






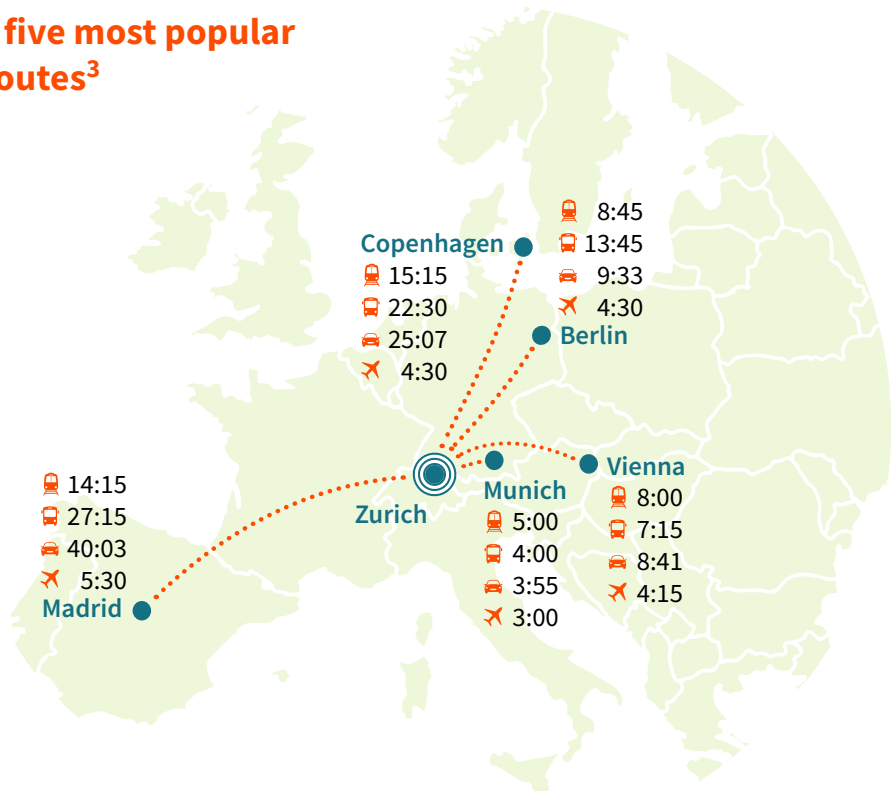
Factsheet

Sustainable Student Mobility (Zurich)

Student exchanges are a valuable cultural and personal experience, but traveling can come with a carbon cost: A flight from Paris to Rome generates around 0.25 tons of greenhouse gas (GHG) emissions per person.¹ This is 1/6 of the annual per capita GHG emission budget which would allow us to reach the targets of the Paris Climate Agreement.² By making informed travel decisions and using sustainable travel options, students can reduce the environmental impact of their exchange and contribute to a greener and more conscious mobility between universities.

Travel Times for the five most popular Student Exchange Routes³

-  Train
(incl. transfer)
-  Bus
(incl. transfer)
-  Car
(incl. rest periods)
-  Plane
(incl. check-in & transfer)
-  Main station
city center



Traveling by plane may seem the fastest option, yet considerable time is often lost to check-in, security, transfers to and from the airport – time that could be used more efficiently on a train. On some routes, trains are impressively fast, with travel times close to flying, such as Zurich–Munich. However, other routes, like Budapest–Lisbon, may take much longer and require multiple train changes. In most cases, buses offer a cost-effective alternative with less need for changes and transfers.

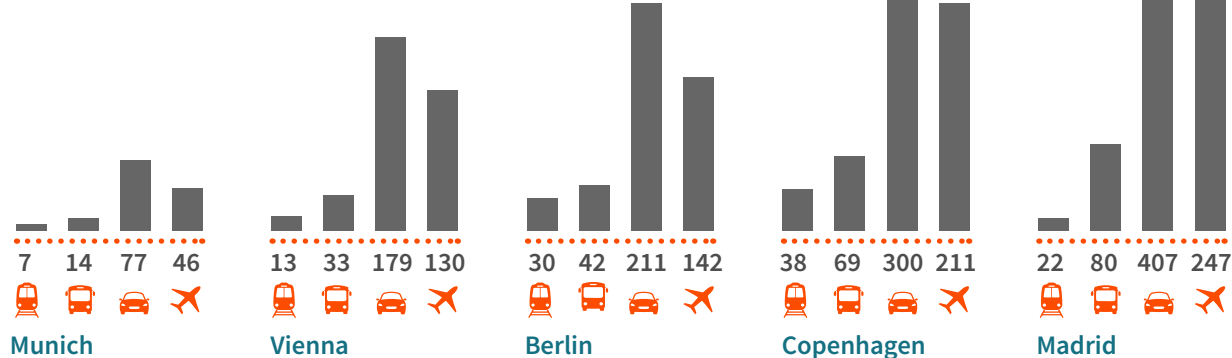
Notes: Travel times were calculated using Rome2rio⁴ for the randomly selected date of October 24, 2024, assuming travelers choose the fastest routes and direct flights. Times include real-time data, schedule estimates, and average transit times. For car travel, 30-minute breaks were added every 3 hours, with a 10-hour overnight break every 8.5 hours. For train and bus travel, it was assumed travelers sleep en route. The dotted route on the map does not represent the exact travel route.

- 1 Atmosfair.de 1 (↗): retrieved on 11.11.2024
- 2 Atmosfair.de 2 (↗): retrieved on 11.11.2024
- 3 Travel routes from exchange students collected by the Charles University of Prague (2021–2023), University of Porto (2021–2023), University of Zurich (2018–2024) and EU Data Collection of student exchanges (2021–2023)
- 4 Rome2rio.com (↗): retrieved Sept. – Oct. 2024

GHG Emissions from different Transportation Modes on the five most popular Student Exchange Routes.⁵

■ kg CO₂e/pP per journey (one way)

From Zurich to



The distance traveled and the choice of transport mode are key factors in reducing carbon emissions from traveling. Flying generates – depending on the country of train travel – between 5 to 42 times⁶ more emissions than train travel. The GHG emissions of train travel can vary depending on the electricity mix of the country one travels through. Additionally, occupancy rates and the proportion of diesel-powered trains influence overall emissions⁷. In these cases, buses may offer a comparatively lower-emission alternative. The occupancy rate of the car plays a key

role in determining the GHG emissions per person when traveling by car. Carpooling with a second person halve the emissions per traveler.

The journey itself can become a valuable part of the stay abroad period, where one can experience Europe, its landscape and people. Therefore, the travel decision should consider the GHG emissions, the overall time required for each option and the possibility to learn more about Europe while traveling.

Reducing the carbon footprint – tips for sustainable travels

- Choose a destination that you can reach by a sustainable mode of transport, primarily train or bus.
- Choose trains or buses for travels instead of flights.
- Consider combining trains and buses to reach the destination faster and more sustainably.
- If flying, chose direct flights, fly Economy, use public transport for your way to and from the airport and offset carbon emissions.
- Consider your journey as part of the experience rather than just reaching your destination the fastest. It can be a transformative and educational experience in its own right.

Notes: Travel distances for trains, buses, and cars were calculated using data from Luftlinie⁸ based on the fastest routes between city centers (main stations) as determined by Rome2rio⁹ for the randomly selected travel date of October 24, 2024. Greenhouse gas emissions per passenger and distance were estimated using data from Mobitool¹⁰. Mobitool factors include the consumption of natural resources and emissions over the full life cycle of transport modes and their infrastructure. **Trains:** Capacity utilization and emission factors were taken from Mobitool¹⁰ for available countries. For other countries, GHG emissions were based on data from countries with the most compatible electricity mix.¹¹ **Buses:** Capacity utilization and emission factor were derived from Mobitool¹⁰ for all countries. To simplify the analysis, the same emission factor was applied uniformly to the route between the bus station and the main train station. **Cars:** GHG emissions assumed a single traveler using a rental car or personal vehicle. Cars were modeled as European averages: mid-sized, 12 years old, running on petrol¹². **Planes:** GHG emissions were calculated using Atmosfair¹³ for direct flights in economy class, based on average capacity utilization and airplane types in Europe. Airport-to-airport distances were used, excluding transfers from main stations. An RFI factor of 3 was applied for additional environmental impacts. Atmosfair calculations do not include life cycle or infrastructure emissions.

- 5 Travel routes from exchange students collected by the Charles University of Prague (2021–2023), University of Porto (2021–2023), University of Zurich (2018–2024) and EU Data Collection of student exchanges (2021–2023)
- 6 Mobitool.ch 1 (↓): retrieved on 11.11.2024
- 7 Eurostat (↗) 2024: retrieved on 11.11.2024
- 8 Luftlinie.org (↗): retrieved Sept. – Nov. 2024
- 9 Rome2rio.com (↗): retrieved Sept. – Oct. 2024
- 10 Mobitool.ch 2 (↗): retrieved Sept. – Nov. 2024
- 11 IEA.org (↗): retrieved Nov. 2024
- 12 Acea.auto (↗): retrieved Nov. 2024
- 13 Atmosfair.de 3 (↗): retrieved Sept. – Oct. 2024

Imprint

Authorship: Nadine Wolf with contributions from Linde Warland and Youngseo Kim, Version December 2024, Publisher: Sustainability Hub, University of Zurich in collaboration with the Consortium of the Sustainable Erasmus+ Travel project.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the EACEA. Neither the European Union nor EACEA can be held responsible for them.