Report

Railway Market Analysis Germany 2022



Railway Market Analysis 2022 Germany

January 2023

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 in its Railway Market Analysis. For the 2021 reporting year, the Bundesnetzagentur sent its questionnaire to more than 2,000 market participants.

In order to estimate the impact of the coronavirus pandemic, some 100 market participants were asked to provide information on transport and economic indicators for the first half of 2022 and for all of 2021.

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

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Summary

In 2021 the coronavirus pandemic continued to impact the railway market. Operating performance in all rail transport services recovered significantly while transport performance only saw partial recovery.

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The 2021 railway market in numbers

Revenue generated by railway undertakings Total €20.0bn $\mathbf{\Lambda}$ $\mathbf{\Lambda}$ Rail freight €5.8 bn Long-distance passenger €2.9 bn \rightarrow Regional and local passenger $\mathbf{\Lambda}$ €11.3 bn

Revenue generated by infrastructure managers

Total	€7.3 bn	$\mathbf{\uparrow}$
Track access charges	€5.7 bn	$\mathbf{\uparrow}$
Station charges	€1.0 bn	$\mathbf{\uparrow}$
Other charges	€0.6 bn	\uparrow

Operating performance of the railway undertakings

Total	1,143 bn trkm	$\mathbf{\uparrow}$
Rail freight	263 mn trkm	\checkmark
Long-distance passenger	150 mn trkm	\checkmark
Regional and local passenger	721 mn trkm	\checkmark
Other transport	9 mn trkm	\checkmark

Transport performance of the railway undertakings

Rail freight	139 bn tkm	1
Long-distance passenger	26 bn pkm	\checkmark
Regional and local passenger	33 bn pkm	\checkmark

Market share of rail traffic held by competitors

Rail freight	58 percent	1
Long-distance passenger	4 percent	↑
Regional and local passenger	34 percent	↑

Employment

Total	172,000 employees	↑
Infrastructure Managers	85,000 employees	\checkmark
Railway undertakings, only train drivers	35,000 employees	\checkmark
Railway undertakings, other employees	52,000 employees	\checkmark

Change 2020/2021

Change 2020/2021

Change 2020/2021

Change 2020/2021

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Change 2020/2021

Change 2020/2021

Summary

Macroeconomic environment

In 2021 the German economy recovered from the 2020 decline. Germany's real gross domestic product grew in 2021 by 2.6 percent compared to the previous year.

Rate of change in real GDP





Figure 1: Rate of change in real GDP (2017-2021; year-on-year change in percent)

The increase in economic growth in 2021 was even larger in the European Union's 27 member states (EU-27). Here there was a 5.4 percent increase, which largely offset the substantial decline from the previous year.

Modal split

The share of the modal split held by freight transport grew more in 2021 than in recent years. Despite a difficult operational and economic environment, transport services shifted from the roads to the rails. Rail freight transport also gained volume from the inland waterways shipping segment. The rail transport sector's share of the modal split rose in 2021 to just over 20 percent and the share of road freight transport declined accordingly by 1.3 percentage points.

Unlike in rail freight transport the market share of rail passenger transport services fell another 0.1 percentage points and was at 6.2 percent in 2021. The ongoing slump in demand since the start of the pandemic was still present. Some selective restrictions in regional and long-distance transport remained. Motorised private transport increased its share by 0.5 percentage points to 88.6 percent.





Figure 2: Development of the modal split in freight transport (2017-2021; shares in percent)

Modal split in passenger transport shares in percent



Figure 3: Development of the modal split in the passenger transport (2017-2021; shares in percent)

Railway transport market

A total of 346 railway undertakings operated in the railway transport market in 2021. 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 relatively small.

Revenue in the railway transport market in billions of euros



Rail freight transport

Long-distance passenger rail transport

Regional and local passenger rail transport

Figure 4: Revenue in the transport market (2017-2021; in billions of euros)

Revenue figures for 2021 show a slight improvement in all types of rail transport services. Total revenue including payments from the rescue package for local public transport in 2021 increased by around €0.5bn over 2020.

By contrast, railway transport punctuality declined again after having seen pandemic-related improvements in 2020. In addition, construction work on the infrastructure had an increased impact on the operational quality of railway transport in 2021.

There were positive developments in the competitive situation and competitors added to their market share in all rail transport services. While more transport contracts were acquired in the regional and local rail passenger transport sector, the long-distance rail passenger transport sector reached its 2019 pre-pandemic level, although the number of contracts remained at a low level. In rail freight transport as well, the competitors were able to continue the positive trend from previous years and further increase their market shares.

Railway infrastructure market

A total of 140 route operators and more than 670 service facility operators participated in the market survey.

The revenue generated by the infrastructure managers increased from 2020 to 2021 from \in 6.8bn to \in 7.3bn after stagnating from 2019 to 2020. With a total of 1,143bn train-kilometres, operating performance was up again compared with the previous year.

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 trainkilometres travelled, while the share of rail freight transport was less than one quarter and longdistance rail passenger transport accounted for less than 10 percent of the total train-kilometres.





Usage charges for other service faciliities
Station charges
Track access charges

Figure 5: Revenue development in the railway infrastructure market (2017-2021; in billions of euros)

Employment trends

The number of workers employed in the railway infrastructure sector (measured in terms of fulltime equivalents¹) continued to increase in 2021. Railway undertakings also achieved a small increase in the number of employees under the ongoing pandemic-related constraints. Here the number of train drivers increased, although the number of the other employees (with operating performance on the rise again) decreased somewhat. Many railway undertakings continue to report considerable difficulties in acquiring qualified personnel or trainees.

A total of approximately 172,000 full-time positions were filled in the railway market. This represents an

increase of a little more than 1 percent compared to 2020.

The railway undertakings surveyed continue to view the personnel situation in many areas as problematic. Improvements over the previous years were not discernible here.

Employment in the railway market



Railway undertakings, other personnel

Railway undertakings, only train drivers

Figure 6: Development of employment in the railway market (2017-2021; in thousands of full-time equivalents)

Public funding

Um In order to mitigate the economic losses that railway undertakings suffered as a result of the pandemic and to make them more competitive with the intermodal competition, the already existing track access charge assistance for rail freight transport was retroactively raised in the summer of 2021 to 99 percent for these charges as from March 2020. Track access charge assistance was also introduced for long-distance rail passenger transport, likewise retroactively as from March 2020. For the first three quarters of 2021 the assistance amounted to around 98 percent of the approved track access charges and for the fourth

¹ Part-time positions are calculated as partial full-time positions, based on the number of working hours.

quarter around 88 percent. The one-off assistance payments for 2020 were paid to the railway undertakings in the rail freight transport and longdistance rail passenger transport segments in autumn 2021 and improved the undertakings' 2021 net incomes significantly.

In regional passenger rail services, the rescue package for local public transport was continued in 2021. Money from the rescue package was used by the regional transport authorities and the federal states to make payments to the railway undertakings to compensate for loss of revenue due to the pandemic.

Instruments that were already in place were used again to assist the infrastructure managers, including the Performance and Financing Agreement II (LuFV II) for federally owned undertakings and the federal government's climate action plan for federally owned and non-federallyowned undertakings. In the 2021 reporting year, the infrastructure operators surveyed received more than €4.5bn in public funding to invest in existing infrastructure.

Pandemic related losses

The Bundesnetzagentur conducted a biannual special survey of some 100 railway undertakings in 2021 to examine transport trends and the economic impact of the coronavirus pandemic on the German railway market. The Bundesnetzagentur estimated that railway undertakings suffered a loss of approximately €0.9bn in 2021 due to the pandemic. At €0.8bn, the long-distance rail passenger transport segment accounted for the largest share of this loss. With losses of €0.1bn, the pandemic's impact was less severe for railway undertakings in regional and local rail passenger transport. Rail freight transport and route operators reported no further pancemicrelated losses.²

² For more detailed information, see the Bundesnetzagentur's special edition of the Railway Market Analysis 2022.

1. Railway transport market

In 2021, operating performance in passenger and freight traffic recovered. Rail freight transport performance in particular increased. Railway undertakings under public service obligation were bolstered by the government's rescue package for local public transport, which stabilised revenue. The economic situation of the railway undertakings remained difficult and the overall market had a negative net income in 2021.

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1. Railway transport market

Performance and quality indicators

Market development

Under section 3(1) para 1 of the General Railway Act (AEG), a public railway undertaking is a railway undertaking that is 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 has been on the rise since 2019.

Number of licensed public railway undertakings

Source: Federal Railway Authority



Figure 7: Number of licensed public railway undertakings (2017-2021; number)

In 2021, 630 railway undertakings were licensed to provide rail transport services for the public.

According to the Bundesnetzagentur's annual survey, more than 346 railway undertakings were actively involved in providing rail transport services in Germany. By international comparison the German railway market has the largest number of competitors.

A total of 163 railway undertakings were active in the commercial rail freight transport sector. There were 107 railway undertakings that provided services in regional and local rail passenger transport. The number of railway undertakings operating in long-distance rail passenger transport (26) remained comparatively small. DB Fernverkehr AG, FlixTrain, SNCF and ÖBB provided the bulk of the transport services in longdistance rail passenger transport.

Several market participants provide transport services in both rail passenger service and rail freight transport. In addition, several railway undertakings are not directly active on the transport market but only move other transport (supplying their own construction sites, making test runs, etc.) or they are active only as a shunting service provider in service facilities.

The number of railway undertakings providing transport services in 2021 increased slightly in rail freight transport, other transport and in longdistance rail passenger transport, and the number of undertakings in regional and local rail passenger transport stabilised at the previous year's level. Long-distance rail passenger transport and heritage railway services in particular either partially or seasonally resumed their passenger transport services.

Transport and competition trends

Under the impact of the coronavirus pandemic, 2020 saw marked declines in transport performance in all three segments of rail transport services. Transport performance in 2021 was different in the various segments. Non-federally-owned railway undertakings in each segment increased their share of the market in 2021.

Transport performance in regional and local rail passenger transport fell again in 2021 from 35bn to 33bn passenger-kilometres, which is the lowest since the Bundesnetzagentur began conducting the market surveys. Competitors' share of transport performance increased slightly from 33 percent to 34 percent.

Long-distance rail passenger transport saw a modest recovery in transport performance in the second year of the pandemic, around 8 percent from 24bn to 26bn passenger-kilometres, but remained far below the 2019 level. Following the pandemic-related decrease in the competitors' share of the market in 2020, 4 percent of the market share was again reached in 2021. After completely halting its services in 2020, Flixtrain resumed services, and other public enterprise providers of long-distance passenger transport services followed suit.

A very different picture developed in rail freight transport, where transport performance increased considerably in 2021 and saw growth of around 14 percent (from 123bn to 139bn tonne-kilometres), setting a new all-time high. At the same time, competitors were able to significantly expand their market share under the influence of a high transport demand and contributed 58 percent of the transport performance in rail freight transport.

Competition in the regional and local passenger rail transport

transport performance in billion passenger-kilometres; shares in percent



Competition in the long-distance passenger rail transport

transport performance in billion passenger-kilometres; shares in percent



Competion in the rail freight transport

transport performance in billion tonne-kilometres; shares in percent



Figure 8: Development of the competition, by type of transport service (2017-2021; transport performance in billions of passenger-kilometres or tonne-kilometres; shares in percent)

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 107 different railway undertakings provided services in regional and local rail passenger transport in 2021.

The railway undertakings in Germany that are operated privately and controlled under public law are clearly in the majority. However, state-owned railways of other European countries usually provide transport services through subsidiaries, as do private and public foreign railway undertakings.

Around two thirds of the transport performance comes from federally owned undertakings and around 14 percent from foreign state-owned railways and their subsidiaries. Smaller shares of 7 percent come from German railway undertakings that are subject to private or public law.

By correcting the ownership of national or foreign undertakings that were previously reported as private undertakings to ownership by the parent company it became apparent that foreign transport enterprises under public law can also claim shares in the market for themselves.



Figure 9: Ownership structure of railway undertakings in the regional and local passenger transport (2021; number/share of traffic handled in percent)

Long-distance rail passenger transport

DB Fernverkehr AG continues to dominate in longdistance rail passenger transport in Germany.

Competitors achieved a market share of nearly 4 percent in 2021. The competitors include foreign state-owned railways such as ÖBB, SNCF and a number of private service providers such as Flixtrain.

Due to the massive decrease in demand brought about by the coronavirus pandemic, nearly all providers completely or to a great extent stopped providing long-distance passenger transport services, and only gradually and incrementally did they resume services in 2021 to the extent that this was permitted and offering transport services was economically viable. In the course of the year Flixtrain sporadically expanded its offering with new connections.

DB Fernverkehr AG also selectively added to its offering in 2021. Massive losses were again incurred due to the fact that the annual average for utilisation of train capacities remained low. The losses were partially reduced through retroactive assistance for track access charges and other financial assistance from the federal government.



Figure 10: Ownership structure of railway undertakings in the long-distance passenger rail transport (2021; number/share of traffic handled in percent)

Rail freight transport

The 163 railway undertakings that conducted rail freight transport on the German railway market in 2021 expanded the market significantly and set a new record for transport performance provided. The gains were not concentrated on individual undertakings but were distributed over the vast majority of active railway undertakings.

In addition to the DB AG Group companies, which had a rail freight transport market share of 42 percent, private German railway undertakings attained a market share of around 20 percent. Another 19 percent of the market was shared by foreign state-owned railways, which together provided nearly half as much transport performance as the DB AG companies.

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



Figure 11: Ownership structure of railway undertakings in the rail freight transport segment (2021; number/share of traffic handled in percent)

Transport and travel distances

The average transport and travel distances have changed only moderately in recent years.

The trend of decreasing average travel distances in regional and local rail passenger transport continues as the average travel distance fell to 20 kilometres in 2021. In long-distance rail passenger transport the long-term trend toward increasing travel distances continued. Following the pandemic-related decrease in 2020 the average travel distance increased to 307 kilometres.

In rail freight transport there was a visible increase in the average transport distance in 2021. This corresponds with the growth of international combined transport.



Figure 12: Development of average transport and travel distances (2017-2021; in kilometres)

Traffic volume

The considerable impact of the coronavirus pandemic on passenger demand was still clearly noticeable in 2021. While passenger numbers in regional and local rail passenger transport fell further to 1,680mn, the numbers rose again slightly in long-distance rail passenger transport. However, at 85 mn passengers they remained well under the pre-pandemic level.

By contrast, traffic volume in rail freight transport reached a record high of 420mn tonnes. Even in the first year of the pandemic, rail freight transport had only to cope with comparatively small losses in transported freight volumes.

420

411

392



Figure 13: Development of transport volumes, by type of transport service (2017-2021; in millions of passengers/in million tonnes of freight)

Punctuality

A passenger train is considered under EU standards to be delayed when it runs five or more minutes behind schedule. A freight train is considered to be delayed when it runs 15 or more minutes behind schedule.³

As part of the market survey the Bundesnetzagentur asks for data on the number of scheduled trains that actually ran, the number of delayed trains, trains cancelled on legs of journeys, and trains that were cancelled completely.

Since 2020, punctuality statistics for rail passenger services are no longer calculated solely on the basis of data reported for the last stop (final stop punctuality), but each individual stop is now included in the calculation (train stop-specific punctuality), which makes the results more informative.

For rail freight transport the calculation method based on final stop punctuality will continue to be used.

In 2020 when the pandemic resulted in a decrease in demand for both rail travel and rail transport, punctuality on the German railway network increased noticeably compared to 2019. The main reasons for this were the smaller traffic loads on infrastructural capacities and, in the case of rail passenger service, the reduced time needed for passengers to board or alight from the trains.

As demand gradually returned in 2021, the number of delays increased again.

The share of delays in regional and local rail passenger transport remained stable between 9 percent and 11 percent for three years. An increase

³ These limits were standardised in the European Commission's Implementing Regulation (EU) 2015/1100. However, route operators in Germany have set different thresholds in some of in delays broke this trend as from May 2022. When the \notin 9 ticket was introduced in June 2022, placing an additional burden on regional passenger rail services, the share of delays rose to 19 percent.

The share of delays in long-distance rail passenger transport also broke its three-year trend that hovered between 23 percent and 28 percent, with delays doubling to around 44 percent by the middle of 2022.

Share of delayed trains by type of transport service on a monthly basis



Figure 14: Share of delayed trains by type of transport service 2019-06/2022 (shares in percent)

In rail freight transport the overall rate of punctuality has slightly decreased since 2017. Whereas in 2017 63 percent of all freight trains reached their destination on time, this figure reached an interim peak in 2020 and then fell from 65 percent in 2021 to 60 percent. However, only around 0.1 percent of all rail travel and transport was cancelled. A growing number of infrastructure construction activities is expected to cause a further

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.

decrease in the number of punctual trains in 2022, which can already be seen in figures from the first half of 2022.

Overall, domestic rail freight transport is considerably more punctual than cross-border services. While only 44 percent of international rail freight transport reached its destination on time in 2021, domestic rail freight transport had a punctuality rate of 64 percent. This shows that there are still formidable hurdles in international rail freight that make the international transport of goods by railway difficult.



Figure 15: Punctuality in rail freight transport (2017-2021; shares in percent)



Figure 16: Punctuality in international rail freight transport (2017-2021; shares in percent)

Punctuality Rail freight total

Resources of railway undertakings

Personnel

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

Railway undertakings employed a total of around 87,000 workers⁴ in 2021, including 35,000 train drivers (the number of which increased by 7 percent). By contrast, there was a slight decrease in the number of other employees.

Personnel employed in the railway transport market

in thousands of full-time equivalents



Figure 17: Development of personnel employed in the railway transport market (2017-2021; in thousands of full-time equivalents)



Employment figures at the Railway undertakings

Figure 18: Personnel structure at railway undertakings, by type of service (2017-2021; shares in percent)

⁴ In full-time equivalents. Hours worked in a part-time positions count toward a full-time position.

Just under 45 percent of these 87,000 jobs are in regional and local rail passenger transport. As was the case in the previous year, train driver positions (20,000) account for around half of the 39,000 jobs in this segment while other fields of work account for the other 19,000. Approximately 16,000 employees (including just under 4,000 train drivers) work in long-distance rail passenger transport. Train drivers comprise around one fourth of the total workforce in long-distance rail passenger transport, which is slightly higher than in the prior year but still significantly smaller than the corresponding figure in regional and local rail passenger transport.

Rail freight transport accounts for the remaining 32,000 jobs (which include 11,000 train drivers).

Around 20 percent of the workers employed by railway undertakings in 2021 were female (up by one percentage point over 2020), and while the share of female train drivers also increased by one percentage point, it was still only 6 percent.

In 2021 around 12 percent of railway undertaking staff were working on a part-time basis. The training rate (share of employees who are undergoing training) did not change appreciably between 2017 and 2021 and remained around 5 percent.

In general the share of older workers increased again in the last year under review. The share of train drivers and other employees over 50 increased by one percentage point compared to last year. With regard to staff under 30, both the share of train drivers (12 percent) and other employees (14 percent) remained stable.

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





under 30 years = 30-50 years = over 50 years

Figure 19: Personnel structure at railway undertakings, by age (2021; shares in percent)

Personnel structure of train drivers at railway undertakings, by age shares in percent



under 30 years = 30-50 years = over 50 years

Figure 20: Personnel structure of train drivers at railway undertakings, by age (2021; shares in percent)

Railway undertakings again rated the availability of personnel as unsatisfactory. Compared with last year, the rating of the availability of train drivers worsened further, 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 also a slight drop in the rating for the availability of technically specialised workers and other personnel from 2021 to 2022. The availability of technically specialised personnel was rated at 3.1 for 2022 and thus slightly worse than in 2021. At 2.9, the rating for the factors influencing availability of other personnel in 2022 was a little worse than in 2021 when it was 2.7. Many 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. The strong economy in many regions and the working conditions in the railway market (such as shift work) impede the recruitment of new staff at many railway undertakings. They are investing more in training measures and lateral entry programmes but also recruiting personnel from other railway undertakings.

Availability of personnel	2017	2018	2019	2020	2021	2022	Trend
Train drivers	3.3	3.4	3.5	3.4	3.1	3.3	. <u>.</u>
Operational personnel	2.9	3.0	3.0	3.0	2.9	3.1	2
Other personnel	2.7	2.8	2.7	2.8	2.7	2.9	

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action). The trend arrows refer to the trend from 2021 to 2022.

Figure 21: Rating of the availability of personnel for railway undertakings (2017-2022; average values)

Economic situation of the railway undertakings

Revenue

Following the sharp decline in revenue resulting from the pandemic, the railway undertakings had only limited success in counteracting the decline in 2021. They increased overall revenue by around 3 percent to just over €20bn, which is around 10 percent lower than the pre-pandemic level from 2019.

Regional and local rail passenger transport

Revenue in regional and local rail passenger transport increased from €11.1bn to €11.3bn, which is near the level from 2019. The rescue package for local public transport, additional payments from the regional transport authorities and back payments for 2020 helped to offset lost passenger revenue suffered by railway undertakings in regional and local rail passenger transport.

Revenue in the railway transport market in billions of euros



Rail freight transport

Long-distance passenger rail transport

Regional and local passenger rail transport

Figure 22: Revenue development in the railway transport market (2017-2021; in billions of euros)



Figure 23: Development of revenue and average train occupancy in the regional and local rail transport segment (2017-2021)

Revenue reached €15.70 per train-kilometre operated. Another decline in the average number of passengers per regional and local rail passenger train (from 50 to 45 passengers per train) resulted in a reduction in market revenue for the railway undertakings in regional and local rail passenger transport. At the same time the regional and local rail passenger transport undertakings received an increased amount of assistance from the regional transport authorities (in particular due to the rescue package payments and additional liquidity assistance).

Using one passenger-kilometre as the unit of measure, revenue in regional and local rail passenger transport increased from 31.4 to 34.3 cents. This was the result of a slight increase in revenue with a decrease in transport performance at the same time.

The decrease in passenger-kilometres is reflected in the smaller average number of passengers per regional and local rail passenger transport train. Average train occupancy fell again in 2021 by around 9 percent to 46 passengers. Revenue in regional and local rail passenger transport at the non-federally-owned railway undertakings fell more sharply than the overall market, by around 12 percent per train-kilometre and by round 9 percent per passenger-kilometre. Average train occupancy decreased by around 4 percent.

Long-distance rail passenger transport

Revenue per train-kilometre operated in longdistance rail passenger transport decreased from €20.1 per train-kilometre in 2020 to €19.4 per trainkilometre in 2021. Revenue remained at a low level while there was a year-on-year increase in the number of train-kilometres.

Using one passenger-kilometre as the unit of measure, long-distance rail passenger transport revenue was just over 11 cents per passengerkilometre and thus down by around 7 percent compared to 2020. Revenue growth was hence below growth in passenger-kilometres.

Average train occupancy per long-distance rail passenger transport train increased by 4 percent from 2020 to 2021 to 174 passengers.



Figure 24: Development of revenue and average train occupancy in the short-distance passenger rail transport segment (without DB) (2017-2021)



Figure 25: Development of revenue and average train occupancy in the long-distance passenger rail transport segment (2017-2021)

Rail freight transport

Rail freight transport saw revenue growth of 6 percent from 2020 to 2021. Operating and transport performance each saw sharp increases of more than 10 percent. The average freight load per train also increased. Revenue in rail freight transport decreased because revenue increased slower than the train-kilometres and the net tonne-kilometres. The reason for the restrained revenue growth is because competition is price-sensitive. In addition, track access charge assistance was partially passed on to end-customers.

This trend was similarly visible in the competitors' market segment, but with a smaller percentage change.







Figure 27: Development of revenue and average freight load of non-federally owned railway undertakings in the rail freight transport segment (2017-2021)

Retail prices

The Bundesnetzagentur's regulatory activities only indirectly affect the prices that rail passengers pay because (in addition to travel comfort and the scope of the transport supply) the regulated infrastructure charges comprise only part of the carriage or haulage charge to be paid.

However, ticket prices are a very important criterion for deciding how attractive passenger rail services are and whether they can compete with other modes of transport. The price also plays a role in deciding whether or not a freight item will be transported by rail.

To assess retail price trends the Bundesnetzagentur draws on data it has collected as well as figures made available to the public by the Federal Statistical Office (Destatis). These figures show price trends for specifically defined services based on a fixed quantity, while the average revenue per tonne-kilometre or passenger-kilometre as calculated by the Bundesnetzagentur additionally reflects shifts in the quantity of the demanded products or services.

For example, changes in the demand for rail passes or discount offers (such as saver fares or the BahnCard) can impact market revenue in these particular areas.

The price indices published by the Federal Statistical Office therefore tend to reflect the perspective of an end-customer who is monitoring price trends for a specific service. By contrast, monitoring the specific charges enables a more precise assessment of revenue trends from the perspective of a railway undertaking.

Regional and local rail passenger transport

Between 2017 and 2021 ticket prices in regional and local rail passenger transport increased by a little more than 10 percent. After noticeable price increases prior to the 2019 timetable change, the pandemic curbed further price changes.

However, the railway undertakings' revenue in regional and local rail passenger transport was significantly higher than before the pandemic. The continued decline in demand for passenger services in 2021 resulted in a further reduction in the share of total net revenue from rail passes or subscription passes and increased the amount of revenue generated per passenger-kilometre accordingly. Revenue in regional and local rail passenger transport climbed even more sharply when public funding from the regular public compensation payments and the local public transport rescue package are included in the calculation. This revenue was around 78 percent higher in 2021 than in 2019, which means that the railway undertakings in regional and local rail passenger transport generated 78 percent more revenue per passengerkilometre travelled than they did just four years ago.



Development of retail prices in the regional and local passenger rail transport indexed: 2017 = 100

Figure 28: Development of retail prices in the regional and local passenger rail transport segment (2017-2021; indexed 2017 = 100)

Long-distance rail passenger transport

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

With the reduction of value-added tax on longdistance rail passenger transport tickets in 2020 from 19 percent to 7 percent, prices actually dropped by around 5 percent more than expected from only reducing the value-added tax. In 2021 prices fell again slightly. This could be due to the fact that attempts were made to make up for a significantly lower demand for travel by generating more demand through lucrative offers. On the contrary, revenue per passenger-kilometres in long-distance rail passenger transport increased significantly from 2019 to 2020, which was a result of a decline in the active use of BahnCards and other discount offers such as subscription passes (similar to what happened in regional and local rail passenger transport). However, this trend already reversed in 2021 when there was a similar level of revenue as in 2020 with around two million more long-distance rail passengers.





indexed: 2017 = 100

Figure 29: Development of retail prices in the long-distance passenger rail transport segment (2017-2021; indexed 2017 = 100)

Rail freight transport

Rail freight transport undertakings continued to receive almost a full refund of their paid track access charges. These lower costs for the railway undertakings were often passed on to transport customers.

A rising demand made it possible to increase both the amount of trains and the utilisation of train capacity, particularly in international combined transport. Due to the higher freight volumes per train and the transfer of cost advantages from track access charge assistance, market revenue in rail freight transport per tonne-kilometre fell significantly (around 9 percent) compared to 2020 and helped to improve the intermodal competitive position of the railway as a mode of transport.



Retail prices in therail freight transport

indexed: 2017 = 100

Figure 30: Development of retail prices in the rail freight transport segment (2017-2021; indexed 2017 = 100)

Railway undertakings' overall market outcome

A total sum for 2021 from all railway undertakings operating on the German market resulted in absolute income of more than minus €0.9bn.

Because the non-federally-owned railway undertakings of all three types of rail transport services had a balanced net income overall, the negative outcome is due solely to the railway undertakings of the DB AG. Without the track access charge assistance, in particular in longdistance rail passenger transport, the market outcome would have been another €2.5bn lower.

Railway undertakings in regional and local rail passenger transport had the highest negative outcome. DB Regio alone had the largest negative outcome (minus €540mn), due to an 11 percent higher cost of materials (for maintenance and higher energy costs), 7percent higher staff costs (caused in part by the integration of the regulated asset base) and €115mn less in compensation payments from the central government and the federal states for pandemic damage compared with 2020. The DB Regio annual report also makes reference to the economic consequences of the flood damage in the Ahr Valley and the Union of German Locomotive Drivers (GDL) strikes.

Railway undertakings in long-distance rail passenger transport and in rail freight transport had only slightly negative outcomes (minus €100mn and minus €200mn respectively), mainly because of reimbursements issued for paid track access charges from 2021 and subsequently for 2020.



Railway undertakings' overall net income for 2021

* see separate explanations

** other operating income: mostly from track access charge assistance, including subsequent payments for 2020

Explanations about the additional effects:

- Rail freight transport: + 0.8 further revenue of DB Cargo (see IB 2021 page 9) including higher service facility charge assistance

- Long-distance rail passenger transport: +0.3 further revenue of DB FV, not from passenger transport but from letting or leasing, services for third parties, material sales and other (unspecified) revenue (see Annual Report DB FV 2021 page 44)

Figure 31: 2021 net income (absolute) of the railway undertakings on the rail transport service level and overall (in billions of euros)

Market outcomes by type of transport service

A total of 71 percent of all the railway undertakings surveyed reported a positive operating result for 2021,⁵ which is a significant improvement on the 2020 figure (65 percent). 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 71 percent of the railway undertakings with a positive net income, the sum of the absolute results comes out to just a small positive figure of €0.2bn, while the sum result of the 29 percent of the railway undertakings with a negative income totals €1.2bn. These undertakings include DB Cargo, DB Fernverkehr and DB Regio and larger, nonfederally-owned railway undertakings as well.





Sum of the negative results in million euros

Figure 32: Breakdown of net incomes of the RUs (2021; in millions of euros an percent of the number of RUs)

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

Regional and local rail passenger transport

Around 60 percent of the railway undertakings in regional and local rail passenger transport reported a positive operating result.





Figure 33: Share of railway undertakings in the regional and local passenger rail transport segment having a positive operating result (2017-2021; shares in percent)

figure in the prior year's market analysis. The figure for 2021 will likewise change during the course of the market analysis for the year 2022.

⁵At 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 2020 figure shown here deviates from the
Breakdown of positive and negative net incomes of RUs in regional and local passenger rail transport



- Sum of the positive results in million euros
- Sum of the negative results in million euros

Figure 34: Breakdown of net incomes of RUs in regional and local rail passenger transport (2021; in millions of euros and percent of the number of RUs)

As was also the case in the overall market, the majority of the railway undertakings in regional and local rail passenger transport had a positive net income, although only to a small extent in terms of absolute figures. The negative net incomes far outweigh the positive ones. DB Regio bears the main share of the losses.

From 2020 to 2021 operating results increased slightly to minus €0.91 per train-kilometre and minus 2.00 cents per passenger-kilometre because the absolute operating results improved significantly with a falling train occupancy rate.



Operating result per train-kilometre and

passenger-kilometre of RUs in regional and

-2.72 2017 2018 2019 2020 2021 Euro per train-kilometre Cents per passenger kilometre

Figure 35: Operating result per train-kilometre and passenger-kilometre generated by railway undertakings in the regional and local passenger rail transport segment (2017-2021)

The situation also improved somewhat for the nonfederally-owned railway undertakings in regional and local rail passenger transport, where the operating result was minus 0.42 per trainkilometre and minus 1.12 cents per passengerkilometre.



Operating result per train-kilometre and passenger-kilometre of non-federally-owned RUs in regional and local passenger rail transport

Figure 36: Operating result per train-kilometre and per passenger-kilometre generated by non-federally owned railway undertakings in the short-distance passenger rail transport segment (2017-2021)

Rail freight transport

In rail freight transport, 87 percent of all undertakings had a positive net income. This represents a sharp increase of 10 percentage points.

Rail freight transport RUs with a positive operating result

shares in percent



Figure 37: Share of railway undertakings in the rail freight transport segment with a positive operating result (2017-2021; shares in percent)

The 87 percent of the rail freight transport railway undertakings with a positive net income only reached an absolute profit of €0.1bn. The 13 percent of the rail freight transport undertakings with a negative net income included DB Cargo, which contributed to the high absolute negative net income.

Breakdown of positive and negative net incomes of RUs in rail freight transport



- Sum of the positive results in million euros
- Sum of the negative results in million euros

Figure 38: Breakdown of net incomes of RUs in rail freight transport (2021; in millions of euros and percent of the number of RUs)

Compared to the 2020 pandemic year, the operating result for rail freight transport improved and had a negative operating result of minus €1.12 per trainkilometre and minus 0.20 cents per tonnekilometre. The improvement (in spite of high rates of increase in train-kilometres and tonnekilometres) is due to substantial improvement of the operating results by around two thirds.

Operating result per train-kilometre and tonne-kilometre of RUs in rail freight transport



Figure 39: Operating result per train kilometre and tonnekilometre generated by railway undertakings in the rail freight transport segment (2017-2021) In total, non-federally-owned railway undertakings in rail freight transport produced a positive operating result of €0.53 per train-kilometre and 0.08 cents per tonne-kilometre. Here as well this is due to the fact that positive absolute operating results doubled while at the same time the segment saw very strong increases in operating performance.

Thus non-federally-owned railway undertakings in rail freight transport were the only group of undertakings that in total generated a profit in 2021 and were able to maintain positive net income during the pandemic.





Figure 40: Operating result per train-kilometre and tonnekilometre generated by non-federally owned railway undertakings in the rail freight transport (2017-2021)

Long-distance rail passenger transport

Compared to 2020, the market outcome in longdistance rail passenger transport improved. Net income in 2021 was minus €0.87 per trainkilometre and minus 0.50 cents per passengerkilometre. In 2021 payments were made for the years 2020 and 2021 from the federal government's track access charge assistance. These payments were taken into account here and contributed decisively to an improvement of net income.





Figure 41: Operating result per train-kilometre and passenger-kilometre generated by railway undertakings in the long-distance passenger rail transport segment (2017-2021)

For non-federally-owned railway undertakings the operating result was minus €0.54 per trainkilometre and minus 0.23 cents per passengerkilometre. Figures remained in the negative range following a strong rebound compared to 2020. However, no data were available on the railway undertakings in long-distance rail passenger transport that are controlled from outside of Germany.

Profit margin

The railway undertakings' profit margin⁶ (the ratio of the operating result to revenue) showed significant recovery in all segments of rail transport services compared to 2020, although figures were not yet in the positive range.

Regional and local rail passenger transport

The profit margin in regional and local rail passenger transport improved in 2021 by around one third to minus 6.2 percent. It was boosted in particular by the payments from the local public transport rescue package (including subsequent payments for the prior year).

Profit margin of RUs in regional and local rail passenger transport



Figure 42: Net operating margin of the railway undertakings in the regional an local passenger rail transport segment (2017-2021; shares in percent)

The profit margin of the non-federally-owned undertakings in regional and local rail passenger transport in 2021 was around minus 3.3 percent, which was a considerable improvement on the 2020 figure (minus 13.1 percent).

Profit margin of non-federally-owned railway undertakings in regional and local passenger transport



Figure 43: Net operating margin of non-federally owned railway undertakings in the regional and local passenger rail transport segment (2017-2021; shares in percent)

Long-distance rail passenger transport

The profit margin in long-distance rail passenger transport was more than minus 60 percent in 2020 and improved to minus 4.4 percent in 2021. The reason for this is the paid track access charge assistance, which is reflected directly in the operating result but not in revenue and thus has a massive impact on the profit margin.

The profit margin of the non-federally-owned railway undertakings in long-distance rail passenger transport remained negative in 2021.

⁶At 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 2020 figure shown here deviates from the

figure in the prior year's market analysis. The figure for 2021 will likewise change during the course of the market analysis for the year 2022.



Profit margin of RUs in long-distance rail passenger transport

Figure 44: Net operating margin of railway undertakings in the long-distance passenger rail transport segment (2017-2021; shares in percent)

Rail freight transport

Following the 2020 pandemic year, the profit margin in rail freight transport saw a small improvement. After a sharp drop from 2019 to 2020 to minus 17.3 percent, there was an improvement from 2020 to 2021 to minus 5.1 percent. This means the 2021 profit margin is back on a comparable level to that of years before the coronavirus pandemic. As revenue in rail freight transport increased only slightly, the increased track access charge assistance for rail freight transport undertakings provided a significant amount of support and explains the jump in net income. -5.0 -5.3 -5.1 -8.8 -17.3 2017 2018 2019 2020 2021

Figure 45: Net operating margin of railway undertakings in the rail freight transport segment (2017-2021; shares in percent)

In recent years the non-federally-owned rail freight transport undertakings have had a better profit margin than the overall market. The margin increased from 1.5 percent in 2020 to 3.3 percent in 2021.



Profit margin of non-federally-owned RUs in rail freight transport

Figure 46: Net operating margin of non-federally owned railway undertakings in the rail freight transport segment (2017-2021; shares in percent)

Profit margin of RUs in rail freight transport

Infrastructure costs and revenue

Infrastructure costs include track access charges, station charges and charges for the use of all other railway service facilities. Examination of the paid infrastructure charges in relation to a segment's overall revenue reveals significant differences between the individual sectors of rail transport services.

The railway undertakings in regional and local rail passenger transport spend the largest share of revenue on infrastructure costs. Their share was around 42 percent during the period under review.

Taking federal government track access charge assistance into account, 6 percent of revenue in long-distance rail passenger transport was spent on infrastructure costs in 2021. Increased track access charge assistance (applicable in 2021 for up to 98 percent of the charges) contributed to the fact that the share of infrastructure costs in rail freight transport fell to a low of around 4 percent. With the decision having been made to reduce track access charge assistance, the share of revenue spent on infrastructure costs will increase again in future years.



Infrastructure costs as a percentage of railway undertakings' revenue

Figure 47: Share of railway undertakings' revenue that is spent on infrastructure costs (2017-2021; shares in percent)

Breakdown of infrastructure costs

A more detailed breakdown of the infrastructure charges shows that the amount of public funding strongly affected the share represented by track access charges.

Station charges accounted for around 18 percent of the infrastructure charges in regional and local rail passenger transport (due to the frequent train stops). In long-distance rail passenger transport, infrastructure-related spending accounted for 31 percent of the railway undertakings' spending. This figure was relatively high because the federal government track access charge assistance reduced the share of paid track access charges to less than 60 percent. The same effect is also at play to an even greater extent in rail freight transport, where the paid track access charges cover only around one third of the total infrastructure costs. Thus the other two thirds of costs come from charges for using service facilities such as marshalling yards or storage siding.



Infrastructure costs paid by Railway undertakings

Figure 48: Breakdown of the infrastructure costs of the railway undertakings (2021; shares in percent)

Track access charge assistance

To strengthen the railway in intermodal competition and mitigate pandemic-related economic losses, the federal government enacted track access charge assistance for railway undertakings in long-distance rail passenger transport and rail freight transport. The EU Commission approved the assistance in July 2021 on the basis of EU Regulation 2020/1429 from October 2020, which gave all member states the legal means to reduce or subsidise track access charges during the pandemic.

In rail freight transport, the assistance rate of approximately 50 percent that was already in place was increased to 99 percent for all of 2021. For longdistance rail passenger transport, which had not been receiving assistance, the assistance amounted to around 98 percent of the track access charges for the first three quarters of 2021 and around 88 percent for the fourth quarter.

The assistance period for both rail freight and longdistance rail passenger transport was retroactively set as starting in March 2020. For the months March through December 2020 and for the months in 2021 up until the month payment was made, assistance was disbursed as a lump sum reimbursement to the railway undertakings retroactively in the third quarter of 2021. Subsequent payments were made on a monthly basis.

The railway undertakings reported to the Bundesnetzagentur that they received €1.8bn in track access charge assistance in 2021. That included just over €1bn to undertakings in longdistance rail passenger transport and around €0.75bn to undertakings in rail freight transport.

Increased assistance for rail freight transport undertakings expired at the end of 2021, so that as from January 2022 the original level of support (45 percent) is being paid. In long-distance rail passenger transport as well, the amount of assistance was reduced to 42 percent as from January 2022.

Electrical traction in the railway market

Being an environmentally friendly mode of transport, railways make an important contribution to environmentally friendly mobility. Most trains in Germany's railway network use electrical traction. The use of modern vehicles with three-phase current drive systems continues to make it possible to recover large amounts of the energy used during operation and feed the energy back into the grid. This is now done by around 81 percent of the electrical tractive vehicles.

The share of electric routes increased from 53 percent in 2019 to just under 54 percent in 2021. Of the approximately 39,261 kilometres in route length, a little more than 21,131 kilometres were electric in 2021. Electrical traction was used to provide more than 75 percent of the operating performance in the German railway network, which corresponds to more than 863mn trainkilometres operated. This operating performance breaks down into around 488mn train-kilometres in regional and local rail passenger transport, just under 145mn train-kilometres in long-distance rail passenger transport and just over 229mn trainkilometres in rail freight traffic.

The share of transport performance provided electrically varies by rail transport segment, with more than 98 percent of transport performance in long-distance rail passenger transport coming from electricity and around 68 percent in regional and local rail passenger transport. In rail freight transport, more than 89 percent of transport performance was provided using electricity.

Prices for traction current

A look at energy prices, which have been on the rise since 2021, shows that the period up until then, when traction current prices were more or less stable, has ended. For many undertakings in past years it was not necessary to enter into long-term supply contracts. With lower prices in mind, ordering was sometimes done directly on the spot market. The average price for traction current in the German railway market in 2020 was around 10.9 cents per kilowatt hour (kWh) and included the network tariff of around 5.4 cents per kWh. In 2021 the price was 12.2 cents per kWh. The proportionate network tariff in 2021 was around 5.8 cents per kWh, which means that the price to procure traction current increased by around 15 percent from 2020 to 2021.



Average purchase price for traction current in cents per kWh

Figure 49: Development of average purchase price for traction current (2017-2021; in cents per kWh)

There are no price differences among the individual rail transport segments for purchasing traction current. The prices obtained by the railway undertakings depend primarily on the contracted volume, the duration of the supply contracts and the individual supplier.

In 2022 a steep price increase began that is not yet reflected in the figures up to 2021. However, DB Energie's known purchase prices from the default supply serve as an indicator. These prices were still stable in 2020 and 2021 at 7.47 cents per kWh (peak) and 6.5 cents per kWh (off-peak).⁷ The price in default supply was thus significantly higher than the price for traction current that railway undertakings could obtain on the market.

At the beginning of January 2022 the default supply prices climbed to 21.7 cents per kWh in the peak period and 18.87 cents per kWh in the off-peak period. Following a first non-annual price increase as from February 2022, prices for default supply traction current rose again as from May 2022. Currently the prices are 36.7 cents per kWh in the peak period and 30.84 cents in the off-peak period, which means that default supply prices have increased nearly fivefold within a very short time. It is assumed that traction current prices obtainable by railway undertakings in the 2022 market have also increased significantly.

Network tariffs for traction current

In addition to the costs for the supply of traction current, the railway undertakings also have to pay network tariffs. The level of the network tariffs varies according to usage pattern from one railway undertaking to another. In addition to an undertaking's total consumption, the peak in actual demand and the resulting use of the electricity grid, the amount of energy fed back into the grid also impacts the individual network tariff. Another factor is how many vehicles of a railway undertaking as a technical withdrawal point can be grouped together as a virtual withdrawal point. In some cases the railway undertaking can claim a customised peak demand if its electricity consumption is atypical as set out in section 19 of the Ordinance concerning Tariffs for Access to Electricity Networks (StromNEV). Claiming a customised peak demand in cases where an undertaking's electricity consumption is atypical reduced the cost per kilowatt in 2021 by between almost 1 cent around 4 cents.

Average network tariff for traction current in cent per kWh



Figure 50: The average network tariff for traction current (2017-2021; in cents per kWh)

Figure 50 shows the average network tariff paid by railway undertakings per kWh in recent years. For reasons outlined above in connection with the existing network tariff system, it is not possible to derive any price trends from the chart. In addition, the tariffs for the peak demand and kilowatt hours drawn change annually. From year to year, costs resulting from the railway undertakings' individual usage patterns can be compensated for, increased or remain the same. However, unlike typical industrial companies, the railway undertakings actually have no influence on the level of peak demand. The railway undertakings cannot implement targeted load management because the respective electricity consumption from the electricity grid depends fundamentally on what is currently happening operationally.

⁷ Default supply is a type of mandatory supply like what is offered to private customers.

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

Revenue in regional and local rail passenger transport

The most important source of revenue for railway undertakings in regional and local rail passenger transport \Box in addition to market revenue⁸ – is public funding paid by regional transport authorities to railway undertakings that have been contracted to provide transport services. This assistance comes largely from the federal government's regionalisation funds, which was made available to Germany's federal states under the Regionalisation Act of 27 December 1993. More than €8.9bn in regionalisation funds were allocated to Germany's federal states in 2021.

Assistance from the regional transport authorities accounted for 68 percent of the railway undertakings' revenue, mainly from the rescue package for local public transport and increased assistance. Market revenue thus accounted for 32 percent of the revenue generated by regional and local rail passenger transport.

Breakdown of revenue in regional and local rail passenger transport Shares in percent



Figure 51: Shares of revenue generated in the regional and local passenger rail transport segment that came from subsidies from regional transport authorities and from market revenues (2017-2021; shares in percent)

Performance for transport services provided under public service obligation (PSO)

For 2021 the regional transport authorities planned to contract more than 729mn train-kilometres in regional and local rail passenger transport.⁹ Of these train-kilometres, more than 81 percent were awarded using competitive procedures (including tendering).

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 undertakings remained unchanged from 2020 to 2021. More than 40 percent of the train-kilometres contracted in regional and local rail passenger transport were awarded to non-federally-owned railway undertakings.

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

⁹ The infrastructure managers reported a total of 721mn trainkilometres operated in regional and local rail passenger transport. The difference is due to cancellations owing to construction measures and other network-related constraints.

Market shares for services provided in regional and local rail passenger transport under PSO shares in percent



Figure 52: Development of market shares for contracted transport services in the short-distance passenger rail transport segment (2017-2021; shares in percent)

Share represented by tendering procedures in the short-distance passenger rail transport segment shares of train-kilometres in percent



Contract awarded by competitive tendering

Figure 53: Share represented by tendering procedures in the short-distance passenger rail transport segment (2017-2021; shares of train kilometres in percent)

Awarding of transport contracts

Regional transport authorities contract railway undertakings to provide regional and local rail passenger transport services. The regional transport authorities concluded 39 transport contracts in 2021 and expected to have concluded 40 in 2022. Thus there was a small increase between 2021 and 2022.





Figure 54: Number of concluded transport contracts and expected number of concluded contracts (2017-2021: number of concluded transport contracts; 2022: expected number of concluded transport contracts)

Of the 39 transport contracts awarded in 2021, 25 were awarded using competitive procedures and 14 were awarded non-competitively.

Of the 39 transport contracts awarded in the 2021 reporting year, around 14 percent of the contracted train-kilometres were contracted noncompetitively and more than 86 percent were awarded using 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 45 tenders in the 25 competitive contract-awarding procedures in 2021. This means that an average of around 1.8 bidders took part in each award procedure and thus the number of bidders continued to decrease.

Non-competitive and competitive awarding of transport contracts number



Contract awarded by competitive tendering

Figure 55: Award of transport contracts by regional transport authorities, by tender and without tendering (2017-2021; number)

Average number of bidders for transport contracts in competitive awarding procedures



Figure 56: Average number of bidders for transport contracts awarded by regional transport authorities on the basis of tendering (2017-2021; average number)

Of the 25 transport contracts awarded by regional transport authorities in competitive awarding procedures during the 2021 reporting year, eight were awarded to federally owned railway undertakings and 17 were awarded to nonfederally-owned railway undertakings. These eight contracts had a total volume of more than 172mn train-kilometres over the entire contract period. The 17 transport contracts that were awarded to non-federally-owned railway undertakings using competitive procedures accounted for more than 592mn train-kilometres over the entire contract period.

Transport contracts awarded using competitive procedures number



Figure 57: Award of transport contracts to railway undertakings by regional transport authorities (2017-2021; number)

Regional transport authorities awarded 14 transport contracts to railway undertakings without using competitive procedures during the 2021 reporting year. Six of them were awarded to federally owned railway undertakings and eight to non-federallyowned railway undertakings. The eight transport contracts that were awarded to non-federallyowned railway undertakings without using competitive procedures accounted for more than 28mn train-kilometres over the entire contract period. The six contracts awarded to federally owned railway undertakings had a volume of more than 89mn train-kilometres for the entire contract term. The majority of the train-kilometres awarded non-competitively included the network of the regional and local rail passenger transport service "Expressverkehr Nordostbayern".





Awarded to other railway undertakings

Figure 58: Award of transport contracts by regional transport authorities to railway undertakings, without tendering (2017-2021; number)

Financing rolling stock in regional and local rail passenger transport

There were 20 contract-awarding procedures in 2021 that included an offer from the regional transport authorities to provide assistance with financing rolling stock. In 17 cases the railway undertakings accepted the financing scheme offered by the regional transport authorities. In two cases a financing scheme different from the one offered was used.

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.

Penalties and fines paid by railway undertakings to regional transport authorities

In 2021, railway undertakings paid approximately €183mn in penalties and fines to regional transport authorities. After decreasing in 2019 and 2020, this figure increased again in 2021.



in millions of euros



Figure 59: Penalties and fines that railway undertakings paid to regional transport authorities (2017-2021; in millions of euros)

Refunds made to passengers

In 2021, railway undertakings in rail passenger transport refunded around €26mn to passengers in compliance with regulations governing passenger rights or as a gesture of good will. In 2019 this figure was €45mn and has been falling since 2020.

Reimbursements

in millions of euros



Figure 60: Development of reimbursements (2017-2021; in millions of euros)

Personnel of the regional transport authorities

From 2020 to 2021 the number of employees working for regional transport authorities (measured in full-time equivalents) increased from 946 to 1,023 and was thus up by more than 8 percent. The rise is a result of around half of the regional transport authorities hiring new personnel.

Employment figures at the regional transport authorities



Figure 61: Development of personnel at the regional transport authorities (2017-2021; full-time equivalents)

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 ("unsatisfactory").

Looking at the regional transport authorities' qualitative assessment of the market for the years from 2017 through 2022, it is striking that the ratings for areas "pricing systems" and "priceperformance ratio" have improved. By contrast, the ratings for "the current state of network development" and "the current state of network maintenance" have not improved.

Regional transport authorities	2017	2018	2019	2020	2021	2022	Trend
Charges, access and condition of infrastructure							
Network development	3.1	3.0	3.5	3.4	3.4	3.4	→
Network condition	3.1	3.3	3.3	3.2	3.3	3.1	7
Modernisation of passenger stations	2.7	2.7	2.8	2.8	2.9	2.8	7
Condition of passenger stations	3.1	3.0	3.0	3.0	3.2	3.1	7
Track access pricing systems	2.6	2.5	2.6	2.6	2.4	2.5	2
Station usage pricing systems	2.9	2.9	2.6	2.5	2.5	2.4	7
Pricing system: Track access pricing systems	3.4	3.4	3.4	3.4	3.2	3.2	→
Pricing system: Station usage pricing systems	3.4	3.6	3.4	3.4	3.3	3.2	7

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

The trend arrows refer to the trend from 2021 to 2022.

Figure 62: Regional transport authorities' ratings of the factors that influence infrastructure and pricing systems (2017-2022; average values)

Comments by the regional transport authorities

As part of the Bundesnetzagentur's market monitoring activities in the railway sector, 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.

Train paths

Respondents commented that the railway network needs to be made more robust through the addition of more crossovers, overtaking tracks and stations with passing loops.

Framework agreements need to be reintroduced so that the regional transport authorities can have planning certainty.

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.

Stations

Respondents said they expected the pricing and cost increases for railway undertakings and regional transport authorities to be presented in a transparent manner.

The federal government and DB need a sustainable solution and funding approach to the large number of dilapidated reception buildings.

DB infrastructure managers need to be more service-oriented toward municipalities.

Sales

According to the respondents, it should be ensured that market dominant sales service providers offer all railway undertakings person-to-person sales service on equal terms.

Light maintenance depots

Regional transport authorities commented that the railway undertakings need to eliminate the potential for discrimination when light maintenance depots are used. They added that 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

Respondents commented that regulation of traction current needs further improvement.

Infrastructure

The reliability of existing infrastructure (including railway crossings, switches and tracks) needs to be increased, the regional transport authorities commented, by improving maintenance and conducting inspections with greater frequency.

They also noted that 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.

Passenger transport end-customer survey

Under section 67(3) of the Rail Regulation Act, the Bundesnetzagentur is required to consult at least every two years with representatives of the users of rail transport services. In 2022 the Bundesnetzagentur conducted a survey on topics having to do with rail passenger services.

The aim was to obtain an impression of the mood toward the current topics in rail passenger services. Areas surveyed included "Deutschlandtakt/-tarif", climate protection and capacity management. 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.

In the period from July to October 2022, 127 representatives of consumer and passenger associations as well as 21 representatives of regional transport authorities in regional and local rail passenger transport were asked questions about the above topics.

Some responses appear below. The complete results of the 2022 passenger transport end-customer survey have been published in German on the Bundesnetzagentur website at:

https://www.bundesnetzagentur.de/Endkundenbef ragung

Planning of the Deutschlandtakt synchronised timetable

Questions related to Deutschlandtakt were asked that concern the current timetable target concepts and organisational issues. In some cases existing assumptions were confirmed. For example, the respondents generally rate the importance of more frequent trains when choosing to travel by rail as "important" or "fairly important", whereby train frequency is considered more important for train travel up to 99 kilometres than it is for train travel with a straight-line distance beyond 300 kilometres. By contrast, the reliability of connections is considered more important for longer trips.

Frequent travel options are more important for business travellers, whereas passengers on personal or holiday travel are more sensitive to prices and do not consider train frequency as important. It shows the challenge of creating target timetables for Deutschlandtakt that are pleasing to all passenger groups.

It is important to stress which areas in the railway system that Deutschlandtakt aims to improve are considered by the respondents to be particularly urgent. The answer to this question is in the following chart. Respondents were asked to rate the different topics from 1 ("Not important") to 5 ("Very important"). The most desired improvements (each with a rating of 3.9) were that trains come at shorter intervals in regional and local rail passenger transport and, surprisingly, that rail freight transport provide noticeable relief to (federal) roads. By contrast, respondents were more or less neutral when asked about a speed increase (2.9) and introducing more sprinter trains (2.4) in longdistance rail passenger transport. Improvements in long-distance transport appear to be less important, although one question to highlight is the funding of economically weak long-distance rail passenger transport routes. A clear majority (66 percent) of the respondents was in favour of "funding through taxes similar to funding nowadays in regional and local rail passenger transport". Another 31 percent saw an advantage to "shared funding using passenger fare revenue from profitable routes". Only 3 percent of the respondents selected the answer "No funding necessary", which means they believe that long-distance rail passenger transport with low economic performance or running at times when demand is low should only operate (as has been the case) if it is economically viable.



Figure 63: Responses to the question, "Which improvements that Deutschlandtakt aims to make are particularly urgent?" Rated on a scale from 1 ("Not important") to 5 ("Very important").



 Financing from taxes, similar to today's shortdistance passenger rail

 Cross-financing from fare income from highyield routes

No financing necessary. There should only be long-distance rail passenger transport on "lemon routes" or at off-peak times if it can be operated (in-house) economically.

Figure 64: Responses to the question, "How should long-distance rail passenger transport routes be funded if they are in low demand and thus not economically viable for the railway undertakings?"

The responses of those surveyed show the need for a discussion about the future market model in longdistance rail passenger transport. Another clear majority of the respondents favours the prioritization of fixed-interval trains in the Deutschlandtakt timetable, both while preparing the working timetable (88 percent of the respondents) and during operation (86 percent of the respondents) e.g. when there is an operational disruption. A mere 8 percent of the respondents indicated that they feel the Deutschlandtakt (or its precursor as an integrated regular interval timetable) has made clear progress in the past four years, whereas 55 percent responded that Deutschlandtakt has improved only slightly. Still 37 percent of those surveyed responded that Deutschlandtakt has not changed and has become just a catchword.



While preparing the working timetable

Figure 65: Responses to the question, "Should fixed-interval trains in the Deutschlandtakt timetable take priority over other trains operating outside the Deutschlandtakt timetable?"

Construction work for Deutschlandtakt

Deutschlandtakt requires construction work, which means that passengers will have to tolerate noticeable limits on the availability of rail passenger services. For this reason end-customers were asked whether they were willing to accept construction site timetables so that Deutschlandtakt could be implemented. Regional transport authorities in regional and local rail passenger transport responded differently than the representatives of passenger associations and passenger advisory boards. A total of 62 percent of those surveyed from the passenger associations and passenger advisory boards believe that the passengers they represent would respond with "Yes" or "More likely yes" if asked whether they would accept limited availability of rail passenger services for the implementation of Deutschlandtakt. Given their responsibility to distribute regionalisation funds and other public assistance, the regional transport authorities in regional and local rail passenger transport believe, however, that 67 percent of the passengers they represent would respond to the same question with "More likely no".

During operation/when there is



Responses from passenger associations

Responses from regional transport authorities

Figure 66: Responses to the question, "Are the passengers you represent willing to accept limited availability of rail passenger services caused by alternative timetables related to construction work so that Deutschlandtakt can be implemented sooner?"

Fixed time windows for maintenance could make it easier to plan for train cancellations. Similarly, 79 percent of the representatives of the passenger associations and passenger advisory boards that were surveyed believe that the passengers they represent consider fixed time windows for maintenance during the night to be advantageous, even if that means no trains can run at night (including, for example, "party trains" on the weekend). Only 57 percent of the representatives of the regional transport authorities in regional and local rail passenger transport that were surveyed hold that belief, although it is clear in any case that respondents consider it more important to reduce the number and scope of alternative timetables related to construction work by having fixed time windows for maintenance than it is to have regional and local rail passenger transport trains running at night.

Responses from passenger associations



Responses from regional transport authorities

• Fixed maintenance windows during the day during off-peak hours (e. g. from 9:00 a.m. to 12:00 p.m.) and thus short-term cessation of train traffic, but significantly fewer construction site timetables.

Fixed maintenance windows, including at night and at weekends during times of "party traffic" (e. g. from 1:00 a.m. to 4:00 a.m.) and as a result, train traffic is temporarily suspended, but significantly fewer construction site timetables.

No maintenance window. The trains should always run and then be canceled at construction site timetables for a limited period of time.

Figure 67: Responses to the question, "Railway infrastructure must be maintained. No trains can run during maintenance. Fixed time windows for maintenance work simplify maintenance and can also be used for smaller construction work. What makes more sense from the perspective of the passengers you represent?"

End-customers were asked whether they would be more willing to accept total closures or extended alternative timetables related to construction work. While the responses concerning shorter journeys with a straight-line distance up to 99 kilometres did not show a uniform pattern, the predominant response (at least 63 percent of those surveyed) concerning longer journeys is that alternative timetables due to construction work are preferable to shorter-term total closures. This shows that the importance of travel time decreases with longer journeys and also that the continued running of trains is considered more important than offering alternative forms of transportation when trains are not running.

Selling of tickets in Germany's long-distance rail passenger transport market

While it can be said that competition in the selling of tickets is growing (e.g. competition procedures for the operation of ticket machines or apps/web applications that function internationally), the ticket sales systems of the DB group are nevertheless dominant. For this reason, one of the questions in the passenger transport end-customer survey was what options the respondent is familiar with for purchasing domestic and international tickets in long-distance rail passenger transport in Germany other than what is available through DB.

Only around 16 percent of all respondents named thetrainline.com as an application for booking domestic and international tickets; other applications received even less mention.

The fact that systems outside the DB group received little mention as applications for booking tickets shows that the DB systems dominate the market for selling tickets.

Another question related to the advantages of stronger competition in the selling of tickets showed that nearly 70 percent of respondents said that they see no advantage to stronger competition in the selling of tickets.

Prioritization of trains on congested railway lines

The German railway system timetables are increasingly tight, due in part to the elimination of practical components for scheduling such as buffer times. While this makes it possible for more trains to run, operational quality can quickly deteriorate because there are only a few options to resolve (hardly avoidable) disruptions when they occur and avoid delaying other trains.

The expansion of operations in rail passenger services also makes it difficult for rail freight transport to get attractive timetable slots and thus contribute to the desired climate policy shift from the roads to the rails. Both of these topics were integrated into the passenger transport endcustomer survey. Reference was made to "congested railway lines".

One way to increase operating quality is to reduce the number of trains running on a given route. So the question was asked whether, from the perspective of the passengers represented by the respondent, it would be better to run trains at more frequent intervals (every 15-20 minutes) with trains often arriving late, or if it would be better if fewer trains (every 30 minutes) were to run but the trains were on time and had more seats available.

The majority (64 percent of the respondents) answered that the passengers they represent would prefer trains at 30-minute intervals that are on time and offer more seats; 26 percent assumed there would be no preference and only 10 percent indicated a preference for more frequent trains even if the trains are less punctual.



Figure 68: Responses to the question, "Congested railway lines caused by large numbers of trains (and in particular due to "mixed transport services") often result in poor operating quality and, along with that, more late trains. Reducing the number of trains could often have a positive impact on operating quality. From the perspective of the passengers you represent, what is better?"

Although the result could change if other intervals had been mentioned in the question, there appears to be a tendency (which is the opposite of the response in the last question) to feel that fewer trains are better than more trains if it improves punctuality.

As the questions related to Deutschlandtakt showed, respondents want Deutschlandtakt to result in noticeable relief to (federal) roads. A supplementary question relating to congested railway lines was asked: whether or not regional and local rail passenger transport should be thinned out or even stopped during times of low demand. Respondents were asked to answer from the perspective of the passengers they represent.

Thinning out regional and local rail passenger traffic on congested railway lines to benefit rail freight traffic was accepted by 43 percent of the representatives of the passenger associations but rejected by most regional transport authorities.



Figure 69: Responses to the question, "Could the passengers you represent imagine running fewer regional and local rail passenger trains on congested railway lines during times of low demand to create more capacity for rail freight transport?"

Quality of passengers' stays on the trains and at the train stations

One question regularly asked in the biennial passenger transport end-customer survey is about the quality of passengers' stays at the train stations and on the trains.

While the majority of passengers indicate that they are "very satisfied" or "generally satisfied" with their stays on both the long-distance passenger trains and on the regional and local passenger trains, their responses when asked about the quality of their stays at train stations is alarmingly negative.

Around 80 percent of respondents in regional and local rail passenger transport are generally dissatisfied and nearly a quarter of them are actually very dissatisfied.

A follow-up question was asked as to where train stations need to be invested in most urgently. In addition to investments in service and passenger information standards, nearly 100 percent of the respondents consider investments in the quality of their stay at train stations "important" (around 75 percent) or "fairly important".

Successful transition in the transport sector calls for improvements, including at train stations and stops. The condition of the access points for potential travellers could often be a reason why they travel by car instead of by rail.



Figure 70: Responses to the question, "Where is investment in train stations needed most urgently?"



Figure 71: Responses to the question, "How satisfied are the passengers with the quality of their stays at the train stations and on the trains?"

2. Railway infrastructure: railway lines

In 2022, the Bundesnetzagentur received data for the 2021 reporting year from approximately 140 route operators. Following a decline in operating performance in the previous year in the wake of the pandemic, the number of train-kilometres operated rose to a record high in 2021.

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2. Railway infrastructure: Railway lines

Route operators

Number of route operators

For its railway market survey, the Bundesnetzagentur gathered data from 140 route operators for the 2021 reporting year. Besides three federally owned route operators, a total of 137 nonfederally-owned route operators are active in Germany.

According to information from the respective operators, there are 33 route operators that provide only rail freight transport service or other transport services in their railway networks. Another 49 route operators use their networks exclusively for rail passenger transport. Four route operators reported that transport services were not provided in their networks during the reporting year. Mixed transport services were provided on the routes of the other 54 route operators. Twenty-one route operators are heritage railways. Narrow-gauge systems are operated by 22 route operators.

Operating performance

The number of train-kilometres operated in the German railway network rose steadily until 2019. The coronavirus pandemic then triggered a downturn in 2020, although the decrease was moderate at 2 percent. The recovery effect in 2021 led to an increase in operating performance to 1,143mn train-kilometres, a record high.

An increase in the number of train-kilometres operated was reported in all categories of transport service, with the exception of "other". The largest percentage increase in operating performance (11 percent) was observed in rail freight transport, marking a return to its pre-pandemic level. Longdistance rail passenger transport and regional and local rail passenger transport reported single-digit growth in their transport services (5 percent and 2 percent respectively).

Non-federally-owned railway infrastructure was used for less than 4 percent of the train-kilometres operated. Traffic density on non-federally-owned railway infrastructure averaged 16 trains per route kilometre per day; this traffic primarily occurred in regional and local rail passenger transport. Traffic density on federally owned infrastructure was significantly higher at 91 trains per route kilometre per day.

Train-kilometres by type of service millions of train-kilometres



Figure 72: Development of the number of train-kilometres travelled (2017-2021; in millions of train-kilometres)

Regional and local rail passenger transport accounted for 63 percent of the total number of train-kilometres operated in the entire German railway network. Long-distance rail passenger transport and rail freight transport, combined with other transport services, accounted for 13 percent and 24 percent respectively of total capacity utilisation. These proportions have been relatively stable for years



Development of the rail network length and degree of electrification

in kilometres

Figure 73: Development of Germany's rail network and the degree of electrification in the rail network (1994-2021; length in kilometres; shares in percent)



Length of lines run by route operators

Figure 74: Overview of the length of routes operated by infrastructure managers (2021; route length in kilometres)

Resources of the route operators

Railway network

Germany's public railway network measured 39,261 kilometres in length in 2021. Total track length was 60,700 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 85 percent of the German public railway network. The remaining 15 percent – 5,883 kilometres – were operated by non-federallyowned route operators.

Although up to 61.5 percent of the network operated by DB is electrified, the electrification rate of the non-federally-owned route networks is only 10.1 percent, with interurban tramways which are operated under the Construction and Operation of Railways Regulations (Eisenbahn-Bau- und Betriebsordnung - EBO) accounting for most of this. In total, the overall electrification rate for the German railway network is 53.8 percent. The degree of electrification has increased only very slowly in the past several years.

In addition to 1435 mm standard gauge networks, both DB and non-federally-owned route operators run non-standard gauge networks with track widths of 600, 750, 900 and 1000 mm.

The route operators reported that 406 kilometres of their railway networks are equipped with ETCS, less than 1 percent of the entire German railway network. The high-speed train network with routes designed for maximum speeds of at least 250 km/h had a length 1,104 kilometres. This is equivalent to 2.8 percent of the entire railway network. To date, only DB Netz AG operates ETCS and high-speed transport routes.

The majority of route operators do not have a large network. In many cases they operate just one route. Of the 5,883 route kilometres operated by nonfederally-owned route operators, some 1,200 kilometres are leased from DB. The lengths of the routes these undertakings operate range from just a few kilometres to several hundred kilometres, with an average route length of 43 kilometres. More than 100 non-federally-owned route operators manage a route network with a length of less than 50 kilometres. Thirty-five of them operate networks with a route length of less than ten kilometres. Non-federally-owned route operators comprise not only private undertakings but also districts, municipalities and special purpose associations. These networks are used primarily for rail freight transport, but often for contracted or non-PSO rail passenger transport services as well.

The route operators categorise a total of around 225 route kilometres as not immediately ready for operation.

Personnel

The number of persons employed by route operators has steadily increased in recent years. Approximately 46,000 persons worked in this area in 2021. The growth seen here was due in part to the sector-wide hiring of new workers to compensate for foreseeable outflows resulting from retirements.

Employment at route operators

in thousands of full-time equivalents



Figure 75: Development of employment at infrastructure managers (2017-2021; in thousands of full-time equivalent)

In 2021, the share of women employees at route operators continued to be around 20 percent. The share of part-time employees was 8 percent, remaining constant over the 2020 reporting year after having grown only slightly but continuously in prior years. At around 8 percent the training rate for 2021 likewise remained at the same level as for the previous year.



Personnel structure at non-federally-owned

Figure 76: Personnel structure at non-federally owned infrastructure mangers (2021; shares in percent)

In 2021, 50 percent of the personnel at nonfederally-owned route operators were over the age of 50 and 12 percent were under the age of 30. Employees between 30 and 50 years of age accounted for the remaining 38 percent.

Looking at all route operators, the largest share of employees – 45 percent – is between 30 and 50 years old. At 17 percent, employees under the age of 30 comprise the smallest share.





Figure 77: Personnel structure at infrastructure managers (2021; shares in percent)

As part of the market survey, route operators have the opportunity to rate the availability of technical operational railway personnel (such as operations schedulers, traffic controllers) and other personnel, using a scale of 1 ("good availability") to 5 ("places company's existence at risk").

Availability of personnel	2017	2018	2019	2020	2021	2022	Trend
Operational personnel	3.0	3.2	3.1	3.2	2.9	3.1	N
Other personnel	2.6	2.7	2.7	2.8	2.7	2.7	→

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

The trend arrows refer to the trend from 2021 to 2022.

Figure 78: Ratings assigend the availability of personnel for infrastructure managers (2017-2022; average values)

Ratings given for technical operational railway personnel (such as operations schedulers and traffic controllers) worsened slightly from 2.9 to 3.1. The rating for other personnel stagnated, remaining unchanged at 2.7 in 2021 and 2022.

Many route operators pointed to the good economy and a general shortage of skilled labour, particularly in technical fields such as the construction sector. This also applies to railway-specific occupations such as traffic controllers and engine drivers. This situation manifests itself in, for example, smaller numbers of applicants or the loss of employees to other railway undertakings due to the latter's active recruitment efforts. Many small route operators depend on volunteers.

Access to railway infrastructure

Network statements for railway infrastructure

All route operators are required by law to provide all access beneficiaries access under nondiscriminatory terms and conditions to the infrastructure they operate.

Under certain circumstances however, the Rail Regulation Act (ERegG), which entered into force in September 2016, allows for limiting free access when the respective infrastructure is deemed to be of little or no competitive importance.



Route operators with a published

Without a network statement and agreement for operational safety

With a network statement and agreement for operational safety

Figure 79: Share of infrastructure managers that have published a network statement and agreements on operational safety (2017-2021; shares in percent)

Route operators are required by law to issue terms of use known as a network statement for the railway infrastructure they operate.

There are exceptions to this, such as for industrial railways and non-standard-gauge railways. When railway lines are used solely for heritage railway service, the respective route operators can also be exempted from the requirement to issue a network statement. This applies to just 21 route operators; requests that have not yet been decided were not counted here. Furthermore, the Bundesnetzagentur can, upon application and when certain conditions are met, grant to parties not belonging to this group exemptions from the requirement to issue a network statement. Accordingly, 41 of the 140 active route operators have been exempted from the requirement to issue a network statement. Another 37 do not have to issue a network statement. They are, however, required to prepare an agreement on operational safety.

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 2021, 95 percent of the route operators 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 completed.

The Bundesnetzagentur continues to encourage infrastructure managers to draw up in a timely manner service facilities network statements that are in conformity with the law.

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 ("unsatisfactory, urgent action necessary").

Since 2010, the ratings given for access to railway infrastructure indicate a slow decline in the level of satisfaction. This trend continued through the reporting period.

The primary reasons for the decline in satisfaction include expectations that have been driven by the competition's many years of growth which stand in contrast to the steadily growing amount of traffic in the railway network in combination with largely stagnant capacities and an accompanying decline in operational quality.

At the same time, all areas examined for the survey received overall ratings of good or satisfactory.

The state of maintenance and development of the railway network and the category construction planning were once again the subject of the strongest criticism from access beneficiaries. The ratings given for the development and maintenance of the railway network in the years since 2010 were consistently better than in 2022. The ratings the parties gave in 2022 for the execution of scheduled construction measures were all worse than the 2.9 assigned during the survey for the 2010 reporting year, the first time this survey was conducted.

The survey respondents particularly complained that they were not sufficiently involved in the planning of construction measures or were not able to exert any influence on the execution of construction measures. Subsequent changes to the original construction plans and deviations from the plans in their execution were also frequently criticised. The access beneficiaries particularly criticised having to use diversionary routes.

On the other hand, a very large majority gave a good or very good rating for the provision of timely information regarding the execution of scheduled construction measures.
Track access	2017	2018	2019	2020	2021	2022	Trend
Allocation of ad hoc train paths	2.2	2.3	2.3	2.3	2.5	2.6	М
Allocation of scheduled train paths	2.3	2.3	2.4	2.3	2.4	2.4	→
Rail timetable quality	2.5	2.6	2.5	2.5	2.7	2.7	·
Train operation during disruptions	2.6	2.7	2.6	2.6	2.7	2.8	<u> </u>
Construction planning	3.0	3.1	3.1	3.0	3.0	3.2	. 🖌
Network development	3.1	3.1	3.2	3.2	3.2	3.4	· <u> </u>
Network condition	3.0	3.1	3.1	3.1	3.1	3.3	<u> </u>

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

The trend arrows refer to the trend from 2021 to 2022.

Figure 80: Ratings given for access to railway infastructure by railway undertakings (2017-2022; average values)

Scheduled construction measures	2017	2018	2019	2020	2021	2022	Trend
Timely notification (only working timetable)?	1.9	2.0	2.0	2.0	2.2	2.1	7
Timely notification (only construction measures during the year)?	2.4	2.5	2.4	2.4	2.5	2.6	2
Was the railway undertaking involved in planning and coordinating the construction measures?	2.7	2.8	2.8	2.7	2.9	2.9	→
Was the railway undertaking able to exert influence on the construction measure?	3.5	3.5	3.3	3.3	3.5	3.5	→
Was it necessary to use diversionary routes?	3.3	3.4	3.5	3.5	3.4	3.8	<u> </u>
Was it necessary to provide a replacement bus service?	2.5	2.5	2.6	2.5	2.4	2.8	2
Were notifications regarding changes in plans no sent oder sent too late?	2.7	2.8	2.9	2.8	2.8	3.1	2
Were the deviations from the plans when the measures were conducted?	2.8	2.8	3.0	2.9	2.9	3.1	2

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

The trend arrows refer to the trend from 2021 to 2022.

Figure 81: Ratings regarding the instrastrucutre managers' scheduled construction measures (2017-2022; averages values)

Charges for the use of railway lines

Track access charges

By law, the track access charges payable to route operators are to be determined based on the costs incurred in connection with operating and maintaining the railway infrastructure. As an exception to this, DB Netz AG is bound by an incentive system which places a ceiling on the total of its charges.

Track access charges can vary greatly, depending on the type of use, traffic density and the general condition of the railway infrastructure. Furthermore, maintenance measures (such as bridge restoration) can in the longer term also have a strong influence on the level of usage charges. Age, the level of modernisation, and condition of the railway infrastructure as well as topographical features (bridges/tunnels, complicated routing) are likewise important cost factors.

Public funding accounts for a significant part but not all of the financing for the transport infrastructure in Germany.

The weighted arithmetic mean of the track access charges that route operators levied in 2021 was €5.01 per train-kilometre¹⁰. This was an increase of just over 2 percent increase on the previous year. At €5.60 per train-kilometre, the median was somewhat higher.



Figure 82: Range of the average track access charges (2021; euro per train-kilometre)

When non-federally-owned railway lines are used primarily or exclusively for rail freight transport, these route operators often demand track access charges that are significantly higher than the abovementioned figures. In some cases, the amount to be paid per train-kilometre is significantly more than €20. The primary reason for this is the generally lower utilisation rates for these railway lines, but also the greater wear caused by the usually heavier trains.

Track access charges in regional and local rail passenger transport in 2021 averaged €5.26 per train-kilometre.

At \in 7.27 per train-kilometre, track access charges in long-distance rail passenger transport were significantly higher. When the prorated refunds disbursed in 2021 for paid track access charges in long-distance rail passenger transport are taken into account, the average charge is \in 0.15.

By contrast, in the rail freight segment, railway undertakings had to pay an average of €3.15 per

¹⁰ Track access charge assistance in rail freight transport was not taken into account here.

train-kilometre (without netting-off the track access charge assistance). When these refunds are taken into account, the real average track access charge in rail freight transport was ≤ 0.07 per train-kilometre.

Between 2017 and 2021, the track access charges railway undertakings had to pay increased by an average of more than 12 percent in long-distance rail passenger transport. With the exception of the producer price index for industrial products, this increase is significantly greater than other important benchmark indicators such as the consumer price index. However, it also exceeds the Infrastructure Managers' Input Price Index published by the Bundesnetzagentur which reconstructs the typical cost structure of an infrastructure manager more precisely by using a combination of publicly available indices published by the Federal Statistical Office rather than general indices.

Viewed over a longer period, the rates of change seen in the Infrastructure Managers' Input Price Index are relatively similar to those observed in other indices. The Infrastructure Managers' Input Price Index has only informational value and has no regulatory effect.

The average track access charge in regional and local rail passenger transport has increased by around 8 percent since 2016. The 1.8 percent cap placed on the permissible annual increase was a decisive factor here.

Track access charges in rail freight transport fell between 2017 and 2018. In 2021, they were 2.3 percent higher than in 2017. This was due to adjustments to the track access charges undertaken in connection with approval procedures conducted by the Bundesnetzagentur. The average nominal track access charge for rail freight transport began rising again in 2019. The federal government has been refunding €350mn a year in paid track access charges since the second half of 2018. In practice, this has nearly halved the track access charges which railway undertakings actually have to pay. In the wake of the coronavirus pandemic, this assistance was increased for a limited time in 2021 to a total of 98 percent of the track access charges, analogously to the assistance granted for long-distance rail passenger transport.



Development of infrastructure managers' average track access charges

Figure 83: Infrastructure managers' average track access charges including the track access charge assistance granted in longdistance rail passenger transport and rail freight transport (2017-2021; indexed 2017 = 100)

Lists of charges

Route operators are required by law to draw up and publish lists of their charges for the use of their railway infrastructure. However, the law does also allow for exceptions here, which have been granted in the case of 41 of the 140 route operators.

A total of 95 percent of the route operators that are required by law to draw up and publish lists of their charges fulfilled this obligation, the same level as in the previous year.

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 priceperformance ratio of the route operators' pricing systems on a scale of 1 ("very good") to 5 ("unsatisfactory").

The assessments they provided in 2022 did not change over 2021. Their average rating for the level of non-discrimination of the route operators' 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.

Track access charges	2017	2018	2019	2020	2021	2022	Trend
Non-discrimination charging systems tracks	2.4	2.3	2.4	2.3	2.4	2.4	
Price-performance ratio tracks	3.0	3.0	2.9	2.8	2.9	2.9	→

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action). The trend arrows refer to the trend from 2021 to 2022.

Figure 84: Ratings assigned by parties with access entitlement for the pricing systems and charges levels (2017-2022; average values)

Economic situation of route operators

Revenue

Route operators generate their income from the charges they collect for the use of their train paths and from external funding. In 2021 they generated a total of €5.7bn in income through track access charges.

Route operators' total revenue from track access charges

shares in percent



Regional and local passenger rail transport
 Long-distance passenger rail transport

Figure 85: Revenue generated by infrastructure managers through track access charges, by type of service (2017-2021; revenue in billions of euros; shares in percent)

Route operators generated approximately €600mn more revenue in 2021 than in 2017. This translates into an average annual rate of increase of around 3 percent.

Looking at the entire market, two thirds of all revenue in 2021 was generated in regional and local rail passenger transport. As in 2020, long-distance rail passenger transport accounted for 19 percent. The share held by rail freight transport declined to just under 15 percent.

Infrastructure assistance

The Performance and Financing Agreement III (Leistungs- und Finanzierungsvereinbarung -LuFV III), which entered into force 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 numerous measures for the railway sector in general and for the federally owned route operators in particular through the 2021 reporting year as well. These measures apply to federally owned and nonfederally-owned operators to varying degrees or in varying forms.

Financing of investments

The route operators surveyed received slightly less than €4.44bn in external funding during the 2021 reporting year to invest in existing infrastructure. They also reported spending €141mn of their own funds for this. All in all, somewhat more than €4.58bn were invested in existing infrastructure. Federally owned infrastructure managers are required under the LuFV to contribute funds of their own to investments in the existing railway network.

Nearly €3.3bn in external funding were invested in the new construction or expansion of the infrastructure. Federally owned infrastructure managers invested more than €1.6bn of their own resources in the new construction or expansion of infrastructure.

As a result, the external funding rate was 67 percent for new construction or expansion of infrastructure, and 97 percent for investments in the existing railway network.

The federal government provided more than €6.9bn of funding for investment measures in 2021, which equates to 90 percent of the total funding received by route operators. Germany's federal states and local authorities provided around 9.5 percent (somewhat more than €0.7bn), while EU funding covered nearly 0.4 percent (some €28bn). Around €215,000 for investments came from private sources.



Figure 86: Investments in infrastructure and the funding sources (2021; investment in millions of euros; shares in percent)

Results situation

As in previous years, non-federally-owned route operators continued overall to expend more on their railway lines than they generated through track access charges.

Regional and local rail passenger transport was the source of most (around 85 percent) of the revenue that non-federally-owned route operators generated from track access charges. Rail freight transport accounts for 15 percent of their revenue.

Personnel costs comprised the largest block of expenses (31 percent), followed by material expenditure (27 percent). Write-downs account for 26 percent. At 15 percent, the "other" expenditure category represents the smallest block ot total expenditure. The average equity ratio of the non-federallyowned route operators – 30 percent – was lower than the average for the overall market. Based on the reported numbers, DB Netz AG had an equity ratio of 43 percent which applies to the entire market. In its annual report, DB Netz AG lists its equity ratio as 42 percent which was achieved primarily due to an additional contribution the German federal government made to DB Netz AG's capital reserves.

Revenues and expenditures of nonfederally owned infrastructure managers Totals in mio. euro | shares in percent



Figure 87: Revenue and expenditure of non-federally-owned route operators (2021; total values in millions of euros; shares in percent)

3. Railway infrastructure: service facilities

In 2022, the Bundesnetzagentur received data for the 2021 reporting year from more than 670 service facility operators.

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3. Railway infrastructure: service facilities

Service facility operators

Number of service facility operators

For its 2022 railway market survey for the 2021 reporting year, the Bundesnetzagentur gathered data from more than 670 service facility operators. Nearly every infrastructure manager also operates service facilities. Tracks with a total length of more than 11,000 kilometres are 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.

Types and number of service facilities

Germany's railway infrastructure encompasses more than 30,000 different, publicly accessible service facilities. This includes nearly 19,000 storage sidings. There are also 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 combined transport), approximately 370 railway fuelling stations/refuelling facilities and nearly 400 maintenance facilities. Furthermore, based on information available to the Bundesnetzagentur, approximately 150 port facilities are connected to the German railway network.

Resources of service facility operators

Personnel

In 2021, service facility operators in Germany employed a total of approximately 39,000 workers (measured in full-time positions). The number of employees has increased in recent years. Similarly to route operators, market participants are also faced with the challenge of adequately filling positions that have become vacant due to retirement.



Employee numbers at service facility operators in thousands of full-time positions

Figure 88: Development of employment at service facility operators (2017-2021; in thousands of full-time equivalents)

Economic situation

Revenue

Service facility operators generate their revenues from the charges they are paid for the use of their service facilities and from external funding.





Charges for other service facilitiesStation charges

Figure 89: Development of revenue generated from charges from the use of service facilities (2017-2021; in billions of euros)

Station charges account for more than 60 percent of the revenue generated from charges for the use of service facilities. With €0.9bn, stops used in regional and local rail passenger transport were the source of most of this revenue; long-distance rail passenger transport stops produced approximately €0.1bn in revenue. Charges for the use of other service facilities generated around €0.6bn.¹¹ Charges generated from the use of storage sidings account for approximately €0.15bn of this, €0.14bn are attributable to marshalling yards, while charges for the use of terminals for combined transport generated €0.18bn.

¹¹ 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

Assistance and funding for service facility operators

As the largest operator of passenger stations, DB Station&Service AG is responsible for the construction, operation and maintenance of approximately 5,400 passenger stations in Germany.

In addition to financing provided through the LuFV and financing for new construction projects, there are other assistance programmes such as the ZIP programme for investment in the future by improving accessibility and a programme to revitalise underground passenger transportation facilities. Germany's federal states additionally offer various support programmes, such as "Stationsoffensive Bayern" for stations in Bavaria, a station modernisation programme in Baden-Württemberg, the "Niedersachsen ist am Zug" programme in Lower Saxony and a modernisation campaign in North Rhine-Westphalia.¹²

In 2020, the Federal Ministry for Digital and Transport (BMDV) and Deutsche Bahn launched an immediate action programme for making train stations more attractive. This programme was continued in 2021. As part of this economic stimulus programme, the BMDV is providing Deutsche Bahn €40mn to renovate train stations, while at the same time fostering regional craft establishments. Approximately 170 stations around the country benefitted from these measures.

Operators of freight terminals for combined transport services can receive funding using the Guidelines on funding investments in transloading facilities for combined transport ("Richtlinie zur

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

¹²https://www.deutschebahn.com/de/bahnwelt/bauen_bahn/Ba hnhofsbauprogramme-5675586 Förderung von Investitionen in Umschlaganlagen des Kombinierten Verkehrs", available only in German). The current guidelines went into effect on 4 January 2017 and were extended through 30 September 2022.

Since December 2020, operators of train formation facilities/marshalling yards have been able to apply for external funding on the basis of the Guidelines on a prorated financing of charges in service facilities for rail freight transport with a focus on single wagonload transport ("Richtlinie über eine anteilige Finanzierung der Entgelte in Serviceeinrichtungen des Schienengüterverkehrs mit dem Schwerpunkt Einzelwagenverkehr", available only in German).

Market outcome

The survey data show that the market outcome of non-federally-owned service facility operators for the 2021 financial year once again worsened significantly over the previous year.

Revenue and expenditure of non-federally owned service facility operators in percent



Figure 90: Revenue and expenditure of non-federally owned service facility operators in the respective year (2017-2021; shares in percent) Expenditure for maintenance, depreciation and the operation of service facilities markedly exceeds the revenue generated from charges for the use of infrastructure. In 2021, this shortfall grew to 34 percent and has now increased for the second year in a row.

It can still generally be assumed that the function of many non-federally-owned service facilities is to support the respective company's primary business purpose. For this reason, not every enterprise has the aim of generating a profit with its service facilities. In many cases, railway operations do not constitute a core business activity for these enterprises, and any shortfalls are offset by other business units.

Examination of selected service facilities

Maintenance facilities

Regular maintenance is of crucial importance for the safe and reliable use of rolling stock. In addition to this work, there are comprehensive inspections and repairs to be performed, 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 2021 market survey conducted for the 2020 reporting year, when asking maintenance facility operators about the type of services they offered and/or performed, the question in this year's survey likewise no longer pertained to 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.

Revenue generated by maintenance facilities

Shares of maintenance types in the overall market, as well as shares of federal and non-federal operators per maintenance type



Figure 91: Revenue generated by maintenance facilities (2021; shares in percent)

This resulted in nearly 400 locations with maintenance facilities being reported to the Bundesnetzagentur by around 220 operators at the time this report was being prepared. These include more than 100 maintenance facilities that are operated by 11 federally owned operators. As in previous years, most maintenance facilities are operated by undertakings that are also railway undertakings or leasing companies for rolling stock or companies that are affiliated with them. The number of undertakings that are new in the market is 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, in some cases historical, rolling stock. In addition, independent operators and rolling stock manufacturers also provide maintenance services for customers. At the same time, the total revenue reported for the 2021 reporting year increased slightly to nearly €3.3bn.

As in the previous year, work performed on one's own rolling stock or the rolling stock belonging to one's corporate group accounted for some 89 percent of total revenue. Approximately 84 percent of the total revenue was generated by federally owned operators, about the same level seen in the previous year.

Germany was subdivided into 15 maintenance markets for the Report on Markets for Railway Maintenance Facilities that was issued in German in April 2020. This maps out the wide variety of maintenance services, the requesting parties' different needs, and the differences in the workshop equipment, know-how and vehicle technology. Measured in terms of revenue, on-site maintenance of vehicles in regional and local rail passenger transport continues to comprise the largest category with somewhat more than 30 percent of total revenue, followed by on-site maintenance of multiple-unit trains used in longdistance rail passenger transport with approximately 16 percent.

In the majority of the maintenance markets, the revenue generated by federally owned operators continues to exceed the revenue generated by nonfederally-owned operators. Heavy maintenance for diesel-powered locomotives and maintenance for tank wagons continue to be exceptions. Here, nonfederally-owned operators account for around 56 percent and 97 percent of the revenue generated through the respective type of maintenance.

The Bundesnetzagentur maintains a database with the addresses of maintenance facilities in Germany and of providers of mobile maintenance services. It also offers an interactive map showing the locations of maintenance facilities. This map is available at: www.bundesnetzagentur.de/werkstattkarte



Figure 92: Locations of maintenance facilities in Germany

Transloading facilities (freight terminals and terminals for combined 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 more than 1,000 locations in Germany that have transloading facilities with track systems. These are run by approximately 270 operators.

More than 860 of these are conventional freight terminals (which include loading tracks, ramps and bays). Freight terminals for combined transport are in operation at more than 180 locations. Approximately 30 locations have a transloading facility that can handle conventional freight and freight for combined transport services. Around 10 of these facilities are located in a port.

More than 150 of the over 860 conventional freight terminals are operated in ports.

Of the more than 180 freight terminals dealing only with combined transport, over 80 are operated in ports.

Looking at transloading facilities with track systems, more than 160 of these are located in the federal state of Bavaria, followed by the states Lower Saxony with more than 150 locations and North Rhine-Westphalia with around 130 locations.

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

To ensure reasonable, non-discriminatory access to public railway infrastructure, network statements for service facilities were issued for approximately 90 percent of these locations. However, measured in terms of the number of operators, slightly more than two-thirds have issued a network statement for their service facilities. One-third of these undertakings have not yet issued a network statement.

More than 220 locations having transloading facilities with 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	Total
Rail Freight Corridor 1 (Rhine - Alpine)	70
Rail Freight Corridor 3 (Scandinavian - Mediterranean)	64
Rail Freight Corridor 4 (Atlantic)	13
Rail Freight Corridor 7 (Orient/Eastern Mediterranean)	24
Rail Freight Corridor 8 (North Sea - Baltic)	112
Rail Freight Corridor 9 (Rhine - Danube)	13

Figure 93: Number of transloading facilities that are located in a freight transport corridor

In 2021, the following types of freight were transloaded at more than 1,000 locations:

Goods type	Total
Agricultural goods (grain, oilseeds, feed, etc.)	192
Wood and other forest products	137
Goods in combined transport (container, swap bodies, trailers, etc.)	161
Paper rolls and other pulp products	151
Vehicles, machinery and machine parts	130
Steel products (coils, slabs, steal beam, steel profiles, sheets, etc.)	206
Scrap metal (NE- and other scrap metal)	161
Waste/Disposal (waste paper, waste glas, old textiles, building material recycling, etc.)	113
Liquid or. gaseous goods (petroleum products, gases, crude oil, vegetable oils, etc.)	55
Bulk goods (coal, ores, stones, grounds, building materials, etc.)	249
Chemicals, fertilizer	40
Dangerous goods	18
Components and finished parts made of concrete	52

Figure 94: Number and overview of the types of freight transloaded in locations with loading and unloading facilities

In addition to the above-listed types of goods, other types of goods that were transloaded at locations with loading and unloading facilities were also reported. These include blocks of stone, forestry products, track-laying machines, subway carriages, peat, palletised goods for forklifts, rolling stock and associated components, (empty) repair wagons, overseas shipping containers, chemical products on pallets, military tracked vehicles, granite stones, paving stones, industrial scales, cellulose and heavy goods with a unit weight of less than 165 tonnes.



Figure 95: Location of freight terminals in Germany

Railway infrastructure in ports

The Bundesnetzagentur currently knows of approximately 150 facilities¹³ with railway infrastructure that are sited in ports. More than 220 undertakings are active at these over 150 locations. Their service facilities include transloading facilities with track systems (conventional freight terminals and terminals for combined transport services), storage sidings, train formation facilities/marshalling yards, maintenance facilities and refuelling facilities (fuelling stations).

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

At around 70 locations the operator of the rail infrastructure in the port also operates a transloading facility (conventional freight terminal or terminal for combined transport services) with a track system.

At more than 40 ports the track system operator in the port and the transloading facility operator are different companies.

To ensure reasonable, non-discriminatory access to public railway infrastructure, more than 90 percent of the operators¹⁴ have issued network statements for their service facilities.

At slightly more than half of the port locations with rail infrastructure, just one company operates the infrastructure (track system and transloading facilities). More than 108 locations with railway infrastructure in a port are located in one of the European Union's rail freight corridors. Their locations are broken down as follows (multiple counts are possible because some port facilities are located along more than one rail freight corridor):

Corridor name	Total
Rail Freight Corridor 1 (Rhine - Alpine)	34
Rail Freight Corridor 3 (Scandinavian - Mediterranean)	32
Rail Freight Corridor 4 (Atlantic)	7
Rail Freight Corridor 7 (Orient/Eastern Mediterranean)	21
Rail Freight Corridor 8 (North Sea - Baltic)	49
Rail Freight Corridor 9 (Rhine - Danube)	11

Figure 96: Number of locations with rail infrastructure in ports which are located in a rail freight corridor

At port locations with railway infrastructure, revenue from infrastructure usage charges paid by the service facility operator's own railway undertaking and by external users exceeded €160mn. Revenue from external users of port infrastructure was slightly more than €143mn. The increase seen in revenue from the use of the railway infrastructure over previous years is due to the fact that the Bundesnetzagentur now takes into account the charges imposed by operators of loading and unloading facilities in ports.

¹³ These are locations (such as a city name). When all undertakings (including those with various addresses) are added into the count, there are more than 220 facilities.

¹⁴ "Traditional" port railways are meant here. When all public undertakings with railway infrastructure in ports are included, more than 81 percent of the locations have a network statement for service facilities.



Figure 97: Locations with rail infrastructure in ports

Access to service facilities

Network statements for service facilities

Railway infrastructure managers are required by law to provide all access beneficiaries access under non-discriminatory terms and conditions to the infrastructure they operate.

Free access can be limited only when certain requirements that have been specified in European and German legislation have been met. This can be the case when the respective infrastructure is deemed to be of little competitive importance, such as in the area of industrial railways (section 15 ERegG) or infrastructure that is of cultural interest and used for cultural or historical purposes.





Figure 98: Share of service facility operators which have published a network statement (2017-2021; shares in percent)

Infrastructure managers are additionally required to issue network statements for the railway infrastructure they operate. Depending on the type of infrastructure being operated, this obligation involves issuing a network statement and/or a network statement for service facilities. There are exceptions to this, such as for industrial railways and non-standard-gauge railways. Furthermore, the Bundesnetzagentur can, upon request, grant exemption from this requirement when certain conditions are met. However, there are still minimum obligations that have to be fulfilled, such as preparing an infrastructure description (description of the service facility).

The only exceptions here are facilities that serve solely museum-related purposes or heritage railway work. This applies to approximately 2 percent of all operators of service facilities for standard-gauge railways.

Before they can go into effect, the Bundesnetzagentur reviews the terms and conditions for access to ensure their conformity with the law. They take effect only after the Bundesnetzagentur confirms they fulfil the legal requirements.

In 2021, approximately 53 percent of the service facility operators who were required to publish a network statement did so.

The Bundesnetzagentur strives to further increase the level of market penetration and encourages infrastructure managers to prepare legally compliant network statements for service facilities on a timely basis.

Assessment of access to service facilities

As part of the annual market survey, access beneficiaries are given the opportunity to assess access to service facilities and rate it on a scale from 1 ("very good, no need for action") to 5 ("unsatisfactory, urgent action necessary").

The period from 2017 to 2022 saw particular improvement in the ratings for the current state of development and maintenance of passenger stations. This was probably due to the fact that a growing number of passenger stations and passenger stops are being renovated or altered to be accessible. This evaluation slightly contradicts the trend seen in the assessments provided by passenger representatives (see the section on the end customer survey) who had not observed any improvement in sojourn quality at passenger stations. Ratings fell in a number of categories, including freight terminals and storage sidings, during this period. One reason for this could be the lack of infrastructure capacity in general and storage sidings in particular.

Access to service facilities	2017	2018	2019	2020	2021	2022	Trend
Freight yard/terminals/siding tracks	2.4	2.5	2.4	2.5	2.6	2.7	2
Marshalling yards/train formation facilities	2.4	2.5	2.5	2.6	2.8	2.7	7
Railway sidings	2.8	2.9	2.9	2.9	2.9	3.0	2
Ports with rail infrastructure	2.4	2.4	2.3	2.4	2.5	2.5	→
Maintenance facilities	2.4	2.5	2.5	2.4	2.6	2.6	→
Refuelling facilities	2.2	2.1	2.2	2.2	2.3	2.3	→
Passenger stations/stopping points	2.1	2.2	2.2	2.4	2.3	2.4	2
Modernisation of passenger stations	2.8	2.8	2.7	2.7	2.7	2.6	7
Condition of passenger stations	2.9	2.9	2.8	2.9	2.8	2.7	7
Training facilities	2.1	2.2	2.3	2.3	2.4	2.5	2

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

The trend arrows refer to the trend from 2021 to 2022.

Figure 99: Ratings for access to service facilities (2017-2022; averages values)

Charges for service facilities

Station charges

In 2021, operators of passenger stations charged an average of €5.85 for a train stop in the rail passenger transport segment with passengers boarding and alighting. By contrast, at €3.28 per station stop, the median is considerably lower because many of the smaller operators of passenger stations charge access beneficiaries lower rates per station stop, or the charge for using the passenger stations is already included in the track access charge. In addition, many non-federally-owned operators of passenger stations run basic stations, whereas DB Station&Service AG also operates significantly larger train stations with more extensive features and facilities. Correspondingly, its average station charge (€6.21) is higher than the overall average and markedly higher than the median.

Since 2017, charges for train stops at passenger stations have increased at the same approximate pace as the consumer price index and the infrastructure managers' input price index have during this time.

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. The law allows for exemptions from this obligation for operators of service facilities which are used exclusively for museum-related or heritage railway work. This is the case for 25 of the 670 service facility operators. The specified charges are to be collected on a nondiscriminatory basis from all users of the respective railway infrastructure. This also applies to undertakings that are affiliated under corporate law.

In 2021, 51 percent of the undertakings that operate service facilities had drawn up corresponding schedules of their charges. Here as well, the Bundesnetzagentur continues urging infrastructure managers to draw up lists of their charges as required by law.

Infrastructure managers' average station usage charges indexed | 2017 = 100



Figure 100: Average station usage charge of infrastructure managers (2017-2021; indexed 2017 = 100)

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 charging systems and the price-performance for action") to 5 ("unsatisfactory/ urgent action necessary"). During the time from 2017 to 2022, the average ratings remained in the middle range of the scale. Particularly noteworthy for this period was the decline in the ratings for traction current.

Non-discrimination in charging systems	2017	2018	2019	2020	2021	2022	Trend
Train paths	2.4	2.3	2.4	2.3	2.4	2.4	->
Passenger stations/stopping points	2.4	2.4	2.5	2.4	2.4	2.4	->
Freight yards/terminals/siding tracks	2.4	2.5	2.4	2.4	2.4	2.4	->
Marshalling yards/train formation facilities	2.5	2.6	2.5	2.5	2.6	2.6	->
Railway sidings	2.5	2.6	2.6	2.6	2.7	2.7	->
Ports with rail infrastructure	2.3	2.4	2.3	2.4	2.3	2.4	2
Maintenance facilities	2.2	2.4	2.4	2.4	2.5	2.4	~
Traction current	2.2	2.3	2.3	2.4	2.4	2.3	<u>></u>

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

The trend arrows refer to the trend from 2021 to 2022.

Price-performance ratio	2017	2018	2019	2020	2021	2022	Trend
Train paths	3.0	3.0	2.9	2.8	2.9	2.9	->
Passenger stations/stopping points	3.1	3.0	3.1	2.9	2.7	2.7	->
Freight yards/terminals/siding tracks	2.8	2.8	2.8	2.7	2.7	2.7	->
Marshalling yards/train formation facilities	2.9	2.9	2.8	2.8	2.8	2.9	2
Railway sidings	3.0	3.0	3.0	2.9	3.0	3.0	->
Ports with rail infrastructure	2.9	2.8	2.9	2.7	2.7	2.7	->
Maintenance facilities	2.6	2.6	2.6	2.6	2.7	2.7	->
Refuelling facilities	2.5	2.4	2.5	2.4	2.5	2.5	->
Traction current	2.8	2.7	2.9	2.7	2.8	3.1	2

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action). The trend arrows refer to the trend from 2021 to 2022.

Figure 101: Railway undertakings' rating onf the influecing of the pricing systems and level of charges (2017-2022; average values)

4. Industrial railways

In 2022 the Bundesnetzagentur received data for the 2021 reporting year from more than 1,100 operators of industrial railways. The Bundesnetzagentur currently has knowledge of more than 1,700 industrial railway sites.

4. Railway infrastructure: industrial railways

Operators of industrial railways/owners of private siding

For its 2021 railway market survey, the Bundesnetzagentur gathered data from the 2020 reporting year from more than 1,100 operators of industrial railways. More than 1,700 industrial railway sites operate railway tracks totalling more than 5,700 kilometres in length and routes totalling more than 420 kilometres in length.

Of the more than 1,700 industrial railway sites, more than 230 sites provided no freight transport services in the 2021 reporting year and another 250 sites (of the 1,700 total) were not ready for operation, which means that railway undertakings could not use these private siding tracks. One of the reasons for this is that these private siding tracks would first have to be put back into working order.

Around 70 percent of the industrial railway operators timetable period. are owners of their infrastructure.

In more than 67 percent of cases the industrial railway operators connect with the public network of federally owned rail infrastructure companies.

Types and number of service facilities

Industrial railway operators also indicated in the market survey that the following types of service facilities are operated at the individual industrial railway sites: loading and unloading facilities, storage sidings, train formation facilities/marshalling yards, maintenance facilities and refuelling facilities and in certain instances passenger stations.

At more than 10 sites the industrial railway operators also perform maintenance work.

Resources of industrial railway operators/owners of private siding

Personnel

In 2021, industrial railway operators/owners of private siding employed a total of around 6,500 workers (measured in full-time positions).

Status of the working timetable periods

Of the more than 1,500 industrial railway sites that were operational in the reporting year 2021, i.e. sites where freight was delivered by rail, around 65 percent were closed in their entirety and more than 14 percent in part during the 2020 working timetable period (15 December 2019 to 12 December 2020). More than one fifth of the industrial railway sites are open industrial railways, which means that they can be used by more than one (at least two) railway undertaking.

The status of the 2021 working timetable period (13 December 2020 until 11 December 2021) is proportionately similar to that of the 2020 working timetable period.

Industrial railway sites by federal state

Based on information currently available to the Bundesnetzagentur, the largest number of industrial railway sites (more than 370) are located in the federal state of North Rhine-Westphalia, followed by Bavaria with more than 310.

Because the Bundesnetzagentur does not yet have a record of all industrial railway operators/owners of private siding in Germany, it is in contact with the competent licensing authorities of the federal states (federal state railway supervisory authorities) and will initiate contact for the first time with other owners of private siding in future market surveys.

Transloading volumes

For 2021 the industrial railway operators/owners of private siding reported an incoming transport volume of more than 317mn tonnes and an outgoing transport volume of more than 672mn tonnes.

Types of transloading and breakdown of freight

The industrial railway operators can provide information in the survey about which freight and goods can be transloaded at their site. The following table shows a list of the types of freight and the number of sites that handle each type. Sites can indicate multiple types of freight since they do not always transload just one type of freight.

Market participants also had the opportunity to add other types of freight that they transload at their industrial railway site. These included hollow glass goods on pallets, anhydrite raw stone and lignite briquettes.

Funding

According to information available to the Bundesnetzagentur, industrial railway operators received funding for private siding tracks in the amount of around €12mn (2020: more than €24.6mn) for the 2021 reporting year. Other assistance in 2021 amounted to more than €2.02mn (2020: more than €2.09mn).

Goods type

Agricultural goods (grain, oilseeds, feed, etc.)	63
Wood and other forest products	75
Goods in combined transport (container, swap bodies, trailers, etc.)	62
Piece goods (paletts, packaged goods,)	8
Paper rolls and other pulp products	56
Vehicles, machinery and machine parts	91
Steel products (coils, slabs, steal beam, steel profiles, sheets, etc.)	236
Scrap metal (NE- and other scrap metal)	190
Waste/Disposal (waste paper, waste glas, old textiles, building material recycling, etc.)	73
Liquid or. gaseous goods (petroleum products, gases, crude oil, vegetable oils, etc.)	205
Bulk goods (coal, ores, stones, grounds, building materials, etc.)	191
Chemicals, fertilizer	153
Dangerous goods	172
Components and finished parts made of concrete	39

Figure 102: Number and overview of types of freight transloaded at industrial railway sites

Owners of adjacent private siding

More than 230 undertakings with more than 240 siding tracks are owners of adjacent private siding.

For future market surveys the Bundesnetzagentur will contact more operators of industrial railways and owners of private siding to make the market overview complete.

Background to the market analysis

The Bundesnetzagentur works to ensure effective competition in the railway market.

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Railway Market Analysis conducted by the Bundesnetzagentur

The Bundesnetzagentur's specific duties and powers are set forth 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 2022 market monitoring/market survey for the 2021 reporting year, the Bundesnetzagentur sent its questionnaire to more than 2,000 market participants.

The ERegG contains provisions requiring market participants to provide information to the Bundesnetzagentur. The term "market participant" also includes 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 this 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 not only in the "Railway Market Analysis" as required by section 122 of the Telecommunications Act but also in the Bundesnetzagentur's "Annual Report" and in its "Activity Report - Railways" (section 71 ERegG). The focus of the latter two publications is on the regulatory aspects of the market, while the Railway Market Analysis publishes current statistical data and their analyses, enabling interested parties to gain insights into the railway sector's structure and performance.

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 about railway market trends.

passenger transport)

	Regulation		
Manufacturers (railway technology, construction)	Railway infrastructure (IM)	Rail transport services (RU)	Customers
 Infrastructure: control & signalling technology, construction, Transport: rolling stock, 	 Tracks (railway line infrastructure operators) Service facilities: stations, ports, etc. (service facilities operators) 	 Short-distance passenger rail transport Long-distance passenger rail transport Rail freight transport 	 Regional transport authorities (short- distance passenger transport) Logistic providers, industry (freight transport) Consumer (short-&

Market analysis focus: railway undertakings with access entitlement and infrastructure managers that are obligated to provide acess

Figure 103: Market definition used in the Railway Market Analysis

Market definition and scope of the survey

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

In addition to data that it collects directly, the Bundesnetzagentur draws on data from other sources for its Railway Market Analysis. These sources include the Federal Statistical Office, the Federal Logistics and Mobility Office and the Federal Railway Authority.

Data from more than 390 railway undertakings surveyed was used in the analyses. Of these railway undertakings, 107 provided services in regional and local rail passenger transport, 26 in long-distance rail passenger transport, and 163 in rail freight transport. Other transport services and shunting operations were also provided. In addition, data from 140 route operators, more than 670 service facility operators and more than 1,100 industrial railway operators/owners of private siding was taken into account in the market analysis. Furthermore, 32 regional transport authorities submitted data for the 2021 reporting year to the Bundesnetzagentur. The Bundesnetzagentur thanks all market participates for the support they have provided in connection with the Railway Market Analysis.

Rating of the influencing factors

As part of this survey, market players are asked to subjectively rate issues relating to access and non-discrimination. The scale used for these ratings ranged from 1 ("very good, no need for action") to 5 ("unsatisfactory, urgent action necessary"). The influencing factors rated by the market participants are shown in a table.

Even though this part of the questionnaire is optional for the respondents, many of the railway undertakings offer their assessment of the current market situation. The published results therefore reflect the market situation and can thus be regarded as representative. In particular, the order of similar indicators in the ratings reveals 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, these findings on the ranking of influencing factors (unlike the other data for the reporting year) refer to the year in which the Bundesnetzagentur conducted the survey (2022).

The issues relating to influencing factors that market participants consider important are shown in the Annex.

Annex

Overview of the questions used for the qualitative ratings (based on a scale from 1 to 5)

Availability of personnel for railway undertakings

What is your company's assessment of the availability of personnel for railway infrastructure operations?

- Availability of train drivers
- Availability of other technical operational railway personnel (shunting personnel, train conductors)
- Availability of other personnel

Regional transport authority's infrastructure

How would you rate, for your area of influence,...

- ...the state of network development?
- ...the state of network maintenance?
- ...the state of passenger station development (including stops)?
- ...the state of maintenance of passenger stations (including stops)?

How would you rate the level of nondiscrimination in the infrastructure managers' pricing systems for...

- ...train paths?
- ...charges for the use of passenger stations (including stops)?

How would you rate the infrastructure managers' cost-to-performance ratio with regard to...

- ...train paths?
- …charges for the use of passenger stations (including stops)?

Availability of personnel for route operators

What is your company's assessment of the availability of personnel for railway infrastructure operations?

- Availability of staff specialised in railway infrastructure operations (including purchasing agents and train movement directors)
- Availability of other personnel

- Questions for railway undertakings about railway lines

How would you rate access to railway infrastructure in Germany with respect to...

- ...the train path allocation process for non-scheduled rail services?
- ...the train path allocation process for working timetable rail services?
- ...timetable quality?
- ...scheduling in the event of a disruption?
- …quality of coordination in the planning of construction sites?

- ...the current state of development of railway lines?
- ...the current state of maintenance of railway lines?

Questions for railway undertakings about railway lines

Construction work scheduled by infrastructure managers

- Were you informed of construction work in a timely manner (only work scheduled during the period covered by the working timetable)?
- Were you informed in good time of construction work to be conducted during the course of the year?
- Were you included in the planning of construction work (coordination)?
- Were you able to exert any influence on the planning of construction work?
- Was re-routing of trains necessary?
- Was it necessary to provide alternative transport?
- Were there changes in the planning process that you were informed of late or not at all?
- Were there any deviations from the original plans when they were actually executed?

Questions for railway undertakings about pricing systems

How do you find the level of non-discrimination in the pricing systems established by the infrastructure managers with respect to usage and consumption charges for train paths?

How would you rate the cost-to-performance ratio with regard to train paths (taking into account the costs incurred to the infrastructure managers)?

Questions for railway undertakings about service facilities

How would you rate access to service facilities?

- Freight terminals, industrial siding, feeder tracks and sidings
- Train formation facilities and marshalling yards
- Storage sidings
- Railway infrastructure in ports
- Maintenance and other technical facilities
- Refuelling facilities
- Passenger stations including stops (access to station infrastructure)
- Current state of passenger station development (including stops)
- Current condition of passenger stations (including stops)
- Access to training facilities

Questions for railway undertakings about pricing systems

How do you find the level of non-discrimination-in the pricing systems established by theinfrastructure managers with respect to usageand consumption charges for:

Traction current

- Train paths
- Passenger stations (including stops)
- Freight terminals, industrial siding, feeder tracks and sidings

- Train formation facilities and marshalling yards

- Storage sidings
- Railway infrastructure in ports

- Maintenance and other technical facilities

- Traction current

How would you rate the cost-toperformance ratio in the following areas (taking into account the costs incurred to the infrastructure managers)?

- Train paths
- Passenger stations (including stops)

- Freight terminals, industrial siding, feeder tracks and sidings

- Train formation facilities and marshalling yards

- Storage sidings
- Railway infrastructure in ports

- Maintenance and other technical facilities
Overview of the averages of the qualitative ratings

Railway undertakings

Track access	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Allocation of ad hoc train paths	2.4	2.4	2.3	2.2	2.1	2.2	2.3	2.1	2.2	2.2	2.3	2.3	2.3	2.5	2.6
Allocation of scheduled train paths	2.5	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.4	2.4
Rail timetable quality	2.8	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.4	2.5	2.6	2.5	2.5	2.7	2.7
Train operation during disruptions	2.8	2.8	2.7	2.6	2.5	2.6	2.5	2.4	2.5	2.6	2.7	2.6	2.6	2.7	2.8
Construction planning	n/a	n/a	2.9	2.9	2.8	2.9	3.0	2.7	2.8	3.0	3.1	3.1	3.0	3.0	3.2
Network development	3.5	3.4	3.3	3.3	3.2	3.1	3.1	3.0	3.0	3.1	3.1	3.2	3.2	3.2	3.4
Network condition	3.6	3.4	3.2	3.1	3.1	3.2	3.1	3.1	3.0	3.0	3.1	3.1	3.1	3.1	3.3

Source: Market surveys of Federal Network Agency (Bundesnetzagentur). Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

Access to service facilities	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Freight yard/terminals/siding tracks	2.9	2.9	2.7	2.8	2.6	2.6	2.6	2.4	2.3	2.4	2.5	2.4	2.5	2.6	2.7
Marshalling yards/train formation facilities	2.9	3.0	2.9	2.9	2.7	2.7	2.9	2.5	2.4	2.4	2.5	2.5	2.6	2.8	2.7
Railway sidings	3.2	3.1	3.1	3.1	2.9	2.9	2.9	2.7	2.7	2.8	2.9	2.9	2.9	2.9	3.0
Ports with rail infrastructure	2.5	2.8	2.4	2.4	2.4	2.5	2.6	2.4	2.5	2.4	2.4	2.3	2.4	2.5	2.5
Maintenance facilities	2.9	2.7	2.6	2.6	2.6	2.5	2.6	2.5	2.4	2.4	2.5	2.5	2.4	2.6	2.6
Refuelling facilities	2.4	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.3	2.3
Passenger stations/stopping points	2.4	2.4	2.3	2.6	2.5	2.5	2.5	2.4	2.4	2.1	2.2	2.2	2.4	2.3	2.4
Modernisation of passenger stations	n/a	n/a	3.2	3.1	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.7	2.7	2.7	2.6
Condition of passenger stations	n/a	n/a	3.5	3.3	3.1	3.1	3,0	3.0	2.9	2.9	2.9	2.8	2.9	2.8	2.7
Training facilities	2.2	2.2	2.3	2.2	2.1	2.2	2.3	2.3	2.3	2.1	2.2	2.3	2.3	2.4	2.5

Source: Market surveys of Federal Network Agency (Bundesnetzagentur). Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
2.8	2.6	2.6	2.5	2.3	2.4	2.4	2.3	2.3	2.4	2.3	2.4	2.3	2.4	2.4
3.2	3,0	3.2	2.9	2.8	2,9	2.9	2.6	2.5	2.4	2.4	2.5	2.4	2.4	2.4
3.0	2.9	2.8	2.9	2.8	2,6	2.8	2.6	2.5	2.4	2.5	2.4	2.4	2.4	2.4
3.1	3.0	2.9	2.9	2.8	2,7	2.9	2.7	2.5	2.5	2.6	2.5	2.5	2.6	2.6
3.0	2.9	2.9	2.8	2.7	2,8	2.9	2.6	2.6	2.5	2.6	2.6	2.6	2.7	2.7
3.0	2.8	2.5	2.6	2.4	2,5	2.6	2.4	2.4	2.3	2.4	2.3	2.4	2.3	2.4
2.8	2.5	2.8	2.8	2.6	2.5	2.6	2.5	2.4	2.2	2.4	2.4	2.4	2.5	2.4
3.0	2.8	2.9	3.1	3.1	3.0	3.0	2.8	2.5	2.2	2.3	2.3	2.4	2.4	2.3
	2008 2.8 3.2 3.0 3.1 3.0 3.0 2.8 3.0	2008 2009 2.8 2.6 3.2 3.0 3.0 2.9 3.1 3.0 3.0 2.9 3.1 3.0 2.8 2.5 3.0 2.8 2.8 2.5 3.0 2.8	2008 2009 2010 2.8 2.6 2.6 3.2 3.0 3.2 3.0 2.9 2.8 3.1 3.0 2.9 3.0 2.9 2.9 3.0 2.9 2.9 3.0 2.9 2.9 3.0 2.9 2.9 3.0 2.9 2.9 3.0 2.8 2.5 2.8 2.5 2.8 3.0 2.8 2.9	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2.8 2.6 2.6 2.5 2.3 2.4 2.4 2.3 2.3 2.4 3.0 2.9 2.8 2.9 2.8 2.9 2.8 2.6 2.5 2.4 3.0 2.9 2.8 2.9 2.8 2.6 2.5 2.4 3.0 2.9 2.8 2.9 2.8 2.6 2.5 2.4 3.1 3.0 2.9 2.8 2.7 2.9 2.7 2.5 2.5 3.0 2.9 2.9 2.8 2.7 2.8 2.9 2.6 2.6 2.5 2.5 3.0 2.8 2.5 2.6 2.4 2.5 2.6 2.4 2.5 3.0 2.8 2.5 2.6 2.4 2.5 2.6 2.5 2.6 2.5 2.6 2.5 2.4 2.5	2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2.8 2.6 2.6 2.5 2.3 2.4 2.4 2.3 2.3 2.4 2.3 3.2 3.0 3.2 2.9 2.8 2.9 2.8 2.9 2.6 2.5 2.4 2.4 2.3 3.0 2.9 2.8 2.9 2.8 2.6 2.5 2.4 2.5 2.6 2.6 2.5 2.4 2.5 2.5 2.5 2.6 2.4 2.5 2.5 2.6 2.5 2.5 2.6 2.5 2.6 2.5 2.6 2.5 2.6 2.4 2.	2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2.8 2.6 2.6 2.5 2.3 2.4 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.5 2.3 2.4 2.5 2.3 2.4 2.5 2.5 2.4 2.4 2.5 2.4 2.5 2.4 2.4 2.5 2.4 2.4 2.5 2.4 2.4 2.5 2.4 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.6 2.5 2.6 2.5 2.6 2.5 2.6 2.5 <	2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2.8 2.6 2.6 2.5 2.3 2.4 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.4 2.3 2.3 2.4 2.4 2.3 2.3 2.4 2.4 2.3 2.3 2.4 2.4 2.5 2.4 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.5 2.4 2.4 2.5 2.4 2.4 2.4 2.5 2.4 2.4 2.4 2.4 2.5 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					

Source: Market surveys of Federal Network Agency (Bundesnetzagentur). Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

Price-performance ratio	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Train paths	3.2	3.0	31	3.0	3.0	3.0		31	3.0	3.0	3.0	29			
Passenger stations/stopping points	3.5	3.4	3.5	3.5	3.5	3.6	3.5	3.3	3.2	3.1	3.0	3.1	2.9	2.7	2.7
Freight yards/terminals/siding tracks	3.0	3.1	2.9	3.1	3.0	3.0	3.1	3.1	2.8	2.8	2.8	2.8	2.7	2.7	2.7
Marshalling yards/train formation facilities	3.2	3.1	3.0	3.0	3.0	3.0	3.0	3.0	2.8	2.9	2.9	2.8	2.8	2.8	2.9
Railway sidings	3.4	3.3	3.2	3.2	3.1	3.1	3.2	3.2	3.1	3.0	3.0	3.0	2.9	3.0	3.0
Ports with rail infrastructure	3.0	2.8	2.7	2.8	2.8	2.8	3.0	2.9	2.8	2.9	2.8	2.9	2.7	2.7	2.7
Maintenance facilities	3.1	2.9	2.9	2.9	2.8	2.7	2.9	2.8	2.7	2.6	2.6	2.6	2.6	2.7	2.7
Refuelling facilities	n/a	n/a	2.6	2.7	2.6	2.6	2.5	2.5	2.6	2.5	2.4	2.5	2.4	2.5	2.5
Traction current	3.2	3.0	3.0	3.3	3.3	3.1	3.1	3.2	3.0	2.8	2.7	2.9	2.7	2.8	3.1

Source: Market surveys of Federal Network Agency (Bundesnetzagentur). Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

Availability of personnel	2017	2018	2019	2020	2021	2022
Train drivers	3.3	3.4	3.5	3.4	3.1	3.3
Operational personnel	2.9	3.0	3.0	3.0	2.9	3.1
Other personnel	2.7	2.8	2.7	2.8	2.7	2.9

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

Scheduled construction measures	2016	2017	2018	2019	2020	2021	2022
Timely notification (only working timetable)?	2.0	1.9	2.0	2.0	2.0	2.2	2.1
Timely notification (only construction measures during the year)?	2.2	2.4	2.5	2.4	2.4	2.5	2.6
Was the railway undertaking involved in planning and coordinating the construction measures?	2.8	2.7	2.8	2.8	2.7	2.9	2.9
Was the railway undertaking able to exert influence on the construction measure?	3.4	3.5	3.5	3.3	3.3	3.5	3.5
Was it necessary to use diversionary routes?	3.1	3.3	3.4	3.5	3.5	3.4	3.8
Was it necessary to provide a replacement bus service?	2.3	2.5	2.5	2.6	2.5	2.4	2.8
Were notifications regarding changes in plans no sent oder sent too late?	2.4	2.7	2.8	2.9	2.8	2.8	3.1
Were the deviations from the plans when the measures were conducted?	2.6	2.8	2.8	3.0	2.9	2.9	3.1

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

Route operators

Availability of personnel	2016	2017	2018	2019	2020	2021	2022
Operational personnel	2.9	3.0	3.2	3.1	3.2	2.9	3.1
Other personnel	2.4	2.6	2.7	2.7	2.8	2.7	2.7

Source: Market surveys of Federal Network Agency (Bundesnetzagentur).

Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

Regional transport authorities

Regional transport authorities	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Charges, access and condition of infrastructure													
Network development	3.5	3.3	3.0	3.1	3.2	3.1	3.2	3.1	3.0	3.5	3.4	3.4	3.4
Network condition	3.1	3.0	3.1	3.0	3.0	3,0	3.1	3.1	3.3	3.3	3.2	3.3	3.1
Modernisation of passenger stations	3.3	3.2	3.1	3.1	3.0	2.9	2.8	2.7	2.7	2.8	2.8	2.9	2.8
Condition of passenger stations	3.3	3.2	3.2	3.3	3.2	3.1	3.1	3.1	3.0	3.0	3.0	3.2	3.1
Track access pricing systems	3.2	2.9	3.0	3.0	2.9	2.8	2.7	2.6	2.5	2.6	2.6	2.4	2.5
Station usage pricing systems	3.5	3.3	3.3	3.4	3.3	3.0	2.8	2.9	2.9	2.6	2.5	2.5	2.4
Pricing system: Track access pricing systems	3.8	3.6	3.6	3.7	3.7	3.8	3.6	3.4	3.4	3.4	3.4	3.2	3.2
Pricing system: Station usage pricing systems	4.1	4.1	4.0	4.0	4.1	3.9	3.7	3.4	3.6	3.4	3.4	3.3	3.2

Source: Market surveys of Federal Network Agency (Bundesnetzagentur). Grading scale from 1 (very good / no need for action) to 5 (insufficient / high need for action).

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List of abbreviations

AEG	General Railway Act
AG	stock company
BMDV	Federal Ministry of Digital and Transport, succeeded the Federal Ministry of Transport and Digital Infrastructure (BMVI)
bn	billion
DB AG	Deutsche Bahn AG
EBA	Federal Railway Authority
ERegG	Rail Regulation Act
ETCS	European Train Control System
EU	European Union
GDL	Union of German Locomotive Drivers
GDP	gross domestic product
IM	Infrastructure Mangers
km	kilometre
kWh	kilowatt hour
LuFV	Performance and Financing Agreement
mm	millimetre
mn	million
ÖBB	Austrian Federal Railways
pkm	passenger-kilometre
RMMS	Rail Market Monitoring Scheme (market monitoring at European level)
RRX	Rhine-Ruhr-Express

RU	railway undertaking/railway undertakings
SNCF	Société nationale des chemins de fer français (French state owned railways)
t	tonne/tonnes
trkm	train-kilometre
ZIP	programme for investment in the future by improving accessibility

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