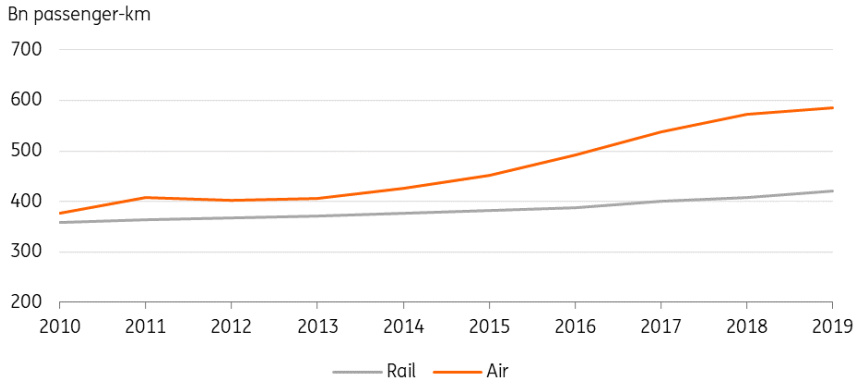
From plane to train: Europe is pushing climate-friendly travel

To reduce carbon emissions, Europe aims to transition travellers from planes to trains. Its extensive rail network and the growing consumer demand for greener transport solutions provide a clear opportunity. However, the European rail sector still needs to overcome hurdles to accomplish a significant modal shift and unlock its full potential

Over the last decade and before the start of the Covid-19 pandemic, air travel in Europe expanded at a much faster pace than rail travel. While air transport increased from 377 billion passenger-kilometres (pkm) in 2010 to 586 billion pkm in 2019 (+5.5% average annual growth rate), rail transport rose at a much more modest rate, from 358 billion pkm to 421 billion pkm (+1.8% average annual growth rate).

Airline travel really took off between 2014 and 2019 due to the rise of low-cost carriers and the popularity of leisure trips, particularly in the intra-EU flight segment. Essentially, the widening gap between air and rail transport was driven by cheap flights.

Rail passenger transport in the EU has lagged significantly since 2010



Source: European Commission. ING research

The European Union aims to boost rail travel to reduce carbon emissions

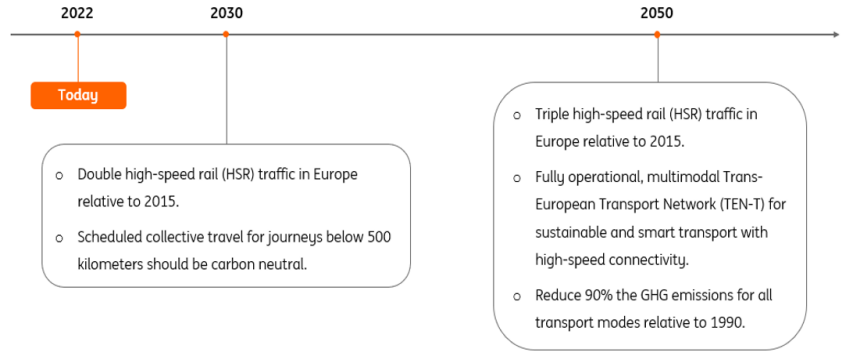
The EU aims to reduce its greenhouse gases (GHG) by 55% by 2030, compared to 1990 levels, and reach net zero by 2050. Shifting more passenger transport from air to rail could potentially play a significant role in reaching this goal in the short and medium run, as rail transport is much more climate-friendly than air transport.

Rail transport is estimated to be 12 times more energy-efficient than air transport. According to the European Environment Agency (EEA), air passenger transport emits, on average, 160 gCO2 per pkm, whereas rail passenger transport is only 33 gCO2 per pkm (well-to-wheel, excluding infrastructure-related emissions).

With a high share of electrified tracks (57% of the EU's rail network in 2020) and an increasing share of renewable energy in the electricity mix (38% of the EU's production in 2020), the environmental footprint of rail is expected to decrease further as we move into the next decade.

Given its potential to reduce CO2 emissions, the EU's policy is clearly supportive of rail travelling. The 2019 European Green Deal and the 2020 Sustainable and Smart Mobility Strategy have put rail passenger transport front and centre in a bid to decarbonise the EU's mobility system.

EU's relevant targets for the transport sector



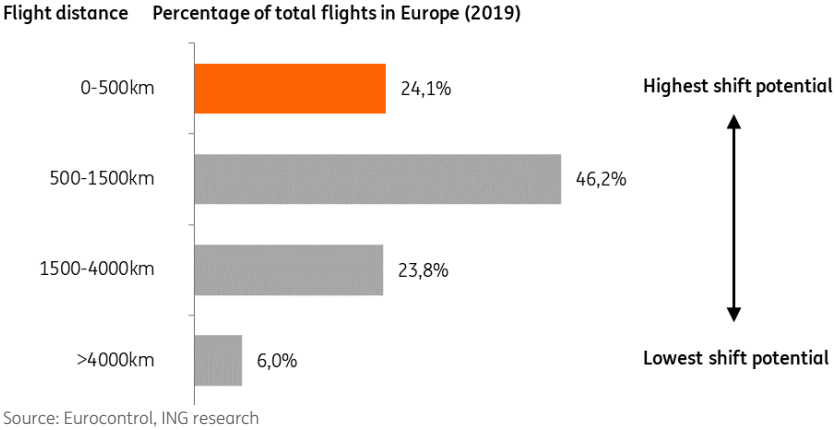
Source: ING Research

The majority of European flights are short and medium distance

Given passengers' increasing demand for greener transport solutions and the nature of European flights (mostly short and medium-distance), there is still so much potential for rail travel. In 2019, nearly 25% of European flights were below 500 kilometres, and approximately 70% were under 1,500 kilometres. The shorter the distance, the higher the likelihood of rail being able to replace flying due to its competitiveness in terms of travel time.

Literature commonly suggests that rail transport can offer a competitive alternative to flights on routes in which the rail journey takes less than six hours, especially if it is a direct connection and avoids passengers changing trains to complete the trip. This potentially covers a significant share of flights.

Flights with the shortest travel distance have the highest shift potential



Source: Eurocontrol, ING research

Rail competes with the advantages of aviation

Although passengers increasingly consider the CO2 impact of their journey, the main factors valued by consumers when planning a trip are still price and time, as shown in the Eurobarometer survey mobility and transport. Hence, most passengers will only shift to rail travel if they perceive

it to be relatively more affordable, quicker or more reliable than flying.

Rail has a green advantage, but should compete harder on price, time and reliability

Competitive advantage	1. Price	2.Time	3. Booking and Reliability	4. CO_2 impact
Air	✓	✓	✓	
Rail				✓

Source: Eurobarometer 2019, ING research

1 Price: the fiscal playing field between air and rail is not level yet

At this point in time, air travel still has a price advantage over rail travel, despite rail being subsidised on fixed infrastructure costs. Under the current pricing scheme, international flights (including intra-EU) are exempt from fuel taxes and VAT. Aviation also currently receives 85% of free carbon allowances as part of the EU Emission Trading Scheme (ETS), although this will be reduced to zero before 2027.

The pressure to increase taxation on aviation jet fuel and flight tickets in Europe is growing (72% of Europeans would favour a carbon tax on flights, according to an EIB survey). Its implementation would give an important pricing signal and contribute to levelling the fiscal playing field between the two modes of transportation.

2 Time: air travel is often faster, but train travel is improving

Planes are fast and can take passengers almost anywhere in the world. However, as European travellers frequently want to travel between cities on the continent, trains can often be competitive when it comes to travel time. When taking into account the time just before travelling, and during, flying is often not that much faster than rail as flyers normally need to spend extra time on airport security and check-in procedures. And, considering plans to improve European rail services, the competitive position of rail in terms of travel time is expected to improve over the next few decades. The following actions are expected to improve the interoperability of the railway system by increasing train speed and frequency:

- The creation of the Trans-European Transport Network (TEN-T), linking the most important lines by 2030 (core network) and all European regions by 2050 (comprehensive network).
- The implementation of the European Rail Traffic Management System (ERTMS), the wireless communication system between trains and rail infrastructure for security and control.

Trains can rival flying on one-third of the EU's busiest routes

Across Europe, there are numerous examples of rail passenger transport rivalling air transport: one-third of the EU's busiest air routes in 2019 have a train alternative under six hours.

The domestic routes of Rome-Milan, Berlin-Munich, Paris-Lyon and Madrid-Barcelona, and the international routes of Brussels-Amsterdam and Paris-London have seen a significant move towards rail over the last decade, and there is still the potential to grow further.

Point-to-point travel time difference for air and rail is often not that big

Route	Air	High-speed rail	Time difference
Madrid-Barcelona	3h20	2h45	– 0h35
Berlin-Munich	3h10	3h55	+ 0h45
Rome-Milan	3h10	3h10	=
Paris-London*	3h20	3h20	=
Amsterdam-Paris	3h20	3h20	=

Source: ING Research

*The air flights' travel times disposed in the table include 2 hours for pre and on carriage time. For Paris-London high-speed rail, we added 1h for border control.

3 Booking and reliability: booking flights is much easier than booking trains

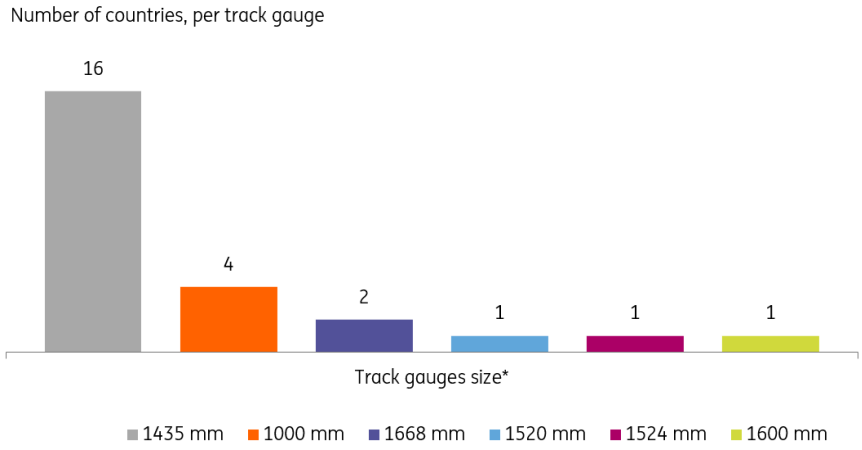
A major point still hampering rail is the complex ticketing system. Research shows that booking an international train trip in Europe has a dropout rate ten times higher than booking a flight. So, improving the train ticket system and ensuring a seamless customer booking experience would immediately boost passengers' use of rail services.

In practice, this could mean creating a European system where all relevant trains are displayed and allowing passengers to travel simply with one ticket instead of several tickets. The CER (Community of European Railway and Infrastructure companies) and the UIC (International Union of Railways) have recently committed to deploying a better rail ticket system by 2025, simplifying the access to tickets and extending the booking time slots. Additionally, if more travel search engines (like Skyscanner) start to also show train options, that would encourage more train ticket sales.

More international coordination between operators would boost the efficiency and quality of rail travel

Furthermore, better coordination between rail operators and agents across Europe would potentially boost efficiency and the quality of rail travel. This would help to accomplish a significant shift in passengers – Eurostar/Thalys can be seen as a best practice here. Following aviation's lead, improving the harmonisation of timetables and the international alignment of slots would help the rail sector. In addition, the (technical) standardisation of rail track gauges and electric currents will be of major importance to facilitate the increase in rail travel, particularly for cross-border trips. Initiatives such as the EuroLink, a joint platform of European rail infrastructure managers, the Trans Europ Express (TEE) 2.0, a network of European routes promoted by cooperating rail companies, and the Timetable and Capacity Redesign (TTR), provide examples of successful coordination.

Rail track gauges are not entirely uniform across EU



Source: European Commission, ING research

*Some countries have multiple track gauges size

Business and city trip travellers are willing to switch to rail

The growing sense of urgency to fight climate change has made travellers more cognisant of the CO2 impact of their journeys. According to a 2021 report by SAP Concur, 69% of corporate travellers advocated for more sustainable travel policies. As a result, a growing number of private companies and universities have been updating their corporate travel policies, pushing for greener business travel solutions. In the Netherlands, a corporate coalition (Anders Reizen) has called for all business trips to London to be done by train, by 2030. Similarly, city trip travellers are becoming more willing to take the train instead of the plane when it directly connects them to the city centre, typically their final destination. This reduces door-to-door travel time.

It is expected that more connections in Europe will fall within a six-hour time range in the next few decades; this is the likely case for the international routes linking Milan-Munich, Amsterdam-Berlin, and Frankfurt-Prague.

Multimodal travel initiatives can help to increase rail travel

European countries are increasingly looking for ways to push rail travel (for example, France has banned short-haul domestic flights that could be directly substituted for rail journeys under two hours and 30 minutes, and The Netherlands set targets to push rail travel on distances up to 700km). Cooperation between air and rail operators, through offering packages, can play an important role in promoting a more carbon-efficient transport system while increasing passengers' travel options and flexibility. For instance, the partnerships between KLM and NS, Air France and SNCF, and Lufthansa and Deutsch Bahn are some good examples of such intermodal initiatives that can help to increase rail travel.

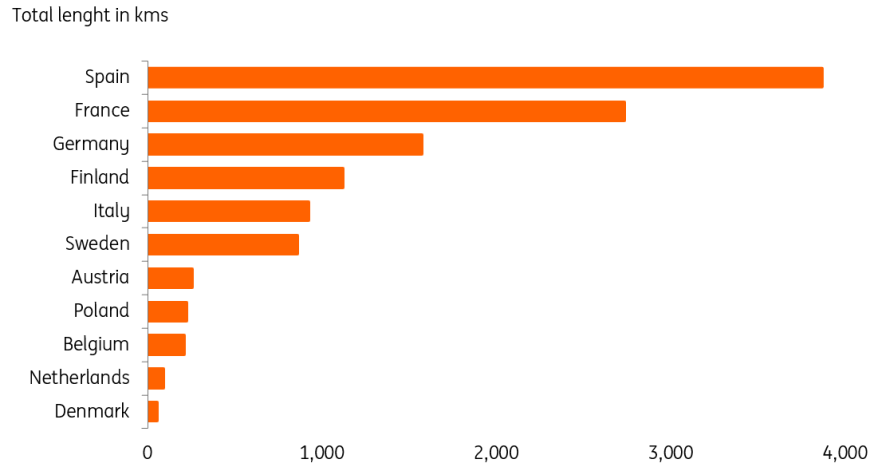
Optimising the use of existing rail infrastructure is key

Europe has a solid and comprehensive rail infrastructure of nearly 200,000km in 2020. In terms of length, the high-speed rail network, which allows trains to operate at significantly faster speeds (normally above 200km/h), has quadrupled since the beginning of the 21st century, reaching 12,000km in 2020, mostly pushed by the expansion in Spain, France and Germany, which, by 2020,

was home to 69% of the total high-speed rail network in the EU. Considering the already-extensive rail network in Europe and the still relatively low occupancy rates in most rail services, optimising the use of the existing capacity and infrastructure in Europe seems key to boosting capacity in the short and medium term.

Nevertheless, in the long term, investments will still be required to further expand the network. On infrastructure, existing conventional lines might be upgraded to accommodate high-speed trains, infrastructural constraints may be resolved, or new lines might be built (but this is extremely costly and time-consuming). On capacity, new trains will most certainly need to be acquired – however, manufacturing and delivering new trains can take up to eight years. Labour shortages might also be a constraint when planning to expand rail's capacity.

Spain had the longest EU high-speed rail network in 2020

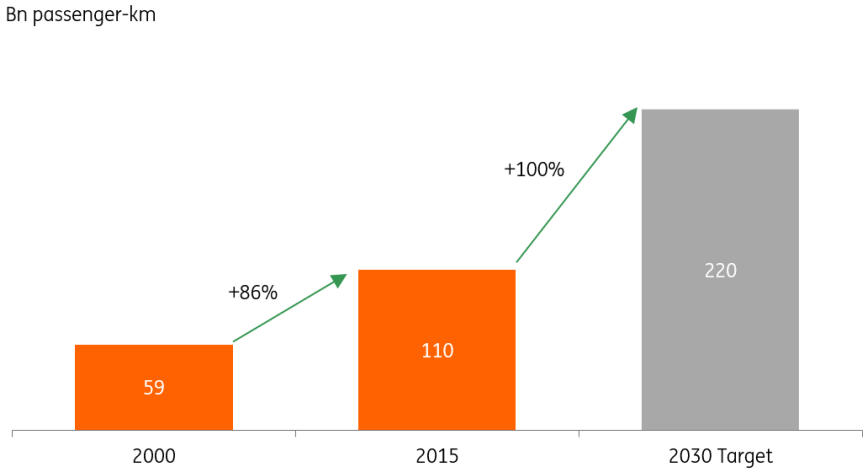


Source: European Commission, ING research

Countries with high-speed lines are in a better position for the shift to rail

High-speed rail is generally an important factor in the transition from air to rail passenger transportation as it provides the opportunity to compete on travel time. The fact that high-speed rail in 2019 accounted for 31% of the total rail passenger transport, while only representing 6% of the total rail network length, emphasises its importance. Thus, the European countries with an already-established high-speed rail network are expected to see a faster shift to rail travel and benefit more in the medium term as some of the current bottlenecks are eliminated.

Doubling high-speed rail traffic in Europe by 2030 won't be easy



Source: European Commission, ING research

There are challenges, but lots of opportunities too

The increasing urgency to adjust consumer behaviour and fight climate change has made travellers and policymakers more aware and supportive of rail travel.

There is still potential for growth in rail travel by filling empty seats and developing the network. To facilitate growth and shift more travellers from planes to trains, Europe must improve in these three key areas:

1. Price: improve the level playing field with aviation in terms of taxation and pricing externalities to facilitate competition.

2. Time: boost efficiency by stepping up the integration of international railway operations and offer more (and more frequent) direct cross-border connections to hubs. In addition, invest in upgrading the infrastructure and (security) systems in order to raise train speed and frequency.

3. Booking and reliability: create an internationally-aligned ticketing system and offer combined tickets. This would be the most important change in the short run.

Fostering cooperation between air and rail operators and setting up policy incentives that support rail travel, such as the French ban on short-haul distance flights, can clearly contribute to increasing rail passenger volume.

Overall, even though it won't be easy to fulfil Europe's climate targets for transport, the current ambitions and plans give an encouraging prospect for the future of rail travel.

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