

# CO<sub>2</sub> EMISSION CALCULATION METHODOLOGY

Since 2008, Thalys has been evaluating the carbon dioxide (CO<sub>2</sub>) emissions of Thalys journeys in partnership with independent third parties such as EcoRes. By doing this, Thalys wants to improve the understanding of its impact, give its passengers the possibility of evaluating the carbon footprint of their journey and therefore helps to raise awareness in responsible mobility issues.

At the same time, Thalys developed the eco-comparer, a tool which allows passengers to evaluate and compare the carbon emissions for the same journey with Thalys by car or by plane. This tool aims to enable every traveler to assess the environmental impact of his/her journey. In 2016, the independent consultancy firm Ecores updated the results based on the figures from 2015.

The eco-comparer is available on the homepage of the website ([www.thalys.com](http://www.thalys.com)) and the related data published in Thalys communication campaign. The methodology for the calculation of the eco-comparer data's is detailed below .

The data used can provide rough size representative of the CO<sub>2</sub> emissions generated by travelling in Thalys, car or plane.

## I. FOR THE CO<sub>2</sub> EMISSIONS RELATING TO A JOURNEY BY THALYS :

The calculation takes into consideration the following elements from the real operating conditions:

- the number of kilometers travelled on the network by all Thalys trains;
- the number of passengers transported on each segment;
- the electricity consumption of the trains;
- railway electricity emission factors for each country for electricity consumption :

Country	Emission factor	Reference
France	0,053 kg CO <sub>2</sub> / kWh	Decree No. 2011-1336
Belgium	0,18 kg CO <sub>2</sub> / kWh	SNCB
Netherlands	0,227 kg CO <sub>2</sub> / kWh	NS
Germany	0,461 kg. CO <sub>2</sub> / kWh	DB

*Emission factors vary according to the energy mix of each country and evolve annually.*

For 2015:

CO<sub>2</sub> emission related to traction power represent 27,572 t CO<sub>2</sub>

The number of travelers per kilometer is 2,385,117,684 trav.km.

It represents the distance travelled by all passengers on the Thalys network in 2015.

By dividing the CO<sub>2</sub> emission by the number of traveler, we get the emission factor specific to Thalys traction power, which is **11.56 g CO<sub>2</sub> /km.**

The data used in the present document solely considers emissions related to traction power.

To find out the average emissions during a Thalys journey by passenger and by trip, multiply the journey in kilometers by this emission factor (11,56 g CO<sub>2</sub>/km).

Journey	Distance (km)	Emissions (kg CO <sub>2</sub> )
Paris - Amsterdam	523	6,05
Paris - Brussels	314	3,63
Paris - Cologne	537	6,21
Brussels - Amsterdam	210	2,43
Brussels - Cologne	224	2,59

## II. FOR THE DATA RELATING TO A JOURNEY BY CAR:

We used the average emissions of a diesel car in France as representative of the cars in circulation in France<sup>1</sup>. According to the method used, the calculation takes the emission factor for this vehicle in traction power, that is 207 g CO<sub>2</sub> eq./km, multiplied by the number of kilometers between the starting point and the destination at stake<sup>2</sup>. This figure is uplifted by 20% to account for vehicle performance in real traffic conditions. The result is then divided by the average number of passengers per vehicle on interurban routes, which is 2.3<sup>3</sup>.

We get the CO<sub>2</sub> emission factor for the car of **90 g CO<sub>2</sub> eq / km**. To find out the average emissions during a car journey by passenger and by trip, multiply the journey in kilometers by this emission factor. The value used for a journey by car is:

Journey	Emissions (kg CO <sub>2</sub> )
Paris - Amsterdam	45.9
Paris - Brussels	27.5
Paris - Cologne	43.5
Brussels - Amsterdam	19.0
Brussels - Cologne	19.1

## III. FOR THE DATA RELATING TO A JOURNEY BY AIRPLANE:

For the majority of journeys, the figures come from the methodological guidebook by the Ministry of Ecology, Sustainable Development and Energy for CO<sub>2</sub> information and transport services<sup>4</sup>.

The calculation takes into account the traffic structure by type of plane for each route considered and also considers the average passenger load factor observed for each segment (route/aeroplane type), in order to propose realistic and validated emission factors for each type of plane. The figures are calculated according to the methodology for the application of Article L. 1431-3 of the French Code of transport.

The value put forward for a trip by plane is thus:

Journey	Emissions (kg CO <sub>2</sub> )
Paris - Amsterdam	65.0
Paris - Brussels	97.0
Paris - Cologne	119.0
Brussels - Amsterdam	26.5
Brussels - Cologne	n/a

<sup>1</sup> CO<sub>2</sub> emissions of a car in France on average : ADEME – Base Carbone

<sup>2</sup> Source: Google Maps.

<sup>3</sup> Load factor for private cars: STIF and DRIEA – “Enquête Globale Transport en Île-de-France”, 2010; CGDD - “la mobilité des français, panorama issu de l’Enquête nationale transport”, 2010. This calculation is in accordance with the methodological guidebook by the Ministry of Ecology, Sustainable Development and Energy for CO<sub>2</sub> information and transport services available here: <http://www.developpement-durable.gouv.fr/Information-CO2-des-prestations-de.html>

<sup>4</sup> French Civil Aviation Authority (French: Direction générale de l’aviation civile, DGAC)