Characteristics of the railway network in Europe

Statistics Explained

Data extracted in March 2024.
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" The railway network in the EU shrunk by 7.5% between 1990 and 2022. In contrast, it increased by almost one third in Spain, due in large part to the construction of dedicated high-speed lines. "

" In 2022, Luxembourg had the highest share of electrified railway lines in the EU, with 96.7%, followed by Belgium (88.0%) and Sweden (75.0%), each with shares well above the EU average of 56.9%. "

" In 2022, the densest railway networks in the EU were in Czechia (123.3 metres of railway line per square kilometre) and Belgium (118.8); Greece (15.3) and Finland (19.7) had the lowest network densities. "

" In 2022, there were 8 111 km of dedicated high-speed railway lines in the EU, with Spain and France together accounting for close to three quarters of the dedicated EU high-speed network. The high-speed network in the EU has grown by 51% since 2010. "

An efficient, secure and interoperable railway infrastructure is essential for sustainable transport of persons and freight across Europe, ensuring reliable and low-emission production chains and mobility. The railway infrastructure is an important component of the Fit-for-55 programme's sector policies on transport, aimed at meeting the transport sector's targets as part of the European Green Deal. This article presents data on different characteristics of the railway network in Europe. The data generally cover the European Union (EU) Member States , the EFTA countries and the candidate countries and one potential candidate . The only exception is the section on level crossings, which covers the EU Member States and EFTA countries. Metro, tram and light rail urban lines are not included in the railway statistics. The article also presents data on the development in the length of the railway network in Europe and on its density. It provides information on the development in electrification of the network, as well as in its capacity through increases and decreases in the length of lines with two or more parallel tracks. Information on tracks with different track gauges are also provided. A special section is dedicated to the development of high-speed railway lines. Finally, the article looks into level crossings on the railway lines , an important issue for railway safety .

Developments in the extent and density of the national railway networks

In 1990, the railway network in the EU amounted to 218 600 km of railway lines . By 2022, it had decreased to roughly 202 131 km, corresponding to a decline of 7.5 %. However, the trend in the length of national networks differed substantially between the different EU countries (see Figure 1).

Among the EU countries, Spain recorded by far the largest expansion of its railway network between 1990 and 2022, both in actual length (+3 900 km) and in relative terms (+31.1 %).[1]There were also relatively strong expansions of the networks in Estonia (+14.5 %; +150 km) and the Netherlands (+9.4 %; +260 km) over this period.

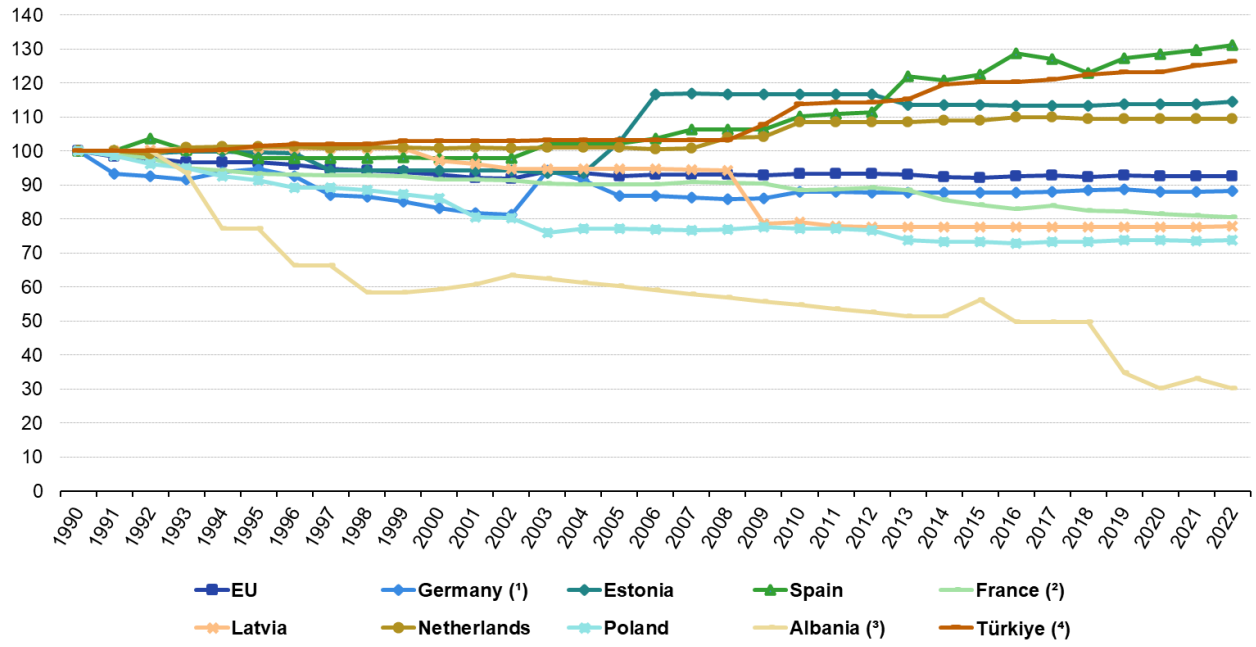
In contrast, the national networks were considerably slimmed down from 1990 to 2022 in Poland (-26.2 %; -6 900 km) and Latvia (-22.2 %; -500 km). The same applied to the two largest national railway networks in the EU, France

[1]It should be noted that a methodological change resulted in a break in the time series in 2013, increasing the recorded network length by around 1 200 km.

(-19.4 %, -6 700 km) and Germany (-11.8 %, -5 200 km).

There were also large differences among the candidate countries over the same period. While Türkiye recorded a strong increase in its railway network (+26.4 %; +2 200 km), stimulated amongst others by the building of new high-speed lines, Albania saw the length of its railway lines reduced by -69.7 % (-470 km).

Railway network length in selected countries (most significant changes), 1990-2022
(index 1990=100)



(¹) 2003: break in series.
(²) Eurostat estimates.
(³) 2003-2012: Eurostat estimates.
(⁴) 1994-1996 and 2020-2022: Eurostat estimates.
Source: Eurostat (online data code: rail_if_line_tr)

eurostat

Figure 1: Railway network length in selected countries (most significant changes), 1990-2022 (index 1990=100) Source: Eurostat (rail_if_line_tr) The figures for all EU Member States, EFTA countries, candidate countries and one potential candidate can be found in the attached Excel file and in the source dataset(s).

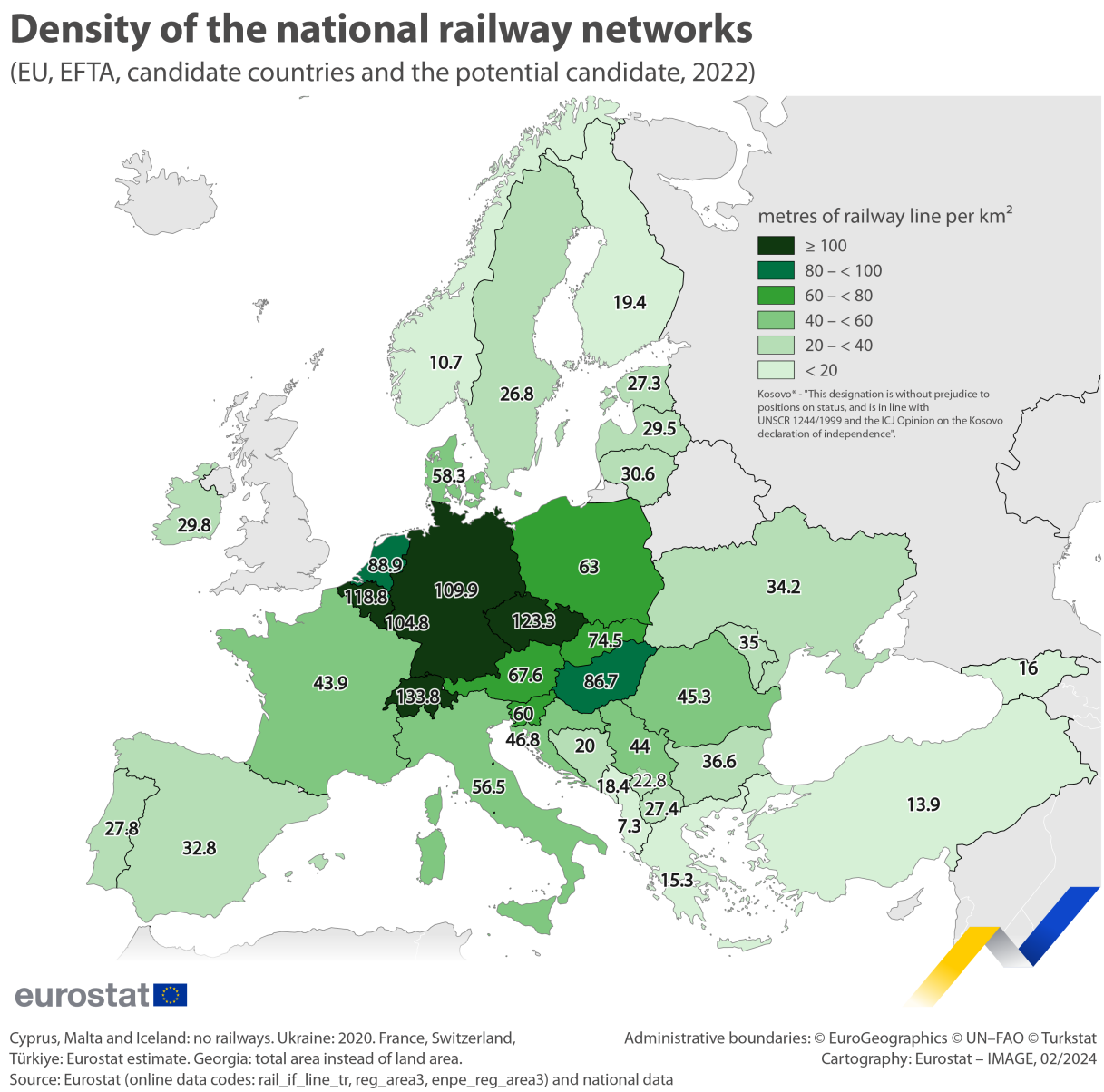
Railway networks and other transport networks tend to be concentrated in and around main cities and other population hubs, while there are fewer railway lines in areas with low population and limited industry. Thus, the density of the railway network, measured in metres of railway line per km2land area, overall tends to be lower in countries with large less-populated regions. Map 1 provides a picture of the railway network density in Europe.

Within the EU, the countries with the highest density of railway network are all situated in the centre of northern Europe, reflecting both their high population density and relatively high volumes of freight transport. In 2022, Czechia had the highest railway network density with 123.3 metres of railway lines per km2. Other EU countries with high density were Belgium (118.8 m/km2), Germany (109.9 m/km2) and Luxembourg (104.8 m/km2).

Lower densities are reported for EU countries on the outskirts of the EU. Greece had the lowest railway network density, with 15.3 m/km2. Low densities were also recorded in the Nordic countries (Finland 19.4 m/km2; Sweden 26.8 m/km2), the Baltic countries (Estonia 27.3 m/km2; Latvia 29.5 m/km2; Lithuania 30.6 m/km2), the Iberian peninsula (Portugal 27.8 m/km2; Spain 32.8 m/km2) and Ireland (29.8 m/km2).

The EFTA countries are strong contrasts to each other with respect to their railway network density. Norway had a lower density than any of the EU Member States, at 10.7 m/km2in 2022, explained by its low population density. In Switzerland, the density lay at 133.8 m/km2, higher than in any country in the EU.

Generally, the railway networks are not very dense in the candidate countries and the potential candidate. Their densities range from 7.3 m/km2in Albania and 13.9 m/km2in Türkiye to 34.2 in Ukraine and 35.0 in Moldova.



Map 1: Density of national railway networks in the EU, EFTA and candidate countries and the potential candidate, 2022 (metres of railway line per square kilometre land area) Source: Eurostat (rail_if_line_tr) for length of railway lines; (reg_area3), (enpe_reg_area3) and national data for geographical area

Development in the share of electrified lines

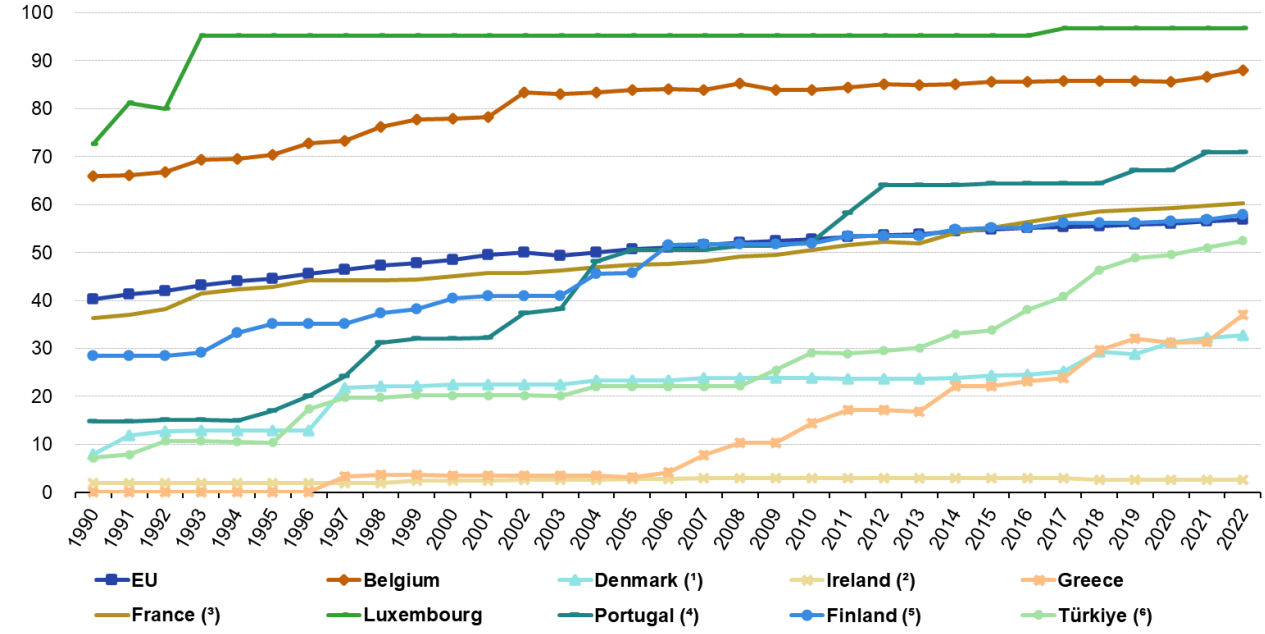
Electrification is a key element of the modernisation of railway networks, substantially lowering the negative environmental impact of railway transport compared with road transport and other transport modes heavily dependent on fossil fuels. Non-electrified railway lines are mainly operated by diesel locomotives and railcars.

Figure 2 shows the development in the electrification of the railway network in the EU and for selected countries with notable electrification levels or developments.

Over the period from 1990 to 2022, there was considerable progress in the electrification of the lines of the European railway network. Whereas 40.2 % of the railway lines in the EU were electrified in 1990, this share had increased to 56.9 % by 2022. This corresponds to an increase of 16.7 percentage points (pp) . The strongest increase took place in Portugal, where the electrification rate rose from 14.7 % to 70.9 %, an increase of 56.2 pp. Other EU countries that advanced considerably over this period were Greece (+37.1 pp), Finland (+29.5 pp), Denmark (+24.8 pp), Luxembourg and France (both +24.0 pp), as well as Belgium (+22.1 pp). Ireland had the lowest share of electrified lines in 2022, with just 2.6 %. This was only slightly higher than the 1.9 % electrified lines it had in 1990.

Among the candidate countries, in Türkiye the share of electrified railway lines increased from 7.2 % in 1990 to 52.5 % in 2022, up 45.3 pp.

Electrified railway lines in selected EU Member States (most significant levels and changes), 1990-2022
(% of total length of railway lines)



(1) 1990-2012: Eurostat estimates.
(2) 2018: break in series.
(3) Eurostat estimates.
(4) 2003-2006: Eurostat estimates.
(5) 2015: break in series.
(6) 2020-2022: Eurostat estimates.
Source: Eurostat (online data code: rail_if_line_tr)

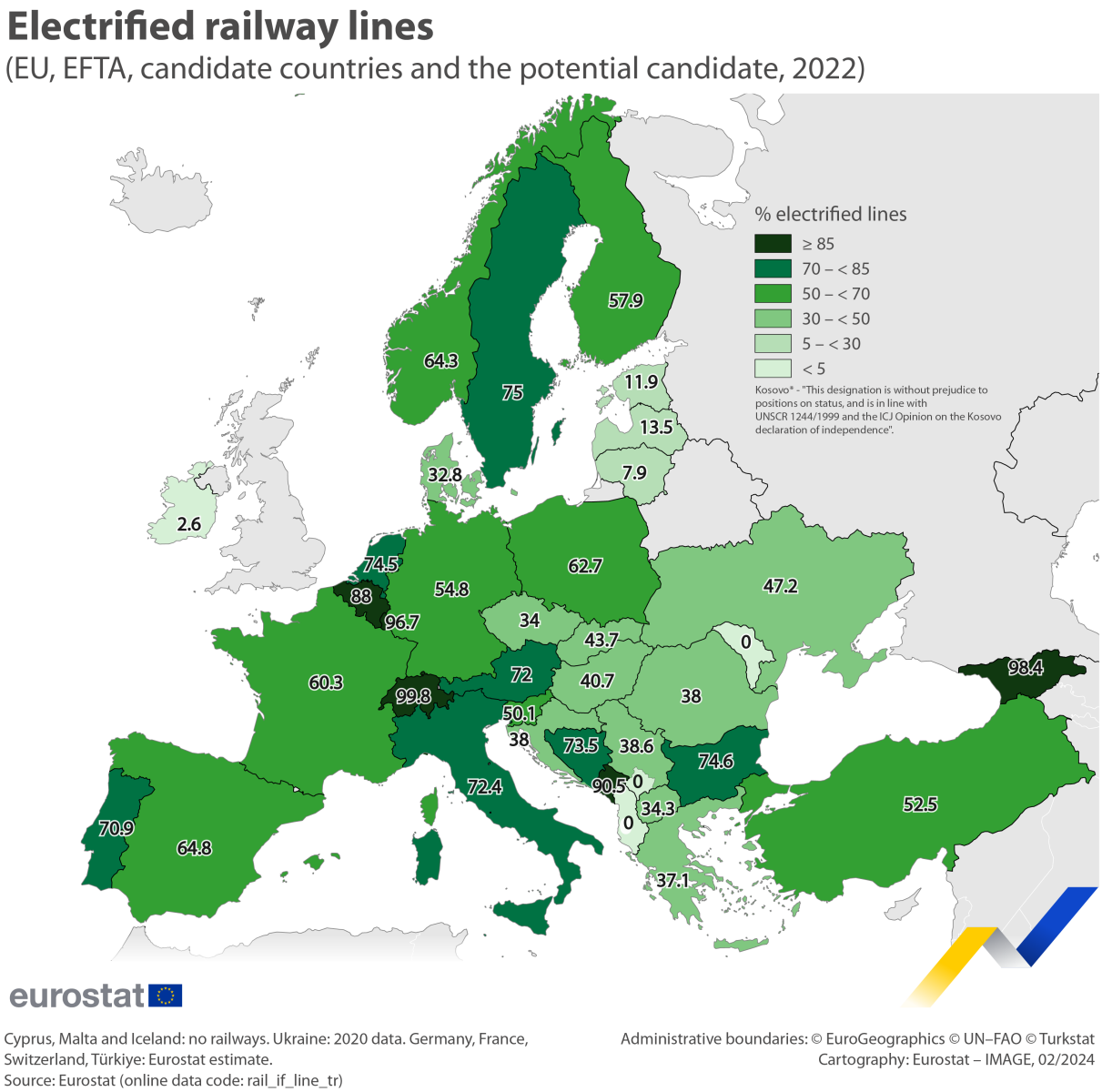
eurostat

Figure 2: Electrified railway lines in selected EU Member States (most significant levels and changes), 1990-2022 (% of total length of railway lines) Source: Eurostat (rail_if_line_tr) The figures for all EU Member States, EFTA countries, candidate countries and one potential candidate can be found in the attached Excel file and in the source dataset(s).

As shown in Map 2, Luxembourg has by far the highest level of electrification within the EU. In 2022, 96.7 % of the railway lines in Luxembourg were electrified, reflecting its drive to electrify its railway network in the 1990s. Belgium also had a high degree of electrification, with 88.0 % in 2022. Other EU countries with high electrification rates are Sweden (75.0 %), Bulgaria (74.6 %) and the Netherlands (74.5 %).

In Ireland, only 53 kilometres of its railway lines were electrified by 2022, making up a share of only 2.6 % of the railway network in the country. Also in the Baltic countries, the electrification rate is low, with 7.9 % in Lithuania, 11.9 % in Estonia and 13.5% in Latvia.

In other parts of Europe, Switzerland stands out with an almost complete electrification of its national railway network (99.8 % in 2022). Among the candidate countries and the potential candidate, Georgia (98.4 %) and Montenegro (90.5 %) both have a high degree of electrification, whereas Albania, Moldova and Kosovo*[2]report no electrified railway lines.



Map 2: Electrified railway lines in the EU, EFTA and candidate countries and the potential candidate, 2022 (% of total length of railway lines) Source: Eurostat (rail_if_line_tr)

[2]* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo Declaration of Independence.

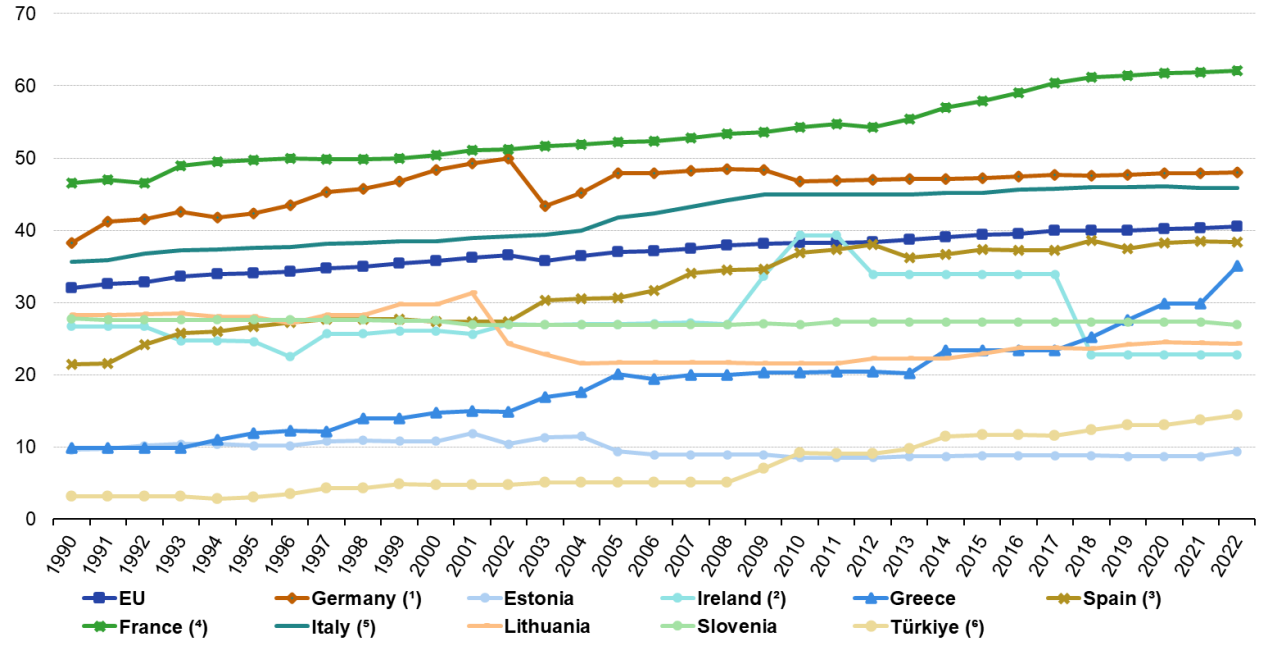
Increased capacity through expansion of lines with two or more tracks

In addition to the length of the railway lines, an important aspect of the capacity of national railway networks is the share of lines with two or more parallel tracks. Multiple parallel tracks enable more efficient and higher levels of traffic on the railway lines, increasing flexibility and reducing the effects of any disturbances. Figure 3 highlights the development in lines with two or more parallel tracks in the EU and in selected countries that stand out.

Over the last decades, the capacity of the EU railway network has constantly improved, with the share of lines with two or more parallel tracks growing from 32.0 % in 1990 to 40.5 % in 2022, an increase of 8.5 pp. This represented an additional 11 800 km of railway lines equipped with two or more tracks over the period. In Greece, the share of lines with multiple tracks expanded strongly, from 9.9 % in 1990 to 35.1 % in 2022 (+25.2 pp; +450 km). This share also increased considerably in Spain (+16.9 pp) and France (+15.6 pp). In absolute numbers, the lines with two or more parallel tracks grew most in Spain (+3 600 km), Italy (+2 000 km), Germany (+1 800 km) and France (+1 200 km).

In contrast, between 1990 and 2022 the share of the railway lines equipped with two or more tracks declined slightly in four of the EU countries: Lithuania (-4.0 pp), Ireland (-3.9 pp), Slovenia (-0.9 pp) and Estonia (-0.2 pp).

Railway lines with two or more tracks in selected countries (most significant levels and changes), 1990-2022
(% of total length of railway lines)



(1) 1990, 2003-2004, 2006-2009: Eurostat estimates. 2003: break in series.
(2) 2018: break in series.
(3) 2013: break in series.
(4) Eurostat estimates.
(5) 1990-1994, 2014-2015: Eurostat estimates.
(6) 2020-2022: Eurostat estimates.
Source: Eurostat (online data code: rail_if_line_tr)

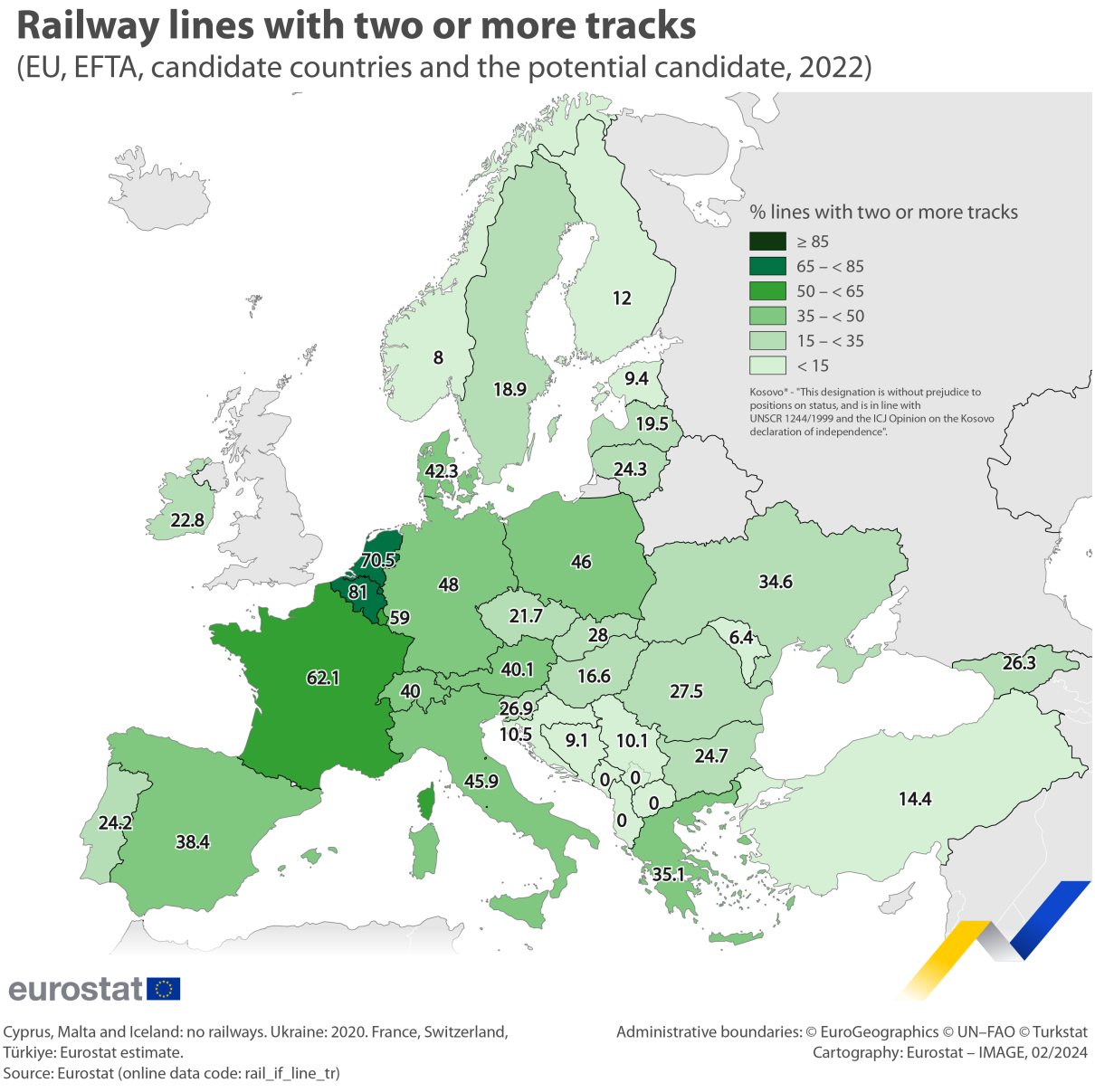
Figure 3: Railway lines with two or more tracks in selected countries (most significant levels and changes), 1990-2022 (% of total length of railway lines) Source: Eurostat (rail_if_line_tr) The figures for all EU Member States, EFTA countries, candidate countries and one potential candidate can be found in the attached Excel file and in the source dataset(s).

A certain difference with respect to the share of railway lines with two or more parallel tracks can be seen between countries in the north, east and furthest west of the EU and countries in the middle and south (see Map 3). The

highest shares of railway lines with multiple tracks are found in Belgium (81.0 %) and the Netherlands (70.5 %). Both countries are characterised by a relatively small land area, high population density and high levels of freight transport to and from important sea ports (Rotterdam and Amsterdam in the Netherlands; Antwerp in Belgium). France (62.1 %), Luxembourg (59.0 %), Germany (48.0 %) and Poland (46.0 %) also have national networks with a high share of lines with two or more parallel tracks.

The lowest shares of railway lines with multiple tracks are found in Estonia (9.4 %) and Croatia (10.5 %). Low shares are also found in the Nordic countries Finland (12.0 %) and Sweden (18.9 %) and in eastern countries such as Hungary (16.6 %) and Latvia (19.5 %).

Among other European countries, Norway is similar to its Nordic neighbours Finland and Sweden in this aspect. Its share of 8.0 % railway lines equipped with multiple tracks is lower than in any of the EU countries. Even lower rates are found in some of the candidate countries and the potential candidate. Montenegro, North Macedonia, Albania and Kosovo* are not reporting any railway lines with multiple tracks. Moldova reported a share of 6.4 % in 2022.



Cyprus, Malta and Iceland: no railways. Ukraine: 2020. France, Switzerland, Türkiye: Eurostat estimate.
Source: Eurostat (online data code: rail_if_line_tr)

Administrative boundaries: © EuroGeographics © UN–FAO © Turkstat
Cartography: Eurostat – IMAGE, 02/2024

Map 3: Railway lines with two or more tracks in the EU, EFTA and candidate countries and the potential candidate, 2022 (% of total length of railway lines) Source: Eurostat (rail_if_line_tr)

Track gauge: an important feature for interoperability of railway networks

One important characteristic of the railway network with respect to connectivity and interoperability is the width of the tracks, known as*track gauge* . The track gauge is the smallest distance between a pair of rails, measured between the inside of the rail heads. Generally, one distinguishes between 'large gauge' railway tracks (more than 1 435 mm width), 'standard gauge' (1 435 mm) and 'narrow gauge' (less than 1 435 mm).

A general phenomenon is a slow change to standard gauge tracks from tracks with narrow gauge, as well as dismantling of some lines with narrow gauge, illustrated in Figure 4. Some narrow gauge lines are also preserved as "heritage" lines or are converted to light urban rail; both of these categories fall outside the scope of 'railway lines' in a statistical sense.

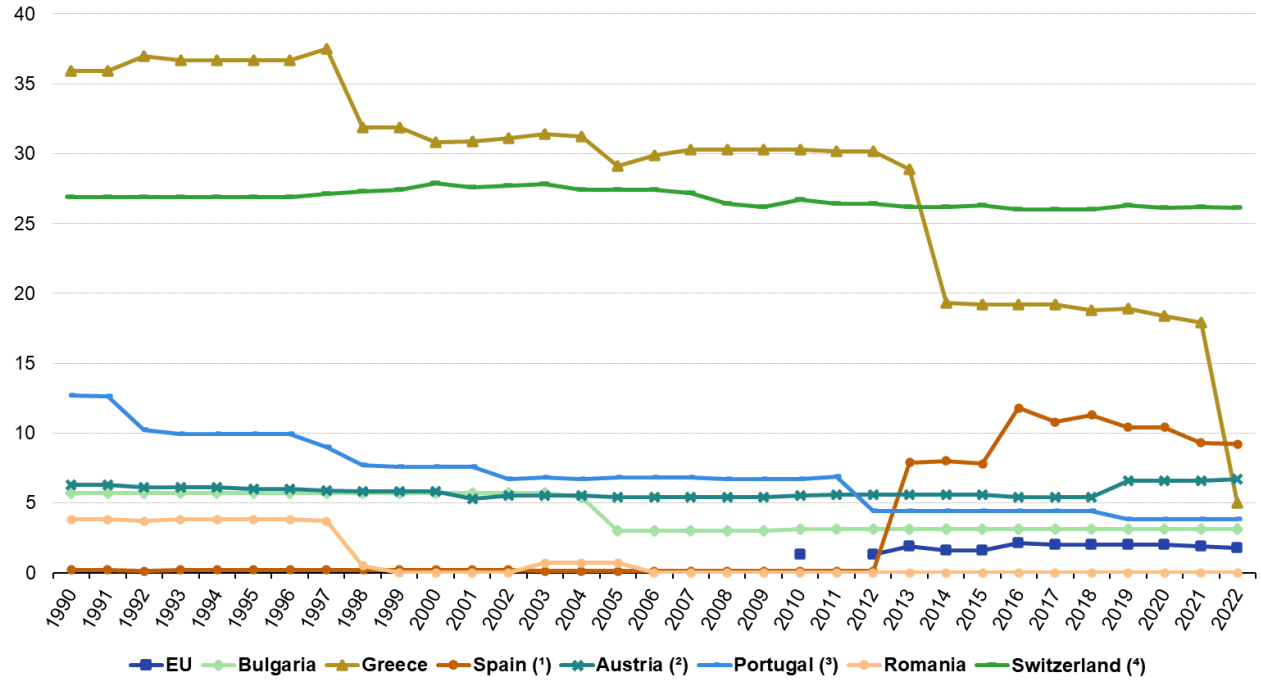
Lines with narrow track gauge play only a marginal role in the EU railway network, with a share of only 1.8 % in the total length of the network in 2022. However, narrow gauge lines are still of some importance in some countries.

The most striking development over the period 1990-2022 took place in Greece, where the share of lines with narrow track gauge decreased from 35.9% in 1990 to 5.0 % in 2022 (-30.9 pp), mainly through sharp falls in 1998, 2014 and 2022. Portugal also recorded a considerable slimming-down of its narrow track gauge network over this period, from 12.7 % of its national network in 1990 to 3.8 % in 2022 (-8.9 pp). Austria retained one of the higher shares of narrow gauge lines with 6.7 % of the total network in 2022, compared with 6.3 % in 1990, a slight increase of 0.4 pp. However, within this period, the share lay at between 5.3 % and 5.6 % between 2001 and 2018. The share of narrow track lines declined by 3.8 pp to zero in Romania and by 2.6 pp to 3.1 % in Bulgaria over this period.

It should be noted that Spain reported an apparent increase in the share of narrow gauge lines over this period, to 9.2 % in 2022. This apparent increase was mainly caused by a methodological change in 2013, which caused a break in Spain's time series; data before and after this break in series should not be compared directly.

Among other European countries, Switzerland stands out with a number of narrow gauge lines in its mountain regions. These narrow gauge lines make up slightly over a quarter of the Swiss railway network, remaining relatively stable over the period. Only a slight decrease has been recorded, down 0.8 pp from 26.9 % in 1990 to 26.1 % in 2022.

Railway lines with narrow track gauge in selected countries (most significant levels and changes), 1990-2022
(% of total length of railway lines)



(1) 2013: break in series.
(2) 1995-2009: Eurostat estimates.
(3) 2003-2007: Eurostat estimates
(4) 1990-1998, 2008-2009, 2011-2014, 2016-2019, 2021-2022: Eurostat estimates; 1999: break in series.
Source: Eurostat (online data code: rail_if_line_ga)

Figure 4: Railway lines with narrow track gauge in selected countries (most significant levels and changes), 1990-2022 (% of total length of railway lines) Source: Eurostat (rail_if_line_ga) The figures for all EU Member States, EFTA countries, candidate countries and one potential candidate can be found in the attached Excel file and in the source dataset(s).

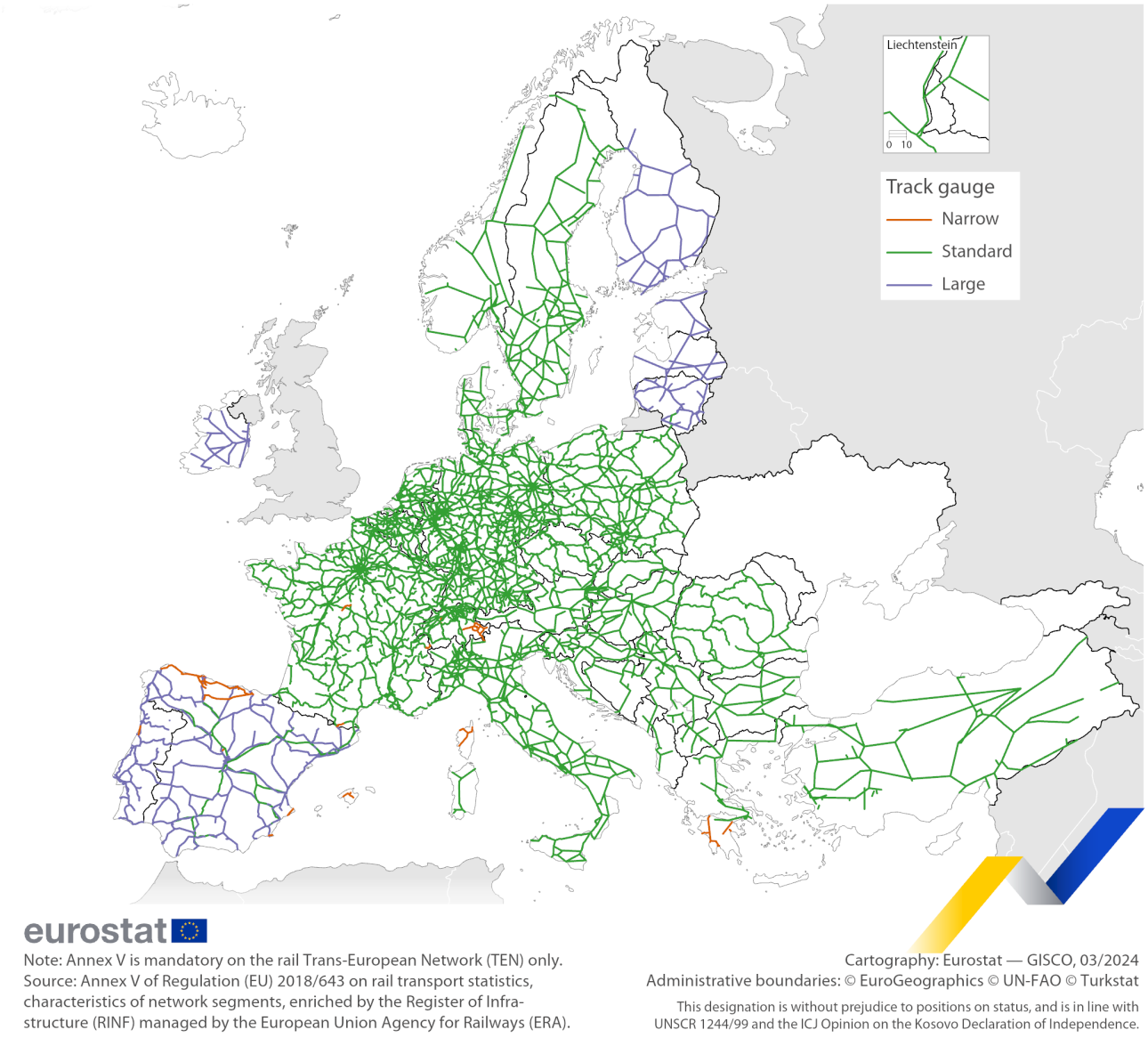
Data on the track gauge of such segments of the railway network is available through Annex V of Regulation (EU) 2018/643 on rail transport statistics. However, data reporting under Annex V is only mandatory for the Rail Trans-European Transport Networks (TEN-T) . Thus, there is a certain bias in the available geo-referenced data, as the coverage is generally limited to the TEN-T network or the most important railway lines, thus the data does not necessarily cover minor lines. The data reported under Annex V are enriched by data from the Registers of Infrastructure (RINF) managed by the European Union Agency for Railways (ERA) .

The standard gauge on the European railway network is 1 435 mm, displayed as green lines in Map 4 below. The main railway lines in Europe, including all dedicated high-speed railway lines, use this standard gauge.

Some countries in Europe operate lines with a large track gauge. The networks in the Baltic countries Estonia, Lithuania and Latvia use a track gauge of 1 520 mm, also known as 'Russian gauge'. Finland uses a track gauge of 1 524 mm. As this is within the tolerance limits, it is possible to exchange trains between 1520 mm and 1524 mm networks without changes to the wheelsets. In Ireland, a track gauge of 1 602 mm ('Irish gauge') is used. Portugal and Spain use a track gauge of 1 688 mm ('Iberian gauge') for the main lines of their network, although Spain's extensive dedicated high-speed lines are constructed using the 1 435 mm standard gauge to enable them to link to the rest of the European high-speed network. The high-speed lines using standard gauge reached 3 100 km in Spain in 2022. Contrary to this, Spain's large gauge network decreased by 900 km from 1990 to 2022.

Generally, few railway lines with narrow track gauge still exist, most of them in mountainous regions. They often become heritage lines being operated as museum or touristic lines. Today, modern narrow track gauges are mainly operated in local tramway networks, which are out of the scope of the railway statistics.

Railway lines by track gauge, 2020



Map 4: Railway lines by track gauge, 2020 (% of total length of railway lines) Sources: Regulation (EU) 2018/643 Annex V and the Register of Infrastructure (RINF) managed by the European Union Agency for Railways (ERA)

The EU network of dedicated high-speed railway lines is expanding

An important target of European policies is to reduce the environmental impact of the transport sector and its emissions of greenhouse gases . In this context, the steady expansion of the interconnected high-speed railway network across Europe is a vital contribution towards strengthening rail travel as an alternative to travel by road and air, which cause substantially higher CO2and greenhouse gas emissions per passenger-kilometre .

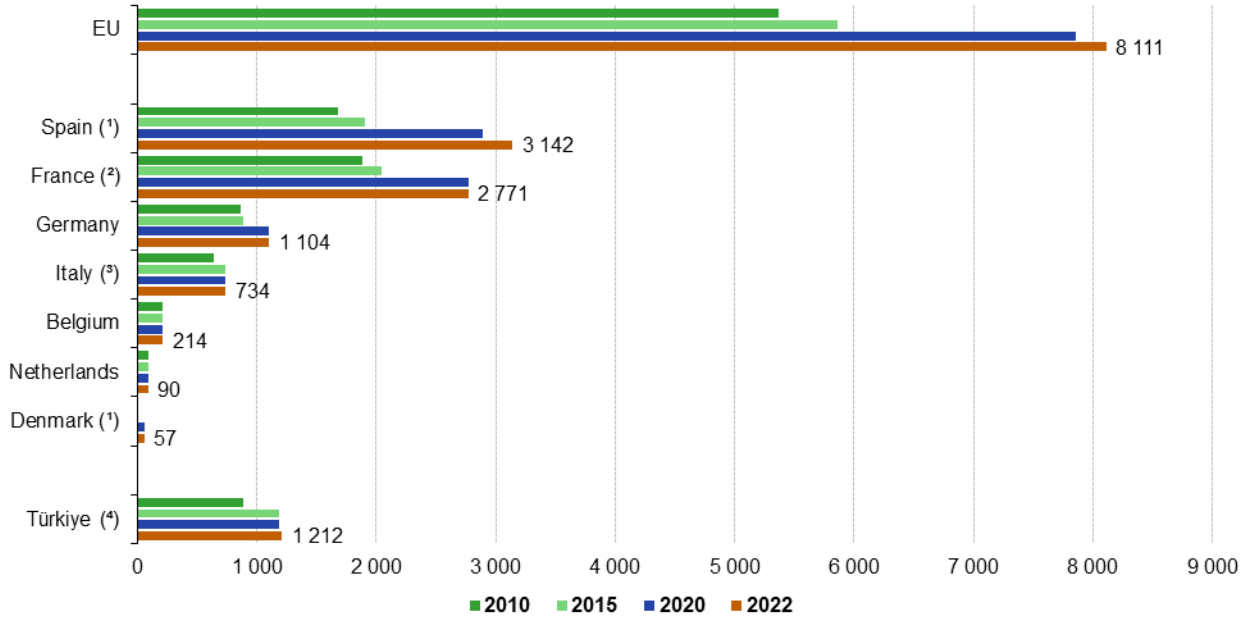
Dedicated high-speed railway lines are railway lines specifically built to allow traffic at speeds of 250 km/h or greater on their main segments. Figure 5 shows how, over the 12 years from 2010 to 2022, the network of dedicated high-speed railway lines in the EU expanded considerably, by 2 740 km (+51.0 %) from roughly 5 400 km to just

over 8 100 km. This high-speed network is interoperable across the EU, with connections operating across national borders.

This rapid progress is mainly attributable to the expansion of the dedicated high-speed lines in Spain and France, which together make up close to three quarters of the high-speed network in the EU (Spain 38.7 %; France 34.2 %). From 2010 to 2022, the high-speed network in Spain grew from 1 684 km to 3 142 km (+1 458 km; +86.6 %), while the network in France grew from 1 884 km to 2 771 km (+887 km; +47.1 %). The dedicated high-speed network in Germany grew from 864 km to 1 104 km over the same period (+240 km; +27.7 %), while that in Italy increased from 638 km to 734 km (+96 km; +15.0 %). For the other EU countries with dedicated high-speed lines, there were only limited changes: Belgium opened another 3 km in 2019, increasing its dedicated high-speed network to 214 km, while the network in the Netherlands stayed unchanged at 90 km. Denmark opened its first 57 km of dedicated high-speed lines in 2019.

Among the candidate countries, Türkiye was the only one with specifically built high-speed railway lines, increasing from 888 km in 2010 to 1 212 km in 2022 (+324 km; +36.5 %).

Dedicated high-speed railway lines with a maximum speed of 250 km/h or more in the EU, EFTA and candidate countries and the potential candidate, selected years 2010-2022
(kilometres)

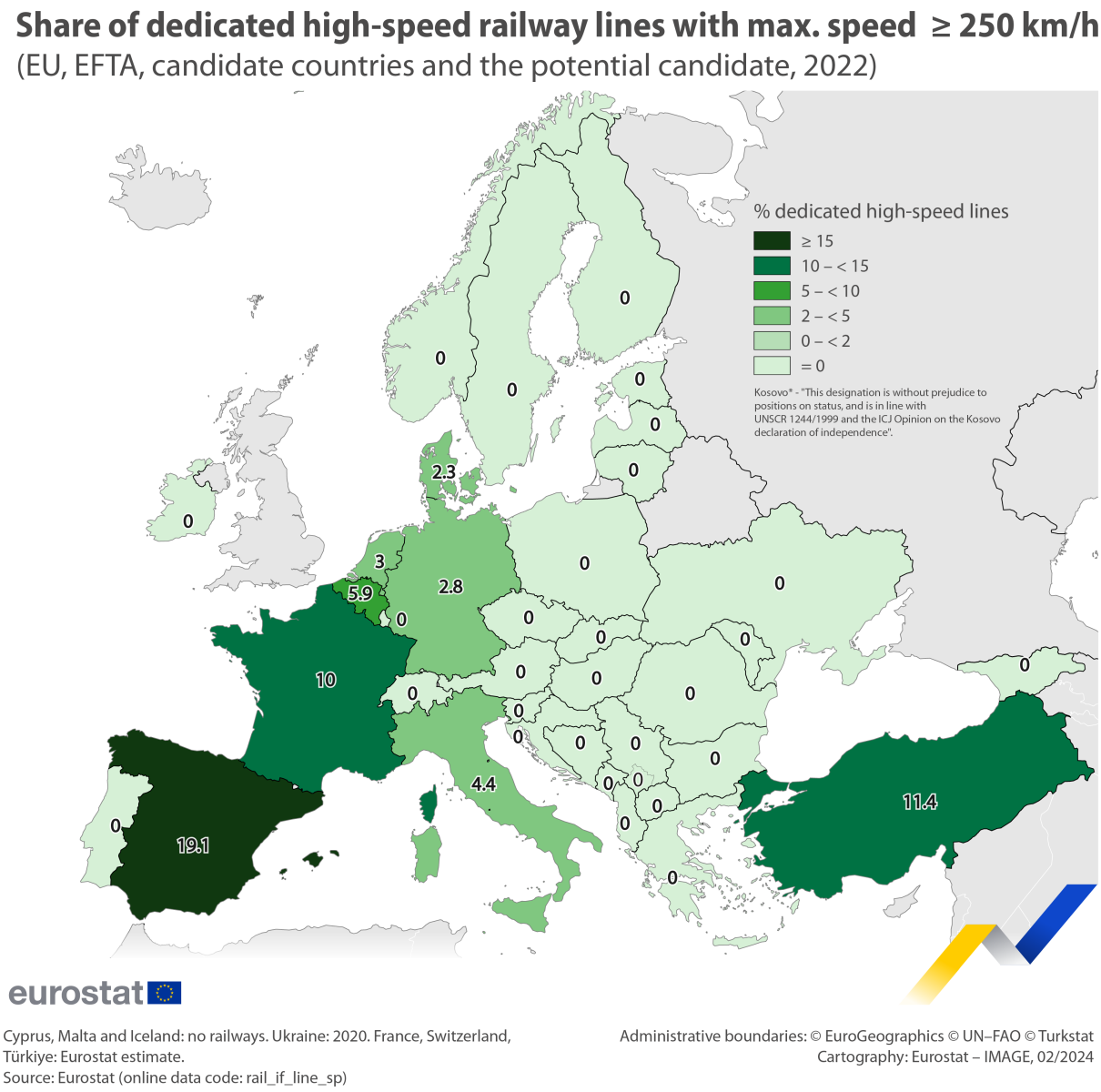


Note: Other countries: no dedicated high-speed railway lines. Cyprus, Malta and Iceland: no railways.
(1) 2010: Eurostat estimate.
(2) Eurostat estimates.
(3) 2015: Eurostat estimate.
(4) 2022: Eurostat estimate.
Source: Eurostat (online data code: rail_if_line_sp)

Figure 5: Dedicated high-speed railway lines with a maximum speed of 250 km/h or more in the EU, EFTA and candidate countries and the potential candidate, selected years 2010-2022 (kilometres) Source: Eurostat (rail_if_line_sp)

As mentioned, Spain, France, Germany, Italy, Belgium, the Netherlands and Denmark are the only EU countries with dedicated high-speed railway lines. Although these networks are vital to strengthening rail travel as an environment- and climate-friendly alternative primarily to road and air travel, Map 5 shows that the shares of the dedicated high-speed lines within the national railway networks are more limited. The share in Spain lay at 19.1 %

of the total length of the national railway network in 2022. In France, the share stood at 10.0 %. In the other EU countries with dedicated high-speed lines, the shares ranged between 5.9 % in Belgium to 2.3 % in Denmark. In Türkiye, the dedicated high-speed lines made up 11.4 % of its national railway network in 2022.



Map 5: Share of dedicated high-speed railway lines with maximum speed of 250 km/h or more in the EU, EFTA and candidate countries and the potential candidate, 2022 (% of total length of railway lines) Source: Eurostat (rail_if_line_sp)

Level crossings on railway tracks remain an important safety issue

An intersection where a road is crossing a railway track, at 'street level', is called a*level crossing* . The crossing should be authorised by the responsible manager for the railway infrastructure and be open to all users of the road. There are two types of such level crossings:*active* level crossings and*passive* level crossings. An active level crossing is equipped with devices that are activated when it is unsafe to cross the railway tracks. These devices include physical protections such as barriers and gates, as well as warning signals such as lights, bells, horns, klaxons, etc. Passive level crossings are rail track crossing points without any active devices to protect or warn

users.

A main challenge for railway safety is to reduce the number of level crossings, as cars, cyclists, pedestrians and other road users may come into direct contact with trains and other rolling stock. Indeed, accidents at level crossings is one of the main categories of railway accidents, both with respect to the number of persons killed and the number of accidents.

The main strategies for reducing the risk of accidents between road users and railway rolling stock is to construct underpasses or tunnels for the roads or the rail tracks in order to eliminate level crossings, as well as converting passive level crossings into active ones through installation of active devices to protect and warn. Information on the number of level crossings, as well as of the number of level crossings equipped with the different types of active safety devices, are part of the Common Safety Indicators (CSI) compiled by the European Union Agency for Railways (ERA). Data on railway safety and accidents, sourced from the ERA, are available in Eurostat's database: transport , see the dataset collection 'Rail transport safety (tran_sf_rail)' under 'Multimodal data (tran)' / 'Transport safety (tran_sf)'.

Between 2010 and 2022, the total number of level crossings in the EU decreased by 17.8 % (from 114 424 to 94 050). The number of level crossings were significantly reduced over this period in Greece (-43.2 %), the Nordic countries Sweden (-39.9 %), Denmark (-38.5 %) and Finland (- 34.4 %), as well as in Austria (-34.0%). In absolute number of level crossings, the numbers fell most in Sweden (-4 540; -39.9 %), followed by France (-4 047; -22.0 %) and Germany (-3 852; 22.1 %).

However, the number of level crossings are typically more prevalent on railway lines in regions with lower population density and thus less road traffic crossing the railway lines. Closures of railway lines in such regions may have a certain impact on the overall number of level crossings. Thus, from a safety perspective, it may often be more interesting to analyse the number of level crossings, and passive level crossings in particular, relative to the length of railway lines operated.

Figure 6 presents the development from 2010 to 2022 in the number of level rail track crossings per 100 kilometres railway line, in the EU and in the EU Member States and EFTA countries. In 2022, there were on average 46.5 level crossings per 100 km railway line in the EU, down from 56.1 in 2010 (-17.1 %). The highest prevalence of level crossings per 100 km railway line in 2022 was found in Czechia (83.7), followed by Hungary (76.5) and the Netherlands (74.1). Between 2010 and 2022, the number of level crossings relative to the length of the network was reduced by 38.6 % in Sweden, from 101.9 level crossings per 100 km line in 2010 to 62.6 in 2022. Other EU countries that were able to substantially reduce the relative number of level crossings over this period were Denmark (-34.5 % to 34.9 level crossings per 100 km line in 2022), Finland (-34.4 % to 42.5 in 2022) and Austria (-31.0 % to 60.9 in 2022).

Norway had a higher number of level crossings per 100 km railway line than any of the EU Member States, with 86.5 in 2022.

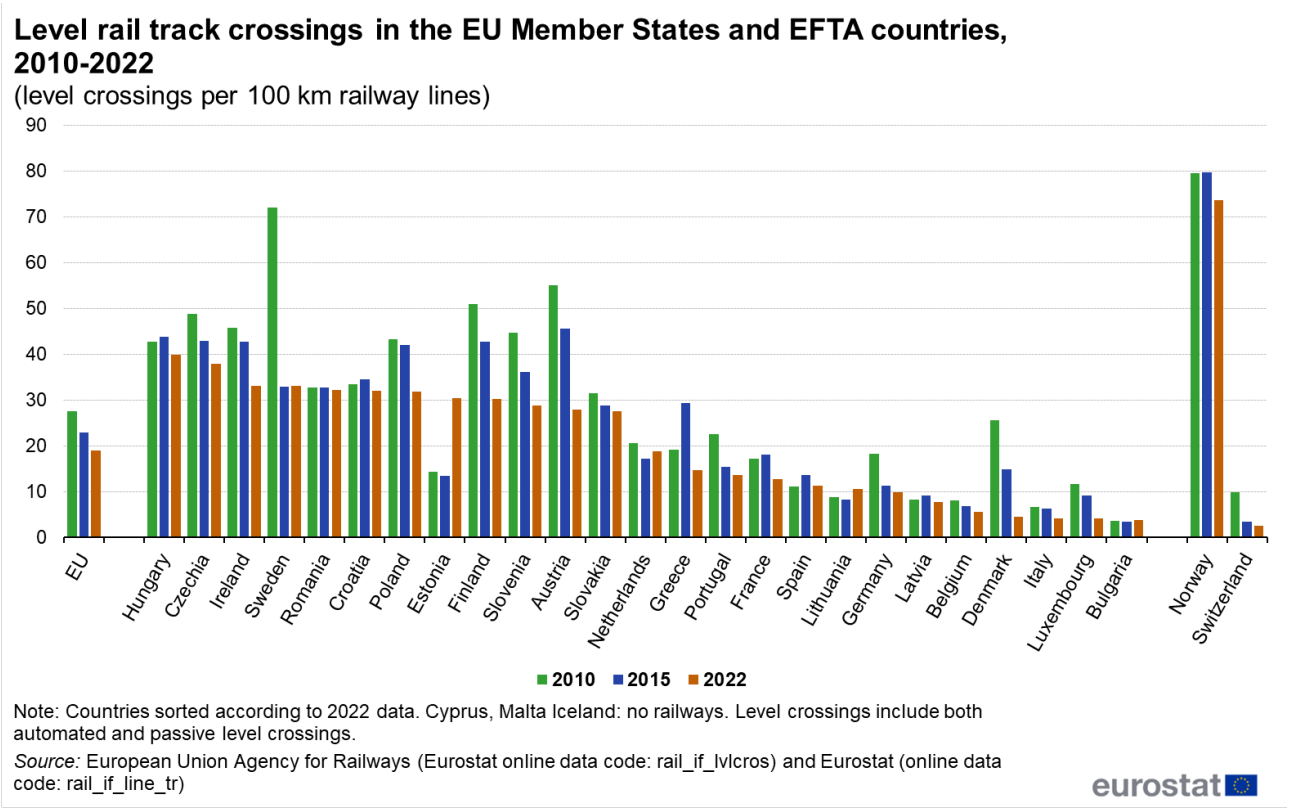
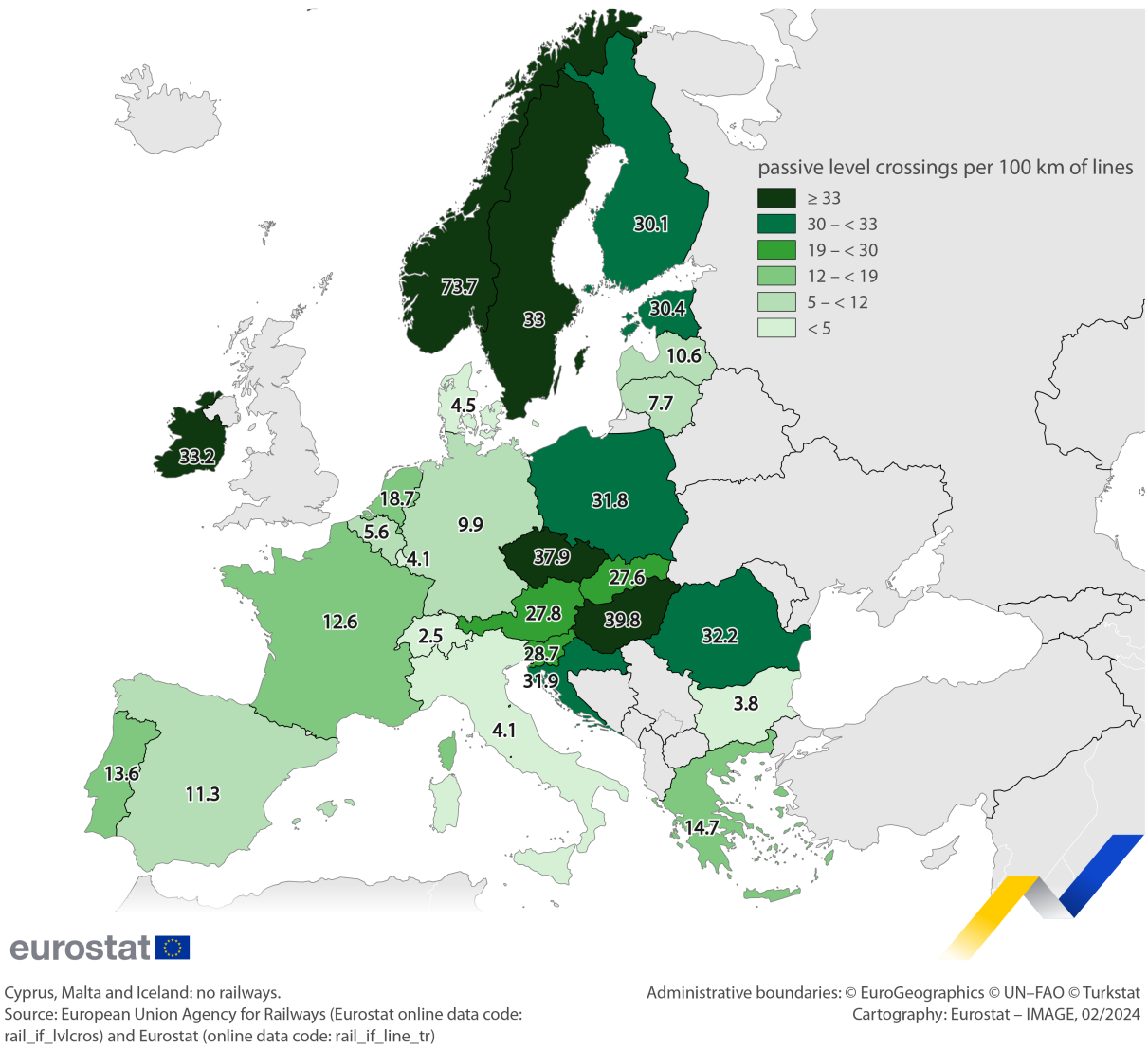


Figure 6: Level rail track crossings in the EU Member States and EFTA countries, selected years 2010-2022 (level crossings per 100 km railway lines) Source: European Union Agency for Railways (Eurostat online data code: rail_if_lvlcros) and Eurostat (online data code: rail_if_line_tr)

When it comes to reducing the number of passive level crossings, the progress has been even more pronounced. Between 2010 and 2022, the number of passive level crossings in the EU were reduced by almost one third, from 56 142 to 38 413 (-31.6 %). In absolute numbers, the largest reductions were achieved in Sweden (-4 429; -55.1 %), Germany (-3 233; -45.7 %), Poland (-2 587; -29.6 %) and France (-1 741; -33.1 %). Denmark reduced the number of passive level crossings by 83.4 % over the period. Other EU countries with substantial reductions were Luxembourg (-65.6 %) and Austria (-51.7%). This achievement in reducing the number of passive level crossings is reflected in the sharp reduction in accidents at level crossings , which fell by 29.2 % over the same period.

In 2022, there were on average 19.0 passive level crossings per 100 km railway line in the EU (see Map 6), down from 27.5 in 2010 (-31.0 %). The highest prevalence of passive level crossings per 100 km railway line were found in Hungary (39.8) and Czechia (37.9). There were also relatively high numbers of passive level crossings in Ireland, Sweden, Romania, Croatia, Poland, Estonia and Finland, with between 33.2 and 30.1 per 100 km railway line.

The EFTA countries Norway and Switzerland stood out compared with the EU countries. In 2022, Norway had 73.7 passive level crossings per 100 km railway line, higher than any of the EU countries; Switzerland, with 2.5 passive level crossings per 100 km line, had a lower prevalence than any EU country. This reflects the low railway network density in Norway and high density in Switzerland, respectively.



Map 6: Passive level crossings in EU Member States and EFTA countries, 2022 (number per 100 kilometres railway line) Source: European Union Agency for Railways (Eurostat online data code: rail_if_lvlcros) and Eurostat (online data code: rail_if_line_tr)

Source data for tables and graphs

- Characteristics of national railway networks in Europe 1990-2022 (March 2024)

Data sources

Data collection

Statistics on railway infrastructure are collected on a voluntary basis through the Eurostat / United Nations Economic Commission for Europe (UNECE) / International Transport Forum (ITF) Common Questionnaire on Inland Transport Statistics. The Common Questionnaire is based on a goodwill agreement with the participating countries. Eurostat, UNECE and ITF cooperate on coordinating and streamlining data collection at international level to reduce the administrative burden on national administrations, as many of the 58 reporting countries are members of more than one of the organisations.

Data is generally provided by the national statistical institutes or responsible transport administrations . However,

methodologies are not harmonised at EU level, apart from the illustrated Eurostat/UNECE/ITF Glossary for Transport Statistics which harmonises definitions, thus comparability across countries may be restricted for certain topics or indicators. As data provision is voluntary, data may not be available for all EU Member States for each indicator. Thus, EU aggregates may be estimated or missing.

Eurostat cooperates closely with the European Union Agency for Railways (ERA) with respect to statistics on the European railway network. Eurostat publishes data provided by ERA on railway lines equipped with the ERTMS railway traffic management system and on level crossings, provided through ERA's: Common Safety Indicators . An in-depth exchange of data with geographical coordinates has also been implemented between the Register of Infrastructure (RINF) managed by ERA and the technical characteristics of the railway network segments collected every 5 years through Regulation (EU) 2018/643, Annex V. This comparison of maps also has an impact on national aggregates.

Some additional data, filling in missing information for certain indicators (old time series, or in relation to high-speed lines), have been provided by the International Union of Railways (Union Internationale des Chemins de Fer: UIC) , with which Eurostat exchange certain data and cooperate closely with regarding definitions.

Coverage

The data in this article covers the EU Member States , the EFTA countries and the candidate countries and one potential candidate .

There are no railways in Cyprus, Malta and Iceland. There is only a minor railway network in Liechtenstein, which is generally included in the data of Austria.

Definitions

All definitions of the indicators are taken from the illustrated Eurostat/UNECE/ITF Glossary for Transport Statistics , currently in its 5thedition (2019). This glossary can be found on Eurostat's website. For the specific definitions related to railway infrastructure, see chapter A.*Railway transport* , sub-chapter A.I*Infrastructure* of the Glossary for transport statistics.

Context

The EU is committed to achieving climate neutrality by 2050, delivering on its commitments under the Paris Agreement. The European Green Deal aims to transform the EU into a fair and prosperous society with a modern and competitive economy. It is a package of policy initiatives, which includes initiatives covering the climate, environment, energy, transport, industry, agriculture and sustainable finance – all of which are strongly interlinked.

The transport sector currently accounts for a quarter of the EU's greenhouse gas emissions , of which 70 % come from road transport . Investing in transport infrastructure, particularly in railways and inland waterways transport, contributes to the decarbonisation of transport. The European Green Deal sets a clear objective of reducing emissions from transport by 90 %, compared with 1990 levels, by 2050. The European Commission's Sustainable and Smart Mobility Strategy and its action plan sets out 82 initiatives to reach this target.

Efficient transport services and infrastructure are vital to exploiting the economic strengths of the European Union, supporting the internal market and growth, and enabling economic and social cohesion. They also influence trade competitiveness, as the availability, price, and quality of transport services have strong implications on production processes and the choice of trading partners.

National rail networks have different technical specifications for infrastructure, which makes it more difficult and costly to run a train from one country to another. EU policies aim to overcome such differences. Creating an integrated European railway area thus requires better technical compatibility – 'interoperability' – of infrastructure, rolling stock, signalling and other characteristics of the rail system. Procedures for authorising the use of rolling stock across the EU's rail network also need to be simplified.

Eurostat's transport statistics are vital for monitoring EU transport policies and targets, providing key information in a coherent and reliable manner. Data are generally provided in accordance with the respective legal acts on statistics for the different transport. However, some important information is not covered by these legal acts,

including information on the characteristics of the transport infrastructure. Comparable international data on railway infrastructure is instead collected on a voluntary basis through the Eurostat/UNECE/ITF Common Questionnaire on Inland Transport Statistics.

Other articles

- Railway freight transport statistics
- Railway passenger transport statistics - quarterly and annual data
- Railway safety statistics in the EU
- Inland transport infrastructure at regional level
- Transport equipment statistics
- Transport statistics at regional level

Dedicated section

- Transport statistics

Publications

- All Eurostat transport publications online
- Key figures on European transport - 2023 edition
- Eurostat Regional Yearbook - 2023 edition
- Energy, transport and environment statistics - 2020 edition
- European Commission – Directorate-General Mobility and Transport (MOVE): EU transport in figures: Statistical pocketbook 2023
- European Union Agency for Railways (ERA): ERA publications

Database

- Transport , see:

Railway transport (rail)

Railway transport infrastructure (rail_if)

Length of railway tracks by electrification of tracks (rail_if_tracks)
Length of railway lines by number of tracks and electrification of lines (rail_if_line_tr)
Length of electrified and non-electrified railway lines by track gauge (rail_if_line_ga)
Length of electric and non-electric railway lines by nature of transport (rail_if_line_na)
Length of electrified railway lines by type of current (rail_if_electri)
Length of railway lines by maximum permitted speed (rail_if_line_sp)
Length of railway lines equipped with the railway traffic management system by type of signalling (source: ERA) (rail_if_traff)
Level crossings by type (source: ERA) (rail_if_lvlcros)

Tables

- Transport , see:

Railway transport (t_rail)

Total length of railway lines (ttr00003)

Rail transport of passengers (ttr00015)

Goods transport by rail (ttr00006)

Methodology

- Eurostat/United Nations Economic Commission for Europe (UNECE)/International Transport Forum (ITF): Glossary for transport statistics, 5thedition (2019)
- Eurostat/ITF/UNECE Common Questionnaire on Inland Transport Statistics (ESMS metadata file — rail_if_esms)
- Length of railway lines equipped with the railway traffic management system by type of signalling (source: ERA) (ESMS metadata file — rail_if_traff_esms)

Legislation

Statistics on railway infrastructure is collected on a voluntary basis through the Eurostat/ITF/UNECE Common Questionnaire on Inland Transport Statistics. The Common Questionnaire on Inland Transport Statistics is based on a goodwill agreement with the participating countries.

Rail transport statistics:

- Regulation (EU) 2018/643 of the European Parliament and of the Council of 18 April 2018 on rail transport statistics (recast)

Railway safety:

- Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety (recast)

European Union Agency for Railways:

- Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) No 881/2004

External links

- International Transport Forum (ITF)
- United Nations Economic Commission for Europe (UNECE): Transport statistics
- European Commission – Directorate-General Mobility and Transport (MOVE): Rail and Infrastructure and Investment
- European Union Agency for Railways (ERA): Common Safety Method on Common Safety Targets and Registers of Infrastructure (RINF)
- International Union of Railways (UIC): RAILISA (RAIL Information System and Analyses) statistics
- European Environment Agency EEA): Transport and mobility
- European Climate, Infrastructure and Environment Executive Agency (CINEA): Connecting Europe Facility for Transport (CEF Transport)

Notes