

Transportation and Energy: Toward More Sustainable Mobility

This is a physical fact. To get moving, means of transport use energy: human for the bicycle, fossil for most vehicles or partially renewable for the electric car. Throughout the 20th century, tourism and trade have benefited from the progress made in the transportation sector to accelerate and intensify.

The problem?

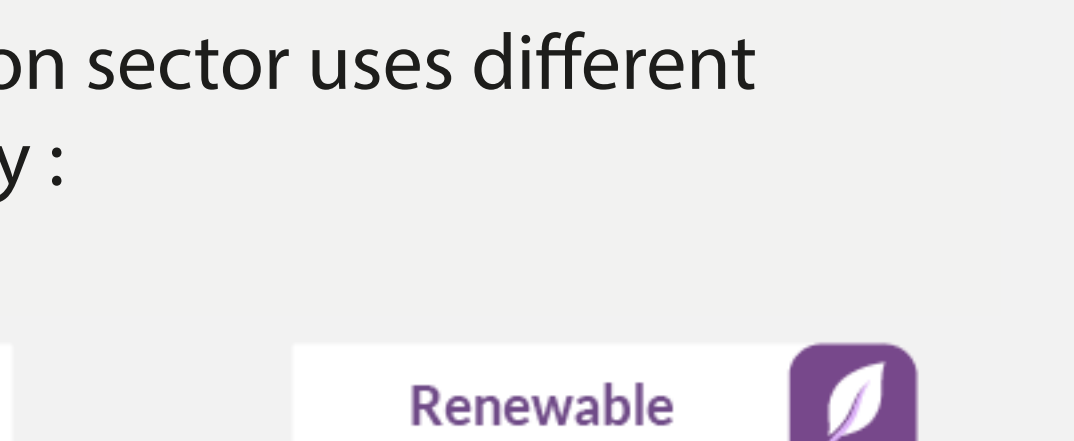
Their growth has gone hand in hand with the increase in greenhouse gas emissions and pollution.

In France, the transportation sector represents

+1/3 of energy consumption

and is

1st issuer of CO₂



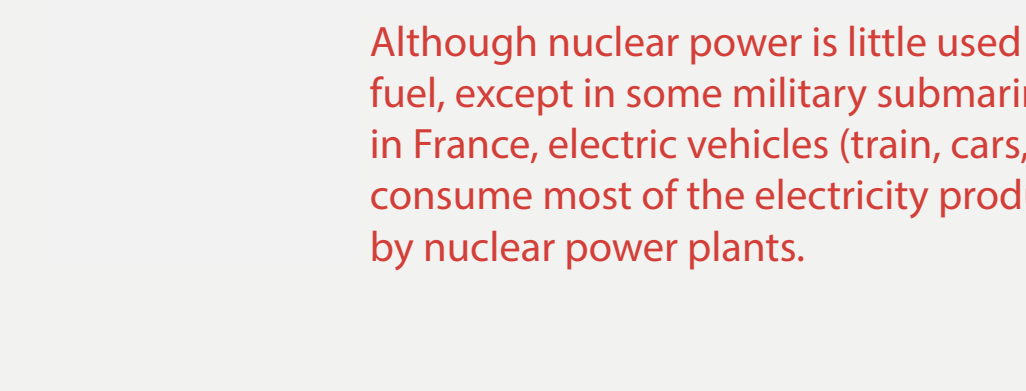
To curb these nuisances, without nailing people and goods in place, the sector is turning to solutions for more sustainable mobility.

The transportation sector uses different sources of energy :

Non-renewable

Renewable

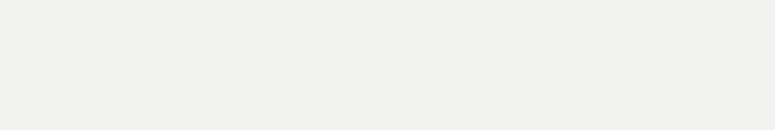
Gas



Natural gas buses

Biomass

Biofuels are used as a complement in cars, ships or airplanes.



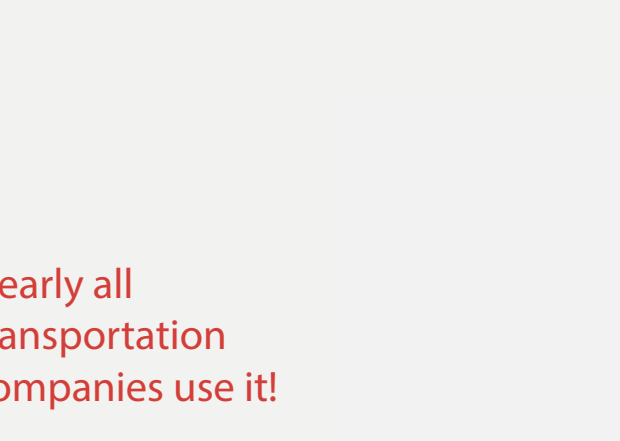
Nuclear



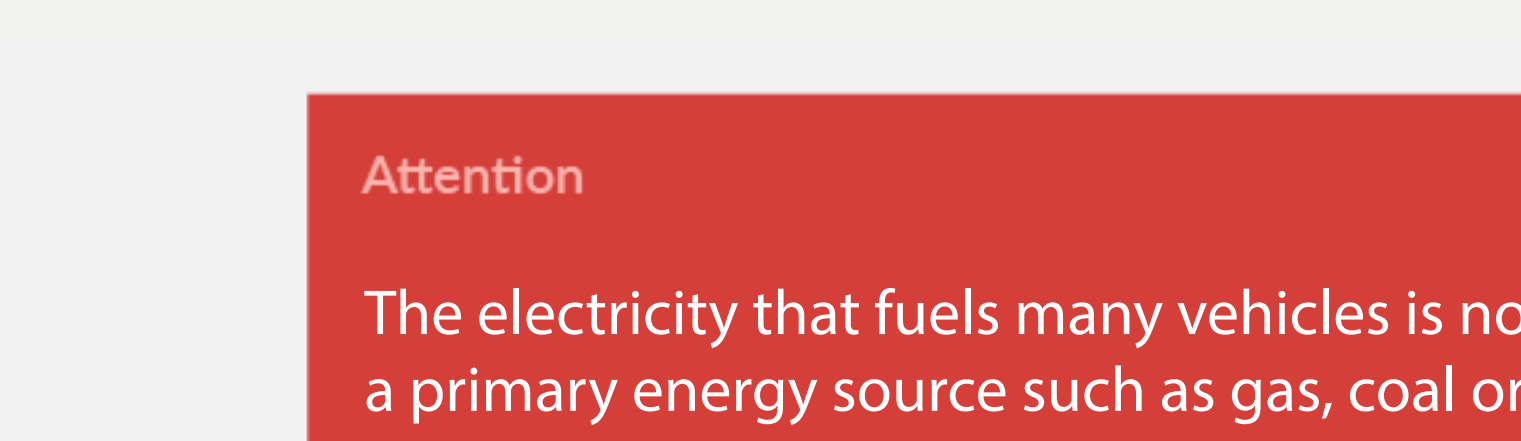
Although nuclear power is little used as a fuel, except in some military submarines, in France, electric vehicles (train, cars, etc.) consume most of the electricity produced by nuclear power plants.

Hydrogen

A few cars are already on the market (in the United States, China, and Japan). In France, the first hydrogen-powered trains are scheduled to enter service in 2027.



Oil



Nearly all transportation companies use it!

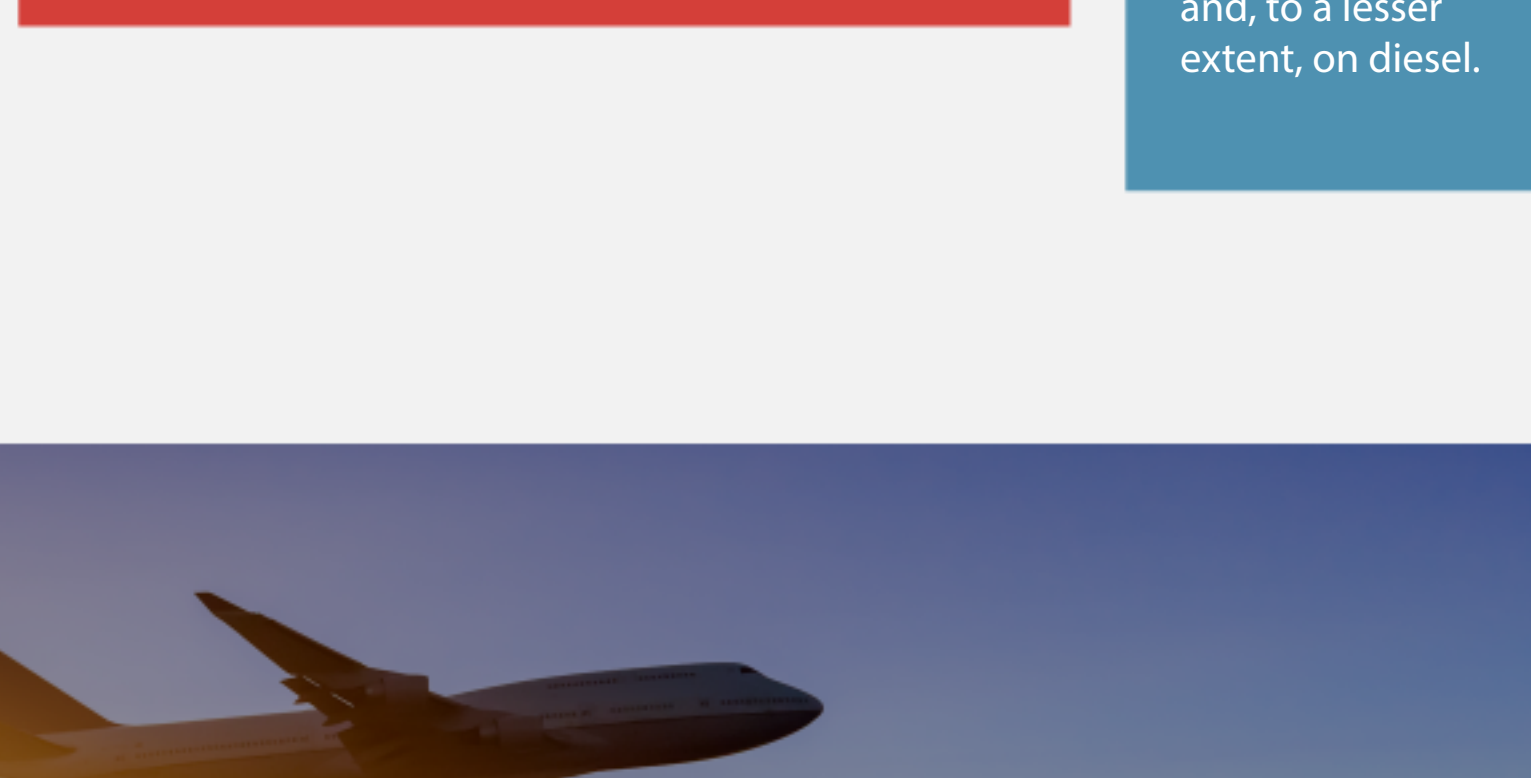
Attention

The electricity that fuels many vehicles is not a primary energy source such as gas, coal or hydrogen. It is a secondary energy source, obtained by the transformation of a primary source.

The main energies consumed by the transportation sector:

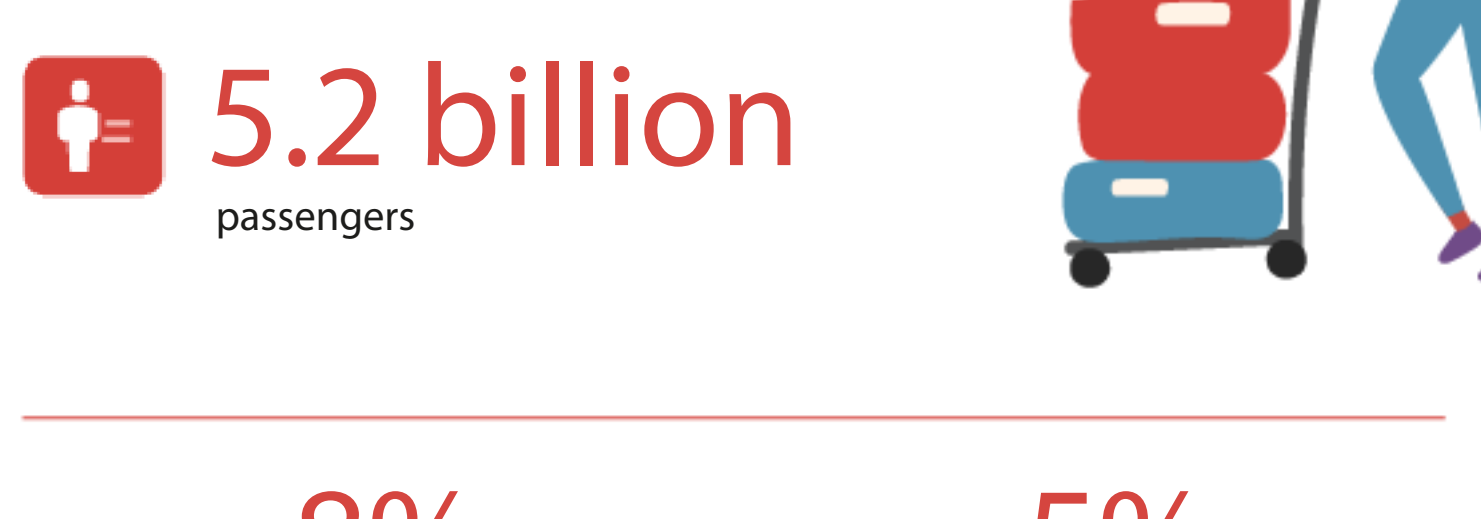


Whether moving people or goods 4 modes of transportation are used:



Aviation

39 million flights to transport
5.2 billion passengers



Marginal 50 years ago, aviation's share of CO₂ emissions is still growing.

In addition to greenhouse gases, there is also significant air pollution due to the release of fine particles.

In response to its environmental impact, the aviation industry is focusing on lighter, more fuel-efficient, and less polluting aircraft. Since 2000, passenger numbers have been rising, but each flight emits less CO₂ on average than before.

The Navy

110,000 make up the merchant fleet
80% of trade is by boat

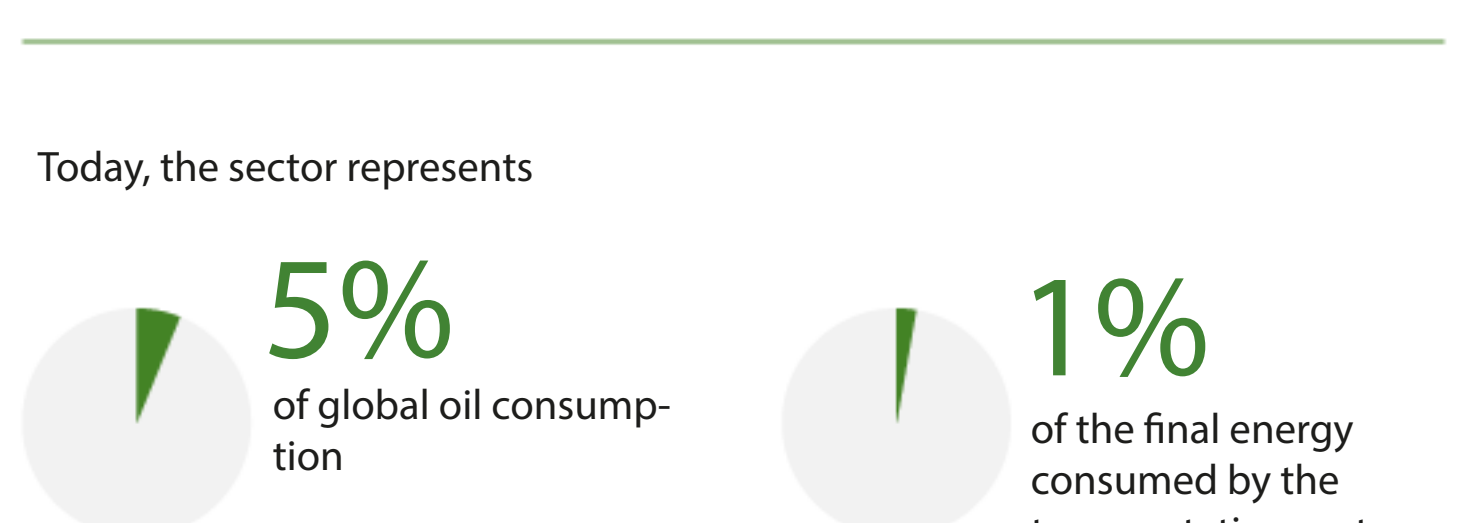
Shipping is the least expensive way to transport large quantities over long distances, costing significantly less per ton than rail, road, or air transport.

12 billion tons of goods that transit through the seas!

Today, the sector represents



Like all means of transportation, ships emit CO₂



Because their fuel is heavier and richer than gasoline or even diesel, ships emit greater quantities of pollutants such as nitrogen oxide or sulfur.

Since 2015, ships have been required to use cleaner fuel near the coast. Because this change is complicated and expensive, they are also considering using liquefied natural gas (LNG).

Road transport

1.65 billion vehicles are on the road around the world, including
40 million electric cars, accounting for 2.5% of the global vehicle fleet

Since 2015, the number of electric vehicles on the road has grown significantly. However, the global vehicle fleet is being replaced slowly, and internal combustion engine vehicles still make up the vast majority of the market today.



Road transport is regularly singled out for the CO₂ emissions it is responsible for.



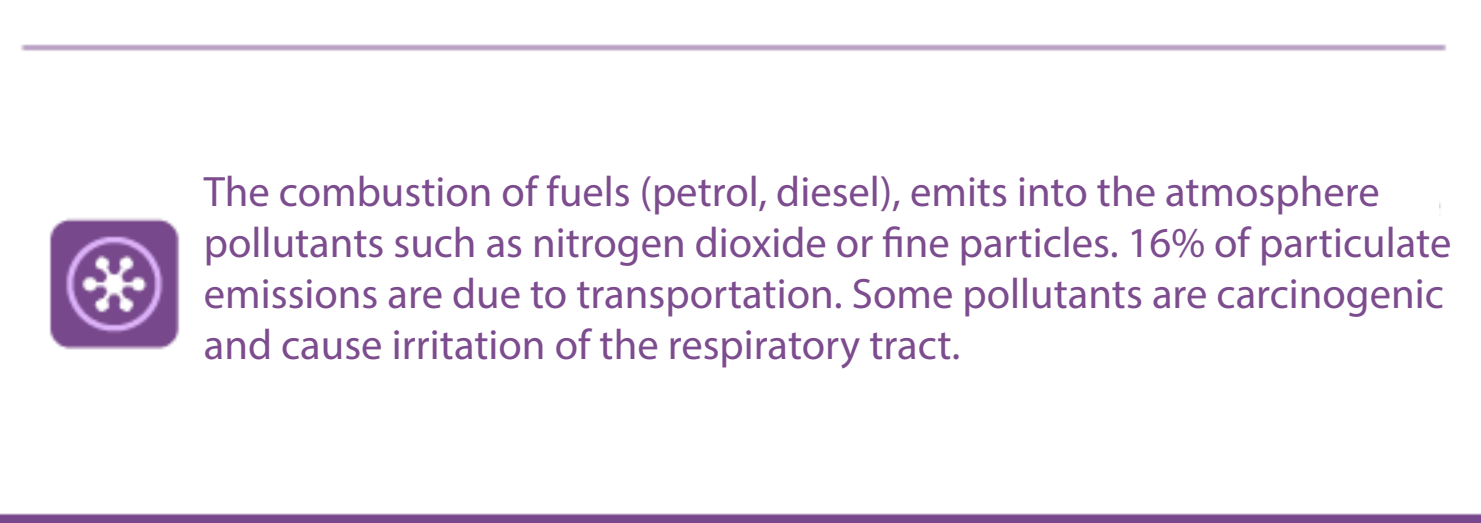
The combustion of fuels (petrol, diesel), emits into the atmosphere pollutants such as nitrogen dioxide or fine particles. 16% of particulate emissions are due to transportation. Some pollutants are carcinogenic and cause irritation of the respiratory tract.

+1/2 of constrained activities (work, study, ...) are done at -9 km from home. The future of the car over short distances lies in the use of so-called soft means of transport, multimodality and electromobility.

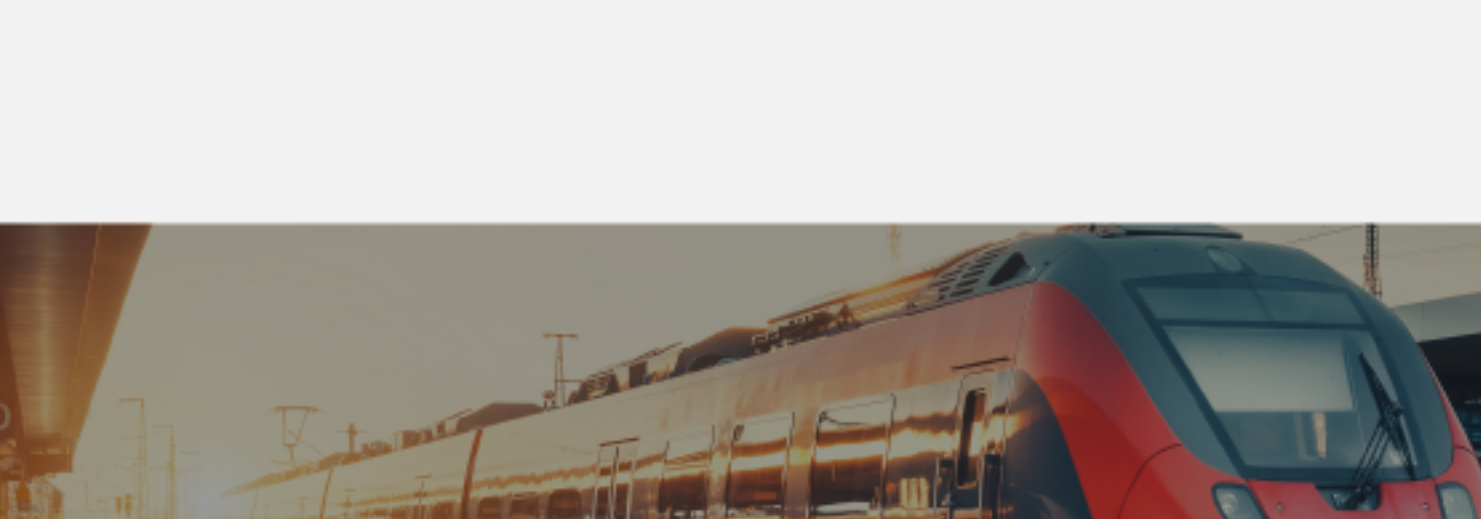
Rail transport

1 million kilometers of railroad track world-wide
8% people using a mode of transportation
7% of the freight

Because it operates mainly on electricity, the train represents.



Mainly powered by electricity, the mix of which varies from country to country, the train emits little CO₂



In France, nearly 20% of regional trains (TER) still run on diesel, despite the fact that most of the network has been electrified.

The future of rail travel is already underway. In Germany, hydrogen-powered trains generate their own electricity on board. In France, battery-powered trains can travel up to 80 km without overhead power lines. The new TGV trains consume about 20% less energy. Innovation in rail travel is advancing primarily through efficiency.