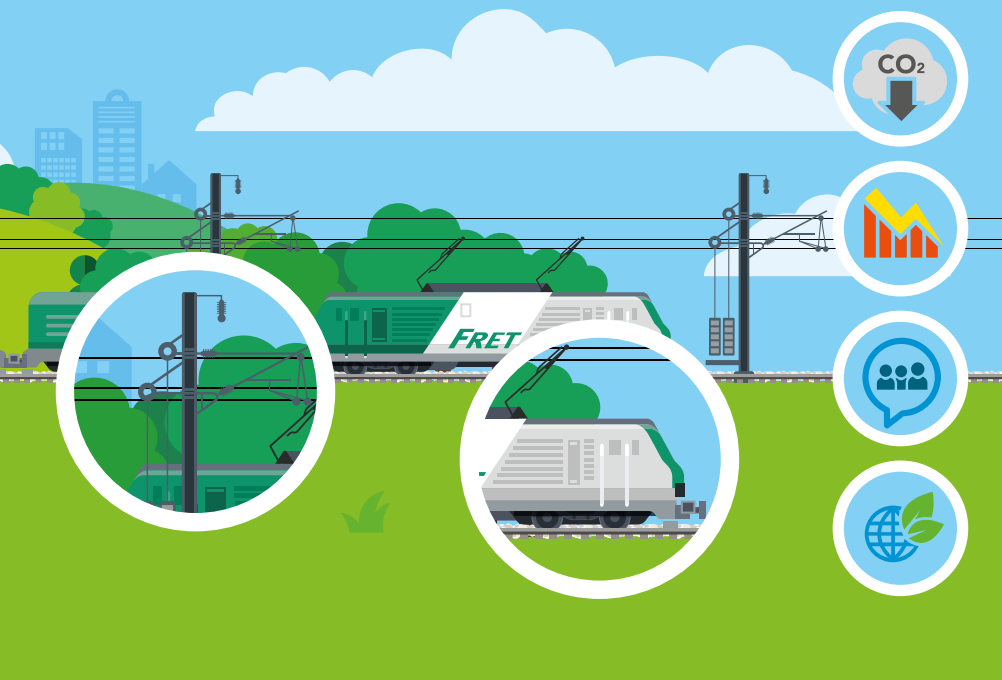




THE ADVANTAGES OF RAIL TRANSPORT







BACKGROUND AND STAKES

Among high-capacity transport methods, trains offer the lowest external costs in terms of CO₂ emissions, air pollution, exposure to noise or accidents.

As a result, rail transport offers a sustainable transport solution.

In this context, SNCF Réseau is leveraging every component of its Corporate Social Responsibility strategy **in order to foster credibility and trust with its customers and the areas it serves.**

This fact sheet will help you learn more about the advantages of rail transport.



THE CLIMATE EMERGENCY

Signed in December 2015, the Paris climate agreement sets the objective of preventing global warming from exceeding 2°C in comparison with the pre-industrial era. To achieve this, it will be necessary to reduce greenhouse gas (GHG) emissions. Both the political and scientific communities agree that this is a major challenge and that urgent solutions must be found. One solution widely supported by the IPCC⁽¹⁾ is to expand rail transport.

(1) Intergovernmental Panel on Climate Change (IPCC): <https://www.ipcc.ch/sr15/>



THE ADVANTAGES OF RAIL TRANSPORT

A SOLUTION TO CUT GREENHOUSE GAS (GHG) EMISSIONS

In France, the transport sector accounted for 31% of GHG emissions in 2019⁽¹⁾. This makes rail transport, **which accounted for less than 1% of CO₂ emissions for 10% of passengers and freight carried in France⁽²⁾**, a particularly effective method for reducing our transport carbon footprint.

The use of essentially de-carbonised electrical energy significantly limits the GHG emissions produced by the rail transport sector. Taking action to bring about a modal shift towards rail transport is a positive step for the climate and energy transition.

A CLOSER LOOK AT GHGS EMITTED

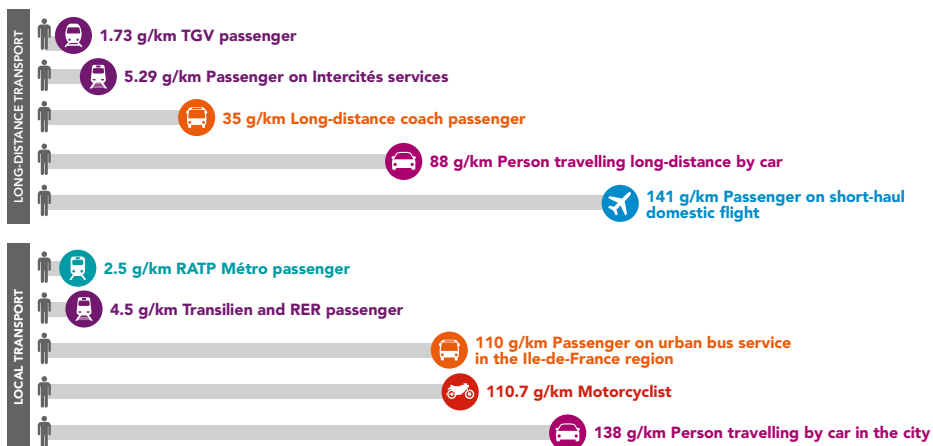
BY THE TGV

- A passenger on the TGV emits **80 times less CO₂/km** than a passenger on a medium-haul flight.
- **50 times** less than someone travelling alone in a car on a long distance journey.

BY FREIGHT TRAINS

On average⁽³⁾, a freight train emits **9 times less CO₂/km** than a heavy goods vehicle for the same weight carried.

EMISSIONS (EXPRESSED IN g CO₂) FOR A PASSENGER TRAVELLING 1 KM IN FRANCE⁽⁴⁾



(1) Source: developpement-durable.gouv.fr, 2021. / (2) Source: CITEPA, Secten 2020 format inventory.

(3) Source: alliance 4F, 2020. / (4) CO₂ emissions per person: comparison between different modes of transport. Source: SNCF 2020, according to the "Methodological Guide to GHG Information for Transport Services" of the Ministry of the Ecological Transition, and the ADEME carbon database.



A SOLUTION FOR EMITTING LESS FINE PARTICULATE MATTER (PM_{2.5}) AND NITROGEN OXIDES (NO_x)

In 2019, 48,000 premature deaths⁽¹⁾ were attributed to air pollution in France and, more precisely, to fine particulate matter. This represents 9% of total annual deaths, making it the third leading cause of death after tobacco and alcohol⁽²⁾.

Another cause of air pollution: emissions of nitrogen oxide (NO_x), an irritating gas which can cause respiratory problems or bronchial hyperresponsiveness among those sensitive to it.

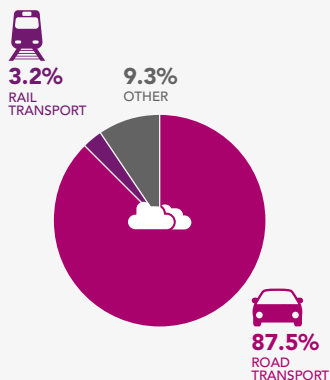
DID YOU KNOW?

In 2018, 18% of fine particles were attributable to the transport sector in France⁽²⁾.

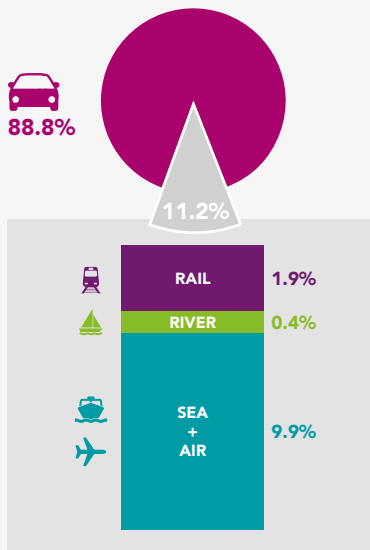
Whether we consider fine particulate matter or nitrogen oxide, rail transport causes far less pollution than the other transport methods, particularly road transport.

RAIL TRANSPORT: THE TRANSPORT METHOD THAT CONTRIBUTES THE LEAST TO AIR POLLUTION⁽²⁾

Fine particulate matter (PM_{2.5}) emissions by mode of transport in France.



Nitrogen oxide (NO_x) emissions by mode of transport in France.



(1) Source: www.santepubliquefrance.fr, 2019.

(2) Source: CITEPA, Secten 2020 format inventory.



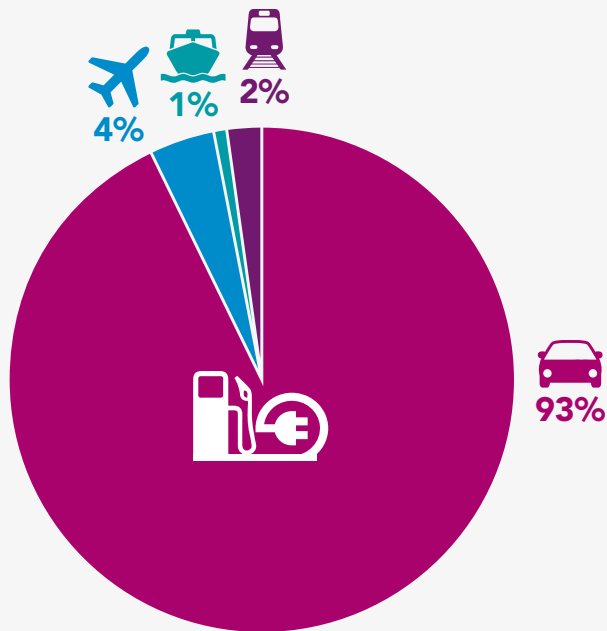
A SOLUTION FOR CONSUMING LESS ENERGY

When it comes to energy, rail transport offers a high return: the steel wheels on the rails have low rolling resistance and dissipate less energy than the other transport methods.

DID YOU KNOW?

On average, a freight train uses energy **6 times more⁽¹⁾** efficiently than a lorry.

ENERGY CONSUMPTION OF DIFFERENT MODES OF TRANSPORT IN FRANCE⁽²⁾



(1) Source: "European rail freight vision 2030, Rail freight forward", 2018.

(2) Source: "Chiffres Clés du transport" from the Ministry, published in 2020.



A TRANSPORT METHOD WHICH TAKES UP LESS SPACE THAN ROAD TRANSPORT

Rail transport takes up less space than road transport for an equivalent volume carried. Its advantage: a high carrying capacity and reduced land usage.

This reduced land usage is particularly due to the large proportion of green spaces on SNCF land, around 61,000 ha out of a total surface area of 88,000 ha.

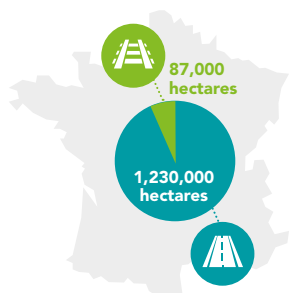
This characteristic makes rail routes relatively friendly toward natural environments, biodiversity and nearby agricultural activities.

The green spaces in the railway network (embankments, verges) play an important role as ecological corridors and havens for biodiversity.

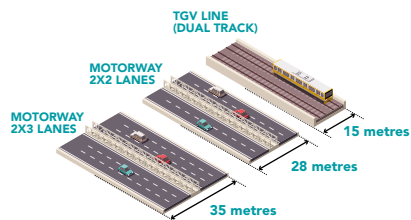
SNCF Réseau is committed to protecting this asset by ensuring that biodiversity issues are taken into account in routine maintenance, and by contributing to ecological continuity on land and in waterways.

Find out more about our commitment to biodiversity in our fact sheet: [SNCF Réseau's biodiversity approach](#).

87,000 HECTARES OF LAND ARE DEDICATED TO RAILWAYS, COMPARED TO 1,230,000 HECTARES FOR ROADS AND MOTORWAYS⁽¹⁾.



INFRASTRUCTURE THAT USES LESS SPACE⁽²⁾



(1) Sources: SNCF Réseau SIG 2021. Public statistics, "Les infrastructures linéaires de transport : évolutions depuis 25 ans", December 2016.

(2) Source: 2018 SDDRET NA Guide.

KEY FIGURES

IN FRANCE,

6.6%

OF LAND AREA IS DEDICATED TO RAILWAYS FOR 10% OF FREIGHT AND PASSENGERS CARRIED.

IN THE ÎLE-DE-FRANCE REGION

- RAILWAY RIGHTS-OF-WAY (INCLUDING RAILWAY STATIONS):

5,300 hectares

- ROAD RIGHTS-OF-WAY:

392,200 hectares



A SAFE TRANSPORT METHOD

The rail system offers a very high level of safety when carrying passengers and goods.

The passengers and shippers who choose trains are therefore helping to bring down road accident levels and reduce the costs for society.

KEY FIGURE

OVER THE SAME DISTANCE,
THE RISK OF A FATAL ACCIDENT
IS:

**MORE THAN
200 TIMES LESS**

BY TRAIN THAN BY CAR.

THE SAFETY OF DIFFERENT MODES

OF TRANSPORT IN EUROPE⁽¹⁾

NUMBER OF DEATHS PER BILLION
PASSENGER-KILOMETRES



PLANE
0.06 deaths



TRAIN
0.1 deaths



BUS/COACH
0.23 deaths



CAR
2.7 deaths



MOTORCYCLES
38 deaths

(1) Sources: 6th report on monitoring development of the rail market, 2019.

Report on railway safety and interoperability in the EU 2020 - European union agency for railways.



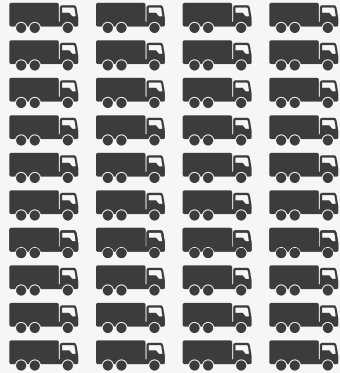
A SOLUTION THAT GENERATES LESS CONGESTION

Rail transport is especially well-suited to mass transportation, particularly in major urban areas. This is not the case with the other modes of transport, particularly road transport, which quickly becomes congested at peak times.

DID YOU KNOW?

- The highest capacity Transilien trains currently being deployed on the Ile-de-France network can carry almost 3,000 passengers, including 1,100 seated passengers. Each train is the equivalent of 2,500 cars which, at 80 kmph, would represent a queue stretching back 115 km.
- On average, a freight train can carry more than 500 tonnes of freight, the equivalent of around forty lorries on the road.

40 LORRIES



= 1 TRAIN





A SOURCE OF REGIONAL ECONOMIC DEVELOPMENT

Rail transport facilitates contact between cities and promotes tourism and access to services (health care, administration, etc.). It helps optimise the location of production activities and match supply with demand in the labour market. The ease of travelling through urban areas also improves workers' productivity.

For this reason, property prices are influenced by the proximity of a nearby railway station.

More widely, transport generates value in the property market, but this windfall is not retained by the rail sector, which receives only part of the profit it generates for the local authority.

LESS EXPOSURE TO RAIL NOISE THAN ROAD NOISE

ADEME (the French Environment and Energy Management Agency) and the CNB (French National Noise Council) have produced a map of the French population's exposure to noise, particularly noise related to the transport sector. It showed that the number of people exposed to noise from rail traffic at various levels is far lower than those exposed to road noise.

KEY FIGURES⁽¹⁾



ALMOST

52 MILLION

PEOPLE ARE EXPOSED TO ROAD TRAFFIC NOISE IN FRANCE.

COMPARED TO

6 MILLION

PEOPLE EXPOSED TO RAIL TRAFFIC NOISE.



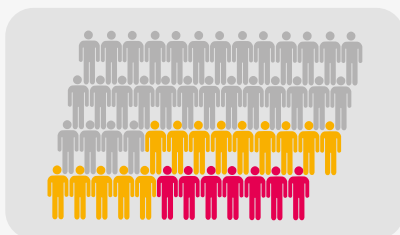
EXPOSURE TO TRANSPORT NOISE IN FRANCE⁽¹⁾

DAY

42 dB(A) <  55 dB(A) <  65 dB(A) < 



ROAD



 = 1,000,000 people



RAIL



 = 1,000,000 people

NIGHT

45 dB(A) <  55 dB(A) < 



ROAD



 = 1,000,000 people



RAIL



 = 1,000,000 people

(1) Sources: ADEME and CNB, 2016.

SNCF RÉSEAU

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Published by: AKATOA / Updated May 2021 - Printed on 100% recycled paper
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