

GREENHOUSE GASES INFORMATION FOR TRANSPORT SERVICES GENERAL METHODOLOGY

2021 VERSION

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)

The CO₂e information is communicated to the passenger, before purchase, on the website: <https://www.sncf.com/en/booking-itinerary/itinerary>



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: <https://www.ecologie.gouv.fr/information-ges-des-prestations-transport>, reference of document : GHG information for transport services - Methodological guide (PDF - 17.87 Mo)

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 38.6 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. They are updated on “Carbon database – Base carbone” in <http://www.bilans-ges.ademe.fr/> by French Energy Agency “ADEME” (English version of website is available).

2. EMISSIONS FOR A PASSENGER TRAVELLING ONE KILOMETRE

A. Focus on sanitary crisis in 2020

The 2020 year was marked by an unprecedented sanitary crisis which had a significant impact on the SNCF Group business. 2020 data is therefore not representative of the activity in normal times. For information, the global indicator for activity “Voyageurs” (traveller) per passenger-km rose from 6.1 g CO₂e/pass.km to 8.2 g CO₂e/pass.km (+34%vs. 2019). Due to the extent of the health crisis, the drop in passenger numbers was greater than the drop in supply.

So, in this note, we continue to use values relative to the year 2019. You will find some updated values compared to the previous note (2020 version), these are mentioned in purple and based on 2019 values for SNCF data.

B. Emissions for SNCF passengers in 2021:

Type of train	Emissions for a passenger travelling 1 km
Intercités	5.29 gCO₂e
Trains Grande Vitesse (High-Speed Train)	1.73 gCO₂e
Whose TGV INOUI value	1.9 gCO ₂ e
Whose OUIGO value	0.73 gCO ₂ e
Transilien	4.75 gCO₂e
Train/RER (average value for IDF Mobilité)*	4.1 gCO₂e
TER	24.81 gCO₂e

Source : based on energy consumption (Source : Réseau de transport d'électricités (Rte), 2019) and 2019 passenger figures

** Weighted average of Ile de France Mobilité Trains managed by Transilien & RATP : values to use for all operators on Ile de France Territory*

C. Emissions for passengers on SNCF’s international trains in 2021 :

Type of train	Emissions for a passenger travelling 1 km
Thalys	6.68 gCO ₂ e
Eurostar	6.64 gCO ₂ e
LYRIA	2.05 gCO ₂ e
RENFE & SNCF in cooperation	5.4 gCO₂e
DB&SNCF in cooperation	4.5 gCO₂e
TGV InOui Italia	8.5 gCO₂e

Sources:

Actual passenger numbers and electricity consumption 2019 for each carrier;

Emission factor for transport electricity “France” (38,6 gCO₂e/kWh) for kilometres travelled in France

Emission factor for transport electricity are provided on <http://www.bilans-ges.ademe.fr/> by French Energy Agency “ADEME” or emission factors for railway electricity for the countries concerned when provided by traction electricity suppliers, for kilometres travelled in other countries or energy agencies (“GOV.UK” for United Kingdom) or on the basis of emission factors from International Energy Agency (IEA). For further details visit: www.thalys.com and www.eurostar.com.

D. Emissions for SNCF passengers on a road mode :

1. 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
Coaches in France – Mixed value	29.5 gCO₂e

Source : Ademe carbon database Emission factor « Bus - Diesel »

	Emissions for a passenger travelling 1 km
Interurban coaches	146 gCO₂e

Source: ADEME Carbon database update of emissions factor for “City bus - average - Urban area, < 100 000 inhabitants” which is also reference for interurban coaches on Ministère du Développement durable et de l’énergie [Ministry of Sustainable Development and Energy] “CO₂e information for transport services – Methodology Guide” 2018

2. Taxis, chauffeur-driven car, 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, 2018.

E. Emissions for « Ile-De-France Mobilité », RATP & SNCF Transilien passengers in 2020:

In accordance with L1431-1 article of French transportation Code, Ile-De France (IDF) Mobilités, SNCF Transilien & RATP make available at passenger disposal, Information about GreenHouse Gas (GHG) emissions produced during their travel.

Transilien provides passengers in the Île-de-France region with CO_{2e} information on their journeys, using any of the available transport means: Transilien, RER, Métro, Tram, Bus. This information is determinate by indicators yearly updated and in accordance to current regulatory (decree n° 2017-639). The figures used in our calculator for calculating CO₂ emissions for other transport modes are taken from RATP. For its, part, SNCF provides Transilien figure to RATP. With these data, average values for IDF Mobilité are calculated.

You can find these figures on these websites:

<https://www.vianavigo.com>

<https://www.ratp.fr/itineraires>

<https://www.transilien.com/fr/itineraire>

These figures are given here for information:

Other urban modes in Île-de-France	Emissions for a passenger travelling 1 km
Métro	2.5 gCO _{2e}
Tramway	2.2 gCO _{2e}
Train/RER	4.1 gCO _{2e}
Whose Transilien Value	4.7 gCO _{2e}
Whose RER RATP Value	2.6 gCO _{2e}
Bus (with “Noctilien”)	104 gCO_{2e}
Whose RATP	98 gCO _{2e}
Whose other operators	110 gCO _{2e}

F. Emissions for other transport modes

1. Cars

Sources: Average car emission in France & associated car occupation rate (short distance, long distance, average) : **ADEME** – Carbon Database

	Average emissions for a car in France for 1 km per vehicle	Average number of passengers per car	Emissions for a passenger travelling 1 km	Used by:
Average	0.178 gCO _{2e}	1.4	111 gCO_{2e}	Transilien
Short distance	0.185 gCO _{2e}	1.6	134 gCO_{2e}	TER
Long distance	0.163 gCO _{2e}	2.2	75 gCO_{2e}	IC and TGV

2. Inter-urban coaches

	Emissions for a passenger travelling 1 km
Inter-urban coaches	146 gCO ₂ e

Source: Ademe Carbon database update of emissions factor for “City bus - average - Urban area, < 100 000 inhabitants” which is also reference for interurban coaches on **Ministère du Développement durable et de l’énergie** [Ministry of Sustainable Development and Energy] “CO₂e information for transport services – Methodology Guide” 2018

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 specific travel flight.

For example: the emissions for a passenger travelling 1 km on a 101-220-seats plane on an internal flight of less than 1000 km are:

	Emissions for a passenger travelling 1 km
Short-haul average	141 gCO ₂ e
< 500km	167 gCO ₂ e
500-1000km	126 gCO ₂ e

Source: **ADEME** (Carbone Database), Passengers aircraft - short-haul flight, <500kms, 500-1000kms, 101-220 places, 2018 - Without contrails.

3. CO₂e EMISSIONS FOR CERTAIN JOURNEYS (2021)

	Origine-Destination	Rail Distances* (km)	Emission factor (gCO ₂ e/km/voy)	Emission by train (kgCO ₂ e)	Alternative mode	Distances** (km)	Emission factor*** (gCO ₂ e/km/voy)	Emission by alternative mode (kgCO ₂ e)
TGV	PARIS - LYON	563	1,9	1,1	Car	466	75	35,0
	PARIS - LILLE	258	1,9	0,5	Car	226	75	17,0
	BORDEAUX - PARIS	617	1,9	1,2	Car	587	75	44,0
	PARIS - RENNES	374	1,9	0,7	Car	350	75	26,3
	MARSEILLE - PARIS	883	1,9	1,7	Plane	627	141	88,4
	PARIS - STRASBOURG	503	1,9	1,0	Car	488	75	36,6
	PARIS - NICE	978	1,9	1,9	Plane	674	141	95,0
	PARIS - TOULOUSE	713	1,9	1,4	Plane	571	141	80,5
	LYON - MARSEILLE	381	1,9	0,7	Car	314	75	23,6
	LILLE - LYON	794	1,9	1,5	Plane	558	141	78,7
OUIGO	NANTES - PARIS	385	0,73	0,3	Car	386	75	29,0
	LYON - MARSEILLE	320	0,73	0,2	Car	314	75	23,6
	AVIGNON - MARNE LA VALLEE	697	0,73	0,5	Car	702	75	52,7
LYRIA	PARIS - GENEVE	692	2,05	1,4	Plane	408	141	57,5
THALYS	PARIS - BRUXELLES	314	6,68	2,1	Car	312	75	44,0
INTERCITES	CLERMONT FERRAND GARE - PARIS BERCY	420	5,29	2,2	Car	425	75	31,9
	LIMOGES - PARIS	400	5,29	2,1	Car	394	75	29,6
	BAYONNE - TOULOUSE	199	5,29	1,1	Car	300	75	22,5
TER	PARIS - TROUVILLE DEAUVILLE	281	24,81	7,0	Car	199	111	22,1
	GRENOBLE - LYON	131	24,81	3,3	Car	113	111	12,5
	MARSEILLE - NICE	218	24,81	5,4	Car	205	111	22,8
	GENEVE - LYON	129	24,81	3,2	Car	150	111	16,7
	ARCACHON - BORDEAUX	59	24,81	1,5	Car	72	111	8,0
Transilien	PARIS-GARE DE LYON - JUVISY (RER D)	20,3	4,1	0,1	Car	21	134	2,8
	PARIS-MONTP – VERSAILLES-CHANTIERS	14,5	4,1	0,1	Car	26	134	3,5
	PARIS-NORD - ERMONT-EAUBONNE	13,7	4,1	0,1	Car	14	134	1,9
	PARIS-ST-LAZARE - LA DÉFENSE	6,45	4,1	0,0	Car	8	134	1,1
	MAGENTA – CHELLES-GOURNAY	17,5	4,1	0,1	Car	21	134	2,8

* Values from OUI.SNCF comparator & Open data SNCF

** Mappy for cars, DGAC for planes

*** GHG Emission factors from ADEME database

4. FURTHER INFORMATION

Further information on this methodology can be obtained by emailing engagementsocietal-transitionecologique@sncf.fr.

5. AUDITORS' MODERATE ASSURANCE REPORT

This methodology received a moderate assurance report from the auditors of PricewaterhouseCoopers in the Audit of february 2021 :

- ⇒ <https://www.sncf.com/en/finance/financial-publications-sncf>
- ⇒ [SNCF Group Financial Report - 31 December 2020](#)
- ⇒ Consult page 92 of this report