IRG-rail

Independent
Regulators' Group - Rail

13th Annual Market Monitoring Report

March 2025

01

Introduction

Participating countries

AT - Austria
BE - Belgium
BG - Bulgaria
HR - Croatia
CZ - Czech Republic
DK - Denmark
EE - Estonia
FI - Finland
FR - France
DE - Germany
EL - Greece
HU - Hungary
IE - Ireland
IT - Italy
XK - Kosovo*
LV - Latvia
LT - Lithuania
LU - Luxembourg
MK - North Macedonia
NL - Netherlands
NO - Norway
PL - Poland
PT - Portugal
RO - Romania
RS - Serbia
SK - Slovakia
SI - Slovenia
ES - Spain
SE - Sweden
CH - Switzerland
UK - United Kingdom

SCOPE

31 countries

5 years of data
2019 - 2023

Main focus this year
Characteristics of infrastructure managers

CONTENT OF THE REPORT

FOCUS TOPICS IN PREVIOUS REPORTS

2018	2019	2020	2021	2022
Competition in the railway markets	Impacts of the COVID-19 pandemic in the first half of 2020	Additional analyses of the Impacts of the COVID-19 pandemic in 2020	Impacts of COVID-19 in 2021 and market recovery	Heterogeneity of network usage and potential determinants

*Kosovo (XK): This designation is without prejudice to positions on status and in line with UNSCR 1244 (1999) and the ICJ opinion on the Kosovo declaration of independence.

IRG-Rail – A network of cooperation

The Independent Regulators' Group Rail (IRG-Rail) was established by 15 European rail regulatory bodies in June 2011. Since foundation, the objective of the group has been to establish a network of cooperation between member organisations in the railway sector. The group has expanded over time and now includes members from 31 countries.

IRG-Rail members aim to consistently deal with regulatory challenges and rail developments across Europe. IRG-Rail acts as a platform for cooperation, sharing best practice and promoting a consistent application of the European regulatory framework. As stated in the Group's statutory document, 'the overall aim of IRG-Rail is to facilitate the creation of a single, competitive, efficient and sustainable railway market in Europe' [1].

What we do

Directive 2012/34/EU states that regulatory bodies have a formal duty to monitor the situation in the railway market. Market monitoring is therefore an essential task for the national regulatory bodies. It is also a vital instrument for enhancing market transparency, setting direction for the activities of regulatory bodies and encouraging market participants to develop and improve their activities.

General aim of the Market Monitoring Working Group

The IRG-Rail Market Monitoring Working Group was set up as a platform for cooperation and to exchange best practices in terms of data collection and analysis. The group has an agreed set of guidelines[2] for gathering railway data and produces the annual Market Monitoring Report, based on the results of a yearly collection of data.

This is IRG-Rail's 13th Market Monitoring Report and covers calendar year 2023, unless otherwise stated.

Content of the report

The Market Monitoring Report provides an overview of market developments and the economic conditions in the railway sector with respect to IRG-Rail member countries. The report also compares developments and the competitiveness of the railway market over time.

The report consists of two parts. This Main Report presents results at the overall European level. The Working Document includes country specific data and more detailed observations[3]. In addition, the underlying data is available on the IRG-Rail website[4].

Each Market Monitoring Report focuses on one or more specific subject(s). This year, the report includes a study on the characteristics of European rail infrastructure managers. Furthermore, in this Main Report, readers can find new indicators on the freight market (freight terminals and punctuality), and passenger market (operators' market share in PSO and non-PSO markets, punctuality). There are also new indicators in the Working Document (intermodal traffic, PSO passenger-km awarded by competitive tenders and number of passenger stations).

Methodology

It is the responsibility of each regulatory body to gather, quality-assure and submit data according to the agreed guidelines. The Working Group has developed a common template to save effort for regulatory bodies and to ensure the comparability of the data. Data comes from market surveys carried out by the regulatory bodies and/or national statistics, as well as other trustworthy sources.

31 countries contributed to this 13th Market Monitoring Report. However, most countries were not able to provide data for all measures. This report only presents indicators for which enough data was made available, to ensure reliable and consistent information. As a result, some analyses are performed using data from a subset of participating countries. Therefore, some sections may not cover all 31 countries. In each section of the report, key figures and analyses presented use a consistent sample of countries[5]. Detailed information and specific data by country are also provided in the Working Document.

[1] https://www.irg-rail.eu/irg/about-irg-rail/general-information/About-the-IRG-Rail.html
[2] The guidelines can be found here.
[3] The Working Document can be found here.
[4] The data can be found here.
[5] The data coverage for each figure is included in the footnotes. All countries are included, unless otherwise specified.

Recent trends in European rail transport (2022-2023)

Passenger services

Passenger train-km	Passenger-km	TAC* from passenger services	Operator revenues
+1%	+12%	+5%	+9%
(31 countries)	(31 countries)	(28 countries)	(24 countries)
(2019-2023 : -0.2%)	(2019-2023 : +1%)	(2019-2023 : +10%)	(2019-2023 : +13%)

Freight services

Freight train-km	Freight tonne-km	TAC* from freight services	Operator revenues
-6%	-8%	-6%	+5%
(31 countries)	(31 countries)	(29 countries)	(21 countries)
(2019-2023 : -5%)	(2019-2023 : -8%)	(2019-2023 : -9%)	(2019-2023 : +18%)

Notes: All comparisons are for 2023 compared with 2022, plus comparisons in grey between 2023 and 2019 below each indicator. The number of countries included is provided under each metric. *Track Access Charges for the Minimum access package collected by infrastructure managers.

OVERVIEW

In 2023, inflation in IRG-Rail countries remained high at 7% on average, despite a decrease of almost 2 percentage points from 2022. These high price pressures, and the subsequent tightening of monetary policy, have slowed economic activity with a notable weakness in industry. In parallel, passenger demand for travel by rail has increased. This means that two contrasting pictures can be observed in the European railway market.

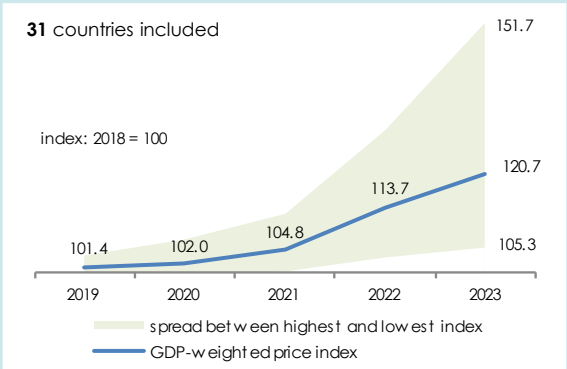
In the rail passenger market, **passenger-km increased sharply over the last year** (+12%), with a smaller increase in train-km. Thus, passenger transport exceeded its 2019 level. Both PSO and non-PSO traffic contributed to this expansion.

Meanwhile, **rail freight transport** suffered from the consequences of the economic slowdown and **net tonne-km fell by 8% compared to 2022.** International traffic contributed to this reduction (-13%) and saw its share fall to the record low level of only 48%.

Track access charges (TAC) collected by infrastructure managers (IM) **increased for passenger services but decreased for freight services**, in line with the changes in traffic.

On a mostly stable railway network, infrastructure managers' expenditure per route km increased by 19% in 2023 compared with 2022. There appears to have been more investment in renewals than in maintenance.

Figure 1 – Average price index from 2019 to 2023



In 2023, **RUs' revenue from passenger services exceeded the 2022 level by 9%, in line with the growth in traffic.** Compared with 2019, it was 13% higher, due in part to inflation. **For freight services, the increase in RUs' revenue in 2023** compared with previous years amid the drop in traffic is largely explained by inflation.

RUs' spending on diesel (per litre) decreased by 19% over the year, driven in part by the fall in the price of oil in 2023**.** Meanwhile, **spending on electricity (per kWh) continued to increase** over the same period (+19%).

02

Characteristics of the railway network

IN 2023

Network length

232,514 km
total route length

4.77 km
of lines per 100 km² country area

4.32 km
of lines per 10,000 inhabitants

Network usage intensity

54
trains per day per route km

82%
for passenger services

18%
for freight services

57%
share of electrified route

3.9%
share of high-speed route

The sample used to calculate these figures is specified in the following pages.

European railway network

In 2023, the overall route length for IRG-Rail monitored countries was over 232,500 km. Over recent years the total route length has remained stable. Within specific countries there have been some changes (see Working Document for more detail). There may be changes within a network, that are not visible in the data, including where line closures and new construction have balanced each other out.

Almost 70% of the total route length comes from the eight countries with the largest networks: Germany, France, Poland, Italy, the UK, Spain, Sweden and Romania. Luxembourg has the shortest network of all participating countries (271 km).

Figure 2 – Route length (in km) of participating countries in 2023

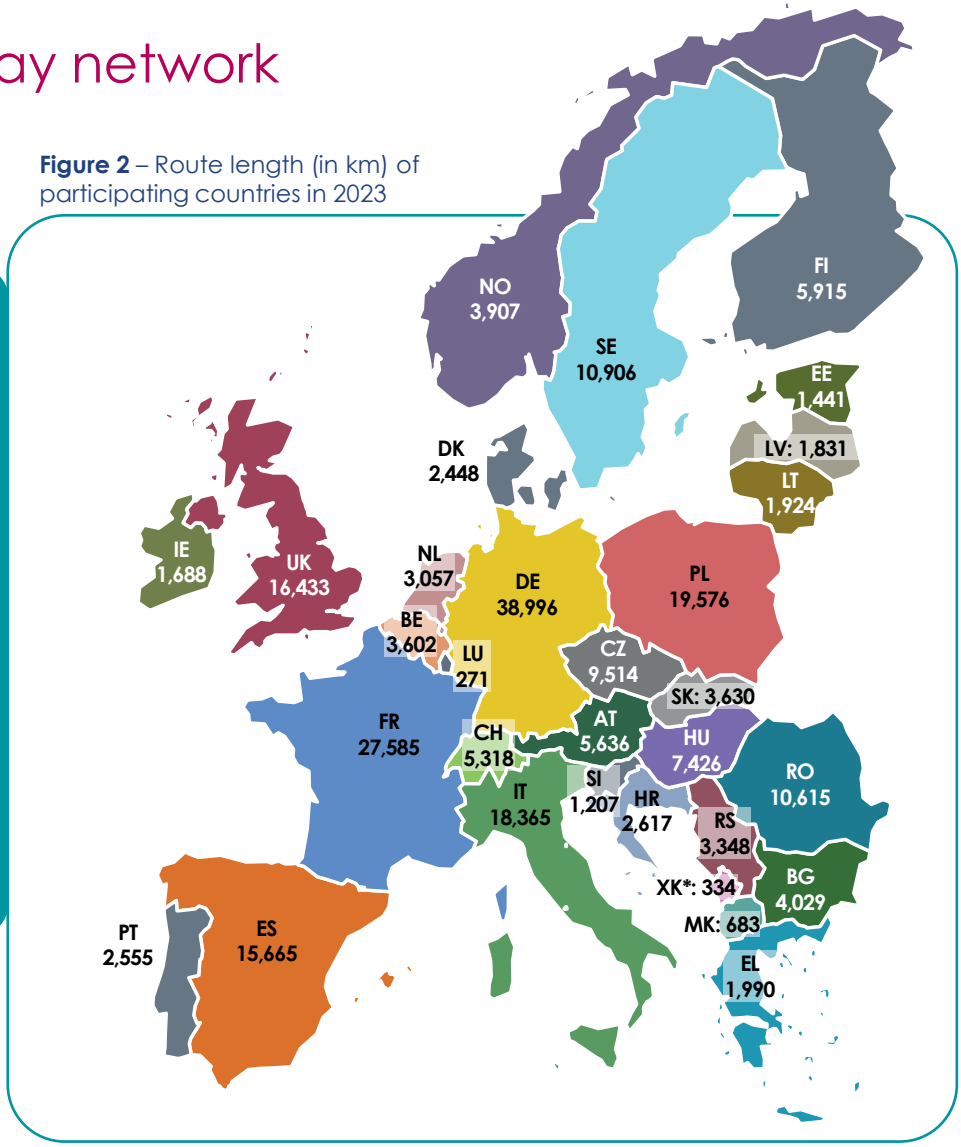
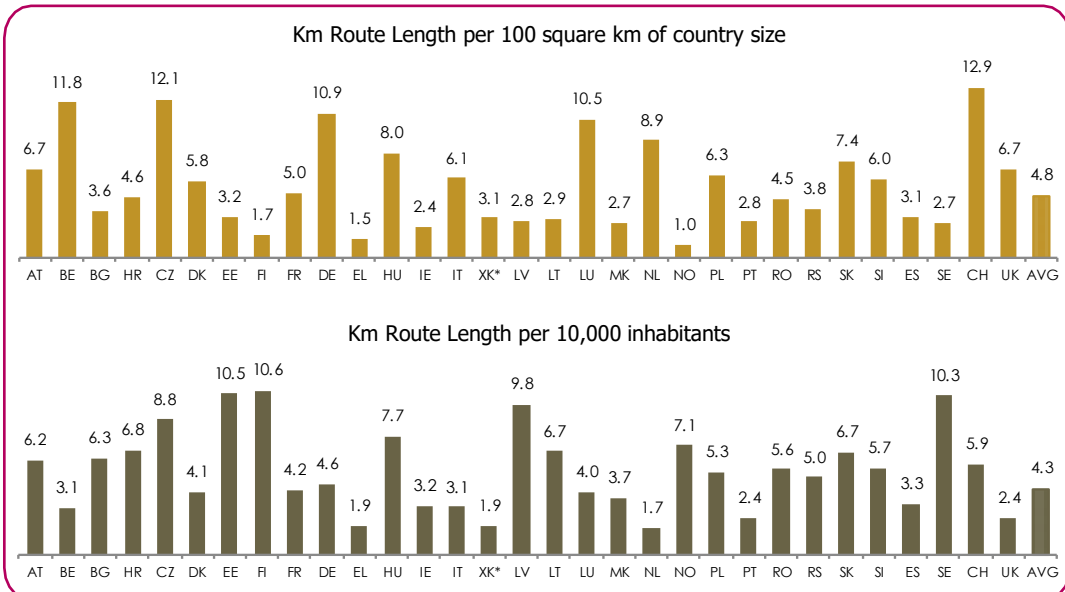


Figure 3 – Network density with respect to country area and population in 2023



Network density is an indicator for the development and coverage of the rail network in each country. The average network density in monitored countries was about the same in 2023 as it was in 2022.

Switzerland reported the highest network density relative to country size, 12.9 route-km per 100 km^2, followed by Czech Republic (12.1) and Belgium (11.8). All these countries have rail networks with a high level of coverage across the countries' land area. Norway has the lowest network density relative to country size of all participating countries (1.0).

Network density can also be presented in terms of route length per 10,000 inhabitants. In 2023, the density was on average 4.3km of route per 10,000 inhabitants. This means the indicator remained stable between 2022 and 2023. As in 2022, Estonia, Finland and Sweden have the densest networks in terms of route length per capita, with more than 10 km of route per 10,000 inhabitants. The countries with a higher network density relative to population size typically show a lower density in terms of country size. This is usually indicative of a relatively low population density, or the fact that there are large areas of the country which are not served by the rail network. Greece and the Netherlands show the lowest density in terms of route length per 10,000 inhabitants, both 1.7 km of route per 10,000 inhabitant

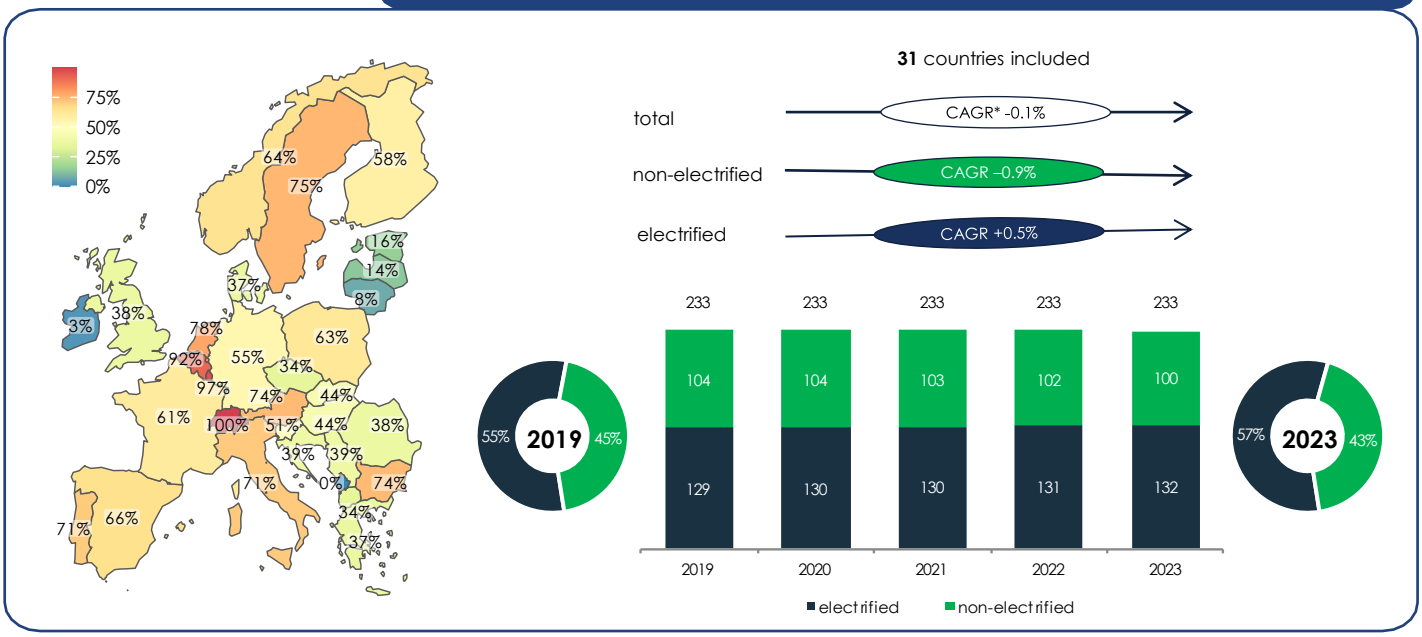
Additional indicators included in the Working Document:
- High-speed route length
- TEN-T route length

Electrification of the railway network

In 2023, 57% of the total route length was electrified. This includes an additional 3,000 electrified route km and an increase of 2 percentage point of electrified route share compared with 2019.

Across Europe, the level of electrification of the railway network varies significantly, from Switzerland where the entire network is electrified, to Kosovo where the entire network is non-electrified. Nine countries have a share of electrified network higher than 70%, and five have a share of electrified network below 20%.

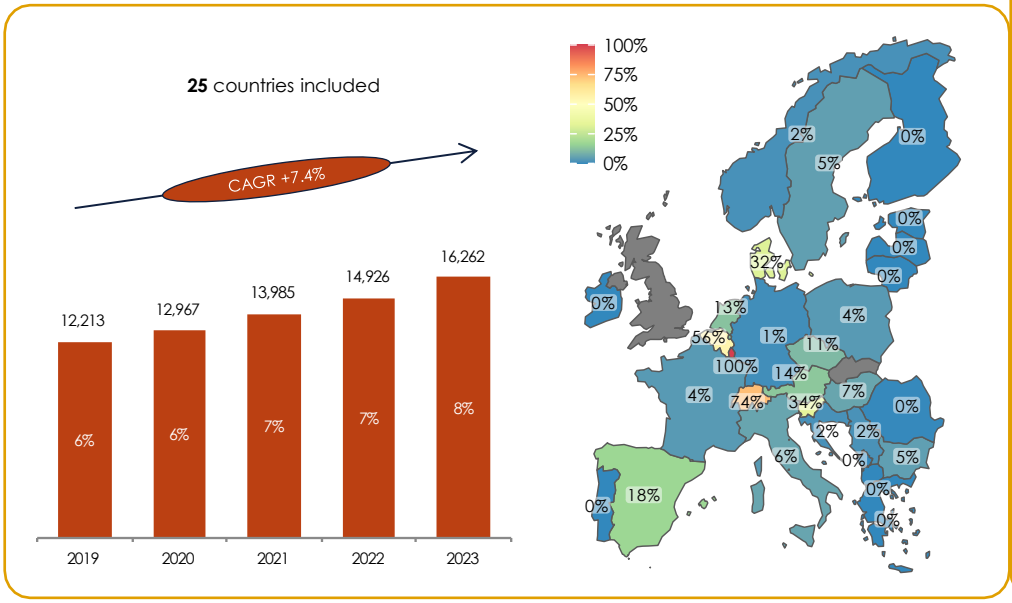
Figure 4 – Electrified share per country in 2023 (left) and breakdown of total route length (thousand km) into electrified and non-electrified network (right)[6]



*CAGR: compound annual growth rate

Interoperability of the railway network

Figure 5 – Total ETCS-enabled route length (km) and share of total route (%) from 2019 to 2023[7] (left) and share of ETCS-enabled routes per country in 2023 (right)



In total, 25 IRG-Rail countries reported data on ETCS-enabled routes in 2023. The total route equipped with this system is over 16,000 km long. Since 2019, the ETCS-enabled route length has increased rapidly (by 7.4% on average per year). However, this represents only 8% of the total network and the widespread effort to deploy ETCS over the last five years has allowed these routes to gain only 2 percentage points in share of total network.

Switzerland has the longest ETCS-enabled route length (3,922 km). In Luxembourg, 100% of the rail network is equipped with ETCS. While nine countries, including those with largest network such as Germany and France, have a share of ETCS-enabled routes of 5% or lower.

[6] In this graph and the following, CAGR stands for the compound annual growth rate.
[7] 25 countries are included in this figure (Denmark, Latvia, Lithuania, Netherlands, Slovakia and UK are not included).

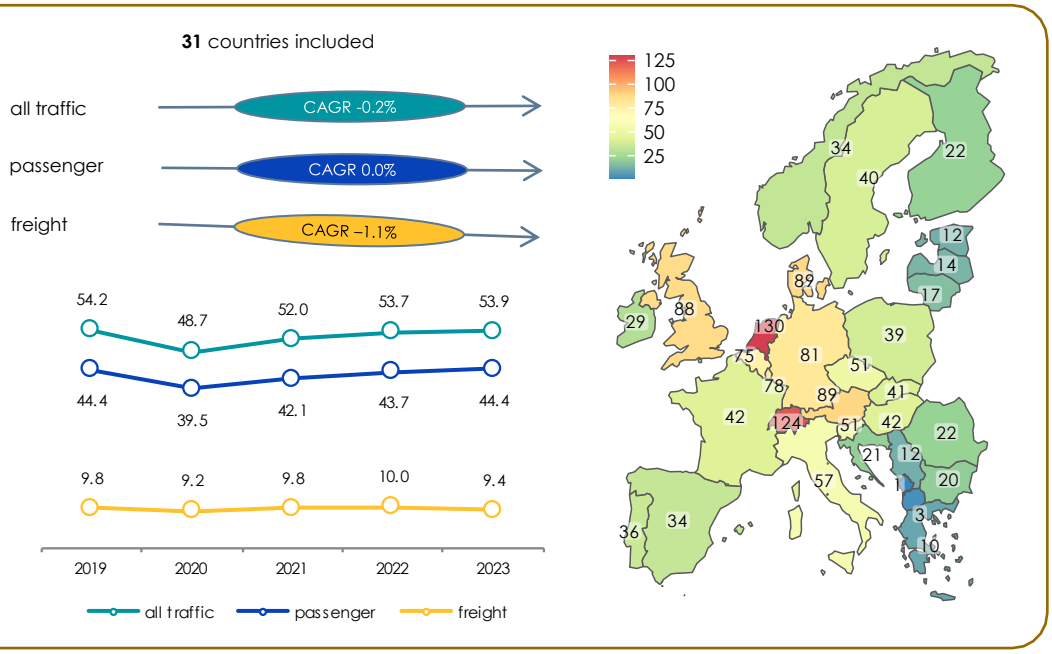
More information on infrastructure managers in the focus chapter (Chapter 7)

Network usage

The rail network was predominantly used by passenger services in almost all monitored countries. For passenger services, the average usage was 44.4 train-km per route-km per day in 2023. This is up from 43.7 train-km per route km per day in 2022. The network usage intensity for these services was highest in the Netherlands, followed by Switzerland, Austria, Denmark, and the UK.

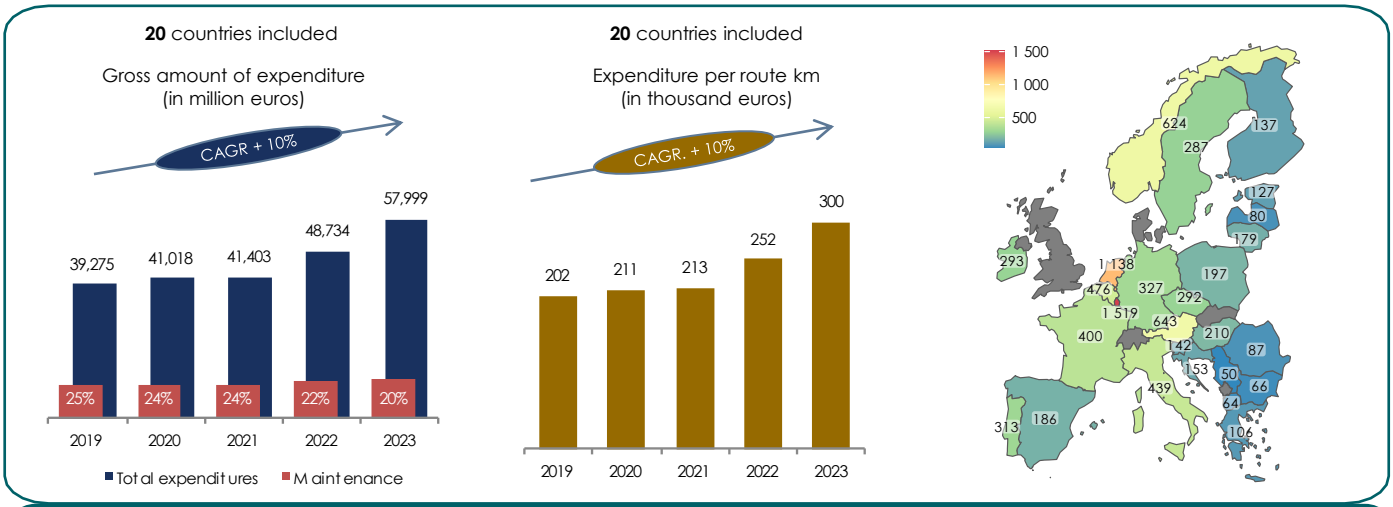
For freight services, the average usage was 9.4 train-km per route km per day. Since 2019, the average has been fairly constant between 9 and 10 train-km per route km per day.

Figure 6 – Overall network usage intensity (train-km per route km per day) from 2019 to 2023 (left) and its 2023 level per country (right)



Infrastructure managers' expenditure on the network

Figure 7 – Infrastructure managers' expenditure on the network, share of maintenance in total amount (left), expenditure per route km (centre) from 2019 to 2023 and expenditure per route km per country in 2023 (right) [8]



Infrastructure managers' expenditure on the network reached almost €58 billion according to data from 20 countries in 2023. Expenditure has increased steadily since 2019, by 10% on average per year. The increase was particularly large in 2022 and 2023, which could be explained by high levels of inflation in the same period.

Overall, expenditure per route km reached €300,000 in 2023, with substantial variation across countries. As with last year, the highest level was reported in Luxembourg (over €1.5 million per route km) while the unit amount was lower than €100,000 per route km in six countries. Several factors contribute to these disparities including the actual conditions of the network, historic works completed, composition of infrastructures and usage intensity (see the Working Document for more explanation).

[8] 20 countries are included in this figure (Denmark, Ireland, Kosovo*, Latvia, Luxembourg, Netherlands, North Macedonia, Serbia, Slovakia, Switzerland and UK are not included).

03

Track access charges (TAC) for the minimum access package

IN 2023

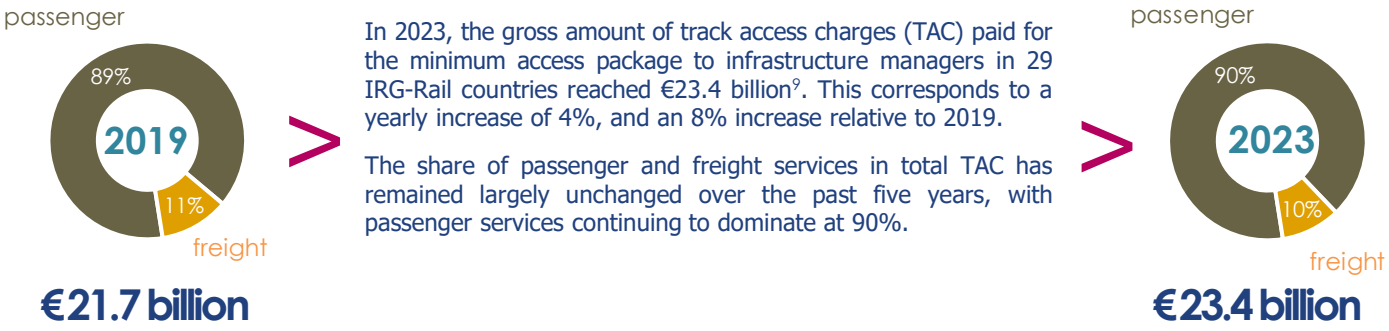
€23.4 bn
total TAC

€5.13
average TAC per train-km

90%
share of TAC from passenger services

The sample used to calculate these figures is specified in the following pages.

Evolution of TAC



In 2023, the gross amount of track access charges (TAC) paid for the minimum access package to infrastructure managers in 29 IRG-Rail countries reached €23.4 billion[9]. This corresponds to a yearly increase of 4%, and an 8% increase relative to 2019.

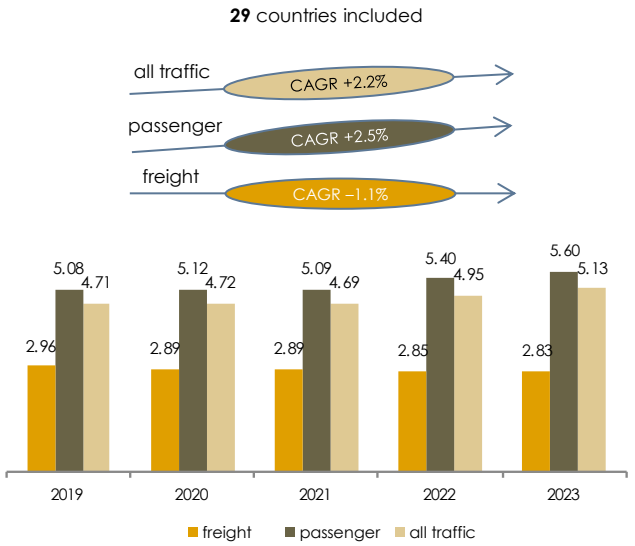
The share of passenger and freight services in total TAC has remained largely unchanged over the past five years, with passenger services continuing to dominate at 90%.

TAC per train-km

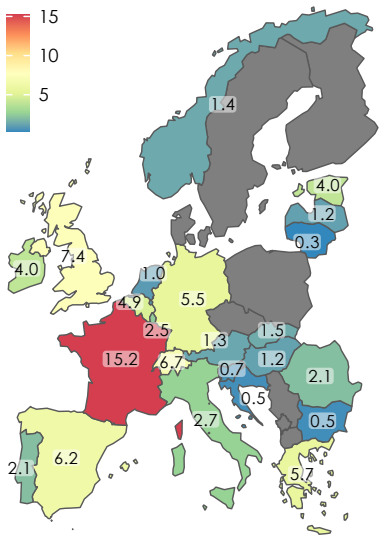
About 90% of all European track access charges (TAC) is paid by passenger services. While the average TAC per passenger train-km was €5.13 in 2023, this indicator varies substantially between European countries. In seven countries, the charge was lower than €1, while it was higher than €5 in another six countries, even exceeding €10 in France. Moreover, this ratio is, on average, 70% higher for non-PSO services, in comparison with their PSO counterparts. It should be noted that for some countries, railway undertakings (RUs) do not pay the whole amount of TAC that is collected by infrastructure managers, as public financing may intervene to reduce the TAC burden for RUs (see the Working Document for more detail).

After a sharp decline during the pandemic, TAC revenue from passenger services began to recover in 2022 and continued to grow in 2023, now standing 10% above 2019 levels. In contrast, freight revenue showed some recovery but remained 5% below the 2019 level in 2023. Moreover, between 2019 and 2023, TAC for total traffic showed a compound annual growth rate (CAGR) of 2.2%, with passenger TAC increasing by 2.5%. In contrast, freight TAC experienced a decline (-0.6%).

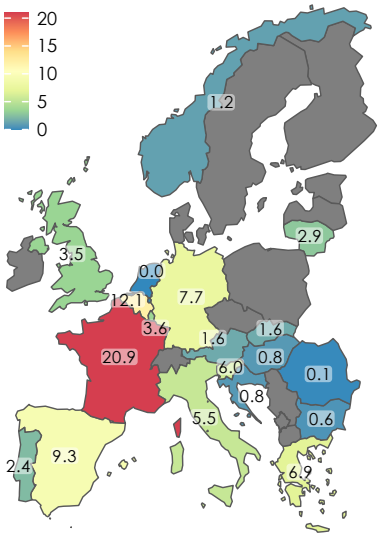
Figure 8 – Track access charges (in Euro per train-km) paid for the Minimum Access Package[10] to infrastructure managers from 2019 to 2023 (chart)[11] and 2023 level per country (maps)



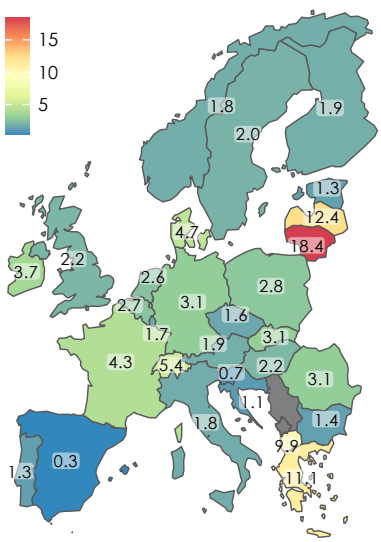
PSO TAC (Euro per train-km)



Non-PSO TAC (Euro per train-km)



Freight TAC (Euro per train-km)

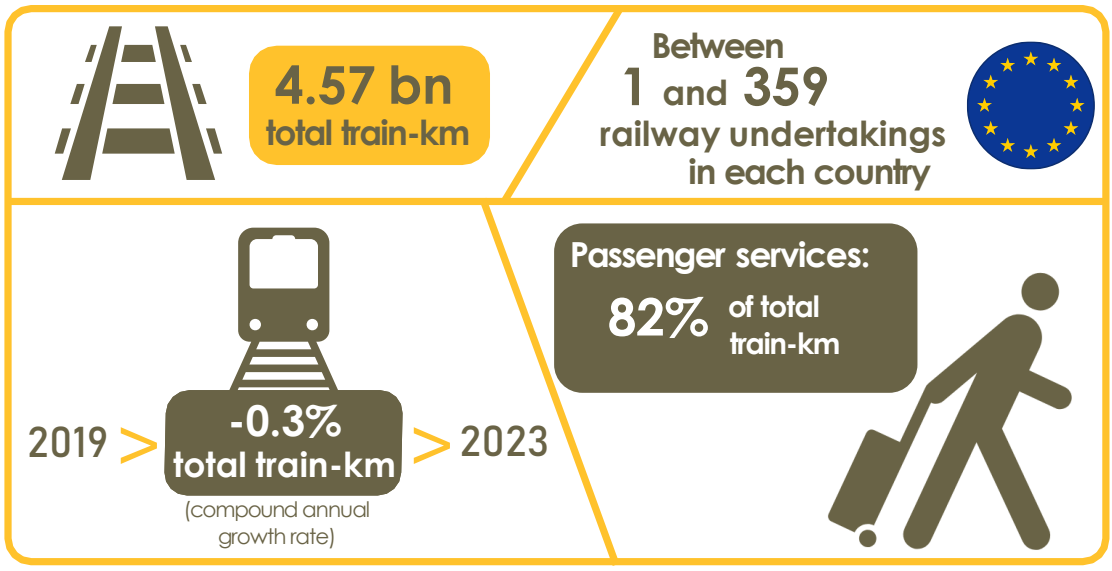


[9] 29 countries are included in this paragraph and its associated figures (Kosovo and Serbia are not included).
[10] Directive 2012/34/EU of the European Parliament and of the Council.
[11] 29 countries are included in this figure (Kosovo and Serbia are not included).

04

Market players and European rail traffic

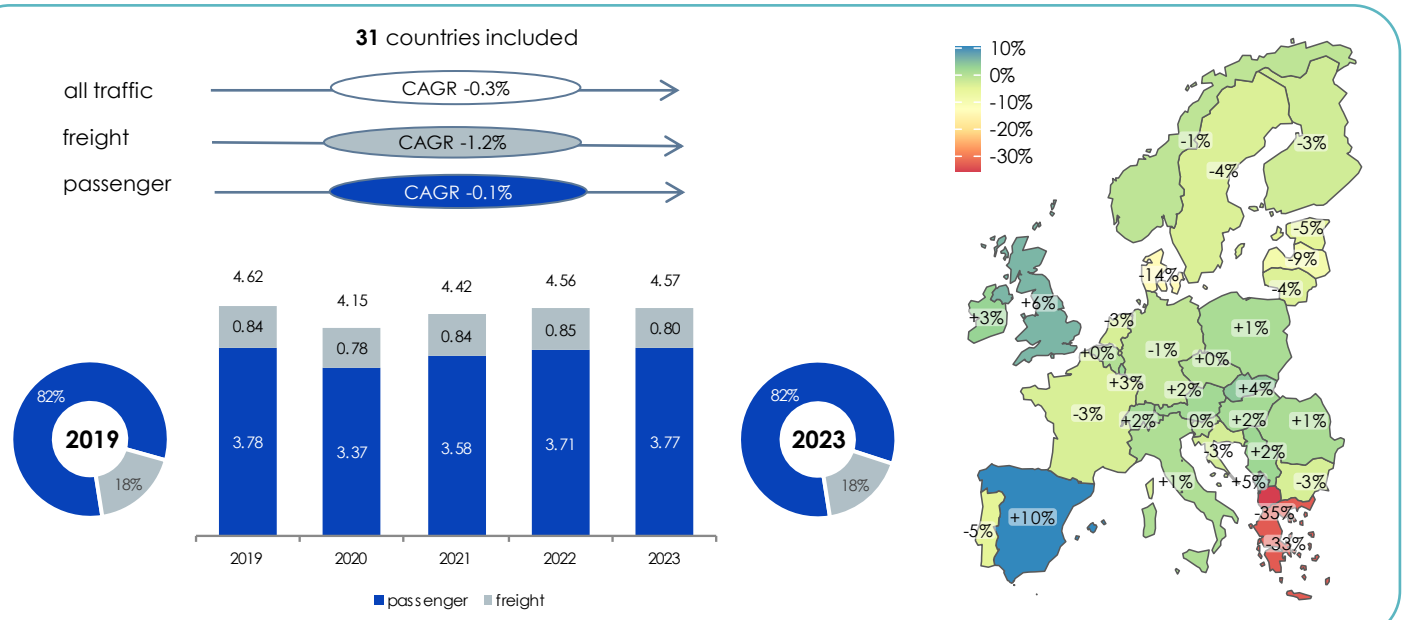
IN 2024



The sample used to calculate these figures is specified in the following pages.

Total rail traffic

Figure 9 – Rail traffic in billion train-km from 2019 to 2023 (left) and 2023/2022 individual change (right)

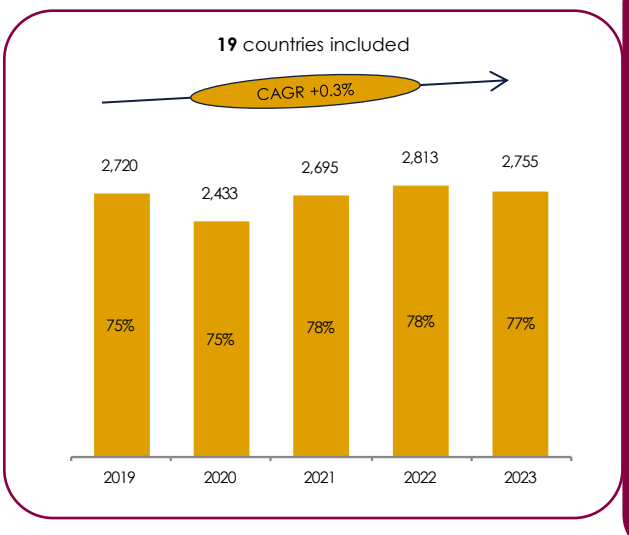


In 2023, a total of 4.57 billion train-km was reported by member countries, almost the same as 2022. Rail traffic has returned to close to pre-pandemic levels (still down by 1%). The split of total traffic between passenger and freight services remained stable in 2023 compared with 2019.

Rail transport supply varies substantially between countries. There have been year-on-year of increases of more than 5% in Spain, the UK and Kosovo, while there have been reductions of more than 30% in Greece. This was due to a fatal accident and a significant storm in Greece in 2023. In comparison to 2019, only 11 countries reported increases in rail traffic, while 20 countries saw a fall in train-km.

Electrified traffic

Figure 10 – Electrified train-km (in millions) and share in total rail traffic (%) from 2019 to 2023[12]



Of the 19 countries that reported, more than three quarters (77%) of rail traffic is electrified. In 2023, electrified train-km totalled almost 2.8 billion, slightly higher than the pre-pandemic level (+1%). However, as total traffic was lower than the 2019 level, this results in an increase in the share of electrified train-km (up 2 percentage points).

While some countries show shares of electrified train-km close to 100% (Luxembourg 98%, Sweden 96%, Italy 93%), some countries observe proportions close to 85% of train-km resulting from diesel trains (Ireland, Lithuania).

Apart from a few exceptions, most electrified train-km are run in the passenger segment (82% on European average). The share of electrified train-km in 2023 was higher in the freight sector (78%) than it was in the passenger sector (76%). This is because the non-electrified sections see passing more passenger services than freight services.

[12] 19 countries are included in this figure (Austria, Czech Republic, Denmark, Ireland, Kosovo, Luxembourg, Netherlands, North Macedonia, Norway, Slovakia, Slovenia and Switzerland are not included).

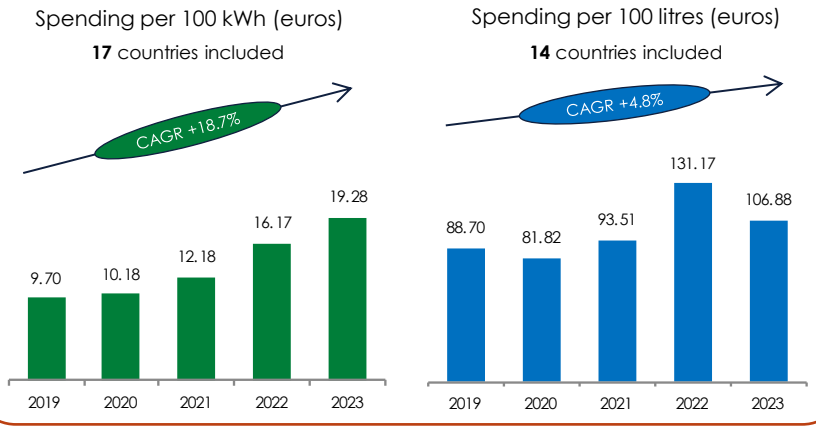
Additional information on infrastructure managers in the focus chapter (Chapter 7)

Railway undertakings' energy expenditure

Railway undertakings' spending on energy has significantly increased since 2019, but did not follow the same trend depending on the type of energy. On the one hand, spending on traction current almost doubled since 2019. This is driven by the strong upswing from 2021 to 2023 when electricity spending increased by at least 19% on a year-on-year basis. Most reporting countries saw electricity spending peak in 2022 followed by a drop in 2023. However, France, Germany, Poland and the UK recorded large increases in spending per kWh in 2023 after moderate rises in previous years.

On the other hand, after a 40% increase in 2022, spending on fuel decreased by 19% in 2023 amid a decline in oil prices. This results in a moderate annual growth rate of 5% over the last five years.

Figure 11 – Railway undertakings' spending (in euros) per 100 kWh and per 100 litres of diesel from 2019 to 2023[13]



Railway undertakings

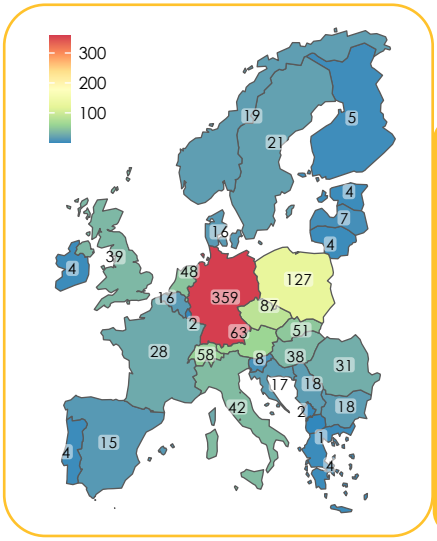


Figure 12 – Number of active railway undertakings by country in 2023

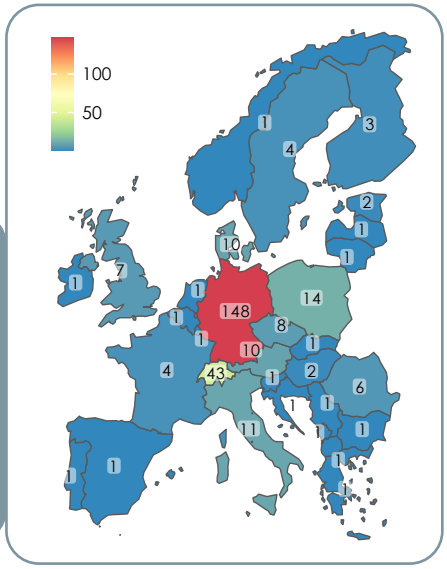
The number of active railway undertakings (RUs) varies substantially across members, from one RU in North Macedonia to 359 in Germany.

For most members (22), the number of active RUs operating freight services exceeds the number of RUs operating passenger services. This reflects the earlier opening of the freight market. Freight services were offered by 72% of all active railway undertakings, while passenger services were only offered by one third of operators.

Railway undertakings in the passenger sector can be categorised as operating PSO or non-PSO services. All countries indicated at least one active railway undertaking operating under a public service contract (PSO), with 11 members reporting that passenger traffic was operated by PSO operators only. While three countries do not have any non-PSO operator, 17 countries feature more than one operator in this 'open access' segment.

Infrastructure managers

Figure 13 – Number of infrastructure managers by country in 2023



A total of 289 infrastructure managers (IMs) were reported by participating countries for 2023. Similar to the number of active railway undertakings, the number of IMs varies across countries. Germany again shows the highest number (148) followed by Switzerland (43) and Poland (14). However, a majority of countries (17) reported only one infrastructure manager operating the whole national network.

The number of infrastructure managers seems to reflect the historic developments, demographical circumstances and geographical features of a country. In some countries, due to profitability reasons, some individual regional networks which used to be managed by the main infrastructure manager are now run by local governments or entities.

[13] 17 countries are included in the figure of spendings per kWh (Austria, Czech Republic, Denmark, Finland, Kosovo, Latvia, Luxembourg, North Macedonia, Netherlands, Norway, Serbia, Sweden and Switzerland are not included). 14 countries are included in the figure of spendings per litre (all countries above plus Croatia, Greece, Slovakia and UK). Italy is not included in the first figure but included in the second one.

05

The rail freight market

IN 2023

800 m
freight train-km

435 bn
freight net tonne-km

Freight load factor:
544 net tonne-km per freight train-km

55%
total market share of competitors* in the freight market
(net tonne-km)

€25.57
RU's revenue per freight train-km

€cent 4.55
RU's revenue per net tonne-km

The sample used to calculate these figures is specified in the following pages.
* Competitors in each country refer to all railway undertakings other than the domestic incumbent.

The rail freight market: size

For reference, the modal split of rail freight transport in the EU countries was 17.1% of total inland freight tonne-km in 2023, stable compared to the previous year (source: Eurostat).[14]

Rail freight traffic saw a clear downturn in 2023, due to economic slowdown in Europe. While freight train-km decreased by around 6%, net tonne-km fell by 8% to the lowest level over the last five years. Traffic decline was observed in all but three countries across Europe with decreases ranging from 1% to more than 50% in Estonia (due to the ongoing war in Ukraine) and Greece (due to a fatal train accident and a significant storm which led to subsequent track closures).

Figure 14 – Total freight traffic from 2019 to 2023 (left) and 2022/2023 change in tonne-km (right)

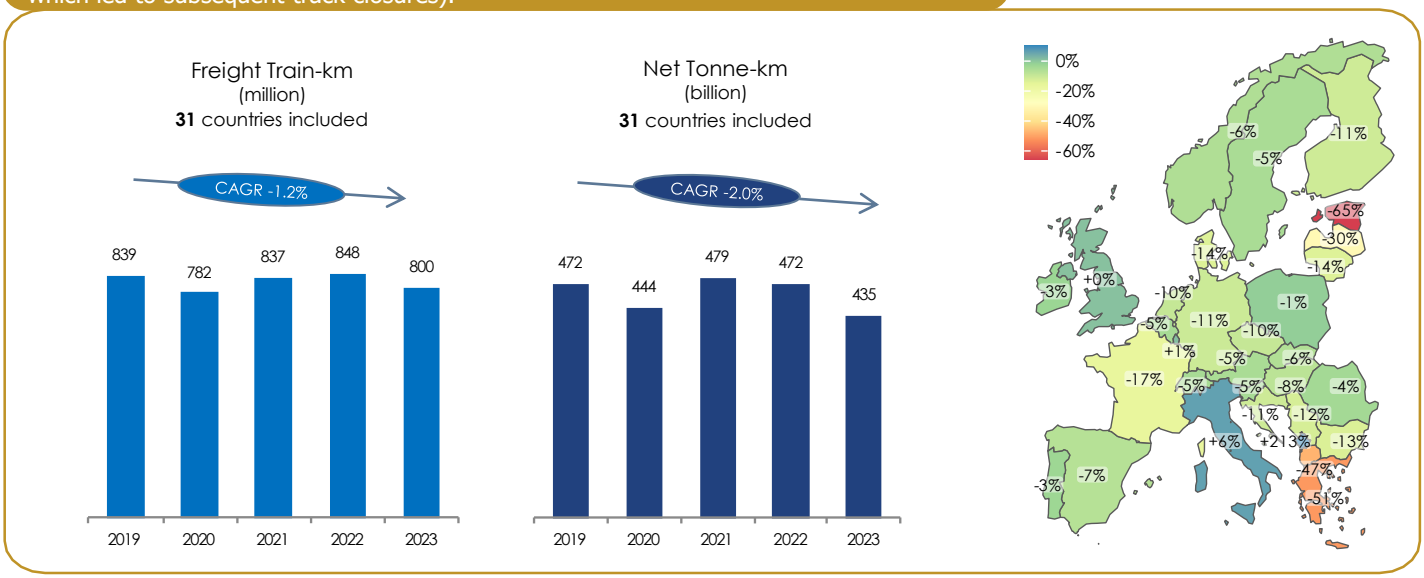
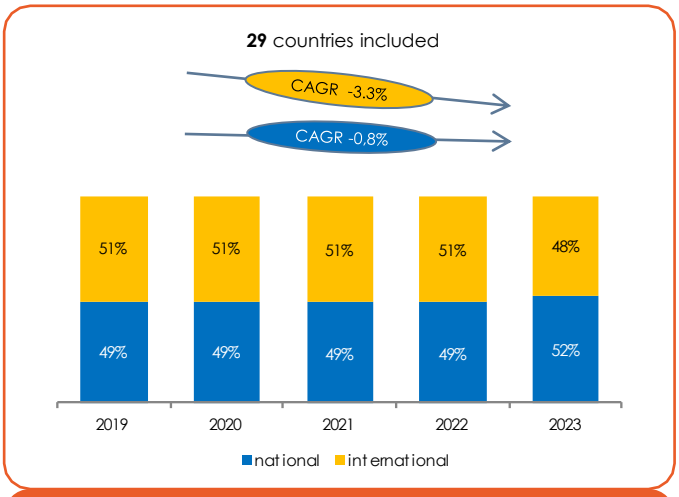


Figure 15 – Share of national and international freight traffic (based on net tonne-km) from 2019 to 2023[15]

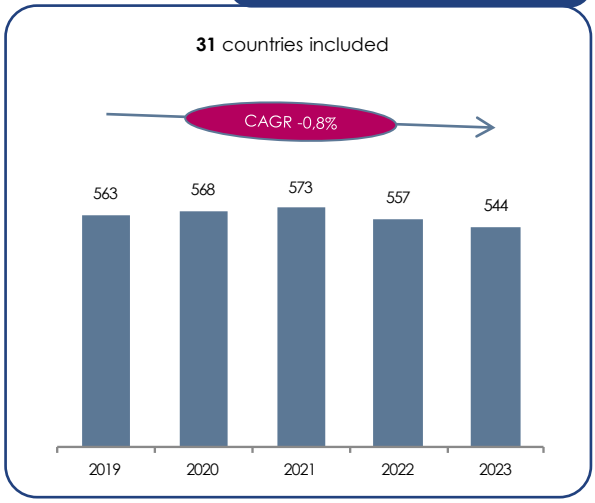


International traffic was more affected by the contraction of the freight market. Its share dropped to below 50% for the first time since the start of IRG-Rail's market monitoring data collection for 2010. From 2022 to 2023 national traffic only decreased by 2%, while international transported tonne-km fell by 13%.

After several years of growth, a reduction in the freight load factor can be observed for the second year in a row. Freight load factor in 2023 decreased by 2% compared with 2022, and by 3% compared with 2019.

Over the last five years, two thirds of the countries reported a decrease in this indicator.

Figure 16 – Freight load factor (net tonne-km per freight train-km)



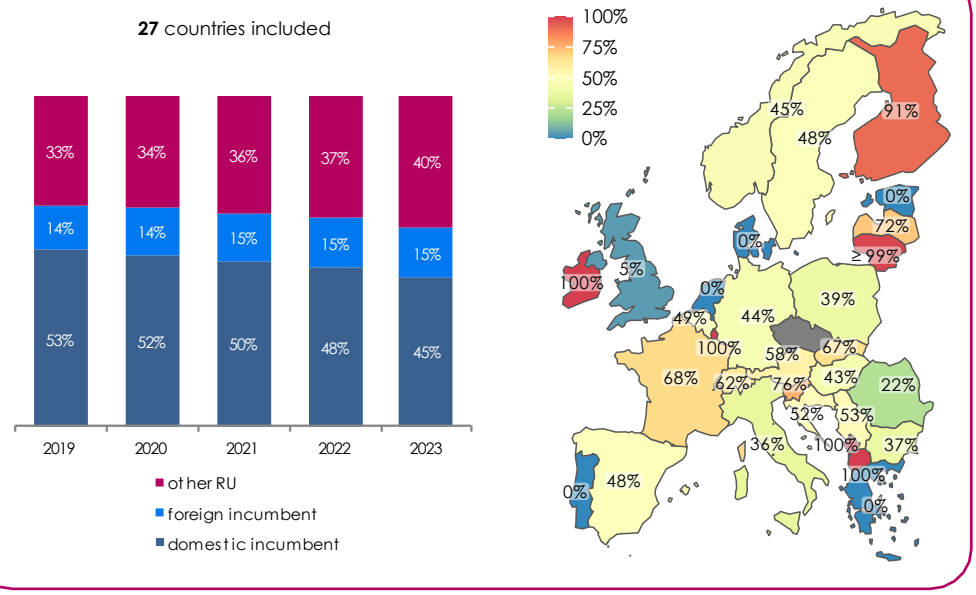
[14] Data on the modal split of freight transport in the European Union can be found on Eurostat website.
[15] 29 countries are included in this figure (Kosovo and Switzerland are not included).

Market share of freight railway undertakings

Figure 17 – Market share (based on net tonne-km) of freight railway undertakings (left)[16] and share of the domestic incumbent by country in 2023 (right)

As in previous years, competitors continued to gain market share from the domestic incumbents in 2023. The latter's share declined by 3 percentage points over the year to 45% in 2023. While the market share of foreign incumbents has remained stable at approximately 15%, that of other railway undertakings has been on an upward trend since 2017, now reaching 40% [17].

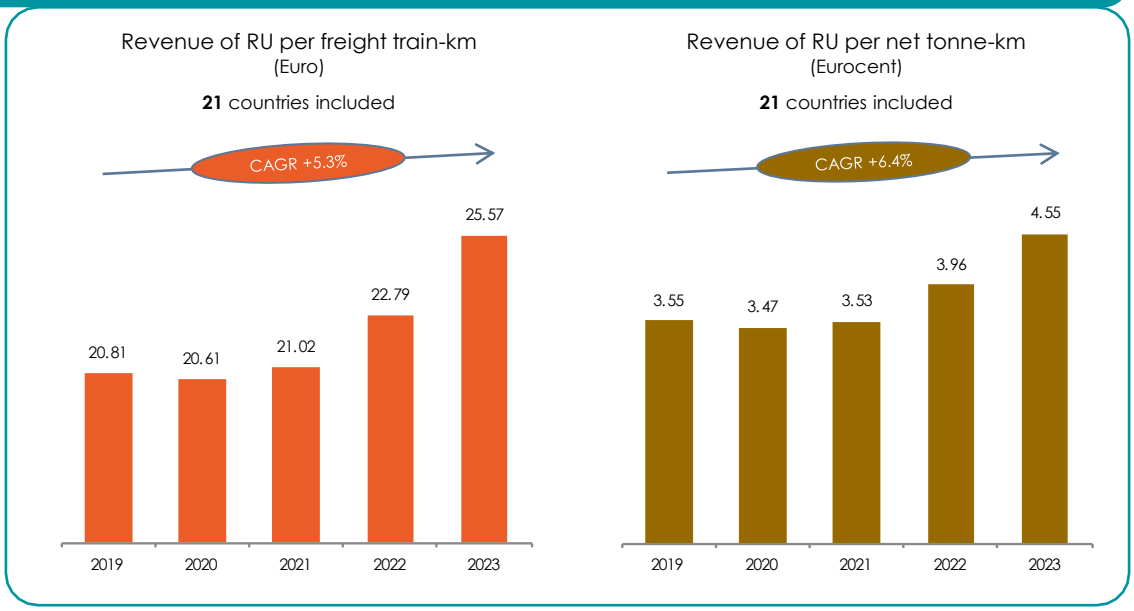
Only five countries have no traffic (or nearly no traffic) by the domestic incumbent's competitors in 2023.



Economic performance of freight railway undertakings

Railway undertakings' revenue from freight services showed a strong increase from 2022 to 2023. Freight revenues rose by 12% per train-km and 15% per net tonne-km. Since 2022, operators had increased prices to compensate for high inflation in costs (9% and 7% on average in 2022 and 2023 respectively). The increase in average revenue per train-km was driven by cost inflation in countries with high freight transport volumes, such as Poland (+19%), Germany (+14%) and France (+14%).

Figure 18 – Freight railway undertakings' revenue per train-km and per net tonne-km from 2019 to 2023[18]

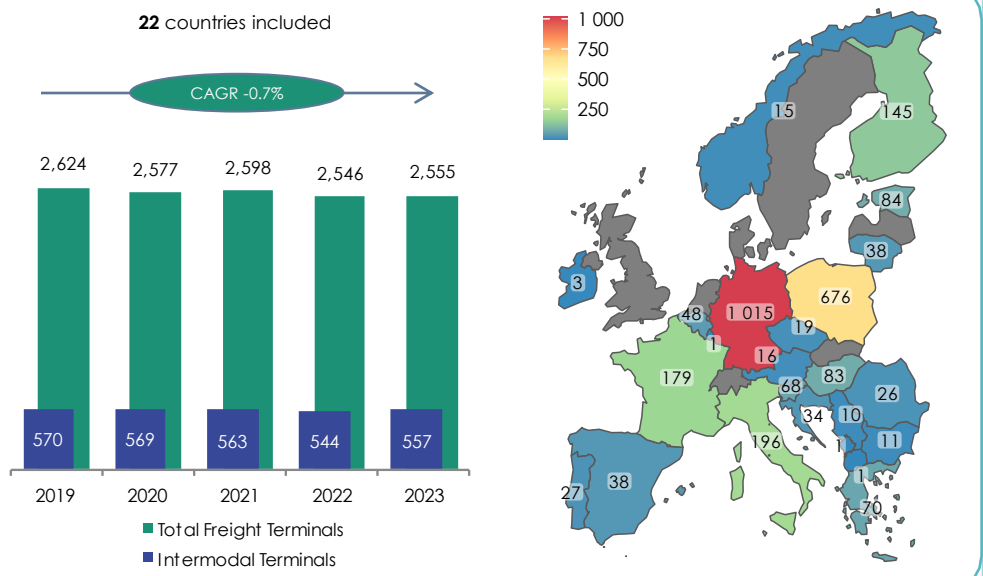


[16] 27 countries are included in this figure (Czech Republic, Estonia, Serbia and Switzerland are not included). Incumbents include their subsidiaries, if any.
[17] Other railway undertakings consist of both privately owned and publicly owned companies without any link to the domestic and foreign incumbents (e.g. undertakings held by communities, counties or regions)
[18] 21 countries are included in this figure (Austria, Belgium, Czech Republic, Denmark, Kosovo, North Macedonia, Netherlands, Slovakia, Switzerland and United Kingdom are not included).

Additional indicators included in the Working Document:
- Intermodal freight traffic

Service facilities for freight transport

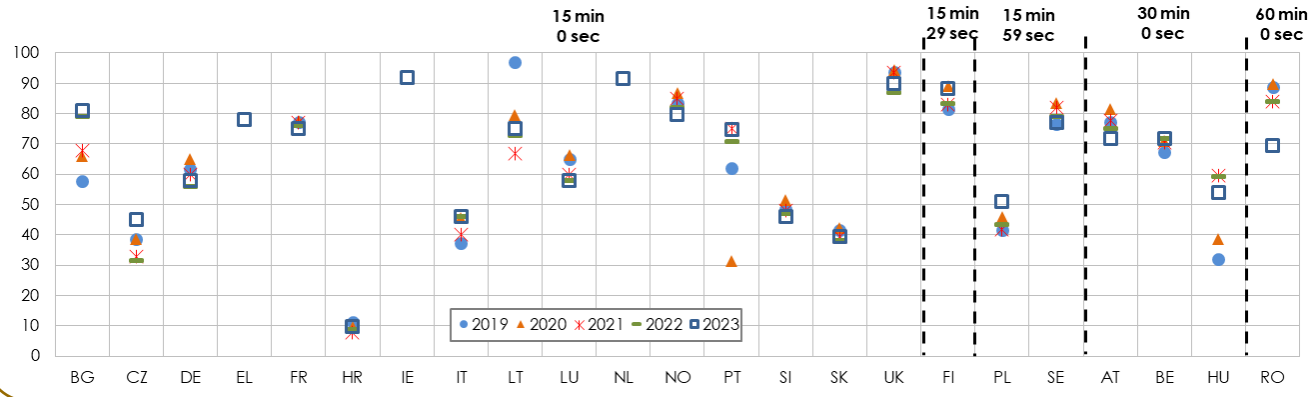
Figure 19 – Number of freight and intermodal terminals from 2019 to 2023 and number of freight terminals per country in 2023 (right) [19]



There were 22 countries that reported data for freight terminals, where goods can be loaded/unloaded. A slight downward trend can be observed in the total number of terminals. This is mainly influenced by the number in Germany, with around 1000 terminals and a reduction of around 100 over the last five years. In practice, however, the closures mostly affect small terminals, while new larger and efficient terminals have been built. The proportion of intermodal terminals, serving at least two means of freight transport (i.e. rail + road/ship), has remained stable at around 22% over the last five years.

Punctuality of freight trains

Figure 20 – Share of freight trains arriving on time at their last stop from 2019 to 2023 (in %)



Punctuality rates for freight trains ranged from 30% to 90%. This is much wider than the range observed for passenger services (see Chapter 6). It should be noted that comparisons should be made with caution, due to differences in the punctuality thresholds being used.

In 2023, 12 countries reported an improvement in freight punctuality compared with 2022, while seven countries reported a deterioration. The main reasons cited were network congestion, unplanned diversions, maintenance works, technical problems of vehicles, priority given to passenger trains in case of traffic disruptions and staff shortages.

[19] 21 countries are included in this figure (Denmark, France, Greece, Latvia, Netherlands, Slovakia, Sweden, Switzerland and United Kingdom are not included).

06

The rail passenger market

IN 2023

3.8 bn
passenger train-km

518 bn
passenger-km

26%
total market share of competitors* in the passenger market

€24.23
RU's revenue per passenger train-km

€cent 16.63
RU's revenue per passenger-km

The sample used to calculate these figures is specified in the following pages.

* Competitors in each country refer to all railway undertakings other than the domestic incumbent.

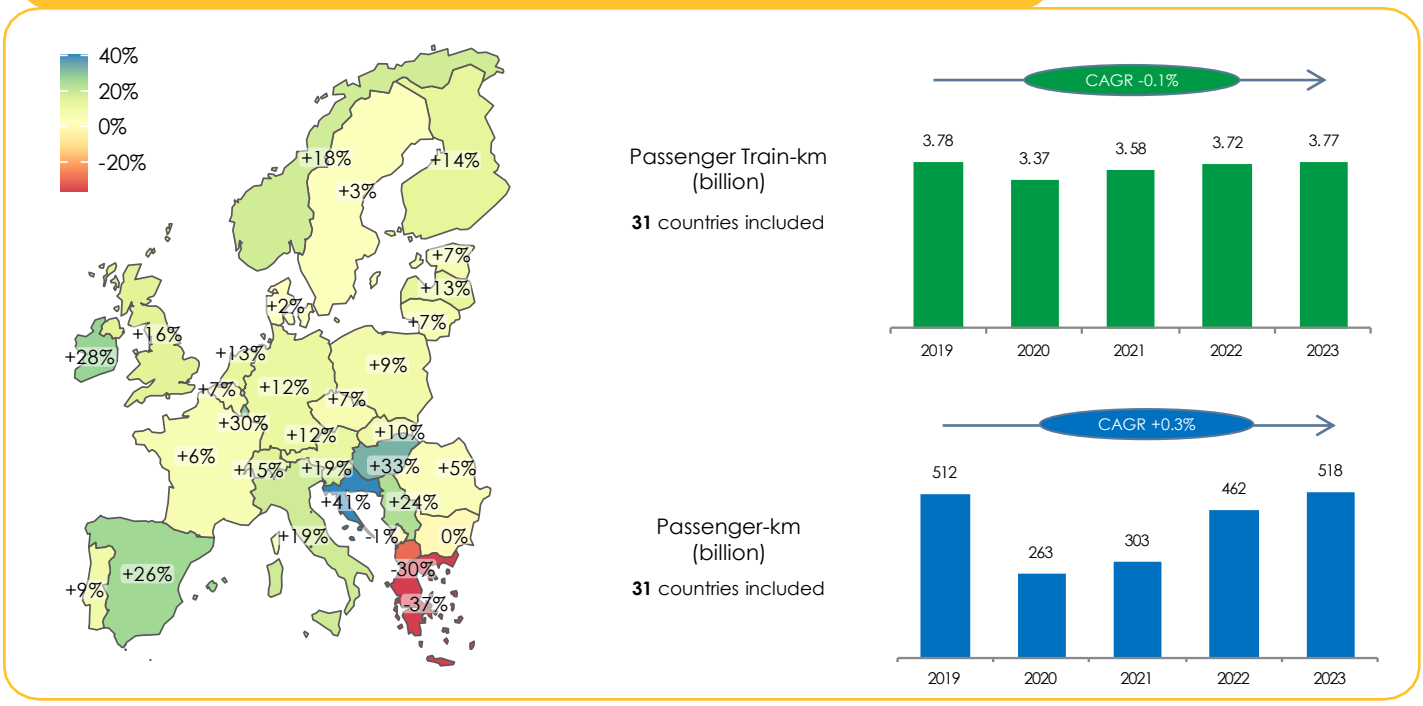
The rail passenger market size

In 2022, the modal share of rail passenger services in the European Union represented 8% of the total inland transport by passenger-km, meaning an increase of 2.1 percentage points compared with 2021, and a return to 2019 levels.[20]

In 2023, 31 countries reported 3.8 billion train-km run by passenger trains. Figure 21 shows that numbers are almost back to 2019's pre-pandemic level. Compared with 2022, 20 countries reported higher passenger train-km for 2023.

On the demand side, 518 billion passenger-km were recorded for 2023, increasing by 12% compared with 2022. This reflects strong growth in demand for rail passenger transport which exceeded the pre-pandemic level. Almost all countries reported a year-on-year increase, except for Greece and Macedonia. Rail transport in these two countries in 2023 was severely affected by a fatal train accident and a significant storm resulting in several track closures.

Figure 21 – 2023/2022 change in passenger-km (left) and total passenger traffic from 2019 to 2023 (right)

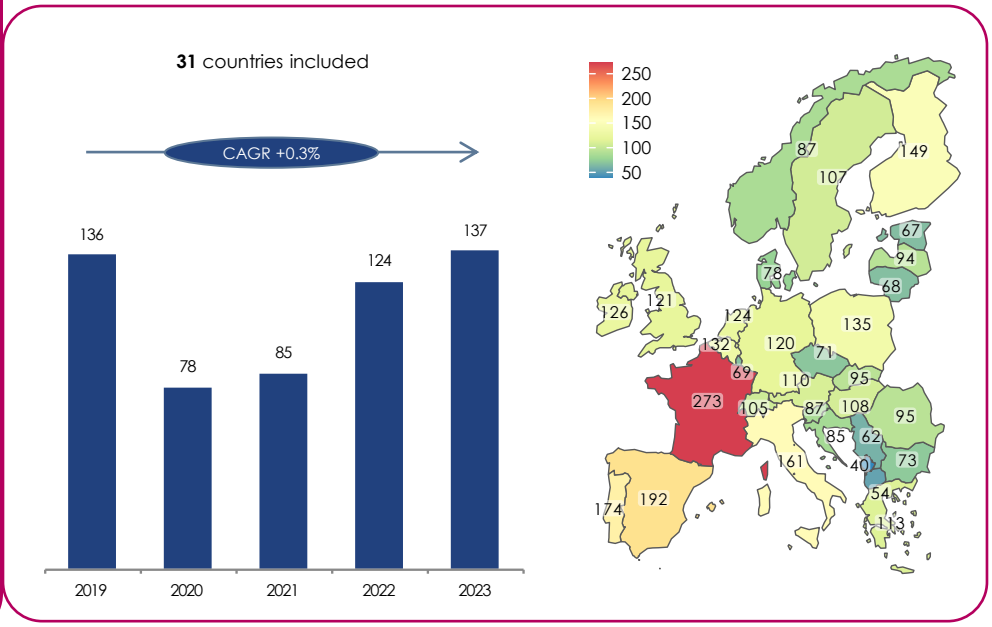


In 2023, there was an average of 137 passenger-km per train-km. This is up by nearly 10% compared with 2022, due to the large increase in passenger transport demand.

While train-km stagnated in 2023, passenger-km increased by 1%, compared with 2019. As a result, the load factor of passenger trains slightly increased over the same period.

France had the highest average passengers per train, at 273, which can be attributed to the greater capacity of its trains, in turn motivated by high TAC level per train-km in France. Moreover, high-speed trains, the capacity of which is particularly high (552), account for a large share of traffic in the French passenger market.

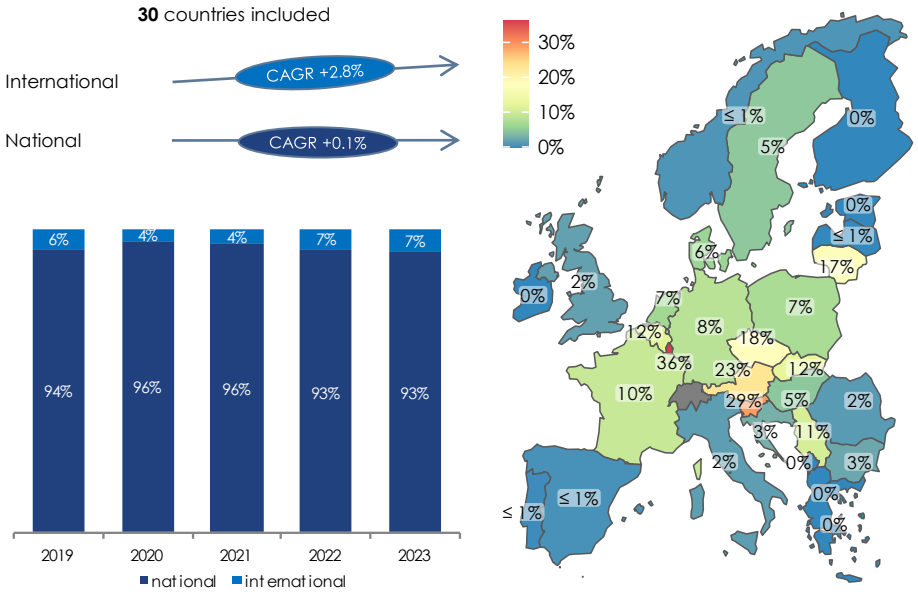
Figure 22 – Passenger load factor (passenger-km per passenger train-km) from 2019 to 2023 (left) and 2023 level by country (right)



[20] Data on the modal split of passenger transport in the European Union can be found on Eurostat website.

Components of the rail passenger market

Figure 23 – Share of national and international passenger traffic (based on passenger-km) from 2019 to 2023 (left)[21] and share of international traffic per country in 2023 (right)



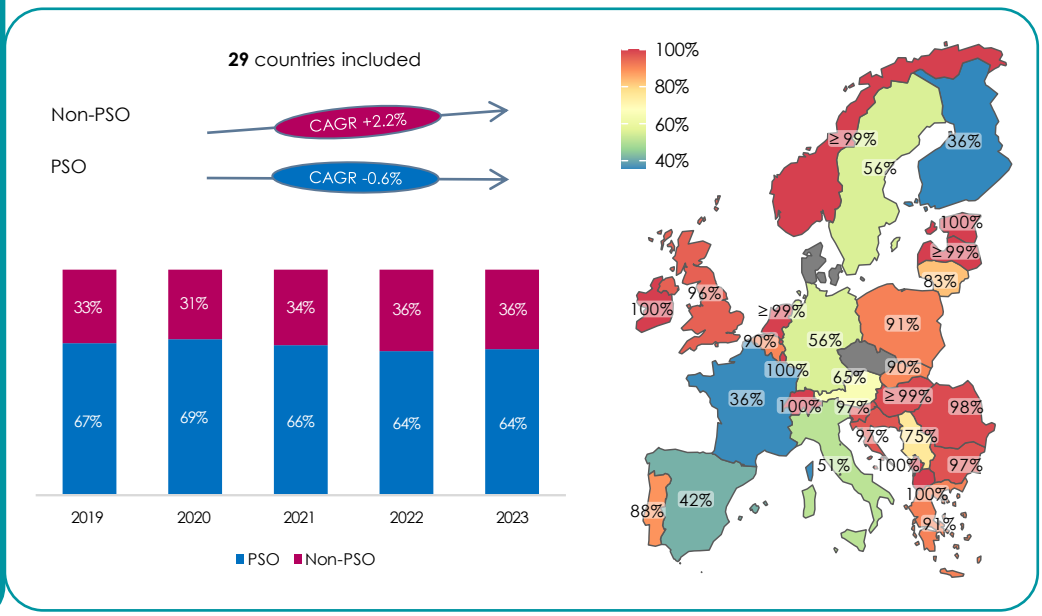
In 2023, there were large increases in both national and international passenger traffic (in passenger-km) compared to 2022 (+12% and +15% respectively). Over the last five years, international passenger-km have grown steadily, by almost 3% per year on average, while national traffic has stabilised. However, the share of international traffic in the passenger market has remained low at only 7%, far below the 50% observed on the freight market.

For many countries, international services represent less than 10% of the total passenger market, with the likes of Estonia, Finland, Greece and Kosovo* reporting national traffic of 100%. Higher shares of international traffic can be found in countries in central position having borders with many neighbours, such as Luxembourg, Slovenia and Austria. Luxembourg and Slovenia have also seen the share of international traffic increase the most from 2019, by more than 4 percentage points.

In 2023, PSO and non-PSO traffic increased by a similar rate (around +12%) compared with 2022. Although most passenger rail transport is still operated by PSO services, non-PSO traffic has gained 3 percentage points of market share since 2019. This is the result of a steady increase of non-PSO traffic over the last five years (+2.2% on average per year) while PSO traffic has recorded a slight decrease.

PSO shares vary substantially across countries, ranging from 36% in Finland and France to 100% in countries such as Ireland and Estonia. Since 2019, PSO shares have even increased in some countries, with the likes of Baltic countries due to the interruption of non-PSO transit services to/from Russia.

Figure 24 – Share of PSO and non-PSO traffic (based on passenger-km) from 2019 to 2023 (left)[22] and share of PSO traffic per country in 2023 (right)



[21] 30 countries are included in this figure. Switzerland is not included.
[22] 29 countries are included in this figure. Czech Republic and Denmark are not included.

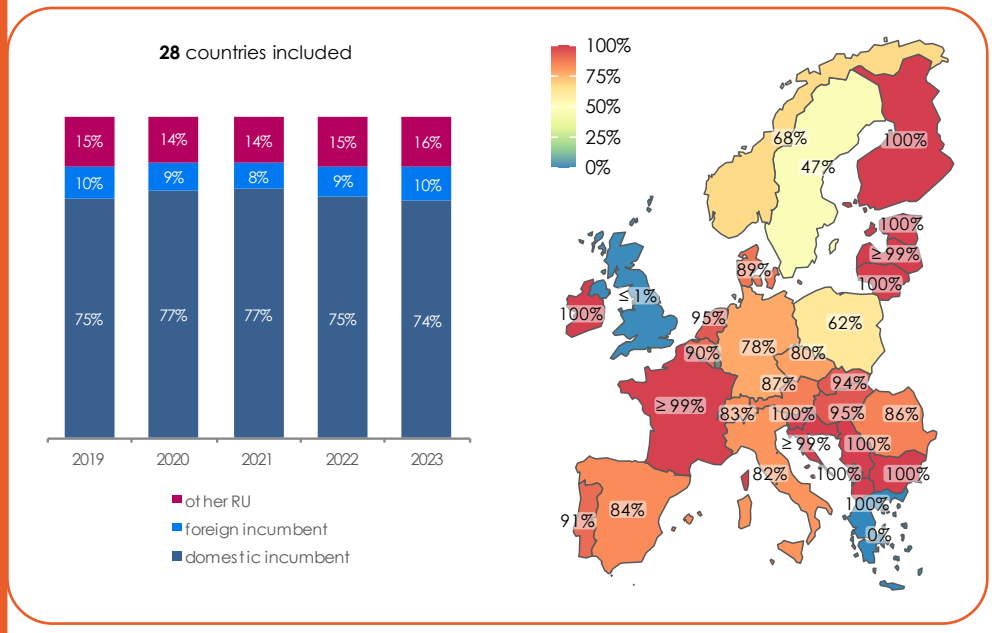
Additional indicators included in the Working Document:
- PSO traffic awarded by competitive tenders

Market share of passenger railway undertakings

In contrast to freight transport, the passenger market is still largely dominated by domestic incumbents. Over the 5-year period to 2023, domestic incumbents' share in the passenger market has remained mostly stable, as does that of competitors. In absolute passenger-km values, competitors have performed better than domestic incumbents. The former have recorded an increase in traffic of more than 2% on average per year while domestic incumbents' passenger-km have stagnated. This has, however, resulted in a market share gain of only 1 percentage point for competitors.

Eleven countries reported still having a *de facto* monopoly, with (almost) all passenger traffic being operated by domestic incumbents and their subsidiaries. On the contrary, Norway and Spain have seen competitors' share expand largely recently, by 22 and 16 percentage points respectively since 2019.

Figure 25 – Market share (based on passenger-km) of passenger railway undertakings (left)[23] and share of domestic incumbent per country in 2023 (right)



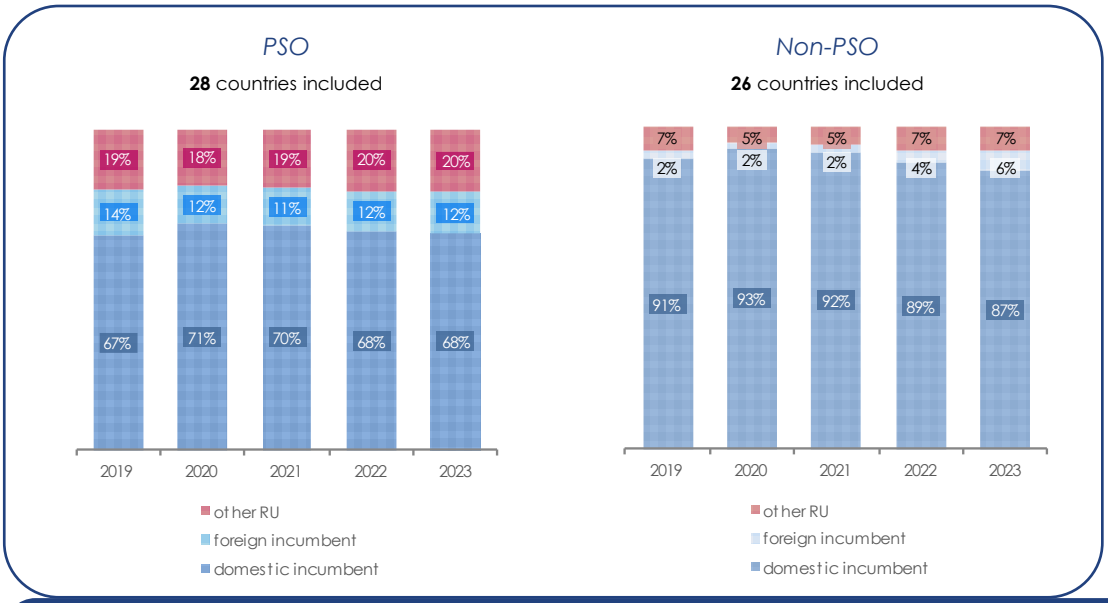


Figure 26 – Market shares (based on passenger-km) of passenger railway undertakings respectively on PSO and non-PSO markets[24]

The PSO market has also been dominated by domestic incumbents, but to a lesser extent. Indeed, the domestic incumbents' share reached 68% in 2023, while that of competitors was 32%. This signifies that the use of PSO contracts is a preferred means to enter a passenger rail market by new entrants. In line with the overall market, the PSO market split in 2023 was mostly stable compared with 2019. However, 13 countries still have a monopoly or a share of domestic incumbent in PSO passenger-km over 99% in 2023. Sweden stands out as the only country which still has its incumbent railway undertaking but whose share is lower than 50% (16%).

Unlike the PSO market, the non-PSO market has seen only around 10% of its traffic operated by competitor railway undertakings. In 2023, 6% of non-PSO passenger-km was transported by foreign incumbents and 7% by other RUs, which is an increase of 4 percentage points for foreign incumbents at the expense of domestic incumbents. Compared to 2019, Spain recorded the largest drop of domestic incumbent's non-PSO market share (down 28 percentage points, which are now accounted for by foreign incumbents).

[23] Incumbents include their subsidiaries, if any. 28 countries are included in this figure (Hungary, Luxembourg and Slovakia are not included).
[24] 28 countries are included in PSO figure and 26 countries in non-PSO figure (Czech Republic, Denmark and Slovakia are missing in both figures, Hungary and Luxembourg are not included in non-PSO figure only).

Additional indicators included in the Working Document:
- Passenger train stations

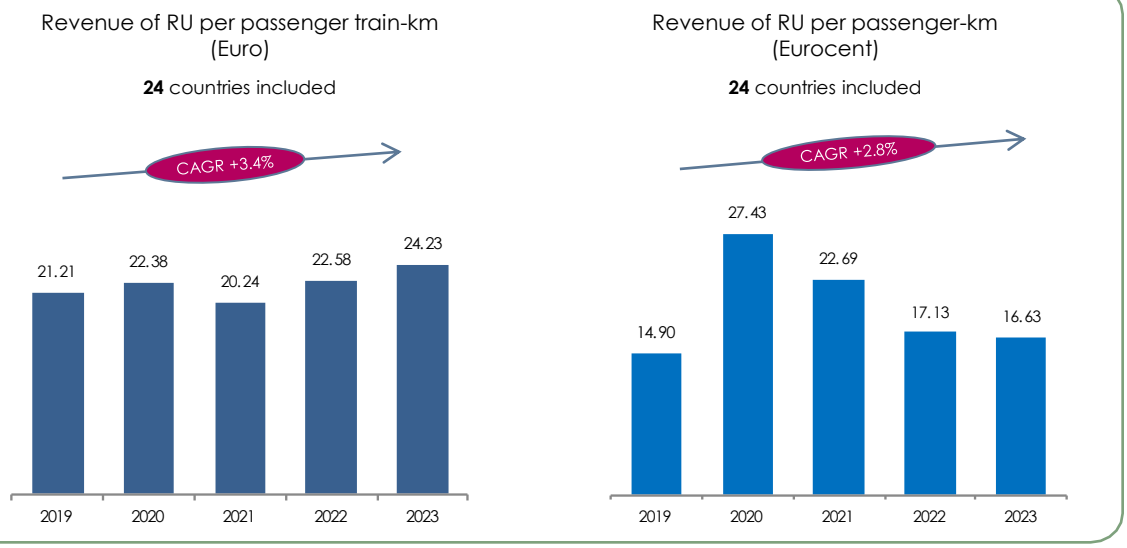
Economic performance of passenger railway undertakings

In 2023, the average revenue of passenger railway undertakings was €24.23 per train-km (up 7% from 2022) and 16.63 Eurocent per passenger-km (down 3% from 2022). The increase in revenue per train-km was driven by the increase in revenue from fares (+12% for PSO and +10% for non-PSO) as PSO compensations remained mostly unchanged. On the demand side, while PSO revenue per passenger-km decreased by 6% (driven by a 10%-drop in PSO compensations), non-PSO unit revenue rose by 4% from 2022 to 2023.

Compared to 2019, the changes in unit revenue are similar no matter which denominator is used (+14% per train-km and +12% per passenger-km). PSO compensations largely contributed to the increase in unit revenue, +37% over 2019-2023 period, followed by non-PSO revenue with an upturn of around 5%. PSO revenue from fares has, however, slightly decreased by 1%.

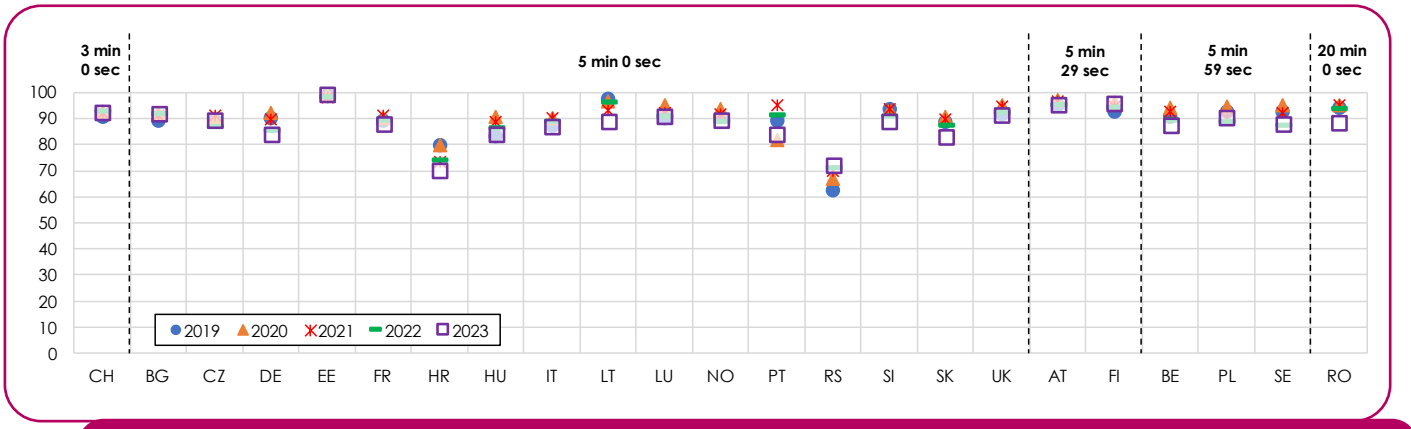
Across reporting countries, on average in 2023, 38% of passenger operators' revenues were from PSO compensations, 37% from PSO fares, and 25% from non-PSO revenues. The share of PSO compensations has been continuously reduced from the peak in 2020 (64% of passenger revenues) but was still 6 percentage points larger than what had been recorded for 2019.

Figure 27 – Passenger railway undertakings' revenue (from fares and compensations) per train-km and per passenger-km from 2019 to 2023[25]



Punctuality of passenger trains

Figure 28 – Share of passenger trains arriving on time at their last stop from 2019 to 2023 (in %)



Various punctuality thresholds are used across countries, but it can be observed that punctuality of passenger trains is more homogenous across countries and in general better than that of freight trains.

From 2019 to 2023, several countries have seen passenger train punctuality deteriorate, such as Germany, Croatia, Lithuania, or Slovakia. This is partly due to maintenance works on the rail network, but also to poor conditions of the rolling stock of some railway undertakings.

[25] 24 countries are included in this figure (Austria, Czech Republic, Denmark, Kosovo*, North Macedonia, Slovakia and Switzerland are not included).

07

Characteristics of European railway infrastructure managers

INTRODUCTION

A rail infrastructure manager (IM) is defined as any body or firm responsible in particular for establishing, managing and maintaining railway network infrastructure, including traffic management and control-command and signaling, according to the Directive 2012/34/EU.

Infrastructure managers play a crucial role in developing rail transport, especially amid the market opening and liberalisation that the European railway market has been experiencing. As an impartial and non-discriminatory access to the infrastructure is essential for competition on the rail market, IMs stay at the centre of the economic regulation mission assigned to regulatory bodies.

In this chapter, main characteristics of infrastructure managers are presented. Firstly, some key indicators of the network and information on their activities are shown. Secondly, the organisation and ownership of IMs are analysed. Finally, IMs' financial indicators are provided. The chapter aims to demonstrate the diversity of European IMs rather than to benchmark them. Interpretation and/or comparison of quantitative results should be done with caution.

31 IRG-Rail members reported 99 IMs for this focus chapter (out of the total number of 289, see Chapter 4), covering 97% of the European railway network. Each country has its main IM which is active nationwide, together with local-based IMs (operating on a specific area) and outsourcing IMs (including public-private partnership arrangements). Germany reported the highest number of IMs for this chapter (41 over 148 IMs in total) while Austria, the UK, France and Sweden reported data for all their IMs (10, 7 and both 4 IMs respectively). A table summarising essential information about the IMs included in this focus is available in the Working Document.

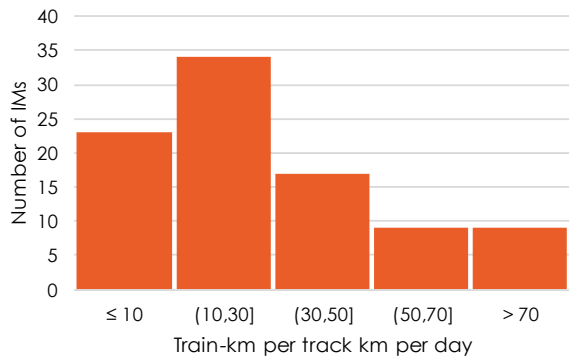
Activities of infrastructure managers

99 reporting IMs managed a network consisting of 365,000 track km (226,500 route km) in 2023. This implies a ratio of track per route of 1.6 km. For eight IMs, this ratio reaches 2 km or more, indicating a multiple-track network, while the network of 17 IMs consists exclusively of single-track routes.

61% of the reported network is electrified[26] but the electrification varies substantially among IMs. The network of 35 IMs can only accommodate diesel trains, while for 17 IMs, their entire network is electrified. Among the latter, one can find small IMs (other than the main IMs) in Austria, France, Sweden and the UK[27].

Most of the reported network (89%) has the standard gauge of 1,435 mm, 10% has a broader gauge (1,520 mm, 1,600 mm or 1,668 mm), and only 1% has a narrower gauge (most of which are metric tracks). The network of 71 IMs consists exclusively of standard-gauge tracks. Spanish IM Adif stands out by its mixed track gauges: 26% of standard-gauge tracks (mostly high-speed), 68% of Iberian broad-gauge tracks and 6% of metric tracks.

Figure 29 – Distribution of infrastructure managers by their network usage intensity in 2023



In 2023, 92 reporting IMs reported 4.6 billion train-km on a network of 364,000 track km. This results in an **average network usage of 34.4 train-km per track km per day**. 23 IMs show a daily usage intensity of less than 10 train-km per track km, while for nine IMs, the metric is more than 70. SOB in Switzerland has the busiest network with more than 220 train-km per track km per day, followed by A-train in Sweden, GySEV and WLB in Austria (over 100 train-km per track km). The networks managed by these IMs are mainly used by high-frequency commuter trains or shuttle services, explaining their high network usage intensity.

The usage intensity of main IMs varies from less than 10 train-km per track km per day (Infrakos (XK), MZ-I (MK) and Hellenic Railway (EL)) to more than 60 (ProRail (NL), Banedanmark (DK) and SBB (CH)).

IMs operate a large range of railway network-related activities, which can be classified into three main categories: maintenance, management and capacity allocation.

While **maintenance** of the network seems to be the core business of IMs which is realized by all reporting IMs, several IMs assure the maintenance of service facilities as well. Passenger stations and sidings associated with the network are usually maintained by the IMs (by more than 82 out of 99 IMs). About a half of the reporting IMs state that they maintain freight terminals and marshalling yards in addition to their network. Finally, some IMs also maintain train washing platforms, refueling facilities, traction current installations and loading points.

Most IMs are responsible for **traffic management** on their network, except for some IMs in Austria, France and Sweden where this task is operated in a centralised manner by the main IM in their respective country. A large share of the reporting IMs (between 77% and 84%) are responsible for both maintaining and managing of passenger stations and sidings[28]. Meanwhile, as freight terminals and marshalling yards are often managed by specialized operators, only a half of the IMs undertake the management of these service facilities.

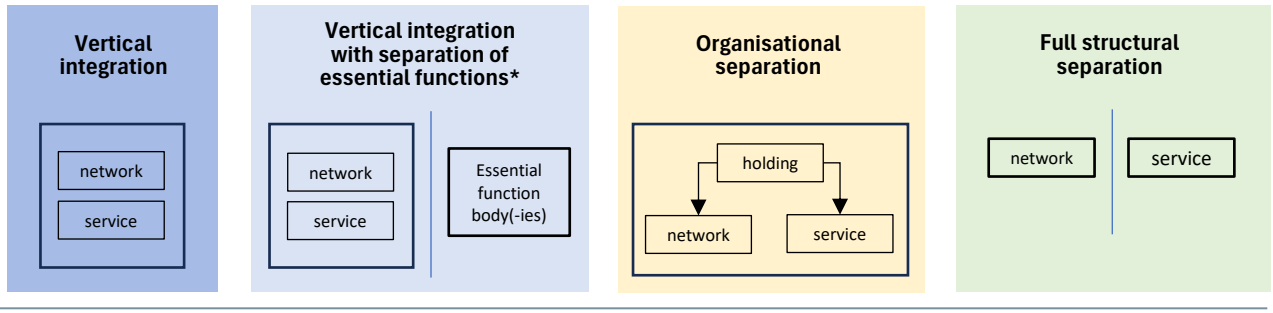
Rail capacity allocation is one of the two regulated tasks of IMs set out in the Recast directive, beside traffic management, to prevent discrimination against railway undertakings in their access to the network. 80 European IMs are assigned with this task in 2023. Among 19 IMs which do not manage rail capacity, one can find the main IM of 5 countries, namely Hungary, Ireland, Latvia, Luxembourg and Switzerland. In these countries, an independent organization is responsible for essential functions such as capacity allocation and even definition and collection of access charges. The existence of such a separate allocating body aims to improve the transparency and efficiency of the capacity management process, especially when the historical vertical organisation of the main undertaking still prevails (see next section).

[26] This electrification rate is calculated based on track km, thus different from that presented in Chapter 2 which is based on route km.
[27] See Table 1 in the Working Document for more detail
[28] These activities can be done by the infrastructure managers themselves or by their subsidiaries.

Organisation of infrastructure managers

The Fourth Railway Package with its Directive 2016/2370/EU set out the conditions for the vertical separation between infrastructure management and rail service operations. According to the legislative text, Member states could choose between different organisational models, ranging from full structural separation to vertical integration, by ensuring the organisational and decision-making independence of the infrastructure manager as regards the essential functions. The latter is defined as decision-making with respect to train path allocation and infrastructure charging.

Figure 30 – Classification of infrastructure managers according to their organisation model in 2023



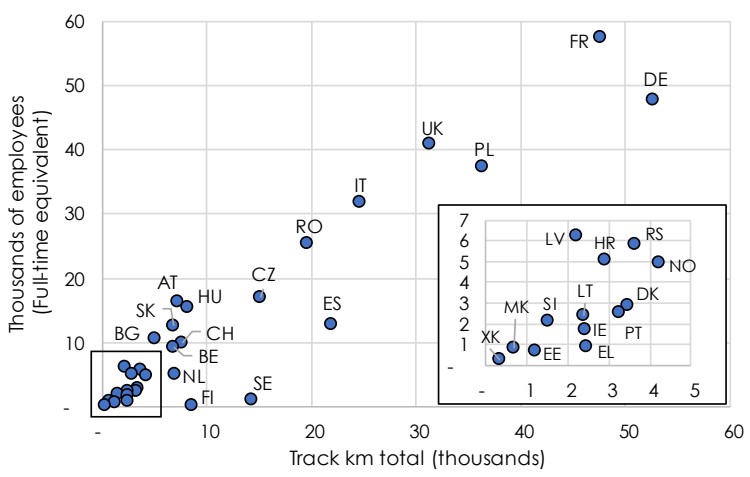
	Vertical integration	Vertical integration with separation of essential functions*	Organisational separation	Full structural separation
Main IM		- IE - HU - LV - CH - LU	- AT - IT - SI - DE - LT - FR - PL	- BE - EL - NL - SE - BG - ES - NO - SK - CZ - FI - PT - UK - DK - HR - RO - XK - EE - MK - RS
Other IM	- AT (5) - HU (1) - CH (1) - IT (1) - DE (17) - SE (1)	*(Number of IM in parentheses)*	- CH (1) - SE (1) - DE (15) - UK (3) - IT (1)	- AT (4) - FR (3) - UK (2) - DE (8) - IT (1) - EE (1) - SE (1)

The large choice of separation arrangements between infrastructure management and rail service operations set out by the Directive has resulted in **different organisational models of infrastructure managers across European countries**. While in 19 countries, the main IM is a distinct entity from any rail service operators ('full structural separation'), 7 countries have adopted the 'organisational separation' model where the main IM belongs to the same holding as a railway undertaking, specifically the domestic incumbent undertaking. In five countries, the 'vertical integration' model has been kept for the main IM but the essential functions of infrastructure management have been transferred to an independent body.

Most reporting IMs are owned by a governmental agency (State, Ministry of Transport, Federal state) **or a regional/local administration**, while 21 IMs are majority owned by private shareholders, including 13 in Germany, 3 in France and the UK, 1 in Estonia and in Sweden.

Almost 396,500 employees (full-time equivalent) worked for the 88 European IMs that reported this indicator in 2023 (covering 97% of total route km). The principal IMs account for 98% of the workforce, with more than 387,500 employees. The number of employees correlates positively with the network size (see Figure 31). On average, 1.1 employee is employed per track km in 2023.

Figure 31 – Number of employees of main IM per country in 2023, in relation with their network size



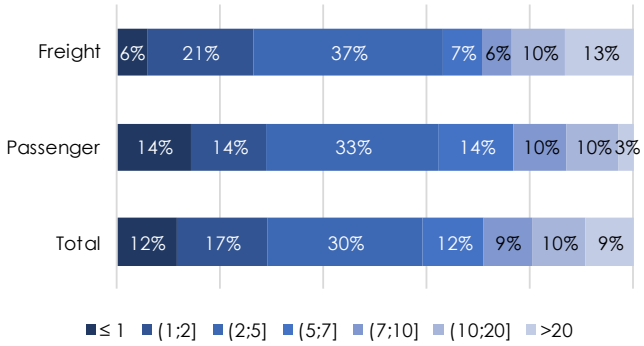
* According to Directive (EU) 2016/2370, essential functions of infrastructure management means decision-making concerning train path allocation (definition and assessment of availability, and allocation of individual train paths) and infrastructure charging (determination and collection of charges). All essential functions may not necessarily be assigned to a unique independent body.

Financial indicators for infrastructure managers

In 2023, around €19 billion in **track access charges** (TAC) were paid to 86 reporting IMs. TAC per train-km vary substantially across IMs, ranging from less than €1 to €48 for passenger services and up to €55 for freight services. The highest unitary passenger TAC level is reported for LISEA in France which manages over 330 km of exclusively high-speed lines. For freight services, a few small German operators are charging between €30 and €50 per train-km for the use of their networks, in absence of subsidies for infrastructure maintenance and modernisation works. On the other hand, TAC levels lower than €1 are charged by IMs in Bulgaria, Sweden, Hungary, Finland among others.

The breakdown of IMs by levels of TAC per train-km for freight and passenger services is comparable (Figure 32). Around 30% of IMs declare an amount of TAC lower than €2 per train-km while for 10% of IMs, TAC levels exceed €20 per train-km.

Figure 32 – Breakdown of infrastructure managers by collected track access charges per train-km (in euros) in 2023



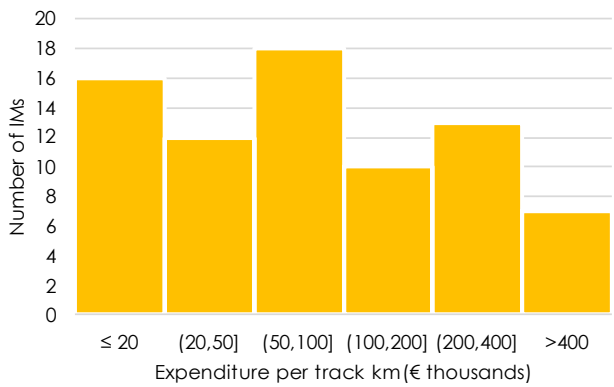
Railway networks are costly infrastructure. TAC alone typically cannot completely cover the total costs of maintenance and management, as well as the construction of new infrastructure. Therefore, IMs often receive **funding from various external sources**.

In 2023, 64 IMs reported receiving almost €47 billion of external funding, more than two times higher than the amount of TAC. Major sources of external funds come from the state, regional budget, European funds and even loans. Overall, more than 80% of the declared funding amount comes from state and regional budgets and around 10% from EU funds. State funding can be used to finance IMs' operating expenditure (about one third of the funding) as well as capital expenditure (two thirds).

Funding frameworks are highly diverse among IMs. For most IMs, state funds are the biggest source of funding, while EU funds may account for a larger share of external funding amount for some IMs.

However, these results should be interpreted with care since the data quality may not be sufficient. Indeed, harmonising IMs' funding data is not a simple task due to the complexity of the funding systems. Sometimes, the source of funding may not be clear enough for an efficient classification (for instance, when EU funds transit through the state budget then are injected to the IM's account). External funding to IMs could be the subject of a more in-depth study in the future, especially by setting up a more harmonised framework to collect and analyse these data.[29]

Figure 33 – Distribution of infrastructure managers by amount of expenditure per track km in 2023



The costs incurred by IMs include **operating and capital expenditure**. On average, total cost reached almost €220,000 per track km in 2023. About one third of the total cost covers IMs' operating expenditure, including maintenance, traffic management, power consumption, etc. Two thirds of the total cost involves IMs' capital expenditure which aim to upgrade or build new physical assets. €13 billion dedicated to develop new rail infrastructure in 2023 were declared by 77 participating IMs, accounting for 18% of their total expenditure.

37% of reporting IMs have an expenditure level of €50,000 per track km or less, while for 9% of IMs, expenditure per track km exceed €400,000. For main IMs, the total cost per track km varies substantially from €34,600 (CNCF CFR – Romania) to €687,300 (Bane NOR – Norway).

IMs' expenditure depends on numerous factors such as the network size and complexity, network usage intensity, condition and age of the network components, but also political willingness which decides the availability of resources for rail infrastructure (as public funds are an essential funding source for IMs).

[29] See also PRIME's publications on IMs' financial indicators, including funding, on its website. PRIME is the platform of rail IMs in Europe.