

INFORMATION on GREENHOUSE GASES emissions FOR TRANSPORT SERVICES

GENERAL METHODOLOGY

2025 VERSION



The GHG information (expressed in CO₂e, or CO₂-equivalent) is communicated to the passenger, before purchase, on the website: <https://www.sncf-voyageurs.com/fr/voyagez-avec-nous/horaires-et-itineraires/itineraires>

Values updated in August 2025 on the basis of data for 2024.

1. CALCULATION METHODOLOGY

A. Mandatory ghg information

The method used by SNCF Voyageurs 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). The calculation methodology is based on the European standard for the calculation and declaration of energy and greenhouse gas emissions from transport services (NF EN 16258).

B. Principles

Your journey carbon footprint is estimated by multiplying the distance travelled by the average amount of CO₂e emitted per traveller per kilometre according to the type of train you take. SNCF Voyageurs distinguishes 5 different types of trains: **TGV INOUI, TGV OUIGO, Intercités, TER et Transilien**

For example, for a Paris-Strasbourg journey with TGV and suburban train, formula is:

journey distance by TGV INOUI x CO₂e emission per kilometre for a TGV INOUI passenger + journey distance by TRANSILIEN x CO₂e emission per kilometre for a TRANSILIEN passenger

- The distance is taken from the kilometric databases for the rail lines,
- 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**

Traveller GHG emissions
per type of train expressed
in gCO₂e /km

=

$$\frac{\sum \text{electricity consumption} \times \text{electricity emission factor} + \sum \text{diesel consumption} \times \text{diesel emission factor} + \sum \text{biodiesel consumption} \times \text{biodiesel emission factor}}{\sum \text{traveller. Kilometres}}$$

C. Scope of application

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

- SNCF Voyageurs operates a **passenger rail transport business**,
- **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 electricity losses on the line and all unladen journeys**,

D. Extended scope of ghg transport information

Aware of the climate change challenges and keen to provide a complete picture of the emissions associated with its mobility solutions, SNCF has taken part :

- in a working group led by ADEME (Agence de la Transition Ecologique) which aimed at taking into account the impact of vehicle manufacture,
- and in a study with Carbone 4 to take into account both the carbon impact of manufacture and maintenance (taking into account the consumption of maintenance centres).

The impact of infrastructure has not yet been taken into account in the comparisons. Transit points (passenger stations, freight warehouses) could be taken into account with the new ISO 14083 international standard on accounting for transport GHG emissions, to be published in spring 2023.

Scopes	Taking into consideration
Traction energy consumption	Taken into account in all exercises
Refrigerant leaks from air conditioning equipment	Not taken into account
Vehicle manufacturing	Taken into account voluntarily and given for information purposes on the Empreinte Database
Maintenance (building energy consumption)	Taken into account voluntarily
Hub (rail stations, warehouses)	Taken into account in ISO 14083 not yet applied
Infrastructures (network)	Not taken into account as of today

2. Communication

A. Mandatory GHG Information

The regulatory CO₂e footprint for use only is the one used by

- Our internal itinerary engine, which feeds SNCF.com and SNCF-Connect.com
- Travel agencies

B. ADEME Empreinte Base®



⚠ On the ADEME® footprint database, only the upstream/combustion part of the various modes of transport should be taken for the regulatory GHG information by selecting the "Data from Article L1431.3 of the Transport Code" filter. <https://base-empreinte.ademe.fr/>

3. EMISSIONS FOR A SNCF Voyageurs PASSENGER TRAVELLING ONE KILOMETRE

A. Long distance train emission values – 2024 SNCF V Voyageurs alue

	Emissions for a passenger travelling 1 km (gCO ₂ e/Passenger.km)
TGV	2.5
of which TGV INOUI value	2.7
of which OUIGO value	1.6
Intercités	5.1
Eurostar Group	5.8
LYRIA	3
DB&SNCF in cooperation	8.1
TGV InOui Italia	8.9
France-Espagne	4.3

Sources : see annex 1

B. TER train emission value - 2024 SNCF Voyageurs Value

	Emissions for a passenger travelling 1 km (gCO ₂ e/Passenger.km)
TER	19.4

Sources : see annex 1

C. Ile-de-France Mobilités train emission values, RATP & SNCF Transilien – 2024 SNCF/RATP values + Empreinte Base

In accordance with L1431-1 article of French transportation Code, Ile-De France (IDF) Mobilités, SNCF Transilien & provide passengers with Information on the GreenHouse Gas (GHG) emissions emitted during their travel.

Transilien provides passengers in the Île-de-France region with CO₂e information on their journeys, using any of the available transport means: Transilien, RER, Métro, Tram, Bus. This information is determined by indicators yearly updated and in accordance with current regulation (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 Voyageurs 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>

Other urban modes in Île-de-France	Emissions for a passenger travelling 1 km (gCO ₂ e/Passenger.km)
Transilien	6.3
Train/RER IDF (IDF mobilités average value)*	5.5
Métro **	4.3
Tramway **	3.8
Bus RATP **	76

Sources : see annex 1

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

** values from RATP

D. Emissions for SNCF Voyageurs coach passengers - Empreinte Base value

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 is not available, applying the methodology guide, these emissions are:

	Emissions for a passenger travelling 1 km (gCO ₂ e/Passenger.km)
Long distance coaches	33
Interurban coaches	146

Details : see annex 3

E. Taxis, chauffeur-driven car, transport on demand emissions - Empreinte Base value

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 (brand, 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 unladen journeys, provided in the "CO₂e information for transport services – Methodology Guide" - Ministère du Développement durable et de l'énergie, 2018.

4. Emissions for other transport modes

A. Emissions from travellers in private cars – Empreinte Base value

Emissions linked to private cars can also be expressed in terms of whole numbers of passengers: 1 passenger is equivalent to single-person car journeys and more than two passengers can be considered as car-pooling.

	Average emissions for a car in France for 1 km per vehicle (gCO ₂ e/Passenger.km)	Average number of passengers per car	Emissions for a passenger travelling 1 km (gCO ₂ e/Passenger.km)	To be compared with	Sources ADEME Empreinte base ®
Average	134	1.6	84	TER	Average car emission in France – average car occupation rate
Short distance	178	1.4	127	Transilien	Average car emission in France - short distance car occupation rate
Long distance	134	2.2	61	TGV, Intercités	Average car emission in France – long distance car occupation rate

Details : see annex 3

B. Emissions for coach passengers - Empreinte Base value

	Emissions for a passenger travelling 1 km (gCO ₂ e/Passenger.km)	To be compared with	Sources ADEME Empreinte base ®
Long distance coaches	33	Long distance (TGV, Intercités)	« Bus - Diesel » Emission factor
Interurban coaches	146	TER	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]

Details : see annex 3

C. Emissions for Domestic flights - Empreinte Base value

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 (gCO ₂ e/Passenger.km)	Sources ADEME Empreinte base®
< 500km	159 gCO ₂ e	Passengers aircraft - <500km, - Without contrails.
500 -1 000km	123 gCO ₂ e	Passengers aircraft - 500-1000km, - Without contrails.
1 000 - 2 000 km	101 gCO ₂ e	Passengers aircraft - 1000-2000km, - Without contrails.

Special case of condensation trails and cirrus clouds: These trails generated at high altitudes can sometimes be persistent and contribute to global warming. Their impact is complicated to quantify, but they are taken into account in some cases for comparison purposes, as it is estimated that they double the radiative forcing of aviation (<https://www.carbone4.com/trainees-de-condensation-impact-climat>). This item is not taken into account in the regulatory GHG information.

5. Emissions of a long-distance passenger travelling one kilometre, taking into account the impact of manufacturing and maintenance

gCO ₂ e /Voy.km	Use *	Maintenance **	Vehicle manufacturing **	Total
TGV	2.5	0.4	0.6	3.5
Intercités	5.1	1.3	0.3	6.7
Transilien	6.3	1.1	4.9	12.3
TER	19.4	1.2	3.2	23.8
Thermal car - long distance	61	2.2	25.6	89
Electric car	9	1.4	83.6	94
Long distance coaches	33	2.2	2.8	38
aircraft - 500-1000 km	123	1.9	0.4	125
aircraft < 500 km	159	1.9	0.4	161

- * 2024 values for SNCF Voyageurs transport train
- ** for SNCF Voyageurs transport trains, 2024 values for manufacturing and maintenance
- ** For other modes, Base Empreinte values for manufacturing part, for Maintenance TGV INOUI carbone 4 study realised in 2021 for SNCF

6. CO₂e EMISSIONS FOR CERTAIN JOURNEYS (2023)

⚠ On the calculator of the merchant where you buy your ticket, the calculated rail distance may vary depending on the railroad taken by your train.

	Origin-Destination	Rail Distances (km)	Emission factor (gCO ₂ e/voy.km)	Emission by train (kgCO ₂ e)	Alternative Mode	Distances (km)	Emission factor (gCO ₂ e/voy.km)	Émission by alternative mode (kgCO ₂ e)
TGV	PARIS - LYON	429	2,7	1,2	Voiture	466	61	28,4
	PARIS - LILLE	225	2,7	0,6	Voiture	226	61	13,8
	BORDEAUX - PARIS	537	2,7	1,5	Voiture	587	61	35,8
	PARIS - RENNES	364	2,7	1,0	Voiture	350	61	21,3
	MARSEILLE - PARIS	750	2,7	2,1	Avion	627	123	77,2
	PARIS - STRASBOURG	451	2,7	1,2	Voiture	488	61	29,7
	PARIS - NICE	972	2,7	2,7	Avion	674	123	83,0
	PARIS - TOULOUSE	794	2,7	2,2	Avion	571	123	70,3
	LYON - MARSEILLE	325	2,7	0,9	Voiture	314	61	19,1
	LILLE - LYON	645	2,7	1,8	Avion	558	123	68,7
OUIGO	NANTES - PARIS	386	1,6	0,6	Voiture	386	61	23,5
	LYON - MARSEILLE	325	1,6	0,5	Voiture	314	61	19,1
	AVIGNON - MARNE LA VALLEE	646	1,6	1,1	Voiture	702	61	42,8
LYRIA	PARIS - GENEVE	503	3,0	1,5	Avion	408	159	64,7
Eurostar Group	PARIS - BRUXELLES	314	5,8	1,8	Voiture	312	61	19,0
INTERCITES	CLERMONT FERRAND GARE - PARIS BERCY	419	5,1	2,2	Voiture	425	61	25,9
	LIMOGES - PARIS	400	5,1	2,1	Voiture	394	61	24,0
	BAYONNE - TOULOUSE	321	5,1	1,6	Voiture	300	61	18,3
TER	PARIS - TROUVILLE DEAUVILLE	219	19,4	4,2	Voiture	199	84	16,7
	GRENOBLE - LYON	131	19,4	2,5	Voiture	113	84	9,5
	MARSEILLE - NICE	224	19,4	4,3	Voiture	205	84	17,2
	GENEVE - LYON	162	19,4	3,1	Voiture	150	84	12,6
	ARCACHON - BORDEAUX	58	19,4	1,1	Voiture	72	84	6,0
Transilien	PARIS-GARE DE LYON - JUVISY (RER D)	20,3	6,3	0,1	Voiture	21	127	2,7
	PARIS-MONTP - VERSAILLES-CHANTIERS	14,5	6,3	0,1	Voiture	26	127	3,3
	PARIS-NORD - ERMONT-EAUBONNE	13,7	6,3	0,1	Voiture	14	127	1,8
	PARIS-ST-LAZARE - LA DÉFENSE	6,45	6,3	0,0	Voiture	8	127	1,0
	MAGENTA - CHELLES-GOURNAY	17,5	6,3	0,1	Voiture	21	127	2,7

For more TGV values, please consult our open-data platform :

<https://ressources.data.sncf.com/explore/dataset/emission-co2-perimetre-usage/information>

7. AUDITORS' MODERATE ASSURANCE REPORT

The method for calculating gCO₂e/passenger.km received a moderate assurance report from an independent third party organisation as part of the verification of SNCF's CSRD on march 2025 :

⇒ <https://www.groupe-sncf.com/medias-publics/2025-03/rapport-financier-annuel-2024-groupe-sncf.pdf>

⇒ Download SNCF Group annual financial report

Contact

Further information on this methodology can be obtained by emailing : infoges@sncf.fr

Annex 1 : SNCF Voyageurs emission factor sources

Actual passenger numbers and electricity consumption 2024 for each carrier;

- **Electricity for transport use** with an emission factor of 58 gCO₂/kWh in 2024
- **Off road diesel** with an emission factor of 3.16 kgCO₂/Litre
- **Biodiesel B100** with an emission factor of 1.22 kgCO₂e/Litre

Electricity emission factors for European countries (Germany, Spain, UK, Belgium, Netherlands) are taken from

- the International Energy Agency's emissions factors database
- the energy suppliers' database
- local energy authorities (GOV.UK for the United Kingdom)

For Eurostar Group, sources from Eurostar Group CSRD.

Annex 2: Methodological change for French electricity emission factor

Following a methodological change in French energy agency ADEME Base Carbone® for the electricity emission factor, SNCF has chosen to use the average national mix value and no longer a value per use for rail traction electricity.

Annex 3: Details of values for private cars and coaches

Car value in passenger.kilometres: Values systematically recalculated on the basis of average load factors given in the Empreinte database's documentation of emission factors for road passenger transport: <https://base-empreinte.ademe.fr/documentation/base-carbone?docLink=Routier2>

- **Average** : 134 gCO₂e / Vehicle.km / 1.6 passengers = 84 passenger.km
- **Short distance** : 178 gCO₂e / Vehicle.km / 1.4 passengers = 127 passenger.km
- **Long distance** : 134 gCO₂e / Vehicle.km / 2.2 passengers = 61 passenger.km

long-distance coaches: « Bus - Diesel » Emission factor

Interurban coaches: 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]