Calculation Method for CO₂-Information per shipment & routing at LH / LH Cargo

The indication of specific CO_2 emissions refers to Tank-to-Wheel (TTW) processes (=direct emissions from airplanes and trucks). The calculations are based on the annual average kerosene consumption implying actual load factors and flight routings of the respective previous year. The CO_2 calculation follows the so-called "gate-to-gate" principle and includes all phases of a flight - from taxiing on the ground to flying detours and holding patterns in the air. For the leg distance of flights, only the shortest distance between two airports is used based on great-circle distances (GCD) assuming an ellipsoid globe (so called "Vincenty's formulae"). In case of transportation on a passenger aircraft, Lufthansa takes an average passenger weight (including luggage) of 100kg into account.

For shipments via Road Feeder Service (RFS) the value for average diesel consumption is based on "CLECAT". The average route distance for road traffic is taken as a basis (LH internal source).

For Co-operation - Partner flights/trucks we assume LH data.

Lufthansa (LH)-Method (without RFS) – TTW-CO₂-emissions:

$$CO_2(TTW) = \sum_{Leg=1}^{n} \left[1\,t \times GCD_{Leg}\,(km) \times spec.\,KC\,LH_{aircraftyp} \left(\frac{kg\,kerosene}{TKT} \right) \times 3{,}15 \left(\frac{kg\,CO_2}{kg\,kerosene} \right) \right]$$

RFS: Lufthansa (LH)-Method – TTW-CO₂-emissions:

$$CO_2(TTW) = 1\,t \times distance\,(km) \times spec.\,diesel\,consumption \left(\frac{l\,diesel}{tkm} \right) \times 2{,}63\,\frac{kg\,CO_2}{l\,diesel}$$

Legend:
TTW = Tank-to-Wheel; GCD = Great Circle Distance; KC = Kerosene Consumption; TKT = ton kilometers transported; Leg = route section without stopover, distance = kilometers driven on the road

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Comment:
The DIN EN 16258 standard has provided guidelines for standardized calculation of greenhouse gas emissions for transport processes since 2013. The LH Group adheres to this guideline with regard to the allocation of the payload.

At the same time the International Air Transport Association (IATA) has separately developed its own calculation proposals, which deal with the division of fuel consumption between freight and passengers and attribute a larger share of fuel consumption to passengers because of the passenger-specific infrastructure. Although this method has no effect on the overall efficiency of a flight, it changes the apportionment between passengers and freight. There are still divergences between the two methods (including from the method used up to now by Lufthansa). We would welcome a standardized, internationally harmonized and accepted method.

If you need more details or further information, please contact us (bettina.jansen@dlh.de)