

Report

Railway Market Analysis
Germany 2023



Bundesnetzagentur

Railway Market Analysis 2023

Germany

December 2023/January 2024

The Bundesnetzagentur's mandate

The Bundesnetzagentur analyses trends in the railway market on a regular basis. This work helps to identify potential discrimination at an early point in time and strengthen competition.

Statistical data and analyses that provide insights into the structure and development of the railway sector are published by the Bundesnetzagentur in its Railway Market Analysis. For the 2022 reporting year, the Bundesnetzagentur sent its questionnaire to more than 2,600 market participants.

In order to estimate the impact of the coronavirus pandemic, some 100 market participants were requested to provide information on their transport-related and financial indicators for 2022.

The scope of the Bundesnetzagentur's market monitoring activities is defined in section 17 of the Rail Regulation Act.

Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen

Section 702 – Technical Aspects of Rail Regulation, Rail Sector Digitalisation, Market Monitoring, Statistics

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Summary

In 2022 all rail transport services saw an increase in revenue, and transport performance increased in all rail transport services. The competitors were able to further increase their share of rail freight transport performance.

The 2022 railway market in numbers

Revenue generated by railway undertakings		Change 2021/2022
Total	€23.8bn	↑
Rail freight	€6.3bn	↑
Long-distance passenger	€5.0bn	↑
Regional and local passenger	€12.5bn	↑
Revenue generated by infrastructure managers		Change 2021/2022
Total	€7.6bn	↑
Track access charges	€6.0bn	↑
Station charges	€1.0bn	→
Other charges	€0.6bn	→
Operating performance of the railway undertakings		Change 2021/2022
Total	1,164mn trkm	↑
Rail freight	268mn trkm	↑
Long-distance passenger	165mn trkm	↑
Regional and local passenger	721mn trkm	→
Other transport	10mn trkm	↑
Transport performance of the railway undertakings		Change 2021/2022
Rail freight	140bn tkm	↑
Long-distance passenger	43bn pkm	↑
Long-distance passenger	53bn pkm	↑
Market share of rail traffic held by competitors		Change 2021/2022
Rail freight	59%	↑
Long-distance passenger	4%	→
Regional and local passenger	34%	→
Employment		Change 2021/2022
Total	176,000 employees	↑
Infrastructure managers	87,000 employees	↑
Railway undertakings, only train drivers	34,000 employees	→
Railway undertakings, other employees	55,000 employees	↑

Macroeconomic environment

In 2022 the German economy continued its 2021 trend, albeit at a slightly lower level. Germany's real gross domestic product grew in 2022 by 1.8% compared to the previous year.

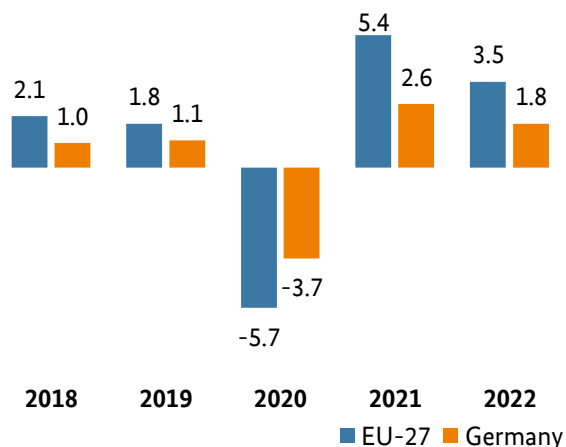


Figure 1: Rate of change in real GDP (2018-2022; year-on-year change in %; Source: Eurostat)

Once again economic growth in the 27 Member States of the European Union (EU 27) was stronger on average than in Germany, where there was an increase of 3.5%.

Modal split

The retroactive addition of long-distance pipelines to the freight transport modal split had a proportionately decreasing effect on the shares in the previous years of the other modes of transport. The 20.2% figure that was published in the 2021 market analysis thus had to be corrected to 19.6%. In 2022 the share of the modal split held by the railway rose slightly from the corrected 2021 figure and once again was close to the 20% mark.

There was not much shifting from road transport to rail transport in 2022 and the shifting that did take place was mainly to the detriment of inland waterways shipping.

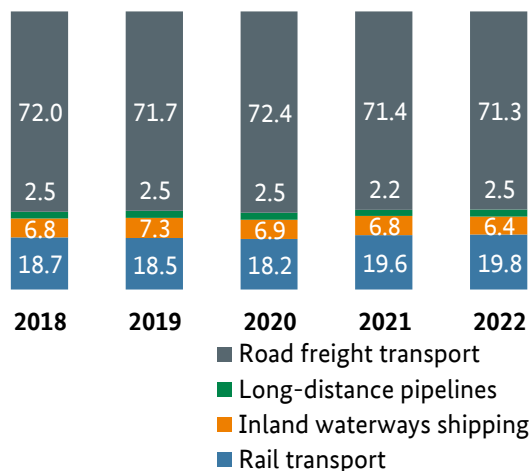


Figure 2: Modal split in freight transport (2018-2022; shares in %; Sources: Destatis, sliding medium-term forecast winter 2022/2023; railway market data from the Bundesnetzagentur's market survey)

In 2022 there was significant recovery from the slump in demand brought about by the pandemic. Compared with 2021 the market share of the rail passenger transport segment saw significant growth. The increase by three percentage points to 9.4% was almost entirely to the detriment of motorised private transport.

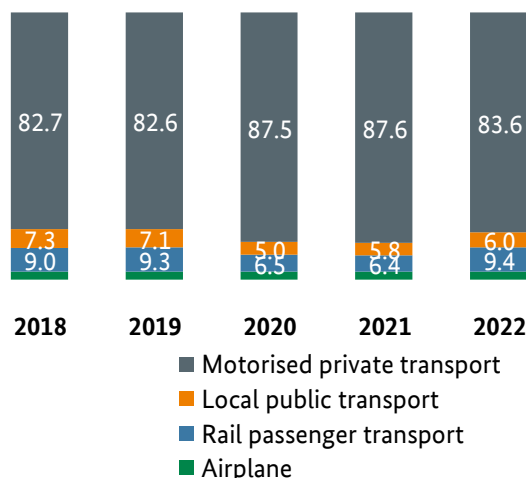


Figure 3: Modal split in the passenger transport segment (2018-2022; shares in %; Sources: Destatis, sliding medium-term forecast winter 2022/2023; railway market data from the Bundesnetzagentur's market survey)

Railway transport market

A total of 342 railway undertakings operated in the railway transport market in 2022. The majority of market participants were concentrated in the rail freight transport and the regional and local passenger transport markets, whereas the number of competing undertakings in the long-distance passenger transport segment remained small.

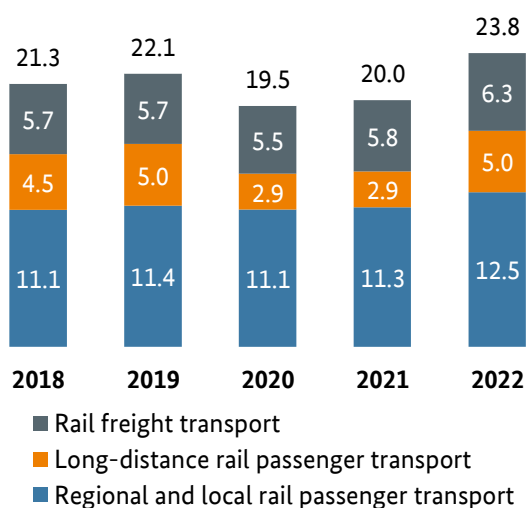


Figure 4: Revenue trends in the railway transport market (2018-2022; in €bn)

Revenue increased significantly in 2022 in all transport services, with long-distance transport registering the biggest increase both in terms of percentages and in nominal terms.

By contrast, the punctuality of transport services continued to decline. For the market as a whole the share of delays rose significantly and continued to approach the 20% mark. Infrastructure construction work increasingly affected the operational quality of railway transport. This will be examined in greater detail in section 1.2 of this document, "Punctuality and network quality".

The competitive situation, however, has stagnated. Only in rail freight transport were the competitors able to slightly increase their share.

Railway infrastructure market

A total of more than 150 route operators and around 700 service facility operators participated in the market survey.

In the years 2021 and 2022 the revenue of infrastructure managers increased from €7.3bn to €7.6bn. Operating performance also continued to increase.

The share of rail infrastructure use by the respective rail transport services remained largely constant. Regional and local rail passenger transport accounted for more than half of the train-kilometres, while the share of rail freight transport was less than one quarter and long-distance rail passenger transport accounted for less than 10% of the total train-kilometres.

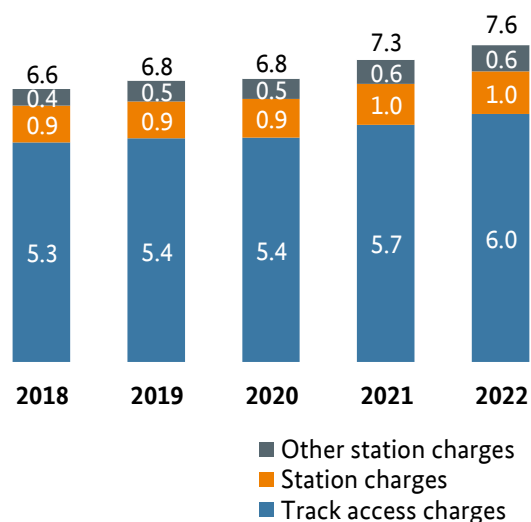


Figure 5: Revenue trends in the railway infrastructure market (2018-2022; in €bn)

Employment trends

The number of workers employed in the railway infrastructure sector (measured in terms of full-time equivalents) continued to increase in 2022. Although railway undertakings saw an increase in personnel, the number of train drivers stagnated. Many railway undertakings continue to report considerable difficulty in acquiring qualified personnel or trainees.

Approximately 176,000 full-time positions were filled in the railway market. This represents an increase of slightly more than 2% compared to 2021.

The railway undertakings surveyed continue to view the personnel situation in many areas as difficult.

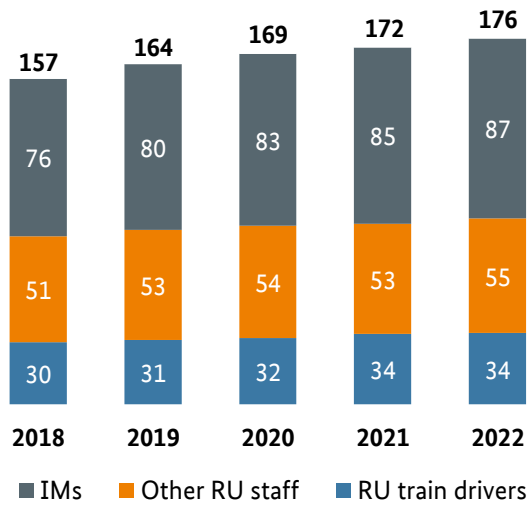


Figure 6: Employment trends in the railway market (2018-2022; in thousands of FTEs)

1. Railway transport market

In 2022 rail passenger services recovered from the impact of the coronavirus pandemic. In addition, the €9 ticket significantly increased demand for regional and local rail passenger transport in the summer months. The competitors' share of the market stagnated.

After having reached an all-time high in 2021, rail freight transport saw another slight increase in performance in 2022. The competitors were able to slightly expand their market share.

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1.1 Performance and quality indicators

1.1.1 Market developments

Public railway undertakings are defined under section 3(1) para 1 of the General Railway Act (AEG) as those that are operated on a commercial basis and may be used by anyone to transport persons or goods. The Federal Railway Authority's register of public railway undertakings indicates that the number of licensed public railway undertakings in Germany has been on the rise in recent years and reaches a new record level every year.

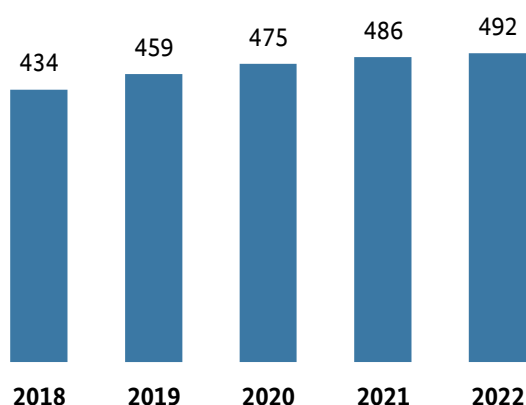


Figure 7: Number of licensed public railway undertakings (2018-2022; number); Source: Federal Railway Authority

In 2022, 492 railway undertakings were licensed to provide rail transport services for the public.

According to the Bundesnetzagentur's annual survey, 343 railway undertakings provided rail transport services in Germany in 2022. This figure also takes undertakings into account that solely performed shunting services or other transport services and hence no passenger or freight transport services. An international comparison again showed that the German railway market has by far the largest number of competitors.

In 2022 a total of 119 railway undertakings provided regional and local rail passenger transport services. By contrast, the number of railway undertakings active in long-distance rail passenger transport

continued to be much lower, with 29 market participants. The vast majority of long-distance rail passenger transport services were provided by DB Fernverkehr and the competitors Flixtrain, ÖBB and Thalys. Following the years of the pandemic, most tourist and heritage passenger transport services resumed in 2022.

There were 237 railway undertakings active in commercial rail freight transport in 2022. A number of these railway undertakings have specialised in other non-traditional transport services such as construction site supply, transfer travel, test runs, etc. or were active strictly as a shunting service provider in service facilities.

Around 50 market participants offered transport services in more than one type of rail transport service, for example both in passenger and freight transport services.

1.1.2 Transport performance and competition

The charts illustrate the effects of the coronavirus pandemic in the years 2020 and 2021. Demand for rail passenger services recovered significantly in 2022. Transport performance increased in all three segments of rail transport services. Overall the non-federally owned railway undertakings maintained or slightly expanded their market share in 2022.

Following a massive decline in passenger demand due to the coronavirus in 2020 and 2021, regional and local rail passenger transport increased to 53bn passenger-kilometres in 2022. This figure nevertheless remains below its pre-pandemic level. Competitors' share of transport performance remained constant at 34%.

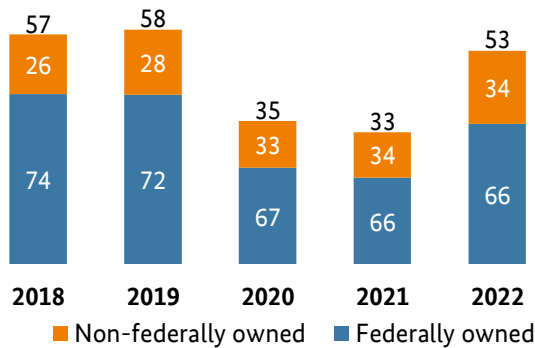


Figure 8: Transport performance and competition in regional and local rail passenger transport (2018-2022; performance in billions of passenger-km; shares in %)

Long-distance rail passenger transport also saw a significant increase in transport performance in 2022, with a total of 43bn passenger-kilometres. This marks a 65% increase compared with 2021.

The competitors' share in long-distance transport remained unchanged from the previous year, with the non-federally owned undertakings again accounting for 4% of overall transport performance.

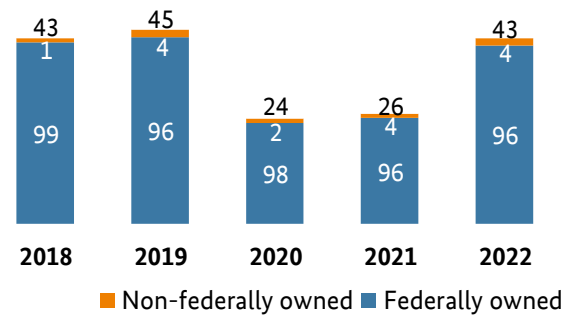


Figure 11: Transport performance and competition in long-distance rail passenger transport (2018-2022; performance in billions of passenger-km; shares in %)

The market introduction of the €9 ticket led to a significant increase in demand for regional and local rail passenger transport service while long-distance rail passenger transport suffered no losses. Demand returned to its previous level when the ticket was no longer offered. In retrospect it can be assumed that a long-term shift could not be achieved in regional and local rail passenger transport.

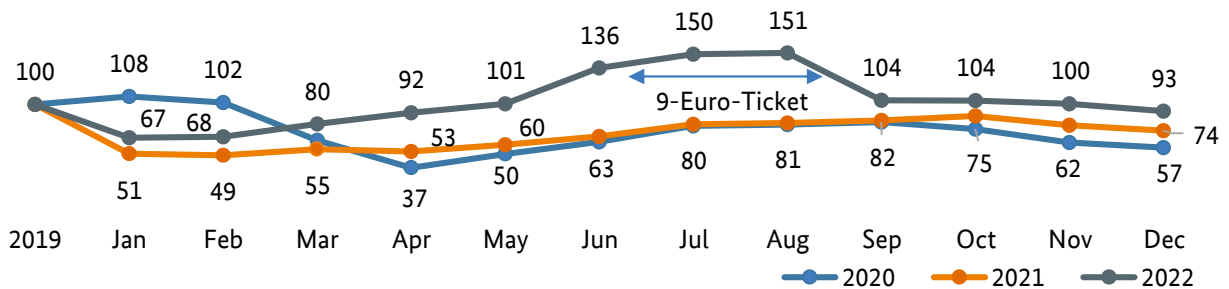


Figure 9: Transport performance in regional and local rail passenger transport; change compared with 2019 in %

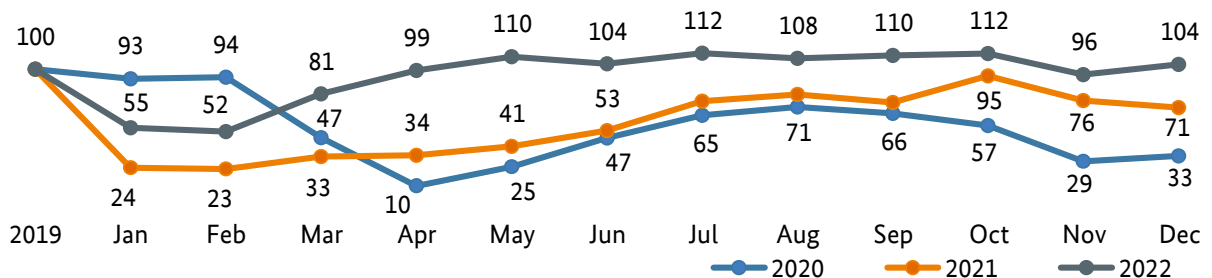


Figure 10: Transport performance in long-distance rail passenger transport; change compared with 2019 in %

After having reached an all-time high in 2021, rail freight transport performance increased again slightly in 2022, with a total of 140bn tonne-kilometres.¹ The competitors in rail freight transport increased their market share to 59%.

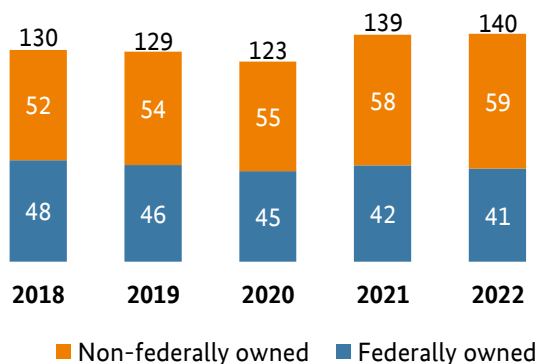


Figure 12: Transport performance and competition in rail freight transport (2018-2022; transport performance in billions of tonne-kilometres; shares in %)

¹ Due to notice of an internal audit of DB Cargo's recording of transport performance, this value and all other calculations based on it should be considered to be preliminary.

1.1.3 Ownership

Compared to other countries in Europe, Germany has by far the highest number of active railway undertakings.

Regional and local rail passenger transport

A total of 119 different railway undertakings provided services in regional and local rail passenger transport in 2022.

The largest group is railway undertakings that are operated by private owners at national level. About two thirds of the undertakings are national private or public railway undertakings. In addition, state-owned railways from other EU countries provided transport services in Germany, usually through subsidiaries. The same applies to private and public-law foreign railway undertakings.

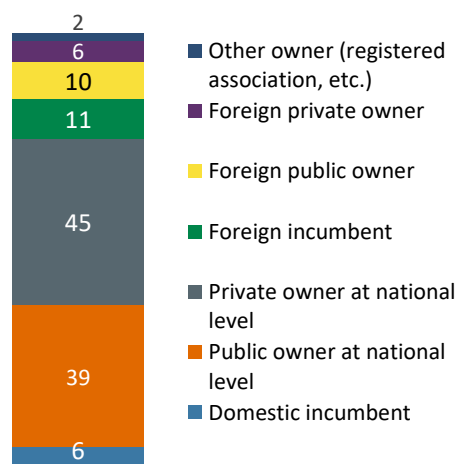


Figure 14: Number of active railway undertakings in regional and local rail passenger transport (2022; by owner type)

The largest share of transport performance was accounted for by federally owned undertakings, followed by foreign state-owned railways and their subsidiaries. The numerous private national undertakings accounted for only a small share (3%) of the total transport performance.

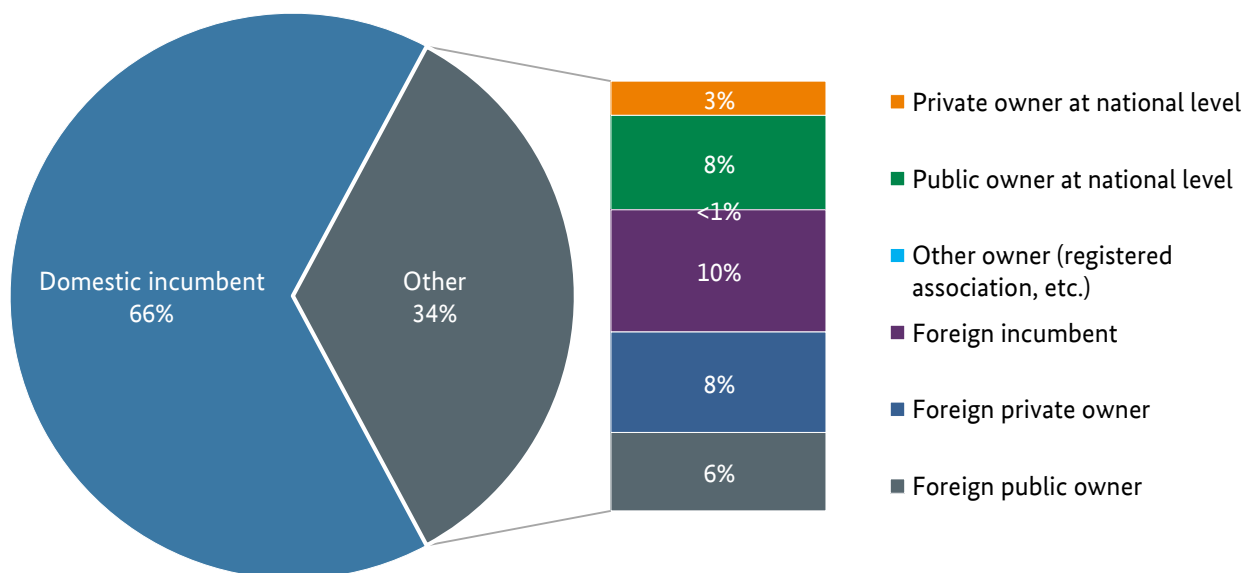


Figure 13: Active railway undertakings' shares in transport performance in regional and local rail passenger transport (2022; by owner type)

Long-distance rail passenger transport

There were 29 railway undertakings providing services in long-distance rail passenger transport. In addition to some commercially-oriented providers, such as Flixtrain, ÖBB or Thalys and SNCF, these (mostly privately-owned) railway undertakings often had a touristic or heritage approach.

In terms of transport performance, the DB Group dominated long-distance rail passenger transport with nearly 96% of transport performance coming from the federally owned undertaking. Private undertakings such as Flixtrain accounted for around 3% of the market share, followed by foreign state-owned railways, which generated 1% of the market's transport performance.

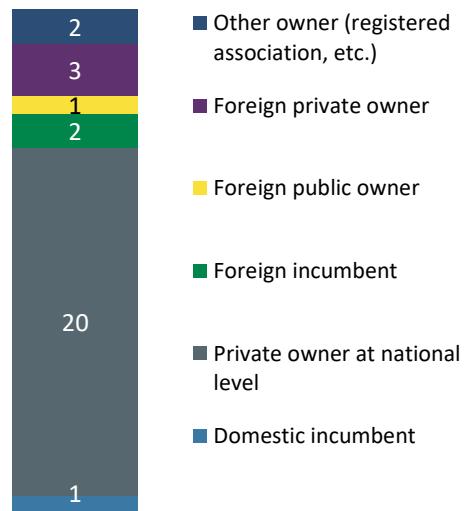


Figure 16: Number of active railway undertakings in long-distance rail passenger transport (2022; by owner type)

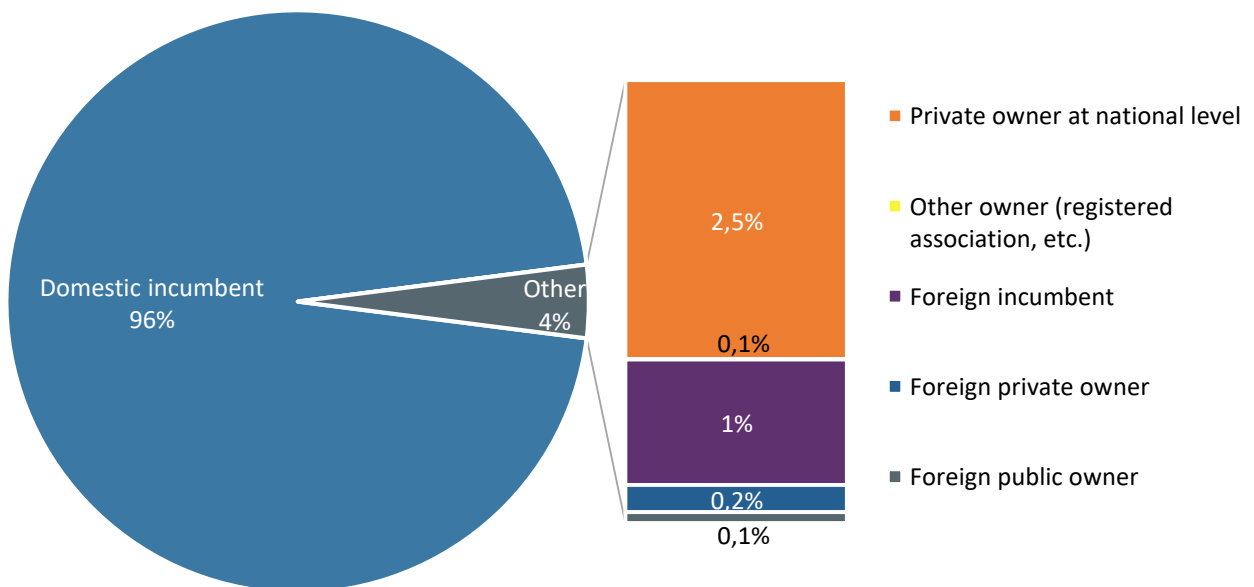


Figure 15: Active railway undertakings' shares in transport performance in long-distance rail passenger transport (2022; by owner type)

Rail freight transport

There were 237 railway undertakings active in the rail freight transport market, the vast majority of which were privately owned.

In terms of transport performance DB AG's group companies had a market share of 41%, while private German railway undertakings accounted for around 20% and foreign state-owned railways a further 20%.

With a market share of 10% (8% under German ownership and 2% under foreign ownership) the non-federally owned railway undertakings (without the DB companies) make a significant contribution to rail freight transport in Germany.

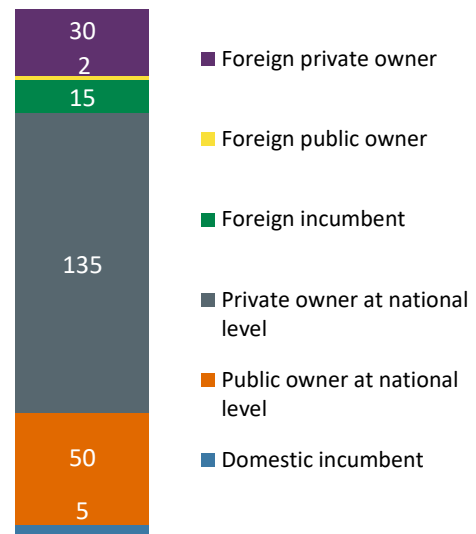


Figure 17: Number of active railway undertakings in rail freight transport (2022; by owner type)

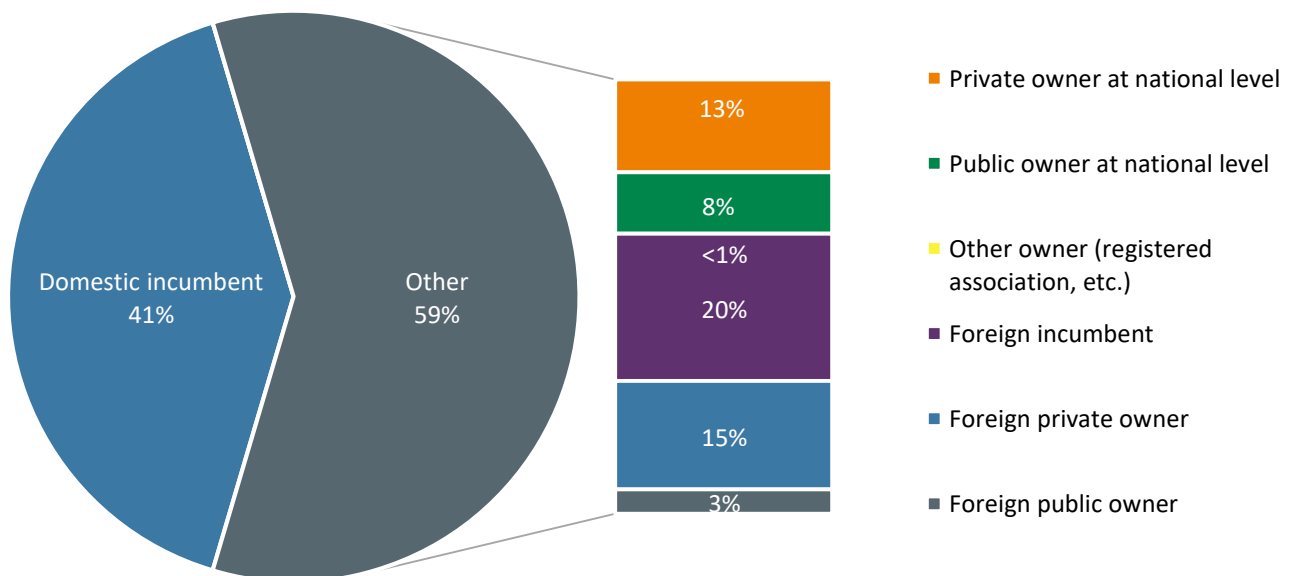


Figure 18: Active railway undertakings' shares in transport performance in rail freight transport (2022; by owner type)

1.1.4 Transport and travel distances

The average transport and travel distances have only seen minor changes in recent years.

The downward trend in regional and local rail passenger transport has ended and the average travel distance in this segment increased in 2022 to 21 km.

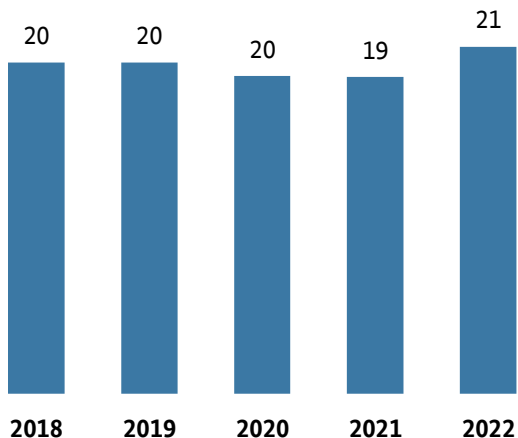


Figure 19: Average travel distance in regional and local rail passenger transport (2018–2022; in kilometres)

In long-distance rail passenger transport the long-term trend of increasing travel distances continued. The average travel distance in 2022 was 314 km.

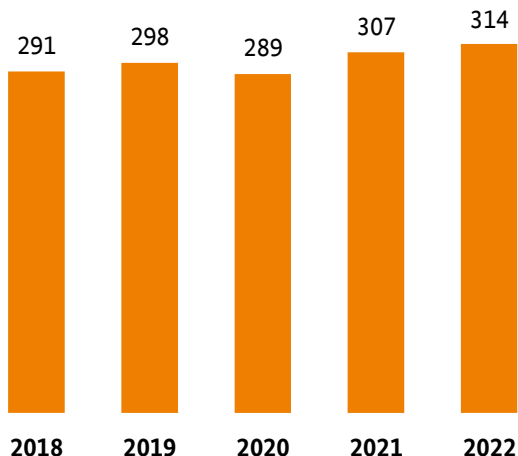


Figure 20: Average travel distance in long-distance rail passenger transport (2018–2022; in kilometres)

Following a substantial increase in average transport distance in rail freight transport in 2021, that figure dropped slightly in 2022.

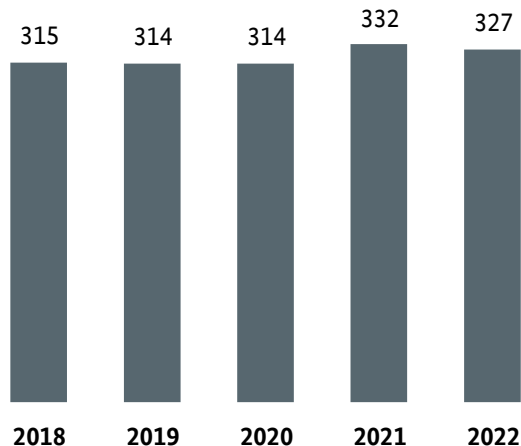


Figure 21: Average travel distance in rail freight transport (2018–2022; in kilometres)

1.1.5 Traffic volume

Traffic volume showed the gradual recovery following the coronavirus pandemic. There was a considerable increase in regional and local rail passenger transport compared to 2021.

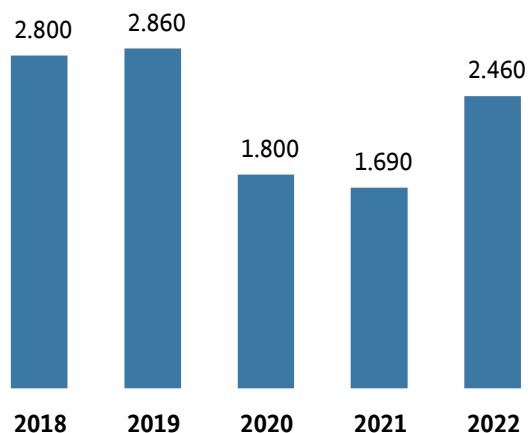


Figure 22: Traffic volume in regional and local rail passenger transport (2018–2022; in millions of passengers)

Traffic volume in long-distance rail passenger transport also saw a significant increase. In spite of the positive developments in passenger rail transport services there has not yet been a return to pre-crisis levels.

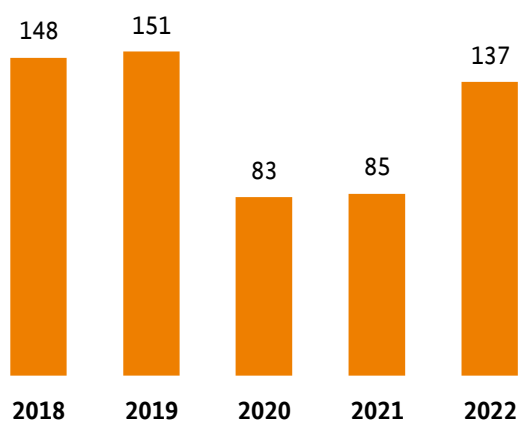


Figure 23: Traffic volume in long-distance rail passenger transport (2018-2022; in millions of passengers)

The coronavirus pandemic had only a short-term negative effect on rail freight transport. Already in 2021 the volume of freight transported went well beyond the 400mn tonne mark. There was a significant increase in traffic volume compared to 2021.

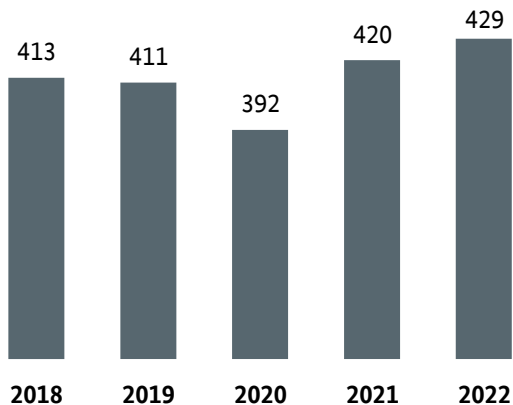


Figure 24: Traffic volume in rail freight transport (2018-2022; in millions of tonnes of freight)

1.2 Punctuality and network quality

1.2.1 Punctuality

By EU standards a passenger train is considered punctual when it runs no more than five minutes behind schedule. A freight train is considered punctual when it runs no more than 15 minutes behind schedule.²

Every year the Bundesnetzagentur asks for data on the number of scheduled stops made and the number of scheduled stops that were delayed. This information is used to calculate punctuality rates in rail passenger services. So the calculation includes not only the last scheduled stop of a train, but each individual scheduled stop, which makes the results more informative.

By contrast, rail freight transport continues to calculate punctuality based on the punctuality of the final stop.

In addition, information is collected and assessed on the number of scheduled trains that actually ran, trains cancelled on parts of routes and trains that were cancelled completely.

Following a noticeable increase in punctuality in 2020 due to a marked decrease in passenger demand and a slight decrease in operating performance on the railway network, punctuality declined again in 2021. The main reasons for this were increasing construction activity on the railway network and an increase in traffic beyond the pre-pandemic levels of 2019.

This trend continued in 2022. A renewed increase in operating performance on the network and

² These limits were standardised in the European Commission's Implementing Regulation (EU) 2015/1100. However, infrastructure managers in Germany have set different thresholds in some of their publications. For example,

DB Netz AG set limits at 5:59 minutes and 15:59 minutes, but all arrival and delivery times for this market survey are based on the EU standards.

significantly higher passenger demand following the pandemic years 2020 and 2021 have brought about repeated declines in punctuality rates.

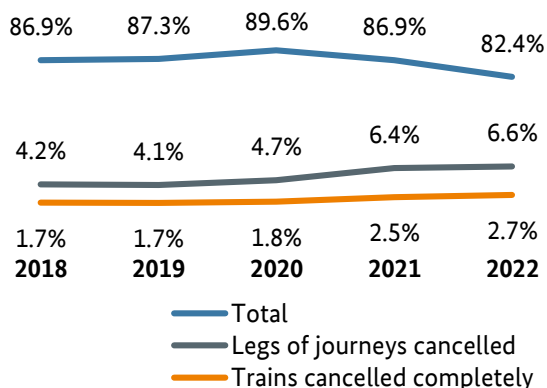


Figure 25: Punctuality in rail traffic; 2018-2022

Regional and local rail passenger transport

In recent years the rate of delays in regional and local rail passenger transport has remained relatively constant between 9% and 10%, and in 2022 the figure jumped to 14%.

The introduction of the €9 ticket in the summer of 2022 had a significant influence on this. The resulting peak demand for regional and local rail passenger transport had a considerable impact on operational stability.

An even higher delay rate (19%) results when only the last stop on the route is taken into account instead of each individual stop.

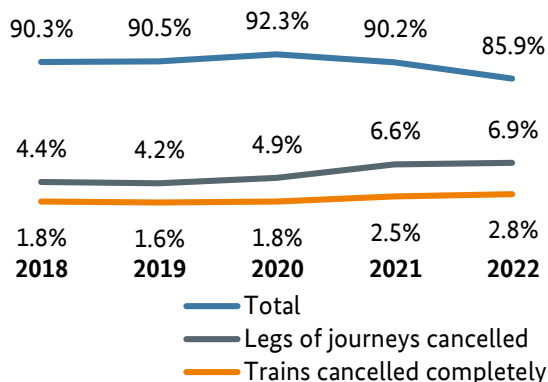


Figure 26: Punctuality in regional and local rail passenger transport; 2018-2022

In addition the percentage of trains cancelled on legs of journeys increased from just over 4% to 7% between 2018 and 2022. The share of trains that were cancelled completely also increased from just under 2% to just under 3%, so that nearly one in 10 local or regional train was cancelled completely or part of its journey was cancelled.

Long-distance rail passenger transport

There was an even more significant drop in the punctuality of long-distance transport. Whereas 72% of all freight train stops were reached on time in 2021, this figure fell to just over 62% in 2022.

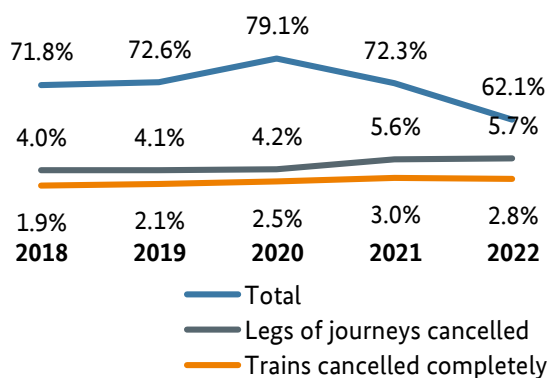


Figure 27: Punctuality in long-distance rail passenger transport; 2018-2022

There were more cancelled trains compared with the previous years. Just over one of every 40 long-distance transport trains was cancelled completely

and more than one of every 20 trains only travelled part of the scheduled journey.

Rail freight transport

In rail freight transport the overall rate of punctuality has also slightly decreased. Whereas 61% of all freight trains reached their destination on time in 2021, this figure fell to just under 57% in 2022.

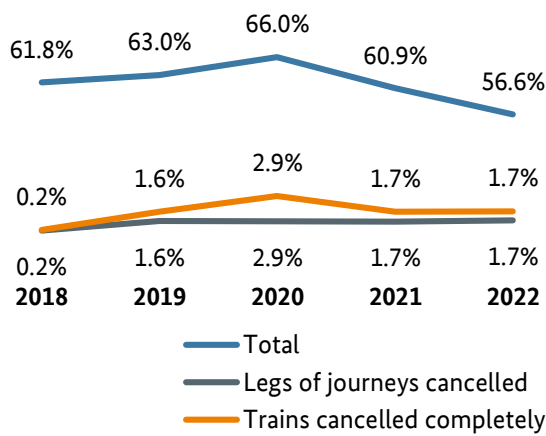


Figure 28: Punctuality in rail freight transport; 2018-2022

In 2018 the rate of complete or partial cancellation of freight trains was in the low one tenth of 1% range. Between 2018 and 2019 the rate increased nearly tenfold. As from 2019 (with the exception of 2020) the rate of completely cancelled trains then remained more or less unchanged. Just under 2% of freight trains in Germany were cancelled completely and a little over 1% more travelled only part of their scheduled journey.

Domestic rail freight transport was considerably more punctual than cross-border rail freight transport. While less than 40% of international freight trains arrived at their destination on time, 61% of freight trains operating within Germany reached their final destination on time.

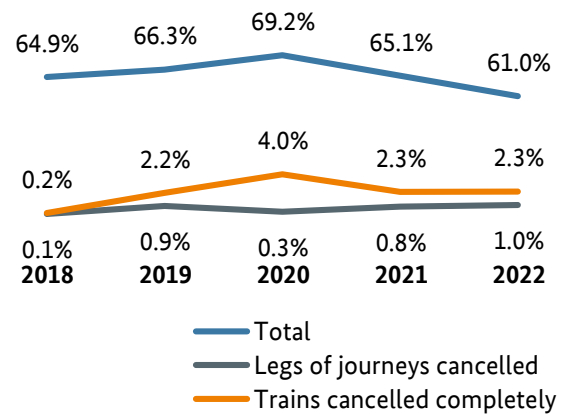


Figure 29: Punctuality in domestic rail freight transport; 2018-2022

There are still considerable hurdles in international rail freight that place a significant limit on the reliability of the railway for the international transport of goods.

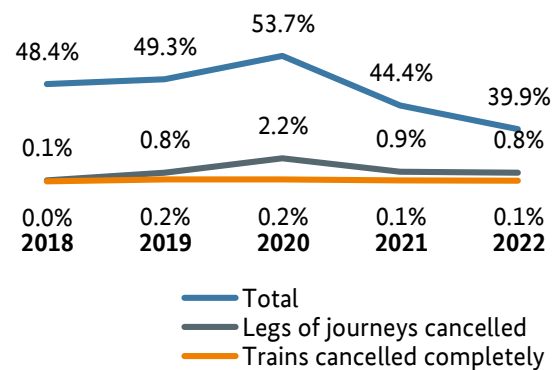


Figure 30: Punctuality in cross-border rail freight transport; 2018-2022

The negative trend in the punctuality of all rail transport services is usually blamed on increasing infrastructure-related construction activities. At the same time the burden on infrastructure brought about by more train traffic since the railway reforms of 1994 on a shrinking network has increased markedly. In addition, both railway undertakings and infrastructure managers point to growing difficulties in staff recruitment.

1.2.2 Network quality

The deterioration in punctuality has led to an increase in complaints from access beneficiaries and their customers about poor operational quality. In this context the Bundesnetzagentur has decided to step up the assessment of data from DB Netz AG's incentive system. Some basic findings will be included in this report.

The Bundesnetzagentur initially contacted DB Netz AG in 2022 for the exchange of data. In the subsequent discussions the scope of the data and the type of data to be exchanged were coordinated to fulfil data security and availability requirements. Currently the Bundesnetzagentur retroactively receives the incentive system daily data verification on a monthly basis. The collection and coding of the data is carried out in accordance with the requirements of DB Guideline 420.9001.

The events recorded in the data record are additional delays, ie situations in which a delay occurs for the first time or is increased. In accordance with the Guideline only delays of 90 seconds (rounded up to two minutes) or more are taken into account.

For 2022 the data record shows a total of 17.8mn delays totalling 208mn minutes of delay (median of three minutes and average of 11.7 minutes). These are all delays with no limitation on possible causes (infrastructure manager, railway undertaking, external or secondary causes). Rail freight transport accounted for 7.2mn delays (148mn minutes), long-distance rail passenger transport for 1.7mn delays (11mn minutes) and regional and local rail passenger transport for 8.7mn delays (42mn minutes). The average delay of more than

20 minutes per instance in rail freight transport was significantly longer than in long-distance rail passenger transport (average six minutes per instance) and in regional and local rail passenger transport (around five minutes per instance).

The long delays in rail freight transport are also noteworthy given that this segment's share (23%) of total operating performance is less than that of rail passenger transport services (62% from regional and local rail passenger transport and 14% from long-distance rail passenger transport). Because it has a different business model, rail freight transport places a different value on avoiding delays than rail passenger services does, and the punctuality thresholds vary between transport services.

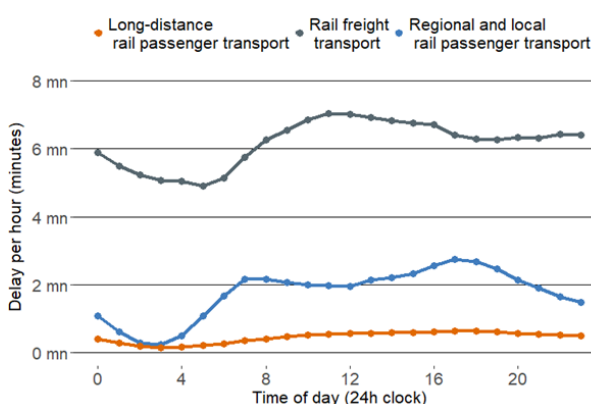


Figure 31: Delays less than one hour, by time of day and type of rail transport service; 2022

There were 2.0mn delays (19mn minutes) coded to infrastructure managers and 2.7mn delays (99mn minutes) coded to railway undertakings.³ The majority of delays (12.8mn) and a high proportion of delay minutes (87mn) are knock-on delays and not attributed to any of these causes. This includes

³ Coding is done by traffic controllers at DB Netz AG. Railway undertakings may request changes. This practice is not undisputed in the marketplace.

external influences such as weather-related disturbances or strikes.

Additional delays that occurred in the night were generally shorter than the ones that occurred during the day. Comparing rail transport services, this difference was much more pronounced within passenger transport services than in rail freight transport due to the lower density of trains. Whereas long-distance rail passenger transport caused very similar delays during certain individual hours of the day, these delays in regional and local rail passenger transport were proportionately a little longer during the usual commuter times (early morning and late afternoon/evening) compared to other times of the day.

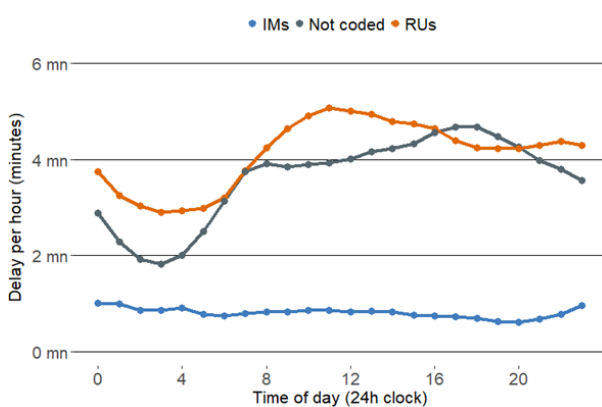


Figure 32: Delays less than one hour, by time of day and responsible party; 2022

Knock-on delays over the course of a day correspond to the network load. Thus the largest number of delays occur in the afternoon hours. By contrast, the majority of delays originating from railway undertakings occur in the morning hours.

Over the course of a week there were differences among the rail transport services, especially between weekends and the days in the middle of the week (Tuesday to Thursday). Wednesday was the day with the most delays (around 36mn delay minutes) in the 2022 reporting year, with weekends accordingly having the fewest delay minutes.

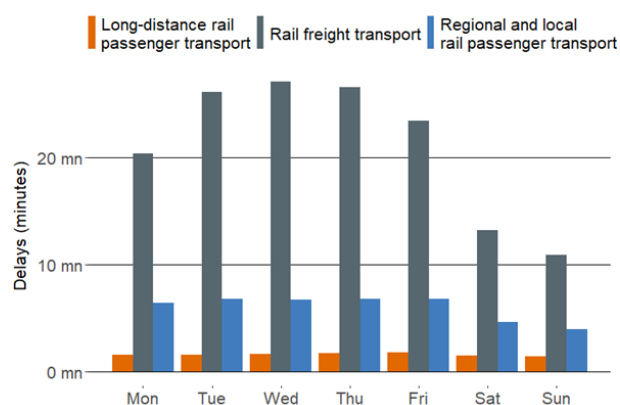


Figure 33: Delays by day of the week and type of rail transport service; 2022

Whereas long-distance rail passenger transport trains delays had a mostly constant number of delays that was comparatively low, regional and local rail passenger transport and in particular rail freight transport showed significantly more delays with different durations. Mid-week rail freight transport had around twice as many delays as on Saturdays and Sundays.

Over the course of the year, delays that were coded to the responsibility of the railway undertakings increased from the beginning to the middle of the year, with a slight decline in November and December. The largest number of these delays were in rail freight transport.

A total of 23.6mn delay minutes were attributed to infrastructure managers. Most of them fell under the categories of constructional situations (in particular construction sites) and infrastructure (eg railway infrastructure, building structures, signal technology).

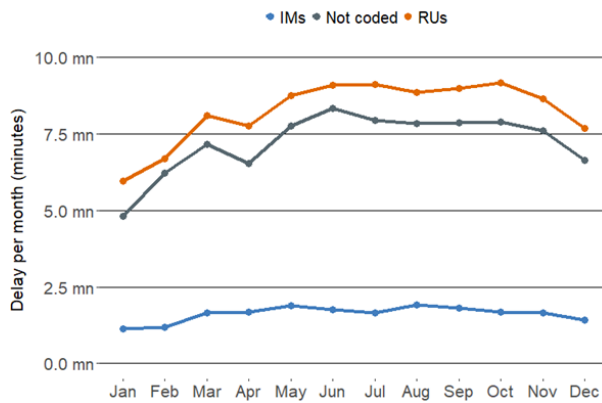


Figure 34: Delays by month and responsibility coding; 2022

Of the 102.1mn delay minutes that were coded as falling under the responsibility of the railway undertakings, nearly 80% were in the category of provision of transport services (eg train preparation, not reported by railway undertaking, exceeding the stop time).

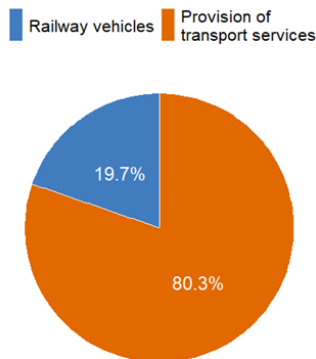


Figure 35: Breakdown of responsible party categories for the delay minutes coded as falling under the responsibility of the railway undertakings; 2022

Breaking down the delays in the course of the year according to causes falling under the responsibility of the infrastructure managers (Figure 37) illustrates that construction-related reasons were predominant especially in the months of March and April.

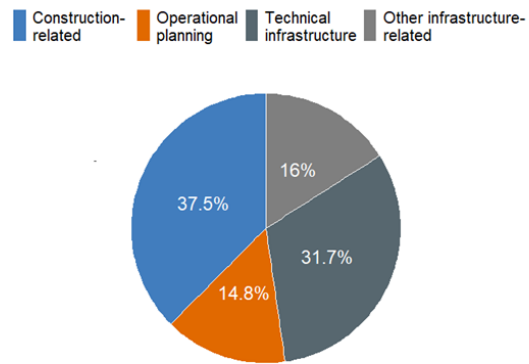


Figure 36: Breakdown of responsible party categories for the delay minutes coded as falling under the responsibility of the infrastructure managers; 2022

Delay minutes declined in the summer months and saw a slight increase again until November. Delays due to faulty technical infrastructure (eg track, overhead contact line, control systems) were a problem particularly in the summer months and reached their peak for the year in August. The same was true for delays caused by operational planning. There was a similarly low number of delays among other infrastructure-related causes (by upstream and downstream infrastructure managers or DB Energie and DB Station & Service).

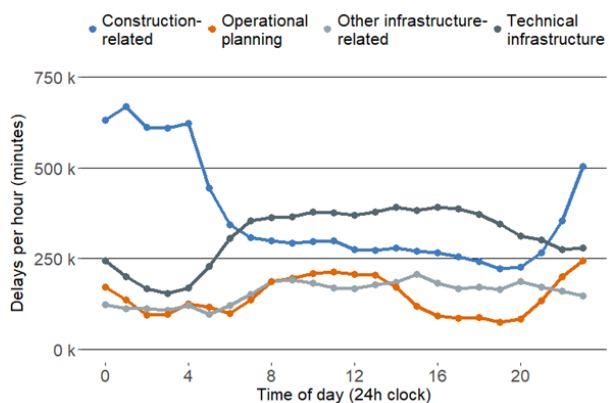


Figure 37: Delays by month coded as falling under the responsibility of the infrastructure managers; 2022

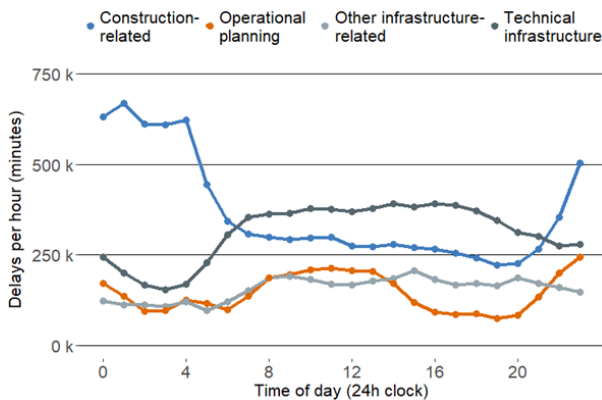


Figure 38: Delays per hour, by time of day and coded as falling under the responsibility of the infrastructure managers; 2022

Delays related to construction work were reported especially at night and in the early morning hours, while delays caused by operational matters or due to defective technical facilities were reported mostly during the day.

Among the delays falling under the responsibility of neither the infrastructure managers nor the railway undertakings (external and secondary causes: 12.8mn delays totalling 87mn minutes) accounted for slightly more than 44% of the duration of the delays due to headway incidents where the train concerned was delayed. Another 20% were caused by headway incidents due to other trains having priority. Headway incidents include situations where a train experiences added delay due to its own initial delay when it has to wait for the next opportunity to continue on its journey or when the train is further delayed by another train that has priority.

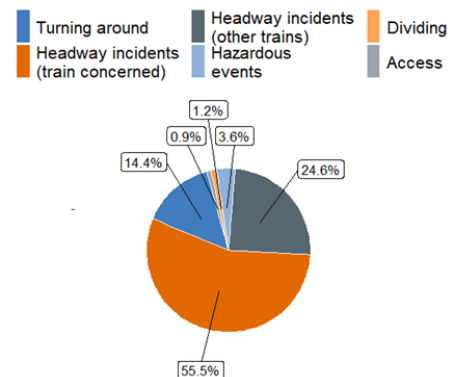


Figure 39: Breakdown of responsible party categories for the delays coded as having secondary causes; 2022.

The figures below show the geographical spread of the delays. The code letter of the operating location number was used to assign a delay to a region. To take into account the regions' different railway network sizes, the delay minutes were divided by the number of operating locations. Thus the delay minutes shown in these figures mean the average delay length of an operating control point in the respective region. Operating performance or line utilisation at the operating locations are not included in the data record and thus it is not possible to take them into account as well.

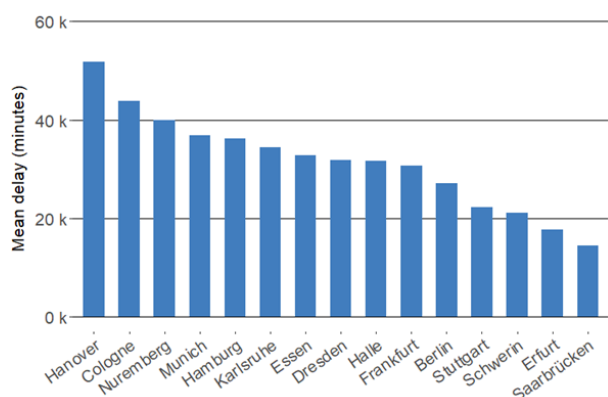


Figure 40: Average annual delay (minutes) of an operating control point for a given region; 2022.

There were significant regional differences, with the Hanover region leading with nearly 52,000 minutes for the year (which equates to 142 minutes per day).

As expected, delay times were lower for regions such as Schwerin, Erfurt and Saarbrücken, which are not close to routes with heavy traffic loads.

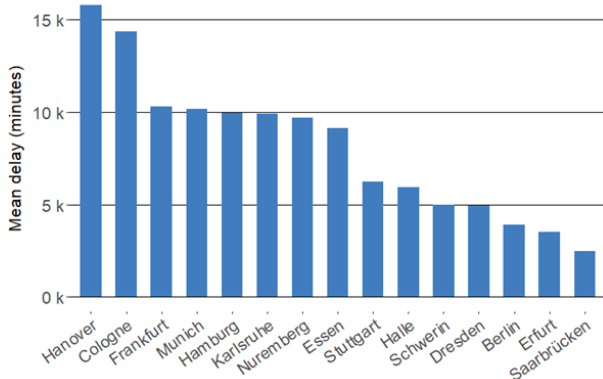


Figure 41: Average annual delay due to headway incidents (minutes) of an operating control point for a given region; 2022.

Comparing the differences in additional delays caused only by headway incidents (priority for other trains or a train's own delay) shows an even greater difference in the operating stations of the regions around Hanover and Cologne compared to the other regions. As with delays overall, the areas around Berlin, Schwerin, Erfurt and Saarbrücken also had the lowest figures for delays caused by headway incidents (Figure 41).

When taking infrastructure-related (Figure 42) or site-related additional delays (Figure 43) into account there are also major differences between the regions. The order of the regions remains similar to that of the overall assessment (Figure 40).

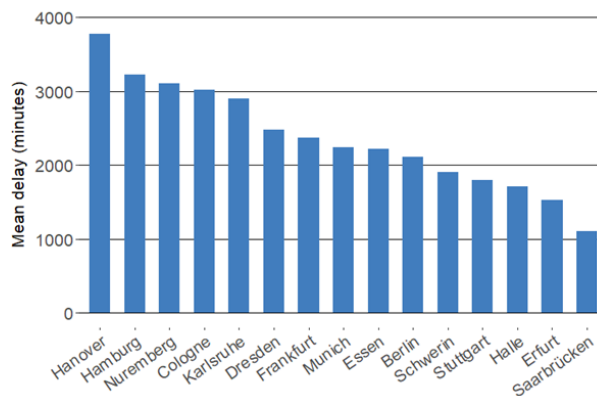


Figure 42: Average annual delay due to incidents caused by the infrastructure manager (excluding construction work, minutes) of an operating control point for a given region, 2022.

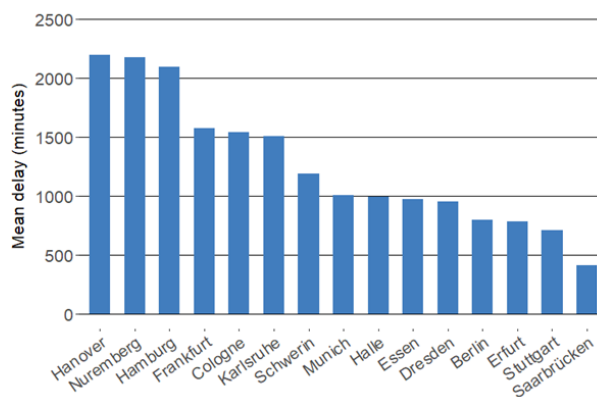


Figure 43: Average annual delay due to construction work and construction work irregularities (minutes) of an operating control point for a given region; 2022.

The six operating locations with the highest overall delays were border stations, whereby the operating control point Oderbrücke also stands out markedly among these. The highest number of delays was not at these operating control points but at the major junction stations for passenger transport.

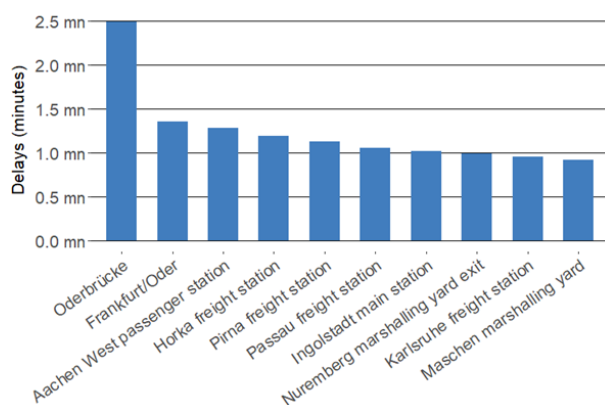


Figure 44: The 10 operating control points with the most delay minutes, 2022

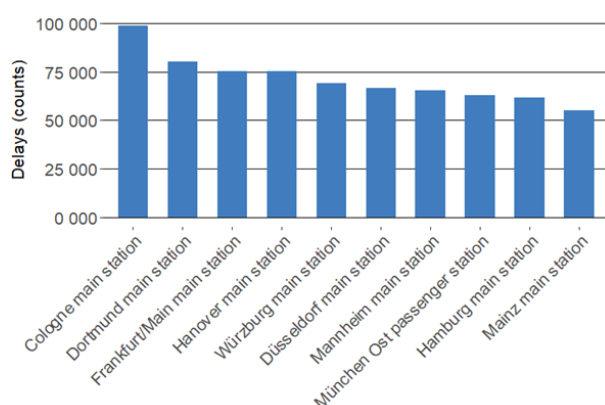


Figure 45: The 10 operating control points with the most frequent delays, 2022

1.2.3 Congested railway lines

The reporting year 2022 is characterised by a high number of completed procedures concerning congested railway lines. Numerous plans to increase railway infrastructure capacity (PEK) were finalised. This involved the following railway lines:

- Berlin – Wittenberge – Hamburg: section Spandau – Nauen;
 - Berlin – Stendal – Hanover: section Wustermark – Rathenow;
 - Münster – Gelsenkirchen.
- The first four congested railway line procedures involved updating already-existing plans to increase railway infrastructure capacity. The other three procedures dealt with three newly declared congested railway lines. New in all the cases was that since 2021, due to a change in section 59(3) of the Rail Regulation Act (ERegG), the Federal Railway Authority (EBA) must in agreement with the regulatory authority determine within six weeks that the congested railway line procedure has been carried out by the infrastructure manager in accordance with the statutory requirements. In addition the EBA must recommend the implementation of one or more measures "that are particularly suitable for increasing rail infrastructure capacity".
- However, this is precisely where the core problem of the congested railway line procedure lies. The infrastructural improvements identified in the plans to increase railway infrastructure capacity are for the short to medium-term, so they need to be implemented within two and a maximum of around seven years. Besides the possibility of a real increase in capacity, ie being able to offer more train paths, it is also about operational quality. If operational quality is poor, which is normally the case with congested railway routes, delays caused by disruptions to operational procedures can no longer be reduced. Essentially more trains are already being driven on congested railway routes than the capacity of the railway infrastructure allows for good operational quality.
- Completely contrary to the need to reduce infrastructural congestion as quickly as possible, the reality is:
- Berlin light rail: Charlottenburg to Ostbahnhof;
 - Hamburg – Hanover: the section between Stelle and Uelzen;
 - Mainline railway tracks Cologne-Mülheim – Duisburg – Essen – Dortmund;
 - Gemünden/Main – Würzburg – Fürth and Bamberg-Fürth;

- For measures proposed in the PEK, 84 small measures can be implemented within the framework of the BMDV's Climate Action Programme (KSP) by way of a programme for "small and medium-sized measures" until 2030, but these only cover a small part of all proposed measures. For all other measures, in particular those identified as necessary in the newer congested railway line procedures, there is still no financing because the measures do not fall under the financing rules of the performance and financing agreement (LuFV, up to now maintenance) or the Federal Rail Network Expansion Act (large expansion measures).

- The financing of 84 small and medium-sized measures came as such a surprise for DB Netz AG that it had not carried out detailed planning in good time. DB Netz AG does not have planning reserves similar to those, for example, in the federal motorways sector. However, for the fastest possible detailed planning, planning capacities are lacking, and because there is still no certainty regarding the financing of previously unresolved and newly recognised congestion after the €754mn of KSP funds have been used up (by 2030), it is also unlikely that there will be detailed planning for the remaining congestion for which financing commitments are not yet foreseeable.

- The third problem with the general elimination of congestion is the need to include it in the overall construction planning and activities. Due to decades of neglected maintenance there is currently an excess of construction work with proportionate (at times nearly catastrophic) consequences for punctuality on Germany's interregional railway network. Additional measures from the congested railway line procedures would temporarily exacerbate the problem.

Congestion of the railway network is not just a problem for heavily used railway lines; it also affects less busy lines (often single-track lines in

more rural areas) including lines where non-federally owned railway undertakings run. Occasionally these lines were even reduced to the demand for local passenger transport, or local passenger transport was so successful in terms of demand that the regional transport authorities gradually ordered more and more trains for regional and local rail passenger transport. Consequently these routes often have no train paths for freight traffic during the day, so this traffic is either forced to run in the night hours (so the freight can reach freight customers during the day) or onto what are sometimes very circuitous routes. As a result freight traffic avoids using such routes or the freight traffic can only run at night as non-scheduled rail services. However, this normally does not prompt a declaration of congestion. In rural areas there is also often no shifting of freight traffic onto rail because the railway undertakings are not trying to acquire any traffic there. As a result the railway sector loses additional freight traffic.

Nevertheless a declaration of congestion for the single-track line Halle-Trotha – Könnern was issued at the beginning of 2022. It has uninterrupted regional and local rail passenger transport train paths during the day between 8am and 4pm, with only a few vacant train path slots before and after those hours. Many lines are fully occupied with passenger transport traffic even longer, eg from 5am to 11pm. In the case of Halle-Trotha – Könnern there was a sugar factory that insisted on a daily delivery, which was only possible in the 2022 timetable using a detour route that was operationally and economically unfeasible.

The problem occurs often throughout Germany. However, it was all the more surprising that there were no corresponding statements from the railway undertakings or their professional associations in the commenting procedure that was open to all access beneficiaries concerning the draft PEK. Clearly there are considerable problems for access beneficiaries to take notice of such opportunities to

comment on individual cases. Unfortunately in this case the publication of the draft PEK went largely unnoticed.

However, in the case of Halle-Trotha – Könnern there was no feasible solution. Capacity expansion would only be possible with a relatively complex extension of the railway line, which in the current situation would require at least €70mn but actually around €200mn to make more sense in terms of transport.⁴ In light of the expected benefits, the financing of such a measure is currently completely unrealistic, although it would also benefit the objective of more punctuality in passenger transport, because otherwise reported delays often impact the entire day. In the case of the railway sector, however, the economic benefits of local expansion measures must always be demonstrated, which is not the case in road transport, railway's competitor.

The 2022 punctuality figures continued on a downward trend and the overall reliability of rail itself is increasingly being called into question. In addition to operational disruptions, eg due to a lack of signal box staffing, emergency construction measures resulting from neglected maintenance, and personnel and maintenance problems (also at the railway undertakings), the topic of congestion is a significant part of the overall problem. There is a mix of local, long-distance and freight traffic on many railway lines in Germany, thus numerous path conflicts would arise if all needs were taken into account. At the same time the congested areas have increasingly merged in terms of time and space. In large areas, including in the whole of North Rhine-Westphalia and to the west of Berlin, there is a shrinking number of "recuperation lines" between congested railway sections and of

"recuperation times" between times of congestion, both of which serve to reduce disruptions.

Disruptions thus accumulate and often make for poor operational quality over the course of several hours. DB Netz consequently announced in November 2022 that it would only be able to deal with the maintenance problem by "completely overhauling" its "high-performance corridors". Since then the discussion about enhancing the DB network and about new congested railway lines in the future has been shaped by plans to block main routes for several months.

⁴ There are many less expensive options such as adding a crossing.

1.2.4 Refunds made to passengers

In 2022, railway undertakings in the passenger rail transport segment refunded approximately €68mn to passengers in compliance with regulations governing passenger rights or as a gesture of good will. In 2021 this figure was €26mn. The steep increase is likely due to the increasingly poor operational quality.

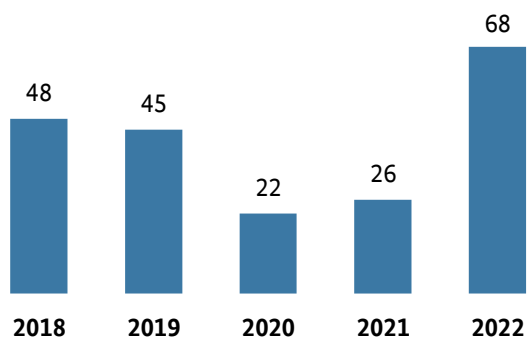


Figure 46: Passenger refunds (2018-2022; in €mn)

1.3 Resources of railway undertakings

1.3.1 Personnel

The number of employees in the railway market has grown continuously in recent years. The increase in personnel was concentrated in railway undertakings in the rail freight transport segment.

Railway undertakings employed a total of around 89,000 workers in 2022, including 34,000 train drivers, the number of which stagnated compared to 2021.⁵

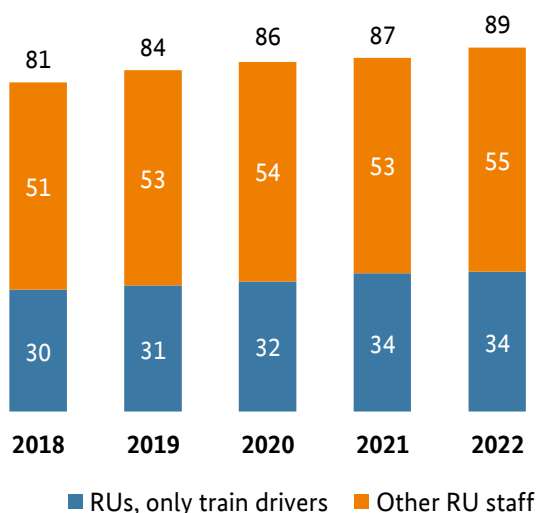


Figure 47: Employee numbers at the railway undertakings (2018-2022; in thousands of FTEs)

Around 45% of these 89,000 jobs are in regional and local rail passenger transport. Train drivers account for 19,000 – approximately half – of the 40,000 jobs in this category while other fields of work account for the other 21,000. Around 16,000 people worked in long-distance rail passenger transport, of whom around 4,000 were train drivers.

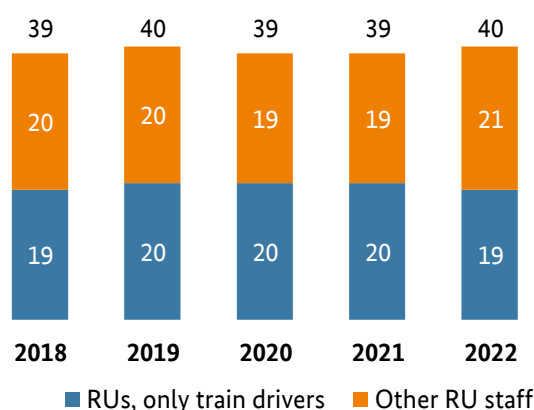


Figure 48: Employee numbers at the railway undertakings in regional and local rail passenger transport (2018-2022; in thousands of FTEs)

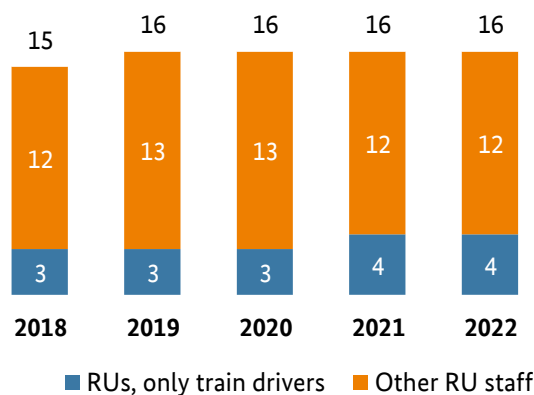


Figure 49: Employee numbers at the railway undertakings in long-distance rail passenger transport (2018-2022; in thousands of FTEs)

In 2022 there were 33,000 people employed in rail freight transport, 11,000 of whom as train drivers.

⁵ In full-time equivalents (FTEs). Hours worked in part-time positions are aggregated into FTEs.

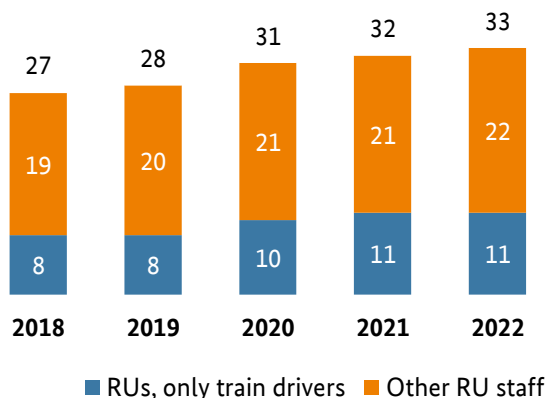


Figure 50: Employee numbers at the railway undertakings in rail freight transport (2018-2022; in thousands of FTEs)

Around 20% of employees at railway undertakings in 2022 were female.

In 2022 around 12% of railway undertaking staff were working on a part-time basis. The training rate (percentage of employees who are undergoing training) did not change appreciably between 2018 and 2022 and was around 6%.

The proportion of older employees has increased in recent years. The percentage of train drivers and other employees over the age of 50 increased by one percentage point compared with last year. With regard to staff under 30, both the percentage of train drivers (13%) and of other employees (12%) remained stable.

Due to the age distribution of those working in the railway transport market, undertakings are being forced by the departure of employees to acquire new personnel on a continuous basis.

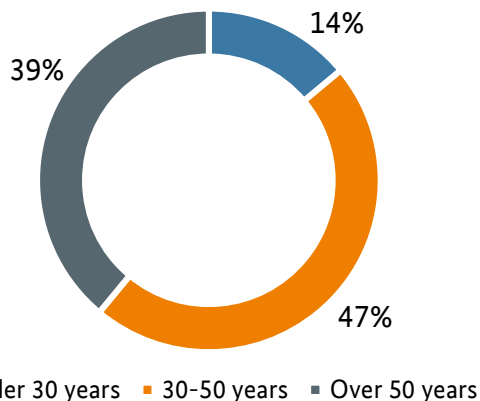


Figure 51: Age distribution of the railway undertakings' employees (2022; shares in %)

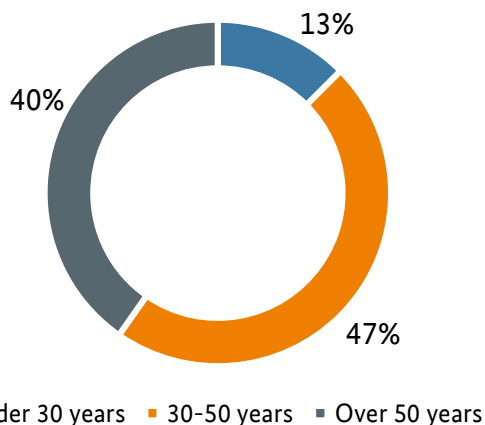


Figure 52: Age distribution of railway undertakings' train drivers (2022; shares in %)

Railway undertakings again rated the availability of personnel as unsatisfactory. Compared with last year, the rating of the availability of train drivers stagnated, with an average reported of 3.3. This leads to the conclusion that the situation remains tense in spite of personnel growth in this area.

There was another slight drop in the rating for the availability of operational staff and other personnel from 2022 to 2023. The availability of operational staff was rated at 3.2 and thus slightly worse than in 2022. At 3.0, the rating for the factors influencing the availability of other personnel was a little worse than in 2022 when it was 2.9.

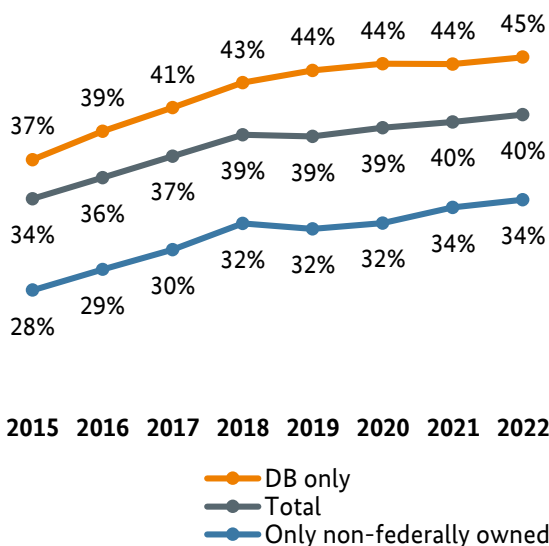


Figure 53: The share of train drivers over 50 out of the total number of train drivers at railway undertakings (%; figures rounded)

Most railway undertakings report that they are seeing a higher number of departures due to the age of their staff while at the same time observing a weak candidate pool. Railway undertakings are investing more in training measures and lateral entry programmes but also recruiting personnel from other railway undertakings.

RU staff availability	2019	2020	2021	2022	2023	Trend
Train drivers	3.5	3.4	3.1	3.3	3.3	→
Operational staff	3.0	3.0	2.9	3.1	3.2	↘
Other staff	2.7	2.8	2.7	2.9	3.0	↘

Figure 54: Rating of the availability of personnel for railway undertakings (2019-2023; Average values; Grading scale from 1 (very good/no need for action) to 5 (insufficient/urgent need for action); The trend arrows refer to the trend from 2022 to 2023; Source: Bundesnetzagentur market surveys).

1.3.2 Rolling stock

In the 2023 railway market analysis the Bundesnetzagentur collected data on the rolling stock used by railway undertakings. The undertakings were surveyed about the line locomotives, shunting locomotives, railcars (multiple-unit sets) and special vehicles they operate.⁶ Around 52% responded that they only operate their own rolling stock. Another 22% use their own rolling stock as well as that of third party providers and 19% of the respondents operate only rolling stock from third party providers. The remaining 7% of the railway undertakings did not provide information about the source of the tractive vehicles they operate.

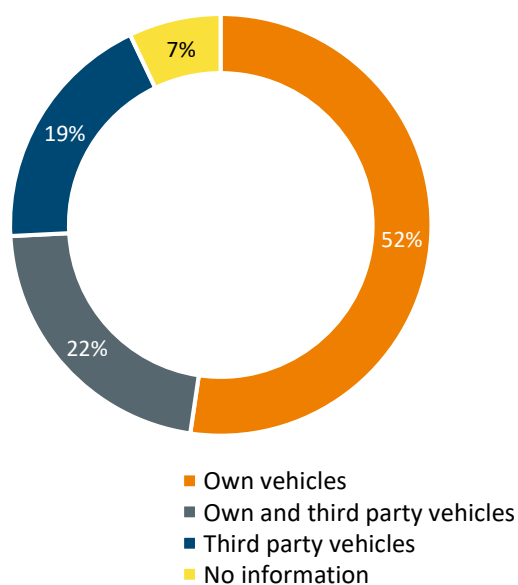


Figure 55: Keepers of the tractive vehicles operated by the railway undertakings in 2022 (%)

In the 2022 reporting year the railway undertakings active in the German railway network used nearly 15,000 powered vehicles. Of these, around 13,200 tractive vehicles were operated, mostly throughout Germany, of which more than half (nearly 7,900 vehicles) were multiple-unit sets. In addition, nearly 3,250 line locomotives, just over 1,200 shunting locomotives and about 850 special vehicles were operated by the railway undertakings throughout Germany.

Around 1,800 tractive vehicles were operated mostly internationally. Unlike in domestic operation, the tractive vehicles predominantly used for international operation were line locomotives (just over 1,350 vehicles). In addition, around 420 multiple-unit sets and a low double-digit number of special vehicles were used by the railway undertakings.

Of the nearly 15,000 tractive vehicles in operation, around 1,600 vehicles were ETCS-equipped. Line locomotives represented the largest share of ETCS-powered vehicles (just over 1,250). In addition there were just under 350 ETCS-equipped multiple-unit sets. No distinction was made between system versions of the vehicles equipped with ETCS. Modifying the German railway network to ETCS may require an upgrade, particularly for older system versions, so that these vehicles can also use modification resources again.

⁶ This includes multiple unit trains with non-powered trailer vehicles such as ICE 1 and 2.

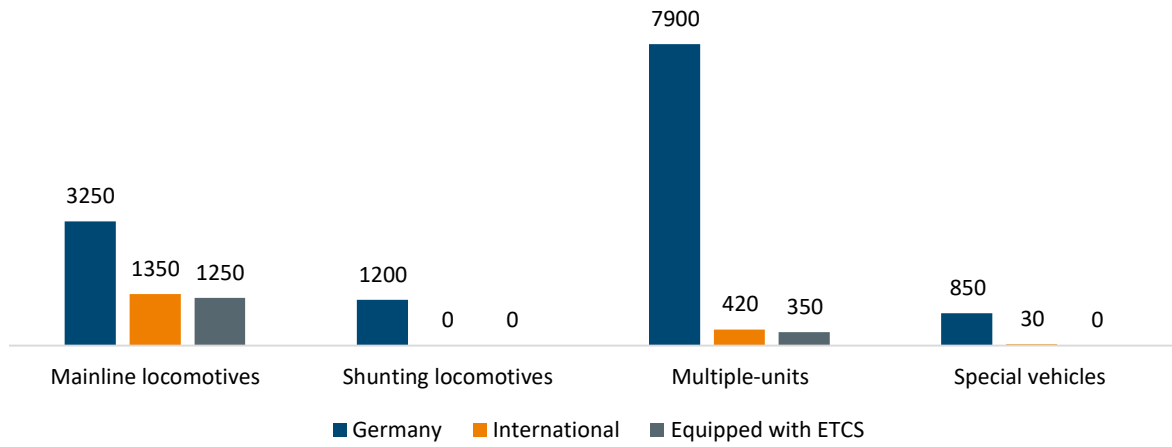


Figure 56: Number of tractive vehicles operated in 2022 by railway undertakings in Germany and internationally

1.4 Economic situation of the railway undertakings

1.4.1 Revenue

With a revenue jump of 18% compared to the previous year, railway undertakings have moved past the 2022 pandemic-driven slump in revenue. The new record high for revenue (€23.8bn) surpasses the pre-corona level from 2019 by 7%. This is due primarily to the increase in transport performance throughout all rail transport services. Revenue includes track access charge assistance, which was reduced in 2022 for rail freight and long-distance rail passenger transport but continued to be paid. Revenue also includes rescue package payments and service facility charge assistance from the federal government.

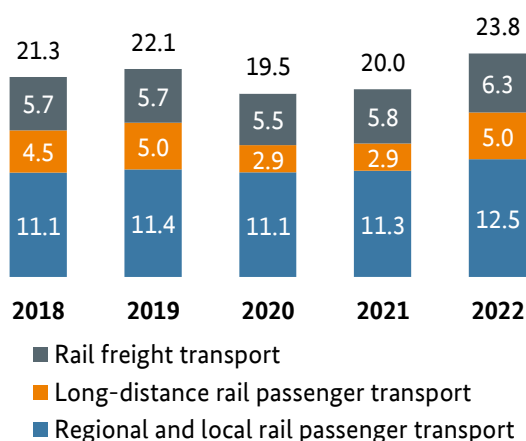


Figure 57: Revenue trends in the railway transport market (2018-2022; in €bn)

Regional and local rail passenger transport

Revenue in regional and local rail passenger transport increased by more than €1bn to €12.5bn, thus also surpassing the 2019 level. The local public transport rescue package and back payments by regional transport authorities for previous years contributed significantly to the increase.

Revenue reached €17 per train-kilometre travelled. While there was only a slight increase in payments per kilometre by regional transport authorities,

demand drove market revenue to an increase of more than 20% compared to 2021.

Average train occupancy increased by more than 50% to 72%, though not yet reaching the 2019 level of more than 80%.

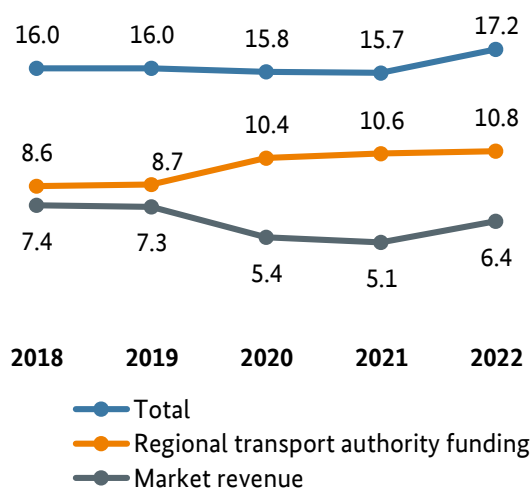


Figure 58: Revenue per train-km in regional and local rail passenger transport (2018-2022; in euros per train-km)

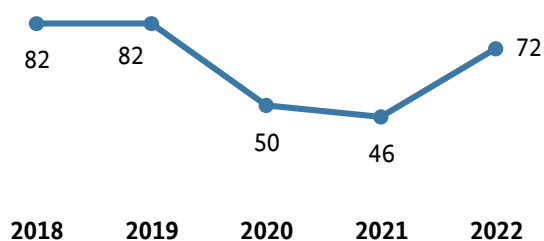


Figure 59: Average train occupancy per train in regional and local rail passenger transport (2018-2022)

The strong increase in demand coupled with only half as much growth in market revenue per train-kilometre resulted in a decrease in revenue from ticket sales per passenger-kilometre. One reason for this was the three-month phase of the €9 ticket in which railway undertakings in regional and local rail passenger transport in particular generated less fare revenue. Also, regional transport authority funding per passenger-kilometre was less than in the previous year. Revenue per passenger-kilometre

in regional and local rail passenger transport (€23.80) was still above the 2019 level (€19.60).

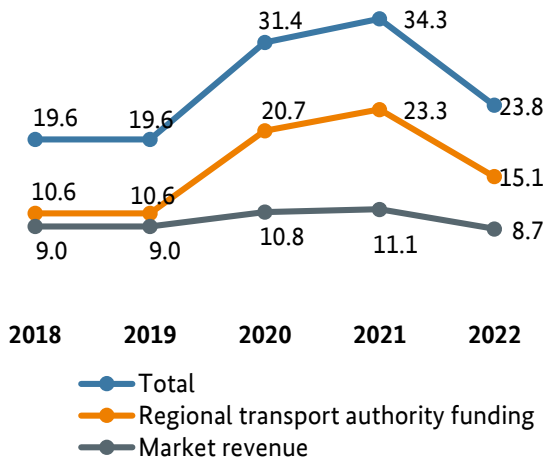


Figure 60: Revenue per passenger-km in regional and local rail passenger transport (2018-2022; in cents per passenger-km)

To roughly the same degree as the market overall, regional and local rail passenger transport railway undertakings that are not federally owned saw an increase in revenue per train-kilometre of around 11%. Average train occupancy increased by nearly 60%, slightly more than the market overall.

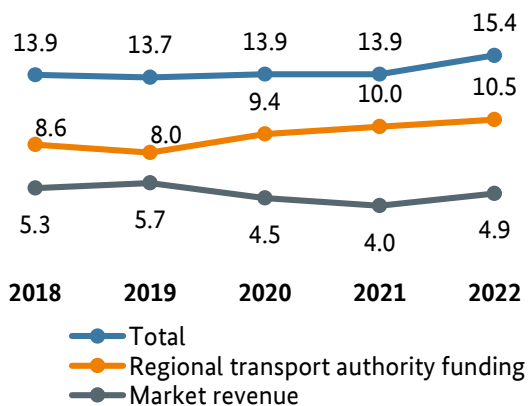


Figure 61: Revenue per train-km in regional and local rail passenger transport | only non-federally owned railway

undertakings (2018-2022; in euros per train-km)

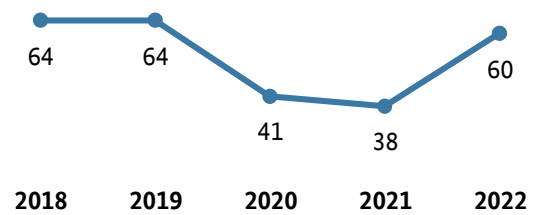


Figure 62: Average train occupancy per train in regional and local rail passenger transport | non-federally owned railway undertakings (2018-2022)

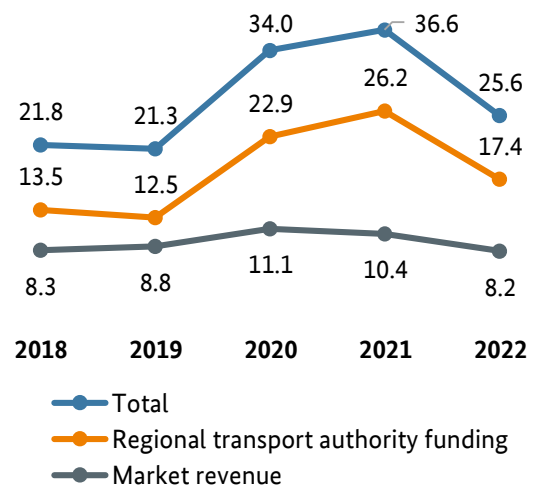


Figure 63: Revenue per passenger-km in regional and local rail passenger transport | non-federally owned railway undertakings (2018-2022; in cents per passenger-km)

Similar to the overall market, revenue per passenger-kilometre decreased at non-federally owned railway undertakings by around 30%.

Long-distance rail passenger transport

Absolute revenue in long-distance transport (€5bn) increased by around 70% in 2022 and thus returned to its pre-pandemic level. Revenue was driven by the track access charge assistance of around 45% that continued to be provided until the end of 2022.

Train-kilometres in long-distance transport increased by around 10%, which was around 11%

above their pre-pandemic level. Revenue per train-kilometre travelled increased by more than 50%.

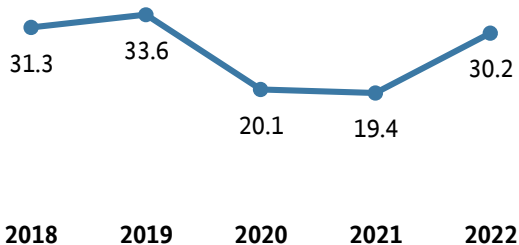


Figure 64: Revenue per train-km in long-distance rail passenger transport (2018-2022; in euros per train-km)

Revenue per travelled passenger-kilometre was driven largely by the increase in demand in 2022. Average train occupancy increased by around 50%.

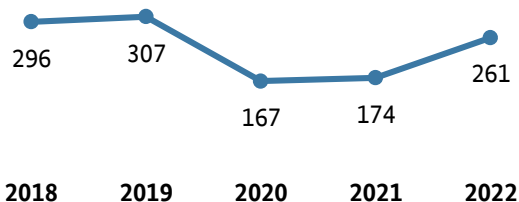


Figure 65: Average train occupancy per train in long-distance rail passenger transport | non-federally owned railway undertakings (2018-2022)

In relation to the somewhat stronger overall revenue growth, revenue in long-distance rail passenger transport increased by around 4% per passenger-kilometre.

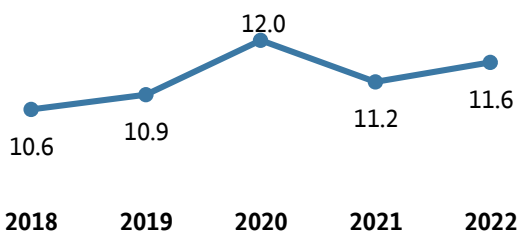


Figure 66: Revenue per passenger-km in long-distance rail passenger transport (2018-2022; in euros per passenger-km)

Rail freight transport

Railway undertakings in rail freight transport saw a revenue increase of around 8% in 2022, setting a new high at €6.2bn. Operating performance increased only marginally by 2%. Accordingly, revenue per train-kilometre grew around 6% to just over €23.

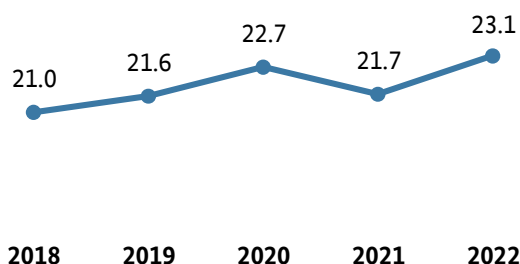


Figure 67: Revenue per train-km in rail freight transport (2018-2022; in euros per train-km)

The increase in the average freight load per train, which had been on the rise in recent years, was halted in 2022 due to the economic situation. There was even a slight decrease. Because revenue rose more sharply than net tonne-kilometres, revenue per tonne-kilometre rose significantly by around 7% to 4.4 cents per tonne-kilometre.

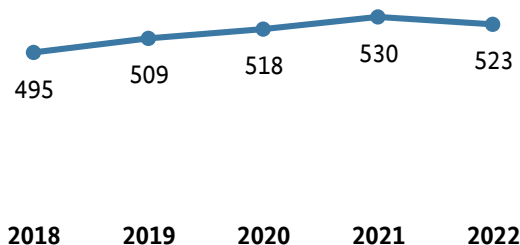


Figure 68: Average freight load per train in rail freight transport (2018-2022; in tonnes)

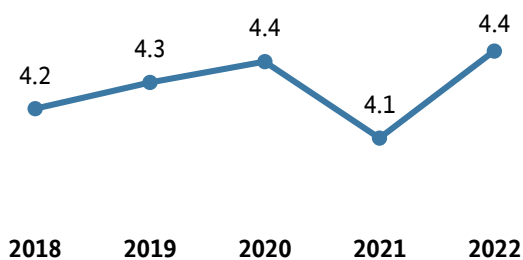


Figure 69: Revenue per tonne-km in rail freight transport (2018-2022; in cents per tonne-km)

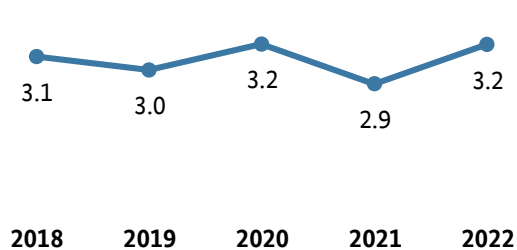


Figure 71: Revenue per tonne-km in rail freight transport | only non-federally owned railway undertakings (2018-2022; in euros per tonne-km)

The competitor railways were able to maintain the average volume of freight, which was also just over 10% above that of the overall market. Part of the track access charge assistance was passed on to the end-customers.

Revenue in rail freight transport outperformed the overall market, with revenue per train-kilometre and per tonne-kilometre both increasing by more than 10%.

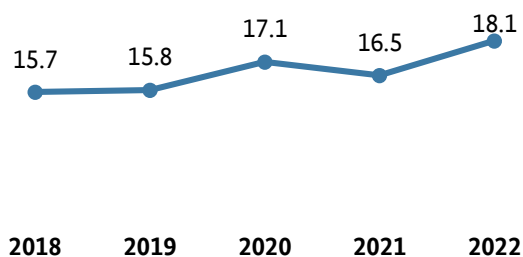


Figure 70: Revenue per train-km in rail freight transport | only non-federally owned railway undertakings (2018-2022; in euros per train-km)

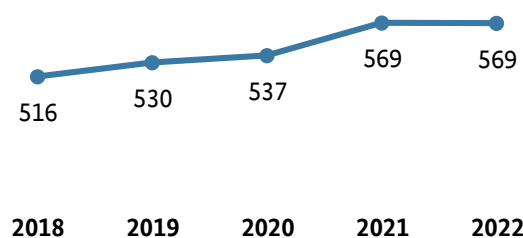


Figure 72: Average freight load in rail freight transport | non-federally owned railway undertakings (2018-2022; in tonnes)

1.4.2 Retail prices

Both ticket prices and freight rates are important criteria for the attractiveness and intermodal competitiveness of railways.

To assess price trends for end-customers, the Bundesnetzagentur compares the results from its own market survey with the public statistics of the Federal Statistical Office (Destatis). While these reflect the price trends of specifically defined services having a constant quantity structure from the perspective of the railway customer, the average revenue per tonne-kilometre or passenger-kilometre determined by the Bundesnetzagentur shows the revenue trend of railway undertakings and takes into account possible shifts in the quantity structure of the products and services requested.

In rail passenger transport such shifts can be influenced, for example by changes in the demand

for rail passes or discount offers (such as saver fares or BahnCards). The €9 ticket also had a noticeable influence on demand structures in rail passenger service.

Regional and local rail passenger transport

Under the influence of the coronavirus pandemic, ticket prices in regional and local rail passenger transport increased very little. In 2021 ticket prices were slightly above 5% more than what they were in 2018. The €9 ticket that was available for three months in the summer of 2022 drove the average ticket price for 2022 down by more than 10% compared to the previous year.

However, the railway undertakings' revenue in regional and local rail passenger transport was higher than before the pandemic. When calculating in the public funding they received, railway undertaking revenue per passenger-kilometre was around 20% higher than before the pandemic.

Fare revenue remains essentially unchanged if public funding through the regular public compensation payments and the local public

transport rescue package are not taken into account. The impact of the €9 ticket is visible when fare revenue is converted to passenger demand. Railway undertakings generated around one quarter less revenue per passenger-kilometre than in 2021 and despite increased standard fares, fare revenue was around 5% lower than in 2019.

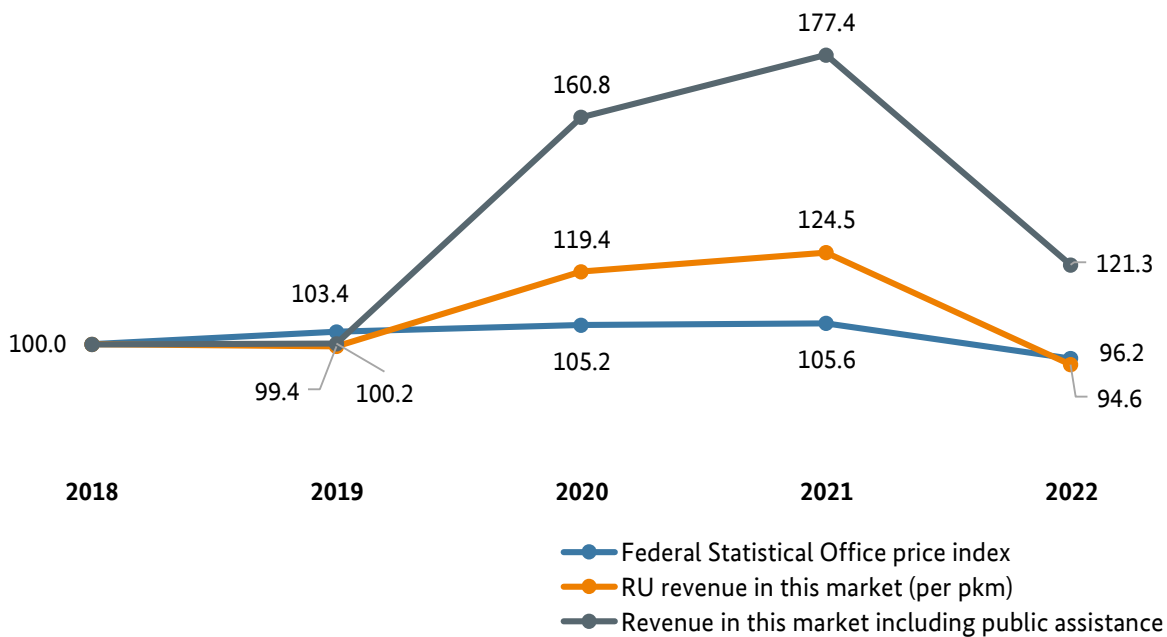


Figure 73: Retail prices in regional and local rail passenger transport (2018-2022; indexed 2018 = 100)

Long-distance rail passenger transport

In long-distance rail passenger transport the fare price index and revenue generated per passenger-kilometre were on relatively similar courses until 2019.

Retail prices for long-distance rail passenger transport tickets fell noticeably in 2020 with the reduction of value-added tax. Attractive offers were used in response to the pandemic to generate additional demand and to increase the amount of costs recovered in long-distance rail passenger transport. This trend also continued in 2022.

By contrast, revenue per passenger-kilometre in long-distance rail passenger transport rose visibly from 2019 to 2020, caused by a decrease in active use of BahnCards and other discount offers such as subscription passes. However, following a temporary decline in 2021, railway undertakings' revenue in long-distance rail passenger transport increased again in 2022 in spite of stronger demand for and the price-dampening effect of a renewed increase in demand for passes and subscriptions. In 2022 railway undertakings in long-distance rail passenger transport generated nearly 10% more per person-kilometre than in 2018.

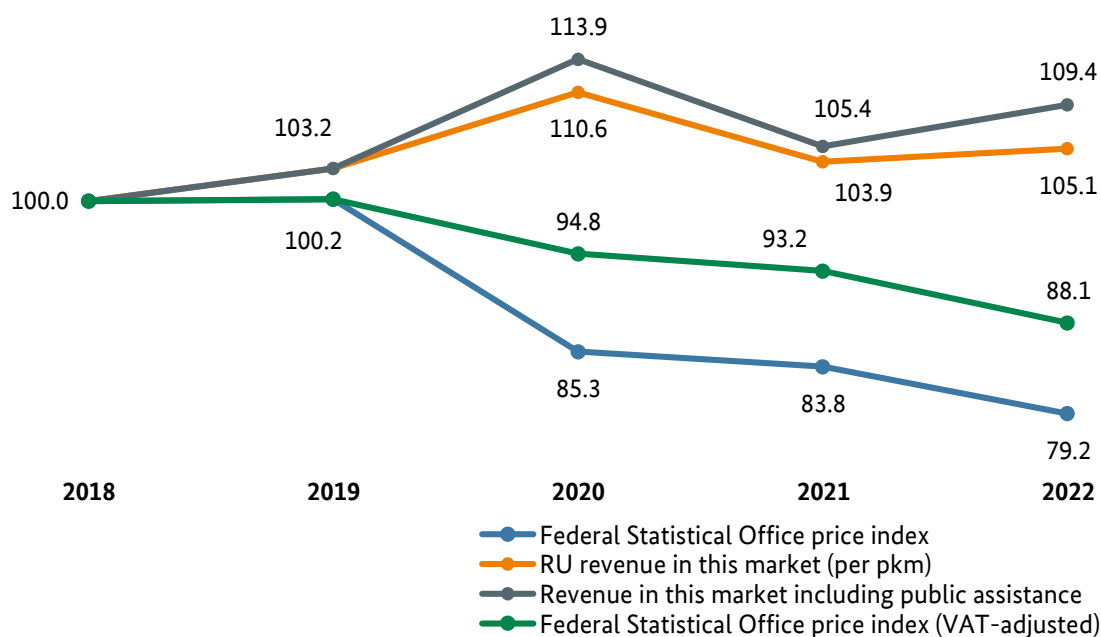


Figure 74: Retail prices in long-distance rail passenger transport (2018-2022; indexed 2018 = 100)

Rail freight transport

Rail freight transport undertakings continued to receive almost a full refund of their paid track access charges until 2021. As freight customers frequently demanded that these cost savings be passed on to them, revenue in rail freight transport per tonne-kilometre decreased significantly from 2020 to 2021.

When track access charge assistance was reduced to around half of the amount of the paid track access charge as from January 2022, rail freight transport market revenue increased again, though only slightly surpassing the 2020 level. In addition to efficiency gains by railway undertakings, this also indicates that there continues to be a high amount of pressure on prices in the transport markets.

By contrast, nominal freight rates increased steadily between 2018 and 2022, with an increase of nearly 3% from 2021 to 2022. Numerous temporary price reductions due to the increased track access charge assistance were presumably not taken into account by the undertakings in their responses.

1.4.3 Railway undertakings' overall market outcome

A total sum for 2022 from all railway undertakings operating on the German market resulted in an absolute net income of more than minus €1.0bn, which is €0.1bn worse than in the previous year.

Most of the loss was in rail freight transport (minus €0.9bn), though DB Cargo alone bears nearly the entire loss.

Regional and local rail passenger transport also had an overall net loss in 2022 of minus €0.2bn. While the federally owned railway undertakings made a loss of €0.24bn, the non-federally owned railway undertakings generated a small profit of €0.04bn.

As in the previous year, long-distance rail passenger transport generated a net income of €0.1bn.

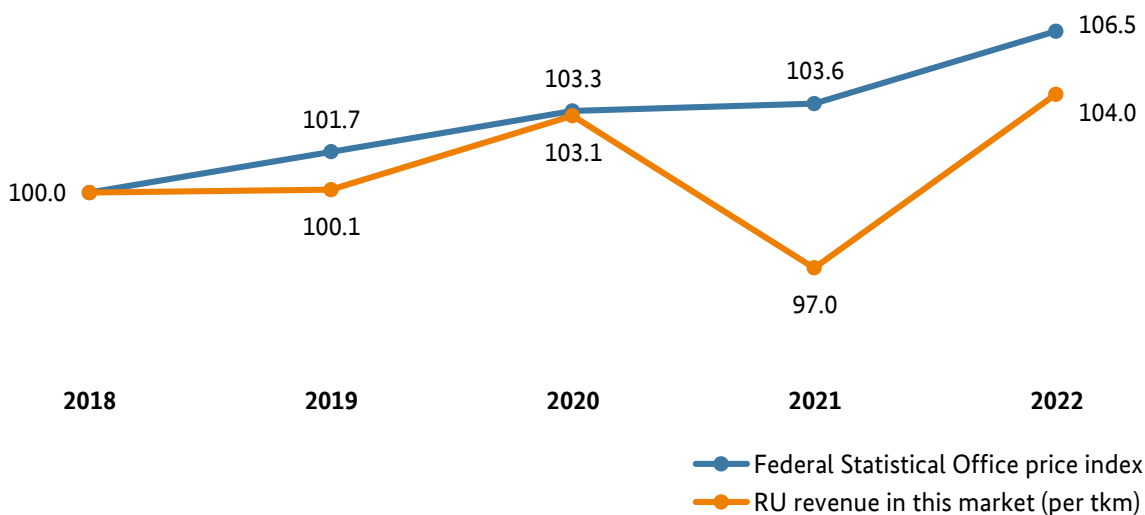


Figure 75: Retail prices in rail freight transport (2018-2022; indexed 2018 = 100)

1.4.4 Market outcomes by type of transport service

A total of 66% of all the surveyed railway undertakings reported positive operating results for 2022, which is slightly worse than it was in 2021 (70%).⁷ This means that nearly one third of the railway undertakings did not generate enough revenue through their core business to cover their expenditure.

For the 66% of the railway undertakings (RUs) with positive operating results, the sum of the absolute results comes out to a small positive figure of just €0.26bn, while the sum result of the 34% of the railway undertakings with a negative income totals €1.27bn. These undertakings include companies of the DB Group such as DB Cargo and non-federally owned railway undertakings as well

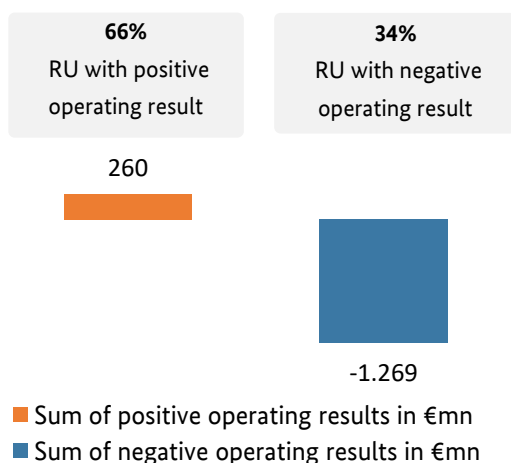


Figure 76: Breakdown of the RUs' operating results (2022; in €mn and % of the number of RUs)

A detailed look at each transport service segment again reveals significant differences.

Regional and local rail passenger transport

Around 60% of the railway undertakings in regional and local rail passenger transport reported positive operating results in 2022. With the exception of the first pandemic year 2020, the ratio of positive operating results continues to be in the 60% range. However, this also means that two of five railway undertakings in regional and local rail passenger transport operate at a loss.

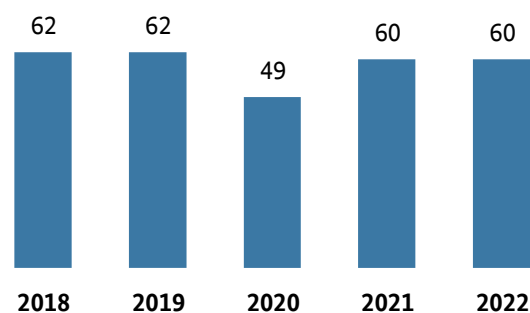


Figure 77: Share of railway undertakings in regional and local rail passenger transport with positive operating results (2018-2022; shares in %)

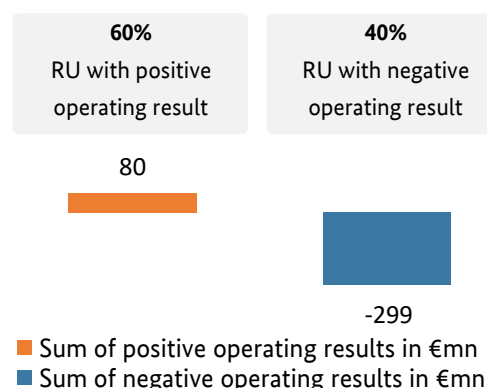


Figure 78: Breakdown of the RUs' operating results in regional and local rail passenger transport (2022; in €mn and % of the number of RUs)

⁷ At the time of reporting, many undertakings do not yet have finalised operating result figures for the year under review. These figures are normally reported in the following year. Accordingly, the 2021 figure shown here deviates from the

figure in the prior year's market analysis. The figure for 2022 may likewise change slightly during the course of the market analysis for the year 2023.

Cumulatively the sum of the positive operating results amounted to just over €80mn, significantly less than the sum of the negative operating results, which reached the €300mn mark. DB Regio bears the main share of the losses.

Although the results per train-kilometre and per passenger-kilometre improved when compared to 2020 and 2021, operating results continue to be negative. In 2022 railway undertakings lost an average of 34 cents per train-kilometre and 0.44 cents per passenger-kilometre.

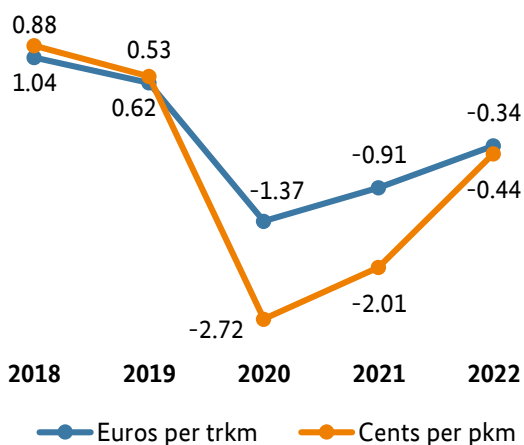


Figure 79: Operating results per train-km and per passenger-km of railway undertakings in regional and local rail passenger transport (2018-2022)

In 2022 the situation improved considerably for the non-federally owned railway undertakings in regional and local rail passenger transport, which had positive operating results for the first time since 2018. However, at 9 cents per train-kilometre and 0.14 cents per passenger kilometre, the results were just above the zero mark.

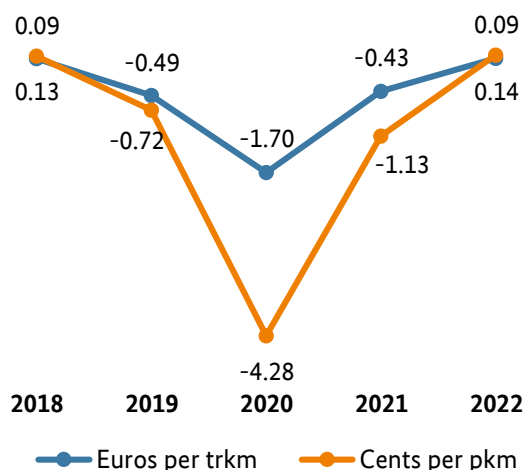


Figure 80: Operating results per train-km and passenger-km of non-federally owned railway undertakings in regional and local rail passenger transport (2018-2022)

Long-distance rail passenger transport

Compared to 2021, the market outcome in long-distance rail passenger transport improved and achieved overall positive operating results for the first time since 2019. In 2022 this amounted to 38 cents per train-kilometre and 0.14 cents per passenger-kilometre. A reduced amount of track access charge assistance continued until the end of 2022 and helped stabilise the railway undertakings active in long-distance rail passenger transport.

Little information is available about the economic situation of non-federal railway undertakings in long-distance rail passenger transport. Many smaller railway undertakings that operate without public funding and had little or no revenue because demand was low during the pandemic are likely to face economic challenges in the longer term due to costs they accrued at that time.

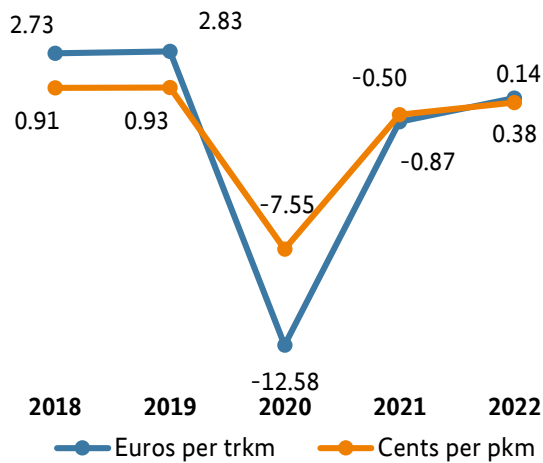


Figure 81: Operating results per train-km and passenger-km of railway undertakings in long-distance rail passenger transport (2018-2022)

Rail freight transport

In rail freight transport the share of railway undertakings with positive operating results fell from 85% in 2021 to just 70% in 2022.

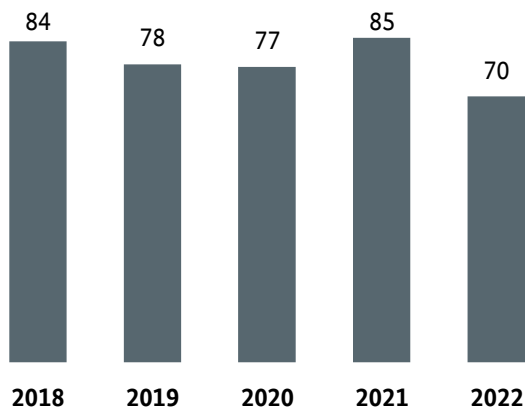


Figure 82: Share of railway undertakings in rail freight transport with positive operating results (2018-2022; shares in %)

As in the previous year, the sum of the positive operating results (€47mn) was significantly less than the sum of the negative operating results (minus nearly €950mn). DB Cargo's results were particularly significant.

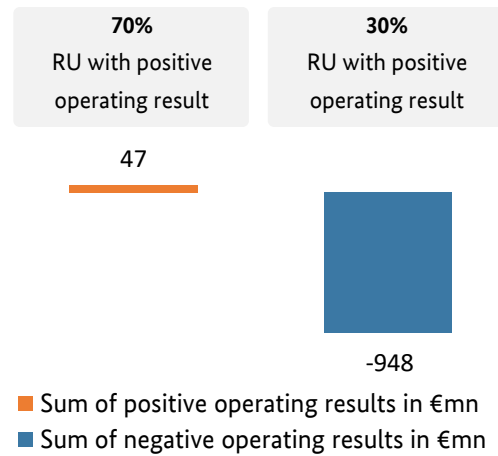


Figure 83: Breakdown of RUs' operating results in rail freight transport (2022; in €mn and % of the number of RUs)

In 2021 rail freight transport business results reached the 2018 level before falling sharply again in 2022. Railway undertakings lost an average of €3.75 per train-kilometre in rail freight transport and 0.67 cents per tonne-kilometre, both figures being more than three times as much as in 2021.

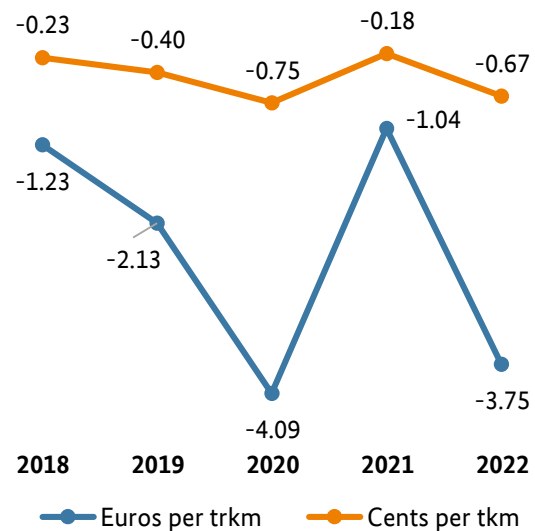


Figure 84: Operating results per train-km and tonne-km of railway undertakings in rail freight transport (2018-2022)

The market outcome of only the non-federally owned rail freight transport undertakings was more positive, but in 2022 it slipped towards zero for the first time. Railway undertakings lost on average 3 cents per train-kilometre and 0.01 cents per

tonne-kilometre. In addition to price pressure in the transport markets, general cost increases were also noticeable, particularly in the area of traction power.

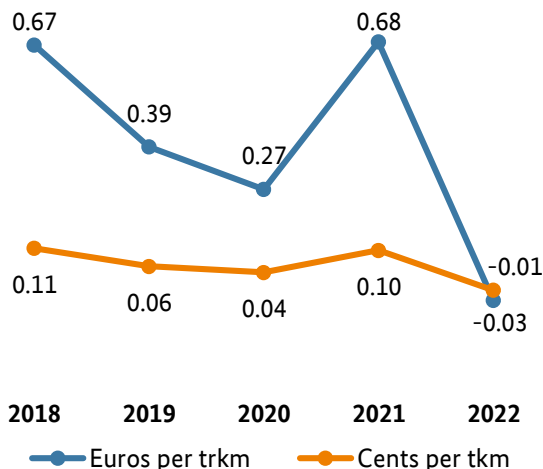


Figure 85: Operating results per train-km and tonne-km of non-federally owned railway undertakings in rail freight transport (2018-2022)

1.4.5 Profit margin

The railway undertakings' profit margin (the ratio of the operating results to revenue) varied in 2022 among the three market segments.

Regional and local rail passenger transport

In regional and local rail passenger transport the trend from 2021 continued, with the profit margin improving from minus 6.6% to just minus 2.1%. In spite of the fact that they continued to receive payments from the rescue package for local public transport, the railway undertakings in regional and local rail passenger transport were unable to return to profitability in 2022. Depending on a transport contract's structure, the significantly lower revenue from when the €9 ticket was offered is likely to have impacted several railway undertakings.

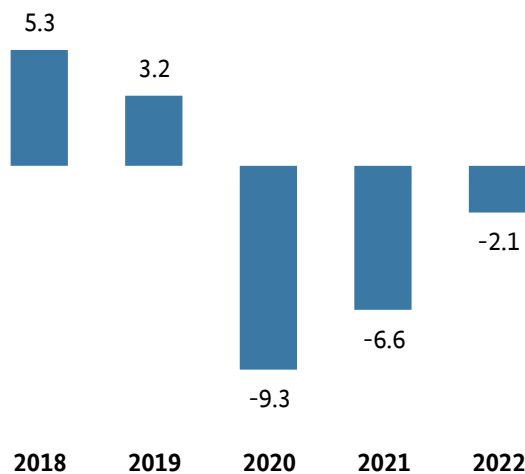


Figure 86: Profit margins of the railway undertakings in regional and local rail passenger transport (2018-2022; shares in %)

The profit margin of non-federal railway undertakings in regional and local rail passenger transport increased from minus 4.6% in 2021 to 0.4% in 2022, which was a significant improvement. The profit margin that can be achieved in regional and local rail passenger transport remains low.

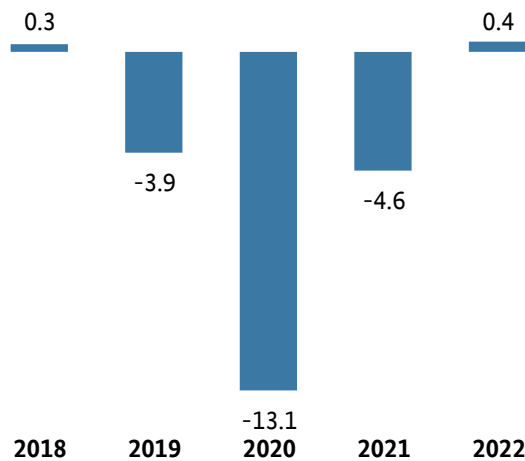


Figure 87: Profit margins of non-federally owned railway undertakings in regional and local rail passenger transport (2018-2022; shares in %)

Long-distance rail passenger transport

Market participants in long-distance rail passenger transport managed to return to a positive profit

margin, going from a profit margin of minus 4.4% in 2021 to 1.2% in 2022. Here the federal government's continued payments of track access charge assistance until the end of 2022 were helpful and had already had a stabilising effect for long-distance rail passenger transport during the pandemic years.

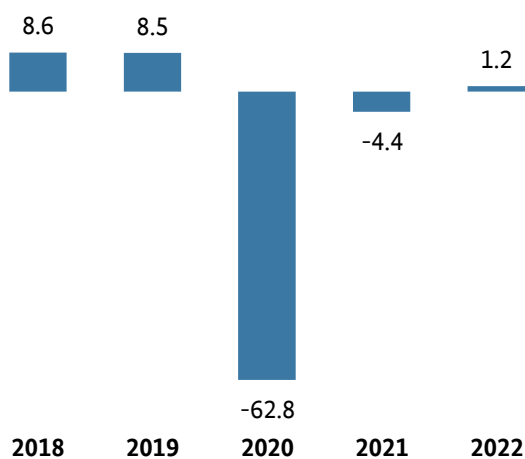


Figure 88: Profit margin of railway undertakings in long-distance rail passenger transport (2018-2022; shares in %)

Rail freight transport

The profit margin for the rail freight transport market deteriorated severely in 2022. At minus 16.0% it was only slightly better than in the first year of the pandemic (2020) when the profit margin was minus 17.3%. The profit margin was decisively impacted by DB Cargo AG's operating results.

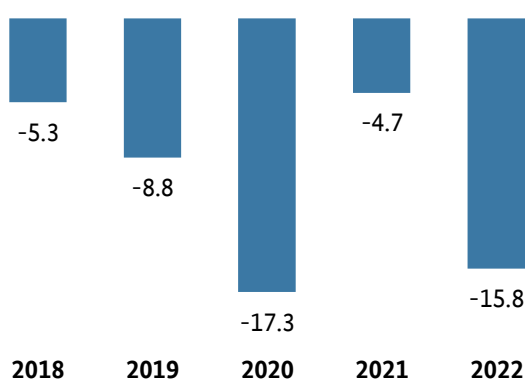


Figure 89: Profit margin of railway undertakings in rail freight transport (2018-2022; shares in %)

The operating results of only the non-federally owned rail freight transport undertakings were much more positive. Between 2018 and 2021 profit margins ranging from around 2% to around 4% were consistently achieved, but for 2022 the average profit margin for this market segment also sank below zero to minus 1.7%.

Significantly higher costs for energy and personnel combined with high price pressures in the transport sector have increased economic pressure on railway undertakings at the same time that the increased track access charge assistance has been phased out.

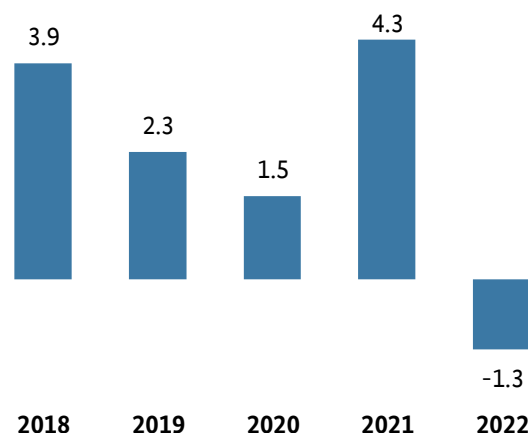


Figure 90: Profit margin of non-federally owned railway undertakings in rail freight transport (2018-2022; shares in %)

1.4.6 Infrastructure costs and revenue

Railway undertakings' infrastructure costs include track access charges, station charges and charges for the use of other railway service facilities. There were significant differences among the individual market segments regarding the share of revenue railway undertakings had to use to pay for the use of infrastructure.

Railway undertakings in regional and local rail passenger transport had to pay the highest share. In 2022 they spent around 39% of their revenue on infrastructure charges, mainly for train paths and stops.

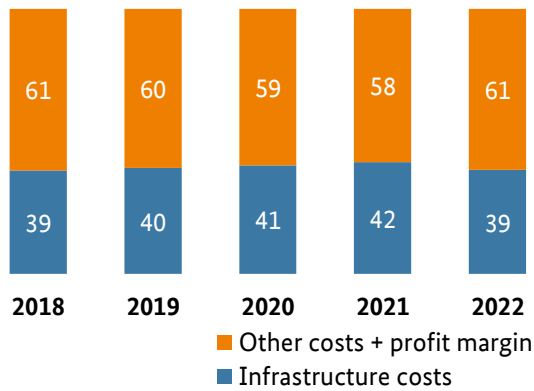


Figure 91: Shares of infrastructure costs as a percentage of the revenue of railway undertakings in regional and local rail passenger transport (2018-2022; shares in %)

After track access charge assistance was reduced for long-distance rail passenger transport, railway undertakings again had to bear a higher portion of costs in 2022 after receiving nearly full funding in 2021. The overall share of infrastructure charges in revenue rose from 6% in 2021 to 18%. However, this share was noticeably lower than in the pre-pandemic years when the federal government provided no assistance with charges.

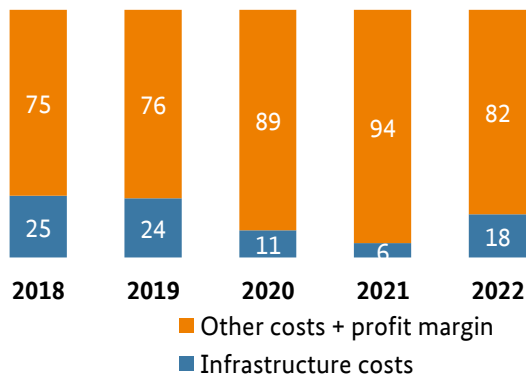


Figure 92: Share of infrastructure costs as a percentage of the revenue of railway undertakings in long-distance rail passenger transport (2018-2022; shares in %)

The amounts of track access charge assistance were also reduced in 2022 for freight traffic. Railway undertakings throughout the rail freight transport market had to spend around 10% of their revenue

on track access charges and charges for the use of service facilities.

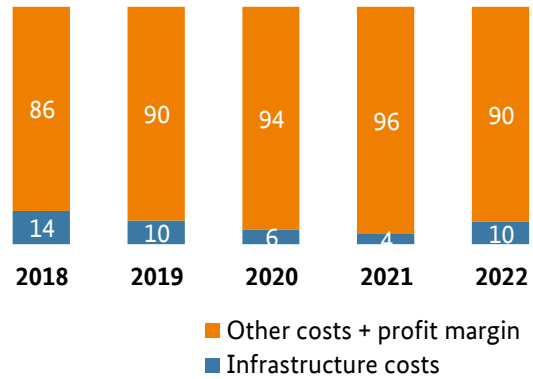


Figure 93: Share of infrastructure costs as a percentage of the revenue of railway undertakings in rail freight transport (2018-2022; shares in %)

The amounts of track access charge assistance were also reduced in 2022 for freight traffic. Railway undertakings throughout the rail freight transport market had to spend around 10% of their revenue

1.4.7 Breakdown of infrastructure costs

A more detailed breakdown of the infrastructure charges clearly shows public funding's effect on the share of revenue spent on track access charges, which were strongly impacted in long-distance rail passenger transport and rail freight transport. Track access charges nevertheless constituted the largest part of the infrastructure charges in all three market segments.

In regional and local rail passenger transport, track access charges accounted for around 80% of the infrastructure charges paid in 2022. Another 18% were for station fees and only 2% were for the use of other service facilities such as storage siding.

Overall, railway undertakings in regional and local rail passenger transport spent 39% of their revenue on infrastructure charges.

Infrastructure costs were similar in long-distance rail passenger transport. Following a reduction in track access charge assistance the share of revenue spent on track access charges rose again significantly and was 82% in 2022, while station charges accounted for 14% of revenue spent and 4% of revenue was spent on charges for the use of other service facilities.

However, railway undertakings in long-distance rail passenger transport had to spend only 18% of their revenue on infrastructure charges, significantly less than those in regional and local rail passenger transport.

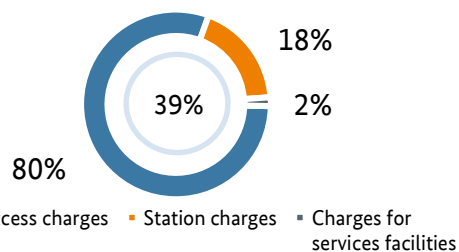


Figure 94: Infrastructure costs of the railway undertakings in regional and local rail passenger transport (2022; shares in %)

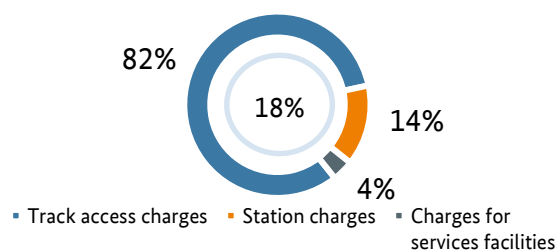


Figure 95: Infrastructure costs of the railway undertakings in long-distance rail passenger transport (2022; shares in %)

The same effect is also at play in rail freight transport. The share of track access charges paid in rail freight transport in 2022 amounted to 63% of the total infrastructure costs; the remaining 37% were spent on charges for the use of service facilities such as freight terminals or storage sidings.

Thanks to track access charge assistance the railway undertakings in rail freight transport only had to spend 10% of their revenue on infrastructure charges.

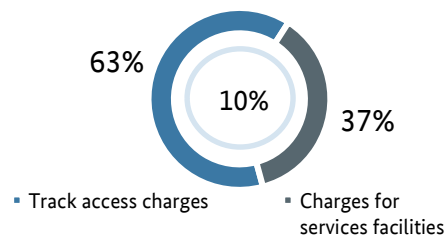


Figure 96: Infrastructure costs of the railway undertakings in rail freight transport (2022; shares in %)

In rail freight transport, under a federal funding programme that includes service facility charge assistance, railway undertakings using marshalling yards or infrastructure facilities for the forming of trains in single wagonload transport continued receiving payments. In 2022, a total of nearly €35mn was paid out to 17 different railway undertakings, almost all of which (96%) of which were DB AG railway undertakings.

1.4.8 Track access charge assistance

Rail freight transport

To strengthen rail freight transport, the federal government introduced track access charge assistance for rail freight transport for a prorated financing of approved track access charges (TraFöG) in 2018.

DB Netz AG to the railway undertakings later or time-delayed on a monthly basis.

Around €350mn were paid to competitor railways; DB railway undertakings received around €270mn, which more or less reflects the shares of the market.

In the three years 2020 to 2022 rail freight transport received a total funding amount of almost €1.8bn.

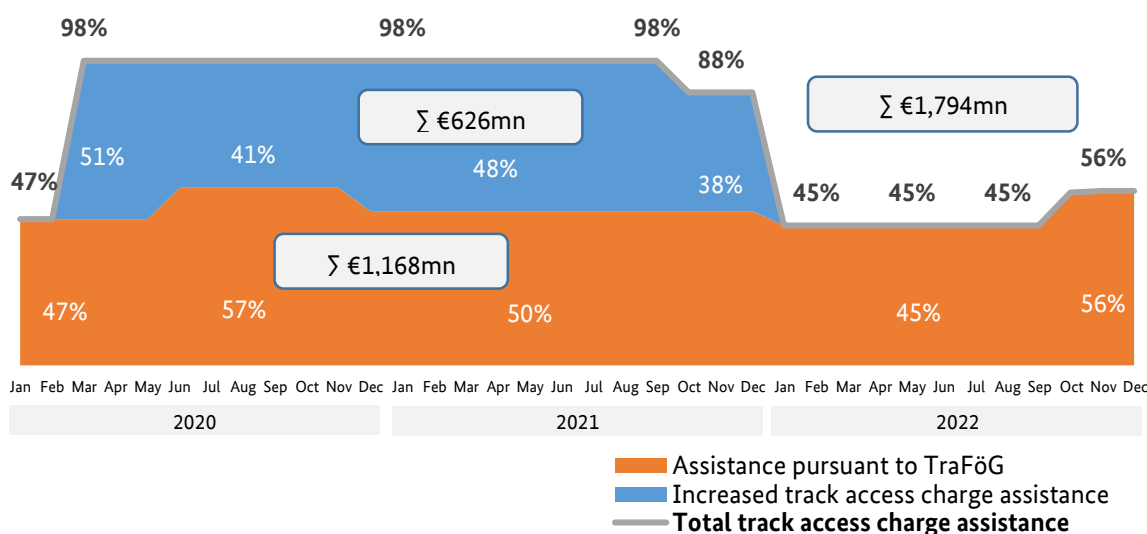


Figure 97: Amount of track access charge assistance in rail freight transport (funding rates in % and funding amounts in €mn)

The funding rates ranged from 45% to 57%, depending on the degree of utilisation of the budget.

Using that as a basis, increased assistance of up to 97.8% was set retroactively from March 2020 pursuant to Directive (EU) 2020/1429 to compensate for pandemic-related damages. The increased funding was originally planned to end in December 2020 but was extended until December 2021 due to the continuation of the pandemic. Since January 2022 the original track assistance charge amount has been back in effect (Figure 97).

The overall total amount of increased funding for rail freight transport comes to €626mn, which is in line with the target value of the Directive. Normally the actual payments were made through

The average track access charges for railway undertakings were proportionately reduced by the funding. While the approved track access charge level of just under €3 was already halved by track access charge assistance for rail freight transport, it fell to a few cents per train-kilometre during the pandemic (Figure 98).

The Bundesnetzagentur asked the railway undertakings in rail freight transport how the track access charge assistance was recorded in their company. Around half of the railway undertakings responded that the assistance was applied directly toward offsetting the expense. The other half entered the increased assistance separately as other operating income.

Rail freight transport track access charge before/after assistance

Annual average in € per train-kilometre

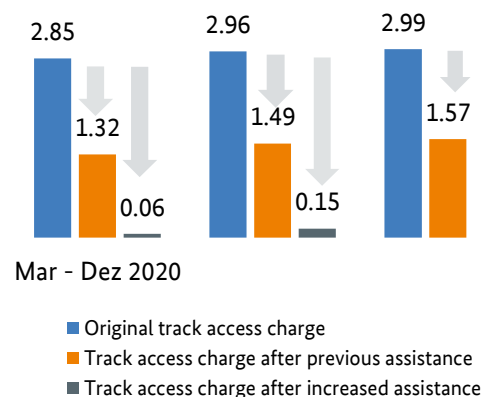


Figure 98: Average track access charge per train-km before/after assistance (€)

The railway undertakings' net incomes tended to be distorted due to the fact that the assistance, which was paid for the first time in the third quarter of 2021, was paid retroactively. The performance results for 2020 were too negative while those for 2021 were too positive due to the high one-off payments. Because payments are now made mostly on an accrual basis this effect was only of minor importance in 2022.

Railway undertakings in rail freight transport reported that there is a great deal of pressure from the transport industry to pass on assistance funding. Railway undertakings criticised the unclear wording of the TraFöG in terms of whether they should pass on the savings from the assistance or focus on the objective of strengthening the railway undertakings.

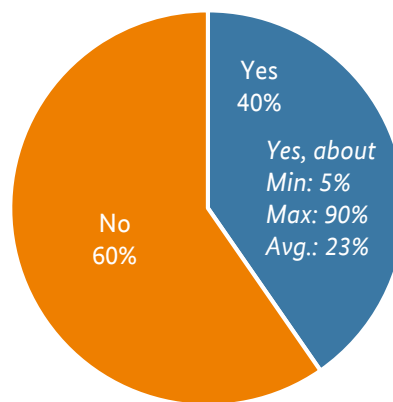
In any case some of the railway undertakings were demonstrably able to shift traffic from road to rail by passing on the assistance. Generally the railway undertakings reported that the extent to which the assistance was passed on was always handled on an individual basis depending on the customer and the specific market.

Several competitor railways that are subsidiaries of (usually foreign) parent companies responded that they passed all of the track access charge assistance on to their parent company. In cases where railway undertakings had a direct relationship with the contracting companies, railway undertakings passed on an average of 48% of the assistance to the market.

The Bundesnetzagentur surveyed the railway undertakings in rail freight transport specifically about the impact of the track access charge assistance in rail freight transport for 2022.

While the majority of the railway undertakings surveyed would have provided their transport services even without the assistance, 40% of the respondents indicated that without the assistance they would have had to reduce their transport performance by around one quarter on average.

Would you have reduced your transport performance without track access charge assistance?

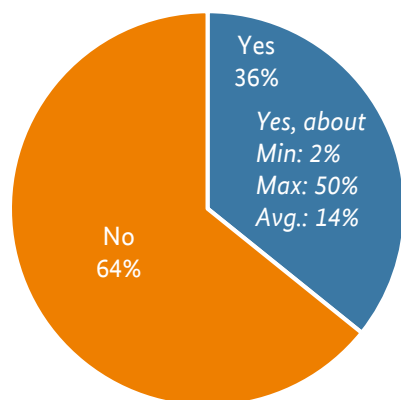


Answers: 109

Figure 99: Share of railway undertakings in rail freight transport with assistance-induced decrease in transport performance (in %)

When asked about whether they were able to expand their transport supply, 36% of the railway undertakings surveyed reported an average increase of 14% that was contingent on track access charge assistance.

Did the track access charge assistance enable you to expand your transport supply?

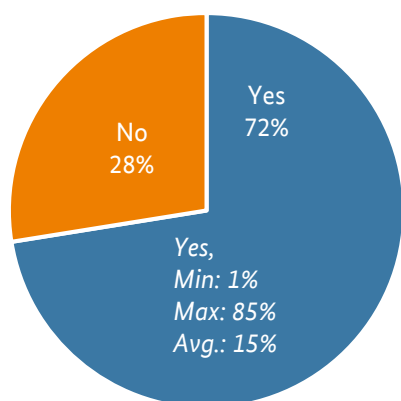


Answers: 109

Figure 100: Share of railway undertakings in rail freight transport with assistance-induced expansion of transport supply (in %)

Around three quarters of railway undertakings passed on the reduced track access charges to their customers in the form of discounts. Responses showed that the average discount was 15% of the track access charge assistance.

Did you pass on the track access charge assistance in the form of reduced prices?

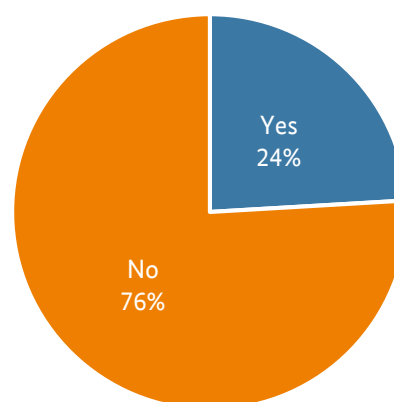


Answers: 109

Figure 101: Share of railway undertakings in rail freight transport with assistance-induced discounts (in %)

Track access charge assistance did not provide additional room for investments for the majority of the railway undertakings surveyed. Around 25 undertakings that did see room for investment named a total of around €20mn of additional assistance-induced investments. Railway undertakings indicated that the benefits of these additional investments came for the most part in the form of cost reductions, quality improvements and increases in efficiency, safety and reliability, and only to a small extent were the investments used to increase the customer base.

Did track access charge assistance provide additional room for investments?



Answers: 88

Figure 102: Share of railway undertakings in rail freight transport with assistance-induced room for additional investments (in %)

Slightly more than a third of railway undertakings confirmed that the competitive situation has improved in relation to road freight transport, but nearly two thirds did not consider the assistance as a means to improve their position in an intermodal comparison.

How do you think track access charge assistance has changed the competitive situation of your railway undertaking in relation to road freight transport?

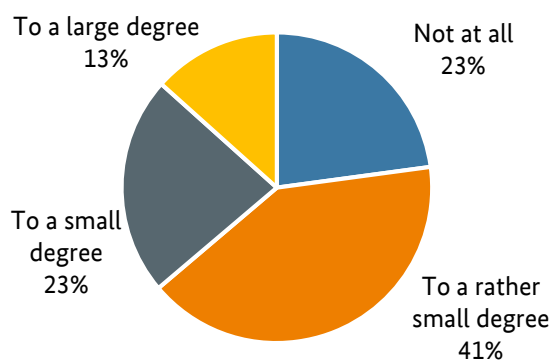


Figure 103: How the railway undertakings in rail freight transport perceive whether or not the assistance changed their competitive situation in relation to road freight transport (in %)

Long-distance rail passenger transport

Long-distance rail passenger transport initially received no assistance in 2020. The federal government later introduced track access assistance in long-distance rail passenger transport to cushion the significant decreases in passenger revenue. The support scheme was developed in the second quarter of 2021 and approved by the European Commission on 30 July 2021. Retroactively it

covered from March 2020 until May 2022 and was extended at a reduced rate until December 2022. Retroactive assistance was disbursed in November 2021.

On the basis of track services provided, assistance payments until December 2022 totalled around €2.4bn.

Because the non-federally owned railway undertakings in long-distance transport suspended their services for economic reasons at the beginning of the lockdown in spring 2020 and did not resume until mid-2021, they benefited only to a limited extent from the retroactive assistance. Thus only DB Fernverkehr AG benefited from the assistance during the pandemic.

At the same time that the assistance was announced in spring 2021, the competitor railways (Flixtrain in particular) announced that they would significantly expand their services as from mid-2021, and this was also done.

In 2022 both DB Fernverkehr and the competitor railways benefited from the assistance. Railway undertakings were able to expand their services due to the stabilising effect the assistance had on net income.

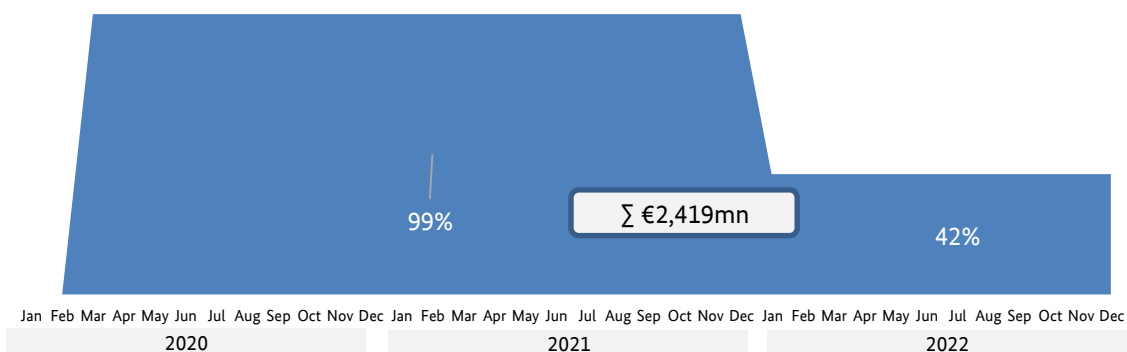


Figure 104: Amount of track access charge assistance in long-distance rail passenger transport (funding rates in % and funding amounts in €mn)

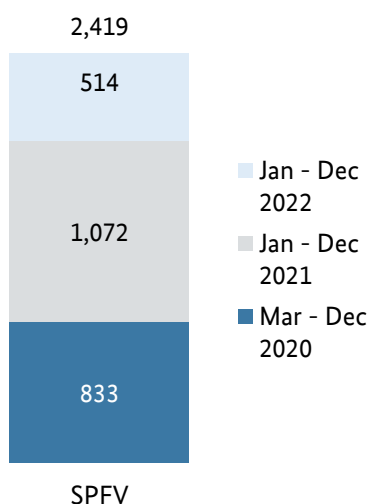


Figure 105: Breakdown of track access charge assistance in long-distance rail passenger transport over time (in €mn)

1.4.9 Energy costs in the rail market

Costs for traction current have increased considerably in recent years. Initially driven by the impact of the coronavirus pandemic, in 2022 the Ukraine war had a particularly strong effect on energy prices. In the first half of 2023 electricity prices on the exchange decreased more or less back to their pre-war levels.

For railway undertakings the effects of energy price trends are important. For the overall market the cost of procuring traction current has more than tripled on average (for 2022 at 17.43 ct/kWh) since 2020. Average prices for railway undertakings ranged from a higher single-digit figure to sometimes more than 40 ct/kWh. The figure below shows price trends from 2018 to 2022.

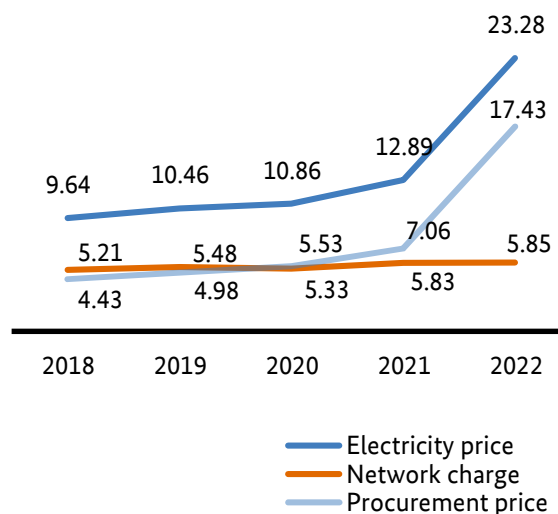


Figure 106: Prices for traction current 2018–2022 in ct/kWh

Price increases were only delayed for those railway undertakings that order their electricity volumes for the longer term. By the same token, higher prices for long-term contracts remain in effect even when prices fall again. In 2023 the electricity price brake for railways is expected to hold the average procurement price at around 15 ct/kWh for the railway undertakings.

Unlike procurement prices, network charges remained relatively stable. Network charges paid were only around 10% higher in 2022 compared with 2020. The price of overall energy costs per kilowatt hour in recent years was thus driven almost exclusively by procurements costs for

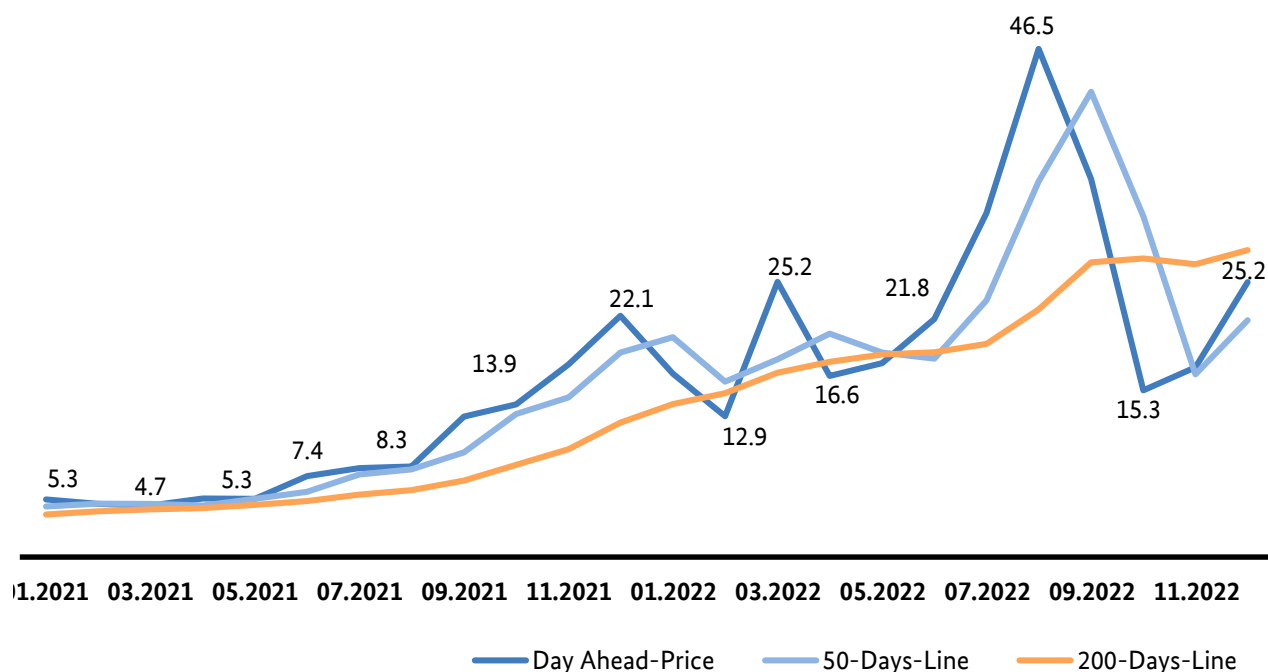


Figure 107: Average monthly spot market prices in Germany 2021-2022; in cents per kWh

traction current. As an environmentally safe mode of transport, most rail services are performed by means of electrical traction, which accounts for three quarters of the overall operating performance in Germany. The activated energy for electrical traction totalled more than 12 terawatt hours (TWh), of which more than 2 TWh were recovered through the use of electric brakes.

Due to varying requirements there is a differentiated consumption per train-kilometre travelled for the individual market segments. Depending to some degree on the market segment, the main influencing factors for consumption (besides the track profile) are the total gross load of a train, the maximum speed travelled and (particularly in regional and local rail passenger transport) the number of stops. The typical demand for traction power for a multiple-unit set in regional and local rail passenger transport is on average 9 kWh, and for longer doubledeck trains around 14 kWh per train-kilometre. The average consumption for typical light rails (tram-trains) on railway lines is less than 5 kWh per train-kilometre.

Locomotive-drawn passenger trains in long-distance rail passenger transport need around 13 kWh, and long-distance freight trains consume on average around 18 kWh per train-kilometre travelled.

Energy consumption can be compared among the three market segments when energy consumption is correlated with the electric transport service provided in the railway market. In regional and local rail passenger transport, energy consumption per rail passenger-kilometre for 2022 averaged 0.167 kWh. Long-distance rail passenger transport consumed around 0.072 kWh per passenger-kilometre in 2022. Rail freight transport needed an average of 0.0313 kWh per tonne-kilometre in the reporting year.

Efficiency in the rail sector is largely dependent on the means of transport's percentage use. The figure below shows energy consumption for each traffic category per passenger- or tonne-kilometre travelled from 2018 to 2022. The effects of the coronavirus pandemic on rail passenger services in

2020 and 2021 are clearly evident. Pre-pandemic figures were nearly reached again in 2022.

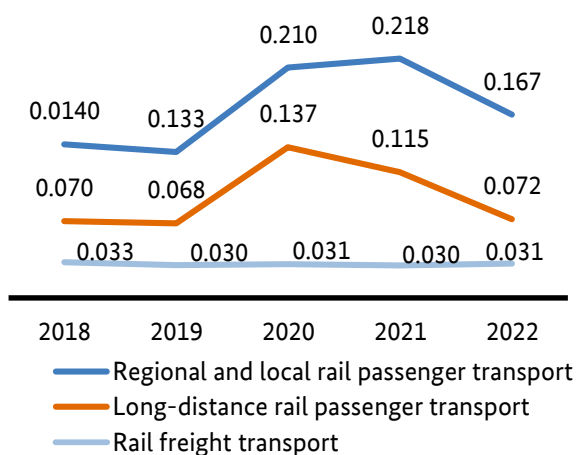


Figure 108: Energy consumption by rail transport service; 2018-2022; in kWh per passenger-/tonne-km

While rail passenger service was for the most part sustained in spite of a decline in demand caused by the pandemic, unnecessary rail freight transport was cancelled. Consumption per tonne-kilometre in rail freight transport remained more or less constant throughout this period.

1.5 Regional and local rail passenger transport services under public service obligation (PSO)

1.5.1 Revenue in regional and local rail passenger transport

The most important source of revenue for railway undertakings in regional and local rail passenger transport – in addition to market revenue – is public funding paid by regional transport authorities to railway undertakings that have been contracted to provide transport services.⁸ This assistance comes largely from the federal government's regionalisation funds and was made available to Germany's federal states under the Regionalisation Act of 27 December 1993. More than €10.0bn in regionalisation funds were allocated to Germany's federal states in 2022.

Assistance from the regional transport authorities accounted for 63% of the railway undertakings' revenue, mainly from the rescue package for local public transport and increased assistance. Market revenue thus accounted for 37% of the revenue generated by regional and local rail passenger transport

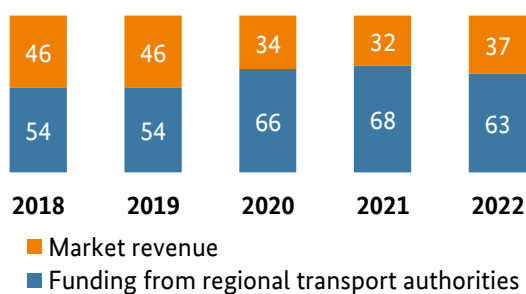


Figure 109: Breakdown of revenue in regional and local rail passenger transport (2018-2022; shares in %)

1.5.2 Operating performance for transport services provided under public service obligation (PSO)

For 2022 the regional transport authorities planned to contract more than 737mn train-kilometres in regional and local rail passenger transport, of which around 721mn train-kilometres were travelled. Whereas in the years prior to 2019 the number of train-kilometres actually travelled amounted to more than the contracted amount, that ratio has turned around since 2020 due to the fact that some services are non-PSO. This is caused by cancellations at short notice in particular due to construction and staff shortages.

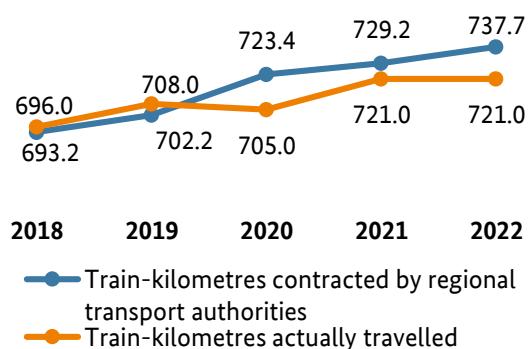


Figure 110: Services contracted by regional transport authorities and actual output on infrastructure managers' networks (2018-2022; in millions of train-km)

Based on the number of train-kilometres contracted, 79% of the train-kilometres were awarded in competitive procedures (including tendering).

From 2021 to 2022 there was only a slight change in the share of the market held by federally owned railway undertakings in relation to the share of the market held by non-federally owned railway

⁸ The term market revenue covers all revenue generated through sales to customers, primarily fare revenue. It does not include public assistance.

undertakings. Non-federally owned railway undertakings were awarded 39% of the train-kilometres contracted in regional and local rail passenger transport.

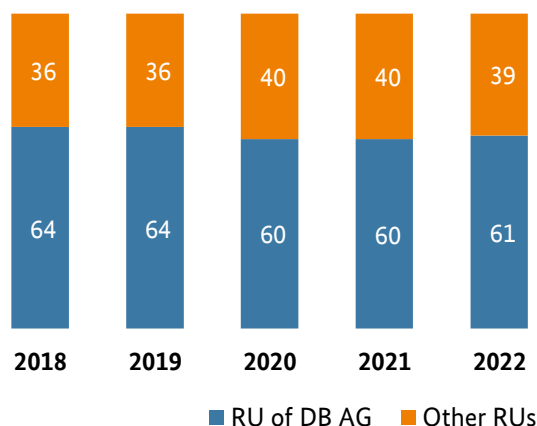


Figure 111: Market shares for contracted transport services in regional and local rail passenger transport (2018-2022; shares in %)

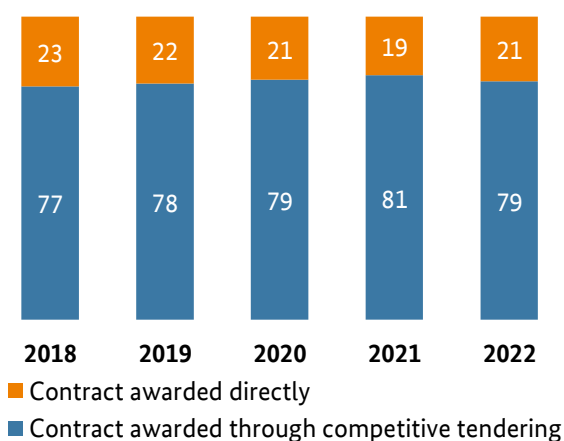


Figure 112: Share of contract-awarding procedures in regional and local rail passenger transport based on train-km contracted under PSO in the respective year (2018-2022; shares of train-km in %)

The regional transport authorities can award net or gross contracts for regional and local rail passenger transport services. For the 2022 reporting year, the share of gross contracts was 65% and the share of net contracts was 35%. There has been a slight

increase in the share of gross contracts in recent years.

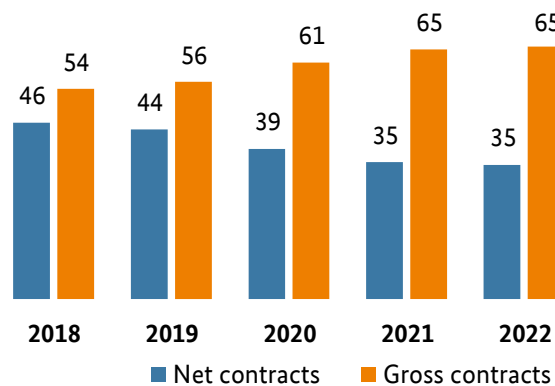


Figure 113: Gross contracts and net contracts when awarding regional and local rail passenger transport services (2018-2022; shares in %)

1.5.3 Awarding of transport contracts

Regional transport authorities awarded 26 transport contracts during the 2022 reporting year. The regional transport authorities expected 31 transport contracts to be concluded in 2023.

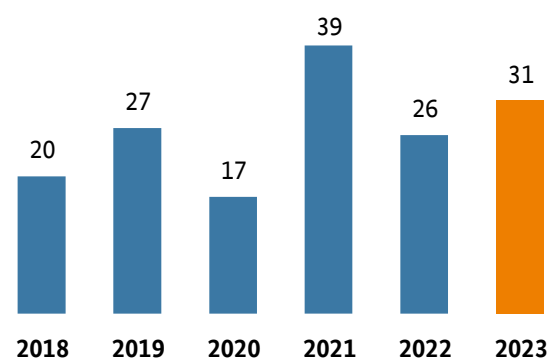


Figure 114: Number of transport contracts concluded and anticipated to be concluded (2018-2022: number of concluded transport contracts; 2023: expected number of concluded transport contracts)

Of the 26 transport contracts awarded in 2022, 17 were awarded in competitive procedures and nine were awarded non-competitively.

Of the 26 transport contracts in 2022, approximately 28% of the contracted train-kilometres were awarded for the entire duration of the contract in non-competitive procedures and around 72% were ordered in competitive procedures. In most cases involving transitional contracts or contracts with a short duration, the award process was not competitive.

Bidders submitted a total of 24 tenders in the 17 competitive contract-awarding procedures in 2022. This means that on average a little more than 1.4 bidders took part in the respective contract-awarding procedure and thus the number of bidders continued to decrease.

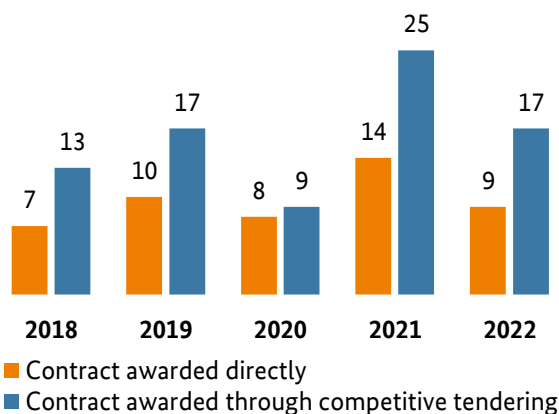


Figure 115: Non-competitive and competitive awarding of transport contracts by regional transport authorities (2018-2022; number)

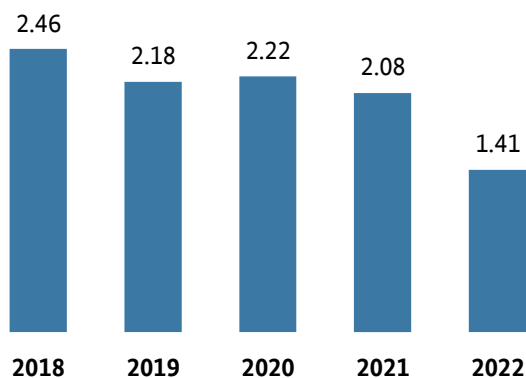


Figure 116: Average number of bidders for transport contracts awarded by regional transport authorities in competitive awarding procedures (2018-2022; number)

Of the 17 transport contracts awarded by regional transport authorities on the basis of tendering during the 2022 reporting year, nine were awarded to federally owned railway undertakings and eight were awarded to non-federally owned railway undertakings. These nine contracts had a total volume of more than 380mn train-kilometres over the entire contract period. The eight transport contracts that were awarded to non-federally owned railway undertakings using competitive procedures accounted for more than 137mn train-kilometres over the entire contract period.

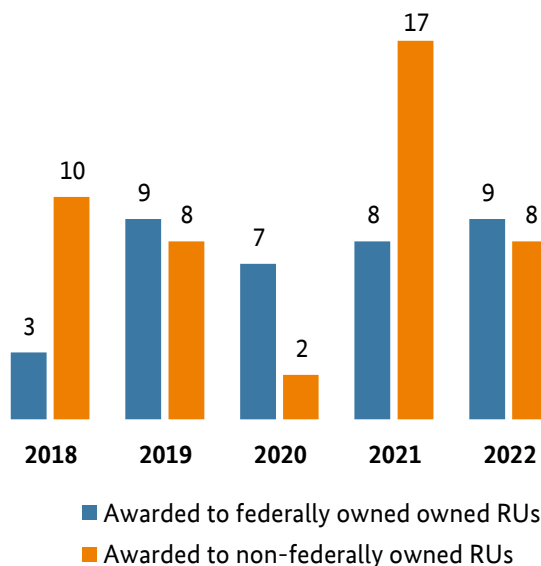


Figure 117: Transport contracts awarded to railway undertakings by regional transport authorities using competitive procedures (2018-2022; number)

In 2022 regional transport authorities awarded nine transport contracts to railway undertakings without tendering. One contract was awarded to federally owned railway undertakings and eight to non-federally owned railway undertakings. The eight transport contracts that were awarded to non-federally owned railway undertakings without using competitive procedures accounted for more than 192mn train-kilometres over the entire contract period.

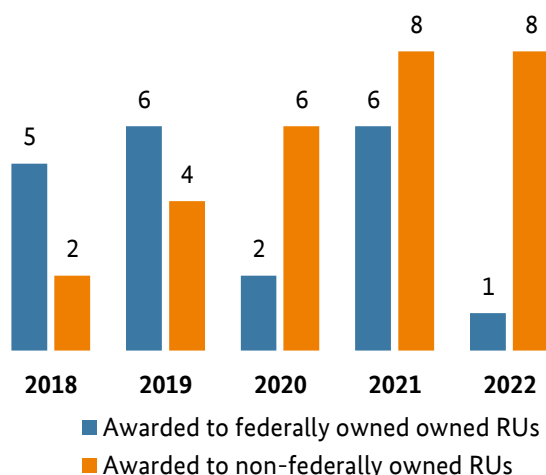


Figure 118: Transport contracts awarded non-competitively to railway undertakings by regional transport authorities (2018-2022; number)

1.5.4 Financing rolling stock in regional and local rail passenger transport

Regional transport authorities awarded 26 transport contracts to railway undertakings in 2022. In 11 contract-awarding procedures the railway undertakings accepted the financing scheme offered by the regional transport authorities.

The customary models for financing rolling stock included the provision of vehicles through a rolling stock pool, a reuse guarantee for rolling stock and specific models such as the VRR model and the RRX-NRW model.

1.5.5 Penalties and fines paid by railway undertakings to regional transport authorities

In 2022 railway undertakings paid around €208mn in penalties and fines to regional transport authorities. This figure has been increasing since 2020.

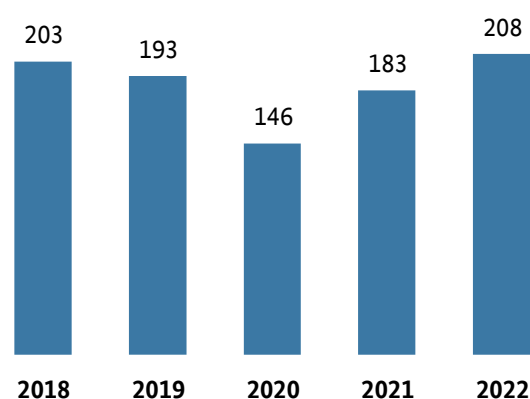


Figure 119: Penalties and fines that railway undertakings paid to regional transport authorities (2018-2022; in €mn)

1.5.6 Personnel of the regional transport authorities

From 2021 to 2022 the number of employees working for regional transport authorities (measured in full-time equivalents) increased further from 1,024 to 1,110.

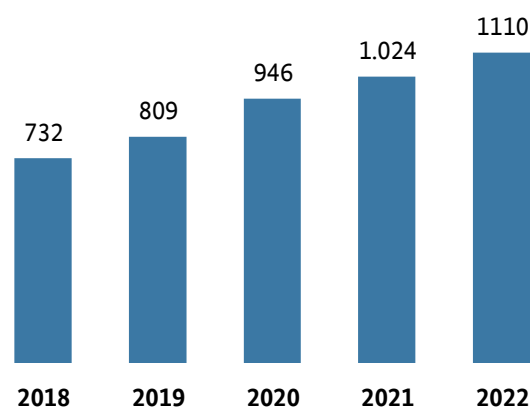


Figure 120: Personnel at the regional transport authorities (2018-2022; FTEs)

1.5.7 Factors that influence the regional transport market

Regional transport authorities participating in the annual market analysis have the opportunity to evaluate and rate market-related aspects on a scale of 1 (very good) to 5 (insufficient).

Looking at the regional transport authorities' qualitative assessment of the market for the years

2019 through 2023, it is striking that the rating for the current state of network maintenance was only average. By contrast, ratings for the pricing system for track access charges and the pricing system for station charges improved slightly.

1.5.8 Comments by the regional transport authorities

As part of the market survey, regional transport authorities have the opportunity to inform the Bundesnetzagentur of their recommendations, advice and wishes for its future regulatory work. They can also provide the Bundesnetzagentur with comments, tips and empirical data relating to access to the railway infrastructure market. The following comments are excerpts organised by topic:

Train paths

The network should be made more robust by having more crossovers,

passing tracks and stations with passing loops. Framework agreements should be reintroduced to ensure planning certainty for the regional transport authorities.

Interval and system train paths need to be given more priority over single train paths.

There needs to be better regulation of train path requests.

There needs to be support for integrated regular interval service.

Stations

There must be a way to make it possible to regionally negotiate station charges. It would have to be in connection with larger areas of responsibility in the regional divisions of DB Station&Service AG.

Sales

It should be ensured that dominant sales service providers offer all railway undertakings person-to-person sales service at the same conditions.

Regional transport authorities on infrastructure	2019	2020	2021	2022	2023	Trend
Network development status	3.5	3.4	3.4	3.4	3.4	→
Network maintenance status	3.3	3.2	3.3	3.1	3.3	↘
Development status of passenger stations	2.8	2.8	2.9	2.8	2.8	→
Maintenance status of passenger stations	3.0	3.0	3.2	3.1	3.1	→
Track access charging systems	2.6	2.6	2.4	2.5	2.4	↗
Station usage charging systems	2.6	2.5	2.5	2.4	2.5	↘
Price/performance: track access charges	3.4	3.4	3.2	3.2	3.1	↗
Price/performance: station usage charges	3.4	3.4	3.3	3.2	3.1	↗

Figure 121: Regional authorities' ratings of the factors that influence infrastructure and pricing systems (2019-2023; average values; grading scale from 1 (very good/no need for action) to 5 (insufficient/urgent need for action))

Light maintenance depots

The railway undertakings need to eliminate the potential for discrimination when light maintenance depots are used. There is a need for effective reviews of the annual charges for using light maintenance depots under a regional and local rail passenger transport service contract.

Energy

Regulation of traction current needs to be further improved.

Infrastructure

The reliability of existing infrastructure (including level crossings, switches and tracks) needs to be increased by improving maintenance and conducting inspections with greater frequency.

Coordination between DB Netz AG and DB Station&Service AG needs to be improved with the aim of achieving solutions that are more passenger-oriented and cost-effective.

1.6 Survey of end-customer representatives in rail passenger transport

As required under section 67(3) of the Rail Regulation Act (ERegG), the Bundesnetzagentur consults every year with representatives of the end-customers of rail transport services. The survey helps to create a foundation for addressing their interests in railway regulation and in transport policy. The surveys rotate each year between topics relating to rail passenger transport and rail freight transport. In 2023 end-customer representatives of rail freight services were surveyed.

The topics and questions were chosen independently by the Bundesnetzagentur. The aim was to obtain an impression of the mood towards current topics in rail freight transport. Areas surveyed included the image, availability and the future of rail freight transport. In addition, there were questions that are regularly asked every two years in the end-customer consultations for evaluating the market, which makes it possible to analyse developments over time.

The survey was conducted online (EU Survey by the European Commission) between August and October 2023. A total of 283 representatives from trade associations and their members (shippers, haulage firms, industrial railways and others) participated in the survey. While the results cannot be considered representative of the opinion of all rail freight transport end-customers in Germany, they do provide an indication of their sentiment. Some topics and particularly pertinent responses suggest the need to look more closely at a topic and possibly reassess previous assumptions and decisions.

Overall the survey results show that railway infrastructure availability is not considered adequate and therefore constitutes a major obstacle to the use of rail freight transport. Nearly 70% of respondents indicated that a lack of capacity in the service facilities and in the rail network prevents

rail freight transport from being used more (see Figure 122). This finding is backed by responses to another question about which measures survey participants consider to be the most important for increasing the attractiveness of expanding the infrastructure of rail networks and service facilities (see Figure 123).

If rail freight transport is to be strengthened, transport policy and rail regulation will have the task of providing rail freight transport with more capacity. This can be done in part by physically and digitally expanding infrastructure, but also by taking legal steps to increase the allocation of the capacity currently available to benefit rail freight transport.

It should also be noted that more than 50% of those surveyed responded to another question that they believe infrastructure managers such as DB Netz AG favour rail passenger services over rail freight transport (see Figure 124).

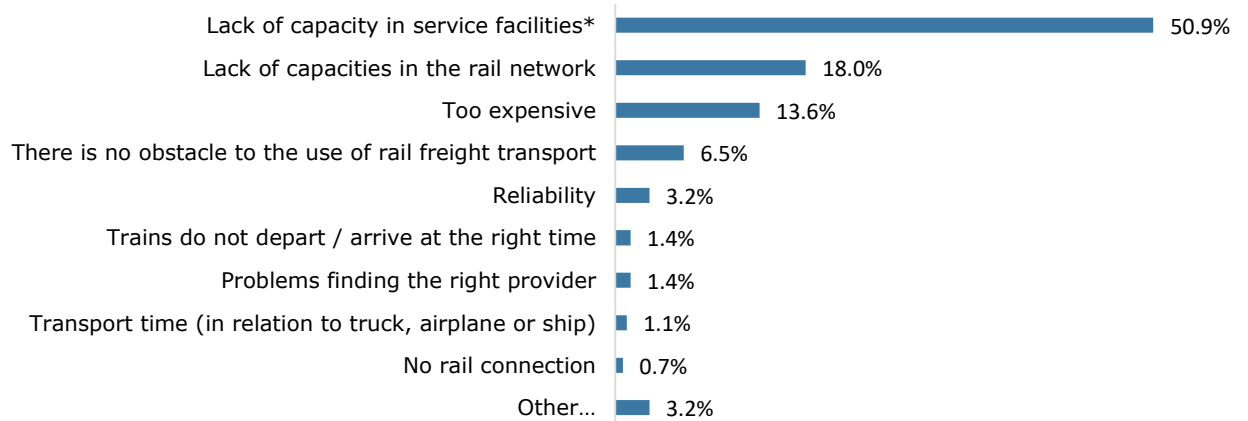


Figure 122: Responses to the question, "What hinders your company or the members of your trade association from using rail freight transport or using it more?" (Multiple answers were allowed.)

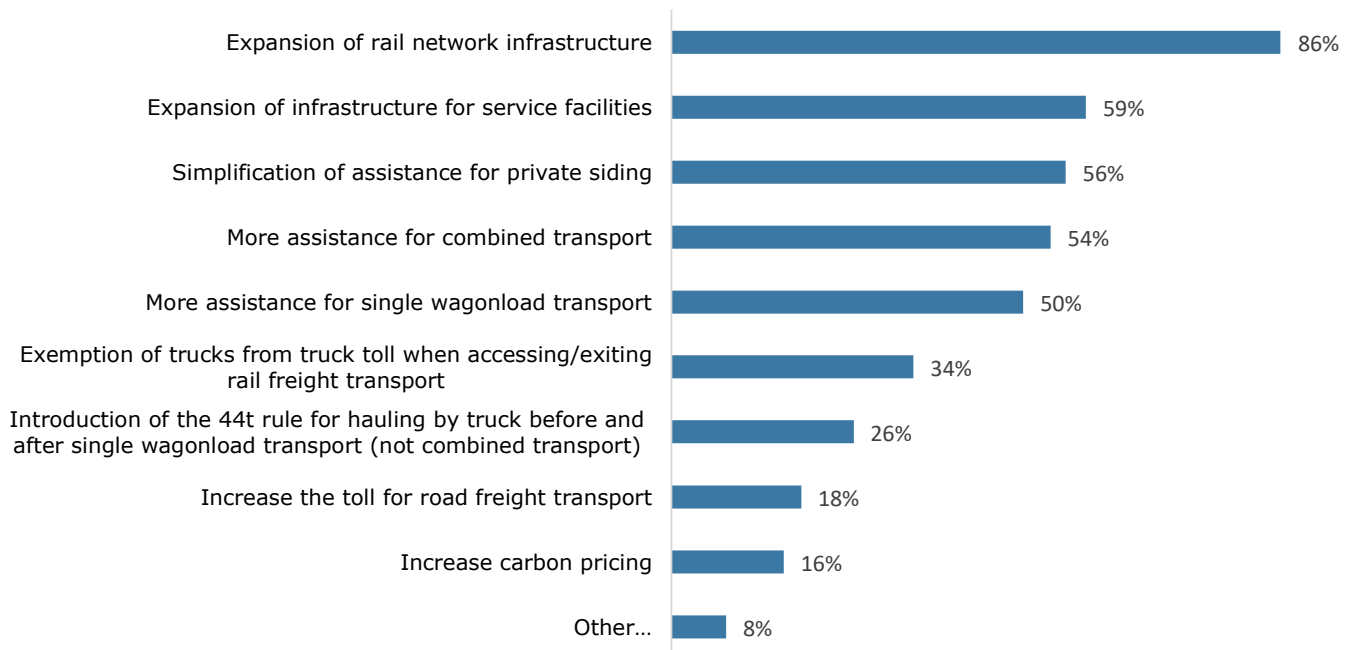


Figure 123: Responses to the question, "Which political or economic measures do you believe should be taken to increase the attractiveness of rail freight transport and enhance its competitiveness?" (Multiple answers were allowed.)

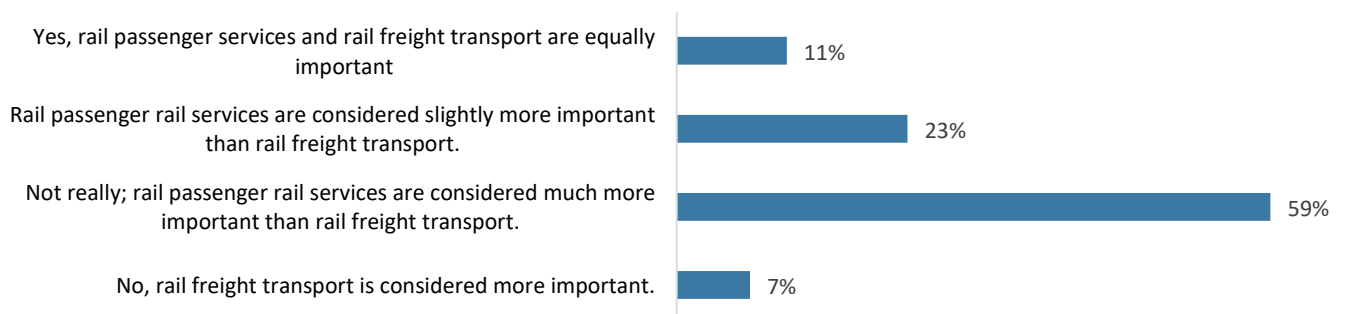


Figure 124: Responses to the question, "With regard to competition with rail passenger services, does your company or do the members of your association feel that rail freight transport is equally important to infrastructure managers such as DB Netz AG as rail passenger services?"

The respondents' answers identified urgent tasks to increase the attractiveness of rail freight transport, but 75% of them see only a small chance of increasing rail freight transport's modal split to 25% by 2030 (see Figure 125).

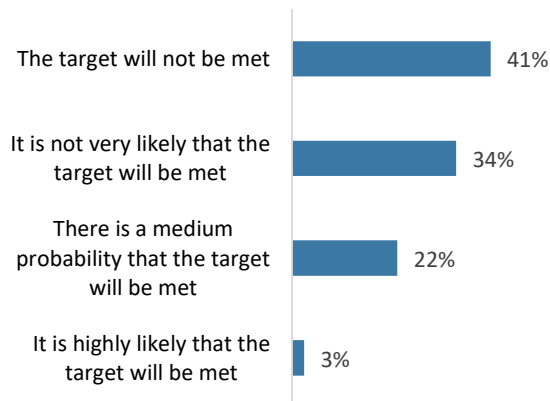


Figure 125: Responses to the question, "What are the chances under the current policy framework of achieving the politically agreed-on target whereby rail freight transport has a modal split of 25% by 2030?"

Respondents indicated that the general conditions would need to change in order for rail freight transport to reach a modal split of 25% in 2030, including in the following areas: incentives and funding programmes, removal of disruptions and construction works, cost structure adjustment (rail transport services are too expensive), reduction of bureaucracy and more flexibility (not further specified), increase in rail capacity, adequate infrastructure for unloading, more private sidings and storage sidings.

However, this rather negative sentiment stands in contrast to the survey of representatives of rail freight transport end-customers and the finding that they apparently operate rather limited warehousing and this task is shifting to transport infrastructure. Thus 41% of respondents stated that if the rail freight transport chain is disrupted, then there is a short-term disruption to production.

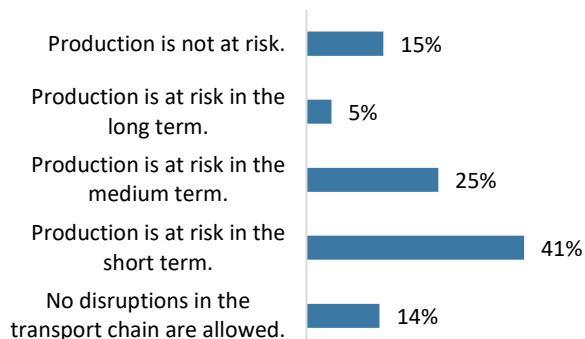


Figure 126: Responses to the question, "How long can the production processes in your company or your members' companies be maintained if the rail freight transport chain is disrupted?"

Respondents also indicated that an interruption to the transport chain is only acceptable for a maximum of one day (21.6%) or three days (30.6%)

This means that it is not possible to increase rail freight transport's modal split only by expanding available railway infrastructure capacity. Indeed the loading industry could also change its production processes so that they are able to receive goods through rail freight transport with more flexibility and not only at the time that is optimal for them. This could not only improve overall resilience to transport chain disruptions but also make better and more efficient use of already-existing railway infrastructure capacity.

This is related to another topic addressed in the survey: construction work to technically refurbish and expand the German railway system, which is planned for the short, medium and long term. Railway infrastructure is increasingly being closed off completely over a longer period of time for construction work. This makes it very challenging for the rail freight transport's end-customers to keep production processes running since rail freight transport companies may be unable to deliver to them when infrastructure is closed off. Nevertheless, a clear majority of those surveyed are satisfied with the information available to them (see Figure 127).

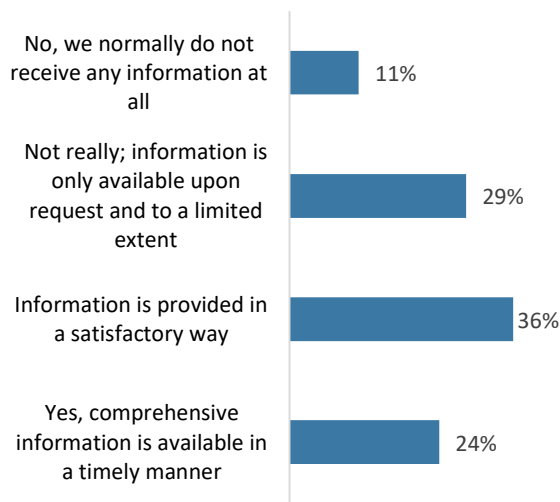


Figure 127: Responses to the question, "With regard to work to refurbish the railway network, does your company or do your association members feel that they are informed adequately and in a timely manner about pending construction measures and the resulting disruption to transport planning?"

However, respondents tend to see little opportunity to influence the planning of construction work on railway infrastructure; 38% of respondents rated their possibility of exerting any influence as insufficient.

When asked about the future of rail freight transport, a clear majority of respondents saw a fairly low ability to adapt and innovate. However, most of them also indicated that the structure of the goods to be transported in rail freight transport would not change (see Figure 128), so a need for action was not necessarily apparent. This assessment also suggests that rail freight as a mode of transport is viable at least in its present state compared to other modes of transport such as road transport.

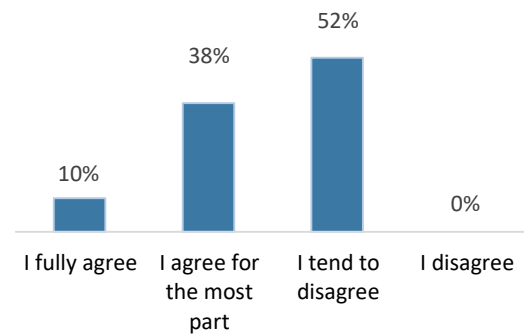


Figure 128: Responses to the question, "How do you assess the statement that the freight structure in rail freight transport will undergo a great deal of change (eg less bulk goods and more small-scale goods)?"

It should be mentioned that most respondents were not only in favour of increasing attractiveness through financial assistance and expanding railway infrastructure. In fact 73% of respondents indicated that they also consider a new market and competitiveness model (eg as a hub and spoke system with regular, reliable connections over long distances) to be useful or even very useful. This should be seen as an urgent recommendation not only to continue providing financial assistance for single wagonload transport, but moreover to begin a discussion about a more promising market model (see Figure 129).

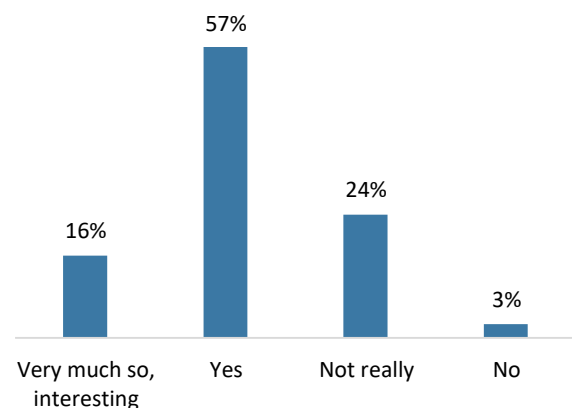


Figure 129: Responses to the question, "Would it be worth considering the introduction of a new market and competitiveness model, eg as a hub and spoke system with regular, reliable connections over long distances?"

In the general assessment of the rail freight transport market with regard to transport times, punctuality and transport costs, there tends to be an overall decline in satisfaction compared to the previous survey from 2021. While the decline is moderate, it is essentially counterproductive to efforts to generate higher market shares for rail freight transport.

The results of the survey of representatives of rail freight transport end-customers stimulate in-depth discussion on some of the survey topics. The results are available on the Bundesnetzagentur's website.

1.7 Heritage railways

While railway undertakings with a cultural and historical background represent only a small part of the overall market, they definitely have social significance, including the fact that they face challenges in the recruitment of new staff. They have the same right of access as other railway undertakings. This section of the report shares some of the information the group of undertakings provided for the 2023 market survey, in particular to document how these companies were impacted by the coronavirus pandemic.

Undertakings that do not exclusively provide heritage transport services were included in this category if these services are predominantly of a heritage nature since the data query often does not allow a clear separation between historical and regular transport services. Railway museums were only included in the assessments if they themselves offered train services or operated railway lines.

Responses were assessed from a total of 67 undertakings offering heritage transport and/or railway infrastructure. The responses are not exhaustive as some companies did not provide complete information.

Route infrastructure used primarily for heritage purposes covers a total of 1,352 km (4% of the

German railway network), of which 431 km are narrow-gauge.

A total of 51 infrastructure managers were included in the heritage category, more than one third of the infrastructure managers in the German rail market.

In 2022 museum and heritage transport had an operating performance of nearly 1.4mn train-kilometres, down from almost 2.0mn train-kilometres in 2019. During the pandemic years self-sustaining transport services not receiving assistance were reduced and sometimes suspended entirely. As pandemic-related restrictions were removed in 2022, transport services increased again but remained at a lower level than in 2019.

A total of 160mn passenger-kilometres were travelled in 2019 and only 130mn in 2022, which was around 80% of passenger demand from 2019.

Heritage transport that was offered on a self-sustaining basis increased significantly compared to the first two years of the pandemic but remained noticeably below the 2019 level of around 50mn passenger-kilometres travelled.

There were more than 5mn passengers in 2019, and in the pandemic years 2020 and 2021 this figure dropped to 3mn. In 2022 heritage railways saw the number of passengers return to 4mn. Transport services receiving public assistance (which are often integrated into local or regional transport systems) saw a faster recovery in passenger demand than self-sustaining transport services.

Railway traffic revenue was more or less in line with passenger demand. In 2019 the railway undertakings in this category recorded revenue of just over €31mn. After the sharp declines in revenue during the pandemic years, revenue figures returned to €25mn in 2022.

The business results reported by railway undertakings in the 2022 market survey were

mostly positive (19 of 26 responses). However, there was an aggregate result of minus €980,000, which corresponds to a profit margin of minus 4%. It must also be taken into account that many railway undertakings operating without public assistance were able to generate only a fraction of their normal revenue or no revenue at all during the pandemic years.

In 2022, railway undertakings with a heritage background had 2,100 employees, often in positions

as volunteers. Just under 200 employees (9%) worked part-time. The undertakings broke down 1,500 of the employees into age groups, which showed that 14% of the employees were less than 30 years old, 46% were between the ages of 30 and 50, and 40% were over the age of 50. The age structure of employees at heritage railways is thus very similar to that of the rail market overall

2. Railway infrastructure: railway lines

In 2023, the Bundesnetzagentur received data for the 2022 reporting year from approximately 140 infrastructure managers. The number of train-kilometres travelled in the German railway network rose to a new record.

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2.1 Infrastructure managers

2.1.1 Number of infrastructure managers and how infrastructure is used

A total of 153 infrastructure managers with infrastructure that trains can travel on were asked to provide data for the 2022 reporting year. Four infrastructure managers who had recently entered the market were surveyed for the first time. Further, some operators of rail infrastructure were classified as infrastructure managers for the first time. The question of whether they conducted signal-controlled train movements was the basis for this classification. Therefore, in addition to three federally owned infrastructure managers, another 150 non-federally owned counterparts operate in Germany.

According to information from the respective operators, 36 of the above-mentioned infrastructure managers provide only rail freight transport service or other transport services in their railway networks. Another 50 infrastructure managers use their networks exclusively for rail passenger transport. Seven infrastructure managers reported that no transport services were provided in their networks during the reporting year. Mixed transport services were provided on the lines of the other 60 infrastructure managers. Twenty-nine infrastructure managers operate narrow-gauge systems. To date, the Bundesnetzagentur has exempted 24 infrastructure managers of heritage railways as defined by section 2(6a) of the Rail Regulation Act from having to comply with relevant provisions of the Act.

2.1.2 Operating performance

Following the decline observed in 2020 due to the pandemic, the recovery seen in 2021 continued through 2022. The previous high reported in 2021 was exceeded by nearly two percentage points in 2022, with all categories of

transport service together reporting a cumulative total of approximately 1,164mn train-kilometres during the year.

Operating performance in the regional and local rail passenger transport segment remained constant at the level reported in the previous year. However, the other transport services posted – in some cases significant – growth. In percentage terms, the largest increases in the number of train-kilometres travelled in 2022 were seen in the Other Traffic segment (approximately 11%) and in long-distance passenger rail transport (10%). The rail freight transport segment was able to grow its transport services by a single-digit percentage.

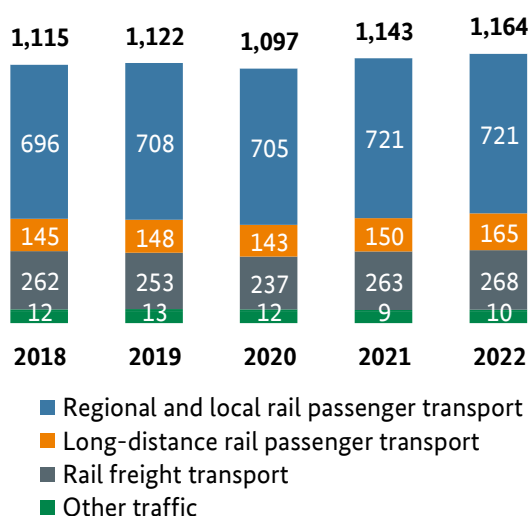


Figure 130: Development of the number of train-kilometres travelled (2018-2022; in millions of train-km)

Non-federally owned railway lines were used for approximately 3% of the total train-kilometres travelled during the 2022 reporting year. Traffic density on non-federally owned railway infrastructure averaged 18 trains per route-kilometre per day. As in the previous year, regional and local rail passenger transport accounted for by far the largest share of this. Traffic density on federally owned infrastructure continued to be significantly higher at

approximately 93 trains per route-kilometre per day.

2.2 Resources of the infrastructure managers

2.2.1 Railway network

Germany’s public railway network measured approximately 39,160 kilometres in length in 2022. Total track length was approximately 60,400 kilometres. In addition, tracks with a total length of more than 11,000 kilometres were operated in service facilities.

Infrastructure subsidiaries of the DB Group operated 33,438 kilometres – somewhat more than 85% of the German public railway network.

A total of 61.6% of the network operated by DB was electrified, while the electrification rate of the non-federally owned route networks was 10.3%. Once again, routes with connections to urban tram systems constituted the largest share of electrified routes. In total, the overall electrification rate for the German railway network was 54.1% in 2022. Based on this, the

electrification rate in the last ten years increased by an average of approximately 0.16% per year for the entire network or a little more than 0.2% per year for infrastructure operated by DB.

The infrastructure managers reported that 490 kilometres of their railway networks are now equipped with ETCS, approximately 1% of the entire German railway network. The high-speed train network with routes designed for maximum speeds of least 250 km/h had a length of 1,163 kilometres. This is approximately 3% of the entire railway network. The newly constructed Wendlingen-Ulm route was put into operation with the 2022/2023 timetable change and extended Germany’s high-speed transport network by some 60 kilometres in 2022. DB Netz AG continues to be the only operator of ETCS and high-speed transport routes in Germany.

The majority of infrastructure managers have a network with a length of 50 kilometres or less. DB leases nearly 1,100 kilometres or nearly one

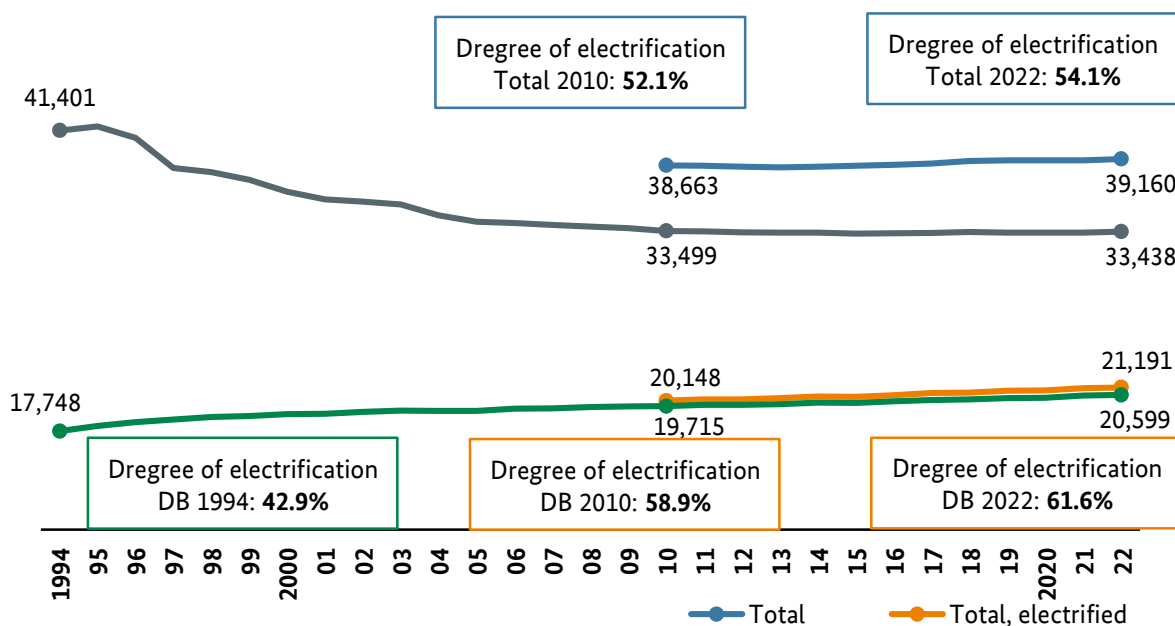


Figure 131: Development of Germany’s railway network and the degree of electrification (1994-2022; length in kilometres; shares in %)

fifth of the total route kilometres operated by non-federally owned infrastructure managers.

Non-federally owned infrastructure managers comprise not only private undertakings but also districts, municipalities and special purpose associations. These networks are used primarily for rail freight transport. However, they are also often used for contracted or non-PSO rail passenger transport services as well.

In 2022, infrastructure managers classified a total of around 190 route kilometres as not immediately ready for operation.

2.2.2 Personnel

The number of persons employed by infrastructure managers increased once again during the 2022 reporting year. Infrastructure managers reported having a total of approximately 47,000 employees.

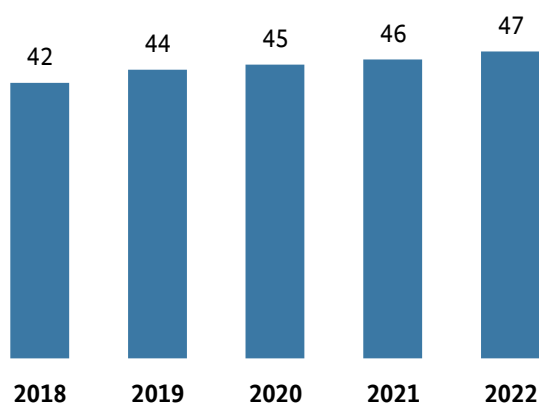


Figure 132: Development of employment at infrastructure managers (2018-2022; in thousands of FTEs)

The share of female employees at infrastructure managers increased slightly to approximately 21%. The number of part-time employees and trainees with an employment contract as a percentage of the total number of employees remained constant at approximately 8%.

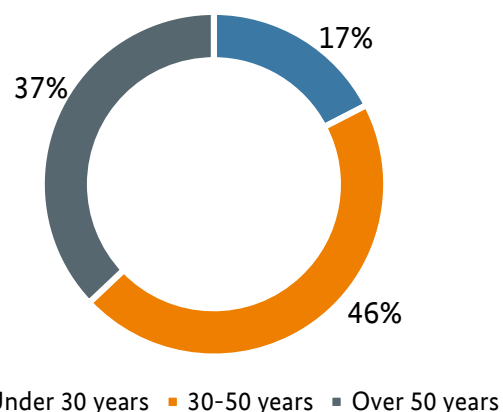


Figure 133: Personnel structure at infrastructure managers (2022; shares in %)

The share of persons over 50 years of age who were employed at non-federally owned infrastructure managers grew slightly and constituted some 52% of the workforce, while the share of employees over the age of 50 out of all employees declined slightly. The share of employees under 30 years of age was 10% in 2022. Employees between 30 and 50 years of age accounted for the remaining share, which was constant at 38%. Looking at all infrastructure managers, the largest share of employees – 46% – was between 30 and 50 years of age. At 17%, employees under the age of 30 comprised the smallest share.

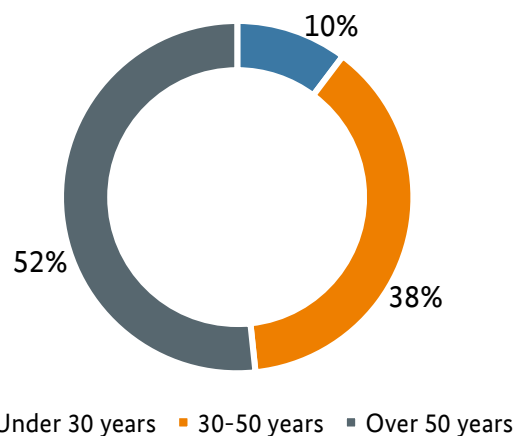


Figure 134: Personnel structure at non-federally owned infrastructure managers (2022; shares in %)

As part of the market survey, infrastructure managers were once again given the opportunity to rate the availability of technical operational railway personnel (such as operations schedulers, traffic controllers) and Other Personnel, using a scale from 1 (good availability) to 5 (places company's existence at risk).

The respondents' perception of the personnel situation for technical operational railway personnel was slightly better than in the previous year. The average rating improved, from 3.1 to 3.0, after having been 2.9 in 2021. The rating for Other Personnel worsened, from 2.7 in the previous year to 2.8 for the current survey.

Many infrastructure managers reported a marked shortage of technical personnel. Shortages were also noticeable in areas where infrastructure managers traditionally make use of volunteers. The respondents particularly described the situation with respect to traffic controllers as being problematic.

IM staff availability	2019	2020	2021	2022	2023	Trend
Operations staff (train dispatchers, controllers)	3.1	3.2	2.9	3.1	3.0	↗
Other staff	2.7	2.8	2.7	2.7	2.8	↘

Figure 135: Ratings assigned the availability of personnel for infrastructure managers (2018-2023; average values)

2.3 Access to railway lines

2.3.1 Network statements

The route and track network operated by the railways in Germany is available for use by any access beneficiary.

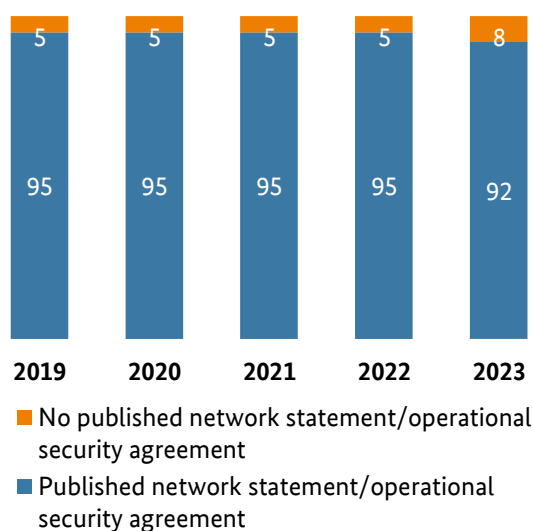


Figure 136: Share of infrastructure managers that have published a network statement (2018-2023; shares in %)

In order to ensure non-discriminatory conditions for all users, infrastructure managers are required by law to issue what is known as a network statement that details the conditions for the use of the railway lines they operate.

Railway lines that are of little competitive importance in terms of traffic are exempt from this requirement. These include industrial railways and non-standard gauge railways. This exemption also applies to railway lines that are used solely for heritage railway service.

During the 2022 reporting year, a total of 153 infrastructure managers were active in the market. The Bundesnetzagentur ruled that 43 were not required to issue a network statement.

Before a network statement can go into effect, the Bundesnetzagentur reviews it to ensure its conformity with the law. Network statements

take effect only after the Bundesnetzagentur confirms they meet the legal requirements.

In 2022, 92% of the infrastructure managers had published network statements. Of the remaining undertakings, some were still in the process of drawing up their network statement or the exemption process had not yet been concluded.

Compared with the previous years, the share of infrastructure managers with a network statement that had passed review by the Bundesnetzagentur declined slightly. Several new infrastructure managers entered the market in 2022, having taken over rail infrastructure from other market participants.

2.3.2 Access beneficiaries' assessment of access

As part of the Bundesnetzagentur's annual market survey, access beneficiaries receive the opportunity to evaluate and rate market-related aspects on a scale of 1 (very good, no need for action) to 5 (insufficient, urgent need for action).

A long-term analysis of the ratings given for access to railway infrastructure reveals an ongoing, gradual decline in the level of satisfaction since 2010.

The continuous increase in the number of competitors in conjunction with stagnant route capacity has impacted timetable quality. These factors decisively influence the quality and condition of the rail infrastructure and the overall performance of Germany's railway system. In their evaluation, access beneficiaries rated the condition of the railway system as subpar.

The ratings for scheduled construction measures indicate that the respondents felt they tended to have little influence on the planning of construction measures as reflected in the rating of 3.8. The trend in this category has been negative since 2010. The only category that saw an improvement in its rating was the timely provision of information, which received a rating of 2.5.

What the market participants said:

The reported problems revolve primarily around two points. Firstly, the market participants regularly point to the inadequate communication and lack of inclusion during the planning of construction measures. Secondly, the rerouting that is necessary in such instances leads to aggravation because the designated diversionary route is in some cases inappropriate for the planned transport service or cannot be used due to other construction measures. In addition, market participants complained that measures were not being bundled, a situation that led to routes being closed multiple times. Market participants reported that they usually were not able to exert any influence on the planning of construction measures.

RU ratings for access to rail networks	2019	2020	2021	2022	2023	Trend
Allocation of train paths for non-scheduled rail services	2.3	2.3	2.5	2.6	2.6	→
Allocation of working timetable train paths	2.4	2.3	2.4	2.4	2.5	↘
Timetable quality	2.5	2.5	2.7	2.7	2.8	↘
Scheduling in the event of a disruption	2.6	2.6	2.7	2.8	2.7	↗
Construction planning	3.1	3.0	3.0	3.2	3.1	↗
Network development status	3.2	3.2	3.2	3.4	3.6	↘
Network maintenance status	3.1	3.1	3.1	3.3	3.5	↘

Figure 138: Ratings given by railway undertakings for access to railway infrastructure (2019-2023; average values; scale from 1 (very good/no need for action) to 5 (insufficient/urgent need for action). The arrows indicate the trend from 2022 to 2023. Source: Market surveys of the Bundesnetzagentur)

RU ratings for scheduled construction measures	2019	2020	2021	2022	2023	Trend
Timely notification (only working timetable)?	2.0	2.0	2.2	2.1	2.1	→
Timely notification (only construction measures during the year)?	2.4	2.4	2.5	2.6	2.5	↗
Was the RU included in planning and coordinating the construction measures?	2.8	2.7	2.9	2.9	2.9	→
Was the RU able to influence the planning and coordinating of the construction measures?	3.3	3.3	3.5	3.5	3.8	↘
Was re-routing of trains necessary?	3.5	3.5	3.4	3.8	3.4	↗
Was it necessary to provide alternative transport?	2.6	2.5	2.4	2.8	2.2	↗
Were changes to planning not reported to you or reported too late?	2.9	2.8	2.8	3.1	2.9	↗
Were there any deviations from the original plans when they were actually executed?	3.0	2.9	2.9	3.1	3.0	↗

Figure 137: Ratings given by railway undertakings for the infrastructure managers' scheduled construction measures (2019-2023; average values; scale from 1 (very good/no need for action) to 5 (insufficient/urgent need for action). The arrows indicate the trend from 2022 to 2023. Source: Market surveys of the Bundesnetzagentur)

2.4 Charges for the use of railway lines

2.4.1 Track access charges

Track access charges payable to infrastructure managers are to be determined on the basis of the costs incurred in connection with the railway infrastructure. As an exception to this, DB Netz AG is bound by an incentive system under which the sum of its charges may not exceed a specified ceiling for the total costs. Track access charges can therefore vary greatly depending on the type of use, traffic density and the general condition of the rail infrastructure of the respective infrastructure manager.

Non-federally owned infrastructure managers set the level of their track access charges every year directly on the basis of their cost trends, particularly with respect to increases in their costs for energy, personnel and purchased services such as vegetation work. Pending maintenance measures such as bridge restoration have a particularly strong effect on their calculations. The planned reactivation of routes or sections of routes often directly lead to significant increases in charges because much of the expenditure is directly booked as an expense rather than as an investment which would have implications over the entire amortisation period.

In addition, the utilisation rate for those non-federally owned railway lines that are used primarily or exclusively for rail freight transport is lower than the utilisation rate for the DB Netz network.

Track access charges in regional and local rail passenger transport averaged €5.45 per train-kilometre in 2022. At €7.49 per train-kilometre, the charge in the non-PSO long-distance rail passenger transport segment was significantly higher.

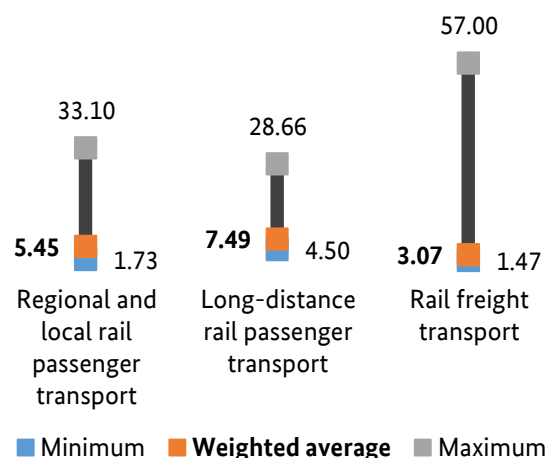


Figure 139: Range of track access charges by type of service (2022; euros per train-km)

When the prorated refunds amounting to 42.4% which were disbursed until the end of 2022 for paid track access charges are taken into account, the arithmetical average charge was €4.28.

Track access charges paid by railway undertakings were the lowest in the rail freight segment, an average of €3.07 per train-kilometre. When the track access charge assistance which averaged 47.6% for the year for rail freight transport is taken into account, the average charge was €1.57 per train-kilometre.

However, the range of charges in the rail freight transport segment is the largest by far due to the aforementioned reasons relating to the level of capacity utilisation and maintenance measures.

Taking a general look at how usage charges have developed over the last five years, it is clear that track access charges do not yet reflect the enormous increase in the aggregate producer price index in 2022. However, the railway sector will probably see marked increases in their costs and prices in the coming years.

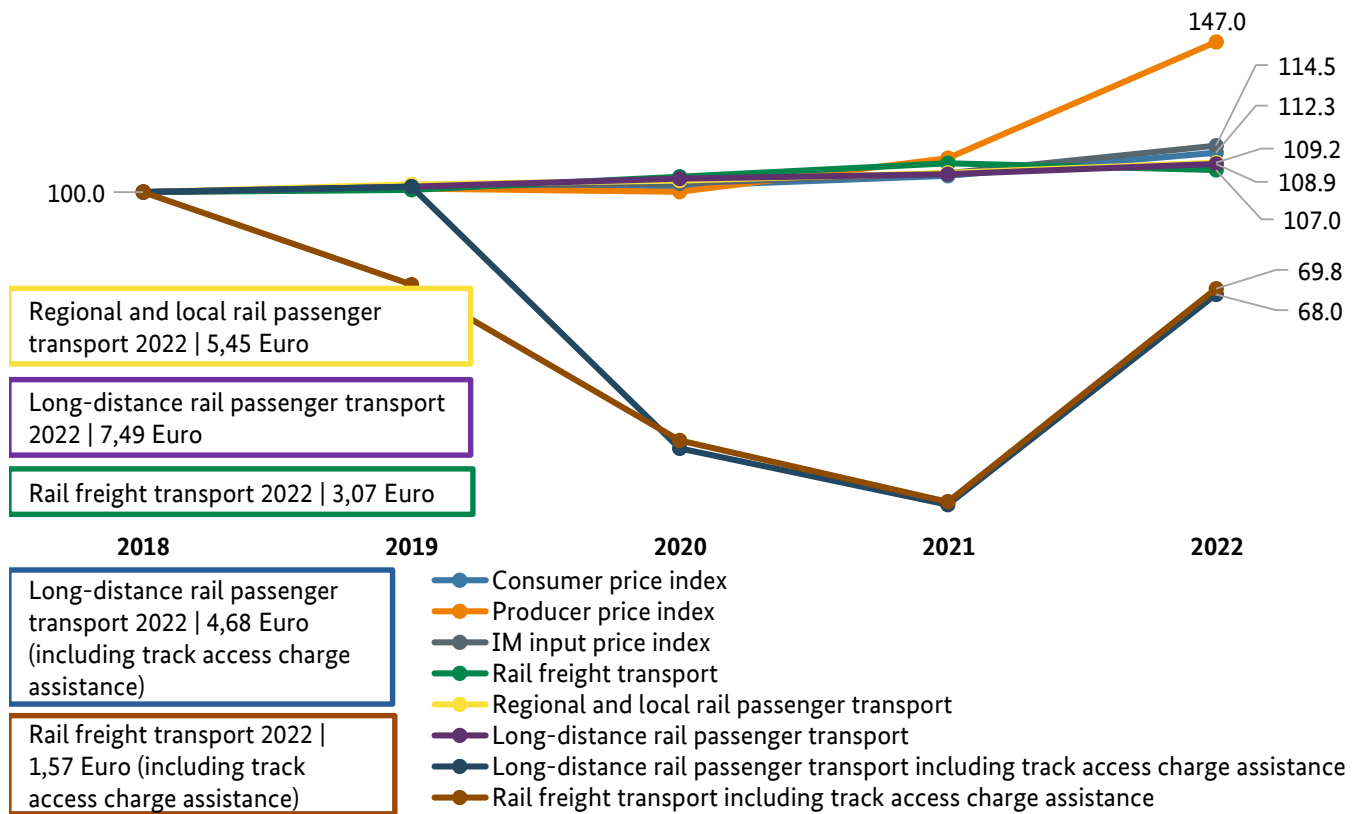


Figure 140: Infrastructure managers' average track access charges including the track access charge assistance granted for long-distance rail passenger transport and rail freight transport (2018-2022; indexed 2018 = 100)

2.4.2 List of charges

Infrastructure managers are required by law to draw up and publish lists of their charges for the use of their railway infrastructure. Here as well, the law allows for exceptions, which have been granted in the case of 41 of the 153 infrastructure managers.

A total of 93% of the infrastructure managers that are required by law to draw up and publish lists of their charges fulfilled this obligation, a slightly smaller share than in the previous year.

2.4.3 Access beneficiaries' assessment of charges

As part of the Bundesnetzagentur's annual market survey, access beneficiaries have the opportunity to rate the level of non-discrimination and the price-performance ratio of the infrastructure managers' pricing systems on a scale of 1 (very good) to 5 (unsatisfactory).

The assessments they provided in 2023 did not change from 2022. Their average rating for the level of non-discrimination of the infrastructure managers' pricing systems remained stable at 2.4. The average rating they gave for the level of the track access charges remained unchanged at 2.9.

RUs: price-performance ratio charges	2019	2020	2021	2022	2023	Trend
Non-discriminatory pricing system for train paths	2.4	2.3	2.4	2.4	2.4	→
Price-performance ratio for track access charges	2.9	2.8	2.9	2.9	2.9	→

Figure 141: Ratings assigned by access beneficiaries for the pricing systems and the level of the charges (2019-2023; average values; scale from 1 (very good/no need for action) to 5 (insufficient/urgent need for action). The arrows indicate the trend from 2022 to 2023. Source: Market surveys of the Bundesnetzagentur)

2.5 Economic situation of infrastructure managers

2.5.1 Revenue

Infrastructure managers generate their income from the charges they collect for the use of their train paths and from external funding. In 2022 they generated a total of €6bn in income through track access charges.

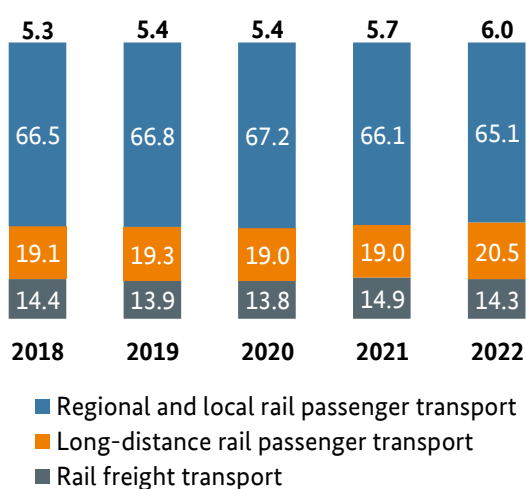


Figure 142: Revenue generated by infrastructure managers through track access charges, by type of service (2018-2022; revenue in €bn; shares in %)

The infrastructure managers’ revenues in 2022 were more than 10% greater than the revenue levels seen prior to the pandemic and confirm the long-term growth path.

The absolute increase in revenue included revenue generated by all transport service categories with an increase in the number of kilometres travelled being the primary reason. The breakdown between service categories remained unchanged: Regional and local passenger rail transport accounted for nearly two-thirds of total revenue, long-distance passenger rail transport was responsible for approximately one-fifth and the rail freight transport segment generated the remaining 14%.

2.5.2 Financing of investments

The infrastructure managers surveyed received more than €4.44bn in external funding during the 2022 reporting year to invest in existing infrastructure. They also reported spending €178mn of their own funds for this. All in all, somewhat more than €4.6bn were invested in existing infrastructure. The Service Level and Funding Agreement III (Leistungs- und Finanzierungsvereinbarung – LuFV III) which went into effect on 1 January 2020 brought a marked increase in the amount of funding for existing infrastructure maintained by federally owned infrastructure managers. In addition, the Federal Government’s Climate Action Plan 2050 continued measures for the railway sector in general and for the federally owned infrastructure managers in particular through 2022 as well. Federally owned infrastructure managers are required under the Service Level and Funding Agreement to contribute funds of their own to investments in the existing railway network. €

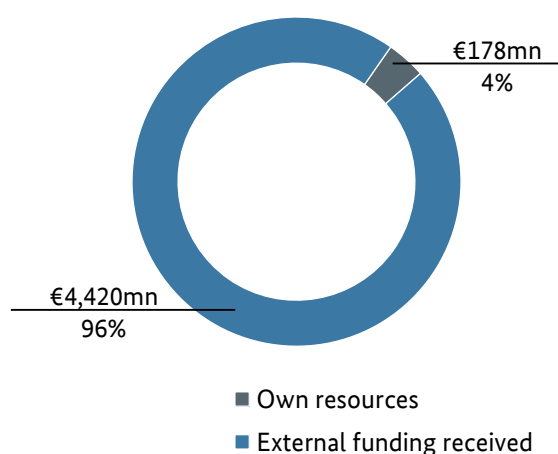


Figure 143: Investment in existing network infrastructure (2022; in €mn; shares in %)

Approximately €2.9bn in external funding was invested in the new construction or expansion of infrastructure. Nearly €1.6bn of own

resources were invested in the new construction or expansion of infrastructure.

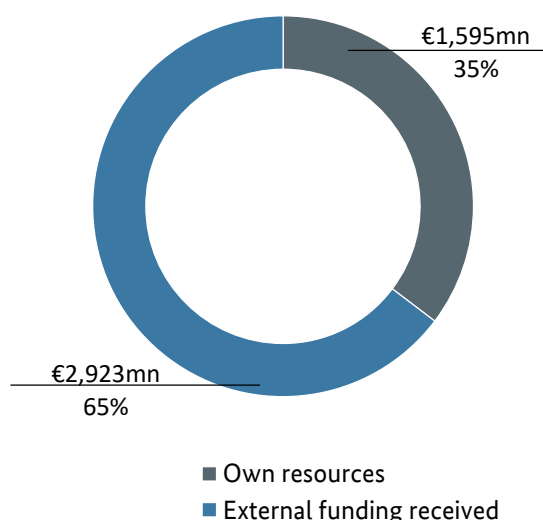


Figure 144: Investment in the new construction or expansion of infrastructure (2022; in €mn; shares in %)

As a result, the external funding rate was 65% for new construction or expansion of infrastructure, and 96% for investments in the existing railway network.

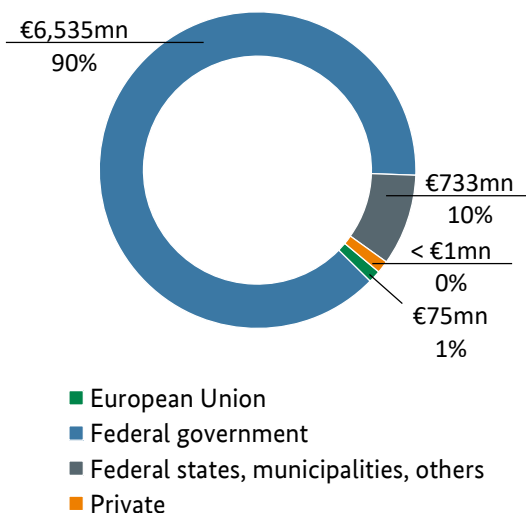


Figure 145: Sources of investment measures (2022; in €mn; shares in %)

The federal government provided more than €6.5bn in funding for investment measures in 2022, approximately €400mn less than in the previous year. This equates to 90% of the total funding received by infrastructure managers.

Germany’s federal states and local authorities provided approximately 10% (somewhat more than €0.7bn), while EU funding covered nearly 1% (approximately €75mn).

2.5.3 Results situation

After having posted losses in the previous years, DB Netz AG, the largest German network operator, reported a positive net profit of €0.4bn in 2022. Government funding in the amount of €476mn particularly factored into this result. However, revenue generated through track access charges also increased – by 7.5% compared with the previous year.

As in the previous years, non-federally owned infrastructure managers overall expended more on their infrastructure than they generated through track access charges. This shortfall grew again due to the many pending rehabilitation and maintenance measures for which non-federally owned infrastructure managers receive public funding only in part.

At 29%, the non-federally owned infrastructure managers’ average equity ratio was lower than the overall market’s average. Based on its reported figures, DB Netz AG had an equity ratio of 46%.

3. Railway infrastructure: Service facilities

In 2023, the Bundesnetzagentur received data for the 2022 reporting year from more than 700 service facility operators. The revenues generated by service facility operators and the number of workers employed by service facility operators increased once again.

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3.1 Service facility operators

3.1.1 Number of service facility operators

In the course of its 2023 railway market survey regarding the 2022 reporting year, the Bundesnetzagentur gathered data from more than 670 service facility operators. Nearly every infrastructure manager reported that it also operated service facilities. Tracks with a total length of more than 11,000 kilometres continued to be operated in service facilities in Germany.

There is still no central register for railway infrastructure that covers all infrastructure managers and their service facilities. To complicate things, a licence is not required to operate most service facilities. In light of this, it must be assumed that the Bundesnetzagentur does not have a comprehensive overview of the railway infrastructure market in some segments.

3.1.2 Types and number of service facilities

In 2022, Germany's railway infrastructure encompassed more than 31,000 individual, publicly accessible service facilities. This included nearly 19,000 storage sidings alone. It also had more than 7,000 passenger stations and passenger stops, over 3,000 marshalling yard tracks and train formation facility tracks, more than 1,000 freight loading and unloading facilities (including more than 180 terminals for multimodal transport services), around 350 railway fuelling stations/refuelling facilities and nearly 400 maintenance facilities. In addition, based on information available to the Bundesnetzagentur, approximately 150 port facilities were connected to the German railway network.

3.2 Resources of the service facility operators

3.2.1 Personnel

In 2022, service facility operators in Germany employed a total of approximately 40,000 workers (measured in full-time equivalents). Following the trend seen in recent years, this number increased again in 2022. Similar to infrastructure managers, market participants are also faced with the challenge of adequately filling positions that have become vacant due to retirement.

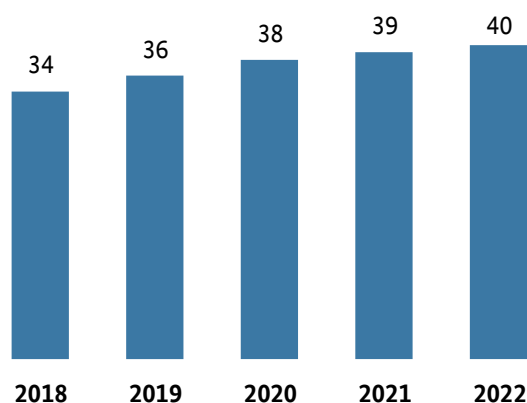


Figure 146: Development of employment at service facility operators (2018-2022; in thousands of FTEs)

3.3 Economic situation

3.3.1 Revenue

Service facility operators have two primary sources of revenue. Their usage charges are generally used to cover their costs for operating and maintaining their facilities, while external funding is often used for investments.

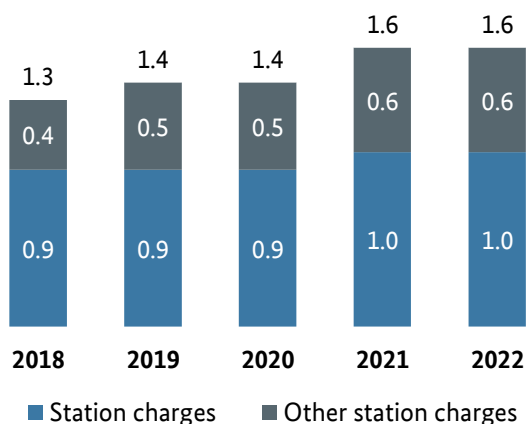


Figure 147: Development of revenue generated from charges for the use of service facilities (2018-2022; in €bn)

Altogether, the operators of service facilities generated revenues of approximately €1.6bn in 2022 from usage charges. Station charges accounted for more than 60% of this sum. One in every eight euros that were charged for stops at passenger stations was for a stop by a long-distance train. The other 40% – approximately €0.6bn – were generated by the remaining categories of service facilities.⁹ Charges for parking rolling stock accounted for the largest share of this 40%. In 2022, railway undertakings expended nearly €160mn for their use of storage sidings.

3.3.2 Results situation

Using the data provided by the non-federally owned operators of service facilities, the Bundesnetzagentur once again identified a shortfall between the aggregate revenue they generated and their expenditures during the year. A comparison with the survey data from previous years indicates that the shortfall between expenditures and the

amount of revenue being generated through usage charges has increased further.

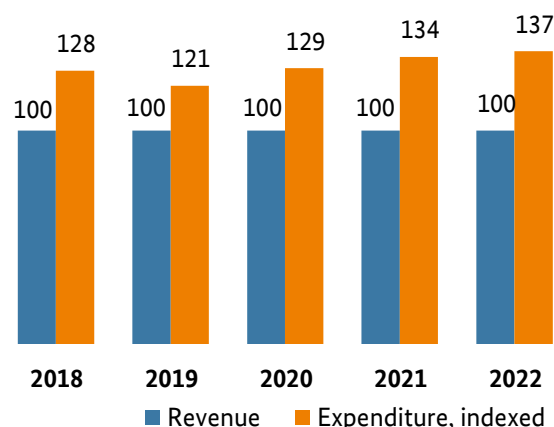


Figure 148: Revenue and expenditure of non-federally owned service facility operators in the respective year (2018-2022; shares in %)

Expenditure (for maintenance, depreciation and the operation of service facilities) exceeded the amount of revenue generated from charges for the use of infrastructure by 37% in 2022, following a shortfall of 34% in the previous year.

Most non-federally owned service facilities do not however have the aim of generating a profit through their operations. Rather, their function is to support the respective company’s primary business purpose. Thus, in many cases the operation of railway infrastructure does not constitute the primary focus of the business, but rather is undertaken to support the company’s business goals. In such cases, cost shortfalls are regularly offset by other business segments.

⁹ These include train formation facilities/marshalling yards, freight terminals, storage sidings, industrial siding lines, feeder tracks and railway sidings plus track systems in ports. Revenue

generated in maintenance facilities and refuelling facilities is not included here.

3.4 Examination of selected service facilities

3.4.1 Maintenance facilities

Regular maintenance is of crucial importance for the safe and reliable use of rolling stock. In addition to this work, service facilities conduct comprehensive inspections and perform repairs, such as repairs following malfunctions and accidents. These services are typically performed in maintenance facilities or, when the work involves straightforward tasks, on a mobile basis trackside.

As with the market surveys of recent years, when asking maintenance facility operators about the type of services they offered and/or performed, the question in this year’s survey no longer targeted the company level, but rather the location level. The additional information this generated and the deeper insights it has provided into the availability of maintenance services and their distribution throughout the country help the Bundesnetzagentur identify regions with little infrastructure, facilitate the processing of exemption requests and make it possible to take informed decisions concerning the strategic importance that individual facilities have for the functioning of Germany’s rail transport market.

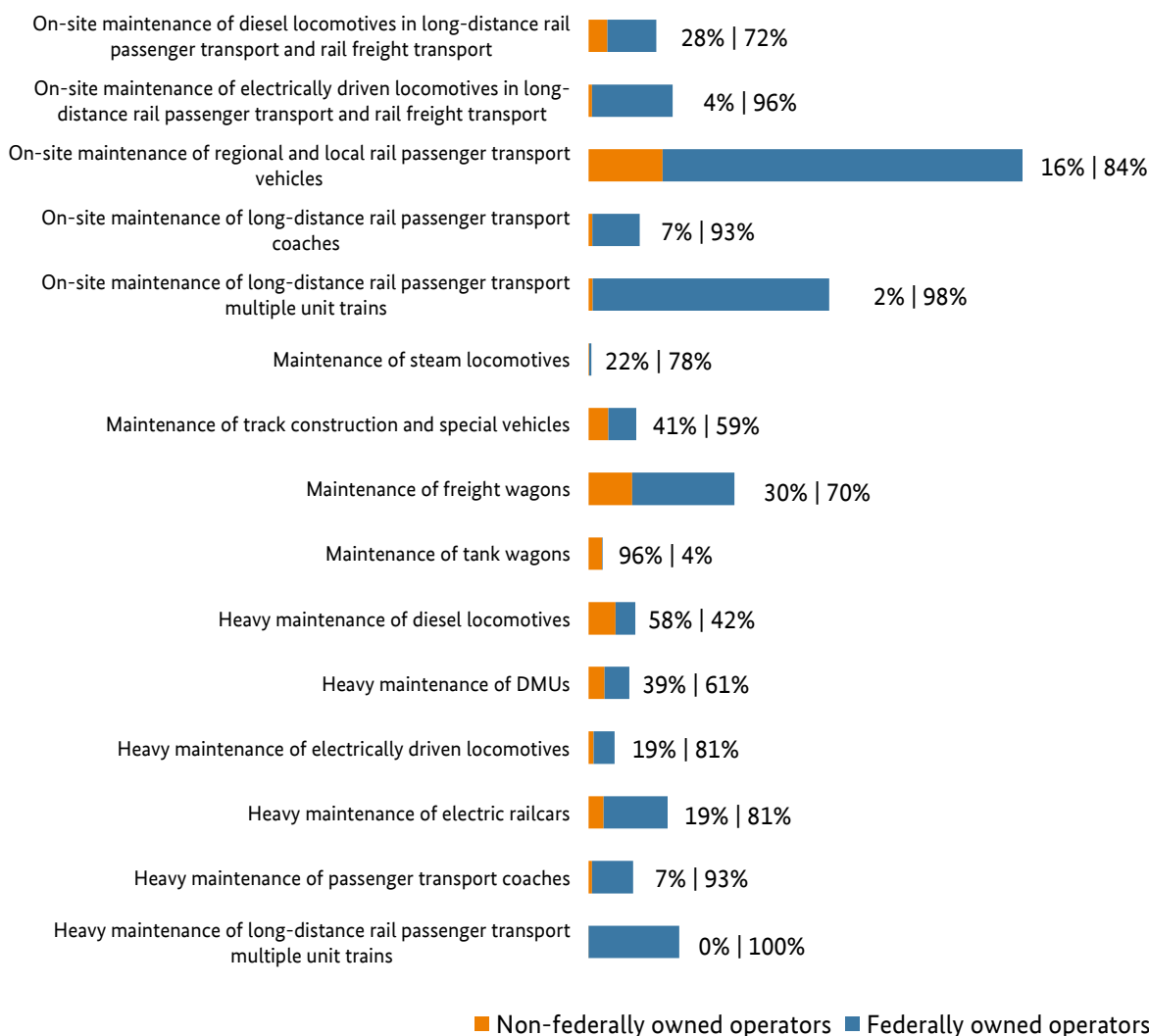


Figure 149: Revenue generated by maintenance facilities (2022; shares in %)

Approximately 220 maintenance facility operators reported nearly 400 maintenance facilities in Germany; this figure includes more than 100 maintenance facilities that are run by 11 federally owned operators. As in previous years, most maintenance facilities were operated by undertakings that are also railway undertakings or leasing companies for rolling stock, or were affiliated with them.

The number of undertakings that are new to the market was once again small, probably due to the large amount of investment needed to establish a maintenance facility. The greatest fluctuation was observed among railway preservation associations which often perform maintenance on a small scale on rolling stock that in some cases is historical. Independent operators and rolling stock manufacturers continued to provide maintenance services for customers. Revenue reported for the 2022 reporting year reached approximately €3.3bn, about the same amount as in the previous year. The share of the total revenue percent that was generated by federally owned operators remained almost unchanged – around 83%.

The division into 15 maintenance service markets, which was established by the report on the markets for maintenance facilities for railways issued in April 2020 and is still in use, reflects the wide range of maintenance services, the requesting parties' diverse needs, and the differences in workshop equipment, know-how and vehicle technology. Measured in terms of revenue, on-site maintenance of rolling stock in regional and local passenger rail transport continues to hold a share of somewhat more than 30%, making this the largest market, followed by on-site maintenance of multiple-unit trains used in the long-distance passenger rail transport segment.

In the majority of the maintenance markets, the revenue generated by federally owned operators continues to exceed the revenue generated by non-

federally owned operators. Heavy maintenance for diesel-powered locomotives and maintenance for tank wagons continue to be exceptions. Here, non-federally owned operators account for around 58% and 96% of the revenue generated through the respective type of maintenance.

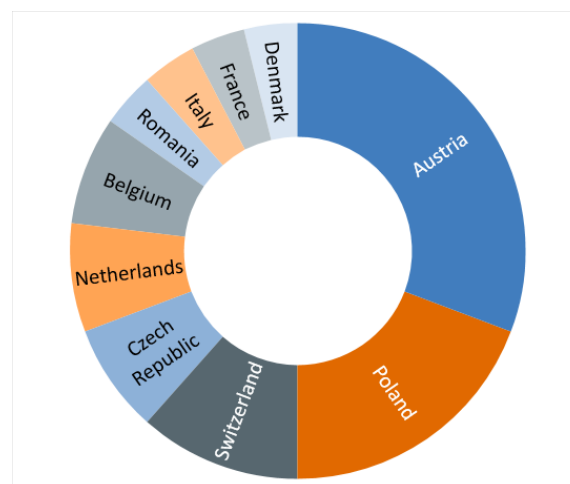


Figure 150: Countries other than Germany in which railway undertakings made use of maintenance services; by the number of mentions

Railway undertakings whose parent company is domiciled outside of Germany particularly made regular use of service facilities located outside of Germany. In general, it can be said that about 70% of those market participants that have their fleet serviced and repaired in a country other than Germany are undertakings whose parent company has its headquarters in a neighbouring country. In addition to them, there are national railways that offer transport services in border regions or on a cross-border basis.

Besides Austria, where primarily companies belonging to ÖBB-Holding AG have their rolling stock serviced, the other main countries where maintenance work is performed on rolling stock that is used in the German railway network are Poland and Switzerland.

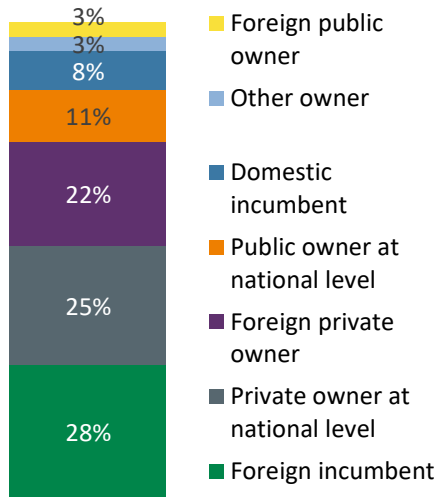


Figure 151: Share of work performed abroad, broken down by ownership of the ordering party (2022; in %)

When the type of work performed abroad is matched up with the different maintenance facility markets as defined here, it is evident that maintenance work is performed primarily on diesel and electric locomotives that are used for rail freight transport. The amount of heavy maintenance work and the amount of on-site maintenance are about the same.

Likewise, maintenance services for freight wagons and for rolling stock used for regional and local passenger rail transport were frequently demanded, while only a few undertakings abroad commissioned heavy maintenance work for multiple-units and multiple-unit trains or maintenance work for passenger coaches.

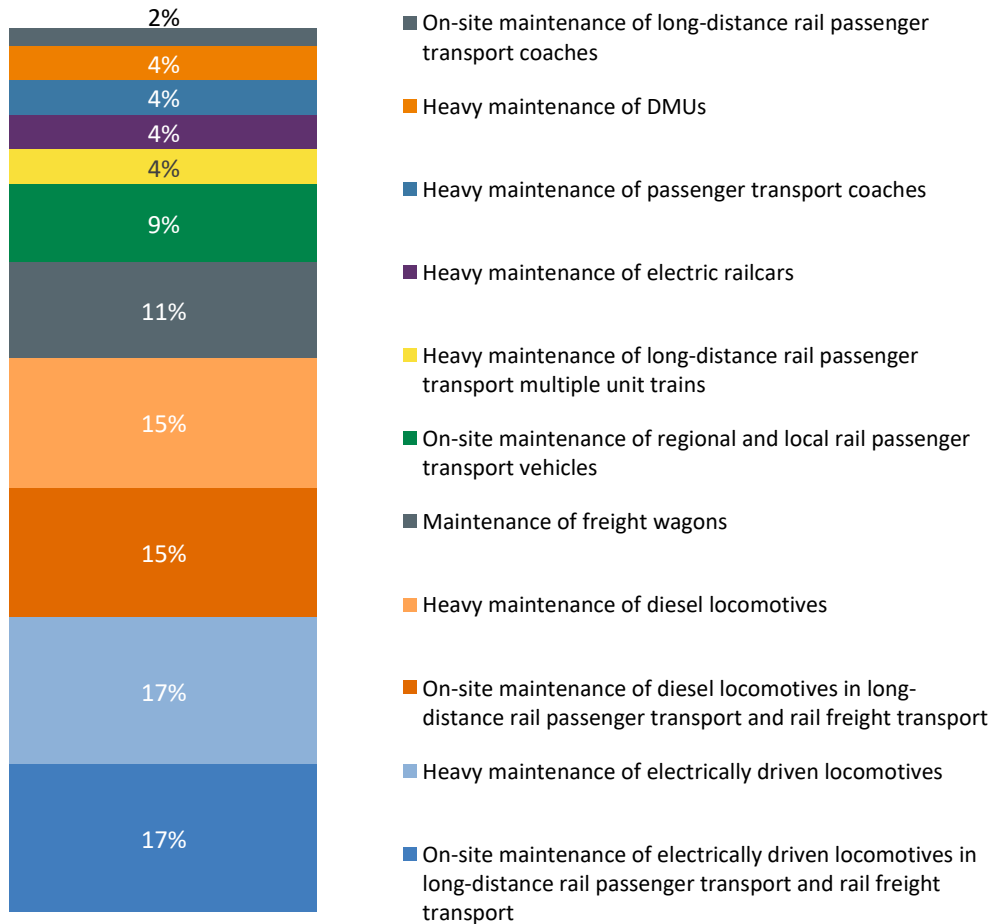


Figure 152: Maintenance work provided abroad, by maintenance facility market (2022; in %)

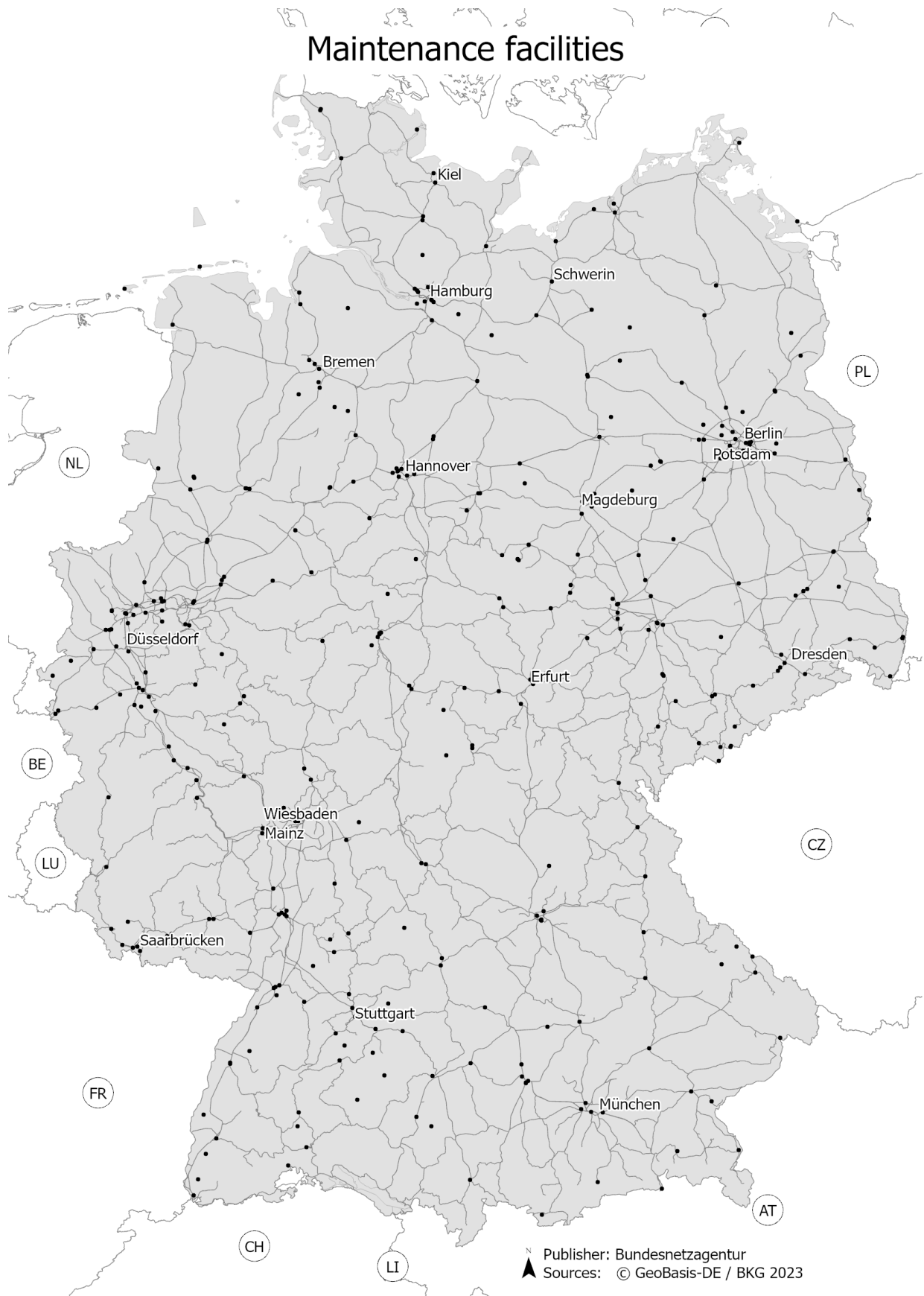


Figure 153: Locations of maintenance facilities in Germany

3.4.2 Loading and unloading facilities/Freight terminals (multimodal/conventional transport)

Operators are required by law to grant access to service facilities and the services they provide. According to regulatory law governing railways, service facilities include freight terminals.

Based on information currently available to the Bundesnetzagentur, there are approximately 900¹⁰ locations in Germany that have transloading facilities with track systems. These are run by some 270 operators.

More than 760 of these locations have conventional freight terminals. Freight terminals for multimodal transport are in operation at more than 180 locations. Conventional freight as well as freight for multimodal transport services can be transloaded at more than 40 locations. Around ten of these facilities are located in a port.

The more than 760 locations with conventional loading and unloading facilities have about 340 DB Netz AG loading terminals. There are approximately 440 loading tracks in these DB Netz AG loading stations; nearly 290 of them were used on more than 70% of the days in the year. Approximately 120 loading tracks were used on fewer than 30% of the days in the year.

Over 150 of the more than 760 conventional freight terminals are operated in ports.

Of the more than 180 freight terminals that handle only multimodal transport, over 80 are operated in ports.

More than 140 of the transloading facilities are located in the federal state of Lower Saxony, followed by the states Bavaria, with more than 130 transloading facilities, and North Rhine-Westphalia with some 120.

Around 230 locations with transloading facilities (not counting DB Netz AG loading terminals) having track systems are located in one of the European Union's rail freight corridors. Their distribution in these corridors is as follows (multiple counts are possible because some sites are located in more than one rail freight corridor):

Corridor name	
Rail freight corridor 1 (Rhine - Alpine)	69
Rail freight corridor 3 (Scandinavia- Mediterranean)	65
Rail freight corridor 4 (Atlantic)	10
Rail freight corridor 7 (Orient- Eastern Mediterranean)	19
Rail freight corridor 8 (North Sea – Baltic Sea)	104
Rail freight corridor 8 (Rhine – Danube)	18

Figure 154: Number of transloading facilities that are located in a freight transport corridor

At more than 80% of these locations, the operator of the transloading facility is the undertaking that also operates the track system in the facility.

To ensure reasonable, non-discriminatory access to public railway infrastructure, service facility network statements have been issued at around 90% of these locations. However, measured in terms of the number of operators, only a little more than two thirds have issued a network statement for

¹⁰ Compared to the previous year, the number of identified locations with loading and unloading facilities was reduced by approximately 100 due to changes in the method used for counting existing loading terminals. The Bundesnetzagentur

had previously counted loading tracks individually. Starting with this reporting year, the number of loading terminals will be counted, rather than the individual loading tracks. A loading terminal can incorporate more than one loading track.

their service facilities. One third had not yet issued a network statement.

As a rule, a wide variety of freight can be transloaded in the freight terminals because the necessary equipment is available there or can be provided by the operator of the transloading facility. However, the transloading activities in the terminals usually involved just a few unvarying types of goods.

At the more than 180 locations with loading and unloading facilities for multimodal transport, over 90% of the locations can tranship containers and nearly 70% can tranship cranable semi-trailers. In the multimodal transport segment, non-cranable semi-trailers and rolling road service for heavy goods vehicles can be transloaded at only a few locations: approximately 25% and 15% respectively.

Loading and unloading facilities¹¹ for conventional freight most commonly transload piece goods/general cargo/part loads and solid matter. Goods requiring special handling, waste and chemical products can be transloaded at nearly 50% of all freight terminals for conventional transport. Liquid or gaseous goods can be handled at 25% of the loading and unloading facilities, while 28% of them can handle dangerous goods.

In addition to the above-mentioned categories of freight, the respondents also listed other types which were transloaded at locations with conventional loading and unloading facilities. These other types include palletised goods for forklifts, foodstuffs, wind turbines, chemical products on pallets, military tracked vehicles, motor vehicles of all types, and heavy goods.

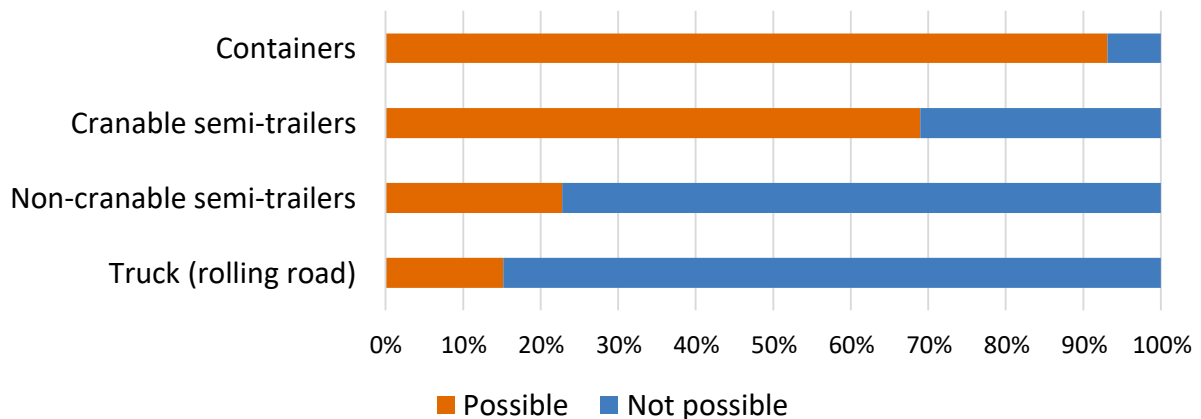


Figure 155: Types of goods that can be transloaded in terminals for multimodal transport

¹¹ DB Netz AG's loading terminals are not included in these observations. DB Netz AG did not provide relevant information for lack of own data.

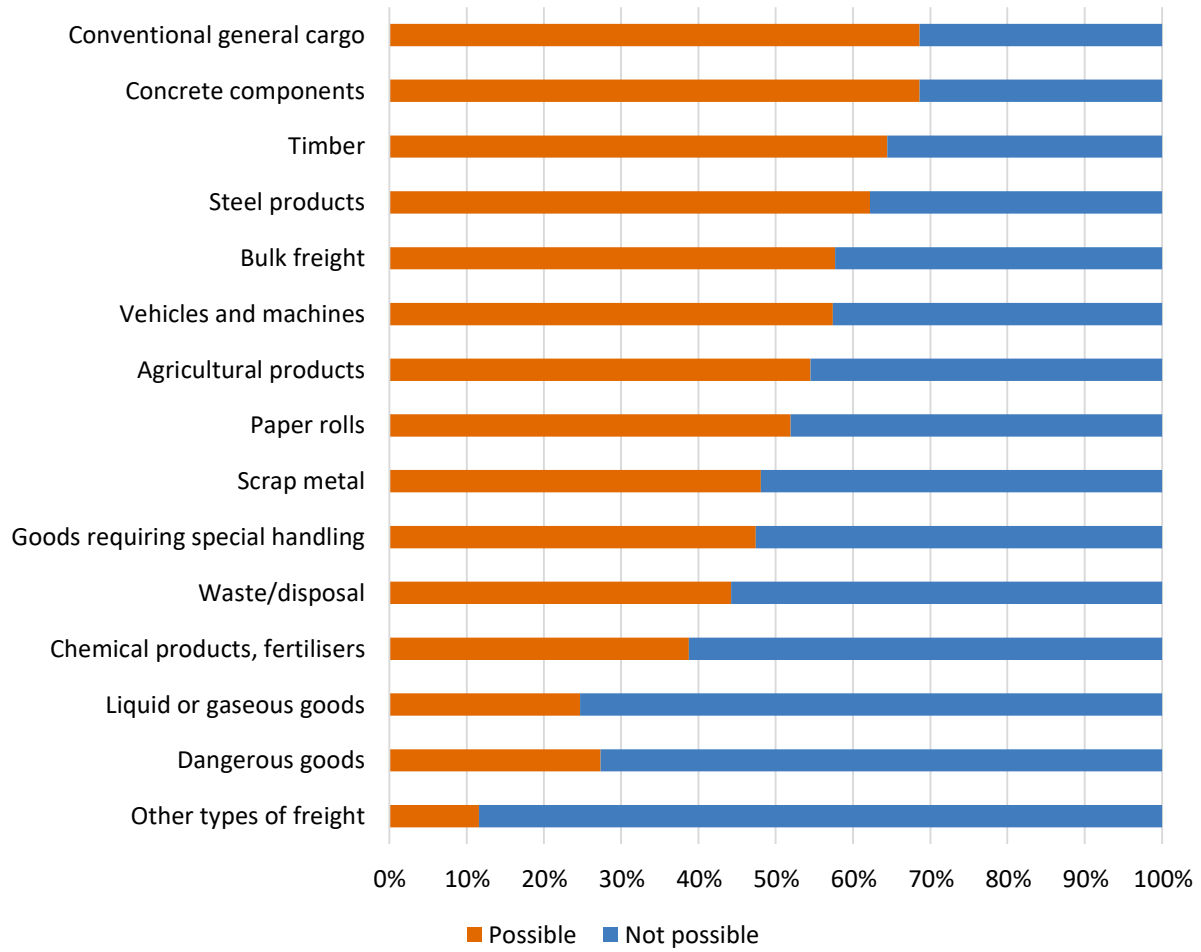


Figure 156: Types of goods that can be transloaded in intramodal transport terminals

Locations of transshipment facilities in Germany

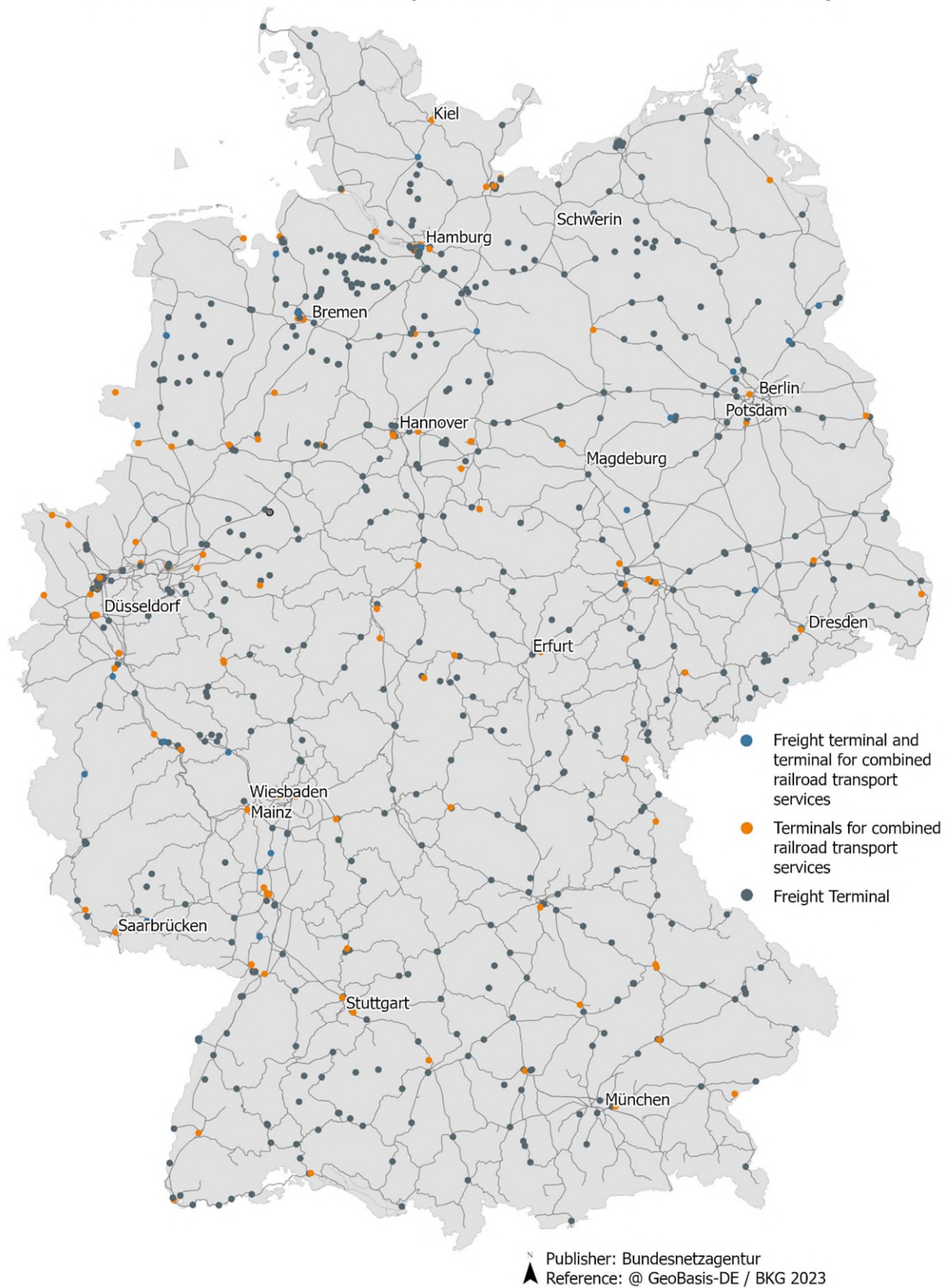


Figure 157: Locations of transloading facilities in Germany

3.4.3 Rail infrastructure in ports

The Bundesnetzagentur currently has knowledge of approximately 150 port locations¹² with rail infrastructure. Further companies that operate transloading facilities with track systems (conventional freight terminals and terminals for multimodal transport services), storage sidings, train formation facilities/marshalling yards, maintenance facilities and refuelling facilities (fuelling stations) are also located at these more than 150 locations. The Bundesnetzagentur knows of 280 undertakings that operate rail infrastructure in a port.

Measured in terms of user numbers and revenue, Hamburg and Bremen are the largest ports with rail infrastructure. There are more than 30 locations in North Rhine-Westphalia and Lower Saxony. The states Schleswig-Holstein, Rhineland-Palatinate, Mecklenburg-Western Pomerania and Bavaria each have more than 10 locations with rail infrastructure in ports.

Furthermore, at more than 70 locations, the rail infrastructure operator in the port is also the operator of a transloading facility (conventional freight terminal or terminal for multimodal transport services) with a track system.

At more than 40 ports, the track operator in the port and the transloading facility operator are not the same company.

To ensure reasonable, non-discriminatory access to public railway infrastructure, more than 90% of

these operators have issued a network statement for service facilities.¹³

At slightly more than half of the ports with rail infrastructure, only one company operates the infrastructure (track system and transloading facilities) alone.

Around 120 port locations with rail infrastructure are located in one of the European Union’s rail freight corridors. Their locations are broken down as follows (since some ports are located in more than one rail freight corridor, some locations are listed more than once):

Corridor name	
Rail freight corridor 1 (Rhine - Alpine)	41
Rail freight corridor 3 (Scandinavia- Mediterranean)	37
Rail freight corridor 4 (Atlantic)	7
Rail freight corridor 7 (Orient- Eastern Mediterranean)	22
Rail freight corridor 8 (North Sea – Baltic Sea)	55
Rail freight corridor 8 (Rhine – Danube)	14

Figure 158: Number of locations with rail infrastructure in ports which are located in a rail freight corridor

¹² These are locations (such as the names of cities). When all undertakings (including those with a diverging address) are counted, there are more than 280 facilities.

¹³ "Traditional" port railways are meant here. When all public undertakings with railway infrastructure in ports are included,

more than 70% of the locations have a network statement for service facilities.



Figure 159: Locations with rail infrastructure in a port

3.5 Access to service facilities

3.5.1 Network statements for service facilities

Service facility operators are required by law to provide all access beneficiaries access to their facilities under non-discriminatory terms and conditions.

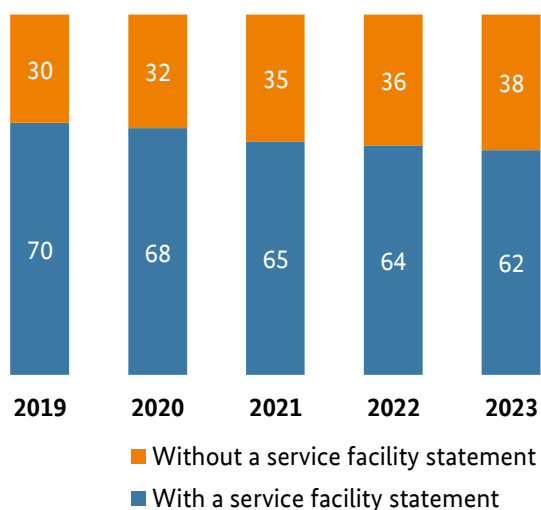


Figure 160: Share of service facility operators that have published a network statement (2019-2023; shares in %)

Service facility operators are required to publish a network statement governing access to their respective facility. The Bundesnetzagentur can, upon request, issue an exemption from this requirement when certain conditions are met. However, there are still minimum obligations that must be fulfilled, such as preparing an infrastructure description (description of the service facility).

An exemption can be granted only when requirements that have been specified in European and German legislation have been met. This generally applies when the respective infrastructure is of little competitive importance to railway transport. This was the case for nearly 14% of the service facility operators surveyed.

The Bundesnetzagentur reviews the network statements of the market participants before they

go into effect to ensure they are in conformity with the law.

In 2022, approximately 50% of the operators of service facilities that were required to have a network statement had published one. This was, once again, less than in the previous year. Nearly two thirds of the operators had prepared a network statement.

3.5.2 Assessment of access to service facilities

In connection with the market analysis, authorised users have the opportunity to evaluate access to service facilities and rate it on a scale from 1 (very good, no need for action) to 5 (insufficient, urgent need for action).

Compared to 2022, there was a slight improvement in the ratings for access to railway sidings, stopping points and training facilities. In contrast, access to train formation facilities was the only area that saw a slight drop in its rating.

The state of the development and maintenance of passenger stations has improved somewhat. This was probably due to the fact that a growing number of passenger stations and stopping points were being modernised or altered to be accessible.

Although the survey participants' ratings for access to storage sidings was more positive, within this block of questions, access to storage sidings still continued to be rated as being the least satisfactory.

Access to service facilities	2019	2020	2021	2022	2023	Trend
Freight terminals	2.4	2.5	2.6	2.7	2.7	→
Marshalling yards /train formation facilities	2.5	2.6	2.8	2.7	2.8	↘
Storage sidings	2.9	2.9	2.9	3.0	2.9	↗
Ports with railway infrastructure	2.3	2.4	2.5	2.5	2.5	→
Maintenance facilities	2.5	2.4	2.6	2.6	2.6	→
Refuelling facilities	2.2	2.2	2.3	2.3	2.3	→
Passenger stations /stops	2.2	2.4	2.3	2.4	2.3	↗
Development status of passenger stations /stops	2.7	2.7	2.7	2.6	2.6	→
Maintenance status of passenger stations /stops	2.8	2.9	2.8	2.7	2.7	→
Training facilities	2.3	2.3	2.4	2.5	2.3	↗

Figure 161: Ratings for access to service facilities (2019-2023; average values; scale of 1 (very good/no need for action) to 5 (insufficient/urgent need for action). The arrows indicate the trend from 2022 to 2023. Source: Market surveys of the Bundesnetzagentur)

What the market participants said

The market participants cited two primary reasons for not using existing alternative service facilities.

In summary, they identified several challenges that the proposed alternatives and service facilities present in connection with the parking of trains. The principal problems include geographically unfavourable locations, lack of operational suitability, lack of supplementary equipment, insufficient usable lengths, the lack of power feeder pillars, and difficulties obtaining access to storage sidings for electrically powered locomotives. In many cases, the alternatives offered do not meet the respective operational requirements and are therefore not considered to be feasible. All in all, the comments reveal a complex set of problems in connection with parking trains and using service facilities.

3.6 Service facility charges

3.6.1 Station charges

In 2022, operators of passenger stations charged an average of €6.00 for a train stop. At €3.21 per station stop, the median for all passenger station operators was significantly less. The reason for this is that many of the smaller operators of passenger stations charge access beneficiaries lower rates per station stop or the charge for using the passenger station is already included in the track access charge. In addition, many non-federally owned operators of passenger stations run basic stations. DB Station&Service AG on the other hand also operates significantly larger train stations with a more extensive range of facilities and equipment. Correspondingly, DB Station&Service’s average station charge (€6.38) was higher than the average and markedly higher than the median.

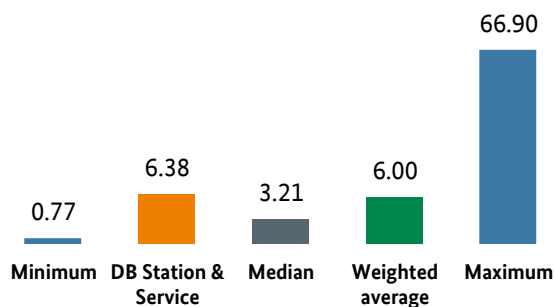


Figure 162: Range of the average station charges (2022; euros per stop)

Between 2018 and 2021, the charges for train stops at passenger stations increased at approximately the same pace as the consumer price index and as the infrastructure managers’ input price index during the same period. Since 2022, the rate of increase in charges for train stops at passenger stations has been less than the rates of increase reported for these two indices.

3.6.2 Charge schedules for service facilities

Operators of service facilities are required by law to set charges for the use of their infrastructure and publish them in schedules. Operators of service facilities that are used exclusively for museum-related or heritage railway work are exempted from this requirement.

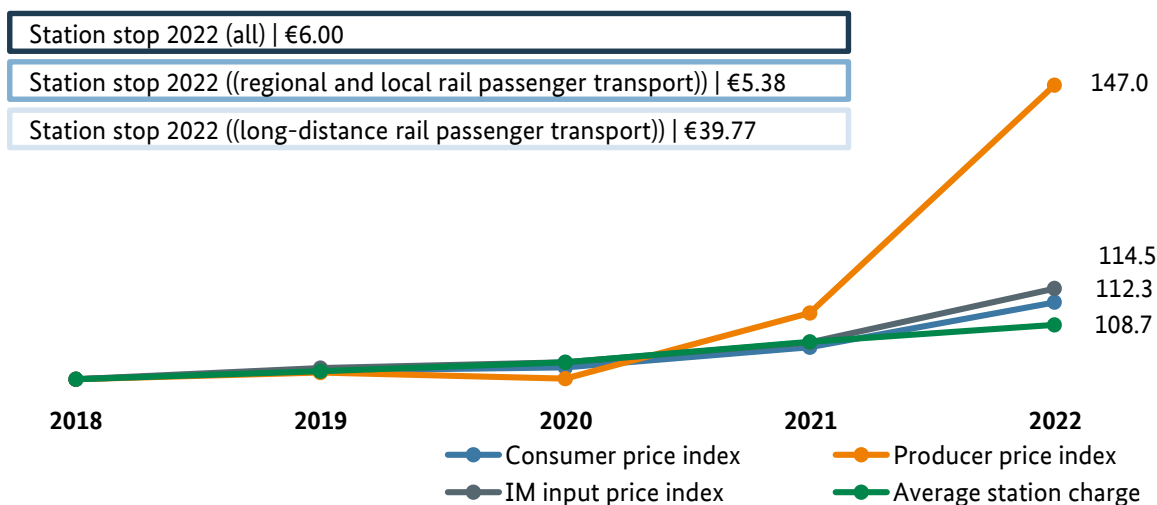


Figure 163: Infrastructure managers’ average station usage charges (2018-2022; indexed 2018 = 100)

This exemption applies to 25 of the approximately 700 service facility operators. These usage charges are to be collected on a non-discriminatory basis from all users of the respective railway infrastructure. This also applies to undertakings that are affiliated under corporate law.

In 2022, 51% of the undertakings that operate service facilities had drawn up corresponding schedules of their charges.

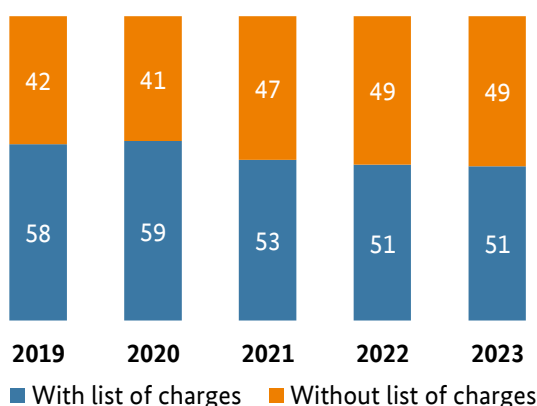


Figure 165: Share of service facility operators that have drawn up schedules of their charges; 2019-2023; shares in %)

The share of service facility operators that have published a list of their charges fell once again in relation to the previous years. This was due to, among other things, the fact that in recent years the Bundesnetzagentur has contacted new undertakings that have not yet published a list of their charges.

3.6.3 Access beneficiaries' assessment of charges

As part of the Bundesnetzagentur's annual market survey, access beneficiaries are given the opportunity to rate the level of non-discrimination in the pricing systems and the price-performance of the pricing systems on a scale of 1 (very good/no need for action) to 5 (insufficient/urgent need for action). During the time from 2019 to 2023, the average ratings remained in the middle range of the scale, with some ratings worsening.

Non-discrimination in charging systems	2019	2020	2021	2022	2023	Trend
Train paths	2.4	2.3	2.4	2.4	2.4	→
Passenger stations /stops	2.5	2.4	2.4	2.4	2.5	↘
Freight terminals	2.4	2.4	2.4	2.4	2.5	↘
Marshalling yards /train formation facilities	2.5	2.5	2.6	2.6	2.7	↘
Storage sidings	2.6	2.6	2.7	2.7	2.7	→
Ports with railway infrastructure	2.3	2.4	2.3	2.4	2.4	→
Maintenance facilities	2.4	2.4	2.5	2.4	2.5	↘
Traction current (traction power)	2.3	2.4	2.4	2.7	2.6	↗

Figure 164: Ratings assigned by railway undertakings for the level of non-discrimination in the pricing systems (2019-2023; average values; scale of 1 (very good/no need for action) to 5 (insufficient/urgent need for action). The arrows indicate the trend from 2022 to 2023. Source: Market surveys of the Bundesnetzagentur)

Price-performance ratio	2019	2020	2021	2022	2023	Trend
Train paths	2.9	2.8	2.9	2.9	2.9	→
Passenger stations /stops	3.1	2.9	2.7	2.7	2.7	→
Freight terminals	2.8	2.7	2.7	2.7	2.8	↘
Marshalling yards /train formation facilities	2.8	2.8	2.8	2.9	2.8	↗
Storage sidings	3.0	2.9	3.0	3.0	3.0	→
Ports with railway infrastructure	2.9	2.7	2.7	2.7	2.6	↗
Maintenance facilities	2.6	2.6	2.7	2.7	2.7	→
Refuelling facilities	2.5	2.4	2.5	2.5	2.5	→
Traction current (traction power)	2.9	2.7	2.8	3.1	3.1	→

Figure 166: Ratings assigned by railway undertakings for the price-performance ratio of the pricing systems (2019-2023); average values; scale of 1 (very good/no need for action) to 5 (insufficient/urgent need for action). The arrows indicate the trend from 2022 to 2023. Source: Market surveys of the Bundesnetzagentur

4. Industrial railways

The Bundesnetzagentur collected data on industrial railways for the 2022 reporting year from more than 1,300 undertakings.

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4.1 Industrial railway operators

4.1.1 Number of industrial railway operators

The Bundesnetzagentur collected data for the 2022 reporting year from more than 1,300 industrial railway operators (owners and operators of industrial railways and private sidings). The Bundesnetzagentur currently has information about more than 2,030 industrial railway sites.

More than 280 of these sites were not used for freight transport in 2022. More than 360 others were not operational and therefore could not be served by railway undertakings.

More than 70% of the owners of industrial railways operate the infrastructure themselves.

Around 70% of the operational industrial railways are connected to the public networks of federally owned rail infrastructure managers.

As the Bundesnetzagentur does not currently have a record of all industrial railway operators in Germany, it is in contact with the competent licensing authorities of the federal states (federal state rail supervisory authorities) and will include other operators in future market surveys.

4.1.2 Types and number of facilities

As in previous market surveys, the industrial railway operators stated that they operated the following types of facilities at their sites: loading and unloading facilities, storage sidings, train formation facilities/marshalling yards, maintenance facilities, refuelling facilities and, in individual cases, passenger stations.

The industrial railway operators also carry out maintenance work at around 20 sites.

4.1.3 Breakdown by federal state

More than 470 or one fifth of the industrial railway sites are in North Rhine-Westphalia. Bavaria has

around 340 sites and Lower Saxony has over 250 sites.

4.2 Resources of industrial railways

4.2.1 Personnel

In 2022 the industrial railway operators had more than 7,400 full-time equivalent employees.

4.2.2 Track and route lengths

Tracks with a total length of over 6,200 km and routes with a total length of over 420 km were in use at the more than 2,030 sites.

4.2.3 Types of freight

Industrial railway operators can optionally state the type of freight and goods that can be transloaded at each site. The following table lists the different types of freight and the number of sites at which each type can be handled; sites at which more than one type can be handled are counted more than once. Operators could also add other types of freight handled at their sites. These included hollow glass goods on pallets, anhydrite raw stone and lignite briquettes.

4.3 Economic situation

4.3.1 Funding for industrial railways

According to the information available to the Bundesnetzagentur, in 2022 industrial railway operators received federal funding totalling more than €22.4mn (2021: around €12.0mn) and other funding totalling more than €3.2mn (2021: more than €2mn).

Goods type	Total
Agricultural goods (grain, oilseeds, feed, etc.)	79
Wood and other forest products	86
Goods in combined transport (container, swap bodies, trailers, etc.)	71
Piece goods (paletts, packaged goods, ...)	3
Paper rolls and other pulp products	60
Vehicles, machinery and machine parts	93
Steel products (coils, slabs, steal beam, steel profiles, sheets, etc.)	277
Scrap metal (NE- and other scrap metal)	213
Waste/Disposal (waste paper, waste glas, old textiles, building material recycling, etc.)	76
Liquid or. gaseous goods (petroleum products, gases, crude oil, vegetable oils, etc.)	232
Bulk goods (coal, ores, stones, grounds, building materials, etc.)	206
Chemicals, fertilizer	176
Dangerous goods	194
Components and finished parts made of concrete	48

Figure 167: Frequency of selected types of freight handling (2022 – number of sites handling each freight type)

5. International market monitoring

The effects of the pandemic seem to have been largely overcome in Europe in 2022. There was an increase in the market shares of competitors.

New challenges are emerging, however, such as rising energy costs across Europe.

5.1 IRG-Rail monitoring of the European rail market

Regulatory bodies from 31 countries provided data for the annual market analysis carried out by the Independent Regulators' Group-Rail (IRG-Rail). The European rail market analysed by IRG-Rail therefore includes markets in non-EU countries such as Kosovo, Serbia and the United Kingdom.

The total route length in the 31 participating countries is about 233,000 km. It has been

around this figure for over 10 years but has been decreasing slightly at an average annual rate of 0.1%.

In 2022 just under 57% of the European network was electrified. The level of electrification has increased by three percentage points in the last 10 years. Germany's level of 54% is still below the European average; most of the other western European countries have a share of electrified network of between 70% and 100%.

Total route length per country in km						
1	AT	Austria	5,629	17	LT Lithuania	1,919
2	BE	Belgium	3,602	18	LU Luxembourg	271
3	BG	Bulgaria	4,029	19	MK North Macedonia	683
4	HR	Croatia	2,617	20	NL Netherlands	3,055
5	CZ	Czech Republic	9,520	21	NO Norway	4,138
6	DK	Denmark	2,448	22	PL Poland	19,393
7	EE	Estonia	1,441	23	PT Portugal	2,555
8	FI	Finland	5,918	24	RO Romania	10,628
9	FR	France	27,592	25	RS Serbia	3,348
10	DE	Germany	39,160	26	SK Slovakia	3,626
11	EL	Greece	1,990	27	SI Slovenia	1,207
12	HU	Hungary	7,645	28	ES Spain	15,860
13	IE	Ireland	1,688	29	SE Sweden	10,914
14	IT	Italy	18,429	30	CH Switzerland	5,317
15	XK*	Kosovo*	437	31	UK United Kingdom	16,430
16	LV	Latvia	1,865			
			233,355			

Figure 169: Route length per country in Europe (km)

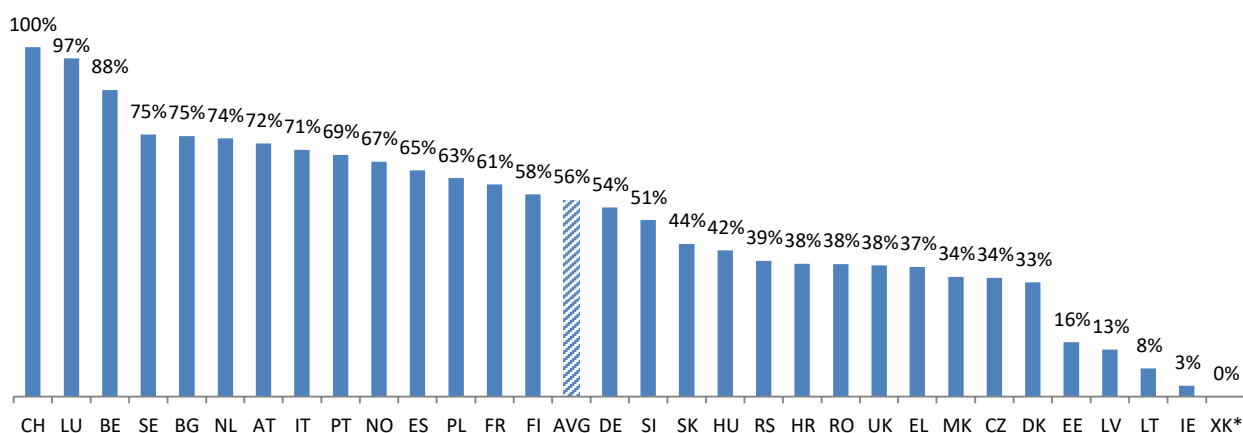


Figure 168: Share of electrified route length per country (%)

In 2022 total operating performance in Europe showed a recovery following declines in 2020 and 2021 due to the pandemic. There was an increase of around 5% compared with 2021 to around 4.31bn train-km, nearly reaching the pre-pandemic level in 2019 of 4.37bn km. The ratio of passenger to freight traffic of around 80% to 20% has remained more or less the same over the past few years, including during the pandemic.

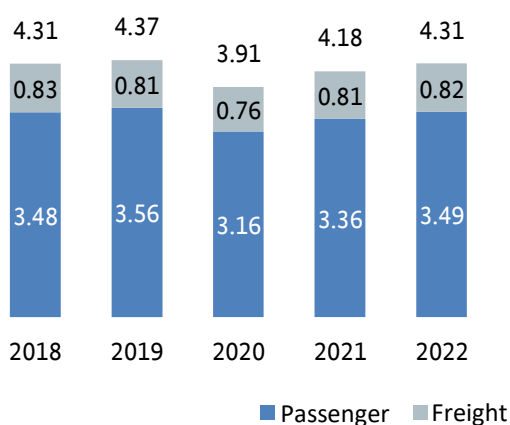


Figure 170: Total operating performance in Europe for passenger and freight services (bn train-km)

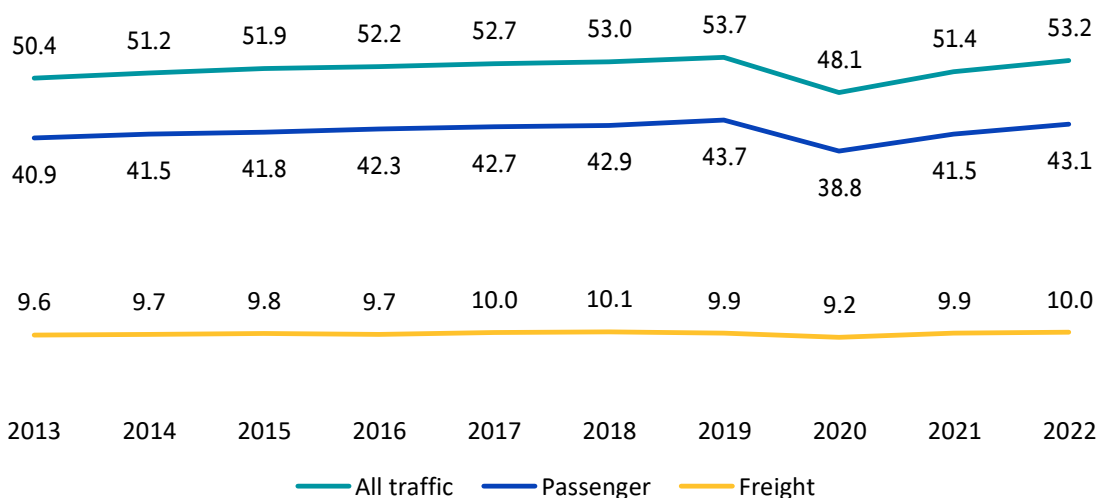


Figure 171: Network usage intensity in Europe for all traffic, passenger and freight (trains per route-km per day)

As with operating performance, network usage for all services returned to near pre-pandemic levels. In 2022 average usage across Europe was around 10 freight trains and 43 passenger trains per route-kilometre per day. Network usage intensity varies significantly between the countries.

Passenger and freight transport performance in Europe differed. In 2022 there was a recovery in passenger transport performance in terms of passenger-kilometres following a drastic drop of almost 50% due to the pandemic. The level of 459bn passenger-km represented an increase of more than 50% compared with 2021, but was still about 10% below the 2019 level.

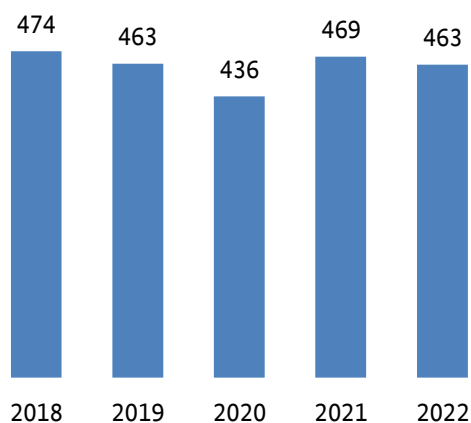


Figure 172: Freight traffic: net tonne-km in Europe (bn)

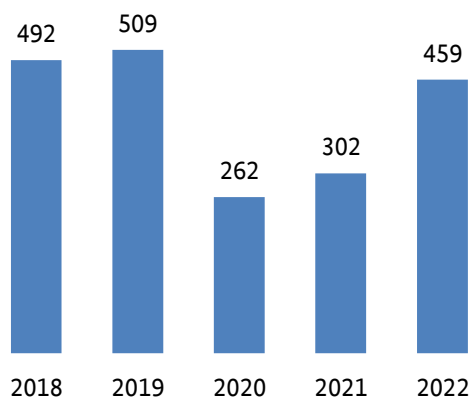


Figure 173: Passenger traffic: passenger-km in Europe (bn)

Freight traffic in Europe was less impacted by the pandemic. Rather, other factors, such as the economy, high energy prices or disruptions in supply chains due to political crises, had a dampening effect on transport performance. In 2022 freight traffic amounted to 462bn net tonne-km, slightly lower than in the previous year. Nearly half of the countries reported slight increases in 2022, but some countries such as Lithuania, Finland and Greece reported decreases of 20% to 50% compared with 2021. Larger western European countries such as Belgium, Italy, Spain, the United Kingdom and France also reported decreases, although these were smaller.

The discontinuation of pandemic-related support measures, in particular track access charge reductions, led to an increase again in the European average track access charge per train-kilometre for both passenger and freight services. In 2022 the overall average track access charge was €4.01 per train-kilometre and therefore around the level for 2019. The average was lowest in 2021, at around 17% below pre-pandemic levels, as in many countries measures to reduce track access charges were in place that were discontinued at the end of the pandemic.

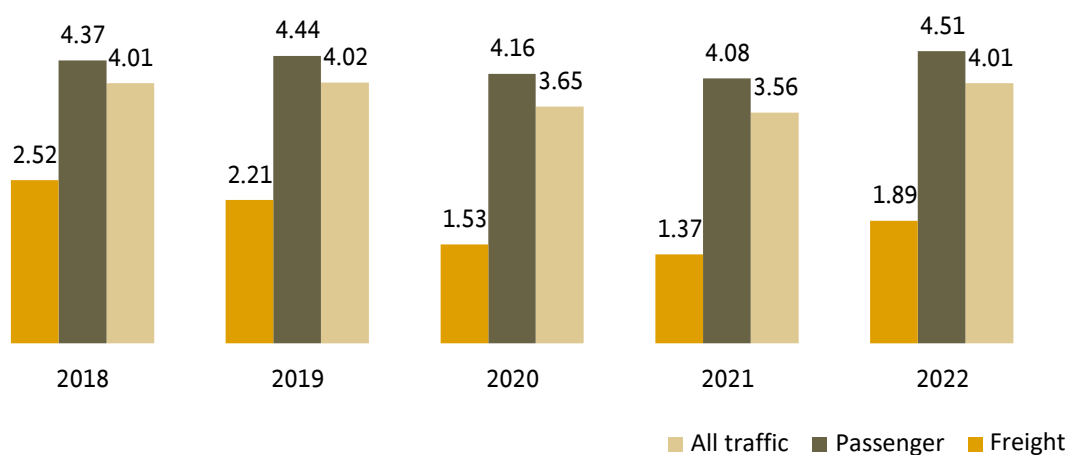


Figure 174: Average track access charges for all traffic, passenger and freight (€ per train-km)

Competition in the rail markets stabilised in Europe following the pandemic. There was a decrease in the shares of the domestic incumbents in both the passenger and freight markets.

In the passenger market, competitors regained the market shares that they had lost during the pandemic, when services were suspended and domestic incumbents received better support. In particular, the market share of non-incumbents increased by two percentage points to 16% at the end of 2022. Together with the market share of foreign incumbents of 9%, the total market share of competitors was 25%.

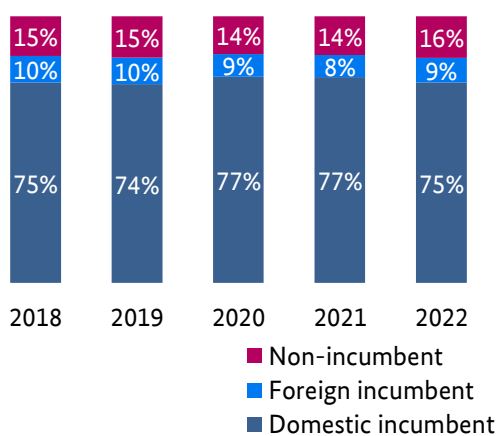


Figure 174: Market shares of passenger railway undertakings (%)

In the freight market, non-incumbents were able to respond more flexibly to changes in demand during the pandemic and increased their market share by one to two percentage points each year. Stabilisation of the market share of the incumbents below 50% is not yet foreseeable; competitors increased their market share further to 52% in 2022.

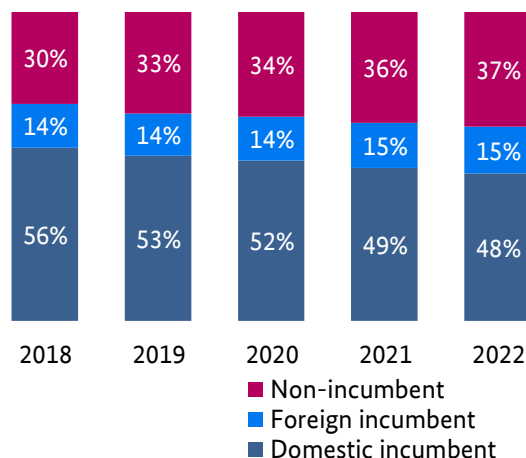


Figure 175: Market shares of freight railway undertakings (%)

In 2022 there was a significant increase across Europe in the prices for electricity for railway undertakings. The average price per kilowatt hour rose by 40% from 13 cents in 2021 to 18 cents in 2022. IRG-Rail aims to make more detailed analyses of the prices.

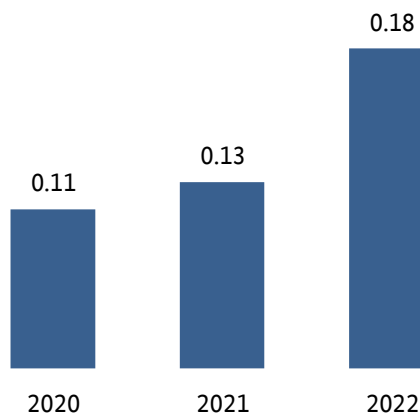


Figure 176: Average European price for traction electricity (cents per kWh)

The Eleventh Annual Market Monitoring Report with detailed statistics for 2021 is available on the IRG-Rail website. The twelfth report for 2022 is due to be published in March 2024.

<https://www.irk-rail.eu/irk/documents/market-monitoring>

5.2 Rail Market Monitoring Scheme (RMMS) of the European Commission

The European Commission is required under Article 15(4) of Directive 2012/34/EU to draw up a report on the rail transport market in Europe for the European Parliament every two years.

In accordance with the directive, the report covers the state of the railway network in the European Union, the evolution of the internal market in rail services and service quality. It also looks at the evolution of framework conditions, such as infrastructure charging, capacity allocation, infrastructure limitations and infrastructure spending and funding, as well as prices for and quality of passenger services and employment and social conditions.

The European Commission adopted Commission Implementing Regulation (EU) 2015/1100 on 7 July 2015. The regulation requires Member States to provide the European Commission with specific information on the development of the rail market as part of the Rail Market Monitoring Scheme (RMMS).

Since 2016, it has been possible for Member States to provide their annual data using a data portal that is continually modified and expanded in line with their individual needs. The portal also enables Member States to view each other's data and therefore make comparisons between individual countries.

The European Commission has been working on a revision of Implementing Regulation (EU) 2015/1100 for several years. As part of this work, Member States were asked to collect ideas and suggestions in a working paper.

The draft revision is still under discussion.

The eighth monitoring report was published in September 2023. The report draws on data from

various sources and contributions, including the statistical pocketbook "EU Transport in Figures" and reports from the European Union Agency for Railways and from Eurostat. The monitoring report covers data up to 2020 and includes information on the impact of the coronavirus pandemic on the rail sector.

In 2020 the total length of the EU rail network was around 201,000 km and around 57% of the network was electrified. The length of the high-speed rail network was over 11,500 km.

Passenger traffic rose by around 3% annually between 2015 and 2019; freight traffic also rose annually by 3%. In 2020 passenger-kilometres fell sharply by 46% due to the coronavirus pandemic. Freight fell slightly between 2019 and 2020.

The total length of track declared congested has been rising since 2015.

Infrastructure spending rose from €39.1bn in 2015 to €41.8bn in 2020.

In 2020 the average punctuality of regional and local passenger services was 88.7%, compared with 93.1% in 2015. The average punctuality of long-distance and high-speed passenger services also fell from 84.9% in 2015 to 82.6% in 2020. The average punctuality for rail freight fell from 65.0% in 2015 to 64.1% in 2020.

In 2020 passenger services provided under a public service obligation (PSO) represented around 64% of the total passenger-kilometres.

Overall, 1,192 active licences for railway undertakings were reported in 2020. Germany reported the highest number of active licences (475) and Luxembourg the lowest (two).

The market share of competitors in freight increased from 35% to 46% between 2015

and 2020. The coronavirus pandemic did not slow down the market penetration of new entrants in the rail freight segment.

According to data from the Member States, around 910,000 people were employed in the railway sector at the end of 2020, of which 523,000 were employed by railway undertakings and 387,000 by infrastructure managers. The workforce in the rail sector is predominantly male; on average only 22% of employees are women. The share of younger employees below 30 years rose from 8.2% in 2015 to 10.2% in 2020. In 2020, however, on average 41.9% of the staff employed by railway undertakings were over 50 years old.

The report is available in various languages and can be downloaded free of charge using the following link:

https://transport.ec.europa.eu/transport-modes/rail/market/rail-market-monitoring-rmms_en

6. Background to the market analysis

The Bundesnetzagentur works to ensure effective competition in the railway market. The background to the market survey is explained in more detail below.

Railway market analysis conducted by the Bundesnetzagentur	112
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6.1 Railway market analysis conducted by the Bundesnetzagentur

The Bundesnetzagentur's specific duties and powers are set out in the Rail Regulation Act (ERegG) and the General Railway Act (AEG).

To fulfil its market monitoring responsibilities under section 17 ERegG, the Bundesnetzagentur has conducted written surveys to collect market data each year since it took up its work in 2006. For its 2023 market monitoring/market survey for the 2022 reporting year, the Bundesnetzagentur sent its questionnaire to more than 2,000 market players.

The ERegG contains provisions requiring market players to provide information to the Bundesnetzagentur. These market players include operators of industrial railways, heritage railways and non-standard-gauge railways. The ERegG does not allow exemptions from the requirement to participate in the annual market survey.

In the event that a market player does not comply with the requirement, the Bundesnetzagentur can (in accordance with section 67(4) in conjunction with section 67(1) ERegG) impose an administrative fine of up to €500,000.

The results of the survey are published in both the "Railway Market Analysis" and in the Bundesnetzagentur's "Activity Report – Railways" (section 71 ERegG). The activity report focuses on the regulatory aspects of the market, while the market analysis contains statistical data and their analyses, enabling interested parties to gain insights into the development and structure of the rail sector.

As part of the Rail Market Monitoring Scheme (RMMS), Member States of the European Union are required by Implementing Regulation (EU) 2015/1100 to provide the European Commission with specific information on the development of the rail market.

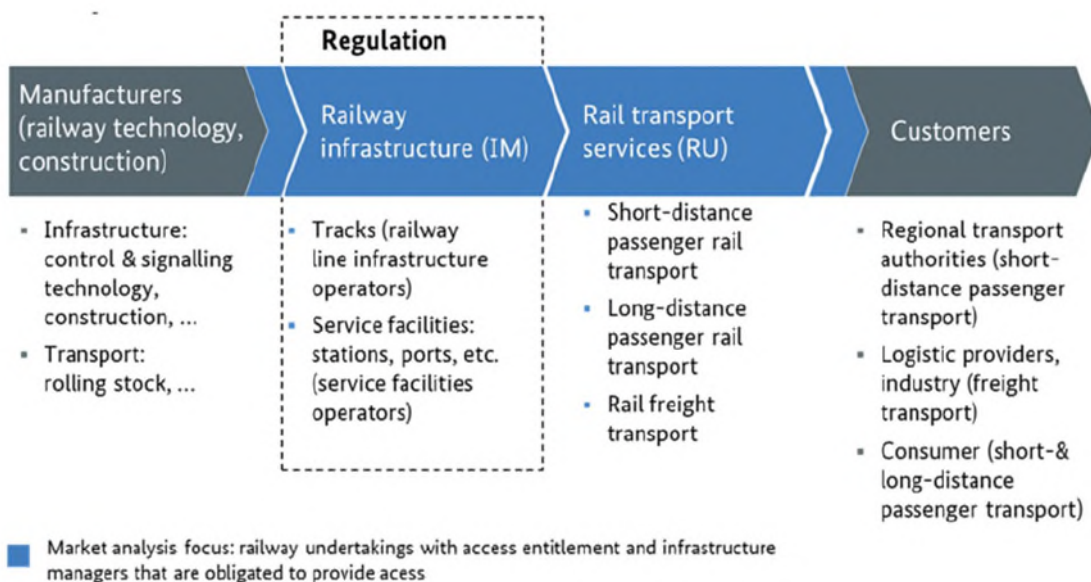


Figure 177: Market definition used in rail market monitoring

6.2 Market definition and survey scope

Undertakings that operate infrastructure are referred to as route operators or service facility operators, depending on the type of infrastructure they operate. Undertakings that offer transport services on railway infrastructure are referred to as railway undertakings (RUs).

In addition to data that the Bundesnetzagentur collects directly, the market analysis draws on data from other sources including the Federal Statistical Office, the Federal Logistics and Mobility Office and the Federal Railway Authority.

The market analysis used data from more than 340 railway undertakings active in the market, of which 119 provided regional and local passenger services, 29 long-distance passenger services and 237 freight services. Other transport services and shunting operations were also provided. The analysis also used data from more than 150 route operators, 670 service facility operators and 1,300 industrial railway operators. In addition, 32 regional transport authorities provided the Bundesnetzagentur with data for the 2022 reporting year. The Bundesnetzagentur

thanks all market players for their support in connection with the market survey.

6.3 Method for rating influencing factors

As part of the survey, market players are asked to subjectively rate aspects of access and non-discrimination on a scale of 1 (very good, no need for action) to 5 (unsatisfactory, urgent need for action). The influencing factors rated by the market players are shown in a table.

Even though this part of the survey is optional for respondents, many of the railway undertakings provide an assessment of the current market situation. The published results therefore reflect the market situation and can be regarded as representative. In particular, the order of similar indicators in the ratings shows the areas where railway undertakings see the most problems.

Since the participating railway undertakings assess the market from their point of view at the time of the survey, the findings on the rating of influencing factors (unlike the other data for the reporting year) relate to the year in which the Bundesnetzagentur conducted the survey (2023).

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List of abbreviations

AEG	General Railway Act
AG	stock company
BMDV	Federal Ministry for Digital and Transport
bn	billion
DB AG	Deutsche Bahn AG
EBA	Federal Railway Authority
ERegG	Rail Regulation Act
ETCS	European Train Control System
EU	European Union
FTE	full-time equivalent
GDP	gross domestic product
IRG-Rail	Independent Regulators' Group – Rail
km	kilometre
KSP	Climate Action Programme
kWh	kilowatt hour
LuFV	Performance and Financing Agreement
mn	million
NRW	North Rhine-Westphalia
ÖBB	Austrian Federal Railways
PEK	plans to increase railway infrastructure capacity
pkm	passenger-kilometre
PSO	public service obligation

RMMS	Rail Market Monitoring Scheme
RRX	Rhine-Ruhr-Express
RU	railway undertaking
SNCF	Société nationale des chemins de fer français (French state-owned railway)
tkm	tonne-kilometre
TraFöG	track access charge assistance for rail freight transport
trkm	train-kilometre
TWh	terawatt hour
VRR	Verkehrsverbund Rhein-Ruhr

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