

GREENHOUSE GASES INFORMATION FOR TRANSPORT SERVICES GENERAL METHODOLOGY

VERSION DATED 2017 July 17^h

1. CALCULATION METHODOLOGY

A. How to estimate the carbon footprint for your journey

1. Multiply the distance travelled by the average amount of CO₂e emitted per traveller per kilometre according to the type of train you take:

- The distance is taken from the kilometric databases for the rail lines,
- SNCF has four types of trains: **TGV, Intercités, TER and Transilien**; the type of train you use depends on your journey and departure time,
- For each type of train, the average amount of CO₂e emitted per kilometre is calculated each year by dividing the energy consumption for the previous year (applying a CO₂e emission factor according to the type of energy) by the number of passengers carried for the previous year and the distance they travelled. The following formula is used:

(Electricity consumption x CO₂e emission factor for electricity for transport use + Diesel consumption x diesel emission factor) / Passengers x km = Emission for a passenger by type of train expressed in **grams of CO₂e/km**

The CO₂e emission for your journey is therefore:

Journey distance x CO₂e emission per kilometre for a passenger on this type of train

2. If you need to use several types of train to make your journey (e.g. taking a TGV then changing onto a TER), the CO₂e emission for your journey is the sum of the emissions for your TGV journey and the emissions for your TER journey

The CO₂e emission for your journey is therefore:

(journey distance by TGV x CO₂e emission per kilometre for a TGV passenger) + (journey distance by TER x CO₂e emission per kilometre for a TER passenger)

3. If you are a season ticket holder or if SNCF does not know how many journeys are actually made by the passenger, the information is sent to you in the form of the **emission for a passenger by type of train expressed in grams of CO₂e/km** as given on the website: <http://www.sncf.com/fr/train-emission-co2>



The method used by SNCF complies with the methodology guide published by the French government for greenhouse gases information for transport services. This guide can be consulted at:

<http://www.bilans-ges.ademe.fr/fr/accueil/contenu/index/page/Transports/siGras/0>

B. additional information

In accordance with article 13 of French decree No 2011-1336, SNCF provides the following additional information on the method of calculation and energy sources:

- SNCF is engaged in the activity of **passenger rail transport**,
- **The values used** for energy consumption and the number of passengers carried are of **level 3**. This means they are average values calculated by type of transport (in our case the types of train - TGV, Intercités, TER and Transilien),
- The consumption used is the **total energy consumption** for the previous year, **including line losses and all empty journeys**,
- We use the following energy sources:
 - o **Electricity for transport use** with an emission factor of 48 gCO₂/kWh
 - o **Non-road diesel** with an emission factor of 3.17 kgCO₂/Litre

These emission factors are laid down by the order of 26 April 2017 implementing Decree No 2017-639 of 26 April 2017 concerning greenhouse gases information for transport services

2. EMISSIONS FOR A PASSENGER TRAVELLING ONE KILOMETRE

A. Emissions for SNCF passengers in 2017*:

Type of train	Emissions for a passenger travelling 1 km
Intercités	8,6 gCO ₂ e
TGV, Lyria, iDTGV, OUIGO	3 gCO ₂ e
Transilien / RER	5,2 gCO ₂ e
TER	30,1 gCO ₂ e

**based on energy consumption (Source: Réseau de transport d'électricités (Rte), 2016) and 2016 passenger figures*

B. Emissions for passengers on SNCF's international trains in 2017 :

Type of train	Emissions for a passenger travelling 1 km
Thalys	10,3 gCO ₂ e
Eurostar	8,6 gCO ₂ e
Elipsos	10,7 gCO ₂ e
Gala	9,5 gCO ₂ e
Alleo	10,3 gCO ₂ e

Sources:

Actual passenger numbers and electricity consumption 2015 for each carrier;

Emission factor for transport electricity "France" (48 gCO₂e/kWh) for kilometres travelled in France

Emission factor for transport electricity "Europe" (420gCO₂e/kWh) or emission factors for railway electricity for the countries concerned when provided by traction electricity suppliers, for kilometres travelled in other countries. For further details visit: www.thalys.com and www.eurostar.com.

C. Emissions for SNCF Auto-Trains for 2017:

Emissions for a car, motorbike or scooter on Auto-Trains are calculated annually **for each Origin/Destination offered**, using the Ecotransit calculator (www.ecotransit.org), and production data for the previous year:

- Average net weight of the load (wagons + vehicles),
- Average number of vehicles carried on this Origin/Destination,
- Distance travelled.

All Auto-trains use electric traction.

The emissions for each Origin/Destination available by Auto-Train are detailed in the printed guide also available from the website autotrain.voyages-sncf.com/.

D. Emissions for SNCF passengers using road transport in 2017:

1. OuiBUS

	Emissions for a passenger travelling 1 km
OuiBUS	42,8 gCO ₂ e

**based on fuel consumption and passenger numbers for 2016 -OuiBUS*

2. TER coaches

Emissions for a passenger travelling 1 km are **displayed in each vehicle**. These figures are calculated by the coach company on the basis of actual consumption and passenger numbers. **If actual data are not available**, applying the methodology guide, these emissions are:

	Emissions for a passenger travelling 1 km
Interurban coaches	141 gCO ₂ e

*Source: **Ministère du Développement durable et de l'énergie** [Ministry of Sustainable Development and Energy] "CO₂e information for transport services – Methodology Guide" 2017*

3. Taxis, chauffeured cars, transport on demand

Emissions per kilometre for a trip are **displayed in the vehicles**

These are calculated by the owner or company using:

- The consumption for the vehicle (make, model, year), the fuel used and the type of journey (urban, non-urban or mixed). Consumption figures for vehicles are available in the guides "**Conventional fuel consumption and CO₂e emissions**" produced by the ADEME each year and available on their website.
- The emission factors for the various types of road fuel including actual conditions of use of the vehicle and empty journeys, provided in the "CO₂e information for transport services – Methodology Guide" - Ministère du Développement durable et de l'énergie, 2017.

E. Emissions for RATP passengers in 2017:

The website www.transilien.com provides passengers in the Île-de-France region with CO₂ information on their journeys, using any of the available transport means: Transilien, RER, Métro, Tram, Bus.

The figures used in our calculator for calculating CO₂ emissions for other transport modes are taken from the RATP methodology available on www.ratp.fr.

These figures are given here for information:

Other urban modes in Île-de-France	Emissions for a passenger travelling 1 km
Métro	3.4 gCO ₂ e
Tramway	3 gCO ₂ e
Bus	96.6 gCO ₂ e

F. Emissions for other transport modes

1. Cars (2017 figures)

Sources:

Average car emission in France: **ADEME** – Carbon Base

Car occupation rates: **STIF and DRIEA** – “Global Transport Survey in Île-de-France” 2010; **CGDD** – Mobility and the French, overview taken from the National Transport Survey”, 2010

Average emissions of a car in France	Average number of passengers per car		Emissions for a passenger travelling 1 km	Used by:
213 gCO ₂ e/km	Île-de-France	1.28	166 gCO ₂ e	Transilien
	Peri-urban journeys	1.4	152 gCO ₂ e	TER
	Inter-urban journeys	2.3	92 gCO ₂ e	IC and TGV

2. Inter-urban coaches

	Emissions for a passenger travelling 1 km
Inter-urban coaches	141 gCO ₂ e

Source: Ministère du Développement durable et de l'énergie “CO₂e information for transport services – Methodology Guide” 2017

3. Domestic flights

The methodology guide recommends using the DGAC website (<http://eco-calculateur.aviation-civile.gouv.fr/>) to identify the emissions for a passenger on a particular route.

For example: the emissions for a passenger travelling 1 km on a 150-seat plane on an internal flight of less than 1000 km are:

	Emissions for a passenger travelling 1 km
Internal flights	168 gCO ₂

Source: Ministère du Développement durable et de l'énergie "CO₂ information for transport services – Methodology Guide" 2012– For a 150-seat plane for a flight of less than 1000 km.

3. CO₂ EMISSIONS FOR CERTAIN JOURNEYS (2015 VALUES)

	Origin-Destination	Rail distances* (km)	Emissions by train (kgCO ₂ e)	Alternative mode	Distances** (km)	Emissions (kgCO ₂ e)
TGV	Paris - Lyon-Part-Dieu	512	1,54	Car :	466	42,9
	Paris – Marseille	863	2,59	Car :	776	71,4
	Paris – Bordeaux	581	1,74	Car :	583	53,6
	Paris – Lille	258	0,77	Car :	222	20,4
	Paris – Genève	503	1,51	Car :	540	49,7
	Paris – Strasbourg	503	1,51	Car :	489	45,0
	Paris – Nice	1108	3,32	Plane :	672	91***
	Paris – Rennes	372	1,12	Car :	350	32,2
	Paris – Toulouse	838	2,51	Plane:	571	87***
	Paris - Avignon	742	2,23	Car :	687	63,2
	Marseille – Lille	1165	3,50	Plane:	808	108***
Intercités	Lyon – Nantes	807	2,42	Car :	723	66,5
	Paris - Clermont-Ferrand	420	3,74	Car :	424	39,0
	Paris – Cherbourg	371	3,30	Car :	356	32,8
TER	Paris – Briançon	861	7,66	Car :	687	63,2
	Marseille - Toulon	67	2,02	Car :	33	5,0
	Poitiers - La Rochelle	147	4,44	Car :	109	17
	Bourgoin-Jallieu - Lyon-Part-Dieu	41	1,24	Car :	80	12,2
	Valencienne - Lille	48	1,45	Car :	52	7,9
Transilien	Caen - Bayeux	30	0,91	Car :	58	8,8
	Paris-Gare de Lyon - Juvisy (RER D)	20.3	0,11	Car :	21	3,5
	Paris-Montp – Versailles-Chantiers	14.5	0,08	Car :	26	4,3
	Paris-Nord - Ermont-Eaubonne	13.7	0,07	Car :	14	2,3
	Paris-St-Lazare - La Défense	6.45	0,03	Car :	8	1,3
	Magenta – Chelles-Gournay	17.5	0,09	Car :	21	3,5

* Ticket kilometres for TGV and IC; TER-SNCF.com and Transilien.com

** Mappy for cars, DGAC for planes

*** Emissions supplied by the DGAC calculator - August 2013

4. FURTHER INFORMATION

Further information on this methodology can be obtained by emailing developpement-durable@sncf.fr.

5. AUDITORS' REASONABLE ASSURANCE REPORT

This methodology received a reasonable assurance report from the auditors of PricewaterhouseCoopers in the Audit of may 2017.