

Methodologies of emissions calculation

This section provides the data basis of our emissions calculation.

1. Flights

For the calculation of the climate fees our calculator includes following factors to estimate the CO₂ emission.

- Based on 1.5 million real flights. Extensive scientific data base drawn from German DLR, English QinetiQ, French Onera and NASA, 2002 world fleet.
- Detailed data for 41 (soon 46) aircraft and engines, covering more than 95% of world air traffic. Containing Jets, turboprops and private jets.
- Works with city pairs only (searching and using the most likely aircraft and flight parameters), but can also process specific data (aircraft type, compartment class, engine type, seating, load factors etc.)
- RFI set to 2.7, according to the current best estimate of IPCC. Applies only to the share of emissions in critical altitudes, not in lower altitudes.
- Implemented in modern internet technology.
- Updated regularly, taking into account new aircraft types, flight patterns, load factors, etc.
- Reviewed and approved by the german federal environmental agency.

2. Ground based transportation

The calculation for non flight issues like public transportation or taxi based on following assumptions¹:

Table 1: CO₂ emissions of **different** means of transportation

Item	Emissions
Taxi (10l gasoline consumption/ 100km)	0.2 kg CO ₂ / km
Local train (Average utilisation)	0.07 kg CO ₂ / pax/km
High speed train (Average utilisation)	0.06 kg CO ₂ / pax/km
Tram (Average utilisation)	0.11 kg CO ₂ / pax/km
Bus (Average utilisation)	0.05 kg CO ₂ / pax/km

3. Hotel

The calculation of the emissions caused by hotel stay is made up of the following factors: Heating, air conditioning and electricity².

¹ Sources

http://www.bmu.de/files/klimaschutz/bildungsservice/klimaschutz/application/pdf/verursacher_haushalt.pdf
http://www.bahn.de/p/view_nav4/mdb/pv/umweltmobilitcheck/MDB19831-umweltkennzahlen_2004.pdf

² Sources

<http://www.gebaeudeenergiepass.de/page/fileadmin/waermewert/bilder/Projekte/Energiepass/dena-Energiepass-V2-End.pdf>
<http://www.bund-strominfo.de/Stromsparen/Elektrogeraete/elektrogeraete.html>

For *heating* we use the following assumptions:

- Average CO₂ emissions of buildings: 20 – 150 kg CO₂/ (m²/a)
- Assumed CO₂ emissions: 125 kg CO₂/ (m²/a)
- Assumed hotel room: 30 m²
- ➔ 10 kg CO₂ per room and day

For *air conditioning* and *electricity* we use the following assumptions:

The CO₂ emissions caused by *electricity* depend on the mixture of the different kinds of power generation. A coal-burning power plant e.g. emits 1 kg CO₂/ kWh, a solar power plant only 0.1 kg CO₂/ kWh.

Therefore we assume an average amount of 0.7 kg CO₂/ kWh.

Air conditioning

- Constant cool down from 30° C to 25° C: 0.03 kWh/ m²
- Assumed average CO₂ emissions of: 0.7 kg/ kWh
- Assumed hotel room of: 20 m²
- ➔ 16 kg CO₂ per room and day

Electricity

- Average consumption of electricity for 1 room (lights, TV, mini bar) is 4 kWh/day
- Assumed average CO₂ emissions of 0.7 kg/ kWh
- ➔ 3 kg CO₂ per room and day

Table 2: Summary of daily CO₂ emissions per average hotel room, 20 m²

Item	Emissions (kg CO ₂ /day)
Heating	10 kg CO ₂
Air condition	16 kg CO ₂
Electricity	3 kg CO ₂
<i>Sum</i>	<i>29 kg CO₂</i>

4. Conference centre

Like the hotel the calculation of the emissions caused by the conference centre is made up of the following factors: The heating, air conditioning and electricity.

As based on our experience the relationship between participant and dimension of the conference centre is around half as much the hotel room, we assume a average CO₂ emission of 14.5 kg per participant and day.

5. Miscellaneous

Based on our experience a conference causes additional emissions between 10 kg and 25 kg CO₂ per participant. This amount could vary depending on the used proceeding. Typical origin for this kind of emissions could be waste management, catering or goods transportation.