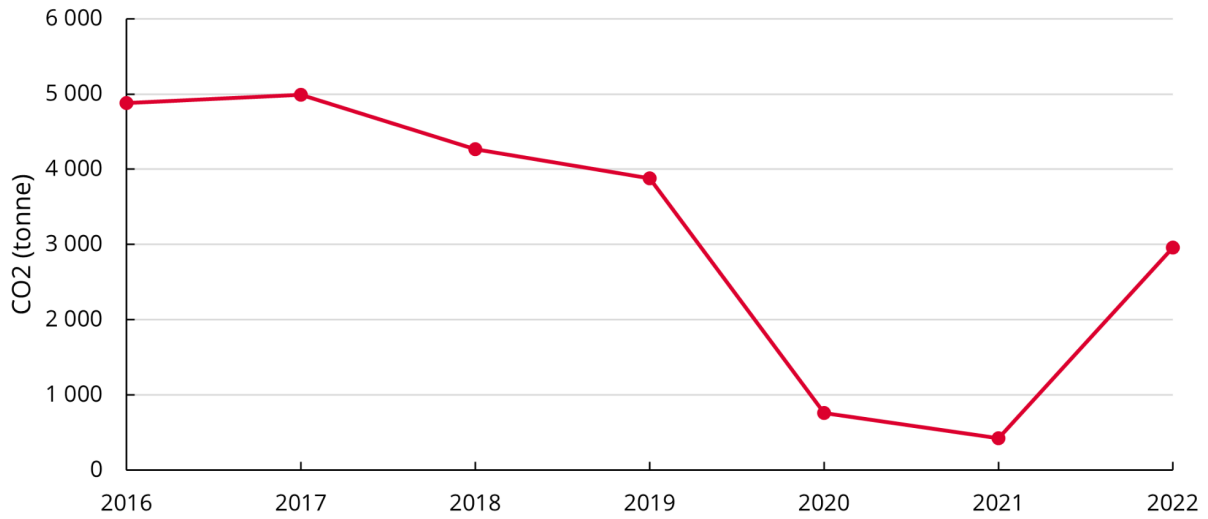


Figure 2. Total CO₂ emissions due to UG flight travel

Table 2 shows the distribution of short, middle and long distance flights in terms of the number of flights, the distance and the emissions. From this, we can see that:

1. The short flights (i.e. the flights that are affected by the UG business travel policy) cause less than 10% of the total emissions;
2. The long flights, which account for ~30% of the total number of flights, contribute to approximately 70% of the total emissions.

	Number	Distance	Emissions
Short	28.1%	4.9%	9.4%
Middle	42.2%	18.1%	22.4%
Long	29.8%	77.0%	68.2%

Table 2. Distribution of different flight types over the total number of flights, distance and emissions

Table 3 below shows the top-10 most visited countries in 2017, 2019 and 2022.

	2017		2019		2022		Total	
1	United States	670	United Kingdom	603	Italy	477	United States	1542
2	United Kingdom	656	United States	519	United States	353	United Kingdom	1527
3	China	515	Italy	459	Spain	327	Italy	1318
4	Italy	382	Spain	286	United Kingdom	268	Spain	966
5	Spain	353	Germany	198	Portugal	221	China	714
6	Germany	226	China	185	Greece	177	Germany	542
7	France	218	France	166	Thailand	139	France	495
8	Switzerland	213	Switzerland	153	Ireland	120	Portugal	495
9	Denmark	150	Philippines	149	Germany	118	Switzerland	463
10	Austria	146	Portugal	145	France	111	Greece	384

Table 3. Most visited countries per year and the number of trips taken to that country

3. Results - Faculty and Departments

Figure 3 shows the total flight distance per faculty or department¹ and Figure 4 shows the distance divided by the total number of employees of that faculty or department (expressed in FTEs). An overview of the number of FTEs (permanent appointments) for each faculty/department was requested at the HR-department of the University. Note that for Campus Fryslân, no data is available for 2017, since the faculty did not exist yet in this year. Both figures are sorted in ascending order of the 2022 data. A list of the used abbreviations can be found in the appendix.

¹ The Bureau of the University also includes the KNIR and the Board of the University.

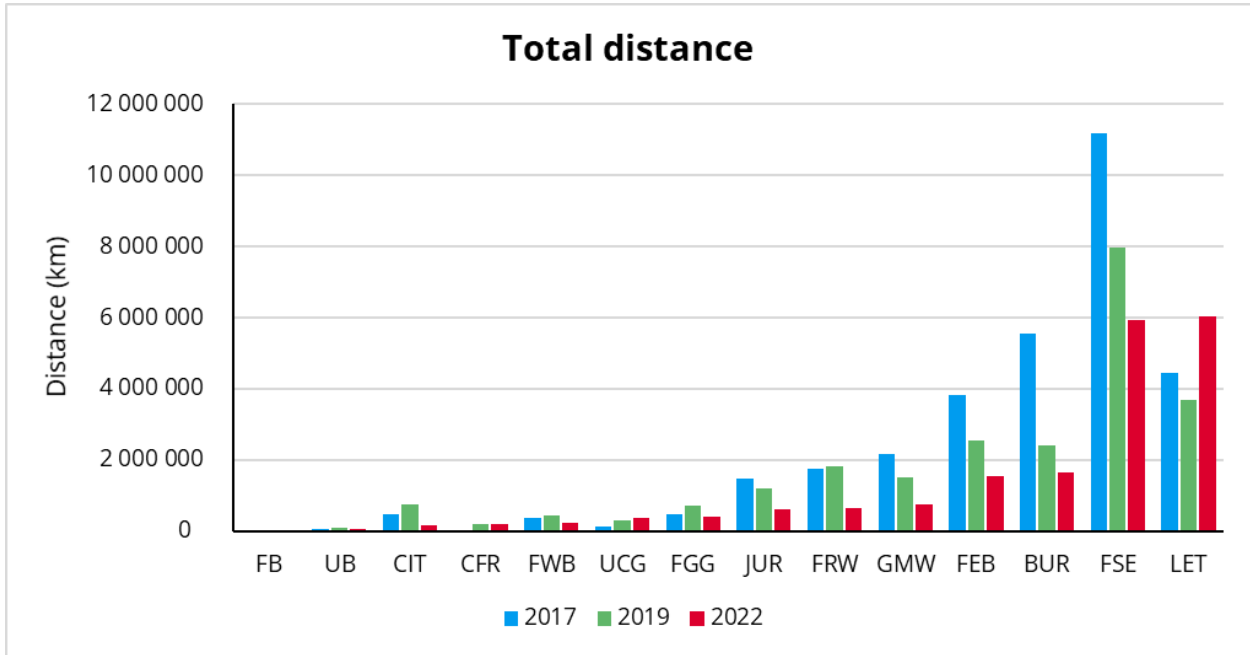


Figure 3. Total flight distance for each faculty/department

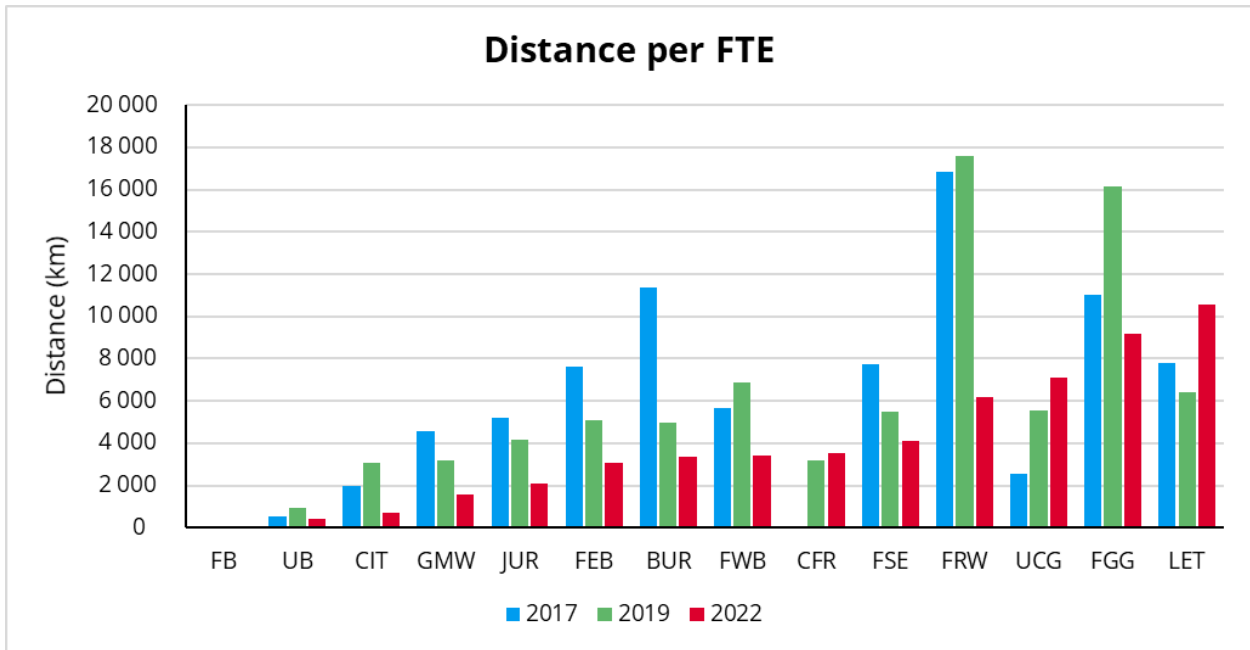


Figure 4. Flight distance per FTE for each faculty/department

4. Impact travel policy

In 2019, the University launched a new business travel policy, in which was stated that business travel can no longer be done by aeroplane to and from locations which are within a distance of 500 km and/or can be reached by train within 6 hours. In 2023, this policy was updated to a distance of 800 km and/or 9 hours of travel time [3]. To assess what the effect has been of the initial policy between 2019 and 2022, and to estimate what the effect of the new policy will be, all European flights leaving from the Netherlands between 2017 and 2022 have been analysed. For all these European destinations (200+), the travel distance from Groningen and the shortest possible travel time by train were collected. When possible, this was done with NS International, otherwise Google Maps was used. For each destination it was then assessed whether or not a trip to this destination would be allowed by aeroplane in both the old and new travel policy.

On average, the old policy (500 km, 6 h) targets 1.1% of the total number of flights between 2017 and 2022. Since the implementation of this policy in 2019, 100 flights have taken place which should not have been allowed within the constraints of the policy. The majority of these “illegal” flights have been taken in 2019 itself (81%).

The new, extended travel policy (800 km, 9 h) will eliminate 6.5% of the total number of flights. On average, this new policy will lead to a reduction of 2.5% of the total CO₂ emissions of business travel within the University.

	% of flights eliminated	CO ₂ reduction (%)
Policy 2019-2021	1.1%	0.4%
Policy 2022 onwards	6.5%	2.5%

Table 4. Comparison between old and new business travel policy

5. CO₂ budget

In the [2021-2026 Sustainability Roadmap of the University](#), a target was set to reach 30% reduction of CO₂ emissions due to business travel. In order to achieve this goal, each faculty/department could get their own CO₂ budget for the following three years. This budget is set based on the average emissions of 2019 and 2022. This average number is then decreased in steps, such that 30% reduction is reached at the end of 2026.

6. References

- [1] J. Ciers, A. Mandic, L. D. Toth, and G. Op 't Veld, "Carbon Footprint of Academic Air Travel: A Case Study in Switzerland," *Sustain. Sci. Pract. Policy*, vol. 11, no. 1, p. 80, Dec. 2018.

- [2] S. van Ewijk, S. Chaudhary, and P. Berrill, "Estimating passenger emissions from airfares supports equitable climate action," *Environ. Res. Lett.*, vol. 18, no. 2, p. 024013, Jan. 2023.

- [3] "Sustainable business travel policy," 2023.
<https://www.rug.nl/about-ug/profile/facts-and-figures/duurzaamheid/projecten/nieuw-zakelijk-reisbeleid?lang=en> (accessed Apr. 12, 2023).

7. Appendix

Appendix A: List of Abbreviations

BUR	Bureau of the University*
CFR	Campus Fryslân
CIT	Center for Information Technology
FB	Facility Management*
FEB	Faculty of Economy and Business
FGG	Faculty of Theology and Religious Studies (from Sep 2023: Fac. of Religion, Culture and Society)
FRW	Faculty of Spatial Sciences
FSE	Faculty of Science and Engineering
FWB	Faculty of Philosophy
GMW	Faculty Behavioural and Social Sciences
JUR	Faculty of Law
LET	Faculty of Arts
UB	University Library
UCG	University College Groningen

Table 5 Abbreviations of faculties and departments

*From October 2022, the Bureau and Facility Management have merged and have become University Services. Since data have been collected for these separate departments for the period 2016-2022 the choice was made to report these data accordingly. From now on (2023), data will be collected for University Services and represented as such.