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REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

Seventh monitoring report on the development of the rail market under Article 15(4) of Directive 2012/34/EU of the European Parliament and of the Council

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List of abbreviations

ASEAN	Association of Southeast Asian Nations
B2A	Business to administration
B2B	Business to business
CAGR	Compound annual growth rate
CCA	Cross-cutting activities
CCS-TSI	Control command and signalling - technical specifications for interoperability
CEF	Connecting Europe Facility
CF	Cohesion Fund
CNC	Core network corridor
COTIF	Convention concerning International Carriage by Rail
CO_2	Carbon dioxide
dB	Decibel
DG MOVE	European Commission Directorate-General for Mobility and Transport
DMT	Deployment management team
DTLF	Digital Transport and Logistics Forum
EDP	European deployment plan
EEA	European Environment Agency OR European Economic Area
EET	Economic equilibrium test
EFSI	The European Fund for Strategic investments
EFTA	European Free Trade Association
eFTI	Electronic freight transport information
EIB	European Investment Bank
ELETA	Electronic exchange of information on estimated time of arrival
ENE-TSI	Energy - technical specification for interoperability
ENRRB	European Network of Rail Regulatory Bodies
ERA	European Union Agency for Railways (formerly European Railway Agency)
ERADIS	European Union Agency for Railways database of interoperability and safety
ERDF	European Regional Development Fund
ERTMS	European Railway Traffic Management System

ESIFs	European Structural and Investment Funds, include Cohesion Fund, European Regional Development Fund, European Social Fund, European Maritime and Fisheries Fund and the European Agricultural Fund for Rural Development
ETA	Estimated time of arrival
ETCS	European Train Control System
GEURL	Group of Experts towards Unified Rail Law
GHG	Greenhouse gas
GIS	Geographic Information System
GSM-R	Global System for Mobile communications - Railways
GTFS	General transit feed specification
H2020	Horizon2020
IEA	International Energy Agency
ILU	Intermodal loading unit
IM	Rail infrastructure manager
INEA	EU Innovation and Networks Executive Agency
IRG-Rail	Independent Regulators' Group – Rail
ITU	Intermodal transport unit
km	Kilometre
KPI	Key performance indicator
MaaS	Mobility as a service
NEBs	National enforcement bodies
NIP	National implementation plan
NSA	National safety authority
OSJD	Organisation for Cooperation of Railways
OTIF	Organisation for International Carriage by Rail
PAYG	Pay as you go
pax-km	Passenger kilometres
PRIME	Platform of Rail Infrastructure Managers in Europe
PSA	Programme support action
PSC	Public service contract
PSO	Public service obligation

REGIO	European Commission Directorate-General for Regional and Urban Policy
RFC	Rail freight corridor
RMMS	Rail Market Monitoring Survey
RMMS Regulation	Commission Implementing Regulation (EU) 2015/1100 for rail market monitoring
RNE	RailNetEurope
ROSCO	Rolling stock company
RU	Railway undertaking
SERAC	Single European Railway Area Committee
SWD	Staff working document
S2R (JU)	Shift to Rail (Joint Undertaking)
TAC	Track access charges
TAF - TSI	Telematics applications for freight
TCR	Temporary capacity restriction
TEG	Technical Expert Group
TEN-T	Trans-European Transport Network
TEU	Twenty-foot equivalent unit
TRAMOS-Rail	Transport Monitoring System – Rail
TTR	TimeTable redesign
TSI	Technical specifications for interoperability
tonne-km	Tonne kilometres
The Agency	European Union Agency for Railways, until June 2016 called European Railway Agency (ERA)
train-km	Train kilometres
UIC	Union Internationale des Chemins de Fer
UIRR	Union Internationale pour le transport combiné Rail-Route
UNECE	United Nations Economic Commission for Europe
WHO	World Health Organization

List of countries

EU	European Union	
EU13	EU Member States having joined the EU in or after 2004	
EU15	EU Member States having joined the EU before 2004	
EU27	All current EU Member States	
EU28	EU Member States between 1 July 2013 and 31 January 2020	
BE	Belgium	
BG	Bulgaria	
CZ	Czechia	
DK	Denmark	
DE	Germany	
EE	Estonia	
IE	Ireland	
EL	Greece	
ES	Spain	
FR	France	
HR	Croatia	
IT	Italy	
CY	Cyprus	
LV	Latvia	
LT	Lithuania	
LU	Luxembourg	
HU	Hungary	
MT	Malta	
NL	Netherlands	
AT	Austria	
PL	Poland	
PT	Portugal	
RO	Romania	
SI	Slovenia	
SK	Slovakia	
FI	Finland	
SE	Sweden	
UK	United Kingdom	EU Member 1973-2020
NO	Norway	Member of EEA since 1994, of EFTA since 1960

Introduction

This Commission staff working document accompanies the *Seventh Report from the Commission to the Council and the European Parliament on monitoring development of the rail market* ('the Seventh Report'). The data and graphs used in this document have been made available in Excel format on the DG MOVE website[1].

Coverage of the Report

This document presents a non-exhaustive report[2] covering the main developments in the EU rail market, reflecting the **topics listed in Article 15(4) of Directive 2012/34/EU** establishing a single European railway area[3] (the 'Recast Directive'), according to which the European Commission must report to the European Parliament and the Council every 2 years on:

1. the evolution of the internal market in rail services (Chapter 3);
2. services to be supplied to railway undertakings as per Annex II to the Recast Directive (Chapter 4);
3. the framework conditions (Chapter 5 and Chapter 6), including:
   - infrastructure charging;
   - capacity allocation;
   - investment made in infrastructure;
   - developments with regard to prices[4];
   - quality of rail transport services;
   - rail transport services covered by public service contracts (PSCs);
   - licensing;
   - degree of market opening;
   - harmonisation between Member States;
   - development of employment and related social conditions;
4. the state of the Union railway network (Chapter 2);
5. the utilisation of access rights (Chapter 5);
6. barriers to more effective rail services (Chapter 5 and Chapter 6);
7. infrastructure limitations (Chapter 5); and
8. the need for legislation (Conclusions).

An overview of rail as a sustainable mode of transport is also included (Chapter 1).

The focus of the Seventh Report and this accompanying staff working document is on developments between 2015 and 2018. When the RMMS Regulation is the only source, trends are assessed for the period 2015-2018 to ensure data comparability. When using other sources, trends may be presented over a longer period.

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1 http://ec.europa.eu/transport/modes/rail/market/market_monitoring_en.

2 In addition to the rail *market* report, the EU Agency for Railways publishes a bi-annual report on *safety* and *interoperability* performance (https://www.era.europa.eu/library/corporate-publications/safety-and-interoperability-progress-reports_en).

3 Directive 2012/34/EU of the European Parliament and of the council of 21 November 2012 establishing a single European railway area OJ L 343, 14.12.2012, p. 32.

4 Comprehensive monitoring of rail prices for customers is not possible due to the broad variety of services offered.

The sources of data include responses to the Rail Market Monitoring Survey ('the RMMS'), the *EU Transport in Figures* statistical pocket book[5], Eurostat[6], IRG-RAIL, statistics collected by various sectoral organisations[7] and ad hoc presentations and studies. Contributions have also been considered from the Member States, national regulatory bodies and stakeholders participating in the Working Group for Rail Market Monitoring under the aegis of the Single European Railway Area Committee (SERAC).

All current EU Member States are covered, except Cyprus and Malta, as they have no railways.

Data for the United Kingdom is presented throughout the Seventh Report and this accompanying staff working document as during the reference period until 2018 the country was still participating in the RMMS as an EU Member State. Aggregated data and averages refer, however, only to the EU27 (i.e. to the current EU Member States). The totals and averages for the EU28 are also provided, either in the text or in the Excel file published on the DG MOVE website together with the Seventh Report[8].

As Norway participates in the RMMS but is not a Member of the European Union, Norwegian data are shown in graphs per country but not included in EU27 totals and EU27 averages.

The implementing act for rail market monitoring

The first five RMMS reports drew on Member States' voluntary responses to the RMMS questionnaire.

The Seventh Report is the second report to actually draw on the mandatory data collection set out in the Commission Implementing **Regulation (EU) 2015/1100 for rail market monitoring**[9] ('the RMMS Regulation') applicable from 1 January 2016. It is also the first report to be produced after the end of the transitional period for the implementation of the RMMS Regulation, in 2018. The questionnaire annexed to the RMMS Regulation was developed in close cooperation with the Member States and stakeholders participating in the SERAC Working Group for Rail Market Monitoring. While building mainly on the previous RMMS, the new questionnaire added some new indicators, particularly related to revenues and traffic outputs, public service obligation (PSO), infrastructure charges and employment.

In addition, under the new regime, Member States' reports have been submitted electronically and validated through exchanges with the Commission using the TRAMOS-Rail (Transport Monitoring System – Rail) web tool. This Seventh Report therefore benefits from better-defined data requirements, a mandatory collection process and a validation review, which has gradually led to more consistent and coherent data after the end of the transitional period in 2018.

Member States have until 31 December of each year to submit in TRAMOS-Rail the data from the RMMS questionnaire for the previous year. DG MOVE then reviews the consistency of inputs for each Member State in January, asking for additions or clarifications if needed. The process is closed by the end of the first quarter. Every 2 years, when preparing the biennial report, DG MOVE performs more in-depth data checks across countries and years to verify the coherence and consistency of the

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5 The Report is based on preliminary Statistical pocketbook data available at 31 August 2020. The 2020 Statistical pocketbook is available on the DG MOVE website. https://ec.europa.eu/transport/facts-fundings/statistics/pocketbook-2020_en

6 http://ec.europa.eu/eurostat/web/transport/data/database

7 UIC, UIP.

8 https://ec.europa.eu/transport/modes/rail/market/market_monitoring_en

9 Commission Implementing Regulation (EU) 2015/1100 of 7 July 2015 on the reporting obligations of the Member States in the framework of rail market monitoring, OJ L 181, 9.7.2015, p. 1.

RMMS database. Estimates or other reliable data sources are used in case of data gaps. Finally, time series are checked against data published in the previous RMMS report and other similar (though not fully comparable) data in order to identify and explain any major deviation. Estimates, alternative sources and discontinuities are duly reported in the relevant parts of the accompanying staff working document.

The refinements implemented during the transitional period may have led some Member States to alter the data and approach they use to respond, which may result in some comparability issues over time. However, steps have been proactively taken by both the Commission and Member States to ensure that these comparability issues have been minimised wherever possible. The Commission has started discussions with Member States to identify developments in the rail market, improvements in data availability, new methodologies, definitions and methods of collecting data that may make it desirable to amend the RMMS questionnaire in the Annex to the RMMS Regulation.

1. Rail and sustainability

Transport is central to the European economy and daily life, and demand for it continues to rise. Estimates suggest increases in European passenger and freight transport by 42% and 60% by 2050 respectively. However, transport generates around a quarter of all EU greenhouse gas (GHG) emissions[10] – which have serious health and environmental consequences. As public awareness about climate change increases, demand for sustainable forms of transport does too – be it for cross-border travel or for everyday commutes. Transporting more freight by rail instead of by road is another essential element of making transport more sustainable. To accelerate sustainable transport across Europe, having an attractive rail system with sufficient capacity and modernised infrastructure will be key.

With the European Green Deal, the European Commission has proposed to cut GHG emissions by at least 55% by 2030, and to achieve climate neutrality by 2050[11]. To achieve climate neutrality, a 90% reduction in overall transport emissions by 2050 compared to 1990 levels is needed. This will be one main objective of the forthcoming Sustainable and Smart Mobility Strategy. To meet this challenge, rail will have to take up a bigger share of the transport system. Through its policies and legislation, the EU aims to make rail more efficient, affordable and innovative. EU policies focus on aspects that are crucial for developing a strong and competitive rail industry and a green and sustainable transport system overall. These are:

- **Facilitating a strong and competitive rail sector**
  Establishing a single European railway area where railway companies can operate in a single and competitive EU-wide market i.e. the same rail operator can offer services anywhere in Europe, without national borders. This will bring down costs and make rail more attractive for passengers.
- **Removing barriers to seamless rail transport**
  EU legislation harmonises diverging safety, administrative and operational requirements across the EU. In this way, the same train will be able to run on networks all over Europe, following the same rules. The EU Agency for Railways (ERA) has a mandate to issue single safety certificates and vehicle authorisations, which are valid in multiple European countries.
- **Developing a modern rail infrastructure network**
  Capacity constraints and ageing infrastructure are hampering rail traffic. That is why public and private investment in Europe's infrastructure is needed, in particular for cross-border links.
- **Stimulating innovation**
  Tackling challenges and opportunities such as rising transport demand, decarbonisation and digitalisation requires innovative solutions. The Shift2Rail Joint Undertaking is a public-private partnership in the rail sector, providing a platform for EU research and innovation.

[10] European Environment Agency (2019): Greenhouse gas emissions from transport in Europe. https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases/transport-emissions-of-greenhouse-gases-12 . See also Section 1.1.1.

[11] Emissions reduction targets are compared to 1990 levels. The European Commission will now start preparing detailed legislative proposals on how this target can be achieved. The Commission will review and, where necessary, propose to revise by June 2021 all relevant policy instruments to achieve the additional emission reductions (https://ec.europa.eu/clima/policies/eu-climate-action/2030_ctp_en).

For rail to fulfil its role in the European Green Deal as an attractive and effective alternative to more polluting modes of transport, it has to be safe, punctual, reliable, affordable and inclusive, and able to adapt to the changing needs of passengers and industries. This depends on the performance of both rail operators and infrastructure managers.

Box 1: European Year of Rail 2021

On 4 March 2020, the European Commission proposed to make 2021 the European Year of Rail, to support the delivery of its European Green Deal objectives in the transport field[12]. The European Year of Rail 2021 will support the efforts of the EU, the Member States, regional and local authorities, and other organisations to increase the share of passengers and freight moving by rail. Through a series of dedicated events, campaigns, initiatives and projects in 2021, the European Year will promote rail as a sustainable, innovative and safe mode of transport. It will highlight its benefits for citizens, the economy and the climate. By reaching out to the broader public, in particular to young people, the initiative intends to convince more people and businesses to make use of rail. It will also help to step up the pace of rail modernisation and focus on the remaining challenges to create a true single European railway area without borders.

1.1 Environmental performance of rail

Rail has the potential to play a significant role in accelerating the reduction of transport emissions, being the most carbon-efficient motorised way to travel. In 2018, rail accounted for only 2% of total EU27 energy consumption in transport, while carrying 12.6% of goods and 6.9% of passengers of all transport modes (land, air and waterways).

1.1.1 Emissions

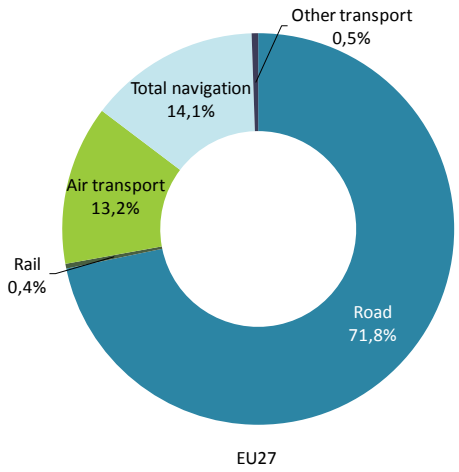
In 2018, the transport sector (including international aviation and maritime) accounted for 27.2% of the total GHG emissions[13] in the EU27 (27.9% in EU28). Within the transport sector, (Figure 1) shows how rail represented only 0.4% of GHG emissions from all transport modes in the EU27 (0.5% in EU28), while continuing to be the only mode to have almost continuously reduced such emissions since 1990[14].

[12] At the time of drafting the report, the Commission's proposal (COM(2020)78) was still being discussed in the European Parliament and in the Council under the co-decision procedure. On 12 November 2020, negotiators from the European Parliament and the Council reached a provisional agreement, which is subject to formal approval by both institutions.

[13] GHG emissions from transport by mode, including international bunkers and indirect CO_2 but excluding land use, land use change and forestry. Rail excluding indirect emissions from electricity consumption. The European Environment Agency (EEA, https://www.eea.europa.eu/) is the main provider for EU-wide GHG emissions data. The GHGs are: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), hydrofluorocarbons (HFC), perfluorocarbons (PFC).

[14] The Statistical pocketbook 2020 provides further details by country, sector and mode.

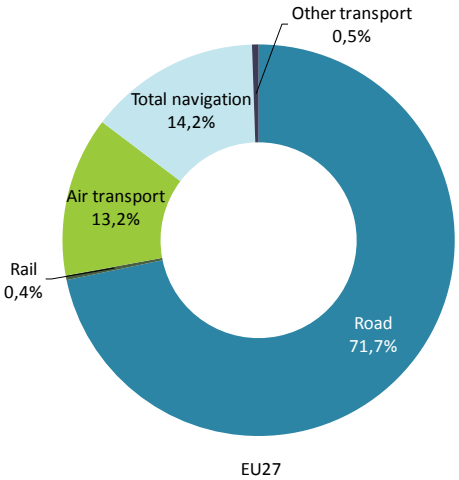
Figure 1: Share of GHG emissions by transport mode (rail, road, domestic aviation, domestic navigation, pipeline transport, etc.) (% of million tonnes CO_2 equivalent, EU27 2018)



Source: Statistical pocketbook, 2020.

When considering only CO_2, in 2018 the transport sector (including international aviation and maritime) accounted for 32.6% of the total CO_2 emissions[15] in the EU27 (33.4% in EU28). Figure 2 shows how within the transport sector rail represented only 0.4% of CO_2 emissions from all transport modes in the EU27 (0.5% in EU28). Rail has continued to be the only transport mode to have almost continuously reduced these emissions since 1990[16].

Figure 2: Share of CO_2 emissions of transport modes (rail, road, domestic aviation, domestic navigation, pipeline transport, etc.) (% of million tonnes, EU27 2018)



Source: Statistical pocketbook, 2020.

Looking at rail from a life-cycle perspective shows that train operations are not the only source of emissions for rail transport. The construction of railway infrastructure, the manufacturing of rolling

[15] Including international bunkers and indirect CO_2 but excluding land use, land use change and forestry. Rail excluding indirect emissions from electricity consumption.

[16] The Statistical pocketbook 2020 provides further details by country, sector and mode.

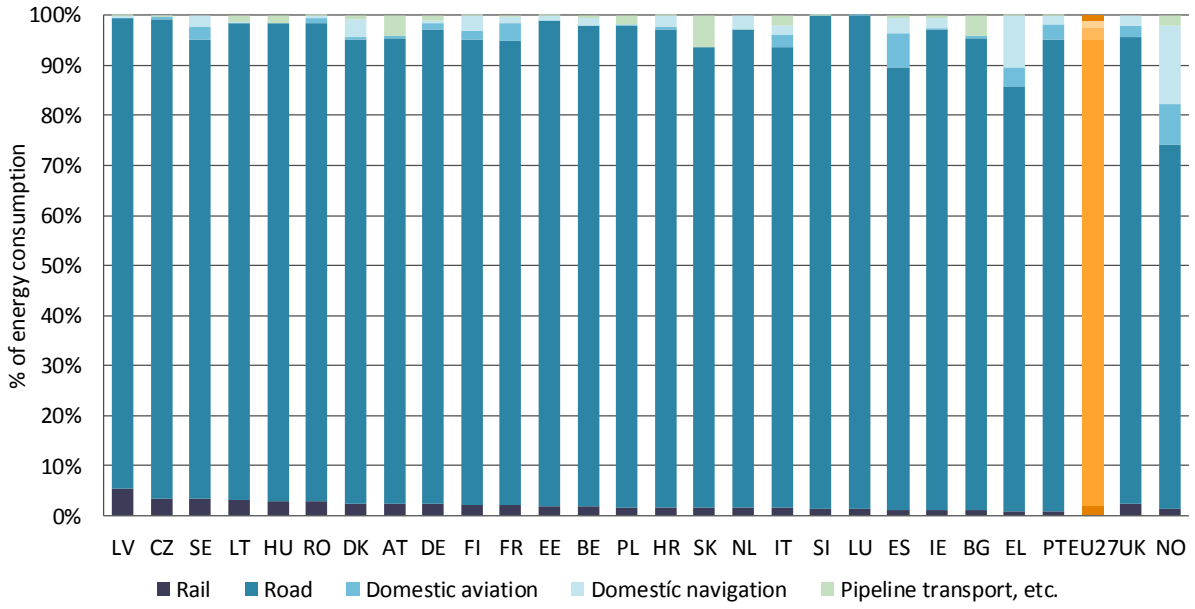
stock, and its maintenance and disposal are all activities producing emissions[17]. Despite these considerations, the overall benefits of using trains remain significant.

Finally, a modal shift to rail would have beneficial effects not only in terms of improved air quality but also in terms of reduced congestion.

1.1.2 Energy consumption

The transport sector accounted for 30.5% of the total final energy consumption in the EU27 in 2018 (31% for EU28); by contrast, within the transport sector rail accounted for only 1.9% of the final energy consumption (2.0% for EU28). The distribution per country is available in Figure 3.

Figure 3: Share of each transport mode (including rail) on total energy consumption per country (% in 2018)



Source: Statistical pocketbook, 2020.

Rail transport not only represents a minor part of transport's energy use, but it also saves overall **energy consumption**. According to a report[18] published by the International Energy Agency (IEA) in cooperation with the International Railway Association (UIC), if the world's passenger and freight traffic currently served by rail was transported by other transport modes, global oil demand for transport would be 16% higher.

The IEA-UIC report also shows that rail significantly outperforms other transport means in terms of **energy efficiency**, measured as tonne oil equivalent per passenger kilometre or per tonne kilometre. Rail is the most energy-efficient motorised land passenger mode and the second most efficient mode overall after shipping[19].

[17] *The Future of Rail – Opportunities for energy and the environment*, International Energy Agency, in collaboration with UIC, 2019.

[18] *The Future of Rail – Opportunities for energy and the environment*, International Energy Agency, in collaboration with UIC, 2019.

[19] World averages.

Two major factors influence the energy intensity of rail:

- Specific energy consumption of different typologies of trains: under the same conditions, electric trains are less energy intensive than diesel trains, given the higher efficiency of their engines and their higher capacity to enable regenerative braking and minimise inertial losses;
- Train capacity and utilisation rates: the higher the occupancy rate or the load factor, the lower the energy intensity.

Already today, four out of five trains in the EU run on electricity[20], and fleet renewals are driving the gradual replacement of diesel vehicles with better-performing diesel engines or electric vehicles. Electric hybrid battery trains and hydrogen trains are also coming into use. Railway undertakings are increasingly promoting the use of traction electricity from renewable sources (hydroelectric power, sun and wind[21]) and are starting to install on-board energy meters for energy consumption or to introduce eco-driving programmes.

The utilisation of rail has been increasing in Europe in the past few years. Passenger rail volumes were consistently growing and rail freight was finally recovering from the financial and economic crisis, while estimated load factors appear to have also slightly increased. However, the COVID-19 pandemic has taken a heavy toll on rail volumes in 2020; its impact has still to be fully assessed.

1.1.3 Noise

According to the World Health Organization (WHO), environmental noise is an important public health issue with negative impacts on human health and well-being, featuring among the top environmental risks to health. European Environment Agency (EEA) figures for 2017 show that the number of people exposed to harmful noise levels produced by railways, although significant, is lower than the number of people exposed to harmful noise levels produced by road[22]. Railway noise affects nearly 22 million people (of which approximately 10.9 million people exposed to railway noise outside urban areas and approximately 10.7 million people exposed to railway noise inside urban areas[23]). Given the predominantly international nature of rail freight transport (more than 50% of rail freight wagons run across borders), any attempt to reduce rail noise at source needs a coordinated European response.

The most cost-efficient measure to achieve this reduction is the retrofitting of existing freight wagons with ‘silent’, composite brake blocks, replacing cast iron brake blocks. Recently built wagons are already equipped with composite brake blocks, thereby complying with the more stringent noise limit values introduced in 2011.

A number of initiatives have been already adopted at the EU level to reduce noise exposure. These include:

- the Environmental Noise Directive 2002/49/EC;
- the technical specification for interoperability (TSI) on noise, which was revised in 2019[24];

[20] http://www.cer.be/sites/default/files/publication/CER%20Factsheet%20Climate%202018.pdf

[21] Electric trains are less carbon intensive than diesel trains if their primary energy sources have low-carbon content.

[22] While noise from roads or railways causes similar health effects, aviation noise is more harmful at the same noise levels. Any comparison between modes should consider not only the number of people exposed, but also the magnitude of health effects at similar noise levels.

[23] Environmental noise in Europe – 2020, EEA Report No 22/2019 (https://www.eea.europa.eu/publications/environmental-noise-in-europe).

[24] Commission Regulation (EU) No 1304/2014 of 26 November 2014 on the technical specification for interoperability relating to the subsystem ‘rolling stock — noise’, as amended by Commission Implementing Regulation (EU) 2019/774 of 16 May 2019.

- financial assistance under the CEF for the retrofitting of rail freight wagons with 'silent' brake technology[25] (which to date has allowed for the co-financing of retrofitting of some 207 000 'noisy' wagons); and
- a European framework laying down modalities for noise-differentiated track access charges[26].

However, despite the efforts of the Commission and Member States, there is still a risk that excessive levels of railway noise can lead to uncoordinated unilateral actions by Member States, such as applying speed limits and restrictions on operating at night.

The 2019 revision of the TSI Noise mandates the introduction of 'quieter routes' from December 2024. This affects the railway lines in the EU with the busiest freight traffic, on which only 'silent' freight wagons may be operated. By the end of 2017, some 350 000 freight wagons present in the EU still needed to be retrofitted with 'silent' brake blocks[27]. By mid-2020 this number had fallen to approximately 100 000, excluding freight wagons that cannot be retrofitted for technical reasons, as well as freight wagons for which retrofitting would not be economically feasible.

The Commission is also evaluating the results of Commission Implementing Regulation on noise differentiated track access charges (EU) 2015/429 (NDTAC). The Commission will assess in particular the progress of retrofitting wagons, the balance between bonus deductions and malus payments, the passing on of the incentives from railway undertakings to wagon keepers, as well as the cumulative level of bonuses wagons have received from different schemes. Based on the results of the evaluation, the Commission may, if deemed appropriate, decide to revise the framework.

1.2 Green financing and cost internalisation

In order to increase its relevance in the modal share of individual and business users, rail needs to become more competitive against other modes. This involves deploying sufficient investments and adequate customer-focused innovations.

In 2018, the total cost of railways, defined as infrastructure expenditure (irrespective of the funding source[28]) plus PSO compensation, was around EUR 138.20 per EU27 inhabitant (EUR 138.58 including the UK), which is an increase of 5.6% compared to 2015. Whereas infrastructure expenditure decreased by 1.7%, PSO compensation increased by 20.8% in the same period according to the figures reported in the RMMS (Figure 4[29]).

[25] Regulation (EU) No 1316/2013 of 11 December 2013 establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010 and repealing Regulations (EC) No 680/2007 and (EC) No 67/2010.

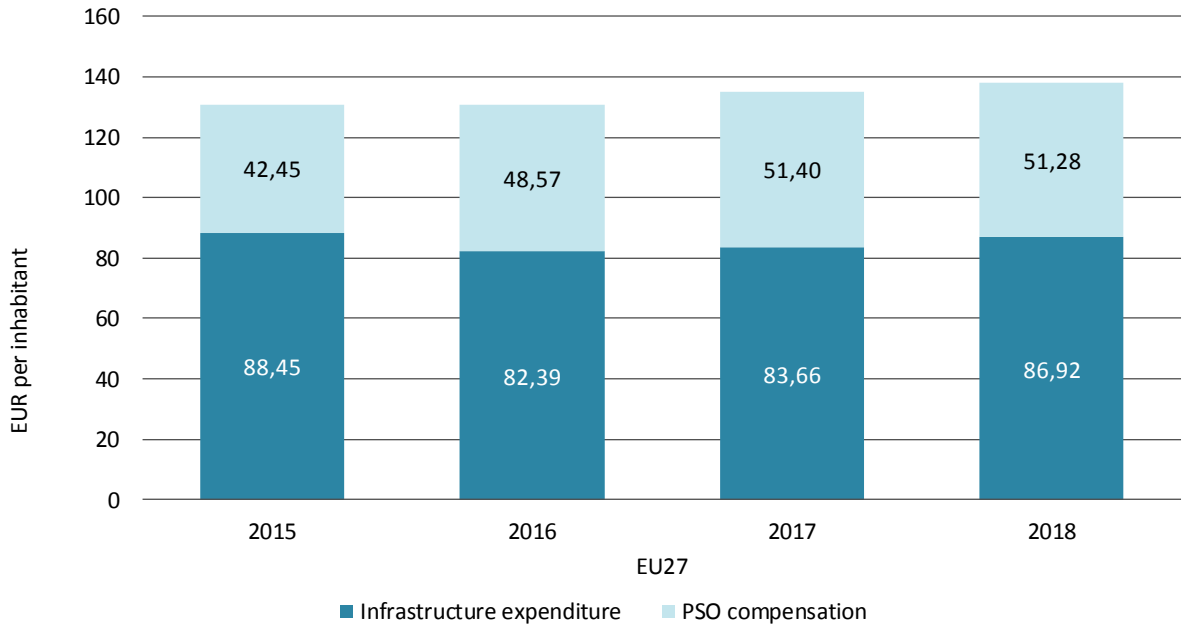
[26] Commission Implementing Regulation (EU) 2015/429 of 13 March 2015 setting out the modalities to be followed for the application of the charging for the cost of noise effects.

[27] ERA, Full Impact Assessment, Revision of the NOI TSI: Application of NOI TSI requirements to existing freight wagons (https://www.era.europa.eu/sites/default/files/library/docs/recommendation/006rec1072_full_impact_assessment_en.pdf).

[28] Funding infrastructure sources reported in the RMMS are public domestic funds, EU funds and own funds of the main infrastructure managers and other owners of major stations and freight terminals, like access charges.

[29] Trends reported here are significantly influenced by the improvements in RMMS data reporting of PSO compensation after the first year of implementation of Regulation 2015/1100.

Figure 4: Cost of railways per inhabitant (infrastructure expenditure plus PSO compensation) 2015-2018



Source: RMMS, 2020, Eurostat, 2020. Missing data for EL, PL, RO and ES.

The cost of railways as defined above rests heavily on public funding and in turn on taxpayers. This is due not only to the PSO compensation but also to the infrastructure expenditure element.

Expenditure in rail infrastructure in fact is also mainly financed through public funding: EUR 28.8 billion (domestic public funds and EU funds) in 2018 for the EU27, roughly equivalent to 80% of the total funding[30] according to figures reported in the RMMS by Member States.

Considering only domestic public funds and PSO compensations (i.e. excluding EU funding and infrastructure managers' own funding), in 2018 the cost of railways for the EU27 was around EUR 111 per capita.

Green taxonomy

Green bonds and climate-aligned bonds represent so far only a small share of the financing instruments used to finance rail projects. However, a growing green bond market could enable a significant share of investment in the EU's railway sector to be financed by green bonds, thus diversifying from traditional public financing sources.

Reorienting capital flows towards a more sustainable economy requires, however, establishing a clear classification system for sustainable activities, i.e. an EU taxonomy to define how 'green' a company or public institution is as regards its investments and turnover.

Following its action plan on financing sustainable growth[31] (March 2018), the European Commission established, in July 2018, a Technical Expert Group (TEG) on sustainable finance[32]. The expert group's remit was to develop recommendations for technical screening criteria for economic activities to be considered environmentally sustainable.

[30] EUR 33.7 billion (about 76%) for EU28.
[31] https://ec.europa.eu/info/publications/sustainable-finance-renewed-strategy_en
[32] https://ec.europa.eu/info/publications/sustainable-finance-technical-expert-group_en

In May 2019, the Commission published a study providing an overview of classification systems (taxonomies) which determine environmentally sustainable activities within the transport sector both globally and in the EU. The study also analysed the green bonds market and its state of play[33]. According to the findings, in 2017 13% (EUR 15.9 billion) of green bonds in Europe were dedicated to transport projects; the majority of these green bonds were railway projects. The green bonds market has grown significantly over the past 10 years, but according to the study there is further growth potential if market bottlenecks – such as the lack of a green bonds definition and framework or the lack of information and market knowledge – are properly addressed.

Based on this study and on almost 2 years of intensive discussions, in March 2020 the TEG published its recommendations for technical screening criteria for economic activities (TEG report on EU taxonomy[34]).

Based on the TEG report, the Commission in turn presented a proposal for a regulation on the establishment of a framework to facilitate sustainable investment: this was the Taxonomy Regulation[35], which entered into force on 12 July 2020 following its adoption by the European Parliament and the Council.

The Taxonomy Regulation sets six environmental objectives:

1) climate change mitigation;
2) climate change adaptation;
3) the sustainable use and protection of water and marine resources;
4) the transition to a circular economy;
5) pollution prevention and control; and
6) the protection and restoration of biodiversity and ecosystems.

To establish the degree to which an investment is environmentally sustainable, an economic activity must qualify as environmentally sustainable. The Taxonomy Regulation establishes that this happens where that economic activity:

- substantially contributes to at least one of the environmental objectives;
- does not significantly harm any of the remaining objectives;
- complies with minimum safeguards as defined in the Taxonomy Regulation; and
- complies with technical screening criteria established by the Commission in specific delegated acts.

The Commission is set to publish a first delegated act by end-2020 presenting the technical criteria (based on the TEG report) for the climate change mitigation and the climate change adaptation objectives, for entry into force end-2021. A further delegated act covering the four remaining objectives should be adopted by end-2021, for entry into force end-2022.

Transport-related activities (both operations and manufacturing) contribute substantially, both directly and indirectly, to (at least) the climate change mitigation objective. Therefore, most of the relevant technical screening criteria for transport investments will be already published by end-2020, falling at least within the scope of the first delegated act.

To make a substantial contribution to climate mitigation, the activities and technical screening criteria included in the Taxonomy need to focus on the main emissions sources from the transport

[33] *Development of a methodology to assess the 'green' impacts of investment in the rail sector*, (May 2019), https://ec.europa.eu/transport/modes/rail/news/2019-06-24-study-rail_en

[34] https://ec.europa.eu/info/files/200309-sustainable-finance-teg-final-report-taxonomy_en

[35] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R0852

sector, supporting reduction in GHG emissions and indirectly accelerating modal shift towards less polluting transport modes such as rail and inland waterways[36].

The transport taxonomy mainly concerns operations of vehicle/vessel fleets and rolling stock (both wagons and locomotives) and the associated enabling infrastructure, including telematics applications such as ERTMS, focusing on three categories of criteria:

- efficient, low- and zero direct emission fleets
- fuel substitution to net-zero carbon fuels
- improving the efficiency of transport system – modal shift.

The manufacturing sector is also a high producer of emissions, and some manufacturing activities are therefore included in the taxonomy. For transport, the taxonomy includes the manufacture of low-carbon fleets and vehicles in road, rail and waterborne. Most eligible actions relate to the manufacture of zero-emission vehicles, although until 2025 some low-emission vehicles could still be eligible (in accordance with EU emission standards).

Finally, transport of captured CO_2 by rail, ship or pipeline is also covered.

Cost internalisation

On the costs side, another aspect to take into account when considering rail competitiveness against other modes is the relative capacity of different modes to internalise external costs caused by their activities, in particular their environmental impact. Internalising external costs would make them part of the decision-making process of transport users.

In 2019, the Commission funded an independent study on sustainable transport infrastructure charging and internalisation of transport externalities. The study provided an overview of the progress made by EU Member States towards the full internalisation of external and infrastructure costs of transport and tried to identify approaches for further internalisation. The results show only partial internalisation of external and infrastructure costs of transport in the EU28[37].

The total external costs of transport in the EU27 were estimated at EUR 867 billion (EUR 987 billion for EU28), composed as follows:

- costs of accidents (29%)
- costs of congestion[38] (26%)
- environmental costs[39] (45%).

These aggregate figures hide large differences between transport modes. Overall, road transport is the largest contributor to external costs (EUR 721 billion in EU27[40], i.e. 83% of the total costs mainly due to passenger cars), whereas rail represents only 2% of the total external costs of transport. Table 1 shows external costs for the EU28.

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36 https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf

37 *Sustainable Transport Infrastructure Charging and Internalisation of Transport Externalities,* June 2019 (https://ec.europa.eu/transport/themes/sustainable/internalisation-transport-external-costs_en).

38 Only includes congestion costs for road transport as it was not possible to estimate congestion costs for other modes.

39 Climate change, air pollution, noise, well-to-tank and habitat damage.

40 EUR 820 billion for EU28.

Table 1: External costs in the EU28 in 2016 (all figures are PPS adjusted)

Vehicle category	Total external costs	Average external costs
Passenger transport modes	**EUR billion**	**EUR-cent/pax-km**
Passenger car	565	12.0
Bus/coach	19	3.6
Motorcycle	41	24.5
High-speed train	1	1.3
Electric passenger train	11	2.6
Diesel passenger train		3.9
Aircraft	48[a]	3.4
Light commercial vehicle	**EUR billion**	**EUR-cent/vkm**
Light commercial vehicle	118	24.7
Freight Transport modes	**EUR billion**	**EUR-cent/tkm**
Heavy goods vehicle	78	4.2
Electric freight train	5	1.1
Diesel freight train		1.8
IWT vessel	3	1.9
Maritime vessel	98[a]	0.7

a= rough estimations

Source: Sustainable Transport Infrastructure Charging and Internalisation of Transport Externalities (2019).

Supporting the modal shift towards rail would have a significant impact on external costs, given: (i) its higher safety compared to other means of land transport; (ii) its larger loading capacity, which would help reduce congestion on roads; and (iii) its better energy efficiency and lower emissions, which would decrease air pollution and climate effects.

External and total infrastructure costs of transport are only partly internalised by current taxes and charges in the EU28. For most transport modes, for example, the study found that only 15 to 25% of the overall external and infrastructure costs are covered. On average, trains were found to have lower coverage ratios than road vehicles; however, they are also responsible for a smaller amount of external costs compared to road. Even excluding fixed infrastructure costs from the analysis, current taxes and charges do not cover the external and (variable) infrastructure costs for most modes. However, given the relevance of fixed infrastructure costs in rail, trains score much better, and high-speed trains even see their taxes and charges exceed their costs. This indicator is in line with the Commission's policy to realise full internalisation of external costs, including wear and tear costs. It recognises that fixed infrastructure costs are sunk costs and that paying for these costs may result in (further) underutilisation of existing infrastructure (e.g. rail).

Focusing only on infrastructure cost coverage[41], the study concluded that there is a limited use of the 'users-pays' principle in the EU28. For most modes, only 15 to 30% of the total infrastructure costs are covered by infrastructure charges. Exceptions are aviation and maritime transport. The variable infrastructure costs (i.e. wear and tear costs) are instead broadly covered by the revenues from infrastructure charges across almost all vehicle categories.

[41] The overall infrastructure cost coverage ratio provides an insight into whether revenues from infrastructure charges internalise all infrastructure costs.

1.3 Resilience

Transport infrastructures are essential for the functioning of society and the economy. Their increasing interdependence makes them more complex to operate and requires a significant coordination effort. Breakdowns due to climate change, incidents or technical failures can compromise essential flows of goods or the ability to meet citizens' needs for mobility.

Interruptions of service in railways can be due to different reasons and can range in severity from simple disturbances in daily operations to disruptions linked to technical failures/weather conditions and finally to exceptional and unexpected events like natural disasters or (as experienced recently) a global pandemic.

In recent years, the EU railway sector has demonstrated its resilience in the light of very adverse situations. Coordination and cooperation between infrastructure managers and with railway undertakings and public authorities have played an essential role in ensuring this resilience.

In case of severe disruptions, the EU infrastructure managers can today trigger a contingency procedure, as provided for in the *Handbook for International Contingency Management*. The handbook was drafted after the severe Rastatt accident in 2017 to avoid traffic interruptions on rail freight corridors (RFCs) and ensure that rail freight continuously feeds supply chains[42].

Since the adoption of the handbook in May 2018, international contingency management plans have been triggered – partially involving cooperation by different RFCs – after the following four international incidents[43]:

- A derailment on the Scandinavian–Mediterranean RFC that disrupted traffic between Hamburg and the German-Danish border from 2-6 August 2020.
- A collision at Auggen on the Rhine–Alpine RFC between a train and elements of a road bridge under construction, impacting traffic between Germany and Switzerland on the rail line between Müllheim and Schliengen from 2-8 April 2020.
- Two incidents in 2019 on the Mediterranean RFC: (i) a mudslide that interrupted rail traffic between France and Italy (Saint Michel de Maurienne and Modane) from 3-22 July 2019; and (ii) heavy rainfalls that impacted the line connecting France and Spain between Montpellier and Narbonne from 23 October to 25 November 2019.

The handbook is currently being updated by RailNetEurope (RNE) to improve and possibly adapt the processes described in it.

More recently, the EU rail sector has experienced a significant disruption to business continuity due to a huge drop in passenger mobility and (partially) in freight transport due to the COVID-19 pandemic.

According to information shared by the sector[44], during the first half of 2020 average estimated decline in rail passenger revenues for EU27 was about -34%, with a total estimated loss close to EUR 10 billion. Even though rail freight operators proved to be the backbone of logistics chains during the first months of the crisis and kept large flows of goods moving, the freight segment also

[42] The contingency plans based on the handbook were developed with the support of the Commission and endorsed by the EU infrastructure managers. The RFCs are the platforms for coordination and cooperation after such events.

[43] Data available at August 2020.

[44] CER overview of COVID-19 impact on the rail market.

felt the effects of the pandemic. Over the same period, the average estimated decline in rail freight revenues for EU27 was about -15%, with a total estimated loss of about EUR 1.25 billion. These estimates include the months of January and February, which were before the start of the crisis caused by the pandemic.

During the peak of the crisis in March and April 2020, ridership went down by more than 90% in several countries and even after the end of lockdown rail passenger numbers have not returned to pre-crisis levels in many countries. The freight segment also felt the impact of the pandemic due to the slowdown in economic activities such as car manufacturing and sales.

Furthermore, rail infrastructure managers were impacted by the COVID-19 pandemic due to the overall reduction in traffic flows and declining revenues from track access charges.

Box 2: European Commission COVID-19 related measures for rail

The outbreak of COVID-19 in 2020 caused lockdowns and other restrictive measures that had a deep impact on rail transport. Keeping transport services running was of crucial importance for the functioning of the EU's internal market, the maintenance of its supply chains and its effective response to the common public health crisis.

The European Commission took relief measures to ensure continued and uninterrupted transport services. The main objectives were to:

- safeguard operational continuity and basic connectivity across borders;
- ensure the availability of goods and essential services while protecting health;
- provide legal grounds for exceptional measures in accordance with the regulatory framework in force; and
- enable financial support measures while preserving the integrity of the internal market.

In an effort to mitigate the economic impact of the COVID-19 pandemic on the transport sector, including the rail sector, the Commission proposed and implemented a number of measures:

- Publication of guidelines to ensure EU passenger rights are applied in a consistent manner across the EU[45] (March 2020).
- New practical advice on how to implement its guidelines for border management, in order to keep freight moving across the EU during the pandemic (March 2020). To ensure that EU-wide supply chains continued to operate, Member States were requested to designate, without delay, all the relevant internal border-crossing points on the trans-European transport network[46] (TEN-T) as '**green lanes**' border crossings. The green lane[47] border crossings had to be open to all freight vehicles, whatever goods they were carrying. Crossing the border, including any checks and health screening, should not take more than 15 minutes. To keep transport moving, the Commission recommended that Member States should take action to ensure the free movement of all workers involved in international transport, whatever the transport mode[48].
- Adoption of a temporary framework for State aid measures[49] (March 2020 and following amendments).
- Publication of an overview of the State aid rules and public service obligations rules applicable to the land transport sector during the COVID-19 outbreak[50] (May 2020).

45 https://ec.europa.eu/transport/sites/transport/files/legislation/c20201830_en.pdf
46 https://ec.europa.eu/transport/sites/transport/files/green-lanes.pdf
47 https://ec.europa.eu/transport/sites/transport/files/legislation/c20201897_en.pdf
48 https://ec.europa.eu/commission/presscorner/detail/en/ip_20_468
49 https://ec.europa.eu/competition/state_aid/what_is_new/covid_19.html
50 https://ec.europa.eu/competition/state_aid/what_is_new/land_transport_overview_rules_during_coronavirus.pdf

- Regulation (EU) 2020/698 laying down specific and temporary measures in view of the COVID-19 outbreak concerning the renewal or extension of certain certificates, licences and authorisations and the postponement of certain periodic checks and periodic training in certain areas of transport legislation (May 2020, for all transport means). The measures introduced to protect public health made it difficult for some transport operators, individuals and national administrations to complete certain formalities required under EU law, such as renewing licences. The validity date of certain certificates, licences and other authorisations was therefore allowed to be extended. Certain periodic checks in road, rail, inland waterways transport and maritime security were also postponed temporarily[51].
- Directive (EU) 2020/700[52] of 25 May 2020 amending Directives (EU) 2016/797 and (EU) 2016/798, as regards the extension of their transposition periods and the delegated Regulation (EU) 2020/782[53] of 12 June 2020 amending Delegated Regulations (EU) 2018/761 and (EU) 2018/762 as regards their dates of application following the extension of the transposition deadline of Directive (EU) 2016/798. This Directive allowed for a three-month extension of the deadline by which some Member States had to transpose EU law on rail safety and interoperability. The delay aimed to ensure that the sector has legal clarity and could focus its time and resources on coronavirus recovery (May/June 2020).
- Regulation 2020/1429 aiming to reduce the financial burden on the rail sector caused by the COVID-19 pandemic through temporary eased rules on charges (October 2020[54]).

[51] Regulation (EU) 2020/698 of the European Parliament and of the Council of 25 May 2020 laying down specific and temporary measures in view of the COVID-19 outbreak concerning the renewal or extension of certain certificates, licences and authorisations and the postponement of certain periodic checks and periodic training in certain areas of transport legislation (OJ L 165, 27.5.2020, p. 10), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R0698&from=EN).

[52] Directive (EU) 2020/700 of the European Parliament and of the Council of 25 May 2020 amending Directives (EU) 2016/797 and (EU) 2016/798, as regards the extension of their transposition periods (OJ L 165, 27.5.2020, p. 27), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2020.165.01.0027.01.ENG&toc=OJ:L:2020:165:TOC.

[53] Commission Delegated Regulation (EU) 2020/782 of 12 June 2020 amending Delegated Regulations (EU) 2018/761 and (EU) 2018/762 as regards their dates of application following the extension of the transposition deadline of Directive (EU) 2016/798 of the European Parliament and of the Council (OJ L 188, 15.6.2020, p. 14), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R0782.

[54] Regulation (EU) 2020/1429 of the European Parliament and of the Council of 7 October 2020 establishing measures for a sustainable rail market in view of the COVID-19 outbreak (OJ L 333, 12.10.2020, p. 1), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R1429&from=EN.

2. The state of the union railway network

2.1 Description

National and European authorities cooperate to ensure all the necessary support for building new rail infrastructure and improving the existing one as a part of an EU-wide multimodal network. An integrated EU-wide transport network on long-distances could bring to the people and the businesses of the Union significant benefits, with the more efficient integration of people and economies. Cross-border regions' exchanges are also important. Lack of cross-border accessibility is one of the main obstacles preventing individuals and organisations to experience the benefits of the internal market; tackling missing cross-border rail links could help improving the offer for sustainable mobility for people in border regions[55]. The TEN-T Guidelines[56], the objectives of the Connecting Europe Facility[57], and the Cohesion Fund[58] priorities reflect the importance attached to rail as enhancer of the internal market and as a sustainable and clean mode of transport.

Focusing on domestic networks, Figure 5 shows the reported length of the national rail networks of the EU Member States plus the United Kingdom and Norway[59].

[55] 'Comprehensive analysis of the existing cross-border rail transport connections and missing links on the internal EU borders', DG REGIO, 2018 (https://ec.europa.eu/futurium/en/transport/comprehensive-analysis-existing-cross-border-rail-transport-connections-and-missing-links).

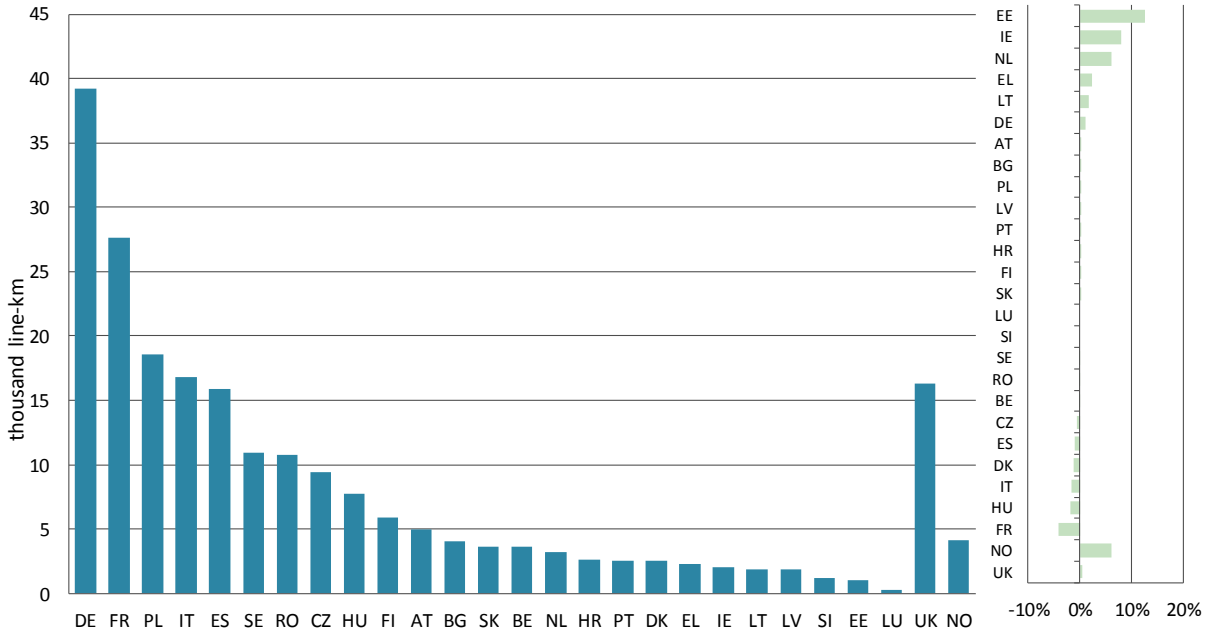
[56] Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network, OJ L 348/1, 20.12.2013. The TEN-T policy is currently under revision. A summary of the results of a full evaluation should be published by the end of 2020. A proposal for a revision of the TEN-T Regulation is currently planned for 2021.

[57] Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010, OJ L 348, 20.12.2013, page 129.

[58] Regulation (EU) No 1300/2013 of the European Parliament and of the Council of 17 December 2013 on the Cohesion Fund, OJ L 347, 20.12.2013, page 281.

[59] Cyprus and Malta are not represented in this report since they do not have railways.

Figure 5: Length of national networks per country (thousand line-km, 2018) and relative change (2015-2018)



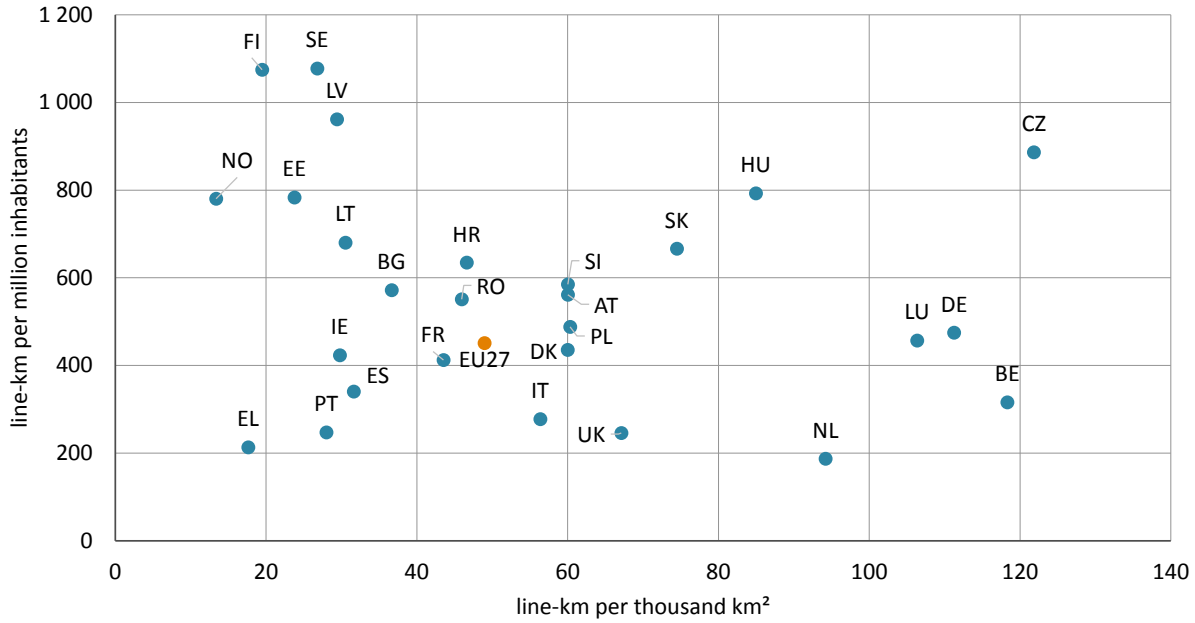
Source: Statistical pocketbook, 2020. Infill data from various other sources.

The total length of the EU27 rail network in use in 2018 was around 201 000 line kilometres (217 000 for EU28), which is a decrease of 0.4% compared to 2015.

Infrastructure density

Figure 6 illustrates the diversity of railways in the different States. It compares the number of line kilometres per thousand square kilometres, on the horizontal axis, with the number of line kilometres per million inhabitants, on the vertical axis.

Figure 6: Density of railway network relative to surface area and population per country (line-km per million people and line-km per thousand km^2, 2018)



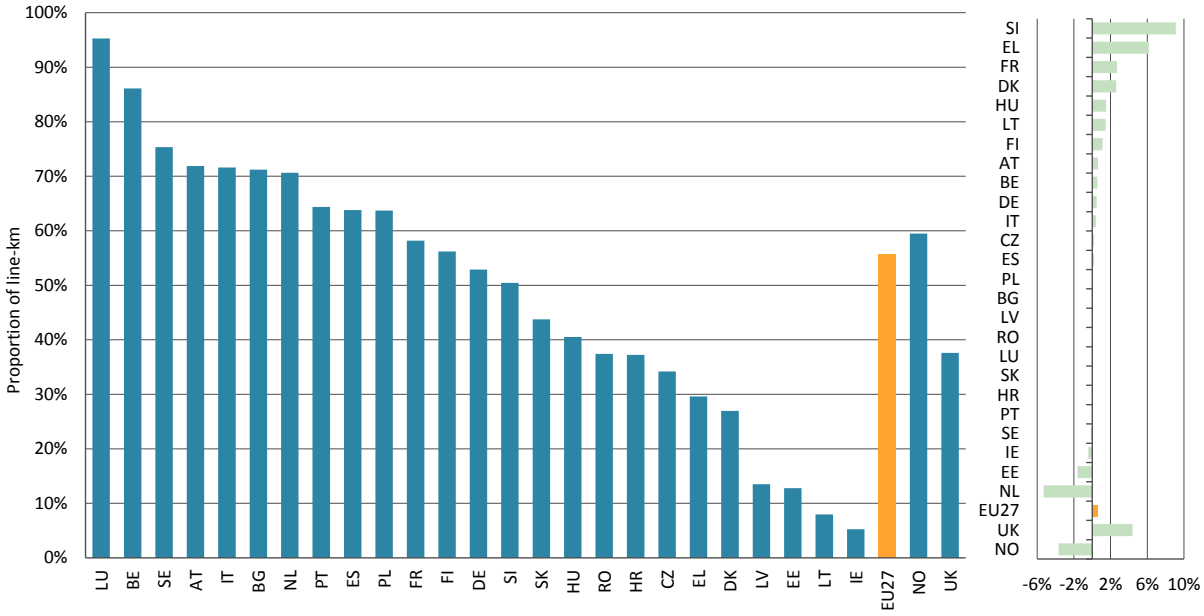
Source: Statistical pocketbook, 2020.

The chart shows how the rail network of Nordic and Baltic countries (Finland, Norway, Sweden, Estonia, Latvia and Lithuania) is very dense when related to their population, but quite sparse if related to their surface area. On the other side, we have countries like Belgium, Germany, Luxembourg and the Netherlands, with a very dense rail network when related to their territory, but more sparse when related to their population (especially in the Netherlands). In Greece, the rail network is sparse when related both to the population and the country's surface area, whereas Czechia has the densest network looking at both indicators at the same time.

Electrified lines

Figure 7 shows the proportion of the electrified network in 2018, measured in line kilometres, and the change compared to 2015.

Figure 7: Percentage of electrified network per country (2018) and change in the percentage of electrified network (2015 vs 2018)



Source: Statistical pocketbook, 2020.

While around 56% of the total EU27 network was electrified in 2018 (54% for EU28), this proportion ranges widely across countries from 5% in Ireland to 95% in Luxembourg. The EU27 network counted an additional 855 km of electrified route since 2015, an increase of 1.2 % (for EU28: additional 1 599 km for an increase of 1.7%).

According to the latest PRIME benchmarking report, in 2018, around 75% of total train-kilometres were travelled thanks to electricity-powered trains[60] . In several cases a higher network utilisation and density appear to be a driver for electrification; since electrifying lines require high investments, electrification makes economically more sense on busy lines. On lower density networks other approaches may be more convenient, as for example battery powered trains and hybrid-diesel electric locomotives.

High-speed lines

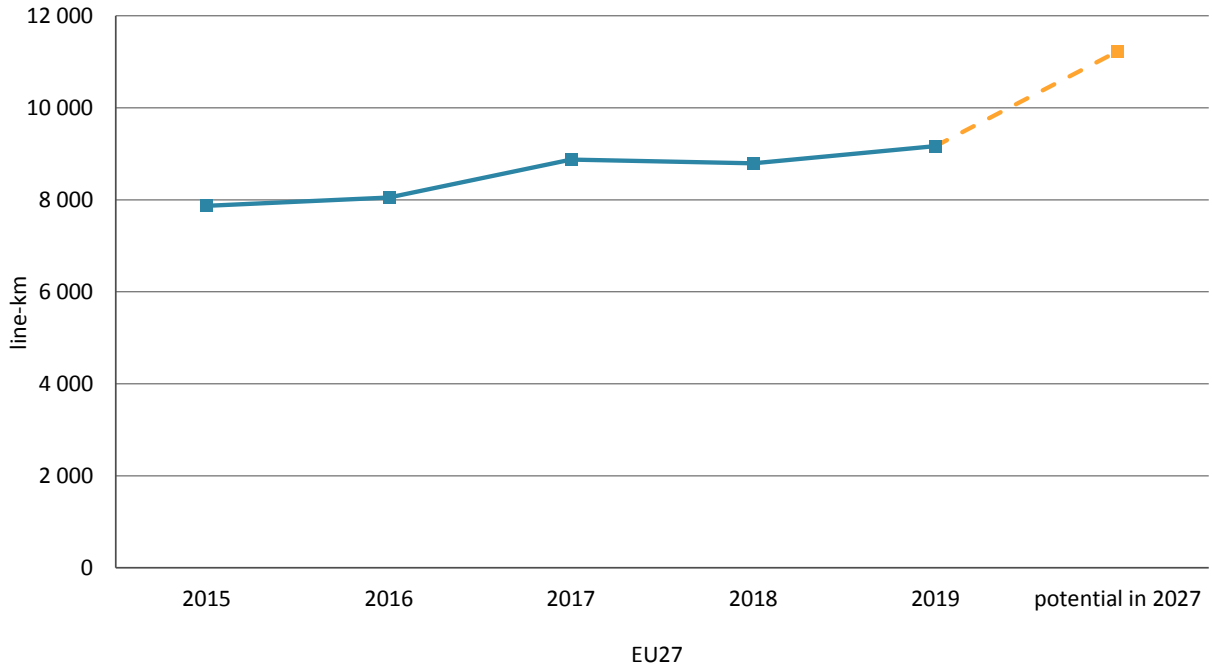
The Commission reports every year statistics on high-speed lines, which are defined as the lines or sections of lines on which trains can go faster than 250 km/h at some point during the journey[61].

Figure 8 shows the development of the EU's high-speed network (not including the UK), which by the end of 2019 extended to 9 169 line kilometres (9 282 for EU28).

[60] PRIME benchmarking report 2018, available at: (https://webgate.ec.europa.eu/multisite/primeinfrastructure/sites/primeinfrastructure/files/prime_external_report_200610.pdf), Figure 35 comparing data provided by 12 peer infrastructure managers.

[61] Except for Austria, for which a maximum speed of 230 km/h is considered.

Figure 8: Development of high-speed lines in Europe, current and potential (line-km, current 2015-2019, further for those under construction)



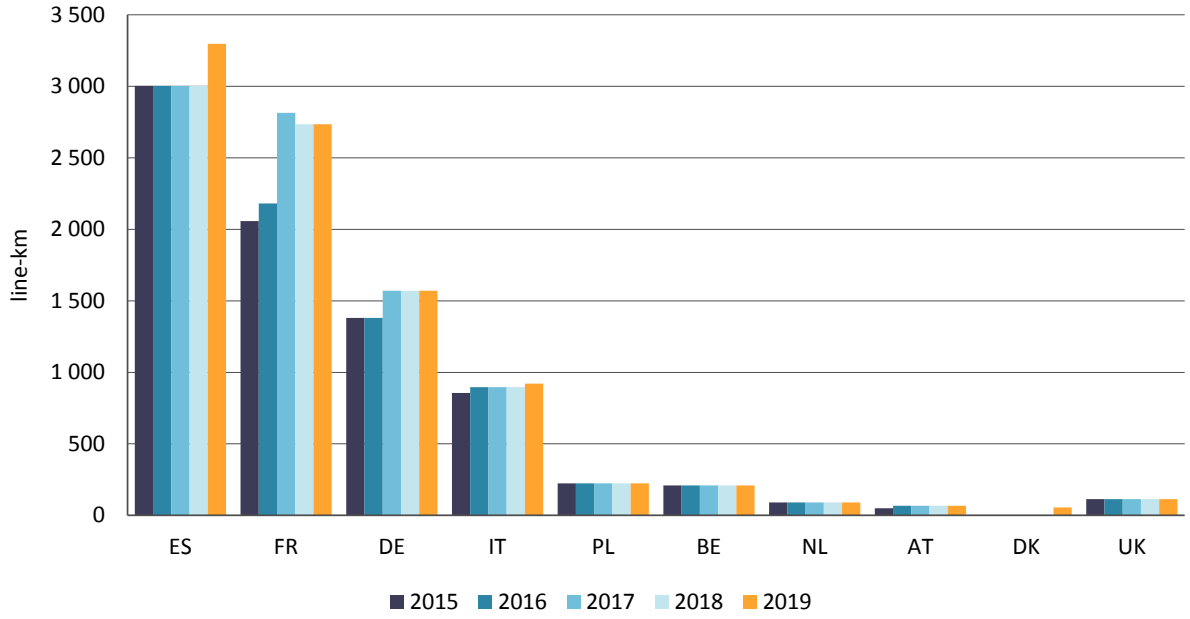
Source: Statistical pocketbook, 2020.

When considering also the length of high-speed lines currently reported under construction, the estimated EU27 network would have a size of 11 228 line kilometres in 2027 (11 341 for EU28).

The EU27 high-speed network increased by almost 1 300 km between 2015 and 2019 (+17%)[62]. Figure 9 shows how the length of high-speed lines evolved from 2015 to 2019 in different countries.

[62] For EU28 +16%.

Figure 9: Length of dedicated high-speed line per country (line-km, 2015-2019)



Source: Statistical pocketbook, 2020.

Spain is the country with the largest high-speed network (around 3 300 line kilometres). No new lines were added to the relatively small networks in Poland and Belgium between 2015 and 2019. The largest increase compared to 2015 can be seen in France (additional 676 line kilometres) and in Spain (additional 295 line kilometres).

2.2 Infrastructure management

An efficient management and adequate funding of the rail infrastructure is fundamental for the provision of efficient and sustainable rail transport services.

Box 3: PRIME benchmarking

The PRIME KPI subgroup was set up in 2014 with two main objectives: to monitor common trends at the EU level; and to benchmark performance and by doing so to strive for better results. In 2020, the group presented its third benchmarking report, covering the years 2012-2018[63]. Compared to the first two reports, this edition includes a number of new indicators, a more complete dataset and four new participants (in total 19). Five infrastructure managers are in the transitional phase to join. Taking into account its wider reach, this year's report offers, for the first time, more detailed explanations and contextual information to make the wealth of data more accessible.

For the infrastructure managers, benchmarking helps to understand where each organisation stands and where there is potential for improvement. For the European Commission, there is an invaluable opportunity to identify best practice and to monitor the progress with respect to EU policy priorities. For all stakeholders, it is an opportunity to observe trends as they evolve, to identify strengths and weaknesses of

[63] https://webgate.ec.europa.eu/multisite/primeinfrastructure/content/prime-members-present-third-benchmarking-report_en

the system.

PRIME members have jointly agreed on the key performance indicators that are relevant for their business. The progress on common data definitions and KPIs is documented in the catalogue, which is continuously refined and publicly available on the PRIME website. PRIME continues to work on making PRIME key performance indicators (KPIs) more robust, comparable for benchmarking purposes and more complete, by covering additional aspects. This work will also serve as a basis for discussions on the future RMMS framework.

2.2.1 Infrastructure governance

The optimised, efficient and non-discriminatory management of the railway infrastructure is essential for the development of railway services.

Member States often have a single national infrastructure manager responsible for the entire national network. In other cases, the main infrastructure manager operates together with smaller ones responsible for specific lines, regional infrastructure or service facilities as shown in Table 2.

Table 2: EU27 Main infrastructure managers with less than 100% share of total route length (2018)

Member state	Share of total route length
CZ	98%
FR	98%
PL	96%
HU	94%
IT	91%
SE	89%
AT	88%
EE	85%
DE	85%
DK	79%

Source: Eighth Annual Market Monitoring Working Document, IRG-Rail 2020.

Within the Fourth Railway Package, Directive 2016/2370 introduced additional measures to ensure that infrastructure managers manage their networks in an efficient and non-discriminatory manner, in particular when they are part of a **vertically integrated** undertaking[64]. Table 3 provides an overview of the institutional settings of the main infrastructure managers in the EU27 (year 2020).

[64] As defined in Article 1(c) of Directive 2016/2370/EU.

Table 3: Institutional setting of the main infrastructure manager, EU27 (except CY and MT)

	Fully separated from RU(s)	Vertically integrated with RU(s)		
		Distinct legal entities		Department within the same company
		under a *common holding company*	In a relation *of parent company - subsidiary*	
State administrative unit	**DK**			
Public Agency	**FI, SE**			
			HU *(IM = parent company),*	**IE** *(the IM is a department of the RU)*
State-owned company	**BE, BG, CZ, EE, EL, ES, HR, NL, PT, RO, SK**	**AT, DE, FR, IT, LT, PL, SI**	**LV** *(IM = parent company)*	**LU** *(the IM is a department of the same company as the passenger and freight RUs)*

Source: Desk research, May 2020.

In almost all Member States, the infrastructure managers are performing **essential functions** (infrastructure charging and path allocation) for their network. In Hungary, Ireland and Luxembourg both the infrastructure charging and path allocation are performed by a separate body. In Czechia, the capacity allocation is performed by an independent allocation body but only for privately owned railway undertakings.

Railway infrastructure managers are usually only in charge of the management of railway infrastructure, with some notable exceptions: in Finland, Väylävirasto's modal competence covers all public passenger and freight traffic on state-owned railroads, state-owned road infrastructure and most Finnish waterways and channels. In Portugal, Infraestruturas de Portugal's modal competences include rail and road infrastructure. In Sweden, Trafikverket is competent for railway infrastructure, long-term infrastructure planning for road traffic, management of rail traffic, shipping and aviation, as well as for the construction and operation of state roads and railways. The Swedish Transport Administration may also, in agreement with the Swedish Maritime Administration, take responsibility for the implementation of infrastructure projects in fairways, locks and canals.

Directive 2016/2370 provides for the main infrastructure managers to participate and cooperate in a **European network of infrastructure managers** to facilitate the provision of efficient and effective rail services within the Union. The Platform of Rail Infrastructure Managers in Europe (PRIME[65]), created initially on a voluntary basis in 2013, became in 2017 the formal European Network of infrastructure managers, as provided for in the Fourth Railway Package.

65 https://webgate.ec.europa.eu/multisite/primeinfrastructure/prime-news_en

Contractual agreements

EU transport policy aims to set the legal framework for infrastructure managers and Member States to provide rail infrastructure at the best value for money. Maintaining the infrastructure is crucial for the competitiveness of the rail system as a whole. However, there is still concern about the sustainable financing of existing rail infrastructure, the quality of infrastructure service and the issue of how to get infrastructure managers to perform better.

Article 30(2) of Directive 2012/34/EU provides for contractual agreement to be concluded between the competent authority and the infrastructure manager, covering a period of not less than 5 years and including elements as specified in the Directive. Table 4 shows the contractual agreements as reported in 2018 by Member States in the RMMS.

Table 4: Contractual agreements between competent authorities and infrastructure managers

	Number of contractual agreements	Performance indicators included	Monitoring body
AT	1	NO	YES
BE	1	YES	YES
BG	1	YES	YES
CZ	1	NO	n/a
DE	1	YES	YES
DK	1	NO	YES
EE	1	YES	YES
EL		n/a	n/a
ES		n/a	n/a
FI		n/a	n/a
FR	1	YES	NO
HR	1	NO	NO
HU	2	YES YES	NO NO
IE	1	YES	YES
IT	12	YES (6) NO (6)	YES (all)
LT	1	YES	YES
LU	1	NO	YES
LV	1	YES	NO
NL	1	YES	NO
PL	2	YES YES	YES NO
PT	1	YES	YES
RO	1	YES	YES
SE	2	NO NO	NO NO
SI	1	NO	YES
SK	1	YES	YES
UK	3	YES YES YES	YES YES YES
NO	1	YES	NO

Source: RMMS 2020.

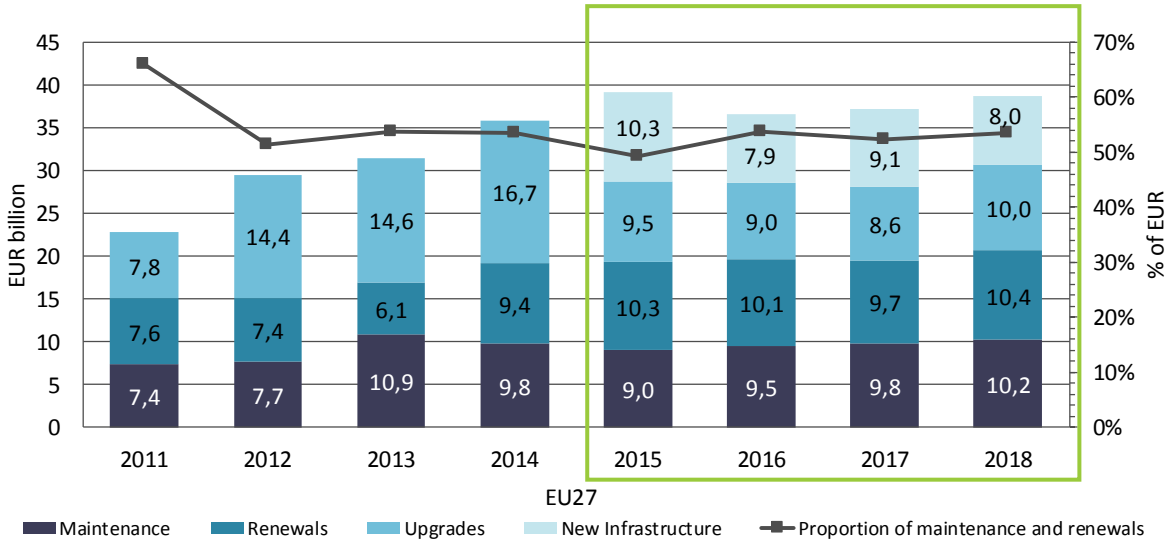
2.2.2 Infrastructure expenditure

The EU has set very ambitious goals to realise a core Trans-European transport (TEN-T) network by 2030 and a comprehensive network by 2050[66]. Realising the core network alone requires investments of around EUR 500 billion over 2021-2030[67]. Rail is particularly involved since rail infrastructure is an important element of the TEN-T network. In April 2019, the Commission launched a review of the TEN-T policy[68]. In the past few years, awareness was raised on new dimensions of the TEN-T policy, as for example the movement of military forces (troops, assets and equipment) within and beyond the EU, which was identified in the action plan on military mobility[69].

Enhancing rail infrastructure investments is also one of the main objectives of national transport policies. Member States have the obligation, stemming from Article 8 of Directive 2012/34/EU, to publish an indicative rail infrastructure development strategy in order to meet future mobility needs in terms of maintenance, renewal and development of their infrastructure based on sustainable financing of the railway system.

Figure 10 shows the total annual infrastructure expenditure as the sum of network maintenance, renewals, upgrades and investments into new infrastructure of the EU27 Member States for the years 2011 to 2018 for EU27. The dotted line indicates the share of maintenance and renewals on total infrastructure expenditure.

Figure 10: Expenditure on infrastructure and proportion of maintenance and renewals (EUR billion, 2011-2018)



Source: RMMS, 2020.

[66] TEN-T comprises two network 'layers':
- the core network includes the most important connections, linking the most important nodes.
- the comprehensive network covers all European regions.
The backbone of the core network is represented by nine core network corridors, which were identified to streamline and facilitate the coordinated development of the core network.

[67] https://ec.europa.eu/transport/sites/transport/files/2019-09-cbs3-report.pdf

[68] https://ec.europa.eu/transport/themes/infrastructure/ten-t/review_en

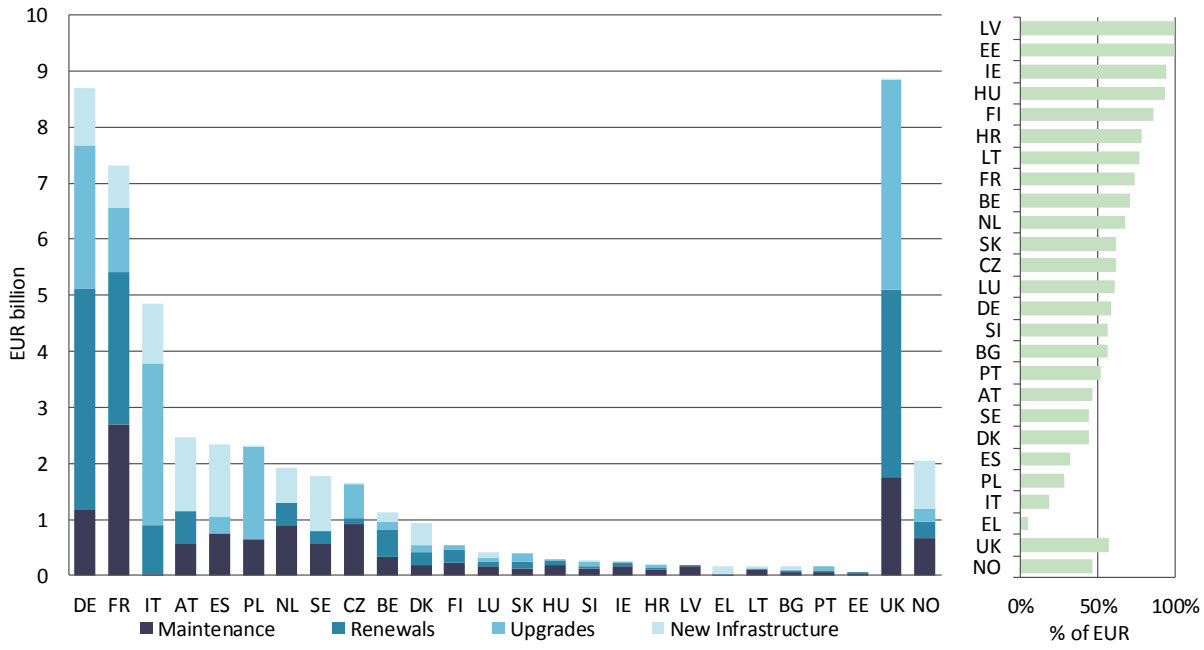
[69] http://europa.eu/rapid/press-release_IP-18-2521_en.htm

Total EU27 infrastructure expenditure rose from EUR 22.8 billion in 2011 to EUR 38.7 billion in 2018[70] (from EUR 29.2 billion to EUR 47.5 billion for EU28). Of 2018 expenditure, 26% was on maintenance, 27% on renewals, 26% on upgrades and 21% in investments into new infrastructure.

The RMMS gathers data on expenditure in new investments only since 2015. Between 2015 and 2018, the share of maintenance, renewals and upgrades expenditures into the existing network slightly increased, whereas the share of new investments was more variable and finally decreased probably due to budgetary reasons.

Figure 11 shows the total annual infrastructure expenditure per country in 2018 as the sum of network maintenance, renewals, upgrades and investments into new infrastructure. The horizontal bar chart indicates the relative share of maintenance and renewals of existing infrastructure in total annual expenditures.

Figure 11: Expenditure on infrastructure and proportion of maintenance and renewals per country (EUR billion, 2018)



Source: RMMS, 2020.

Total infrastructure expenditure in 2018 was highest in Germany, France, Italy and the United Kingdom. Highest expenditure for new infrastructure has been reported in Austria and Spain, whereas highest expenditure for infrastructure upgrades can be seen in the United Kingdom and Italy[71].

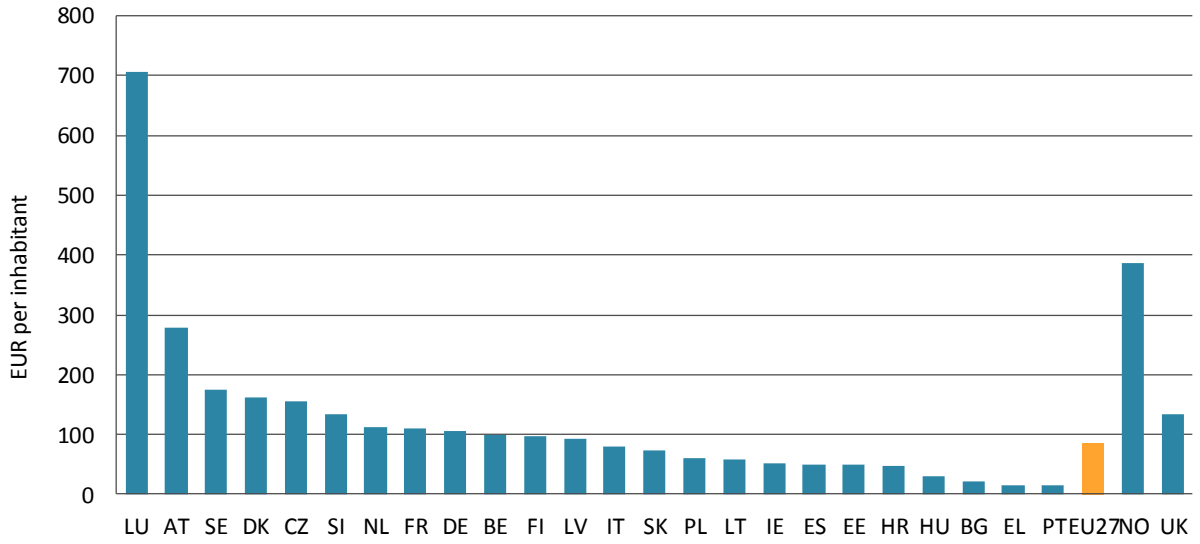
In 2018, total maintenance and renewal expenditure in the EU27 amounted to EUR 20.6 billion (25.8 for EU28), i.e. 53% of the total expenditure (54% for EU28). The highest proportion was for Latvia and Estonia (100%), and the lowest was for Greece (5%).

[70] With a peak of EUR 39.1 billion in 2015 (for EU28: peak of EUR 49.5 billion in the same year).

[71] Not all countries were able to distinguish in their reporting between investment in new infrastructure and upgrades.

Figure 12 shows the total annual infrastructure expenditure per inhabitant in 2018 per country.

Figure 12: Expenditure on infrastructure per inhabitant per country (EUR, 2018)



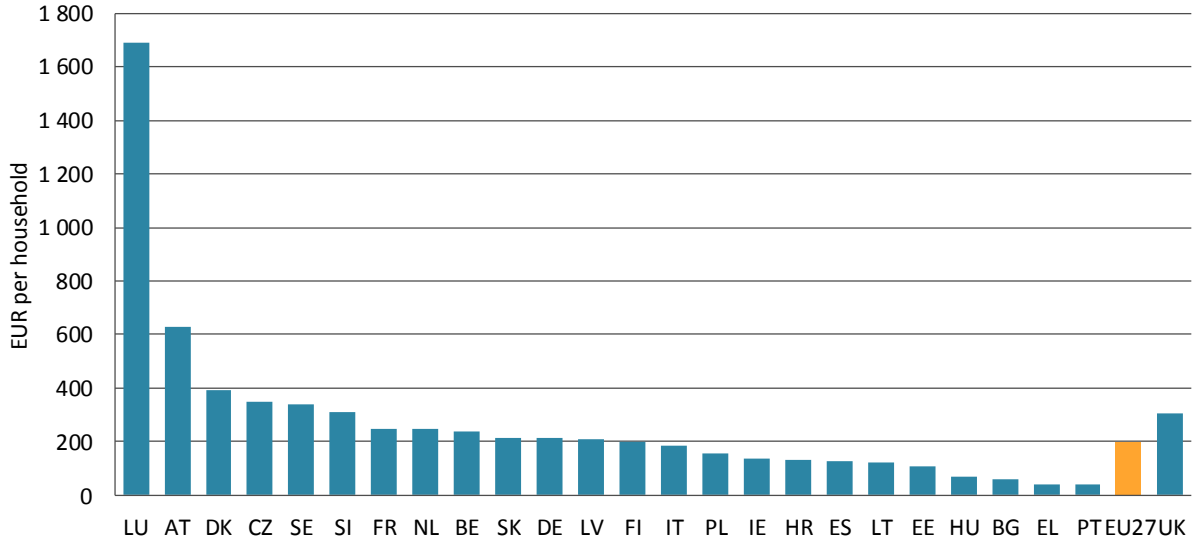
Source: RMMS, 2020, Eurostat, 2020.

In 2018 the average infrastructure expenditure per inhabitant in the EU27 was EUR 87 (EUR 93 for EU28). The highest level by far can be seen in Luxembourg (EUR 706 per inhabitant).

Using different metrics, in 2018 the average infrastructure expenditure per household in the EU27 was EUR 194 (EUR 223 for EU28). Looking at the distribution per country (Figure 13), Luxembourg shows again the highest value (EUR 1 691 per household).

Between 2015 and 2018, the average expenditure either per inhabitant or per household increased only in Estonia, Portugal, Germany, Croatia, Ireland, the Netherlands, Italy, Slovakia and Finland.

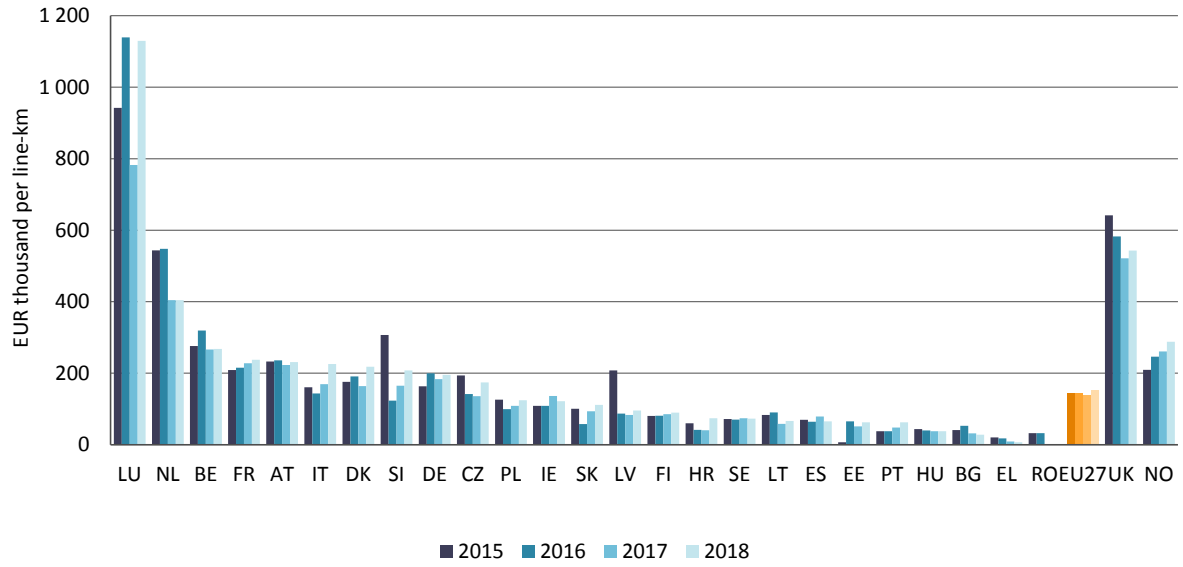
Figure 13: Expenditure on infrastructure per household per country (EUR, 2018)



Source: RMMS, 2020, Eurostat, 2020.

Figure 14 shows the sum of annual infrastructure maintenance, renewal and enhancement expenditure per line kilometre per country for the years 2015 to 2018.

Figure 14: Expenditure on maintenance, renewal and enhancement per line-km per country (EUR thousand, 2015-2018)

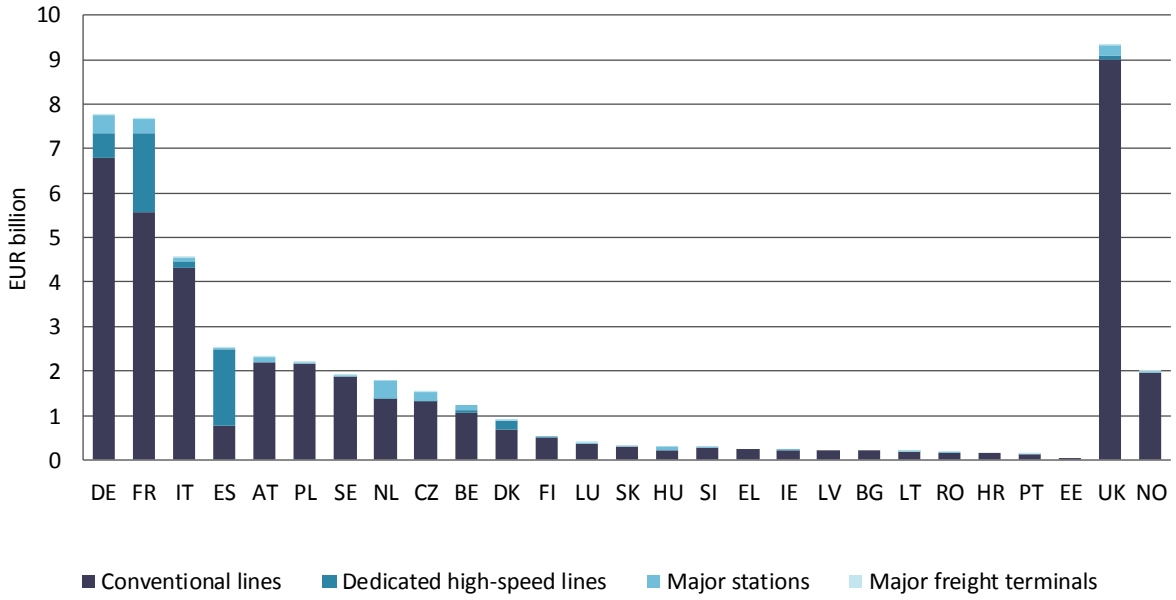


Source: RMMS, 2020, Statistical pocketbook, 2020. RO 2017, 2018 not available, Issues with EE 2015 data.

The EU27 average rose slightly from EUR 143 000 per line kilometre to EUR 153 000 per line kilometre in 2018 (182 000 for EU28). Luxembourg reported the highest expenditure, whereas Greece and Romania are at the lowest end of the surveyed countries.

Figure 15 shows the average annual infrastructure expenditure per country from 2015 to 2018 as a sum of average expenditures for conventional lines, high-speed lines, major stations and major freight terminals.

Figure 15: Expenditure by category by country (EUR billion, average of 2015-2018)



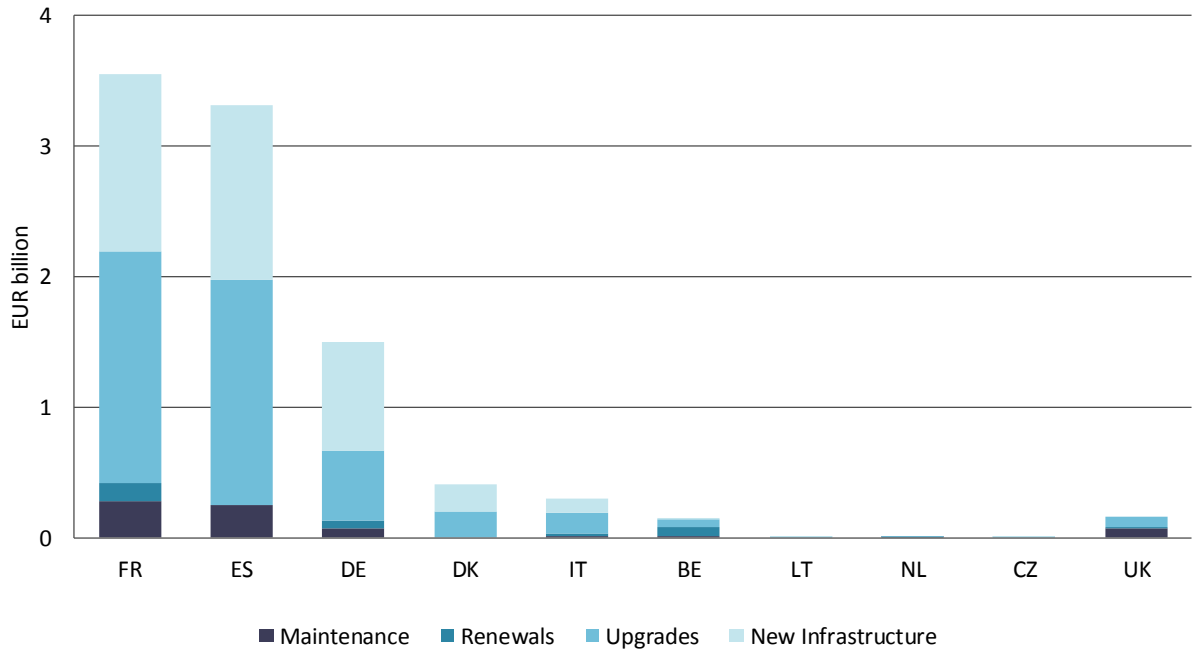
Source: RMMS, 2020.

Average total infrastructure expenditure was highest in Germany, France and the United Kingdom. The same applies for expenditure for conventional lines. Average expenditure for high-speed lines was highest in France and Spain. According to the figures reported in the RMMS[72], expenditure for major stations was highest in Germany and the Netherlands, while expenditure for major freight terminals was highest in Austria.

[72] Reporting on stations and freight terminals expenditure is quite fragmented.

Figure 16 shows the data available on average annual expenditure dedicated to high-speed lines between 2015 and 2018.

Figure 16: Expenditure on high-speed rail by typology of expenditure and by Member State (EUR billion, average 2015-2018)



Source: RMMS, 2020. Partially missing data for BE, DE, IT, NL.

In the top three Member States by expenditure (France, Spain and Germany), more than EUR 4 billion on average were allocated to upgrades over the relevant period. Another EUR 3.5 billion on average were allocated to the construction of new infrastructure. Infrastructure maintenance (EUR 0.6 billion) and renewals (EUR 0.2 billion) played a minor role in these countries.

2.2.3 Infrastructure funding and financing

A modern, integrated rail transport system is necessary to strengthen the EU's global competitiveness and to meet the challenges linked to sustainable, smart and inclusive growth.

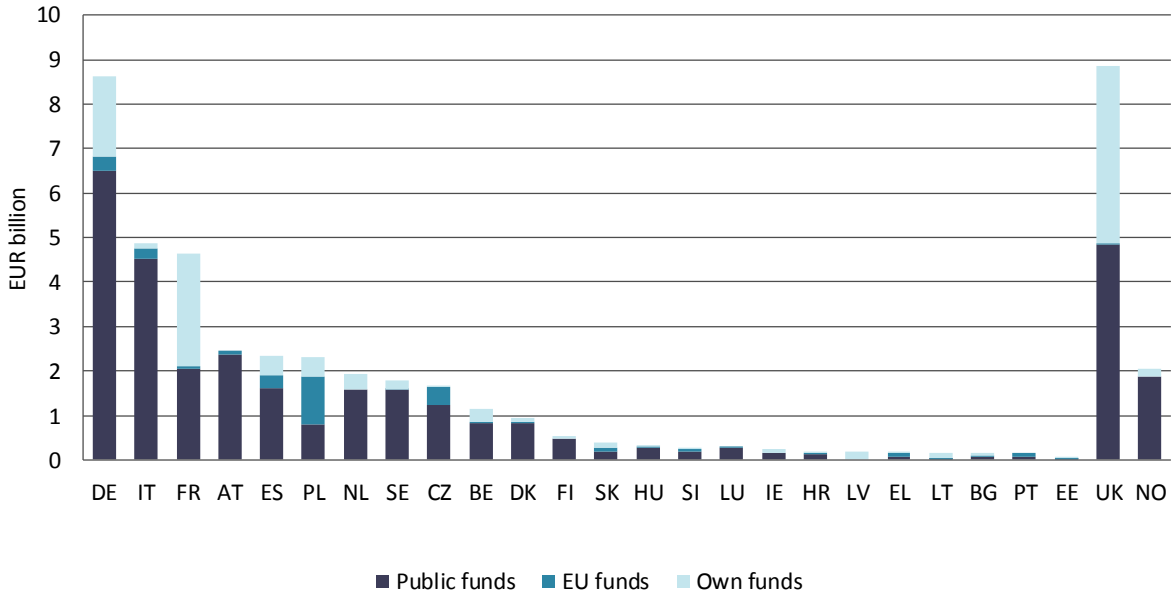
Resources to maintain and improve the rail infrastructure come from a variety of sources, including national public funding, EU projects' support and railway-generated funds such as revenue from track access charges.

Overall, the EU27 Member States reported EUR 35.7 billion of funding for rail infrastructure in 2018 (44.6 for EU28[73]). National budgets contributed to total expenditure and investment by about 70% (more precisely 72% in EU27 and 69% in EU28), whereas EU co-financing accounted for 8% in the EU27 (7% EU28). The remaining share of financing (19% for EU27 or 25% for EU28) came from other

[73] Member States did not indicate in the RMMS the source of funding for about EUR 3 billion of total EUR 38.7 billion reported as infrastructure expenditure.

sources, including loans, equity financing and charges[74]. The United Kingdom, France and Germany show a significant share of own funds, whereas the highest share of EU funds was received by Poland (Figure 17).

Figure 17: Rail infrastructure funding by source and country (EUR billion, 2018)



Source: RMMS, 2020. RO not available.

Box 4: Extensive study on infrastructure managers' funding and financing

The platform of rail infrastructure managers in Europe (PRIME) will carry out an extensive study of infrastructure managers' charging and funding mechanisms, which will be completed in 2021.The study will assess how the mechanism of railway funding can make a difference and enable an infrastructure manager to deliver tangible improvements. These improvements could be in all dimensions of the railway's performance including safety, punctuality, capacity, efficiency and sustainability.

The study will consist of two parts:

- an overview of railway funding and financing, exploring in detail state funding; and
- an overview of track access charging including its various components.

The aim will be to:

- describe the existing structures and mechanisms of railway funding and financing in each Member State;
- understand the reasoning behind the national systems, considering the individual context;
- highlight the experience made with these systems, both with regard to positive outcomes as well as difficulties encountered;
- identify lessons learnt and experiences that can be shared to inform policy and implementation;

[74] Percentages rounded here, so apparently do not add up to 100%. For exact figures, see the Excel file published on DG MOVE website: https://ec.europa.eu/transport/modes/rail/market/market_monitoring_en .

and
- draw some conclusions that might help stakeholders to review their existing arrangements and provide inspiration for further improvement.

Focusing on EU funding and financing[75], different instruments are available in order to provide financial support to the rail sector in achieving a sustainable, smart and inclusive growth and ensuring EU global competitiveness:

- Connecting Europe Facility (CEF)
- European Structural and Investment Funds (ESIFs), including notably:
  - Cohesion Fund (CF)
  - European Regional Development Fund (ERDF)
- European Fund for Strategic Investments (EFSI)
- Horizon 2020

Connecting Europe Facility (CEF)

CEF general goals

The Connecting Europe Facility[76] is an EU funding instrument for strategic investment in transport, energy and telecom infrastructure[77] with a total financial envelope of more than EUR 30 billion under the current CEF programming period 2014-2020[78]. The CEF funds rely on a general CEF envelope, available to all Member States, and a cohesion envelope for eligible Member States funded with CF resources.

This programme is implemented through grants and financial instruments. Grants represent the vast majority of allocated funds, with an indicative envelope of EUR 28.8 billion for the three pillars (transport, energy and telecom[79]). The Innovation and Networks Executive Agency (INEA) manages CEF grants, as well as part of the programme support actions (PSAs). CEF financial instruments are managed with the European Investment Bank (EIB) to which they provide risk-bearing capacity for eligible investments. In some cases, CEF grants and financial instruments can be associated under the same project.

CEF for transport

In the transport sector, the CEF implements the TEN-T, supports investments in cross-border connections and missing links and promotes sustainability and digitalisation. It supports studies (including pilot deployment activities) and building works for new transport infrastructure or for rehabilitating and upgrading existing infrastructure.

The transport sector is the major beneficiary of CEF funding for the current programming period 2014-2020, with a grant budget alone of EUR 23.7 billion, including EUR 11.3 billion reserved for Member States eligible for cohesion funding. Funding is mainly directed to actions on the TEN-T core

[75] *Funding* refers to non-repayable support in the form of grants, *financing* refers to repayable support including debt.
[76] CEF Regulation: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R1316
[77] https://ec.europa.eu/transport/themes/infrastructure/cef_en
[78] The key features of the CEF, its achievements until July 2019 and a brief outlook on future challenges are available here: https://ec.europa.eu/inea/sites/inea/files/cefpub/cef_implementation_brochure_2019.pdf .
[79] See previous footnote.

network and actions linked to horizontal priorities, such as the deployment of ERTMS in rail (notably covered under the Blending Facility[80]). As noted above, CEF support can also be delivered through the CEF Debt Instrument, which de-risks specific EIB investments in the sector.

As of April 2020, EUR 21 billion were already allocated to actions in the transport sector, i.e. 84% of total CEF allocated funds so far. Of this, EUR 11.1 billion (53%) came from the CEF general envelope and EUR 10 billion (47%) from the cohesion envelope.

CEF for rail

A predominant part of the CEF funding for transport (69%) has been allocated to railway actions, as shown by Table 5.

Table 5: Allocation of CEF transport funds to railway actions (April 2020)

CEF transport mode	Number of projects	Actual funding (EUR bn)	% funding
Rail	323	14.7	69%
- of which cohesion envelope	*99*	7.9	*54%*
- of which general envelope	*224*	6.7	*46%*
Road	181	2.0	10%
Maritime	148	1.6	7%
Air	74	1.6	7%
Inland waterways	65	1.3	6%
Other	3	0.0	0%
Grand Total	794	21.2	100%

Source: Innovation and Networks Executive Agency (INEA).

Table 6 shows how the majority of CEF funds allocated to rail (97.8%) aimed at removing bottlenecks bridging missing links and enhancing rail interoperability, in particular on the core network corridors and for the European Rail Traffic Management System (ERTMS). The table presents data following the three funding objectives of the CEF regulation.

Table 6: Allocation of CEF funds to railway actions per funding objective (April 2020)

	Number of projects	Actual contribution (EUR bn)	% funding
Funding objective 1 - Removing bottlenecks, bridging missing links, enhancing rail interoperability	**241**	**14.4**	**97.8%**
European Rail Traffic Management System (ERTMS)	58	1.0	6.5%
Pre-identified projects on the core network corridors	116	12.4	84.2%
Pre-identified projects on the other sections of the core network	15	0.7	4.8%
Projects on the core and comprehensive networks	26	0.2	1.5%
Projects to connect with neighbouring countries	1	0.0	0.0%
Rail interoperability	25	0.1	0.8%
Funding objective 2 - Sustainable and efficient transport systems	**33**	**0.1**	**0.6%**
Freight transport services	9	0.0	0.2%
New technologies and innovation	7	0.0	0.1%
Rail freight noise	17	0.1	0.4%
Funding objective 3 - integration, interconnection and interoperability of transport modes	**49**	**0.2**	**1.6%**
Better accessibility to transport infrastructure for disabled persons	1	0.0	0.0%
Multimodal logistics platforms	22	0.1	0.6%
Nodes of the core network	26	0.1	1.0%
Grand total	**323**	**14.7**	**100.0%**

Source: Innovation and Networks Executive Agency (INEA).

[80] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/apply-funding/blending-facility

If we look at the allocation of CEF transport funds to rail actions by Member State, we see that Poland is the major beneficiary of CEF funds for rail (19% of total allocated funds). Looking in details at CEF funds under the cohesion envelope, which represent 54% of total allocated funds, Poland is by far the major beneficiary, followed by Czechia and Hungary. From the general envelope, Germany, Italy and France are the major beneficiaries (Table 7).

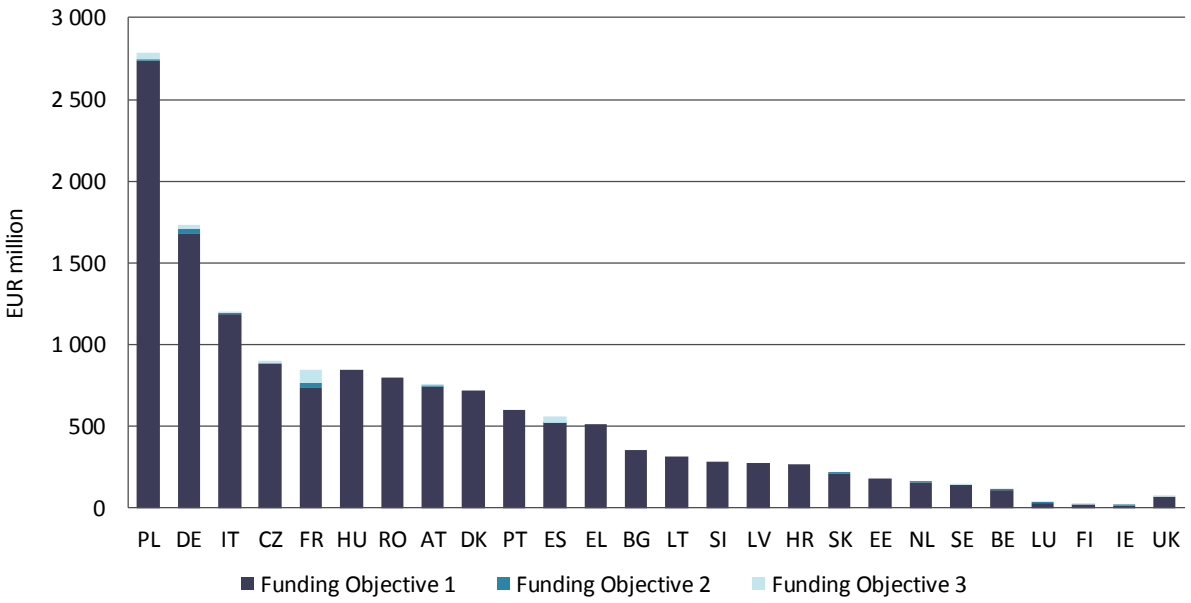
Table 7: Allocation of CEF transport funds to rail actions per envelope and per Member State (April 2020)

Country	General envelope			Cohesion envelope			TOTAL	
	Number of projects	Actual funding (EUR m)	% funding from general envelope	Number of projects	Actual funding (EUR m)	% funding from cohesion envelope	Actual funding (EUR m)	% funding
AT	20	753.1	11.18%				753.1	5.13%
BE	26	111.4	1.65%				111.4	0.76%
BG	3	0.1	0.00%	4	352.3	4.44%	352.4	2.40%
CZ	4	38.4	0.57%	32	857.9	10.80%	896.3	6.11%
DE	51	1 730.1	25.69%				1 730.1	11.79%
DK	6	719.5	10.68%				719.5	4.90%
EE	2	1.0	0.01%	3	177.3	2.23%	178.3	1.21%
EEIG	8	17.4	0.26%				17.4	0.12%
EL	5	4.8	0.07%	6	506.5	6.38%	511.3	3.48%
ES	44	557.5	8.28%				557.5	3.80%
FI	5	27.3	0.40%				27.3	0.19%
FR	49	847.6	12.59%				847.6	5.78%
HR	3	0.7	0.01%	4	261.4	3.29%	262.1	1.79%
HU			0.00%	10	840.5	10.59%	840.5	5.73%
IE	3	11.6	0.17%				11.6	0.08%
IT	27	1 202.6	17.86%				1 202.6	8.20%
LT			0.00%	4	310.7	3.91%	310.7	2.12%
LU	6	28.0	0.42%				28.0	0.19%
LV	2	1.1	0.02%	3	270.4	3.41%	271.5	1.85%
NL	22	157.3	2.34%				157.3	1.07%
PL	10	66.2	0.98%	19	2 722.1	34.28%	2 788.3	19.00%
PT	7	130.1	1.93%	4	467.9	5.89%	598.1	4.08%
RO			0.00%	6	798.7	10.06%	798.7	5.44%
SE	13	150.2	2.23%				150.2	1.02%
SI	6	110.8	1.65%	5	167.4	2.11%	278.2	1.90%
SK	4	0.8	0.01%	10	207.3	2.61%	208.1	1.42%
UK	9	67.1	1.00%				67.1	0.46%
TOTAL	**335**	**6 734.8**	**100.00%**	**110**	**7 940.5**	**100.00%**	**14 675.3**	**100.00%**
		45.89%			**54.11%**		**100.00%**	

Source: Innovation and Networks Executive Agency (INEA).

Looking at the allocation of CEF transport funds to rail actions per Member State and per funding objective (Figure 18), we see that the majority of funding goes to Poland, Germany and Italy, in particular for Funding Objective 1.

Figure 18: Allocation of CEF transport funds to rail actions per Member State and per funding objective (April 2020)



Source: Innovation and Networks Executive Agency (INEA).

European structural and investment funds (ESIFs)

Over half of EU funding is channelled through the five European structural and investment funds (ESIFs[81]). Most of the support provided under the ESIFs is channelled through grants.

Under the 2014-2020 multiannual financial framework, cohesion policy focused on 11 thematic objectives, sustainable transport and network infrastructure being one of them.

The Cohesion Fund (CF[82]) and the **European Regional Development Fund (ERDF[83])** were the main sources of funding for this thematic objective.

Both the CF and the ERDF are managed together by the Member States and the Commission through partnership agreements (whereas part of the CF is directly channelled through CEF, as noted above).

[81] European Regional Development Fund (ERDF), European Social Fund (ESF), Cohesion Fund (CF), European Agricultural Fund for Rural Development (EAFRD) and European Maritime and Fisheries Fund (EMFF).

[82] The CF aims to reduce economic and social disparities and to promote sustainable development. It is aimed at Member States whose gross national income per inhabitant is less than 90% of the EU average (in the MFF 2014-2020 this included BG, HR, CY, CZ, EE, EL, HU, LV, LT, MT, PL, PT, RO, SK and SI (https://ec.europa.eu/regional_policy/en/funding/cohesion-fund/).

[83] The ERDF aims to strengthen economic and social cohesion in the EU by correcting imbalances between its regions. The ERDF resources are available to all regions within the Union, depending on the category of the beneficiary region, i.e. more developed regions, transition regions and less developed regions (https://ec.europa.eu/regional_policy/en/funding/erdf/).

Overall 26% of CF and ERDF funding for transport was allocated to rail-related projects (EUR 18.6 billion out of EUR 70.7 billion). The detail of rail allocation is provided in Table 8.

Table 8: ERDF and CF allocated in rail programmes (May 2020)

	Cohesion Fund (EUR million)	European Regional Development Fund (EUR million)	Total (EUR million)
Railways (TEN-T Core)	5 658	2 655	**8 312**
Railways (TEN-T comprehensive)	3 670	483	**4 153**
Other railways	1 709	2 296	**4 006**
Mobile rail assets	1 359	797	**2 156**
TOTAL			**18 627**

Source: DG REGIO.

Looking at the distribution of allocated funds per Member States (Table 9), we see that Poland has been the major beneficiary, followed by Czechia.

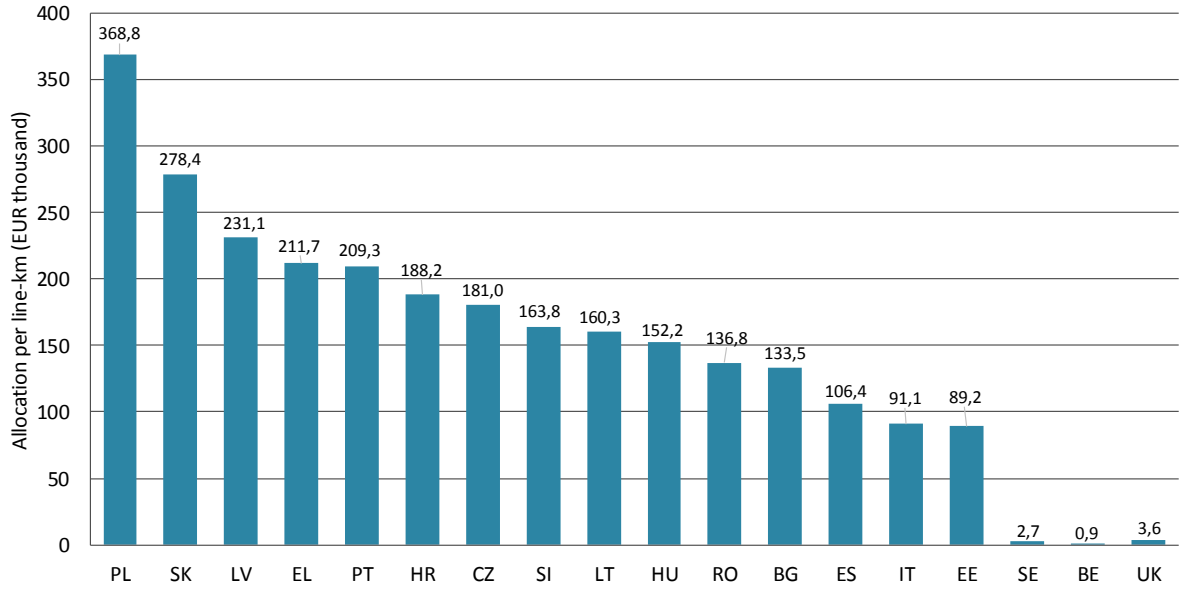
Table 9: ERDF and CF allocated in rail programmes per Member State (EUR million, May 2020)

	Railways (TEN-T Core)	Railways (TEN-T comprehensive)	Other railways	Mobile rail assets	Total	*of which: from CF*	*of which: from ERDF*
BE			3.19		**3.19**		*3.19*
BG	538.00				**538.00**	*538.00*	
CZ	212.41	926.21	277.44	286.28	**1 702.34**	*1 702.34*	
DE							
EE	29.81	29.81	32.49		**92.12**	*92.12*	
ES	1 471.65	10.41	209.39		**1 691.45**		*1 691.45*
FR							
GR	434.70	42.60	8.00		**485.30**	*281.25*	*204.05*
HR	390.00		50.00	50.21	**490.21**	*490.21*	
HU	480.00	230.00	170.00	300.00	**1 180.00**	*1 140.00*	*40.00*
IT	636.75	205.04	509.53	176.97	**1 528.29**		*1 528.29*
LT	244.14		62.27		**306.41**	*244.14*	*62.27*
LV	404.89	22.54	2.50		**429.93**	*429.93*	
PL	1 184.14	2 260.64	2 452.47	939.04	**6 836.31**	*5 009.70*	*1 826.61*
PT	207.00	239.00	86.78		**532.78**	*446.00*	*86.78*
RO	1 253.49	29.12	6.53	183.71	**1 472.86**	*1 118.28*	*354.58*
SE	17.97	5.25	6.69		**29.91**		*29.91*
SI	198.00				**198.00**	*158.00*	*40.00*
SK	605.84	121.72	72.23	210.00	**1 009.79**	*745.84*	*263.95*
TC	3.60	6.36	30.18	1.50	**41.64**		*41.64*
UK		23.89	25.82	8.61	**58.31**		*58.31*
Total	**8 312.39**	**4 152.59**	**4 005.53**	**2 156.32**	**18 626.83**	***12 395.80***	***6 231.03***

Source: DG REGIO.

Figure 19 shows the rate of CF and ERDF funding per line kilometre allocated to each Member State, with Poland being allocated more funding per line kilometre than any other Member State.

Figure 19: Allocation of CF and ERDF funding per line-km (EUR thousand per line-km, May 2020)



Source: INEA, DG REGIO and Statistical pocketbook 2020.

European Fund for Strategic Investments (EFSI)

Established in July 2015 as one of the three pillars of the Investment Plan for Europe, EFSI was jointly launched by the European Commission and the EIB Group (European Investment Bank and European Investment Fund - EIF) to help overcome the investment gap in the EU and foster economic growth, employment and competitiveness after the global economic and financial crisis. EFSI thereby aims to mobilise private investment in projects that are strategically important for the EU, including rail.

EFSI initially consisted in a EUR 21 billion programme (EUR 16 billion portfolio guarantee from the EU budget and a 5 EUR billion capital contribution from the EIB) expected to leverage up to EUR 315 billion in investments by mid-2018[84]. Given the success of the programme, its investment period was extended until end-2020, with an additional EUR 10 billion portfolio guarantee from the EU budget, an additional 2.5 EUR billion capital contribution from EIB and a raised target in terms of investments to mobilise up to EUR 500 billion[85].

[84] Allowing EIB to provide funding for economically viable projects with a higher risk profile than usually taken on by the bank.

[85] https://www.eib.org/attachments/documents/efsi_in_2019_en.pdf

Table 10 shows the total investment mobilised under EFSI and the total EIB financing benefiting from the EFSI coverage (for approved operations).

Table 10: EFSI financing – Approved operations until December 2019

	Investment mobilised by EFSI (EUR million)	Investment covered by EFSI guarantee (EUR million)
Total EFSI (EIB + EIF)	458.0	84.2
Total EFSI EIB	329.0	75.4
EFSI objective: Development of transport infrastructures, and equipment and innovative technologies for transport	36.2	11.3
Rail	5.1	1.6
- out of which rolling stock	*5.0*	*1.5*

Source: EIB.

Horizon 2020 – Shift2Rail

Horizon 2020 (H2020) is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. Funding opportunities under H2020 are set out in multiannual work programmes, prepared by the European Commission within the framework provided by the H2020 legislation and through a strategic programming process integrating EU policy objectives in the priority setting.

Under H2020, the 'Transport Challenge' is allocated a budget of EUR 6 339 million for the period 2014-2020 and will contribute to four key objectives, each supported by specific activities:

- resource efficient transport that respects the environment by making aircraft, vehicles and vessels cleaner and quieter to minimise transport systems' impact on climate and the environment, by developing smart equipment, infrastructures and services and by improving transport and mobility in urban areas.
- better mobility, less congestion, more safety and security with a substantial reduction of traffic congestion; with a substantial improvement in the mobility of people and freight; by developing new concepts of freight transport and logistics and by reducing accident rates, fatalities and casualties and improving security.
- a global leadership for the European transport industry by reinforcing the competitiveness and performance of European transport manufacturing industries and related services including logistic processes and retaining areas of European leadership (e.g. such as aeronautics).
- socio-economic and behavioural research and forward looking activities for policy-making. The aim is to support improved policy-making, which is necessary to promote innovation and meet the challenges raised by transport and the societal needs related to it.

The rail research and innovation is not done under traditional work programmes in H2020 but by the Shift2Rail Joint Undertaking (S2R JU[86]), established by Council Regulation (EU) No 642/2014[87].

S2R JU fosters the introduction of better trains to the market (quieter, more comfortable, more dependable, etc.), which operate on an innovative rail network infrastructure reliably from the first

[86] https://shift2rail.org/

[87] The Transport Challenge of the H2020 contains also a number of cross-modal topics for which the rail supply industry may still apply. Other H2020 work programmes (e.g. security) have also topics focusing on transport, relevant for the rail industry (https://shift2rail.org/participate/other-funding-of-interest/).

day of service introduction, at a lower life-cycle cost, with more capacity to cope with growing passenger and freight mobility demand. All this is developed by European companies, thereby increasing their competitiveness in the global marketplace.

S2R JU also aims to support modal shift by making rail more attractive to users. For passengers, this focuses on more travel options, more comfort and improved punctuality. For freight forwarders/shippers, rail freight should offer a more cost-effective, punctual and traceable shipment option.

The maximum financial contribution of the Union to S2R JU is EUR 450 million, matched by a contribution of EUR 470 million from the industry members.

The European Commission is planning to put forward a proposal for a European Partnership on Rail Research and Innovation in accordance with the Treaty on the Functioning of the European Union (TFEU), building upon the current Shift2Rail Joint Undertaking, currently called 'Transforming Europe's Rail System'. The future Rail European Partnership will focus on accelerating research, development and demonstrations of innovative technologies and operational solutions, enabled by digitalisation and automation[88].

[88] For further information see: https://shift2rail.org/shift2rail-successor/.

3. The evolution of rail services

Traffic volume indicators of this section expressed in passenger kilometres and tonne kilometres are based on RMMS data as available from 2005 on. This data covers exactly the scope of Directive 2012/34/EU and provides breakdowns of volumes in terms of market segments (passenger/freight, domestic/international, PSO/non-PSO). Eurostat also reports traffic volumes in passenger kilometres and tonne kilometres per country, but figures could show slight differences with those reported in the RMMS due to variations in the scope of reporting, potential double counting of transit volumes and adjustments performed in the RMMS (estimates and integration from other sources for missing data).

Since data on train kilometres has been reported in the RMMS only after the entry into force of Regulation 2015/1100, figures reported by Eurostat, UIC and IRG-Rail have been combined to acquire a dataset as complete as possible for the years before 2015.

Finally, to assess the modal split, which requires combining the data of different modes, only Eurostat data are used.

3.1 Traffic volumes

Rail transports some 1.6 billion tonnes of freight and 7.1 billion passengers every year in the EU27[89] (1.6 and 8.9 respectively in EU28[90]). Rail transport is critical as it offers a more sustainable transport option, strengthens economic and social cohesion and connects EU citizens, within and between Member States.

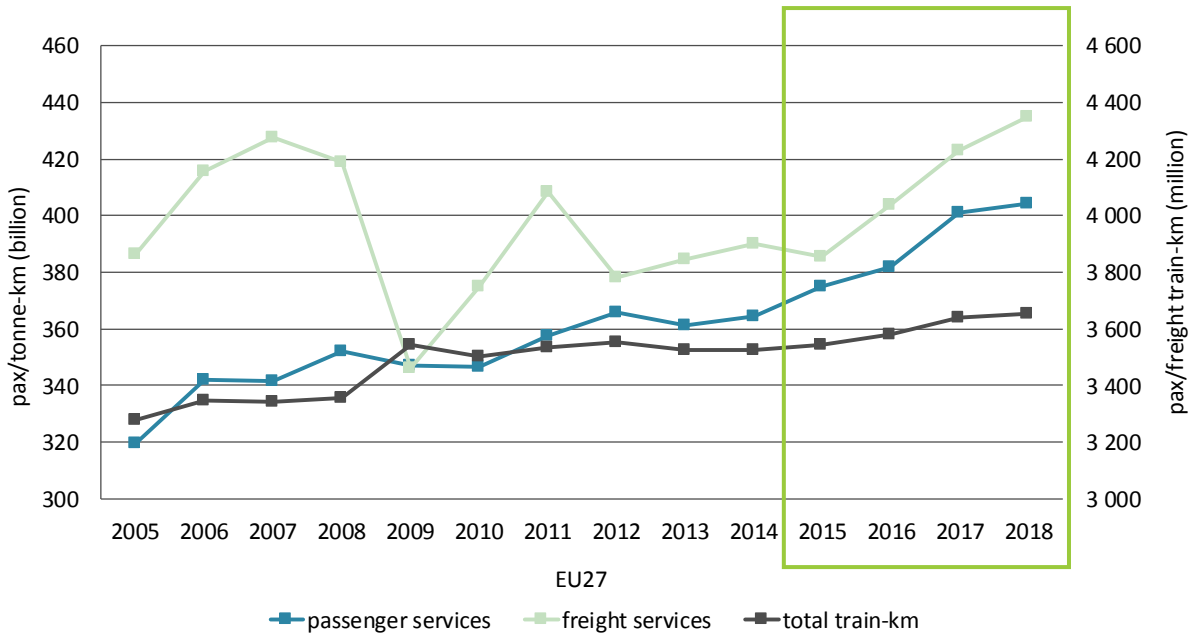
The present report covers data up to 2018 and therefore does not provide any evidence of the impact of the COVID-19 pandemic on the sector. While rail, especially freight, continued to run all throughout 2020, the number of international passengers has been severely down during lockdowns, and demand overall reduced by uncertainty and economic downturn.

[89] Source Eurostat. Freight data EU27 do not include BE, which labelled data confidential; passenger data EU27 do not include BE, HU, NL and PL, which labelled data confidential.

[90] See previous footnote.

Figure 20 summarises trends in passenger and freight volumes over the period 2005 to 2018.

Figure 20: Passenger and freight volumes (pax-km, tonne-km and train-km, 2005-2018)

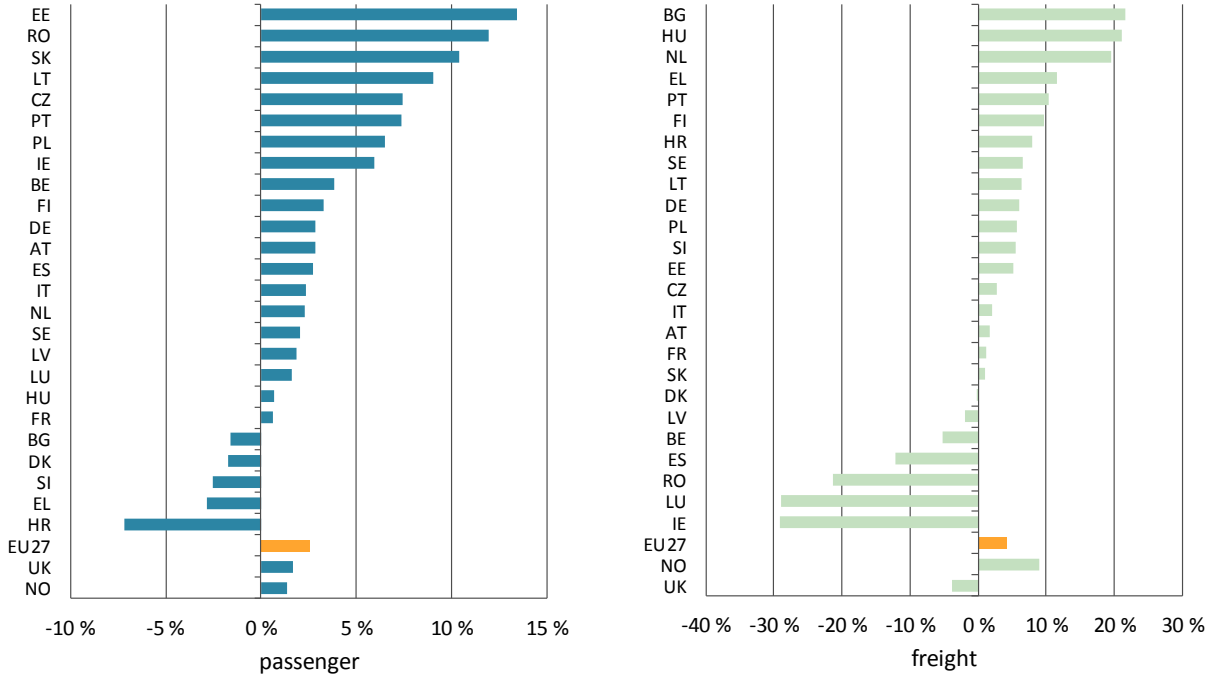


Source: RMMS, 2020. Infill data from various other sources and estimates. The 2015 and 2016 data for RO are estimates; the data also include adjustments to the 2018 pax-km value for BE, the 2015 and 2016 tonne-km values for ES, NL and LU, and the 2015 and 2016 train-km values for IE.

Total train kilometres, which include both passenger and freight train movements, remained for the most part stable between 2009 and 2018, after a significant increase in the period before the 2008 financial and economic crisis. Total passenger services measured in passenger kilometres increased quite smoothly, whereas freight services measured in tonne kilometres increased comparatively more over the same period, albeit with a few ups and downs.

On average, passenger traffic in terms of passenger kilometres in Europe increased by 2.5% annually between 2015 and 2018 (CAGR; 2.4% including the UK), as shown by Figure 21. Freight services in terms of tonne kilometres increased by 4.1% in the same period (3.8% including the UK). Highest increase for passenger services was in Estonia (+13%), whereas Croatia lost 7% annually. In freight services, the highest increase was in Bulgaria (+22%), whereas Luxembourg and Ireland lost 29% annually.

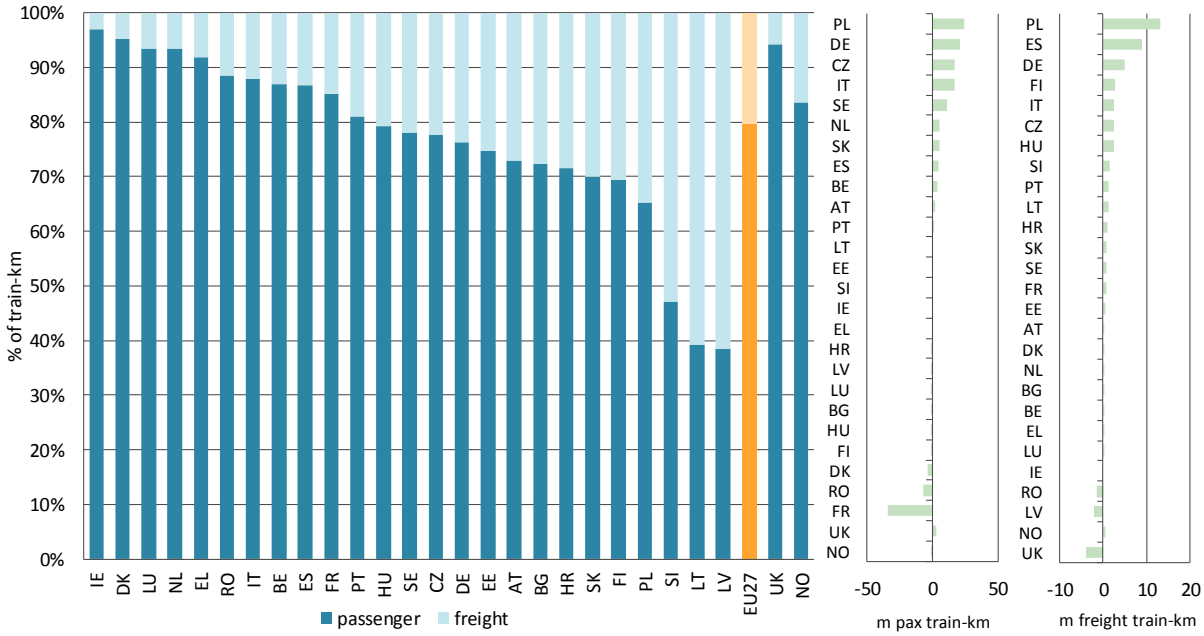
Figure 21: Passenger and freight volumes, compound annual growth rate per country (2015-2018)



Source: RMMS, 2020. Data adjusted for BE, EE, RO.

Rail transport's focus varies between countries. On average, 80% of all train kilometres run in the EU27 in 2018 were passenger services (82% in EU28). Figure 22 shows that the highest share of passenger services is reported for Ireland (97%), Denmark (95%), the United Kingdom (94%), Luxembourg and the Netherlands (both 93%). The highest share of freight services is reported for Latvia (62%), Lithuania (61%) and Slovenia (53%). Based on available data, between 2015 and 2018 passenger services increased by 53 million train kilometres in Romania and decreased by 34 million train kilometres in France. For freight services, in the same period the highest growth was in Poland (+13 million train kilometres) and the largest decline was in the United Kingdom (-4 million train kilometres) and in Latvia (-2 million train kilometres).

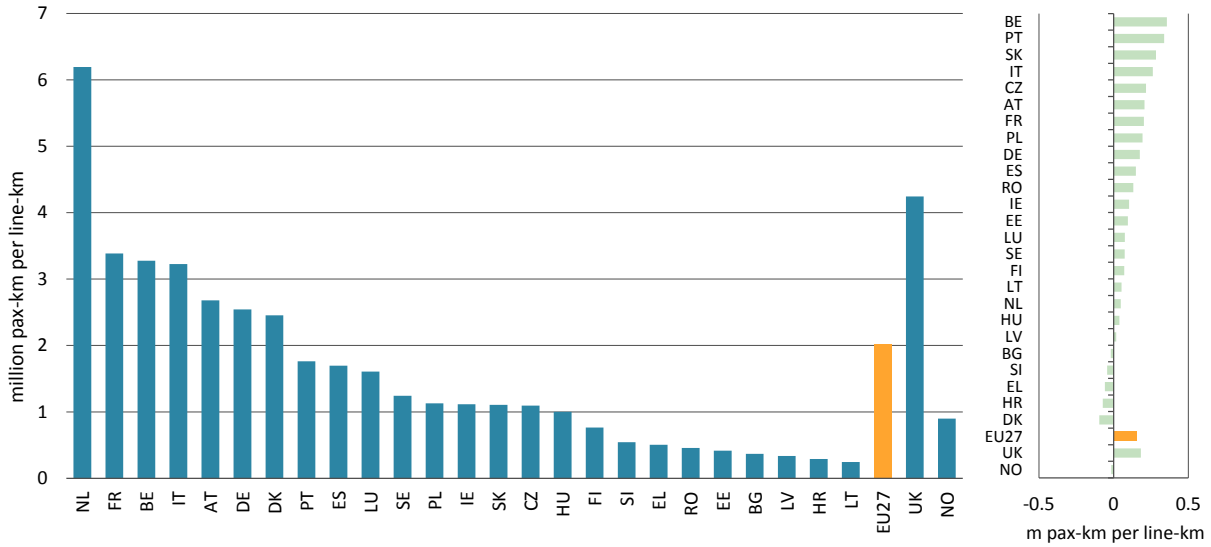
Figure 22: Relative share of passenger and freight train-km on total train-km per country (% in 2018) and evolution (2015-2018)



Source: RMMS, 2020. RO 2015 and 2016 estimated.

Figure 23 shows the intensity of use of the rail network for passenger transport measured in million passenger kilometres per line kilometre in 2018 per country, as well as the evolution compared to 2015.

Figure 23: Utilisation of rail infrastructure for passenger transport per country (millions of pax-km per line-km in 2018) and evolution (2015-2018)

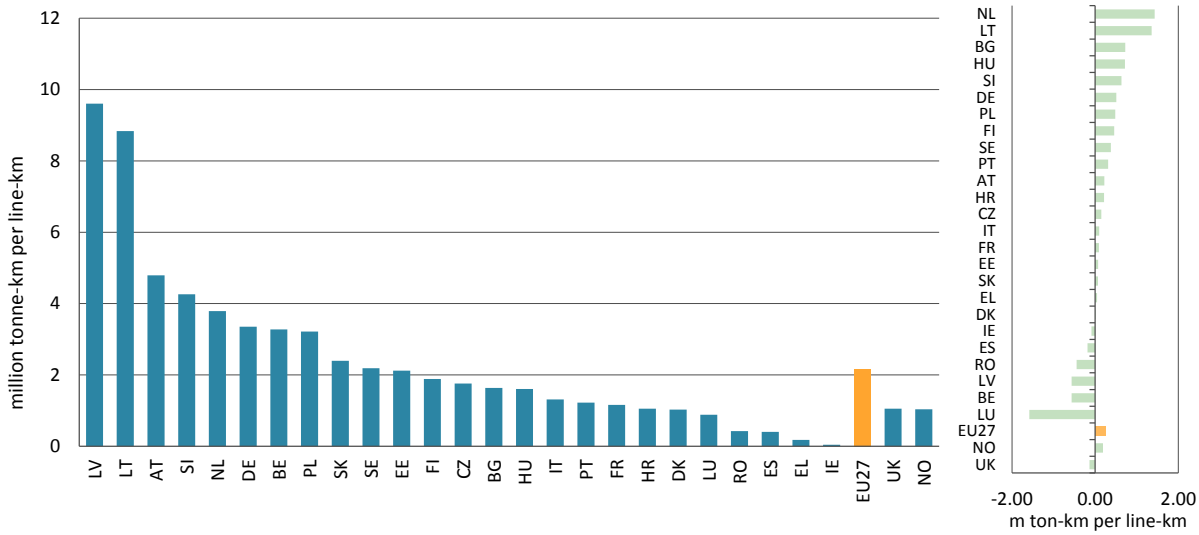


Source: RMMS, 2020, Statistical pocketbook, 2020. BE 2017 and 2018 adjusted.

On average, in 2018 the EU27 network was used by 2.02 million passenger kilometres per line kilometre (2.18 for EU28). The Netherlands had by far the highest passenger traffic density (6.19), while Latvia had the lowest (0.24). Overall, between 2015 and 2018 European passenger traffic density increased slightly by 0.15 million passenger kilometres per line kilometre (0.16 for EU28). According to data available in the RMMS, over the same period Belgium reported the highest increase (+0.36 million passenger kilometres per line kilometre and Denmark the highest decrease (-0.1).

Figure 24 shows the intensity of use of the rail network for freight transport measured in million tonne kilometres per line kilometre in 2018 per country, as well as the evolution compared to 2015.

Figure 24: Utilisation of rail infrastructure for freight transport per country (millions of tonne-km per line-km in 2018) and evolution (2015-2018)



Source: RMMS, 2020, Statistical pocketbook, 2020. Data for PT adjusted.

On average, in 2018 the EU27 network was used by 2.17 million tonne kilometres per line kilometre (2.09 for EU28). Latvia and Lithuania had the highest freight traffic density (9.60 and 8.84 tonne kilometres per line kilometre respectively), while Ireland had the lowest (0.04). Overall, between 2015 and 2018 freight traffic density in the EU27 increased slightly by 0.26 million tonne kilometres per line kilometre (0.23 for EU28). According to data available in the RMMS, over the same period the Netherlands reported the highest increase (+1.43 million tonne kilometres per line kilometre) and Luxembourg the highest decrease (-1.59).

3.2 The passenger market

3.2.1 Rail passenger policy developments

Since 2001, four consecutive railway packages focused on market opening and the harmonisation of rules and standards to the benefit of the passengers and the sector overall. While international passenger services were opened to competition in 2010, the process was finally completed with the market pillar of the Fourth Railway Package, which established:

- open access to domestic passenger services from the 2021 timetable; and
- competitive tendering as the standard for attributing public service obligations in rail passenger transport (with certain limited exceptions) from December 2023.

Despite being still too early to assess the overall impact of the Fourth Railway Package on the rail passenger market, some key trends can be already identified (see Section 5.9.2).

Tendering PSOs rather than awarding them directly can produce significant savings in public funding of the rail sector, while increasing the efficiency and convenience of service provided, ultimately leading to higher passenger satisfaction.

The possibility to enter the passenger rail market via open access has led the development of low-cost services, targeting passengers that would usually have opted for other, cheaper modes of transport. Low-cost offers are often multimodal, for example integrating rail and buses/coaches.

High-speed services are particularly attractive for open access and show potential for growth, as shown for example by competitive services successfully offered on the Italian high-speed rail market and the interest shown by railway undertakings in the process for introducing open access in the Spanish high-speed rail market.

After many years of declining services, night trains are now experiencing a significant comeback. Night train connections are increasingly available both under commercial and publicly funded offers in many Member States.

More generally, cross-border connections have become the focus of increased attention from rail providers and Member States alike. On 2 June 2020, 25 Member States plus Norway and Switzerland signed a political statement on the development of cross-border rail passenger services[91]. On 21 September 2020, Germany announced discussions to launch a Trans Europe Express 2.0 for international high-speed and overnight rail services aiming to make trains more competitive with short-haul aviation[92].

Significant barriers to entry remain. New entrants risk lacking the financial resources to buy new rolling stock, or rolling stock appropriate for specific services as night trains. A limited secondary and leasing market for rolling stock can further jeopardise the ability of alternative operators to enter new markets. Passengers must be able to get an overview of available transport services and book tickets with ease. When multiple providers are operating passenger rail transport services, seamless through-ticketing[93] is fundamental to ensure adequate passenger rights. Rail will only be able to attract more customers if ticketing is substantially improved. The same is true also for integration of rail with other modes, as customers increasingly view mobility as a service (see Section 5.13).

3.2.2 Evolution of passenger volumes

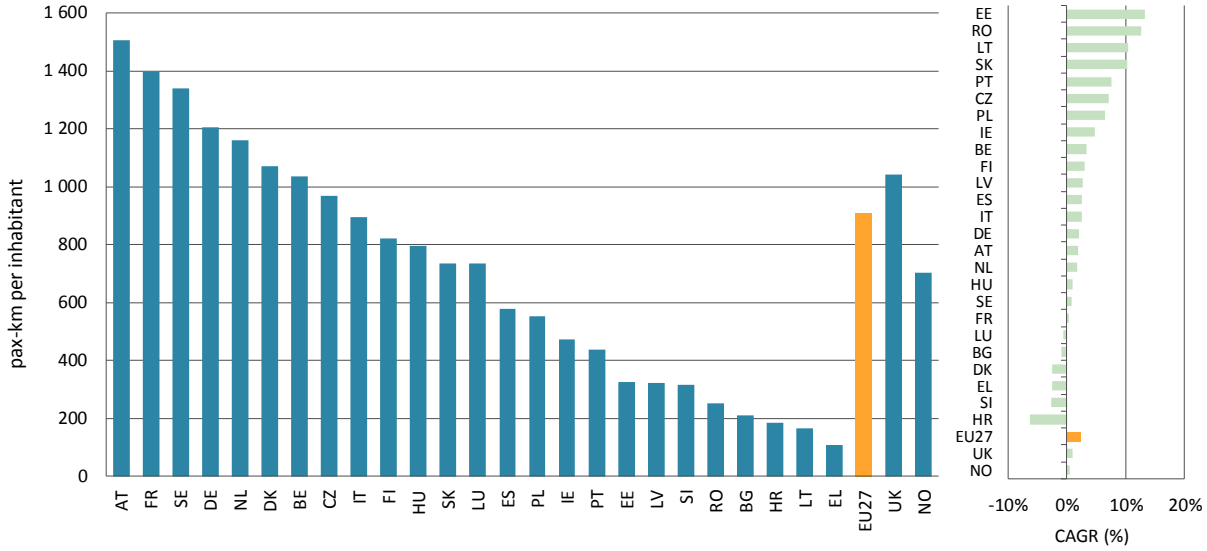
Figure 25 shows how propensity to travel by rail, measured as annual passenger kilometres per inhabitant, varies significantly between states.

[91] https://www.permanentrepresentations.nl/permanent-representations/pr-eu-brussels/documents/publications/2020/06/04/political-statement-for-coalition-of-the-willing-development-international-rail-passenger-transport.

[92] Trans Europe Express (TEE) is a former international first-class railway service. It was founded in 1957, operating in western and central Europe. It ceased operations in 1995.

[93] Where a traveller can purchase a single ticket for its entire journey using multiple railway companies.

Figure 25: Propensity to travel by rail 2018 and compound annual growth rate per country (pax-km per inhabitant, 2015-2018)



Source: Statistical pocketbook, 2020, Eurostat, 2020. 2017 and 2018 data for BE adjusted.

Each citizen of the European Union travelled 909 passenger kilometres on average annually in 2018 (926 if we consider EU28). The highest propensity to travel by rail can be found in Austria (1 504), and the lowest in Greece (108). Comparing RMMS available data, the propensity to travel in the EU27 increased by 2.4% annually between 2015 and 2018 (2.2% if we consider EU28). Estonia shows the highest increase (+16%), whereas Croatia appears to have lost 6%.

Passenger transport modal split

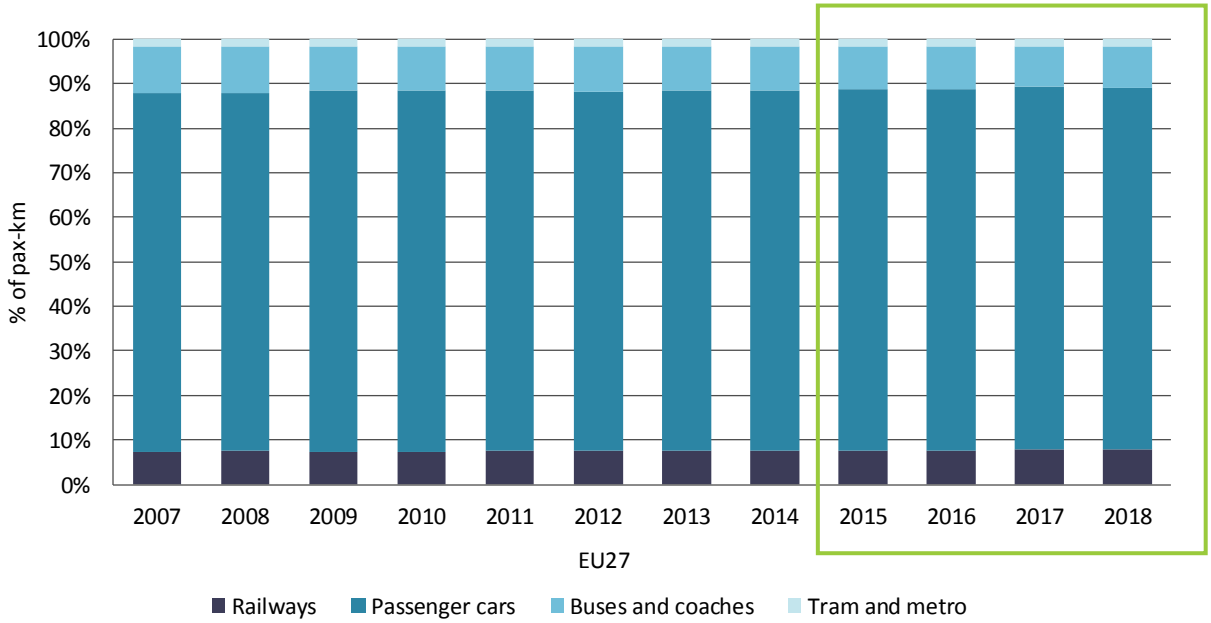
Looking at the EU27 performance by mode (all modes included i.e. land, air and sea transport modes), in 2018, railways had a modal share of only 6.9% against 71.7% for passenger cars[94].

If we focus instead only on land transport (passenger cars, buses and coaches, railways and tram and metro), railways represented 7.8% of the modal split[95].

[94] See Statistical pocketbook 2020.
[95] Excluding powered two-wheelers.

Figure 26 shows the passenger land transport modal split between 2007 and 2018 in the EU27.

Figure 26: Passenger land transport modal split (% in 2007-2018)



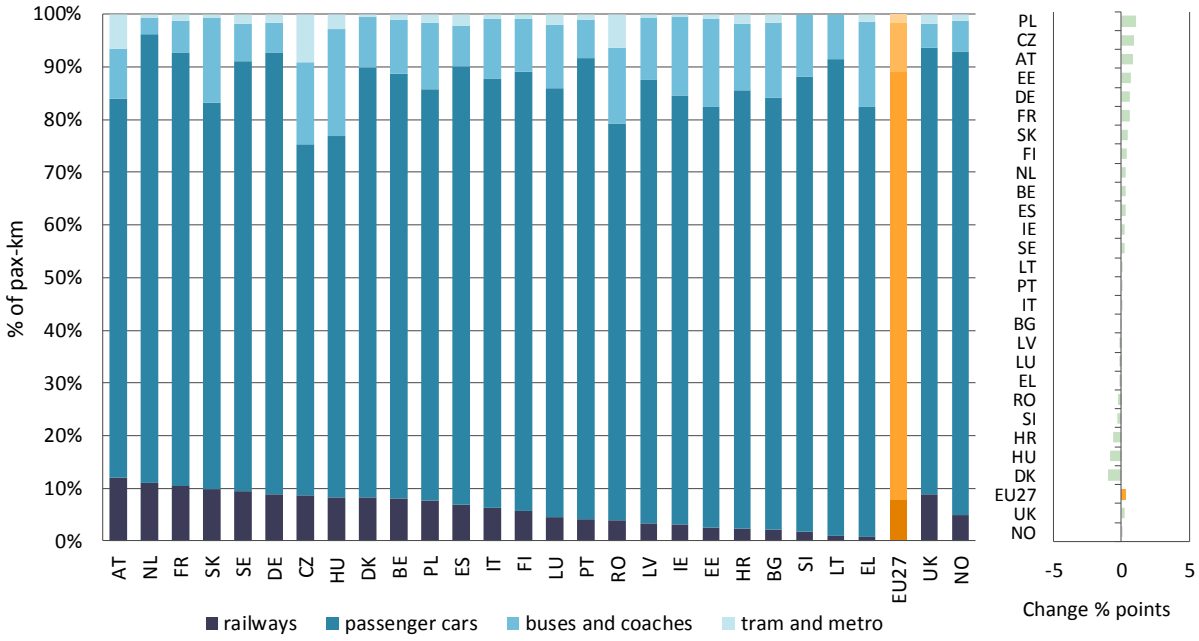
Source: Statistical pocketbook, 2020.

Passenger car transport dominates total passenger land transport within the EU27, with a share consistently higher than 80% between 2007 and 2018. Throughout the same period, the rail mode share rose from 7.3% to 7.8%, while tram and metro's modal share rose from 1.6% to 1.7%. At the same time, the modal share of bus and coach transport fell from 10.5% to 9.1%.

Between 2015 and 2018 in particular, the modal share of passenger cars in EU27 land passenger transport increased from 81 % to 81.4 %, whereas rail increased from 7.6 % to 7.8 %, with significant differences across countries.

Looking at each country, Figure 27 shows that in 2018, Austria, the Netherlands and France were the only countries where rail had a share of more than 10%.

Figure 27: Passenger land transport modal split by country (% in 2018) and change in percentage points for rail (2015-2018)



Source: Statistical pocketbook, 2020; excluding CY and MT.

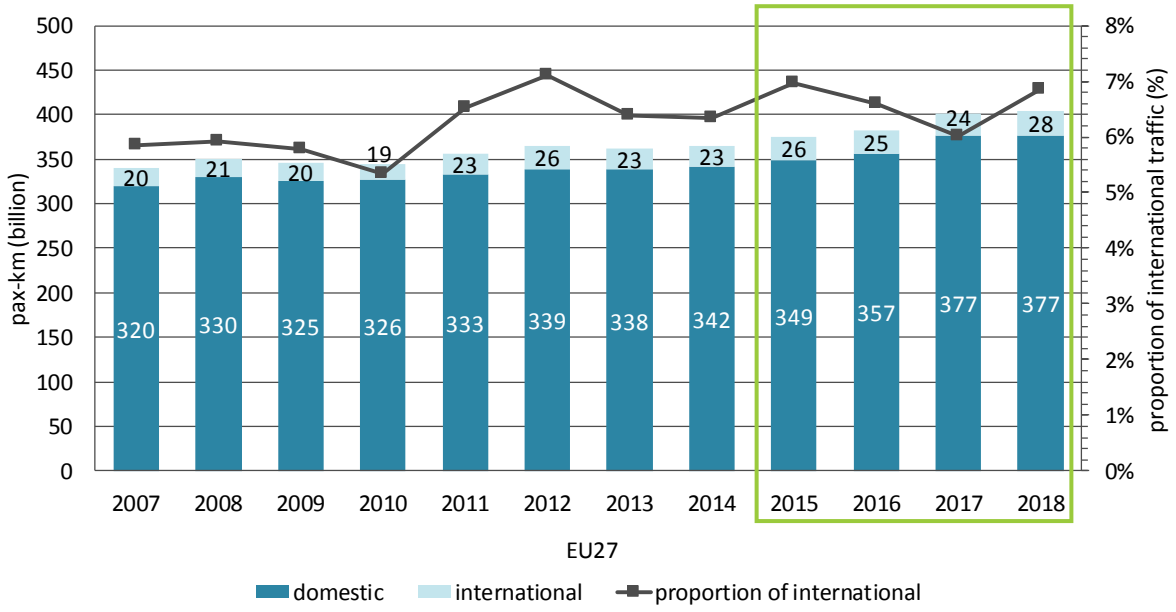
Between 2015 and 2018, rail's modal share increased the most in Poland, Czechia, Austria and Estonia, and decreased the most in Denmark, Hungary and Croatia (Figure 27).

Evolution of rail passenger volumes

In 2018, railways transported some 7.1 billion passengers[96] in the EU27 (8.9 in EU28).

Figure 28 shows the evolution of rail passenger traffic as a sum of domestic and international services for the EU27 for the years 2007 to 2018 (therefore excluding the United Kingdom and Norway). The dotted line indicates the share of international in total passenger traffic services.

Figure 28: Evolution of rail passenger traffic volumes (domestic, international and proportion of international in total traffic) (billion pax-km, 2007-2018)



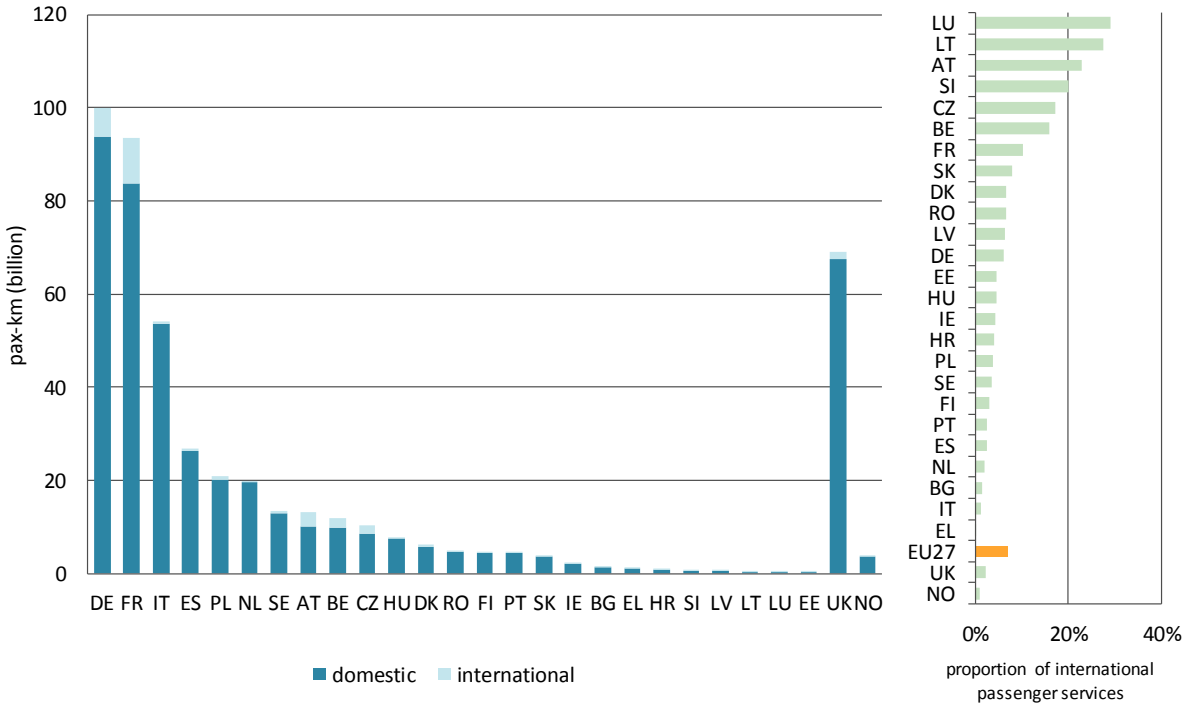
Source: RMMS, 2020. Infill data from various other sources and estimates. The 2015 data for BE, EE, EL, LU and RO are estimates.

Total EU27 rail passenger traffic rose relatively continuously, from 342 billion passenger kilometres in 2011 to 404 billion passenger kilometres in 2018 (from 415 to 473 in EU28), out of around 5 trillion passenger kilometres of land transport overall (6 trillion in EU28). Domestic services increased from 320 to 377 billion passenger kilometres in 2018 (from 390 to 444 for EU28). The proportion of international passenger services ranged between 5% (year 2010) and 7% over the entire period in the EU27.

[96] Source Eurostat. Passenger data EU27 do not include BE, HU, NL and PL, which labelled data confidential.

Figure 29 shows the volumes of domestic and international passenger rail travel, measured in passenger kilometres, and the proportion of international traffic by state in 2018.

Figure 29: Passenger traffic volumes (domestic, international and proportion of international on total) by country (pax-km in 2018)

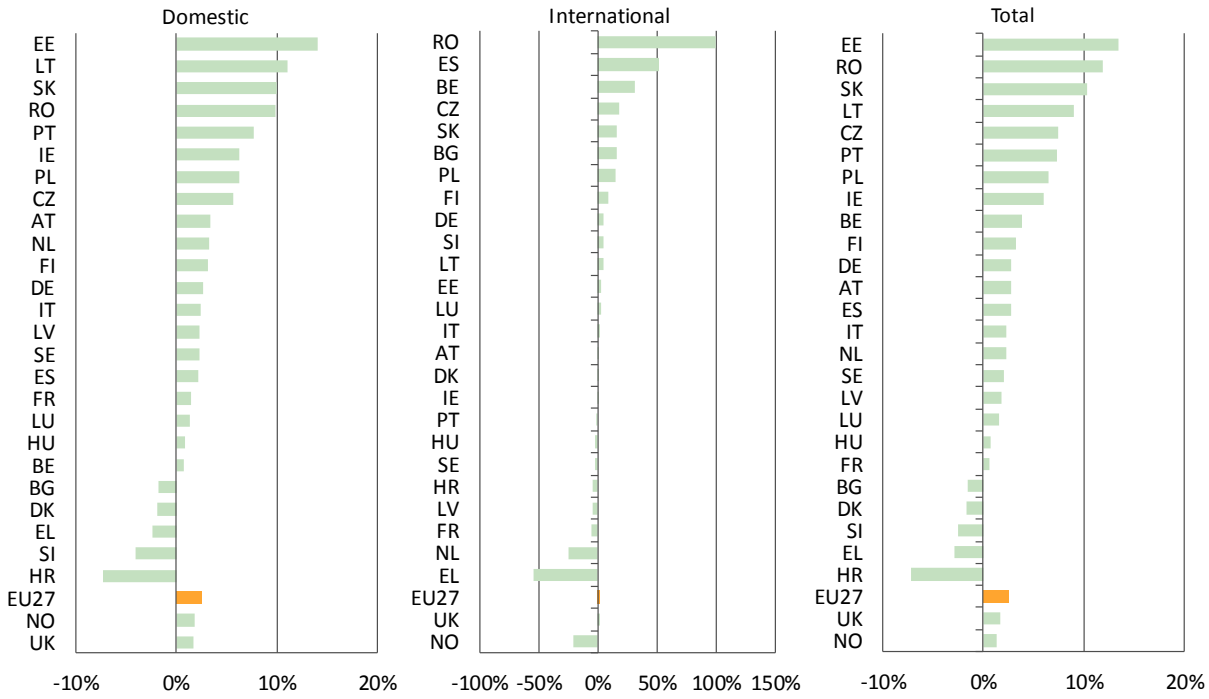


Source: RMMS, 2020. BE 2018 adjusted.

The largest rail passenger markets are in Germany, France, United Kingdom and Italy. 93% of all passenger kilometres in the EU27 stem from domestic passenger services (94% in EU28). Unsurprisingly, considering its size, Luxembourg is the country with the most internationally oriented rail passenger market (29% of the total passenger traffic), whereas Greece has the lowest proportion of international passenger travel (0.2%).

Figure 30 shows the compound annual growth rates for domestic, international and total passenger traffic volumes from 2015 to 2018 for each country.

Figure 30: Compound annual growth rates of domestic, international and total passenger traffic volumes per country (%, 2015-2018)



Source: RMMS, 2020. BE 2018 estimated, BE, EE, EL, LU and RO 2015 estimated.

Total passenger traffic increased by 2.5% annually in the EU27 between 2015 and 2018 (2.4% in EU28). Passenger volumes decreased only in Bulgaria, Denmark, Slovenia, Greece and Croatia.

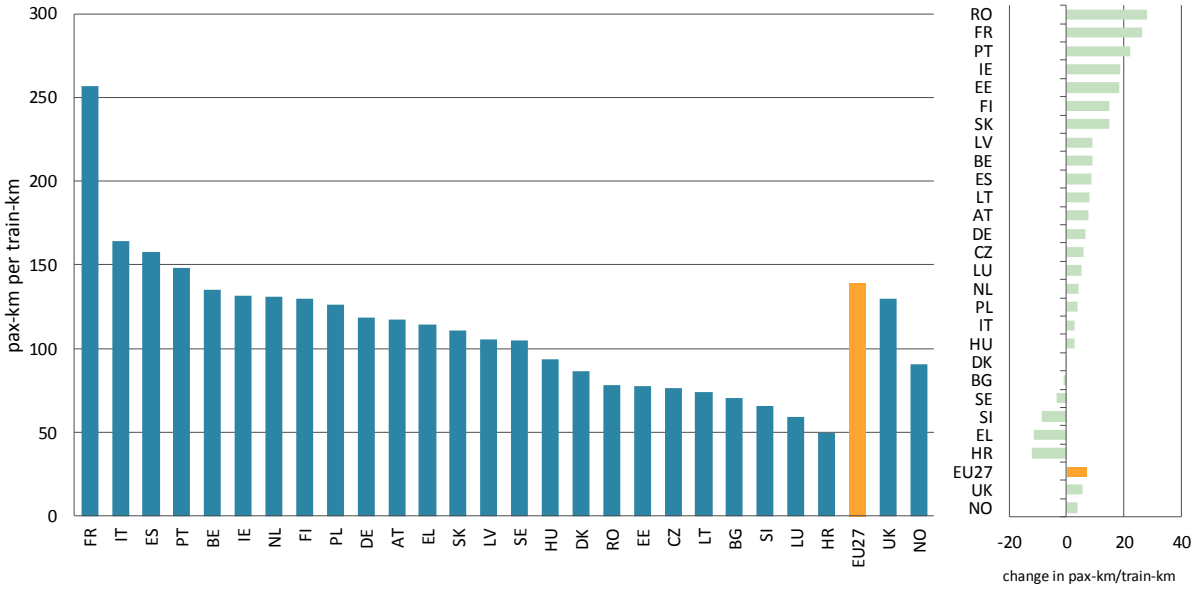
Within total volumes, both the domestic and international segments increased.

Domestic passenger kilometres increased by 2.6% annually in the EU27 (2.4% in EU28). Domestic passenger volumes decreased only in Bulgaria, Denmark, Greece, Slovenia and Croatia.

International passenger kilometres increased by 2.0% annually in the EU27 (same as in EU28). A number of countries reported a decrease in international passenger volumes, including France, the Netherlands and Greece.

Traffic expressed in passenger kilometres provides a first measure of the demand for rail passenger services. A train occupancy rate (expressed for example as the percentage of available seats occupied) would be an important indicator to assess if the supply of those services matches the demand. Lacking information on available seats, Figure 31 provides instead an overview of passenger trains' load factor, measured as the ratio between passenger kilometres and passenger train kilometres per country in 2018, and its evolution compared to 2015.

Figure 31: Number of pax-km per passenger train-km per country (passenger trains' load factor) (2018) and evolution (2015-2018)



Source: RMMS, 2020. RO 2015 and 2016, BE 2018 and IE 2015 estimated.

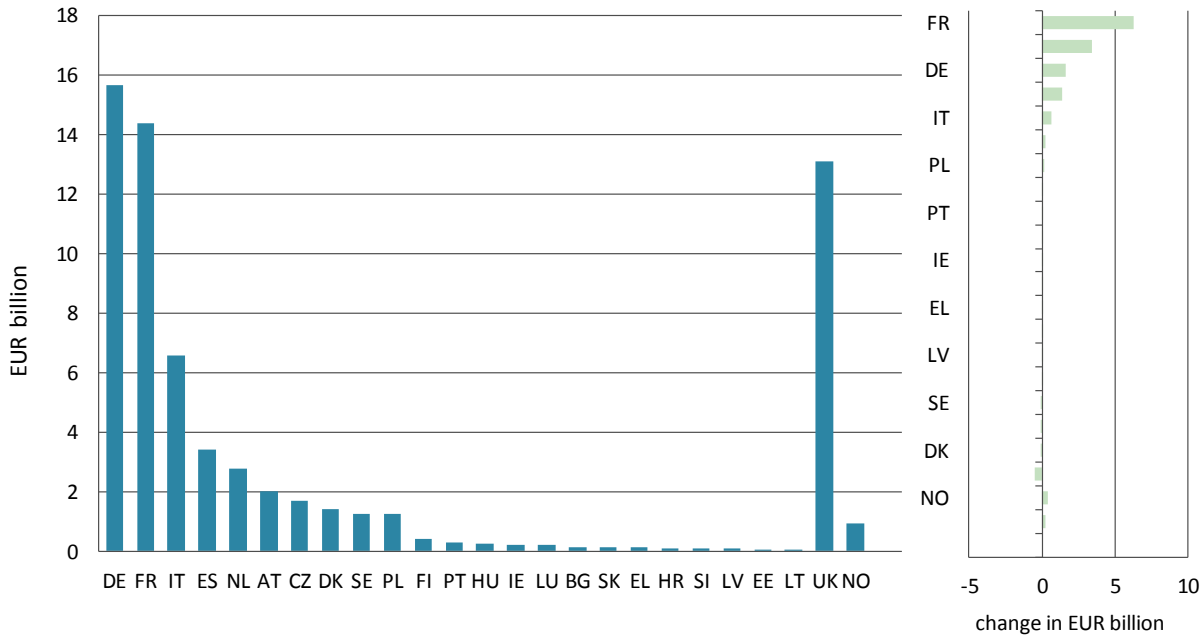
On average in 2018, EU27 passenger trains were loaded with 139 passengers (138 for the EU28). France had by far the highest load factor (257), followed by Italy, Spain and Portugal, all above the EU27 average. Croatia had the lowest load factor (50). Overall, the load factor in the EU27 increased slightly by 7 passengers per train between 2015 and 2018 (same as for the EU28). Based on the available data, Romania and France reported the highest increase (+28 and +26 respectively). The load factor decreased only in Bulgaria, Sweden, Slovenia, Greece and, in particular, Croatia (with a decrease of 12 passengers per train compared to 2015).

3.2.3 Evolution of rail passenger revenues

The RMMS collects data on total revenues from passenger services and its components (fare revenues from commercial services, fare revenues from PSO services and PSO compensation). Despite the clear improvement in data quality since the first year of implementation of the RMMS Regulation in 2015, some gaps and inconsistencies in the input data remain.

Figure 32 shows the reported revenues from passenger transport services per country in 2018 as well as the evolution compared to 2015.

Figure 32: Railway undertakings' revenues from passenger transport services per country (billion EUR, 2018) and evolution (2015-2018)



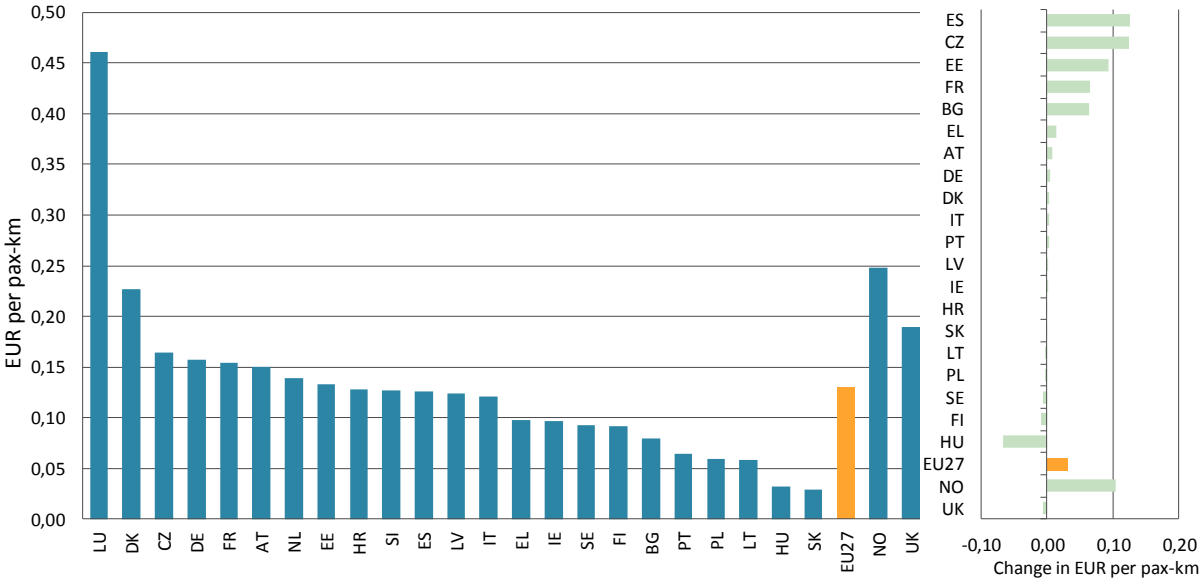
Source: RMMS, 2020. BG, EE, FR, EL, SI and ES estimated, BE and RO not available.

Germany, France and the United Kingdom appear to have had by far the highest amounts of revenues from passenger transport services in 2018 (EUR 15.7, 14.4 and 13.1 billion respectively). The lowest amount was reported for Lithuania (EUR 0.03 billion). Based on the available data, France appears to have had the highest increase compared to 2015 (+EUR 6.31 billion) and Hungary the highest decrease (EUR 0.50 billion).

As a rough indicator of the economic performance of railway undertakings providing passenger services, the total amount of passenger revenues can be related either to traffic expressed in passenger kilometres or in passenger train kilometres. Traffic expressed in passenger kilometres provides an indication of the average return that undertakings can expect from a passenger, whereas traffic expressed in train kilometres provides an indicator of the average return that undertakings can expect from a passenger train.

Figure 33 shows the railway undertakings' revenues from passenger transport services in 2018 per country as well as the evolution compared to 2015, measured in EUR per passenger kilometre.

Figure 33: Railway undertakings' revenues from passenger transport services per pax-km per country (EUR per passenger-km, 2018) and evolution (2015-2018)

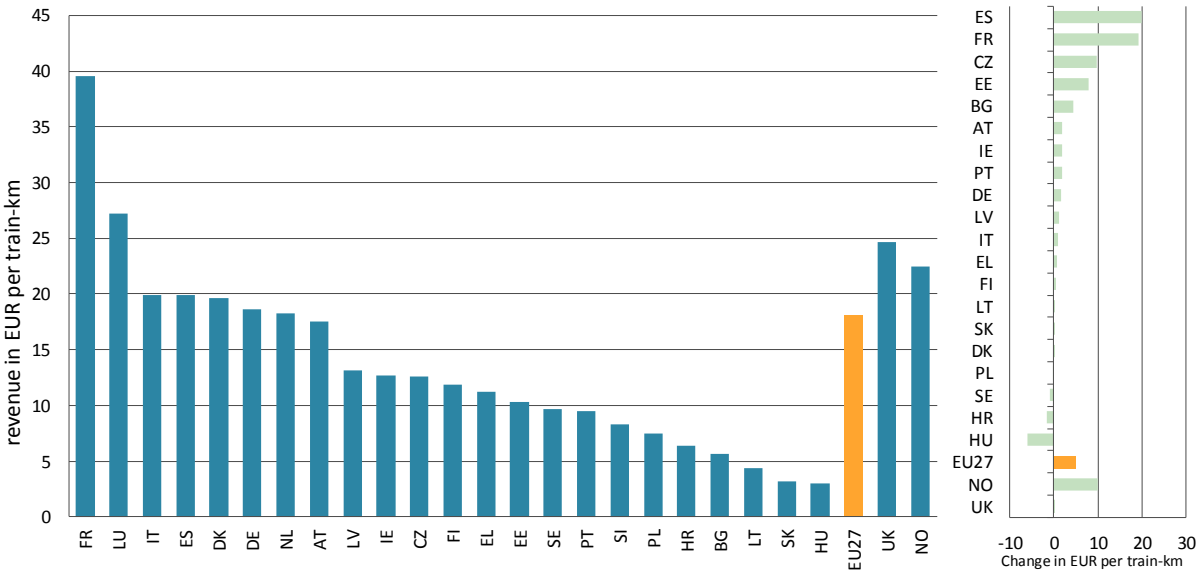


Source: RMMS, 2020. BE 2018 adjusted.

In 2018, the EU27 railway undertakings' revenue per passenger kilometre was on average EUR 0.13 (EUR 0.14 for UK). Luxembourg had by far the highest unit revenue (EUR 0.46), and Slovakia the lowest (EUR 0.03). Unit revenues based on passenger kilometres increased slightly between 2015 and 2018 by EUR 0.03 in both the EU27 and EU28. According to RMMS reporting, Spain had the highest increase (+EUR 0.13), Hungary the highest decrease (-EUR 0.07).

Figure 34 shows the railway undertakings' revenues from passenger transport services in 2018 per country as well as the evolution compared to 2015, measured in EUR per passenger train kilometres.

Figure 34: Railway undertakings' revenues from passenger transport services per train-km per country (EUR per passenger train-km, 2018) and evolution (2015-2018)



Source: RMMS, 2020. BG, EE, FR, EL, SI, ES and RO estimated, BE 2018 not available.

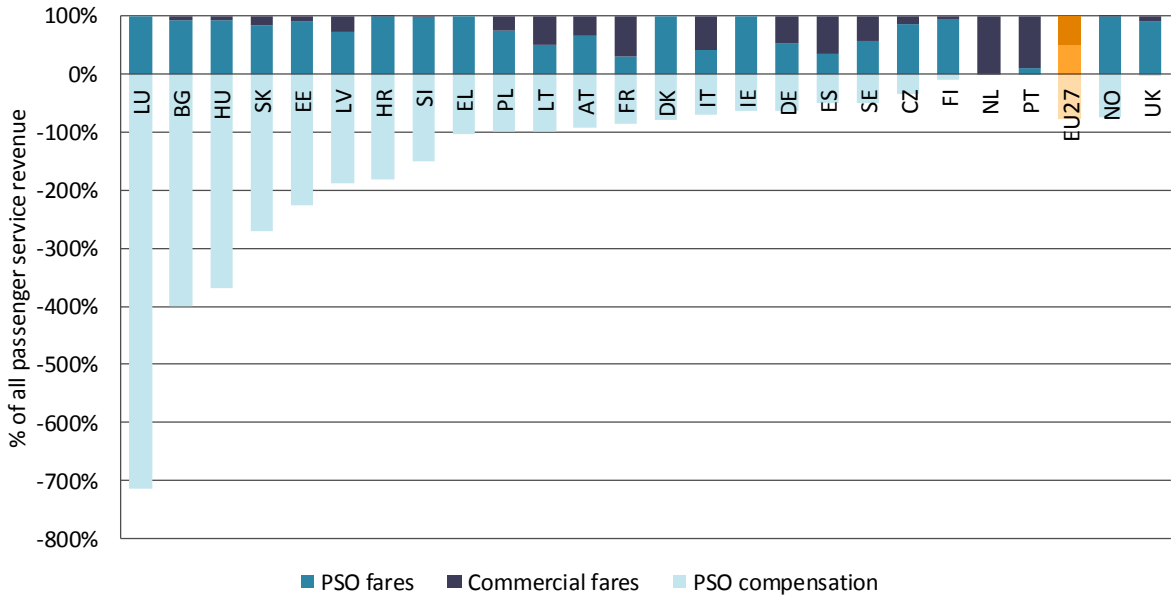
In 2018, the EU27 railway undertakings' revenue per train kilometres was on average EUR 18.04 (EUR 19.06 for EU28). France had the highest unit revenues (EUR 39.57), and Hungary the lowest (EUR 3.02). In the EU27, unit revenues based on train kilometres increased between 2015 and 2018 by EUR 4.97 (EUR 4.22 in EU28). According to RMMS reporting, Spain had the highest increase (+EUR 19.87), while Hungary had the highest decrease (-EUR 5.97).

Figure 35 shows the sources of railway undertakings' revenues from the provision of passenger services as reported in the RMMS for the year 2018.

The figure is structured as follows:

- Above the horizontal axis is the revenue contributed by passengers through fares paid on either PSO or (if reported) commercial services.
- Below the horizontal axis is the proportion of revenue contributed by competent authorities in the form of PSO support.

Figure 35: Sources of passenger railway undertakings' revenue per country (% in 2018)



Source: RMMS, 2020. BE, DK, EL, NL and RO not available.

In many Member States, most of the railway undertakings' revenue is from PSO support from competent authorities. In 2018, reported revenues from commercial fares amounted to EUR 15.2 billion in the EU27 (EUR 16.3 billion in EU28), i.e. 51% of the total revenues (38% for EU28).

3.3 The freight market

3.3.1 Rail freight policy developments

Increasing the modal share of rail freight remains a Commission policy objective, as recently reaffirmed in the Communication on the European Green Deal[97]. Nevertheless, rail freight has continued to face performance issues with punctuality and reliability in comparison to road. The sector has continued to struggle with challenges over infrastructure bottlenecks, interoperability problems and digitalisation. In terms of operations, challenges also remain in particular with border delays and international traffic management in cases of disturbance.

The overall situation of rail freight remains unsatisfactory: its modal share is around 19%. Figure 37 shows a mixed picture for changes in the modal share in the past 3 years in EU countries, with Estonia, Slovakia and Latvia recording a sharp decline. To have a meaningful environmental impact, far larger volumes of freight need to be carried by rail.

In its communication on a European Green Deal, the Commission stated that '…a substantial part of the 75% of inland freight carried today by road should shift onto rail and inland waterways.' To achieve this, rail freight traffic must grow considerably over the next decade, starting immediately.

[97] Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions - The European Green Deal COM/2019/640 final (https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en).

Unlike passenger rail, freight traffic is predominantly international. This is because the competitive advantage of rail freight increases with distance. This strong international and intra-EU dimension means that rail freight is suffering from the lack of a truly single European railway area, in particular from the lack of interoperability between the different networks and the lack of coordination of operations (at the borders or in terms of rail capacity and traffic management for example). Some of rail freight's features, such as low speed, higher operational complexity involving terminals, and inferior punctuality in comparison to passenger traffic, make freight a less desirable customer for infrastructure managers.

To address these issues, the Commission is pursuing a number of initiatives. The Fourth Railway Package set out the general regulatory framework: once fully implemented, it will strengthen the framework conditions for an efficient market organisation and will simplify administrative processes and strengthen interoperability, supported by a broader role for the European Union Agency for Railways. These simplifications will significantly reduce costs for operators. These regulatory measures are complemented by the Commission's infrastructure development policy, the TEN-T network, with significant financial support provided under the Connecting Europe Facility. This is necessary because a well-developed infrastructure, free of bottlenecks and missing links and with infrastructure parameters tailored to freight (such as 740 m train length), is a precondition for rail freight development.

The rail freight corridors (RFCs, see Box 5) remain the key element of the Commission's policy to boost rail freight. Their aim is to trigger rail freight development in terms of volume, market share, quality and reliability along the main freight axes, through fostering cooperation, coordination and harmonisation at different levels and in different areas (such as rail capacity, traffic management, conditions of use of the infrastructure, processes). The Commission is evaluating the legal framework for the RFCs (Regulation 913/2010) with the purpose of identifying needs for any additional legislative measures.

The Commission initiatives alone cannot be comprehensive. The success of the EU's rail freight policy will depend on the efforts of Member States, infrastructure managers and other stakeholders. This is particularly relevant in a context where Member States are working on economic recovery measures following the COVID-19 pandemic. It is important that rail freight measures feature prominently.

The role of rail stakeholders is also fundamental. The Commission places high expectations on the sector and provides strong political support to the implementation of the Rotterdam Sector Statement[98] and, more recently to the 'Rail Freight Corridors: The Future of Rail Freight in Europe[99]' ministerial Declaration, signed during the 'Innovative Rail Transport – Connecting, Sustainable, Digital' ministerial conference in Berlin (21 September 2020). By signing the Berlin Declaration, the EU Member States reiterated their commitment to support international rail freight by:

- further strengthening and developing the rail freight corridors
- supporting the rail freight stakeholders to enable them to better adapt to market needs
- enhancing rail freight transport as one of the most environmentally friendly ways of moving freight
- supporting further technical and operational harmonisation
- acknowledging that strong rail freight requires skilled workers.

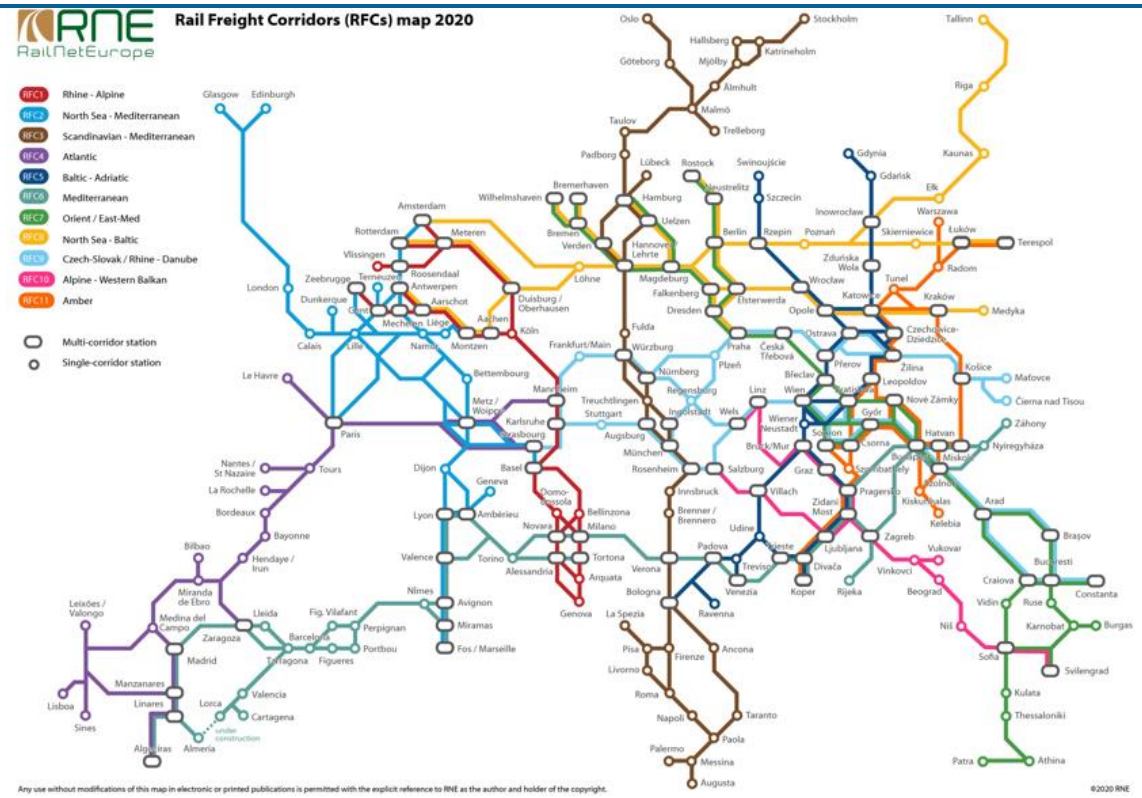
[98] Sector Statement 'Boosting international rail freight': http://www.cer.be/sites/default/files/publication/160520_Sector_Statement_RFC.pdf.

[99] https://www.cer.be/sites/default/files/publication/200921_Berlin%20Ministerial%20Declaration.pdf

For rail freight services to become more reliable and flexible, some actions should be undertaken by the sector, namely:

- making the timetabling process more efficient and flexible (for example along the lines suggested in the 'timetable redesign' project);
- improving information exchange, such as through the sharing of a reliable estimated time of arrival between the parties involved in a train run;
- developing KPIs to adequately measure rail freight performance;
- accelerating the pace towards solving cross-border interoperability issues, where progress is urgently needed in coordination with the Issues Logbook initiative (see Box 15);
- ensuring a better coordination of temporary capacity restrictions; and
- developing and implementing processes for contingency situations[100].

Box 5: Rail freight corridors



Source: www.rne.eu, ©RNE.

[100] For example by developing the *European Rail Infrastructure Managers Handbook for International Contingency Management* (version 1.5 available here: http://rne.eu/wp-content/uploads/International_Contingency_Management_Handbook_final_v1.5.pdf).

Corridors	Countries covered	Start date
RFC1 Rhine–Alpine	NL, BE, DE, IT	November 2013
RFC2 North Sea–Mediterranean	NL, BE, LU, FR	November 2013
RFC3 Scandinavian–Mediterranean	SE, DK, DE, AT, IT	November 2015
RFC4 Atlantic	PT, ES, FR	November 2013
RFC5 Baltic–Adriatic	PL, CZ, SK, AT, IT, SI	November 2015
RFC6 Mediterranean	ES, FR, IT, SI, HU	November 2013
RFC7 Orient-East Med	CZ, AT, SK, HU, RO, BG, EL	November 2013
RFC8 North Sea–Baltic	DE,NL, BE, PL, LT	November 2015
RFC9 Czech–Slovak / Rhine Danube	CZ, SK	November 2013
RFC10 Alpine-Western Balkan	AT, BG, HR, RS, SI	March 2018
RFC11 Amber	SI, HU, SK, PL	January 2019

3.3.2 Evolution of freight volumes

Freight transport modal split

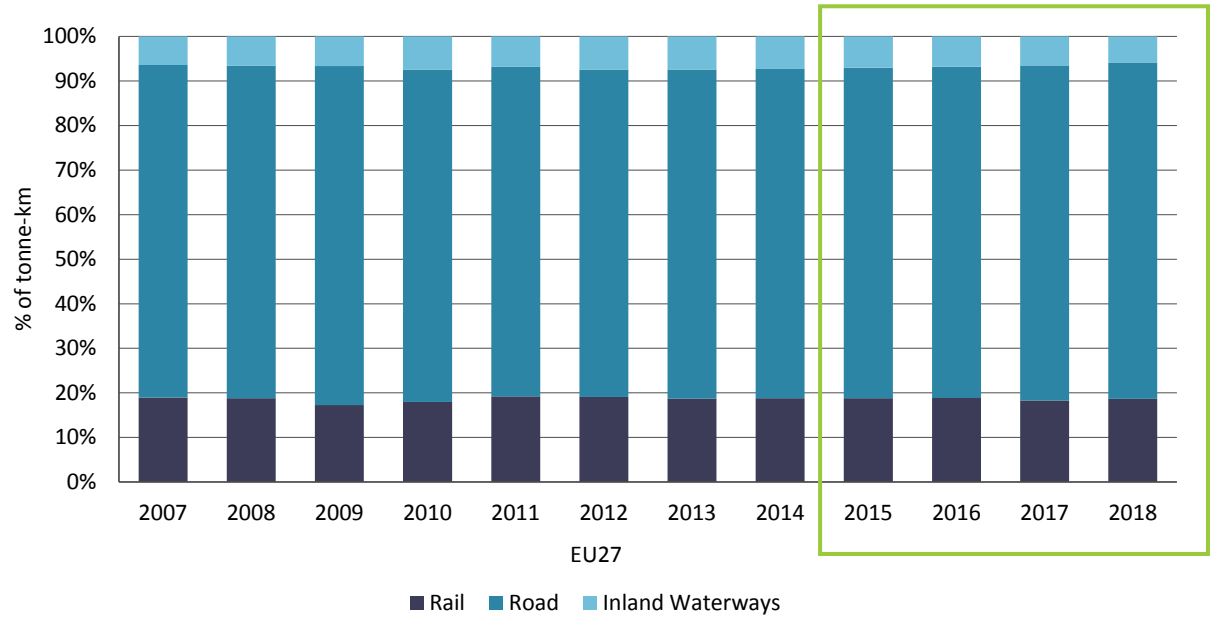
Looking at the EU27 performance of all modes (i.e. road, rail, inland waterways, pipelines, sea and air transport) in 2018, rail had a modal share of 12.6%[101].

Focusing instead only on land transport (road, rail and inland waterways but excluding pipelines[102]), rail represented 18.7% of the modal split.

Figure 36 shows the freight land transport modal split between 2007 and 2018 (pipelines excluded). Road transport dominates total freight land transport within the EU27, with a share consistently higher than 70% between 2007 and 2018. Throughout the same period, the rail mode share fluctuated between 17% and 19%, reaching 18.7% in 2018. Inland waterways varied between 6% and 7%.

[101] See Statistical pocketbook 2020.
[102] Figures related to land freight transport including pipelines are available in the Statistical pocketbook 2020.

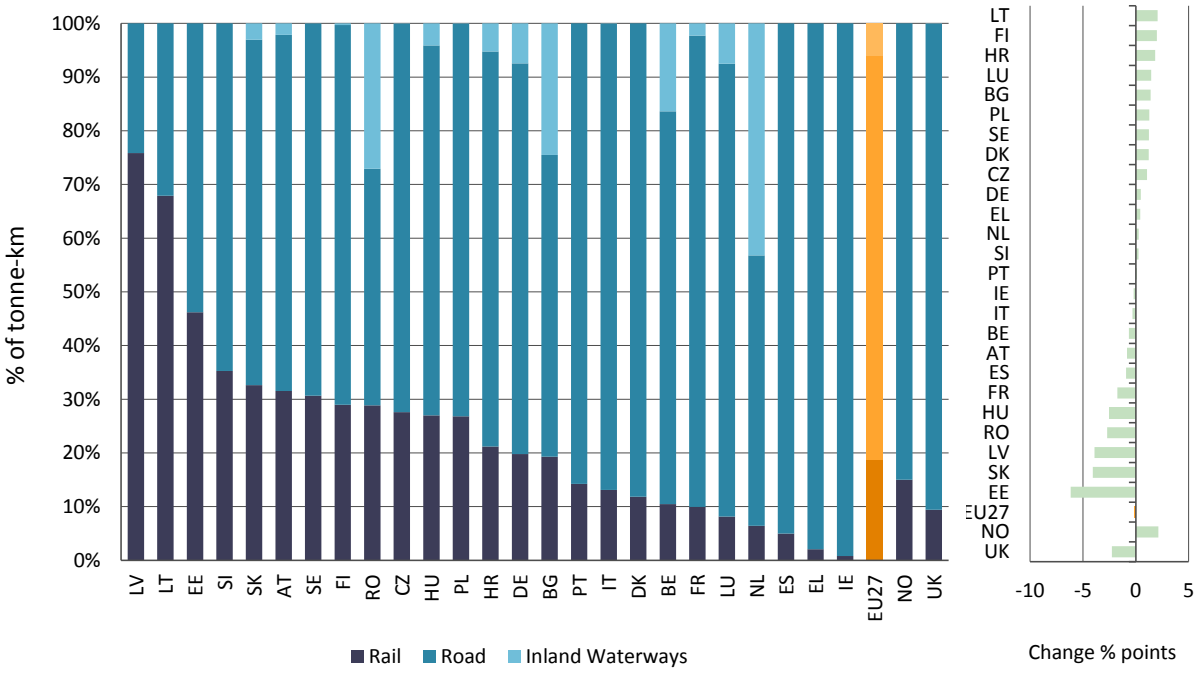
Figure 36: Freight land transport modal split (%, 2007-2018)



Source: Statistical pocketbook, 2020.

Between 2015 and 2018 in particular, the road modal share in EU27 land freight transport increased from 74.2 % to 75.4 %, whereas rail decreased from 18.8 % to 18.7 %, with significant differences across countries. Figure 37 shows the modal shares for rail, road and inland waterways in each Member State.

Figure 37: Freight land transport modal split by country (% in 2018) and change in percentage points for rail (2015-2018)



Source: Statistical pocketbook, 2020; excluding CY and MT.

Rail has the highest modal share in Latvia and Lithuania, primarily because their rail networks carry large volumes of transit traffic to and from the Russian Federation. Rail's share is also high for Estonia, Slovenia and Sweden. In contrast, rail has the lowest modal share in Ireland, Greece and Spain.

Inland waterways are a major competitor for rail in Member States with access to major rivers including the Netherlands, Romania, Bulgaria and Belgium.

The evolution of modal share between 2015 and 2018 has been mixed. The modal share of rail increased more in Lithuania, Finland and Croatia, and decreased significantly in Estonia, Slovakia, Latvia, Romania and Hungary.

Evolution of rail freight volumes

In 2018, around 1.55 billion tonnes of freight was carried on EU27 railways[103] (1.63 in EU28).

Figure 38 shows the evolution of rail freight traffic in Europe from 2007 to 2018 measured in tonne kilometres, separately for domestic and international services (bars), as well as the proportion of international on total rail freight traffic (dotted line).

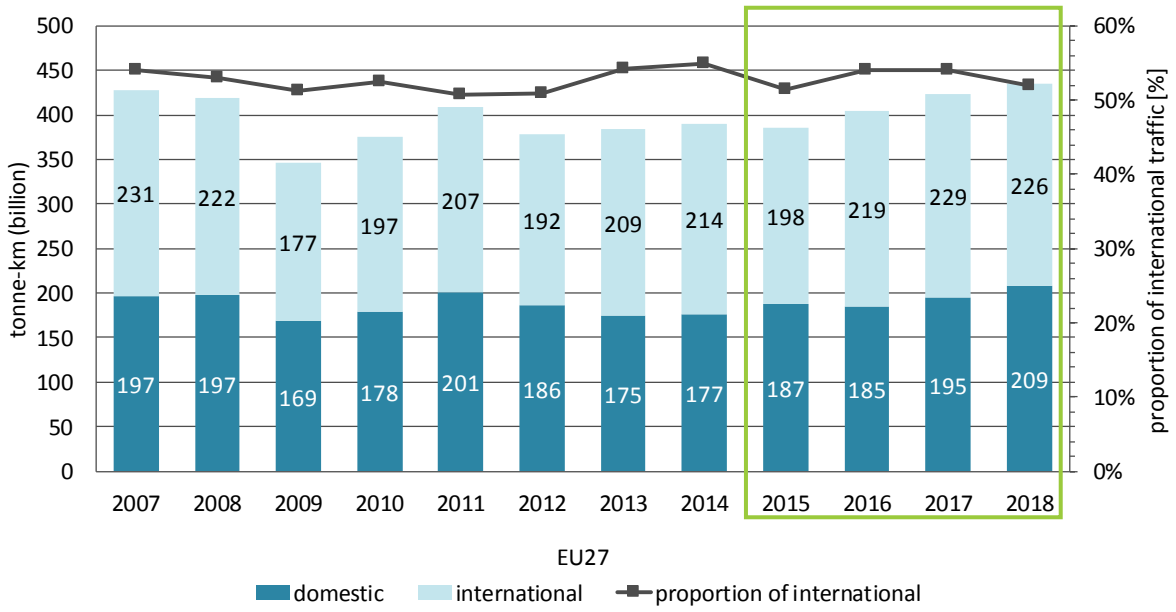
Total EU27 rail freight traffic rose from 385 billion tonne kilometres in 2015 to 435 billion tonne kilometres in 2018 (from 405 to 452 in EU28) out of around 2.3 trillion tonne kilometres of land transport[104] overall (2.4 for EU28).

Domestic services increased from 187 to 209 billion tonne kilometres in 2018 (from 207 to 226 for EU28).

The proportion of international rail freight services remained consistently above 50% over the entire period in the EU27, peaking in 2014 at 54.9% of total rail traffic (51.9% in EU28) and then coming down to 52.0% in 2018 (50.0% in EU28).

[103] Source Eurostat. Freight data EU27 do not include BE, which labelled data confidential.
[104] Excluding pipelines.

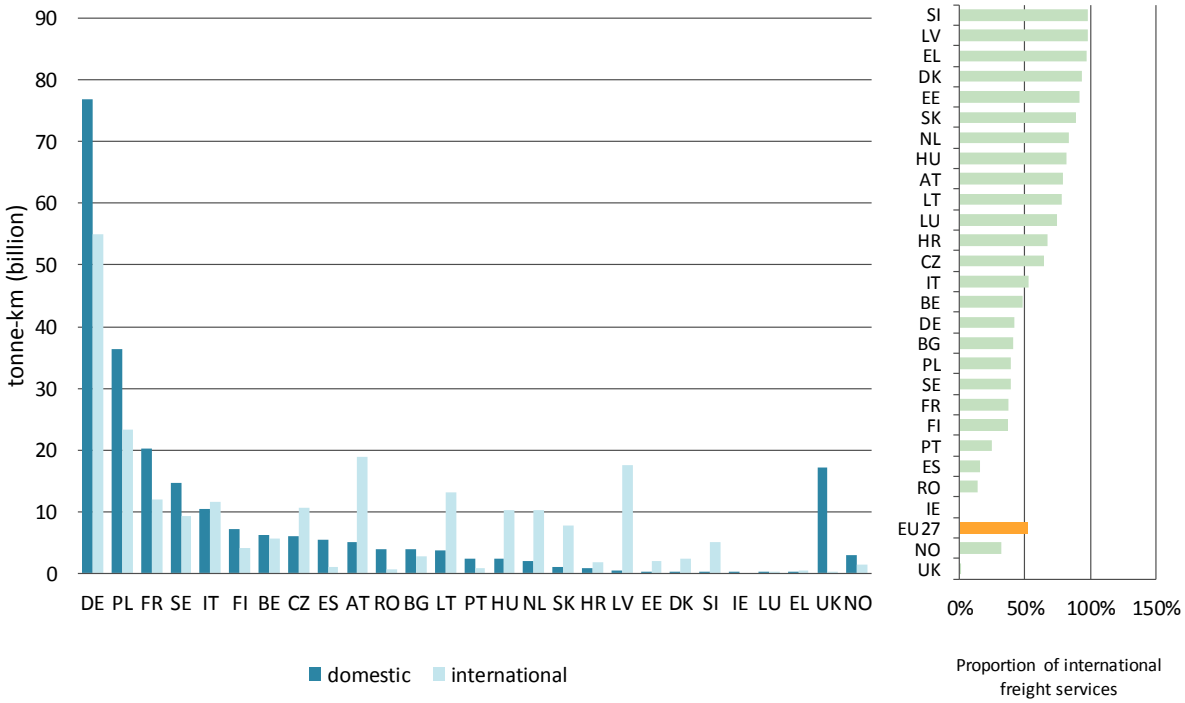
Figure 38: Evolution of rail freight traffic volumes (domestic, international and proportion of international in total traffic) (billion tonne-km, 2007-2018)



Source: RMMS, 2020. Infill data from various other sources and estimates. For 2016, there is a revision of some RMMS inputs and estimates compared with the sixth RMMS report.

Figure 39 shows the volumes of domestic and international rail freight traffic by country in 2018, as well as the evolution of tonne kilometres compared to 2015.

Figure 39: Rail freight traffic volumes (domestic, international and proportion of international on total) by country (tonne-km, 2018)

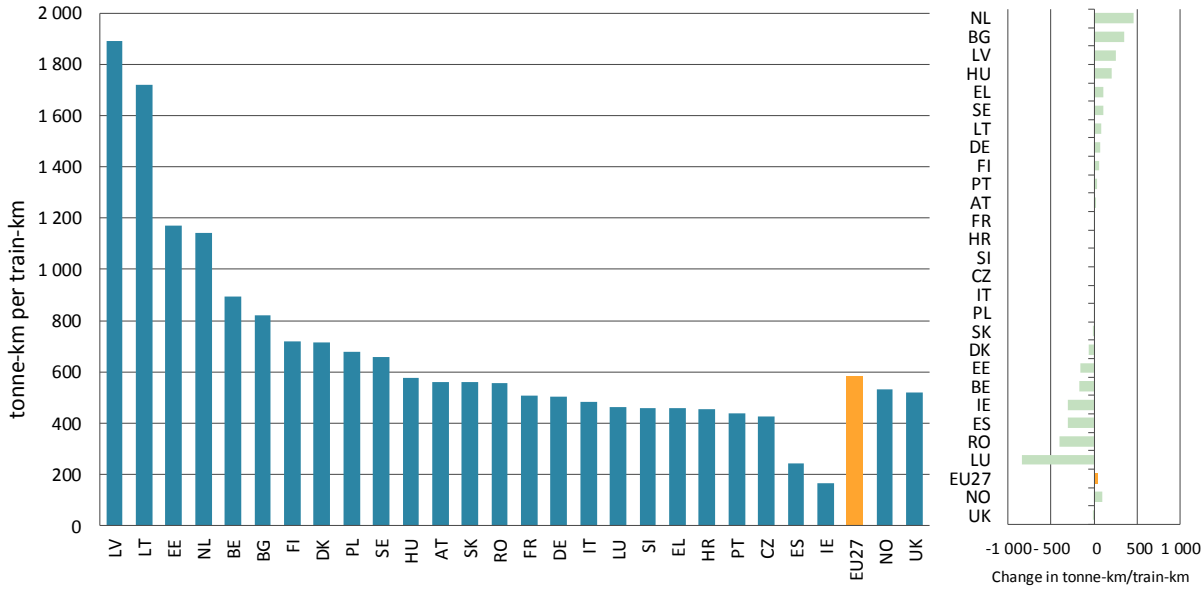


Source: RMMS, 2020. Data for BE and PT adjusted.

Rail freight traffic volumes in 2018 were highest in Germany, Poland and France. Slovenia and Latvia reported the highest proportion of international rail freight traffic (98%) followed by Greece (97%); Ireland and the United Kingdom reported the lowest proportions (0% and 0.4% respectively).

Traffic expressed in tonne kilometres provides a first measure of the demand for rail freight services. Figure 40 gives an overview of the load factor of freight trains, measured as the ratio between tonne kilometres and freight train kilometres per country, in 2018 and its evolution compared to 2015.

Figure 40: Number of tonne-km per freight train-km per country (freight trains load factor) (2018) and evolution (2015-2018)



Source: RMMS, 2020; 2015, 2016 data for NL adjusted.

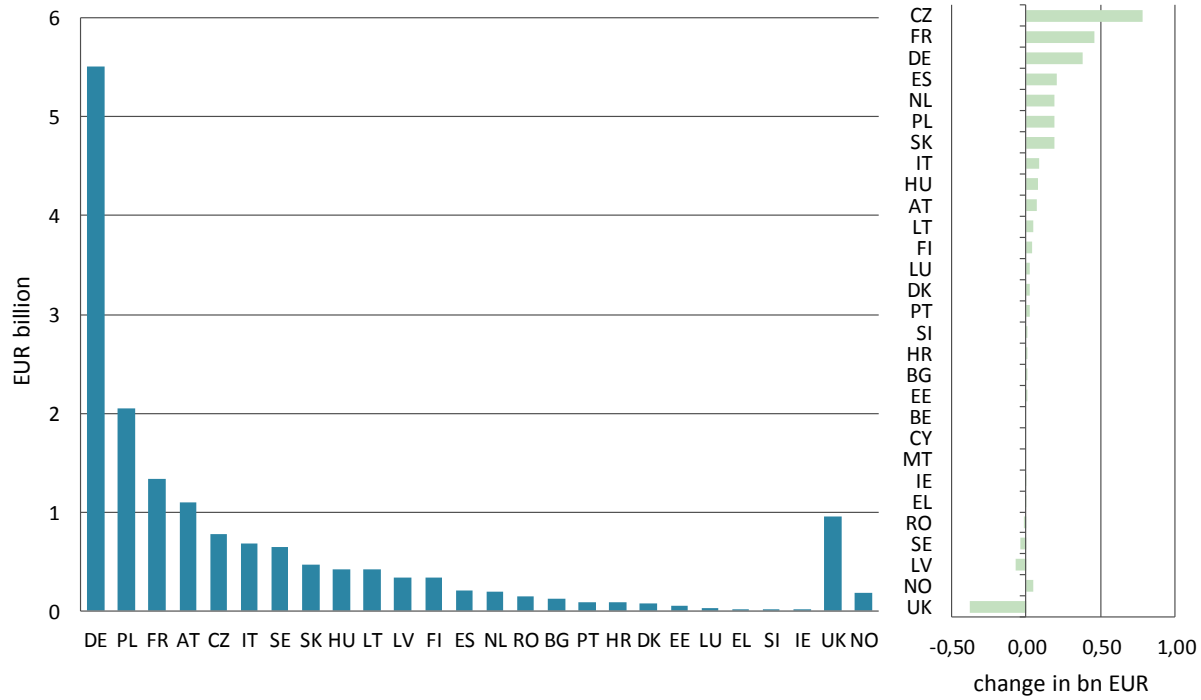
On average, EU27 freight trains were loaded with 583 tonnes in 2018 (580 in EU28). The Baltic countries have a significantly above-average load factor (the highest being in Latvia, with 1 891 tonnes); the lowest load factor is in Ireland (167 tonnes). Overall, the load factor in the EU27 between 2015 and 2018 increased by 35 tonnes per train (33 in EU28). Based on RMMS data, the highest increase can be found in the Netherlands (+456), whereas Luxembourg apparently experienced a decrease of 843 tonnes per train compared to 2015.

3.3.3 Evolution of rail freight revenues

The RMMS collects data on railway undertakings' total revenues from the provision of freight services. Despite the clear improvement in data quality since the first year of implementation of the RMMS Regulation in 2015, some gaps and inconsistencies in the input data remain.

Figure 41 shows the reported revenues from rail freight per country in 2018 as well as the evolution compared to 2015.

Figure 41: Railway undertakings' revenues from freight transport services per country (billion EUR, 2018) and evolution (2015-2018)



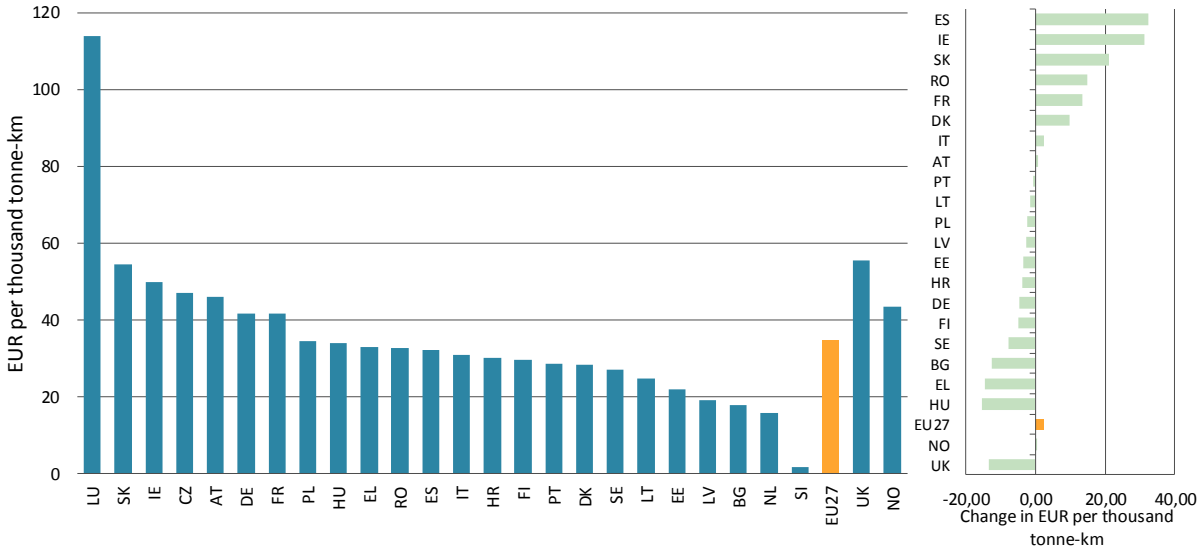
Source: RMMS, 2020. BE not available; CZ, LU, NL, SI, ES 2015 not available.

Germany reported by far the highest rail freight revenues in 2018 (EUR 5.51 billion), while Ireland reported the lowest (almost zero). Based on RMMS data, Czechia experienced the highest increase (+EUR 0.78 billion), while the United Kingdom recorded the highest decrease (-EUR 0.38 billion) compared to 2015.

As a rough indicator of the economic performance of railway undertakings providing freight services, the total amount of freight revenues can be related to traffic expressed either in tonne kilometres or in freight train kilometres. Traffic expressed in tonne kilometres provides an indication of the average return that undertakings can expect from transported tonnes, whereas traffic expressed in freight train kilometres provides an indicator of the average return that undertakings can expect from a freight train.

Figure 42 shows the railway undertakings' revenues from freight transport services in 2018 per country, as well as the evolution compared to 2015, measured in EUR per thousand tonne kilometres.

Figure 42: Railway undertakings' revenues from freight transport services in tonne-km per country (EUR per thousand tonne-km, 2018) and evolution (2015-2018)

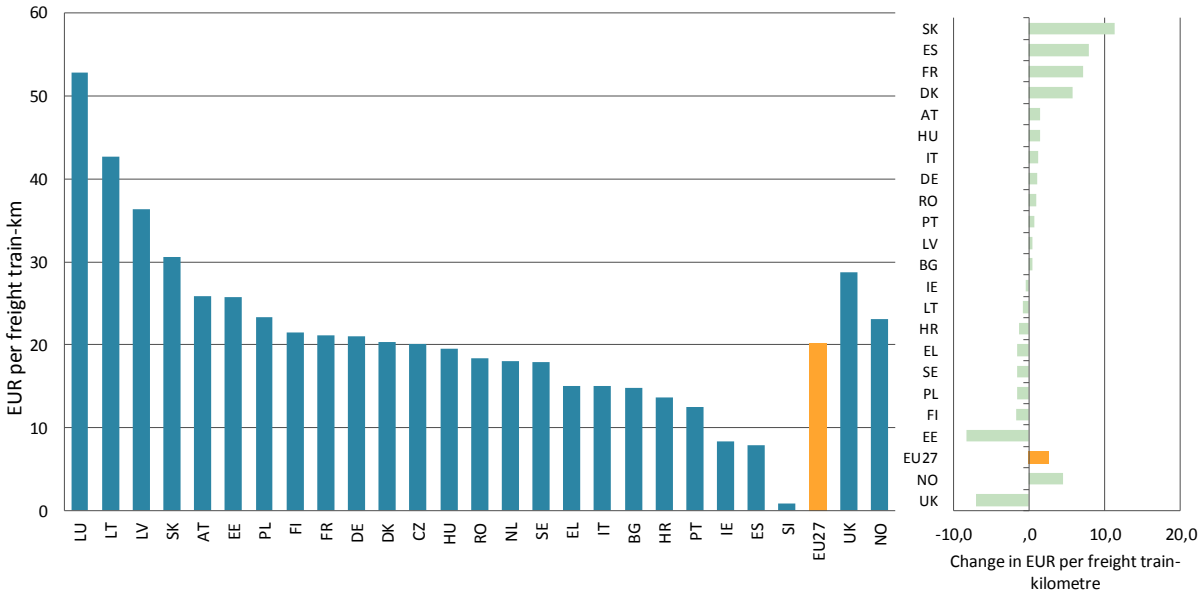


Source: RMMS, 2020. Data for BE, CZ, LU, NL and SI incomplete.

On average, in 2018 the EU27 railway undertakings' revenues from freight transport services were EUR 34.75 per thousand tonne kilometres (EUR 35.54 in EU28). Luxembourg reported by far the highest freight revenues per thousand tonne kilometres (EUR 113.93), while Slovenia had the lowest (EUR 1.87). Overall, revenues in the EU27 increased slightly by EUR 2.53 per thousand tonne kilometres (EUR 1.56 in EU28). Based on RMMS data, Estonia appears to have experienced the highest increase compared to 2015 (+ EUR 32.34 per thousand tonne kilometre), while Hungary had the highest decrease (- EUR 15.47).

Figure 43 shows the railway undertakings' revenues from freight transport services in 2018 per country and the evolution compared to 2015, measured in EUR per freight train kilometres.

Figure 43: Railway undertakings' revenues from freight transport services in freight train-km per country (EUR per freight train-km, 2018) and evolution (2015-2018)



Source: RMMS, 2020. Data for BE, CZ, LU, NL and SI incomplete.

On average, in 2018 the freight revenues of railway undertakings in the EU27 were EUR 20.25 per train kilometre. Luxembourg reported the highest revenues per train kilometre (EUR 52.79), while Slovenia reported the lowest (EUR 0.86). Overall, revenues in the EU27 slightly increased compared to 2015 by EUR 2.32 per train kilometre (by EUR 1.77 in EU28). Based on RMMS data, Slovakia reported the highest increase compared to 2015 (+EUR 11.38 per train kilometre), while Estonia reported the highest decrease (-EUR 8.19).

3.3.4 Multimodal and intermodal transport

According to recent studies and all main stakeholders, intermodal transport continues to be the fastest-growing segment in rail transport. However, no comprehensive and comparable data are currently gathered systematically on intermodal transport in general, nor on intermodal transport involving a rail leg. The Commission carried out a comprehensive study in 2014 and again in 2017. The study established that between 2011 and 2015 intermodal transport involving a rail leg constituted 32% of all intermodal operations and grew 14% in tonne kilometres (10% in twenty-foot equivalent units - TEUs) within the same period[105]. The 14% growth is attributable to the rail leg of the total intermodal operation. The UIC data, when corrected for geographical scope, suggests a further 8.2% increase in TEUs between 2015 and 2017.

[105] *Consultations and related analysis in the framework of impact assessment for the amendment of Combined Transport Directive (92/106/EEC)* (2017) available at https://op.europa.eu/en/publication-detail/-/publication/37e91145-e14a-11e7-9749-01aa75ed71a1 and *Analysis of the EU combined transport* (2015) available at https://op.europa.eu/en/publication-detail/-/publication/675724ad-969f-11e7-b92d-01aa75ed71a1.

According to the Commission study, 63% of operations involve more than one Member State, while 58% of operations are covered by the Combined Transport Directive[106]. Those not covered are mostly national operations. An average rail intermodal operation has a rail leg of 615 kilometres and involves 2.2 transhipments, with road legs on average 102 kilometres each. The Commission is reviewing different possibilities to improve data collection for intermodal transport, including possibility to gather data through the RMMS network.

In November 2017, the Commission adopted its proposal to amend Directive 92/106/EC (Combined Transport Directive[107]) with the aim to provide new and more effective support measures for modal shift. The proposed amendments would have considerably increased the eligibility of intermodal operations (from 41.7% to 72.7%) for the support provided under the Directive and were assessed to bring about an additional modal shift to rail, inland waterways and short sea shipping of 69.9 billion tonne kilometres in the period until 2030. However, taking into account amendments made by the co-legislators, as well as the new far-reaching objectives of the European Green Deal, the Commission has decided to withdraw the current proposal and prepare a new, more ambitious proposal in 2021, as well as review other related EU instruments to strengthen intermodal transport.

To support the development of intermodal transport from a technical point of view, the Commission developed a technical specification for interoperability relating to telematics applications for freight services (TAF-TSI) to digitalise information related to rail freight traffic flows. This will achieve the following:

- establish a **Single train ID** and accompanying tools to facilitate tracking of trains and goods by rail and other operators;
- allow the two-way exchange of a **dynamic, reliable estimated time of arrival** (**ETA)** between freight terminals, ports, intermodal operators, and shippers;
- link the train positioning (or train running information) and its ETA to a **harmonised train composition** (Issues Logbook action No 3);
- link the above-mentioned data to wagons, intermodal loading units (ILUs) and e-consignment notes in a commercially sound way, preventing accidental disclosure/diffusion and making the information available along the logistics chain.

[106] The Combined Transport Directive specifically covers rail intermodal operations involving at least two Member States where the rail leg is at least 100 km and the road leg is up to the nearest suitable rail station (see Article 1 for a more precise definition of the scope).
More in general:
- 'multimodal transport' is any transport using several modes of transport for one journey without any specific characteristics or limitations;
- 'intermodal transport' is a type of multimodal transport where the goods are carried in an intermodal load unit such as a container or trailer and it is the load unit that is transhipped from one mode to another as opposed to the goods being reloaded; and
- 'combined transport' is a type of intermodal transport where the road leg is limited to a short distance and the major part of the route is carried out by rail, inland waterways or maritime transport.

[107] Council Directive 92/106/EEC of 7 December 1992 on the establishment of common rules for certain types of combined transport of goods between Member States, OJ L 368, 17.12.1992, p. 38.

4. The evolution of services supplied to railway undertakings

Directive 2012/34/EU lays down rules for service facilities and services supplied therein. The aim of the Directive was to increase the transparency of access conditions and charges applied and ensuring non-discriminatory access.

Provisions apply to a broad range of facilities and services, listed in points 2, 3 and 4 of Annex II to Directive 2012/34/EU. These include passenger stations, freight terminals, marshalling yards and train formation facilities, storage sidings, maintenance facilities, cleaning and washing facilities, maritime and inland port facilities and refuelling facilities. Additional and ancillary services are also covered, such as traction current supply, pre-heating of trains, arrangements for transport of dangerous goods, access to telecommunication networks and ticketing services.

Implementing Regulation (EU) 2017/2177 lays down the details of the procedure and criteria to be followed for access to service facilities and to the services supplied in these facilities. It also makes provision for sharing and accessing information and for developing cooperation between service facility operators and infrastructure managers.

Information on service facilities and rail-related services is particularly important for freight services. The Rail Facility Portal (see Box 6) provides the sector with a unique entry point for gathering and sharing information between interested parties.

The RMMS monitors service facilities. However, whereas information is largely complete and reliable for stations, information on other service facilities remains fragmented and not always comparable across countries. Data presented in this section must therefore be interpreted with care.

Commission services are working with Member States with a view for the Commission to propose an amendment to Regulation 2015/1100 in order to improve the data gathering process on service facilities.

Box 6: European Rail Facility Portal

The European Rail Facility Portal became operational in 2019. The Commission created the Portal as a tool for the rail sector, which can serve as a single entry point for gathering and sharing information on rail facilities and services between interested parties. It covers both rail freight and passenger facilities.

Information on service facilities and rail-related services is particularly important for freight. In 2020, RailNetEurope became the portal's manager and is currently running the portal in cooperation with the International Union of Combined Road-Rail Transport Companies (UIRR). A large number of business associations are providing support to the project by sitting on the Portal's Governance Board.

The Commission developed the Rail Facility Portal with the purpose of providing a single EU user-friendly and market-oriented GIS-based portal, mapping and providing key information on the rail service facilities and last-mile infrastructure in Europe. The portal aims to remedy the lack of easy access to information on rail facilities and last-mile infrastructure, which will in turn contribute to better planning of rail services. Service facility operators can use it to comply with their obligation to publish information on access conditions pursuant to Directive 2012/34/EU and Commission Implementing Regulation (EU) 2017/2177. The portal is both a market tool and a compliance tool. The new portal manager will ensure a close connection of the portal to rail facility operators. This should contribute to a high number of new descriptions appearing in the portal in the coming months. New features will be introduced, which should respond to the portal users' needs and facilitate compliance with legal rules. The acceptance of the portal

by the sector, as the 'tool of choice', both for inputting and for consulting information on the EU rail service facilities, will be the key success factor. The portal provides a unique opportunity to avoid piecemeal publication of information on services facilities, and thus make such information usable and useful for the benefit of the rail market. The portal will evolve in accordance with the needs of all stakeholders. The guarantor for this is the portal's Governance Board, which includes virtually all relevant rail stakeholders. The wide participation of the sector in the management of the portal will also contribute to its development as a user-friendly and business-oriented tool. Depending on the rail sector's needs, it could become an important element in a future process of digitalisation of services provided for and by rail.

4.1 Charging principles for service facilities, additional and ancillary services

Charging principles for service facilities and rail-related services differ from the ones applied to rail infrastructure. While direct costs and possibly mark-ups (and eventually other charging components) are levied for the access to rail infrastructure, charges imposed for track access within service facilities and the supply of basic services in such facilities[108] must not exceed the cost of providing them plus a reasonable profit. The charge for additional and ancillary services must similarly not exceed the cost of providing the single service including a reasonable profit, except when these services are offered by more than one supplier.

Applicants must have easy access to information on any service facility and its rail-related services. For that reason, it is mandatory that the network statement, available free of charge, contains a section on information on access to and charging for gaining access to service facilities, as well as for the provision of rail-related services. Alternatively, the information can be published on the website of the service facility or on a common web portal (see https://railfacilitiesportal.eu).

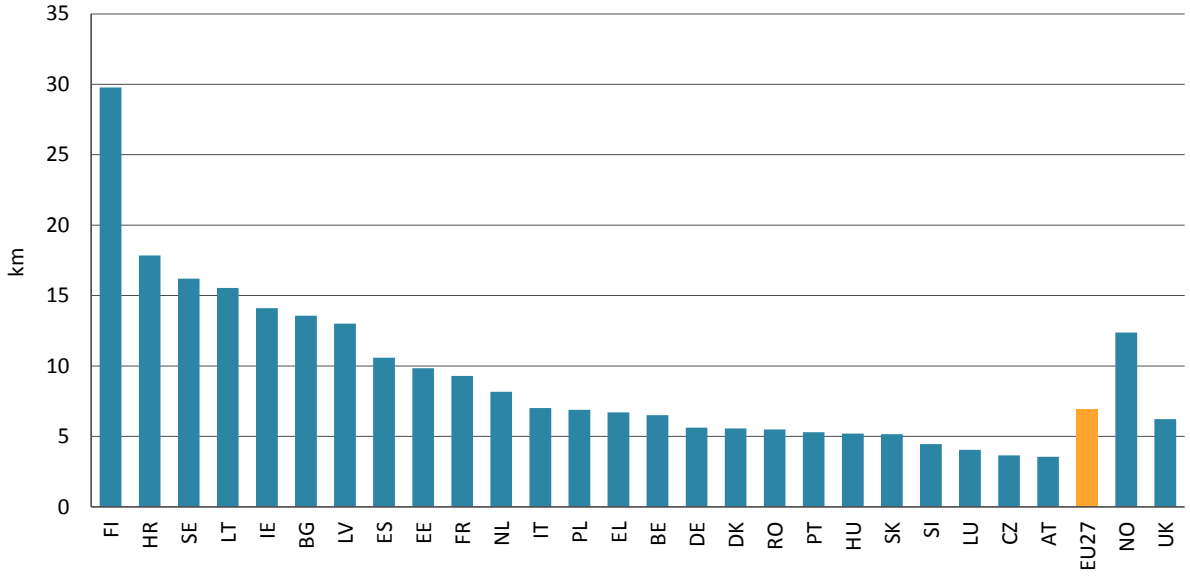
4.2 Passenger stations

There were more than 29 000 stations in the EU27 in 2018 (almost 32 000 in EU28), of which slightly more than 300 were large stations serving more than 25 000 travellers per day (around 350 in EU28).

In 2018, the average distance between stations in the EU27 was 6.9 kilometres (6.8 in EU28). In Finland there is by far the greatest average distance between stations (30 kilometres, equivalent to only 34 stations on average per 1 000 kilometres of line) whereas the Austrian network has the shortest average distance between stations (3.6 kilometres, equivalent to 281 stations on average per 1 000 kilometres of line) (Figure 44).

[108] Different service facility types and rail-related services are enumerated in points 2 to 4 of Annex II to Directive 2012/34/EU.

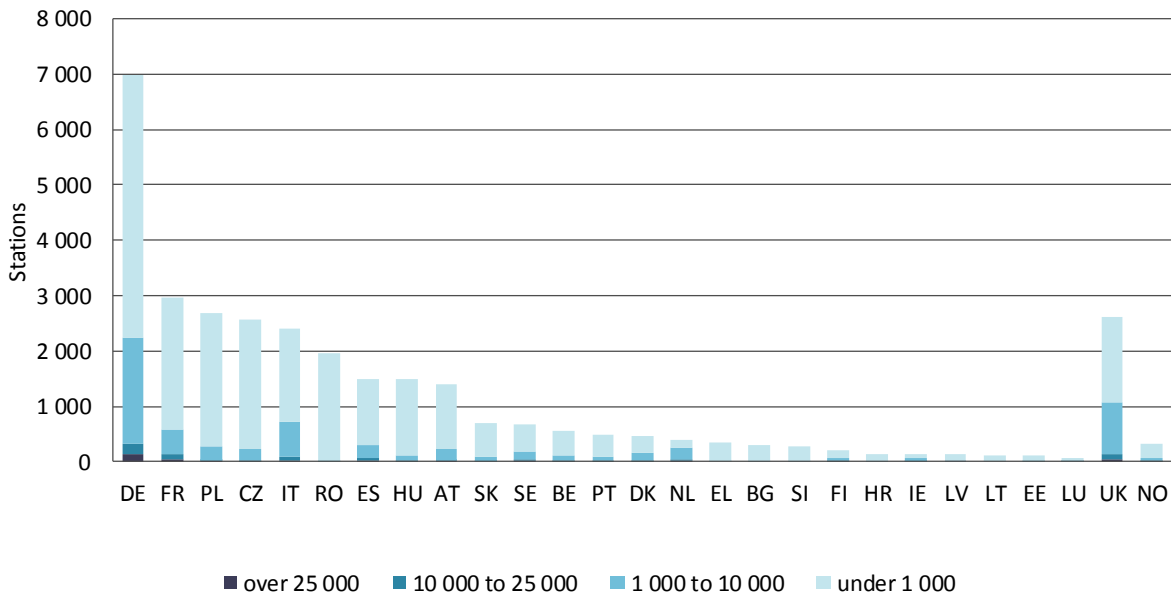
Figure 44: Average distance between stations by country (km, 2018)



Source: RMMS, 2020, Statistical pocketbook, 2020.

Figure 45 shows the numbers of stations with different passenger volumes per day in 2018 per country.

Figure 45: Number of stations by passengers per day by country (2018)

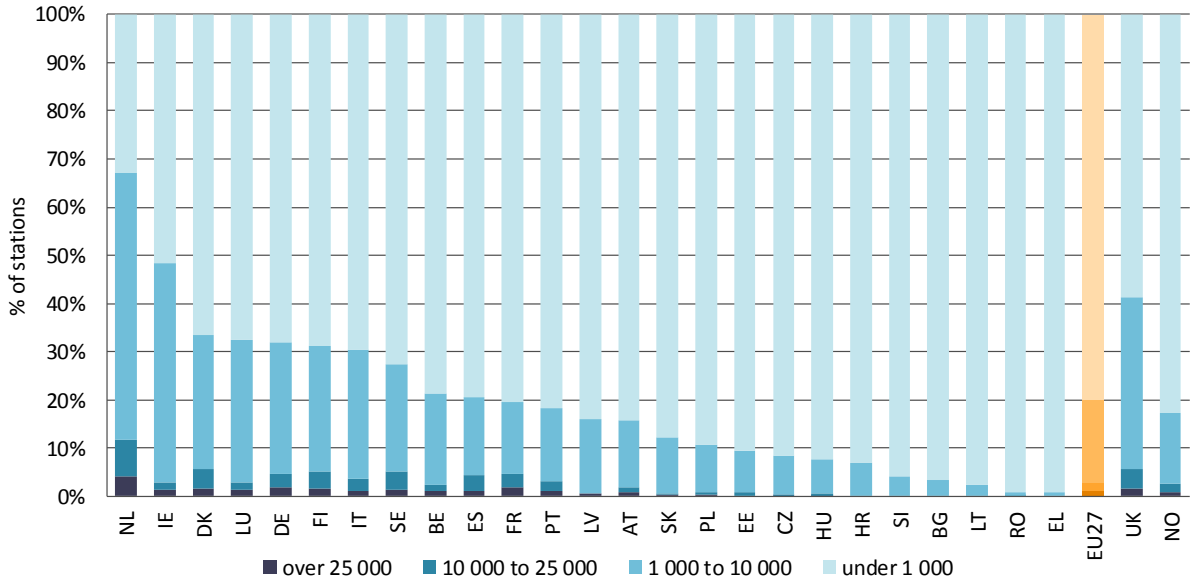


Source: RMMS, 2020. No data for ES. Data for HR, LU, PT, RO and SK adjusted.

The highest number of stations by far was reported by Germany (6 987, almost one quarter of the EU27 total), while the lowest was reported by Luxembourg (68).

Figure 46 shows the proportion of stations with different passenger volumes per day in 2018 per country.

Figure 46: Proportion of stations by passengers per day by country (2018)



Source: RMMS, 2020. No data for ES. Data for HR, LU, PT, RO and SK adjusted.

With the notable exception of the Netherlands, at least half the stations on all networks serve fewer than a thousand travellers per day. These smaller stations make up the majority (80%) of all stations in the EU27 (78% for EU28). Large stations serving more than 25 000 travellers per day are less relevant in numerical terms (representing only 1% of the total), despite their major importance for network interconnection.

4.3 Other service facilities

The RMMS collects data from Member States on the number of other service facilities as referred to in Annex II to Directive 2012/34/EU.

However, discrepancies in the definition of each type of service facility and gaps in inputs at national level limit the comparability of figures across Member States and across years, meaning that caution is necessary when drawing conclusions from the inputs received.

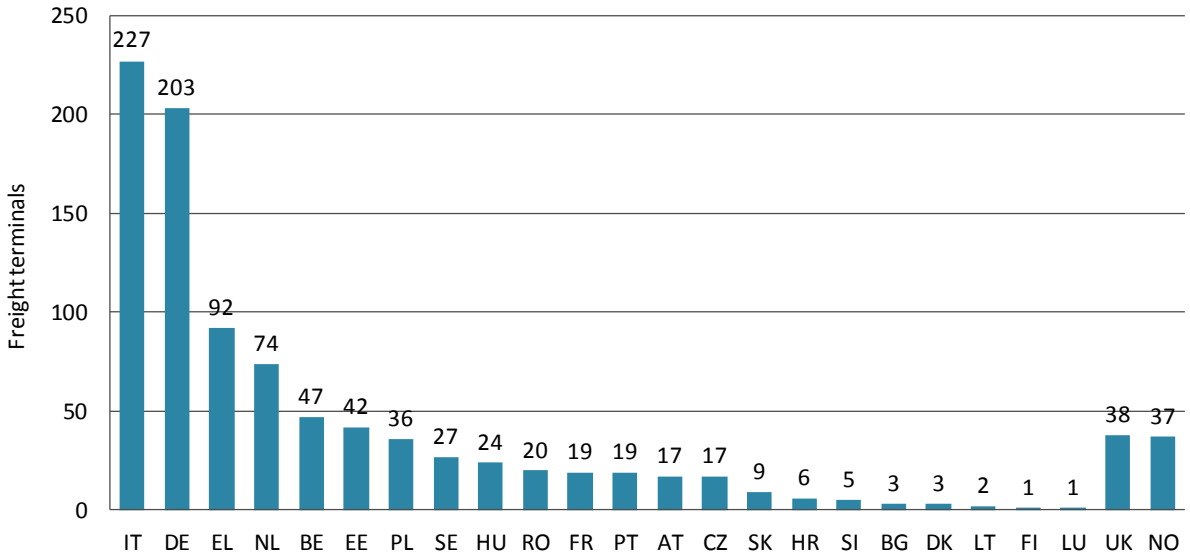
Further to this, the RMMS does not collect data on the actual or foreseeable use of such facilities: the mere reporting of a facility in the RMMS therefore does not necessarily imply that this facility is regularly used (or could be used at short notice or in the near future).

Freight terminals

Based on RMMS data, there were around 894 freight terminals in the EU27 in 2018 (932 in EU28).

Figure 47 shows the reported number of freight terminals in 2018 by state.

Figure 47: Number of freight terminals by country (2018)



Source: RMMS, 2020; no data for IE, LV, ES.

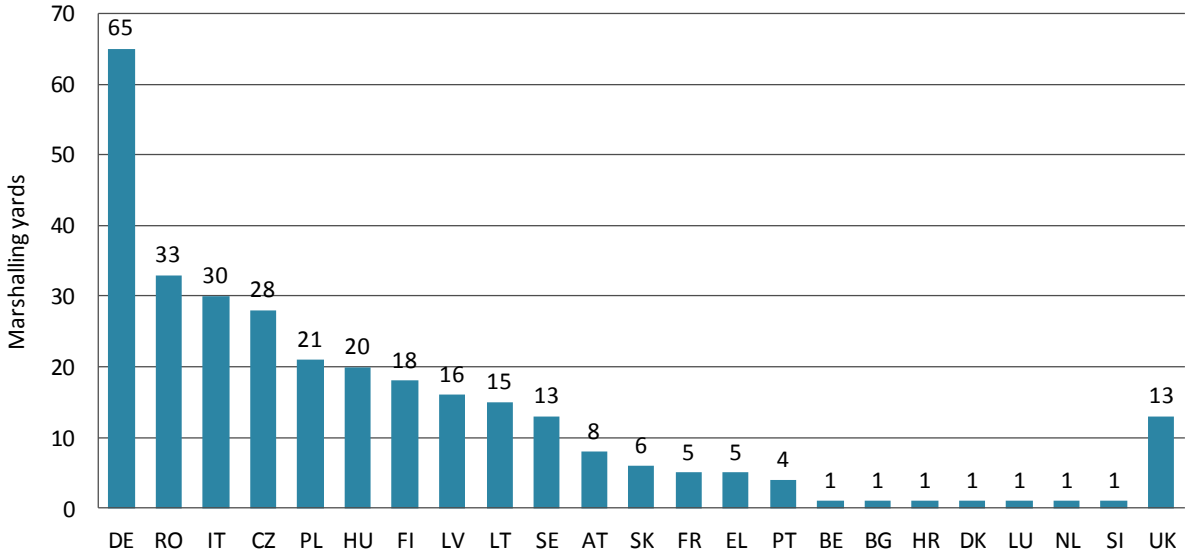
The RMMS Regulation defines freight terminals as a facility equipped for the transhipment and storage of intermodal transport units, where at least one of the modes of transport is rail. Italy and Germany reported the highest number of freight terminals in the EU27.

Marshalling yards and train formation facilities

Based on RMMS data, there were around 294 marshalling yards and train formation facilities in the EU27 in 2018 (307 in EU28).

Figure 48 shows the reported number of marshalling yards and train formation facilities in 2018 by State.

Figure 48: Number of marshalling yards by country (2018)



Source: RMMS, 2020.No data for EE, IE, ES and NO.

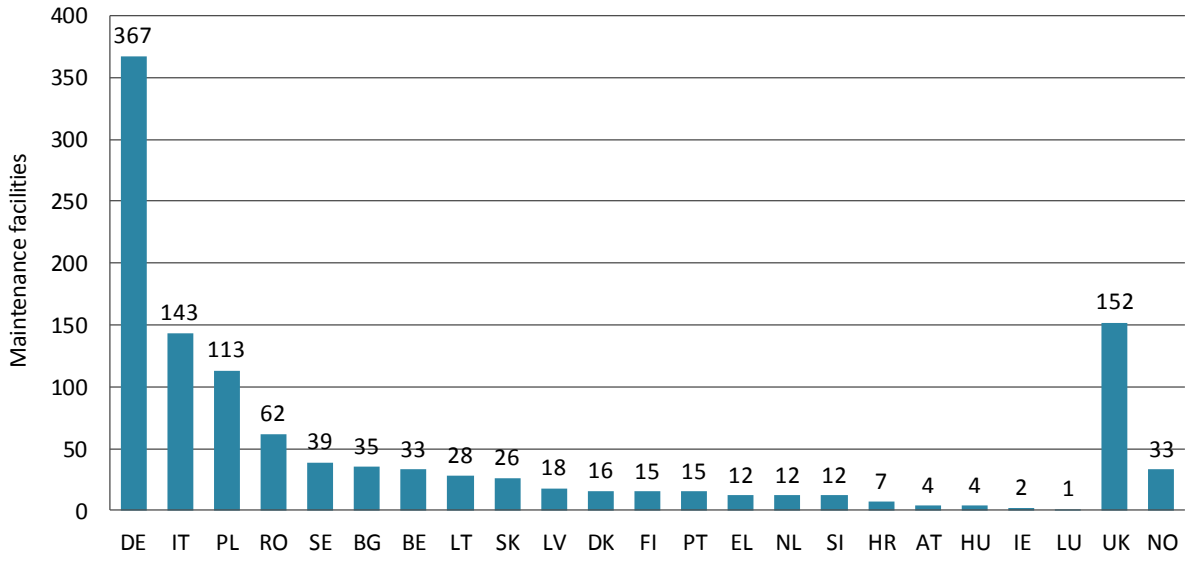
The RMMS Regulation defines a marshalling yard as a site or a part of a site equipped with several tracks or other equipment used for railway vehicle marshalling operations, including switching, and which use gravity as a means to form or rearrange trains.

Maintenance facilities

Based on RMMS data, there were around 964 maintenance facilities in the EU27 in 2018 (1 116 in EU28).

Figure 49 shows the reported number of maintenance facilities in 2018 per country.

Figure 49: Number of maintenance facilities by country (2018)



Source: RMMS, 2020. No data for CZ, EE, FR and ES.

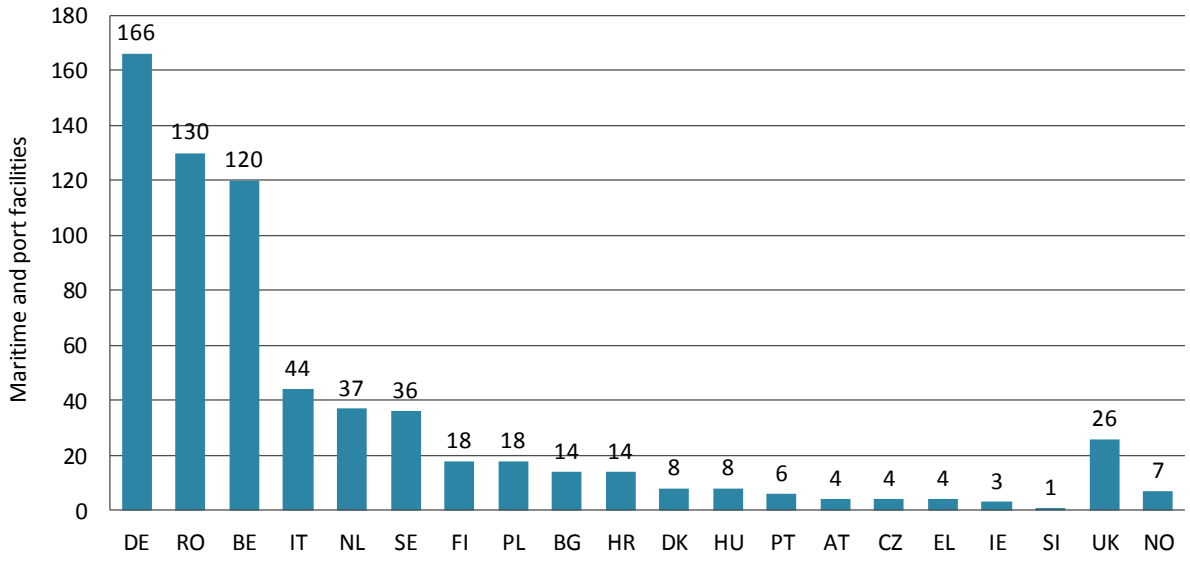
Maintenance facilities are facilities where rolling stock is maintained, including both heavy and light maintenance, to keep it in operation.

Maritime and port facilities

Based on RMMS data, there were around 635 maritime and port facilities in the EU27 in 2018 (661 in EU28).

Figure 50 shows the reported number of maritime and port facilities in 2018 per country.

Figure 50: Number of maritime and port facilities linked to rail activity by country (2018)



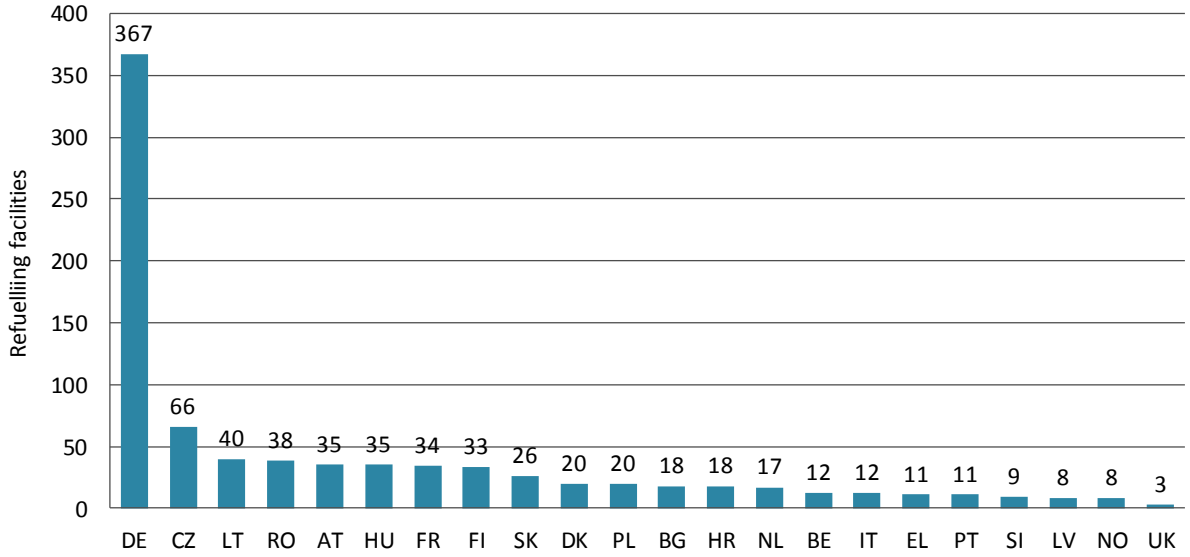
Source: RMMS, 2020. No data for EE, FR, LV, LT, LU, SK and ES.

Refuelling facilities

Based on RMMS data, there were around 830 refuelling facilities in the EU27 in 2018 (833 in EU28).

Figure 51 shows the reported number of refuelling facilities in 2018 per country.

Figure 51: Number of refuelling facilities by country (2018)

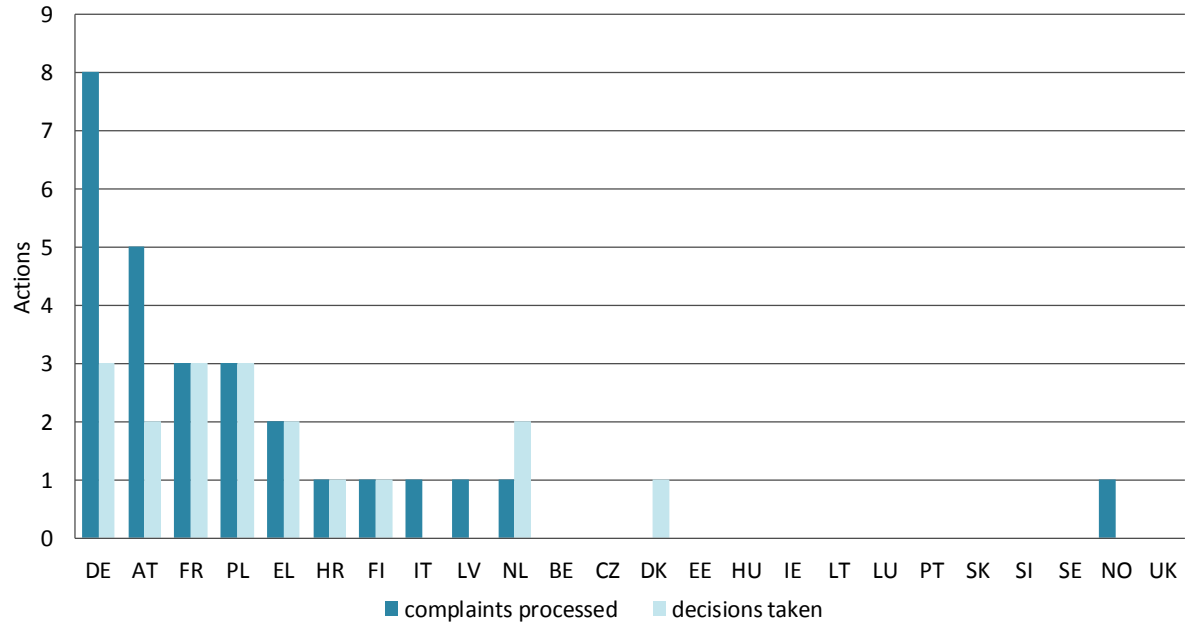


Source: RMMS, 2020. No data for EE, IE, LU, ES and SE.

4.4 Complaints related to access to service facilities

Figure 52 shows the number of complaints being processed by regulators, as well as the number of decisions by regulators in 2018 per country. It should be stressed that reported decisions are not necessarily in response to complaints raised in the same year, since there could be a considerable time lag between the filing of a complaint and its resolution.

Figure 52: Number of complaints being processed and decisions made by country (2018)



Source: RMMS, 2020. No data for RO and ES.

Germany's regulator had to process the highest number of complaints on access to service facilities in 2018 (eight). Three decisions on such complaints were taken by the German, French and Polish regulators.

5. The evolution of framework conditions in the rail sector

5.1 Harmonisation

5.1.1 EU legislation

Overview of EU legislative elements

Following Directive 91/440/EEC, effective from 1 January 1993, the Commission has adopted four railway packages:

- In 2001, the First Railway Package ('rail infrastructure package') allowed rail operators to access the trans-European network on a non-discriminatory basis for the purpose of operating international freight services.
- In 2004, the Second Railway Package liberalised the rail freight market from 1 January 2007, introduced common procedures for investigating accidents, and established safety authorities in the Member States.
- In 2007, the Third Railway Package introduced open access rights for international rail passenger services and a European train driver licence, and strengthened rail passengers' rights.
- In 2016, the Fourth Railway Package was adopted to complete the single market for rail services and to make it more competitive with other transportation modes[109].

The technical pillar of the Fourth Railway Package, adopted by the Council in April 2016, focused on interoperability, safety and a renewed role for the European Rail Agency. It included:

- Regulation (EU) 2016/796 on the EU Agency for Railways and repealing Regulation (EC) 881/2004;
- Directive (EU) 2016/797 on the interoperability of the rail system within the EU (Recast of Directive 2008/57/EC); and
- Directive (EU) 2016/798 on railway safety (Recast of Directive 2004/49/EC).

The market pillar of the Fourth Railway Package, adopted in December 2016, was intended to complete the process of market opening that began with the implementation of the First Railway Package. It laid down rules for improving impartiality in the governance of railway infrastructure, and introduced the principles of mandatory tendering for public service contracts in the railway sector to enhance competition in rail passenger service markets, thereby encouraging railway operators to improve the quality of their services, and their cost effectiveness. The market pillar comprises two Regulations and a Directive.

- Regulation (EU) 2016/2338 amending Regulation (EC) 1370/2007, dealing with the award of public service contracts for domestic passenger transport services by rail;
- Directive 2016/2370/EU amending Directive 2012/34/EU, dealing with the opening of the market of domestic passenger transport services by rail and the governance of the railway infrastructure;
- Regulation (EU) 2016/2337 repealing Regulation (EEC) 1192/69 on the normalisation of the accounts of railway undertakings.

[109] EU legislative measures are accompanied by a number of implementing and delegated acts which are available on the DG MOVE website https://ec.europa.eu/transport/home_en.

The two key features of the market pillar are:

- 'Competitive tendering' as the standard choice for awarding public service contracts: This principle will fully apply from 3 December 2019. The unconditional possibility of directly awarding public service contracts is allowed until 24 December 2023. After that date, the direct award procedure will only be allowed in limited and well-defined circumstances[110].
- 'Open access' from the 2021 timetable: Member States may limit rights of access only if the exercise of these rights would compromise the economic equilibrium of one or more PSCs.

Transposition

Rail Directives can only have their intended effects if they are completely and correctly transposed into Member States' national law by the deadlines and effectively applied thereafter. The European Commission ensures the monitoring of the EU legislation's transposition.

Table 11 shows the status of transposition of rail Directives[111] at 31 December 2018.

Table 11: Status of transposition of Rail Directives, 31 December 2018

Directive	Number of countries which the EC considered had not (fully) transposed at 31 December 2018
2016/2370 (am. 2012/34) – Governance	21
2016/882 (am. 2007/59) – Language requirements	1
2012/34 – Single European railway area	1

Source: DG MOVE, 2020.

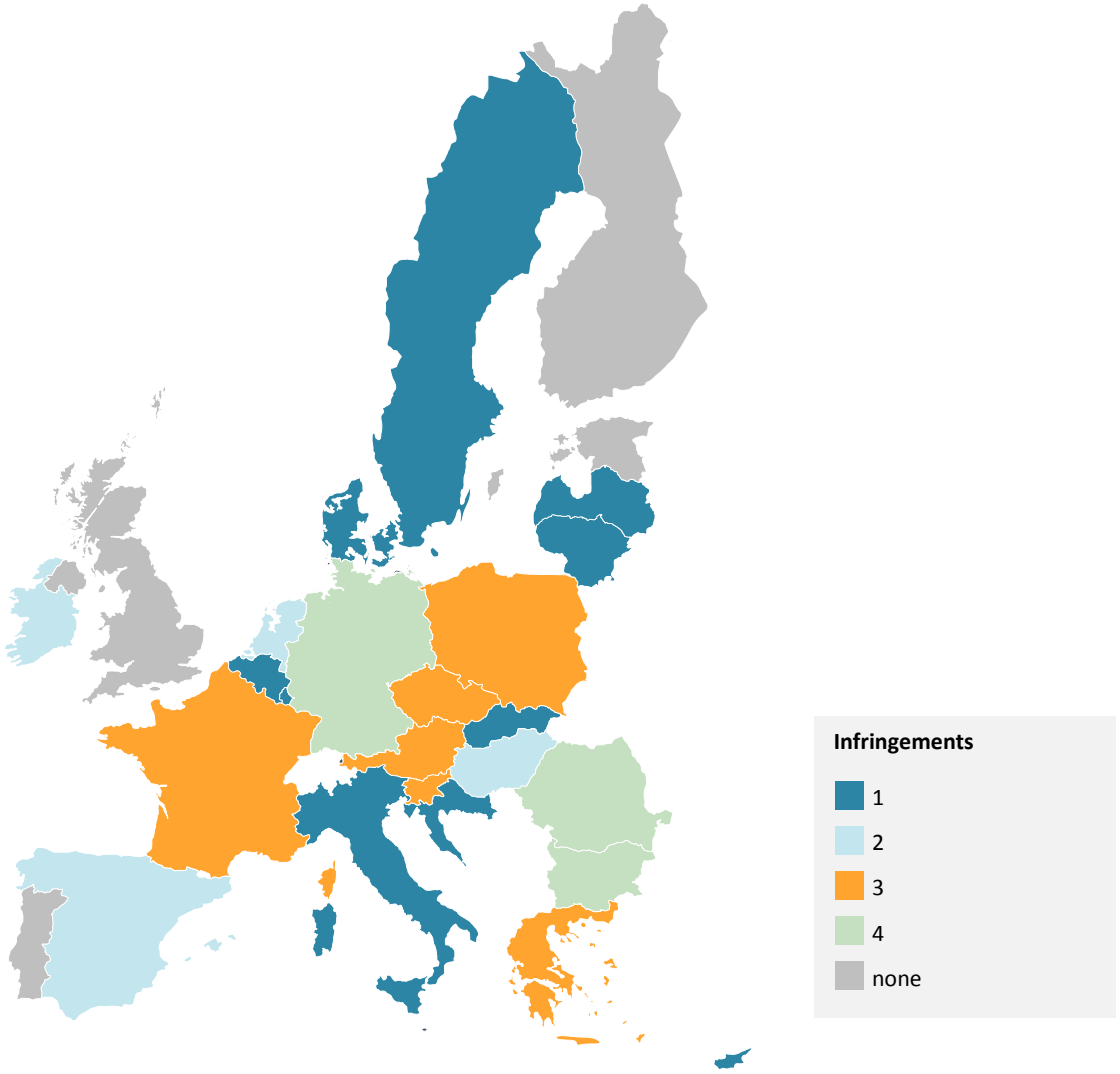
[110] https://ec.europa.eu/transport/sites/transport/files/workshops/2018-pso-workshop-proceedings.pdf

[111] The deadline for the transposition of Directive 2016/2370 was 25 December 2018. For the two directives of the Fourth package technical pillar (2016/0797- Safety and 2016/0798 - interoperability) the deadline for transposition was 16 June 2019 at the earliest so they were not relevant to consider in the table.

Infringements

Figure 53 shows the number of pending infringement proceedings in the field of rail transport at 31 July 2019 (non-communication, non-conformity or incorrect application cases).

Figure 53: Pending infringement proceedings in the field of rail transport, 31 July 2019



Source: DG MOVE, 2020.

5.2 Licensing of railway undertakings

A railway licence is an authorisation issued to an undertaking by a licensing authority recognising its capacity to provide rail transport services as a railway undertaking.

Licensing of railway undertakings is regulated by Articles 16 to 25 of Directive 2012/34/EU, which ensure that access rights to railway infrastructure are applied throughout the EU in a uniform and non-discriminatory manner.

A licence may cover passenger, freight or traction services and is valid throughout the EU, as long as the railway undertaking fulfils all the obligations laid down in European legislation.

To further facilitate access to the market by new operators, the Commission adopted the implementing Regulation (EU) 2015/171 on certain aspects of the licensing procedure. This reduced the administrative fees for start-up railway undertakings and shortened the time to market.

According to Directive 2012/34/EU, the Implementing Regulation and the relevant national legislation, information on the licences for the performance of rail transport services within the EU and the European Economic Area must be communicated by national licensing authorities to the European Union Agency for Railways (ERA) through a common template available in all EU languages and therefore made publicly available on the European Railway Agency Database of Interoperability and Safety (ERADIS[112]).

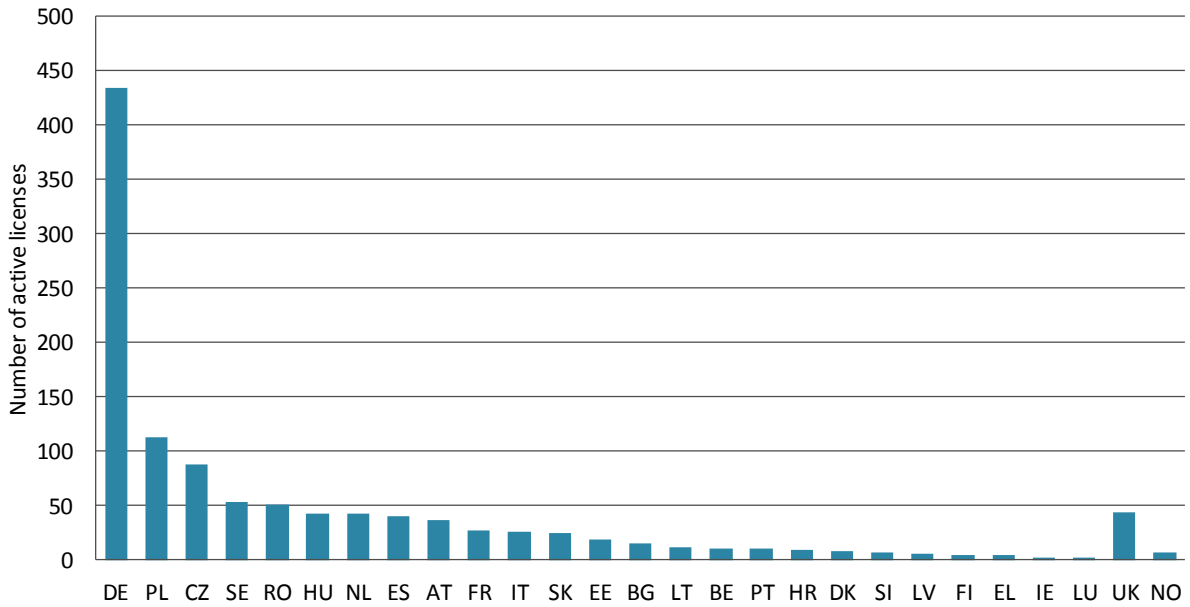
5.2.1 Active licences

Licences of railway undertakings can be active or passive:

- **Active licence:** a licence granted to a railway undertaking that has ***started*** and ***not ceased*** operations within the periods fixed by the Member State in accordance with Article 24(4) of Directive 2012/34/EU.
- **Passive licence:** a licence granted to a railway undertaking that has ***not started*** or has ***ceased*** operations within the periods fixed by the Member State in accordance with Article 24(4) of Directive 2012/34/EU, and licences which have been suspended or revoked.

The number of active licences reported in the RMMS is showed in Figure 54.

Figure 54: Number of active railway licences per country (2018)



Source: RMMS, 2020.

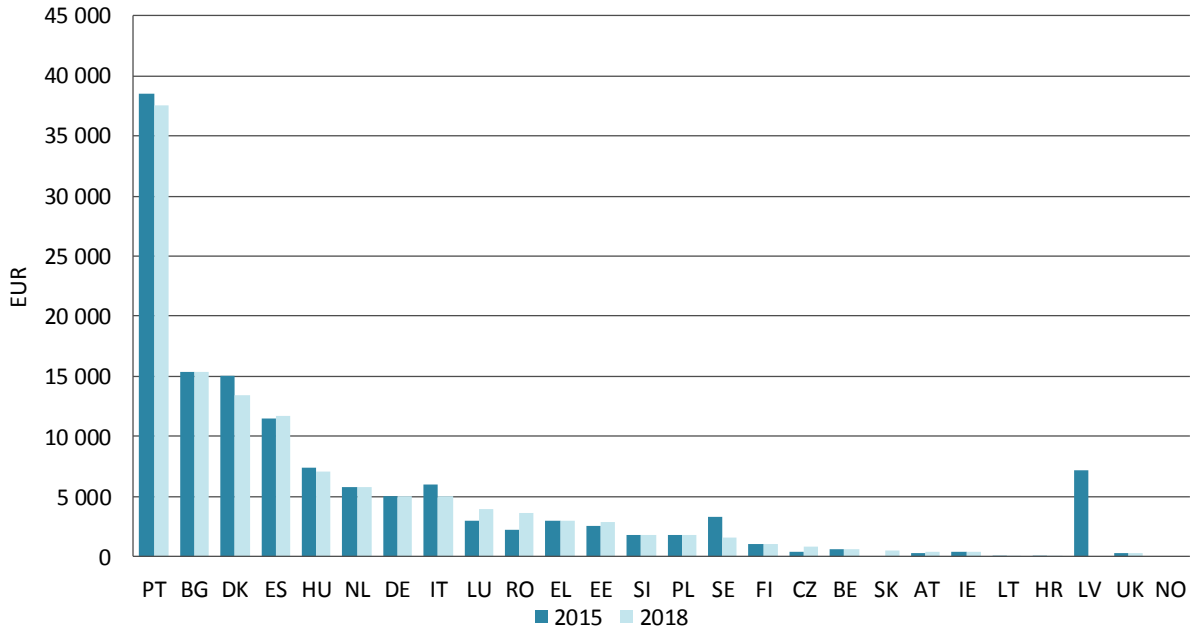
[112] Available at https://eradis.era.europa.eu/.

Overall 1 082 active licences were reported in the EU27 in 2018 (1 126 in EU28). Germany reported the highest number of licensed railway undertakings (434), together with Poland (113) and Czechia (88). Ireland and Luxembourg reported the lowest number of active licences (2).

5.2.2 Average fee to obtain a licence

Figure 55 shows the reported average fees to obtain a licence in 2015 and 2018 in each country.

Figure 55: Average fee to obtain a licence by country (EUR, 2015 and 2018)



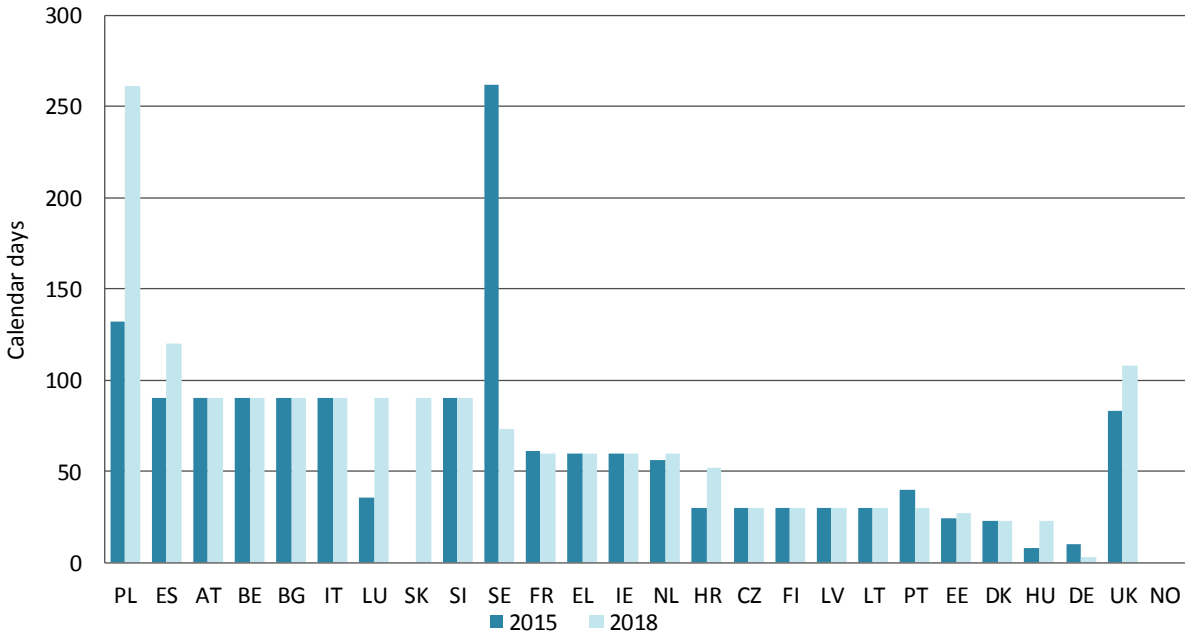
Source: RMMS, 2020. FR and NO reported that licence costs are zero. In LV the charge is a state duty, not a licence fee. SK 2015 not available.

Portugal reported the highest fee level for 2018 (EUR 37 500) followed by Bulgaria and Denmark, whereas Croatia reported the lowest fee (EUR 5) and in France and Norway licences appear to be obtained for free. Fees significantly increased between 2015 and 2018 in Romania, Luxembourg and Czechia, whereas Sweden reported a significant decrease. In Latvia, the payment is a state duty rather than a licence fee.

5.2.3 Average time to obtain a licence

Figure 56 shows the reported average number of calendar days to obtain a licence in 2015 and 2018 in different countries.

Figure 56: Average time to obtain a licence by country (calendar days, 2015 and 2018)



Source: RMMS, 2020. SK 2015 and RO 2018 not available.

Many countries reported an average time to obtain a licence of 90, 60 or 30 calendar days (3 months, 2 months or a month). Poland reported the longest average time for 2018 (261 days), followed by Spain (120) and the United Kingdom (108). In Germany, the reported average time to obtain a licence was only 3 calendar days. Remarkable changes over the surveyed period are visible in Poland, Spain. Luxembourg, Croatia and United Kingdom (major increases) and in Sweden (major decrease).

5.3 Charging principles for the infrastructure

Infrastructure managers recover the cost related to the provision of infrastructure for train operations with infrastructure charges. The basic principle is that the charges should cover at least the 'direct' costs of the train run, referring to the costs incurred by a train run over the network, i.e. the costs of the interaction of train and infrastructure.

To incentivise the optimal use of their infrastructure, infrastructure managers can additionally apply other charging components:

- to improve environmental performance, charges can reflect noise emissions or the usage of diesel/electric locomotives;
- an effective use of infrastructure capacity can be incentivised through mechanisms such as a scarcity charge, a reservation charge or discounts to specific traffic flows;
- the costs of specific investment projects can be recovered by charges based on long-term costs; and
- a performance scheme can enhance operational performance through penalties/rewards linked to the occurrence/avoidance of service disruptions, applicable to both railway undertakings and infrastructure managers.

In addition, Member States may make provision for mark-ups to be applied on top of the direct cost charges in market segments that are able to pay such higher charges. Nevertheless, market segments that can at least pay the direct costs and a rate of return must not be excluded from the use of the rail infrastructure. The overall level of cost recovery through infrastructure charges is interdependent with the level of government contribution; Member States may require different levels of cost recovery.

Currently the RMMS does not allow the possibility to distinguish between the various charging elements used by each Member State. Therefore, while comparing the level of charges reported by Member States, the results need to be interpreted with caution.

Box 7: Electricity charging

Electricity charging or the charging of track current is not directly regulated by Directive 2012/34/EU or Commission Implementing Regulation (EU) 2015/909. Electricity charging is dealt with under the Electricity Directive[113] and the Electricity Regulation[114].

Regulation (EU) 2015/909[115] focuses on mechanical wear and tear, i.e. of the interaction of the train with the rail infrastructure. It gives guidance on the calculation of the costs directly incurred by the train run and therefore does not focus on charging energy consumption or on charges for the use of electric supply equipment. Such equipment, like cables or transformers, is generally not subject to wear and tear from the operation of the train service. Under this Regulation, therefore, the costs of electric supply equipment are not to be considered in the calculation of costs directly incurred by the operation of a train service. The Regulation also does not discriminate based on how trains are powered.

Box 8: Energy metering

Electrical traction energy constitutes one of the key variable cost elements for railway undertakings, influencing the competitiveness of rail. However, in many Member States, infrastructure managers or, if relevant, energy suppliers are not able to invoice the electrical traction energy based on measured consumption, as they do not have the actual data. As a result, many railway undertakings are charged based on rough estimates and have little incentive to reduce their consumption.

To make energy invoicing based on measured consumption, railway undertakings should install energy meters on board their electric traction units. Such meters are already mandatory on all new, renewed and upgraded electric traction units; however, most of the existing rolling stock does not have such meters yet. The aim should be to retrofit those electric traction units with the energy meters as quickly as possible in order to reap full benefits of energy invoicing-based or measured consumption.

Member States should make sure that there is an operational settlement system in place taking into account the relevant legislation concerning the energy market and able to allocate the measured energy consumption to the correct railway undertaking. According to Regulation (EU) 1302/2014[116] (ENE-TSI,

[113] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, OJ L 158, 14.6.2019, p. 125–199.

[114] Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity, OJ L 158, 14.6.2019, p. 54–124.

[115] Commission Implementing Regulation (EU) 2015/909 of 12 June 2015 on the modalities for the calculation of the cost that is directly incurred as a result of operating the train service, C/2015/3766, OJ L 148, 13.6.2015, p. 17–22.

[116] Commission Regulation (EU) No 1302/2014 of 18 November 2014 concerning a technical specification for interoperability relating to the rolling stock — locomotives and passenger rolling stock subsystem of the rail system in the European Union. Consolidated version available here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02014R1302-20200311.

Technical Specification for Interoperability, subsystem energy) there is an obligation to do this by July 2020. By 2022, Member States should also ensure that a data collection system able to collect data coming from the on-board meters is established.

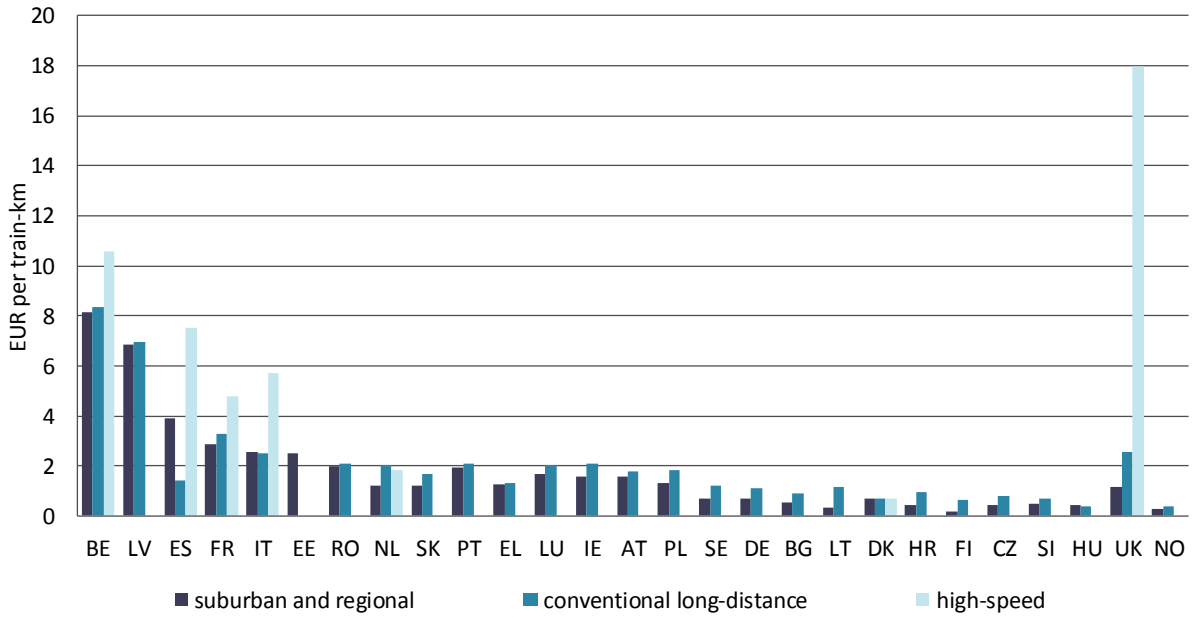
Infrastructure managers and railway undertakings have undertaken to comply with the deadlines provided in the ENE-TSI in a sector declaration.

5.4 Access charges for different categories of passenger trains

As explained in paragraph 5.3, the RMMS does not allow the possibility to distinguish between the various elements of charging applied across infrastructure managers and Member States. Therefore, while comparing the level of charges as reported in the following pages, the results need to be interpreted with caution.

Figure 57 compares estimates of typical access charges (excluding mark-ups) per country in 2018, measured in EUR per train kilometre, for three different types of passenger trains.

Figure 57: Access charges (excluding markups) for different categories of passenger trains, by country (EUR per train-km, 2018)

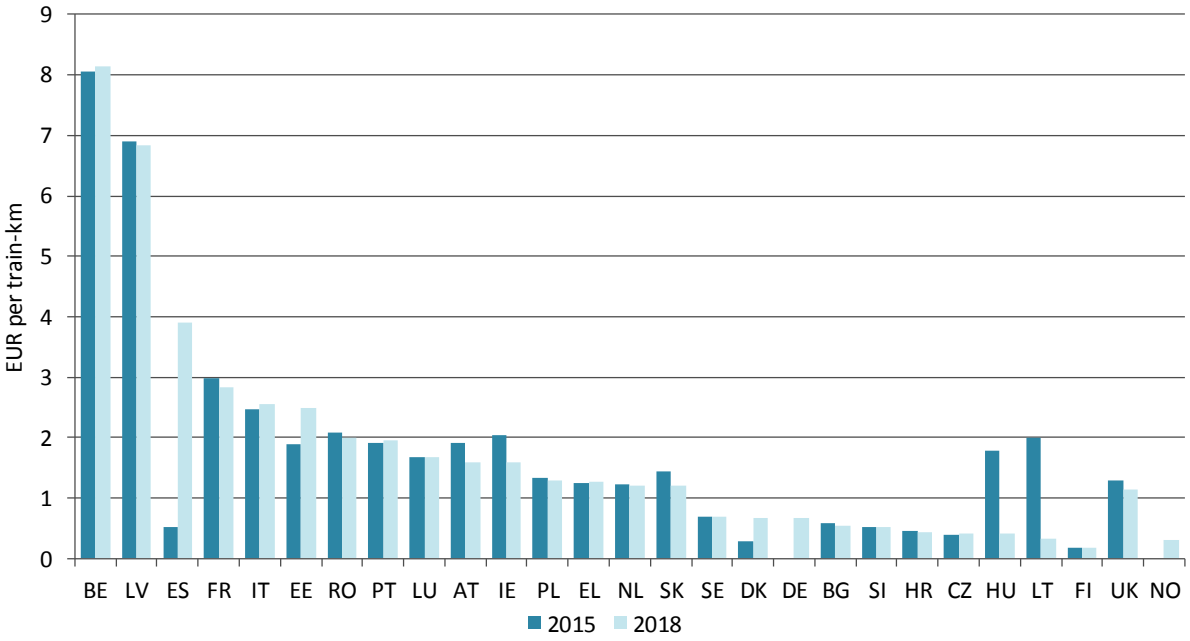


Source: RMMS, 2020.

Overall, Belgium appears to have the highest level of track access charges in 2018, while Hungary appears to have the lowest. Exceptionally high track access charges appear to be applied for high-speed passenger services in the United Kingdom.

Figure 58 shows access charges (excluding mark-ups) for suburban and regional passenger trains per country for 2015 and 2018, measured in EUR per train kilometre.

Figure 58: Access charges (excluding mark-ups) for suburban and regional passenger trains by country, (EUR per train-km, 2015 and 2018)

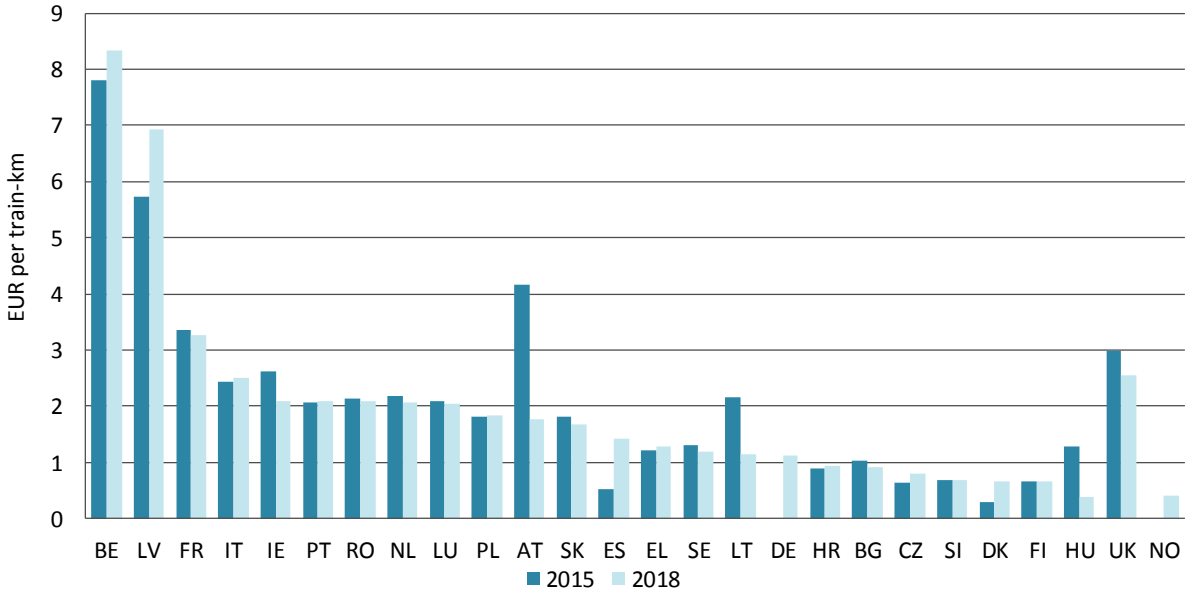


Source: RMMS, 2020. DE, NO 2015 not available. EL, HU 2015 estimated.

The figure shows how charges have changed in several Member States, most notably in Spain and Denmark (increasing) and Hungary and Lithuania (decreasing).

Figure 59 shows access charges (excluding mark-ups) for conventional long-distance passenger trains per country for 2015 and 2018, measured in EUR per train kilometre.

Figure 59: Access charges (excluding mark-ups) for conventional long-distance passenger trains by country, (EUR per train-km, 2015 and 2018)

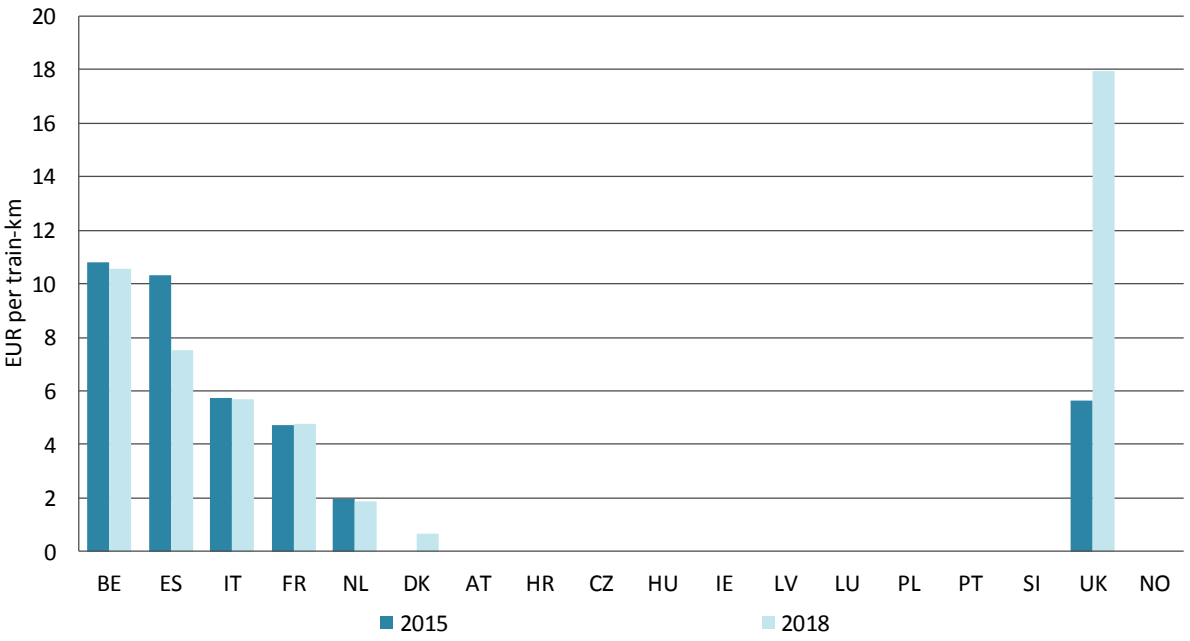


Source: RMMS, 2020. DE, NO 2015 not available. EL, HU 2015 estimated.

The figure shows how charges have changed in several Member States, most notably Latvia, Spain and Denmark (increasing) and Austria, Lithuania, and Hungary (decreasing).

Figure 60 shows access charges (excluding mark-ups) for high-speed passenger trains per country for 2015 and 2018, measured in EUR per train kilometre[117]. Track access charges for high-speed rail (excluding mark-ups) were higher than other passenger charges, reaching in 2018 a maximum in the United Kingdom (EUR 18) and in Belgium (EUR 10.6 per train kilometre).

Figure 60: Access charges (excluding mark-ups) for high-speed passenger trains by country (EUR per train-km, 2015 and 2018)



Source: RMMS, 2020. NL 2015 estimated.

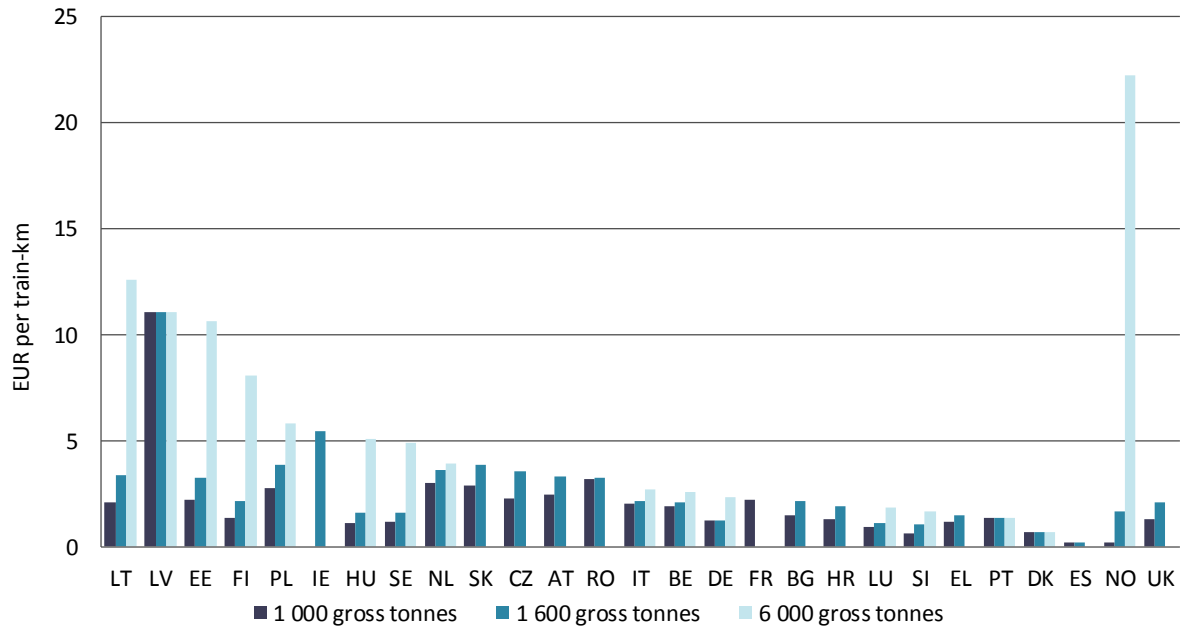
The figure shows how charges have changed, most notably in Spain (decreasing) and the United Kingdom (increasing).

[117] The RMMS asks more precisely for track access charge, excluding mark-ups, for 'passenger trains providing high-speed services on dedicated high-speed lines'.

5.5 Access charges for different categories of freight trains

Figure 61 compares estimates of typical access charges (excluding mark-ups) per country in 2018, measured in EUR per train kilometre, for freight trains of three different maximum gross tonnages.

Figure 61: Access charges (excluding mark-ups) for different categories of freight trains, by country (EUR per train-km, 2018)



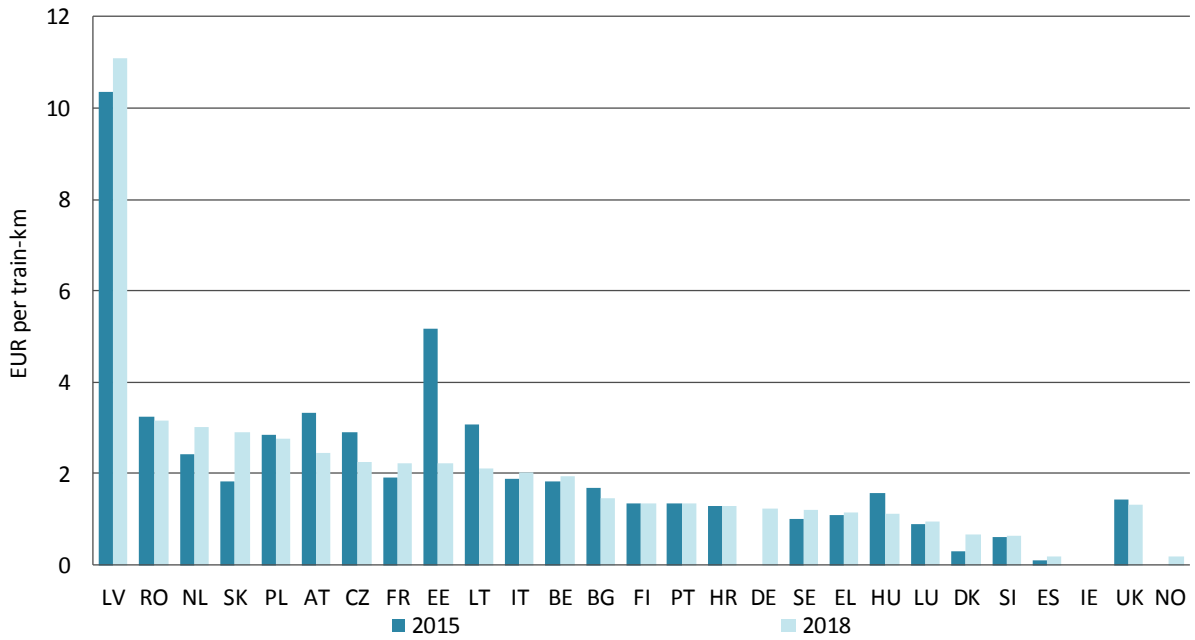
Source: RMMS, 2020.

Overall, highest track access charges are achieved in the Baltic States. Unusually high track access charges are achieved for 6 000 gross tonne freight trains in Norway[118].

[118] Average track access charges for the 6 000 gross tonne freight category can be influenced from the tonnage of trains running the network, which can be significantly higher than 6 000 gross tonne (ex. in Norway for example where full load trains up to 8 500 gross tonne can run through the network).

Figure 62 shows access charges (excluding mark-ups) for 1 000 gross tonne freight trains per country for 2015 and 2018, measured in EUR per train kilometre.

Figure 62: Access charges (excluding mark-ups) for 1 000 tonne freight trains by country (EUR per train-km, 2015 and 2018)

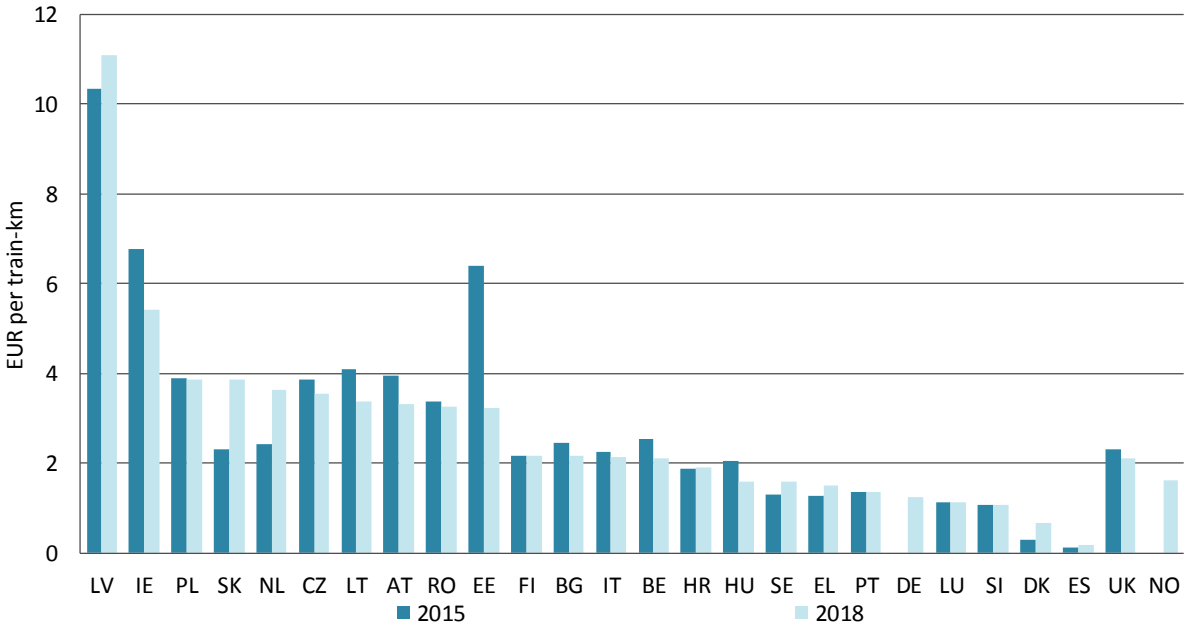


Source: RMMS, 2020. HU 2015 estimated. DE, NO 2015 not available.

The figure shows how charges have changed in several Member States, most notably Denmark and Slovakia (increasing) and Estonia and Lithuania (decreasing).

Figure 63 shows access charges (excluding mark-ups) for 1 600 gross tonne freight trains per country for 2015 and 2018, measured in EUR per train kilometre.

Figure 63: Access charges (excluding mark-ups) for 1 600 tonne freight trains by country (EUR per train-km, 2015 and 2018)

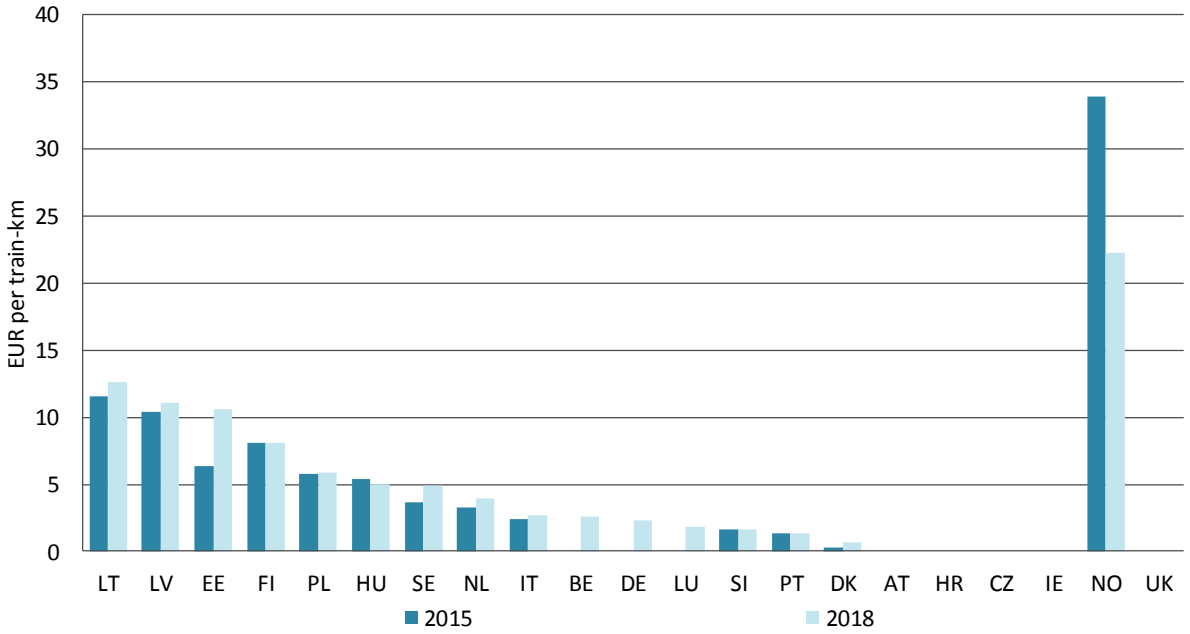


Source: RMMS, 2020. LU, HU 2015 estimated. DE, NO 2015 not available, FR 2018 not available.

The figure shows how charges have changed in several Member States, most notably Denmark and Slovakia (increasing) and Estonia (decreasing).

Figure 64 shows access charges (excluding mark-ups) for 6 000 gross tonne freight trains per country for 2015 and 2018, measured in EUR per train kilometre.

Figure 64: Access charges (excluding mark-ups) for 6 000 tonne freight trains by country (EUR per train-km, 2015 and 2018)



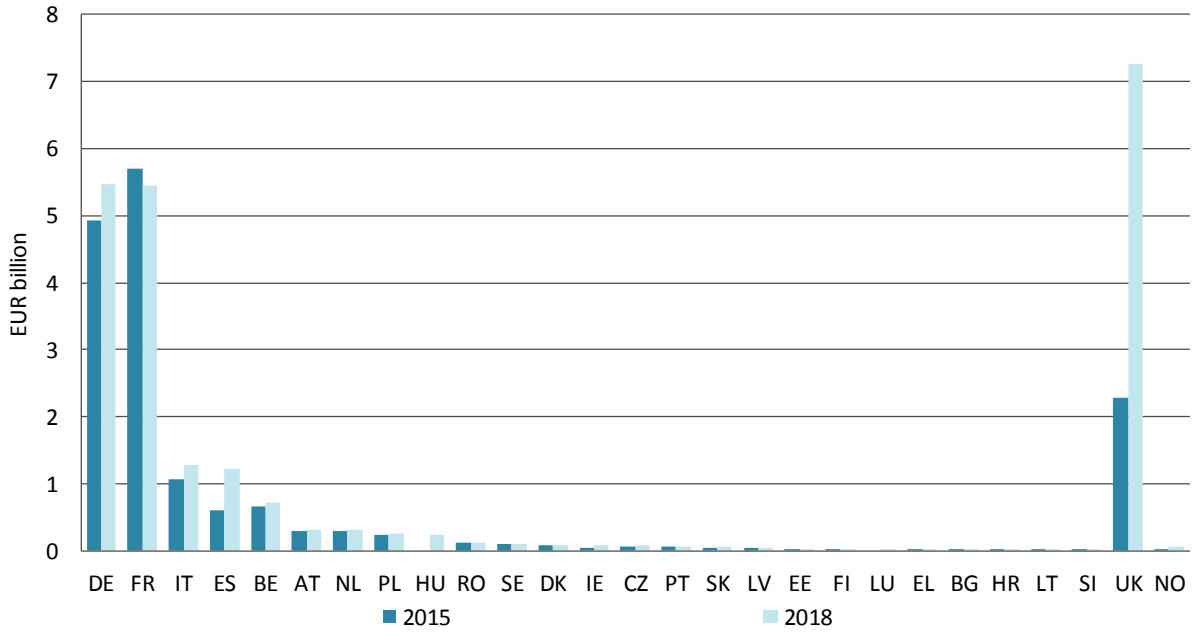
Source: RMMS, 2020. HU 2015: estimate, BE, DE, LU 2015 not available, FR 2018 not available.

The figure shows how charges have changed in several Member States, most notably Estonia and Denmark (increasing) and Norway (decreasing).

5.6 Infrastructure managers' revenue calculated for passenger and freight trains

Figure 65 shows the infrastructure managers' reported revenues from passenger trains through track access charges, station charges and other charges per country for 2015 and 2018. In the RMMS, only charges collected by the infrastructure managers need to be reported. These therefore include charges for station facilities only if owned or managed by infrastructure managers.

Figure 65: Infrastructure managers' revenue earned from charges (TACs, station charges and other charges) paid by passenger trains, per country (EUR billion, 2015 and 2018)



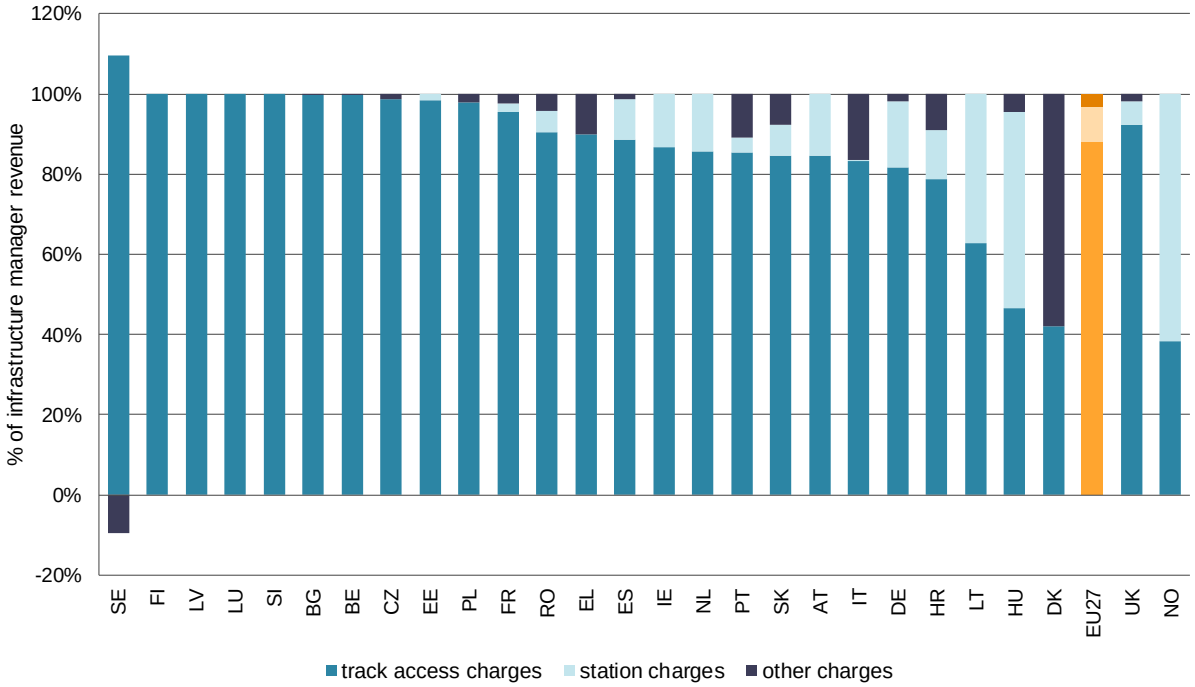
Source: RMMS, 2020. LU 2018 adjusted, Revenues from TACs not available for HU and LU 2015, Revenues from station charges not available for BG, CZ, EL, FI, LV, PT and RO for both years.

Overall, the highest revenues passenger services' charges in 2018 were achieved in Germany, France and the United Kingdom. The lowest revenues (almost zero) in Slovenia[119].

[119] PSO trains are exempted from paying track access charges in Slovenia.

Figure 66 shows the infrastructure managers' share of track access, station and other charges in total revenues from passenger trains per country in 2018.

Figure 66: Proportion of infrastructure managers' revenue earned from TACs, station charges and other charges on total charges paid by passenger trains, per country (% in 2018)

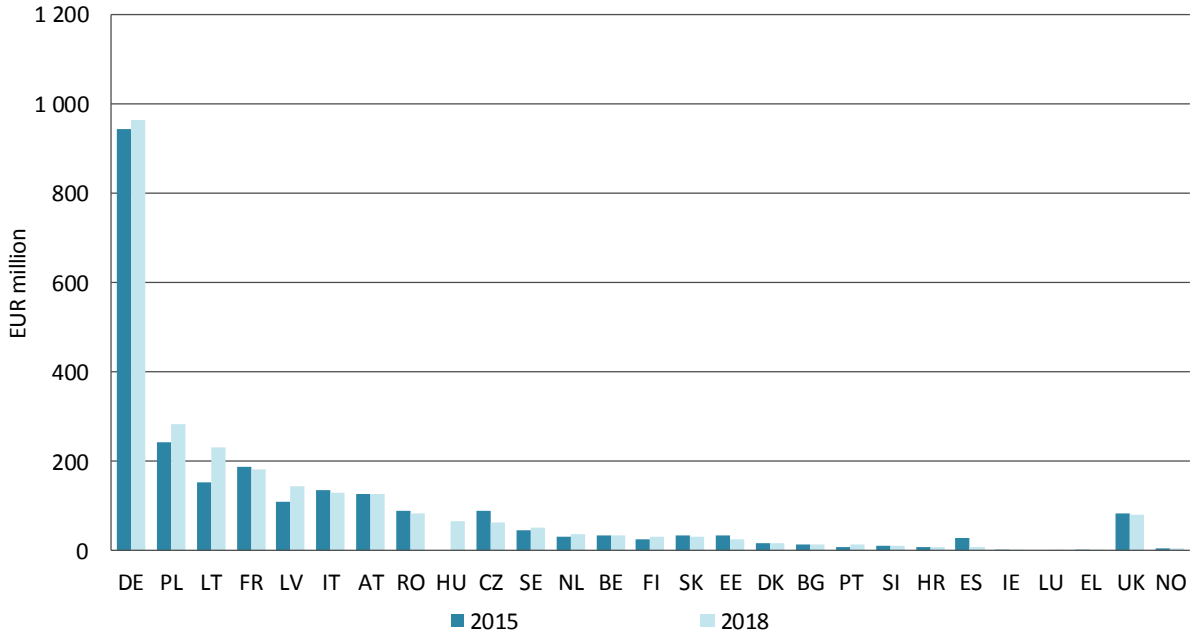


Source: RMMS, 2020. LU 2018 adjusted, SE reports consolidated figures for TACs and station charges, so it is not possible to represent their respective weight on the total charges.

In 2018, track access charges represented on average 88% of the infrastructure managers' revenues from passenger trains in the EU27 (89% in EU28). Norway reported the lowest share of track access charges on total infrastructure managers' revenues from passenger services (38%). Station charges can make up to 49% of the total, as reported by Hungary. Sweden reported negative revenues from other charges due to quality fees paid by the infrastructure manager.

Figure 67 shows infrastructure managers' reported revenues from freight trains through track access charges, freight terminals charges and other charges per country for 2015 and 2018. In the RMMS, only charges collected by the infrastructure managers need to be reported. These therefore include charges for freight terminals only if owned or managed by infrastructure managers.

Figure 67: Infrastructure managers' revenue earned from charges (TACs, freight terminals charges and other charges) paid by freight trains, per country (EUR million, 2015 and 2018)

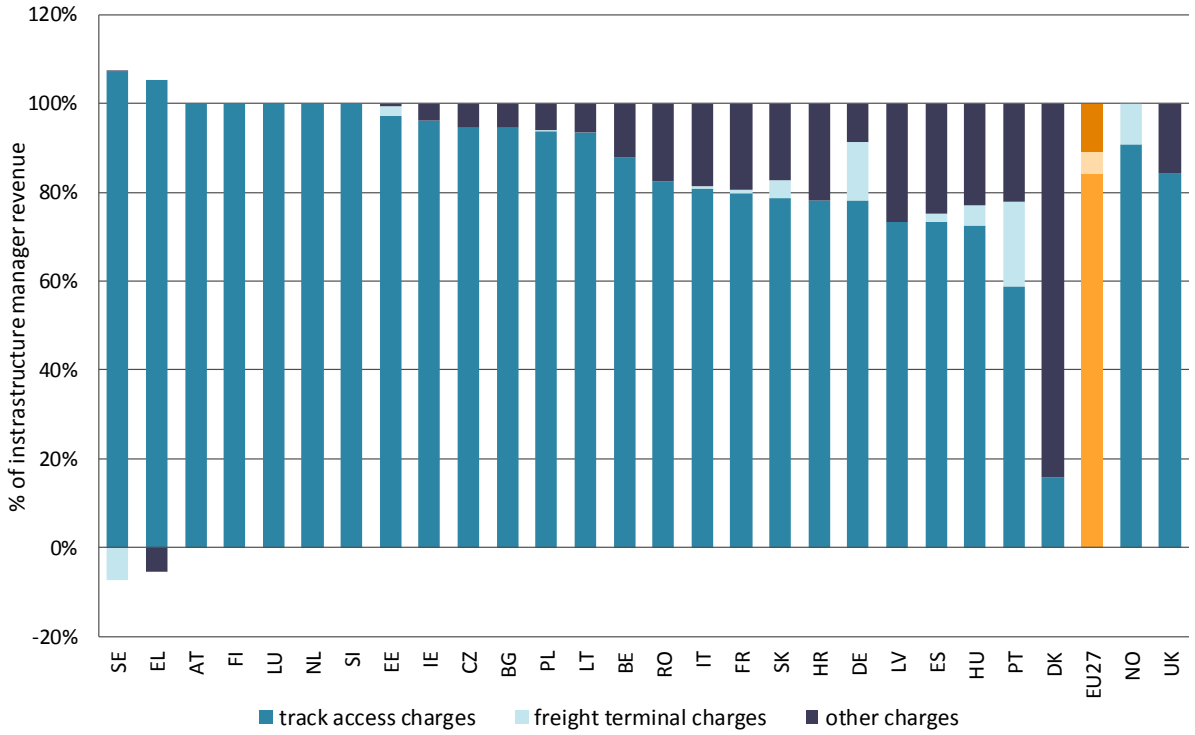


Source: RMMS, 2020. Revenues from TACs not available for HU and LU 2015, Revenues from freight terminals not available for BG, EL, ES, NO and PT for both years and for HU and EE (only 2015).

Germany reported the highest revenues of infrastructure managers from freight services in 2018, while Greece reported the lowest revenues.

Figure 68 shows infrastructure managers' share of track access, freight terminals and other charges in total revenues from freight trains per country in 2018.

Figure 68: Proportion of infrastructure managers' revenue earned from TACs, freight terminals charges and other charges on total charges paid by freight trains, per country (%, 2018)

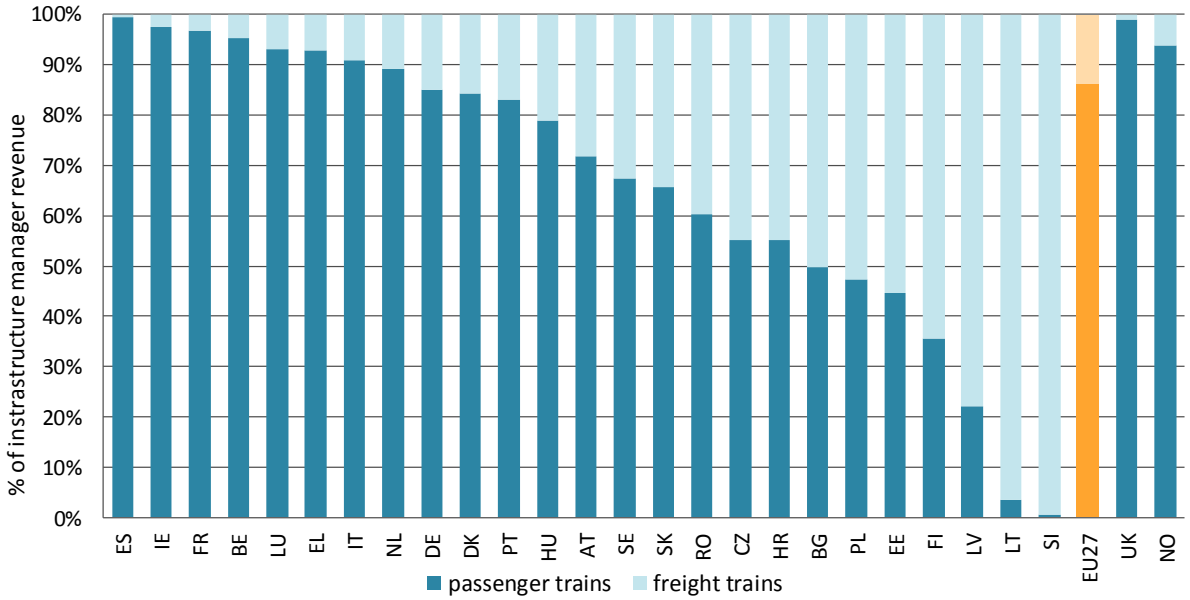


Source: RMMS, 2020. LU 2018 adjusted, Revenues from TACs not available for HU and LU 2015, Revenues from freight terminals not available for BG, EL, ES, NO and PT for both years and for HU and EE (only 2015).

In 2018, track access charges represented on average 84% of the infrastructure managers' revenues from freight trains in the EU27 (same as in EU28). Denmark reported the lowest share of track access charges on total revenues of infrastructure managers from freight services (16%). Freight terminal charges can make up to 19% of the total as reported by Portugal. Sweden reported negative revenue from freight terminal charges, and Greece reported negative revenue from other charges.

Figure 69 shows the share of passenger and freight charges in total revenues of infrastructure managers' revenues from trains per country in 2018.

Figure 69: Share of passenger and freight charges on infrastructure managers' total revenues earned from trains, per country (% in 2018)



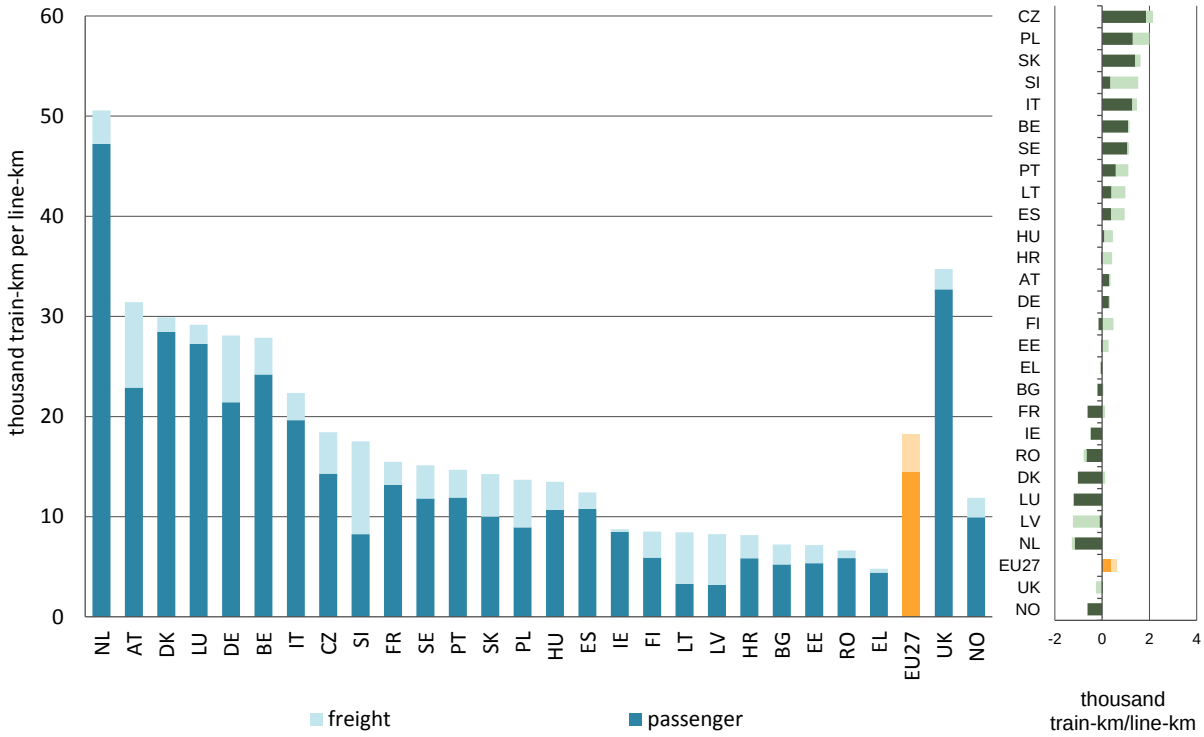
Source: RMMS, 2020.

In 2018, passenger services represented on average 86% of the total revenues of infrastructure managers from trains in the EU27 (90% in EU28). Spain reported the highest share (99%), Slovenia the lowest (1%).

5.7 Capacity allocation and congestion

The capacity of railway networks to accommodate trains to carry passengers or freight is not the same everywhere in the European Union. Some networks (or parts of networks) have a limited capacity available for further traffic, whereas others are underused. Figure 70 shows the reported average network utilisation separately for passenger and freight trains measured in train kilometres per line kilometre in 2018 per country, as well as the evolution compared to 2015. Despite the fact that these broad national averages say nothing about the emptiest parts of the network, they can provide some indications about which networks are on average busier than others.

Figure 70: Network utilisation per country (thousand train-km per line-km, 2018) and evolution (2015-2018)



Source: RMMS, 2020, Statistical pocketbook, 2020. RO 2015 and 2016 estimated; Infill data from various other sources and estimates.

In 2018, the EU27 network had an intensity of use of 18.2 thousand train kilometres per line kilometre (19.5 for EU28). The most intensively used networks in 2018 were those of western Europe, in particular in the Netherlands, with an intensity of use of 50.6 thousand train kilometres per line kilometre. Greece appears to have the lowest intensity of use with only 4.8 thousand train kilometres per line kilometre. In terms of segments, 80% of the intensity of use was due to passenger trains (14.5 thousand train kilometres per line kilometre).

Overall, the intensity of use of the network increased slightly by 0.6 thousand train kilometres per line kilometre between 2015 and 2018 (a broadly equal increase in both the EU27 and EU28). Based on RMMS data, Czechia reported the highest increase over the period (+2.2 thousand train kilometres per line kilometre) and the Netherlands the largest decrease (-1.3 thousand train kilometres per line kilometre).

5.7.1 Allocating capacity

Successful and rejected path allocations for scheduled and ad hoc train paths

Timetables structure and organise the use of railway infrastructure in the form of 'train paths': train paths determine the train (by number), the time of use and the individual trajectory of the train. The

basis for building timetables are path requests by railway undertakings and other applicants[120]. With this, infrastructure managers create a usage plan, i.e. the timetable, which reconciles all path requests in the best possible way, given the available infrastructure capacity. Path requests can be either submitted under the yearly working timetable (designed for planned traffic and on a more long-term basis) and as ad hoc requests for spot traffic at shorter notice. Path allocation requests may be accepted or rejected by an infrastructure manager to resolve conflicting applications for infrastructure capacity.

Member States are required to follow the path coordination processes set out in Article 46(1) of Directive 2012/34/EU. Annex VII to the same Directive[121] specifies a mandatory timeline for establishing the yearly timetable and introduces coordination and consultation processes between infrastructure managers and applicants.

Despite EU path coordination rules having been in place for a long time, the timetabling procedures have evolved nationally and lack Europe-wide harmonisation, which creates barriers for a smooth cross-border traffic.

Further to this, the current timetabling process does not really fit the business model of rail freight in particular. A significant part of the demand is volatile and cannot be planned long in advance, so ad hoc requests for train paths are in principle the most appropriate method to accommodate capacity needs. However, rail freight path requests are also made within the annual timetable process (**scheduled paths**), to avoid the risk of not receiving **ad hoc train paths** of suitable quality (or even none at all) at a later stage.

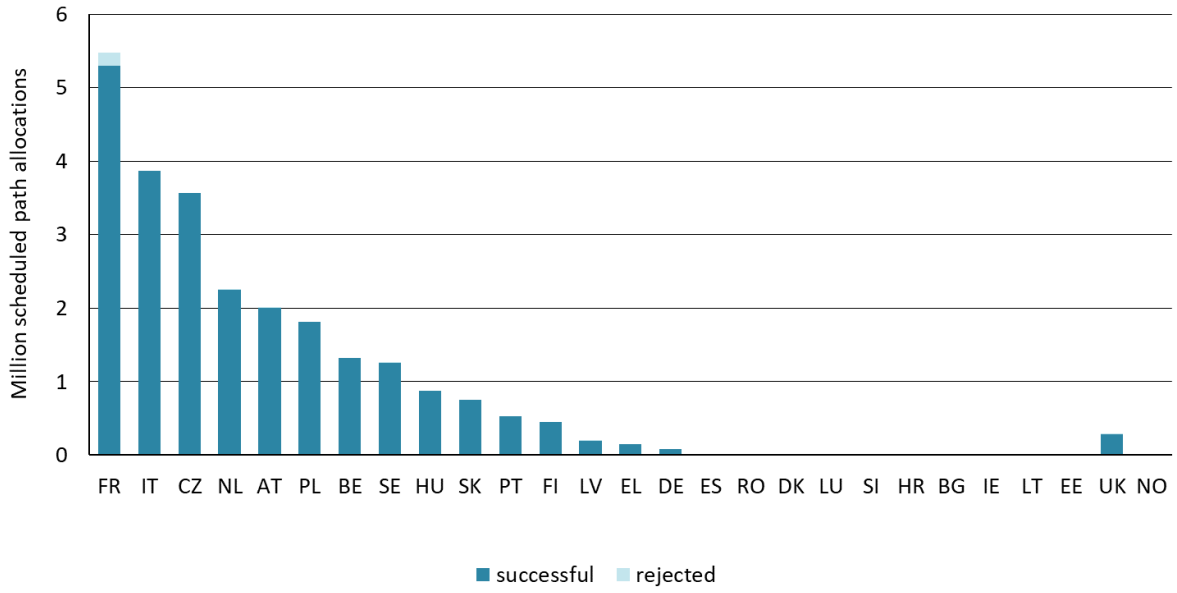
This often leads to suboptimal ordering behaviour and thus to a suboptimal management of infrastructure capacity, resulting in a waste of resources. In fact, train paths often need to be modified or even cancelled at a later stage, when the actual capacity needs materialise.

[120] In addition to railway undertakings, the term 'applicants' includes other persons or legal entities with an interest in procuring infrastructure capacity, such as shippers, freight forwarders or combined transport operators.

[121] As replaced by Commission Delegated Decision (EU) 2017/2075 of 4 September 2017 replacing Annex VII to Directive 2012/34/EU of the European Parliament and of the Council establishing a single European railway area (https://eur-lex.europa.eu/eli/dec_del/2017/2075/oj).

Figure 71 shows the reported number of successful and rejected scheduled path allocation[122] in 2018 per country.

Figure 71: Successful and rejected path allocations for scheduled path allocations per country (million path allocations, 2018)



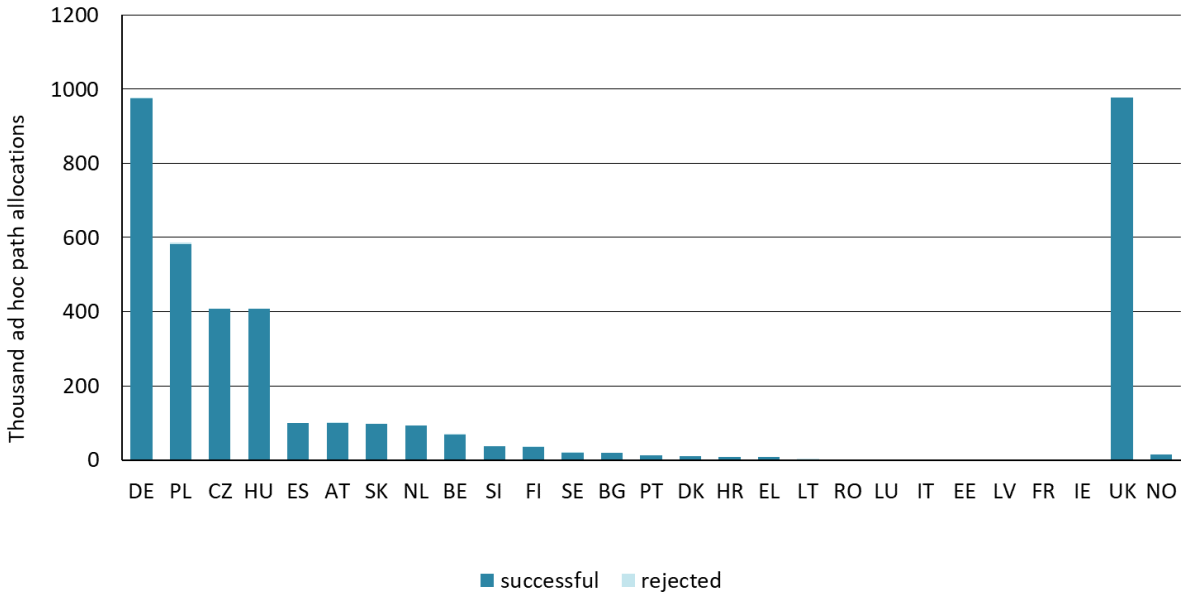
Source: RMMS, 2020.

According to RMMS data, 24.4 million path allocations were successfully scheduled in 2018 in the EU27 (24.7 in E28) and just 0.2 million rejected.

Similarly for ad hoc path allocation (shown in Figure 72), about 3 million ad hoc paths were successfully allocated in the EU27 (about 4 million in EU28), with just nine thousand rejected. Paths for freight services represented 72% of all ad hoc paths successfully allocated in EU27 (58% in EU28).

[122] The definition related to the count of path allocations still need to be refined in the RMMS, as shown for example by the striking difference between France and Germany in scheduled paths which have been allocated. These differences could depend, for example, on how daily paths have been recorded (as any of 1, 7, 28 or 365). The section on capacity allocation in the RMMS questionnaire will be reviewed when Regulation 2015/1100 is revised.

Figure 72: Successful and rejected path allocations for ad hoc path allocations per country (thousand path allocations, 2018)



Source: RMMS, 2020.

Framework agreements between infrastructure managers and railway undertakings

Article 42 of Directive 2012/34/EU allows the conclusions of framework agreements for the use of the infrastructure for longer than one working timetable period. To provide railway undertakings and new entrants with fair access to the railway infrastructure and to optimise the use of infrastructure, the Commission adopted in 2016 Implementing Regulation 2016/545[123] on procedures and criteria relating to framework agreements for the allocation of railway infrastructure.

At June 2020, framework agreements were applied by the infrastructure managers of Austria, Italy, Norway and the United Kingdom. Framework agreements will be used in Spain to open the domestic high-speed rail market[124] starting from the 2020-2021 timetable. To facilitate the access of new operators, the infrastructure manager ADIF opted to sign framework agreements for three high-speed packages (A, B and C) in which three complementary railway offers could coexist for the commercial high-speed services. These framework agreements have a duration of 10 years and any candidate remains able to request capacity independently from this procedure.

[123] Commission Implementing Regulation (EU) 2016/545 of 7 April 2016 on procedures and criteria concerning framework agreements for the allocation of rail infrastructure capacity (Text with EEA relevance) C/2016/1954, OJ L 94, 8.4.2016, p. 1–11.

[124] RENFE (revised decision https://www.cnmc.es/expedientes/stpdtsp01320), ILSA (https://www.cnmc.es/expedientes/stpdtsp01420) and Rielsfera (https://www.cnmc.es/expedientes/stpdtsp01520).

5.7.2 Managing capacity shortages

Infrastructure managers need to meet all capacity requests adequately in a fair and non-discriminatory manner and have to survey the usage of infrastructure capacity. Methods need to be developed to deal with any capacity constraints, enabling additional requests to be satisfied. Reasons for congestion and measures that are to be taken in the short and medium term need to be identified. If, after coordination and consultation, train path demand cannot be matched, the relevant section of infrastructure must be declared congested.

Sections and nodes declared congested

Congestion underlines the existence of infrastructure limitations not allowing all potential traffic to transit on the network.

Article 47 of Directive 2012/34/EU requires that infrastructure managers declare as 'congested' any infrastructure for which it has not been possible (or will soon not be possible) to satisfy requests for infrastructure capacity. The RMMS surveys both tracks and nodes that have been declared congested by infrastructure managers in each country according to Article 47[125].

Figure 73 shows the trends in the total length of track declared congested over the period 2012 to 2018 in the EU27. The congested tracks belonging to rail freight corridors, which are already included in the total congested tracks, are also reported separately in the chart for more clarity.

Figure 73: Total length of track declared congested (total and freight corridors) (km, 2012-2018)



Source: RMMS, 2020.

The total length of track declared congested in the EU27 has constantly risen since 2015 and in 2018 has reached 2 261 kilometres (3 432 in EU28), including 1 339 kilometres of rail freight corridors. This represents more than twice the 2015 level of congested tracks, (almost the double for parts included in rail freight corridors).

[125] Tracks and nodes that, despite being almost saturated, have not been officially declared congested according to Article 47 are not covered by RMMS statistics.

Table 12 shows the distribution by country of total length of track declared congested over the period 2015-2018.

Table 12: Track declared to be congested (total including freight corridors) per country, (km, 2015-2018)

	2015	2016	2017	2018
AT	12	12	12	12
DE	507	681	731	731
DK	84	84	42	42
HU	0	58	58	0
IE	12	12	12	4
IT	163	387	152	240
LT	0	0	293	591
NO	71	71	150	171
PL	4	4	0	0
RO	260	363	346	329
SE			165	267
SI	0	0	0	45
UK	1 171	1 171	1 171	1 171

Source: RMMS, 2020.

The network with the greatest length of declared congested track is that of the United Kingdom, which accounted for 32.5% of total congested track in 2018. There is also extensive congestion in Germany, Italy and Romania, and a significant increase between 2017 and 2018 in Lithuania and Sweden.

Germany, Romania and Lithuania in particular were the countries reporting the highest number of kilometres of freight corridors congested (620, 320 and 309 respectively in 2018).

Between 2015 and 2018, no country declared any kilometre of a high-speed line as congested.

Table 13 shows the number of nodes declared congested according to Article 47.

Table 13: Nodes declared to be congested per country, (km, 2015-2018)

	2015	2016	2017	2018
DE	2	2	2	2
DK	1	1	1	1
EE	0	1	1	1
HU	0	2	2	0
IE	2	2	3	2
IT	0	1	0	0
LT	0	0	2	4
LV		2	0	0
NL	0	1	0	0
NO	2	2	2	2
PL	1	1	0	0
RO	9		2	1
SE	6	4	5	6
UK	1	1	1	1

Source: RMMS, 2020.

Sweden and Lithuania reported the highest number of nodes declared congested for 2018, 6 and 4 respectively.

Principles for dealing with congestion

After a section of infrastructure has been declared congested, a new capacity enhancement plan needs to be developed or an existing one needs to be applied. For a new plan, the infrastructure manager has to carry out a capacity analysis within 6 months, which results in the respective capacity enhancement plan within a further six months. Such plans have to display the reasons for the congestion, the likely future development of traffic, any constraints on infrastructure development as well as the options and costs for capacity enhancement, including likely changes to access charges. This forms the basis to take a decision to remediate the congestion. The users of the relevant congested infrastructure are to be consulted on the plan and its measures.

According to Article 31 of Directive 2012/34/EU, infrastructure managers may levy a charge which reflects the scarcity of capacity of the identifiable section of the infrastructure during periods of congestion. The declaration of congestion for the identified section of infrastructure is therefore a prerequisite for levying such a charge.

The infrastructure manager must cease levying any charges for the use of the relevant infrastructure if no capacity enhancement plan is produced or if no progress with the measures agreed in the plan is made. Otherwise, if the plan cannot be realised, or if the measures in the plan prove not to be viable, the infrastructure manager may continue to levy the charge in agreement with the regulatory body.

The infrastructure manager may also employ priority criteria to allocate infrastructure capacity, if scarcity charges are not levied, or have not achieved a change in traffic demand behaviour. The criteria need to reflect the importance of a service to society relative to any other service, which will consequently be excluded. The importance of transport services under public service requirements and of national or international rail freight have to be taken into consideration. Compensations to infrastructure managers for losses of revenues due to the capacity allocation to certain services may be granted, even including effects related to the exclusion of a service in another Member State. Procedures and criteria have to be described in the network statement.

Box 9: Reservation charges

Reservation charges are charges that infrastructure managers may apply for capacity that is allocated but not used. Infrastructure managers have the right (but are not obliged) to levy these charges if railway undertakings or applicants do not use the capacity they have ordered and have been allocated. Nevertheless, infrastructure managers are obliged to levy a reservation charge, in case of a regular failure of use. The aim of the charges is to incentivise efficient use of capacity.

The conditions on how the infrastructure managers impose these charges, including the criteria to determine the failure to use allocated capacity must be published in their network statement. This ensures a transparent, objective and non-discriminatory application of the charge. Any party, railway undertaking or applicant that orders paths and regularly fails to use them will have to pay the charge.

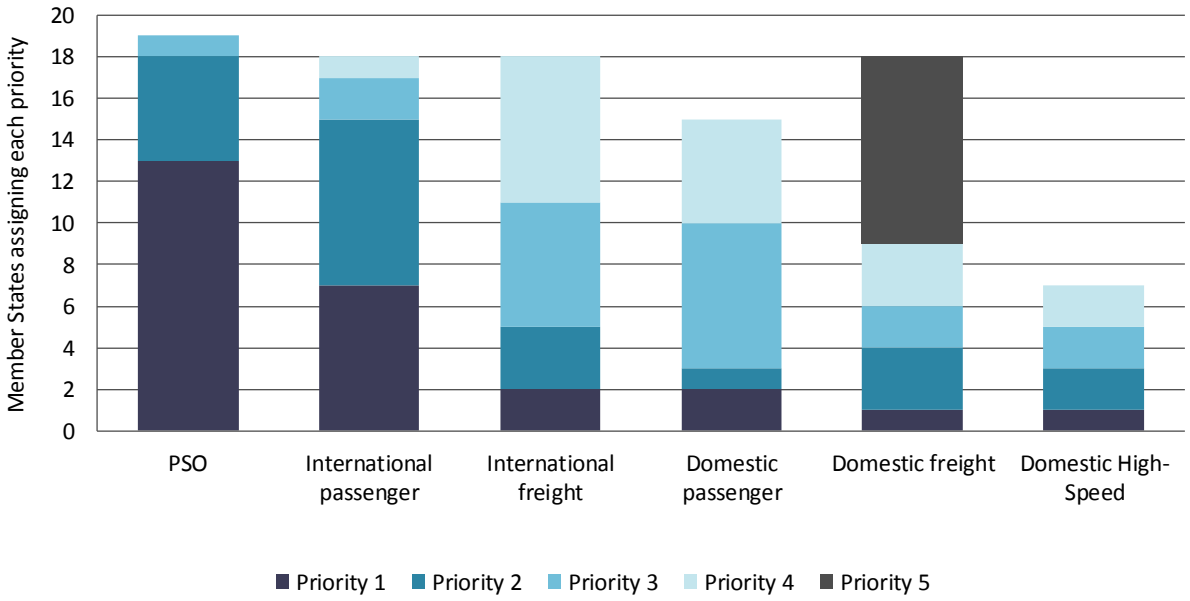
The topic of reservation charges and *force majeure* incidents has been tackled in the PRIME charges subgroup, a working group under the platform of European infrastructure managers. *Force majeure* incidents result in non-usage of allocated train paths, literally speaking after the incident has disrupted the train path. This is especially relevant for international trains that cross more than one network.

A conclusion of the subgroup is that, on a national scale, infrastructure managers do not levy reservation charges if rail traffic cannot be operated due to *force majeure* impacts. Nevertheless, the definition of what is *force majeure* differs from Member State to Member State.

Priority rules and priority services

Article 45 of Directive 2012/34/EU permits the infrastructure manager to give priority to specific services within the scheduling and coordination process, but only as set out in Articles 47 and 49 (congested and specialised infrastructure). Many infrastructure managers make use of priority rules, and the principal types of service given priority – as they have been reported in the RMMS – are summarised in Figure 74.

Figure 74: Principal types of services prioritised by infrastructure managers (number of MS assigning each priority, 2018)



Source: RMMS, 2020.

Passenger services under PSO appear to be given the highest priority in a significant number of countries (13) whereas international passenger services are given the highest priority in 7 countries. Interestingly, only 3 countries reported giving the highest priority to freight (2 to international and 1 to domestic freight services).

Capacity restrictions due to infrastructure works

Infrastructure works are necessary to develop and maintain railway infrastructure, but at the same time they restrict available infrastructure capacity. The impact of capacity restrictions on international rail freight traffic appears to be particularly severe. This is because infrastructure managers usually prioritise the much faster and more punctual passenger trains, which leaves limited access to rail infrastructure for freight trains.

EU legislation[126] lays down rules to ensure there is a predictable schedule for and at least some level of coordination of infrastructure works across Member States. The purpose is to limit the impact of

[126] In particular Article 12 of Regulation (EU) No 913/2010 of the European Parliament and of the Council of 22 September 2010 concerning a European rail network for competitive freight, OJ L 276, 20.10.2010, p. 22–32, and Annex VII point 8 of Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European railway area, OJ L 343, 14.12.2012, p. 32–77.

works on international rail traffic. Infrastructure works are subject to coordination rules, in particular along the rail freight corridors. However, coordination can only be effective if works are planned and executed in a timely manner.

The coordination of capacity restrictions across networks is challenging due to significant differences in the way infrastructure works are planned, financed and executed in different networks. Sound planning and execution of infrastructure works by infrastructure managers require a reliable financial framework and appropriate incentives to improve performance. As most infrastructure managers are dependent on public funding for at least part of maintenance and renewal expenditure, Member States have an important role to play.

EU legislation requires Member States to have contractual agreements[127] between their competent authorities and infrastructure managers, among other things to ensure sound financing of infrastructure works.

5.8 Rail transport services covered by public service contracts

The concept of *public service obligation* (PSO) is defined in Regulation (EC) 1370/2007. In the Regulation, a PSO is defined as a requirement defined or determined by a competent authority to assure the provision of public passenger transport services in the general interest that an operator, if it were considering its own commercial interests, would not assume or would not assume to the same extent or under the same conditions without reward.

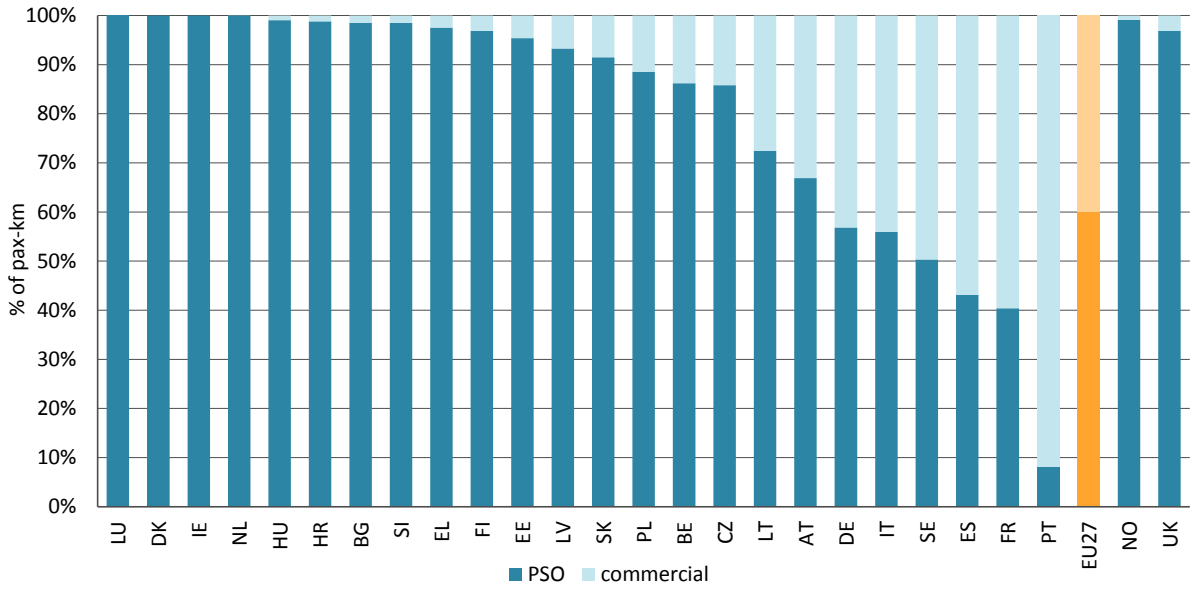
The Regulation, which was amended in the Fourth Railway Package by Regulation (EU) 2016/2338, aims to create an internal market for public passenger transport services by complementing the general rules on public procurement.

[127] Article 30(2) of Directive 2012/34/EU.

5.8.1 PSO scope

Figure 75 shows the share of passenger kilometres offered respectively under a PSO and commercial rail services per country in 2018.

Figure 75: Share of passenger traffic offered respectively under a PSO and commercial rail services per country (% of pax-km, 2018)



Source: RMMS, 2020. The data for BE, PT, EL and FR are estimates. RO not available.

In 2018, PSO passenger services represented on average 60% of the total passenger kilometres in the EU27[128] (66% in EU28). According to RMMS data, all passenger traffic was covered by a PSO in Luxembourg, Denmark, Ireland and the Netherlands.

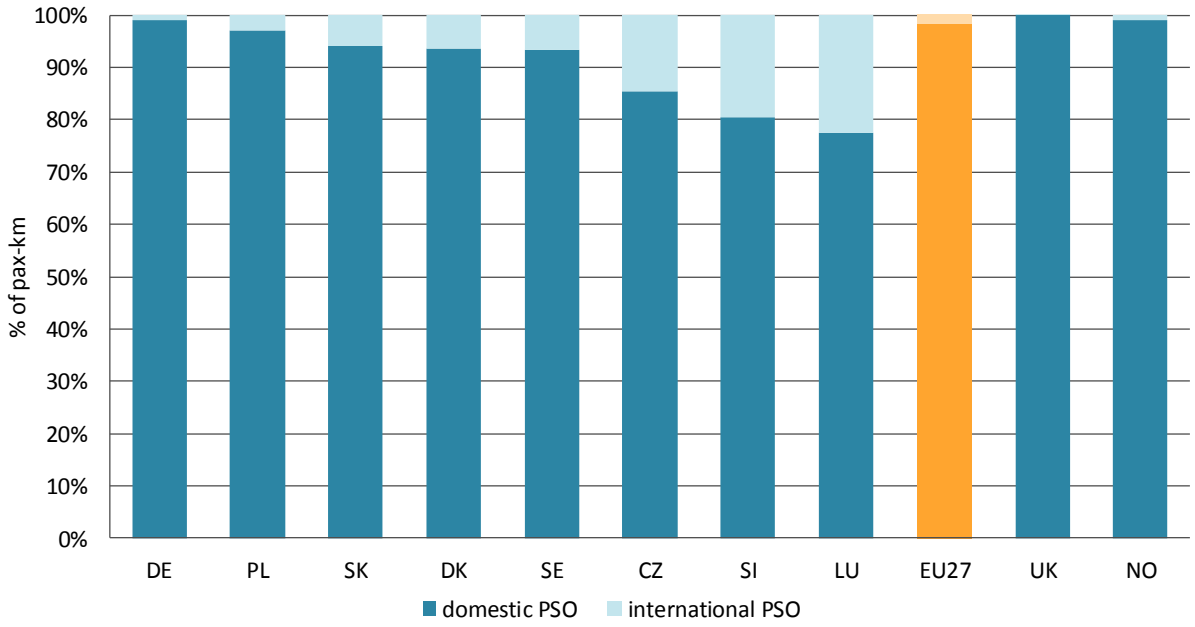
Over 30% of passenger kilometres are on commercially operated services in Austria, Germany, Italy and Sweden (countries where commercial services are offered also by alternative operators), and Spain, France and Portugal (countries with the lowest share of services offered under PSO, 8%[129]).

Services are provided on a commercial basis without a PSO typically in domestic long-distance and interurban markets. International services appear to be rarely provided under a PSO. Figure 76 shows the share of passenger traffic offered respectively under domestic and international PSO services per country in 2018, as reported in the RMMS.

[128] From 53% in 2015.

[129] In Portugal, the incumbent operator CP no longer received compensation and all its traffic was considered as commercial.

Figure 76: Share of passenger traffic offered respectively under domestic and international PSO services per country (% of pax-km, 2018)



Source: RMMS, 2020.

On average, in 2018, domestic passenger services represented 98.3% of the total PSO passenger kilometres in the EU27 (98.6% in EU28). Among countries that reported having international PSO services, Luxembourg (23%), Slovenia (20%) and Czechia (15%) had the highest share of international PSO services on total PSO services, whereas Germany and Norway (1%), together with the United Kingdom (less than 0.5%), had the smallest.

5.8.2 PSO award

Pursuant to Regulation (EC) 1370/2007 'Where a competent authority decides to grant the operator of its choice an exclusive right and/or compensation, of whatever nature, in return for the discharge of public service obligations, it shall do so within the framework of a public service contract.'

The nature and areas of responsibility of competent authorities for passenger rail services vary between states.

- One single national authority can be competent for rail passenger transport, or other tiers of government can be responsible at their own geographical level (typically a region, province or county with a capital city or administrative centre). Most states with devolved authorities also have a national competent authority that can, if needed, specify PSOs for services linking different regions[130].
- These arrangements can involve one single national public service contract (PSC) that serves the entire country or a large number of PSCs. Such contracts can be with a national

[130] This is not always the case: in Germany, for example, the competent authorities are the Länder, three of which cover only the cities of Berlin, Bremen and Hamburg; in addition, interregional public service contracts typically require the cooperation of two or more Länder.

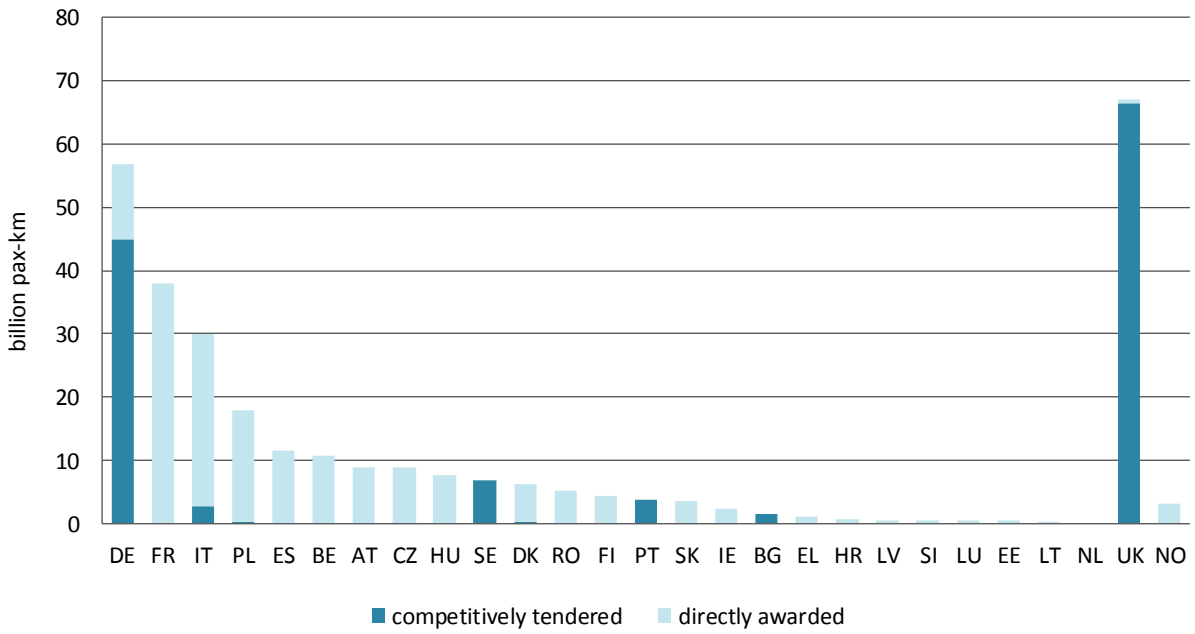
incumbent operator, with established regional and local operators, or through competitive tendering.

Each competent authority is required to publish once a year an aggregated report on: (i) the public service obligations for which it is responsible; (ii) the selected public service operators; and (iii) the compensation payments and exclusive rights granted to the said public service operators by way of reimbursement[131].

Direct award versus tendering

Figure 77 shows the proportion of PSO services, measured in passenger kilometres, which were competitively tendered or directly awarded in 2018 per country.

Figure 77: PSOs competitively tendered and directly awarded per country (billion pax-km, 2018)



Source: RMMS, 2020. No data available for NL.

Of the 229 million PSO passenger kilometres in the EU27 in 2018 (296 in EU28), 26% were on services which had been competitively tendered (43% in EU28). The highest amounts of competitively tendered volumes were in Germany and the United Kingdom. In relative terms, 85.6% of all the EU27 competitive tendering occurred in the two Member States which liberalised their services early (74.3% in Germany and 11.3% in Sweden). If we consider the EU28, 93.2% of all competitive tendering occurred in Germany, Sweden and the United Kingdom (35.4% Germany, 5.4% Sweden and 52.4% United Kingdom). According to RMMS data, limited competitive tendering was also introduced in Portugal, Italy, Bulgaria, Poland, Denmark and Czechia.

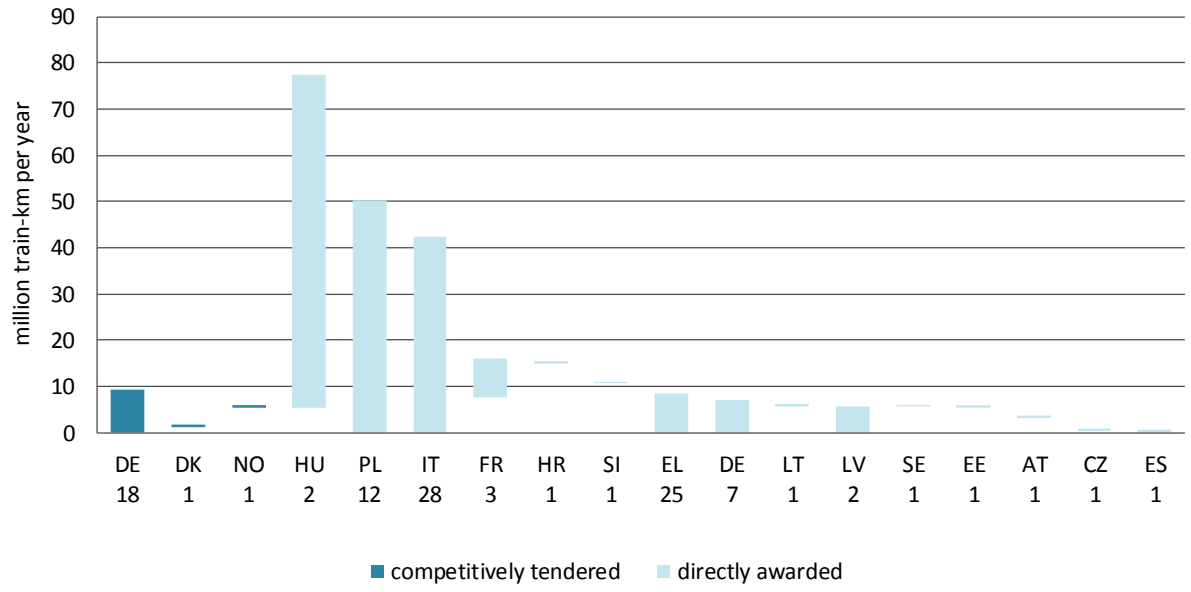
[131] Article 7 of Regulation (EC) 1370/2007, now amended by Regulation (EU) 2016/2338.

Overview of PSO contracts awarded during the reported period

The RMMS collects information related to the size of PSO contracts (if any) awarded during any reference year. Figure 78 shows the size of directly awarded and competitively tendered contracts measured in train kilometres in 2018 per country:

- The numbers on the horizontal axis show the number of contracts awarded, where this is more than one.
- The length of the bars on the figure shows the range between the smallest and largest contract of each type awarded in each state.

Figure 78: PSOs competitively tendered and directly awarded per country (million train-km, 2018)



Source: RMMS, 2020.

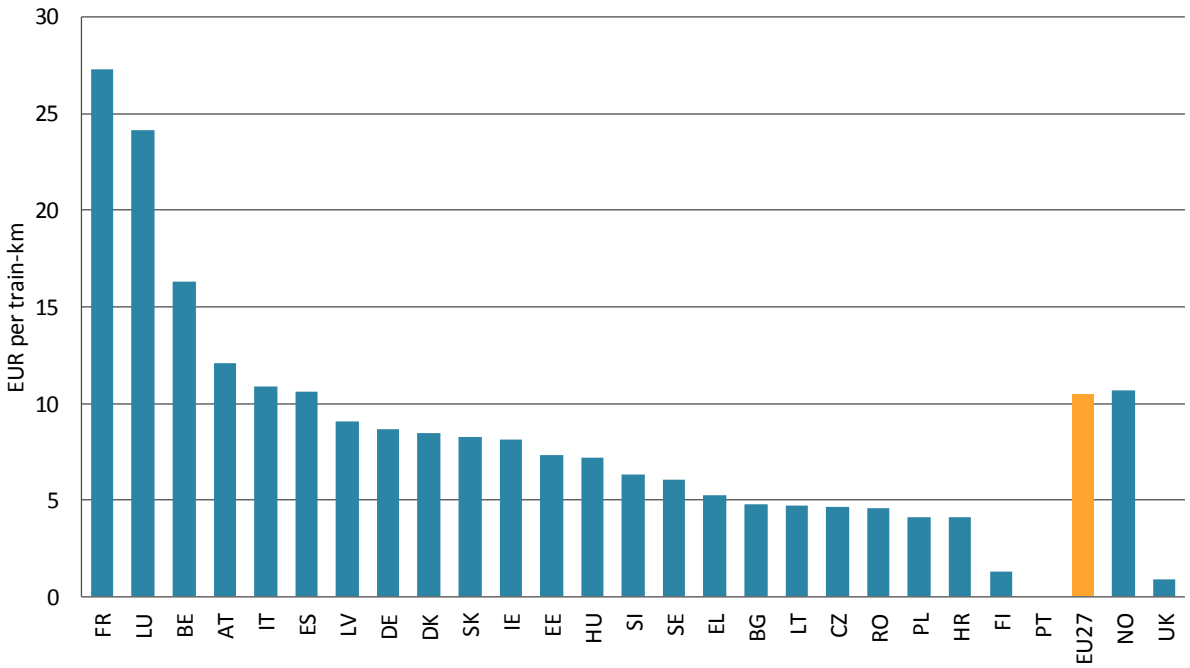
The largest competitively tendered PSO contract was reported by Germany, covering nearly 10 million train kilometres. The largest directly awarded PSO contract was reported by Hungary, covering 72 million train kilometres. A few countries have several directly awarded PSO contracts of remarkable size (Poland, Italy, France, Greece, Germany and Latvia); others reported just one contract.

5.8.3 PSO compensation

Apparent levels of PSO compensation

Figure 79 shows the apparent average levels of PSO compensation measured in EUR per train kilometre in 2018 per country.

Figure 79: Apparent average PSO compensation per country (EUR per train-km, 2018)



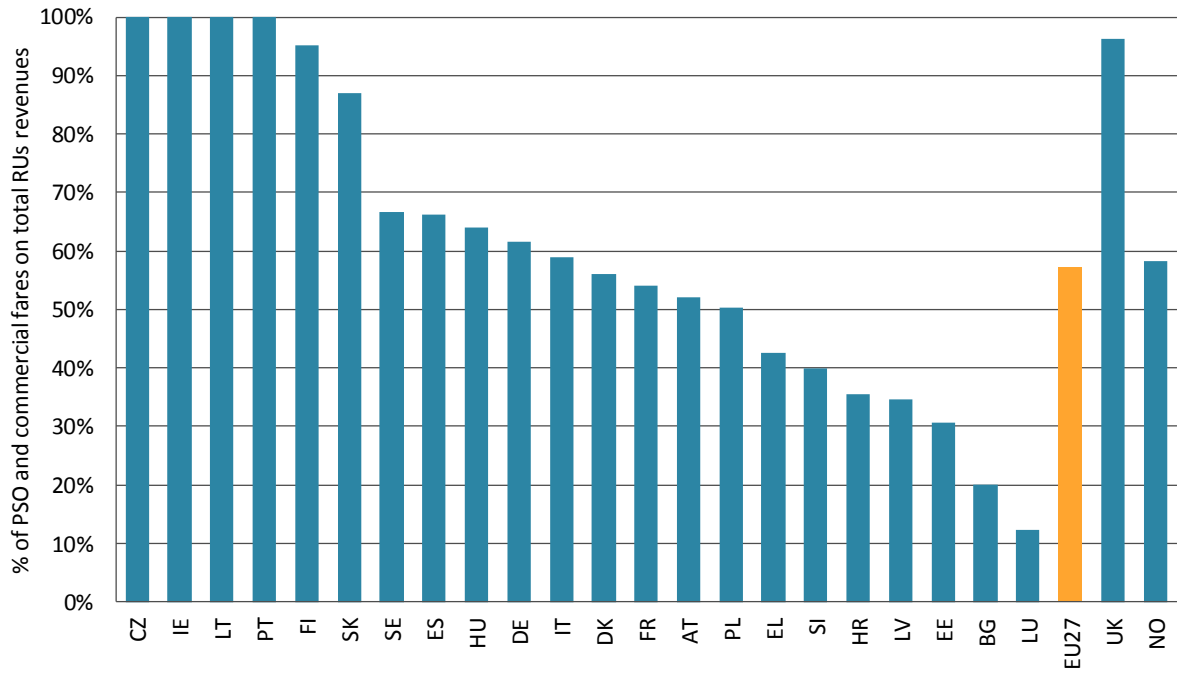
Source: RMMS, 2020. Data for NL not available.

In 2018, the apparent average PSO compensation in the EU27 was EUR 10.51 per train kilometre (8.57 in EU28). France and Luxembourg have the highest apparent average PSO compensation (EUR 27.30 and EUR 24.10 per train kilometre respectively); in contrast, Portugal reported no compensation.

Share of PSO and commercial fares on total revenues of railway undertakings

Figure 80 shows the share of PSO and commercial fares in the total revenues of railway undertakings in 2018 per country. Total revenues include PSO fares, commercial fares and PSO compensation, but exclude PSO operators' revenue from other sources, such as catering, car parking and concessions on stations.

Figure 80: Share of PSO and commercial fares on total revenues of railway undertakings (% in 2018)



Source: RMMS, 2020. BE, NL and RO not available.

In 2018, the share of PSO and commercial fares in the total revenues of railway undertakings in the EU27 was on average 47% (65% in EU28). In Czechia, Ireland, Lithuania, and Portugal PSO costs appear to have been fully recovered by fares, whereas Luxembourg shows the lowest coverage (12%).

5.9 Degree of market opening and utilisation of access rights

EU legislation has provided for an incremental opening of the rail market gradually over the years.

- From 1 January 1993, limited access was established by Directive 91/440/EEC.
- From 1 January 2007, the Second Railway Package liberalised international and domestic rail freight services.
- From 3 December 2009, the Third Railway Package liberalised international passenger services and some cabotage.
- From 2 December 2019, the Fourth Railway Package, through Directive 2016/2370/EU and Regulation (EU) 2016/2338, liberalised the remaining passenger services, subject to measures to protect PSOs.

Some Member States, however, opened their rail markets in advance of the creation of a formal right of entry through EU liberalisation. On the other hand, in other cases, legal market opening has not resulted in any significant market entry by competitors.

5.9.1 Opening of the freight market

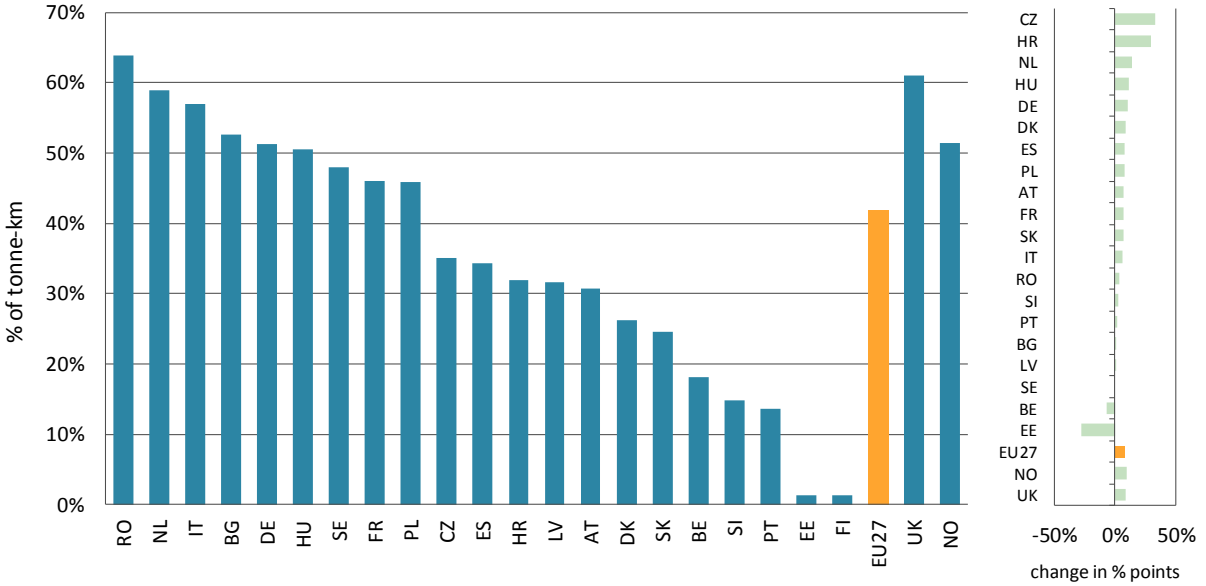
The following paragraphs provide an overview of the competitive environment at the end of 2018, 12 years after the liberalisation of rail freight services in the EU in 2007.

Evolution of competitors' market share in the freight market

The competitors' average market share in the EU27 rail freight market increased from 34% to 42% between 2015 and 2018. The increase in the EU28 was from 35% to 43% over the same period.

Figure 81 shows the shares of the domestic freight markets, as measured in tonne kilometres, which are not served by the historic incumbent operator. The chart on the right shows the change in percentage points of the competitors' market share between 2015 and 2018.

Figure 81: Competitors' market share in the rail freight market per country (% in 2018) and change in percentage points (2015-2018)



Source: RMMS, 2020. NL 2015 adjusted, one operator with 100% market share in EL, IE, LT and LU.

Competitors have the largest market share in Romania (64%), and the smallest in Finland and Estonia. In each of Lithuania, Ireland, Luxembourg and Greece, one operator has a 100% market share. The highest growth between 2015 and 2018 was reported for Czechia and Croatia (33 and 30 percentage points more respectively), whereas a major decline was reported in Estonia (-28 percentage points).

5.9.2 Opening of the passenger market

The following paragraphs provide an overview of the competitive environment existing both in the commercial and in the PSO rail passenger services at the end of 2018. This means that the domestic market opening imposed by the Fourth Railway Package (from December 2019) cannot yet be reflected in the data; the presence of alternative operators depends on whether and how far a country decided to open its passenger market before the date imposed by the EU legislation.

On average, competitors had 14% market share in national passenger markets[132] in the EU27 in 2018 (24% in EU28), an increase of 2 percentage points since 2015 (1 percentage point for the EU28).

Box 10: Development of international passenger transport, in particular night trains and high-speed trains

Night train services, which used to be common in the past, have suffered from declining competitiveness, including due to competition from low-cost airlines. However, the climate emergency has rekindled public interest in the provision of these services, which offer an attractive alternative to flights on certain longer distances. Due to the related CO_2 savings, they fit with the Commission vision for a European Green Deal and with the pledge, signed by 25 Member States plus Norway and Switzerland on 2 June 2020, to develop international rail connections via an international rail passenger platform[133].

While there may be a business case for unsubsidised night train services, at least on certain popular connections, user demand may still be insufficient at this time to encourage the launch of new services or the relaunch of services abandoned in the past. The economics of night train services are difficult to ensure. Compared to daytime rail transport services, night train services require costly specialised rolling stock, can carry fewer passengers per train and necessitate more personnel.

Some Member States wish to kick-start the development of night services, which are typically international, for example by concluding public service contracts that ensure a fair remuneration for rail operators. For example, Sweden is investigating connections to Germany (with potential extensions to Belgium and the Netherlands) and the Netherlands is considering strengthening cross-border passenger services, including night train services, for instance, between Amsterdam and Vienna. Night train services between Vienna and Brussels were re-established in early 2020.

At the same time, unsubsidised night trains have also started appearing. RegioJet seasonal overnight train service opened in July 2020 to connect Czechia's capital Prague with Rijeka in Croatia. The multimodal service, planned to run from July to September, targets Czech, Slovak and Hungarian holidaymakers, with RegioJet providing bus transfers to 30 tourist destinations on the Croatian coast. RailJet is also planning to launch a night service connecting Vienna and Warsaw every day from December 2020. The Swedish rail operator Snälltåget plans to operate its night trains between Stockholm and Berlin via Malmö, Copenhagen and Hamburg from 2021.

High-speed rail services also offer a valid alternative to less sustainable transport modes. At the request of the European Parliament, in 2020 the Commission commissioned a study on cross-border long-distance rail passenger services, with a special focus on night train services. The results of the study, which will focus on the obstacles for the setting-up and running of cross-border passenger services, are expected mid-2021.Perceived obstacles today include the lack of easy ticketing options for passengers, the availability of suitable rolling stock, high infrastructure access charges for cross-border long-distance services and a lack of coordination in the setting-up of cross-border train paths.

Evolution of competitors' market share in the commercial passenger market

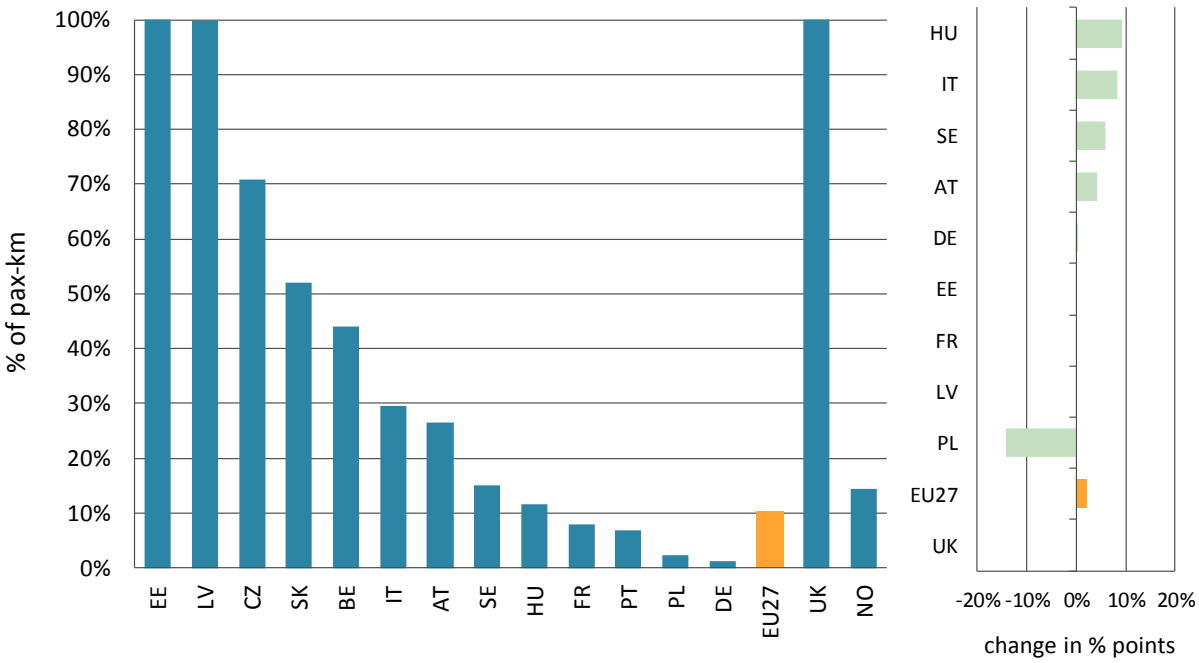
On average, competitors had a 10% market share in national commercial passenger markets in the EU27 in 2018, an increase of 2 percentage points compared to 2015. For the EU28, the average was 12%, also an increase of 2 percentage points on 2015.

[132] PSO and commercial services considered together.

[133] https://www.permanentrepresentations.nl/permanent-representations/pr-eu-brussels/documents/publications/2020/06/04/political-statement-for-coalition-of-the-willing-development-international-rail-passenger-transport .

Figure 82 shows the shares of the commercial (non-PSO) passenger market, as measured in passenger kilometres, which are not served by the historic incumbent operator. The chart on the right shows the change in percentage points of the competitors' market share between 2015 and 2018.

Figure 82: Competitors' market share in the commercial passenger market per country (% in 2018) and change in percentage points (2015-2018)



Source: RMMS, 2020. BG, DK, HR, FI, EL, LT, LU, SI, ES reported no competitors in commercial services with a market share of 1% or more for 2018. There were no commercial passenger market services in IE. No data were available for NL and RO.

Competitors dominate the commercial passenger market in Estonia, Latvia and the United Kingdom. The data on the United Kingdom can be misleading, as all pre-existing services, including those that are commercially viable, are operated under a PSO, and hence all non-PSO services are operated by new entrants. Competitors have significant market shares also in Czechia, where even though the percentage appears lower than in Lithuania and Estonia, the amount of passenger kilometres offered under commercial services is significantly higher. Germany and Poland reported the lowest competitors' market shares in the segment (1% and 2% respectively), with Poland having reported also the largest drop since 2015 (-14 percentage points).

Box 11: Development of low-cost rail services

Rail low-cost offers started to emerge in the EU already back in 2013, both for high-speed and conventional services.

Service	Description
OUIGO	– Subsidiary of SNCF – Offering low-fares, high-speed services (has expanded its initial offer and now reaches 41 destinations in France) – Launched in 2013
IZY	– Low-cost brand of Thalys – Offering low-fares, standard-speed services on conventional lines between Brussels and Paris – Launched in 2016
FlixTrain	– Brand of FlixMobility group, as FlixBus – Long-distance, low-fares train connections: o Flixtrain started offering services on the Berlin–Stuttgart (via Frankfurt) and Hamburg–Cologne conventional lines in 2018. It extended its services to cover the Berlin–Cologne line in 2019 and was planning to extend its services in 2020 to seven new towns on the Berlin–Cologne line and on the Stuttgart-Hamburg line. o FlixTrain (Flixbus Sverige) has been allocated train paths on the Stockholm–Gothenburg and Stockholm–Malmö lines starting from 2020. o The company wanted to enter also the French market with connections Paris–Brussels, Paris–Lyon, Paris–Nice (night train), Paris–Toulouse and Paris–Bordeaux, but gave up its plans in April 2020. – FlixTrain uses a similar model to FlixBus, where FlixMobility handles network development, technology, sales, marketing and quality management, while operations and fleet management are provided by experienced external partners (Leo Express, BahnTouristikExpress, BTE, MRCE). – Integrated offer with FlixBus services
Avlo	– Low-cost RENFE service, initially due to be launched by Q1-2019 under the commercial name of EVA. The launch of the high-speed low-cost service (under the new name of Alta velocidad low-cost, Avlo) was postponed until April 2020, when finally the COVID-19 pandemic obliged RENFE to revise its project and postpone it until further notice. – The service was meant to offer low-fares, no-frills high-speed services between Madrid, Zaragoza and Barcelona, integrated with other modes.
Rielsfera	– The French incumbent SNCF will expand its OuiGo low-cost offer to domestic high-speed services that will be opened in Spain from December 2020. Rielsfera, a subsidiary of SNCF, signed in May 2020 a framework agreement with the Spanish high-speed infrastructure manager to provide five return connections per day between Madrid and Catalonia, five between Madrid and the Valencia region and five between Madrid and Andalusia. Service is expected to start at Easter 2021.

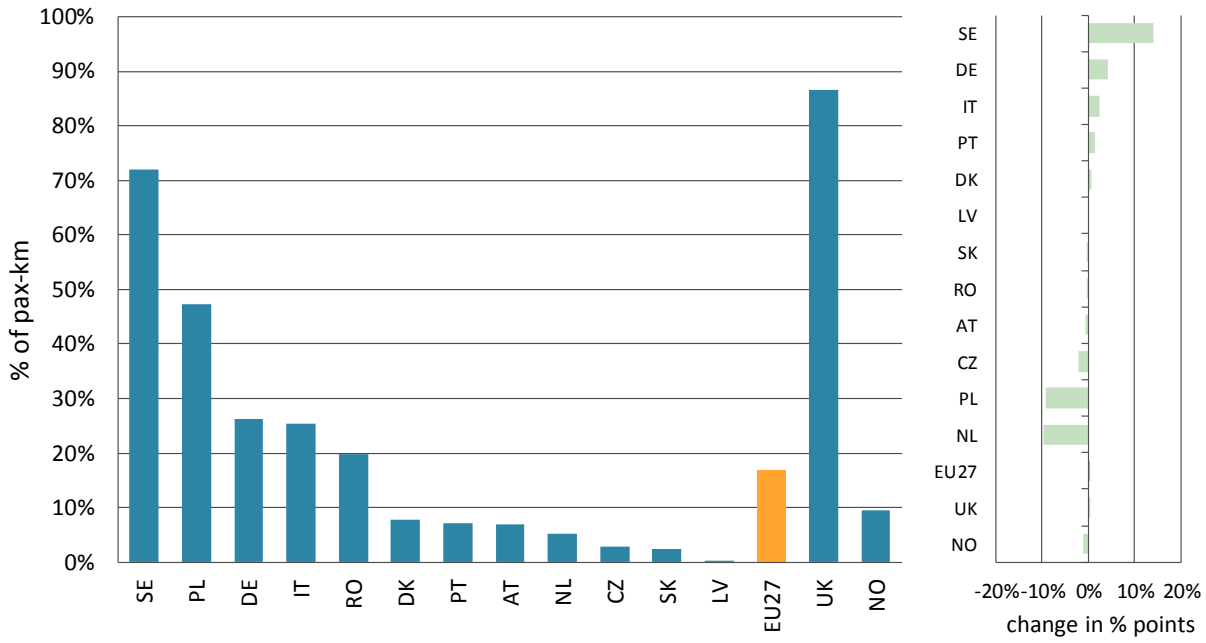
Source: desk research (Sep 2020)

Evolution of competitors' market share in the PSO passenger market

On average, competitors had a 16.2% market share on national PSO passenger markets in the EU27 in 2018. This level remained almost constant compared to 2015 (-0.5 percentage points). For the EU28 the average was 32%, a slight decrease of 2 percentage points compared to 2015.

Figure 83 shows the shares of the PSO passenger market, as measured in passenger kilometres, which are not served by the historic incumbent operator. The chart on the right shows the change in percentage points of the competitors' market share between 2015 and 2018.

Figure 83: Competitors' market share in the PSO passenger market per country (% in 2018) and change in percentage points (2015-2018)



Source: RMMS, 2020. The data for PT in 2015 represent an estimate. No competitors in the PSO passenger market were reported by BE, BG, HR, EE, FI, FR, EL, HU, IE, LT, LU, SI and ES.

In 2018, competitors had the highest market shares of the PSO passenger market in the United Kingdom (87%) and Sweden (72%). In Latvia, by contrast, only 0.1% was in the hands of competitors. The highest growth of competitors' market shares was reported by Sweden (+4 percentage points between 2015 and 2018), whereas a major decline was reported for the Netherlands (-10 percentage points) and Poland (-9 percentage points).

Scope for regulatory bodies to limit open access in the passenger market

The Fourth Railway Package opened domestic passenger markets to competition in all Member States[134]. Railway undertakings must be granted the right of access to railway infrastructure in all Member States for the purpose of operating rail passenger services under equitable, non-discriminatory and transparent conditions.

The EU legislator, however, put in place mechanisms to balance the objective of effectively opening up the market for domestic 'open access' rail passenger services with the need to protect the economic equilibrium of services provided under an existing public service contract. Member States can therefore restrict open access to their rail infrastructure where the national rail regulatory body decides, on the basis of an objective economic analysis, that the new service would cause substantial damage to the economic equilibrium of the existing public service contract in terms of profitability of the services or higher net cost to the competent authority.

134 See in particular Directive 2016/2370 amending Directive 2012/34/EU.

In November 2018, the Commission adopted Implementing Regulation (EU) 2018/1795 laying down the procedure and criteria for the application of the economic equilibrium test (EET) adapted to a rail market fully open to competition[135]. The regulation covers:

- rules for notification of a planned new rail passenger service to infrastructure managers and regulatory bodies;
- the deadline for requesting the economic equilibrium test;
- information requirements and procedure for the economic equilibrium test;
- contents of the economic equilibrium test and assessment criteria; and
- cooperation between regulatory bodies competent for a proposed new international passenger service.

A number of regulators published on their websites further details on the methodology they follow when implementing the economic equilibrium test.

A number of economic equilibrium tests have been required and performed in Member States, now also under the new Regulation. A non-exhaustive list is set out below:

- **Request for an economic equilibrium test rejected**
  - FR: request of Région Hauts-de-France concerning new international service by Flixtrain, 2020
  - CZ: request of Ministry of Transport concerning new international rail passenger service by Leo Express, 2019
  - FR: request of French State concerning new domestic service by Flixtrain, 2019
  - PL: Leo Express, withdrew request for entry before a decision was taken, 2017

- **Economic equilibrium test performed, positive decision for the new service**
  - FR: request of Régions Bourgogne-FrancheComté et Auvergne-Rhône-Alpes concerning new domestic service by Flixtrain, 2020
  - FR: request of Région Occitanie concerning new domestic service by Flixtrain, 2020
  - PL: five cases about new domestic services by Arriva, 2017
  - FR: request of Region Provence-Alpes-Côte d'Azur concerning new international service by Thello, 2013

- **Economic equilibrium test performed, positive decision for the new service**
  - PL: one case about new domestic service by Arriva, 2017.

The decisions are usually available on the respective regulator's website.

[135] Commission Implementing Regulation (EU) 2018/1795 of 20 November 2018 laying down procedure and criteria for the application of the economic equilibrium test pursuant to Article 11 of Directive 2012/34/EU of the European Parliament and of the Council, OJ L 294, 21.11.2018, p. 5–14.

5.9.3 Challenges of market opening

Interoperability

Technical aspects can have a major impact on the capacity of operators to provide their rail transport services across borders and in different countries.

Differences in track gauges and electric current available for traction (presented in Table 14) mean that the same locomotives and wagons cannot be used in all countries. An expansion of activities across borders could imply in some cases that the railway undertaking has to arrange for new rolling stock and new traction vehicles.

Table 14: Main railway gauge and electric current used per country (2018)

	Track gauge	Electric current		
	Mm	dc volts	ac volts	
BE	1 435	3 000	25 000	50 HZ
BG	1 435		25 000	50 HZ
CZ	1 435	3 000	25 000	50 Hz
DK	1 435	3 000	25 000	50 HZ
DE	1 435	800-1 200 (contact rail)	15 000	16.7 Hz
EE	1 520	3 000		
IE	1 600	1 500		
EL	600			
	1 000			
	1 435		25 000	50 HZ
ES*	1 000	1 500		
	1 435		25 000	50 HZ
	1 668	3 000		
FR	1 000	750-850 (contact rail)		
	1 435	1 500	25 000	50 HZ
HR	1 435	3 000	25 000	50 HZ
IT	1 435	3 000	25 000	50 HZ
CY	-	-	-	-
LV	1 520	3 000		
LT	1 520		25 000	50 HZ
LU	1 435		25 000	50 HZ
HU	1 435		25 000	50 HZ
MT	-	-	-	-
NL	1 435	1 500		
AT	1 435		15 000	16.7 Hz
PL	1 435	3 000		
PT	1 000			
	1 668		25 000	50 HZ
RO	1 435		25 000	50 HZ
SI	1 435	3 000		
SK	1 435	3 000	25 000	50 HZ
FI	1 524		25 000	50 HZ
SE	1 435		15 000	16.7 Hz
UK	1 435	750 (contact rail)	25 000	50 HZ
	1 600 (N-IRL)			

Source: Union Internationale des Chemins de Fer, railway companies

Notes: 1 435 mm = standard gauge

* **ES**: new lines have a gauge of 1 435 mm and an electric current of 25 000 volts, 50 Hz

UK: (N-IRL): Northern Ireland

Source: Statistical pocketbook 2020.

National rules, i.e. binding rules adopted in a Member State containing railway safety or technical requirements other than those laid down by EU or international rules, may be applied in addition to EU rules only under certain conditions, as laid down in Directive (EU) 2016/797 and Directive (EU) 2016/798. National rules are being gradually replaced by rules based on common standards, established by common safety methods (CSMs) and technical specifications for interoperability (TSIs), since their persistence can represent a significant obstacle to rail interoperability. ERA is in charge of examining the existing national rules in order to ensure that only national rules that are in conformity with EU law are applied.

Signalling systems can also pose a significant barrier to interoperability. The existence of national Class-B systems on parts of the EU railway infrastructure implies that rolling stock must be equipped with specific interfaces (adapted to a specific Class-B system) in order to allow for proper communication between the vehicles and the infrastructure, thus ensuring smooth and safe operations. Whereas domestic incumbent operators are usually equipped with these specific interfaces, new entrants may have difficulties procuring them, especially when the amount of equipment they need is not sufficient to ensure a viable business case for manufacturers.

Trains need certifications and homologations before being authorised to access the infrastructure. Certifications and homologations are provided by specialised companies. Given the knowhow needed for this kind of activity, these specialised companies may be subsidiaries of incumbent railway operators. In this case, particular attention must be paid to ensure that competition is not hindered through the authorisation process.

When a company wants to access a new domestic market, it must perform test runs before its trains are actually allowed to access the infrastructure. However, test runs also need capacity allocation and are not possible everywhere on a network. The limited availability of paths and tracks for testing can entail delays which could hamper the entry plans of new entrants.

Rolling stock and traction market

Smooth and non-discriminatory access to rolling stock is fundamental for alternative rail operators to enter new markets or to extend their service offer.

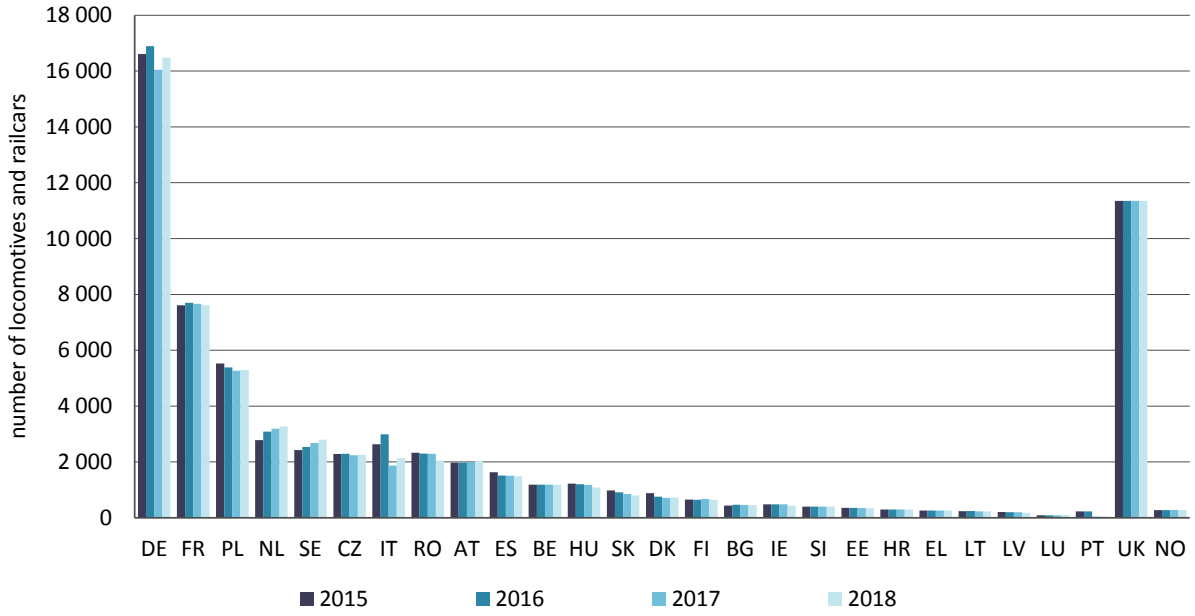
Alternative, smaller passenger operators in particular sometimes lack the appropriate financial resources to engage in significant investments to buy new rolling stock in order to enter a new domestic market in open access or to compete for bigger PSO contracts. Further to this, the secondary and leasing markets for rolling stock can be very limited, making it harder for new entrants to access rail markets.

Adequacy of the rolling stock also can be a significant deterrent for market entry and fair competition.

Locomotives must be compatible with the infrastructure on which they are to be operated, with compatibility determined by track gauge, structure gauge, coupling and signalling equipment and, if electrified, the electrification system (which may use trackside rails or overhead catenary supplying power at several different voltages).

Figure 84 shows the number of locomotives and railcars by country from 2015 to 2018.

Figure 84: Stock of locomotives and railcars (number per country, 2015-2018)

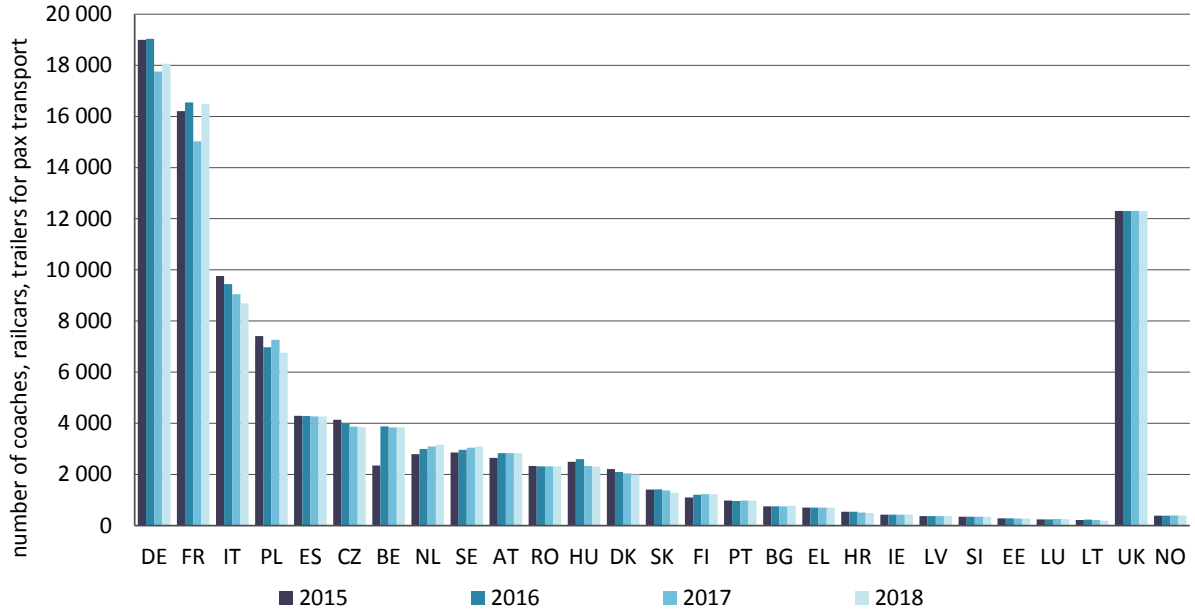


Source: Statistical pocketbook 2020.

The fleet size ranges from 47 locomotives and railcars in Portugal up to 16 480 in Germany.

Figure 85 shows the number of coaches, railcars, trailers for passenger transport by country from 2015 to 2018.

Figure 85: Stock of coaches, railcars, trailers for passenger transport (number per country, 2015-2018)

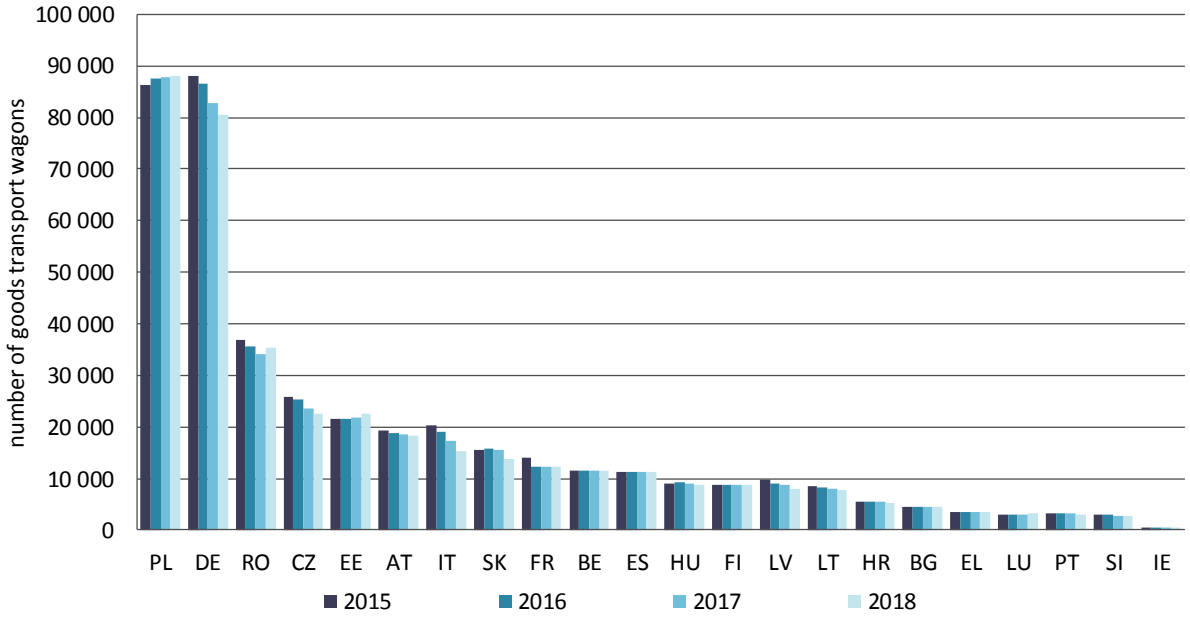


Source: Statistical pocketbook 2020.

The fleet size ranges from 192 coaches, railcars and trailers for passenger transport in Lithuania up to 18 059 in Germany.

Figure 86 shows the number of goods transport wagons by country from 2015 to 2018.

Figure 86: Stock of goods transport wagons (number per country, 2015-2018)



Source: Statistical pocketbook 2020. No data for DK, NL, SE, UK and NO available.

The fleet size ranges from 442 goods transport wagons in Ireland up to 87 990 in Poland.

As for intermodal wagons that are used for **combined transport**, it is difficult to have a comprehensive picture of their number and types. The number of studies available for intermodal fleets is very limited. An overview of the combined transport wagon fleet for 2017 (quantity, type, average age, ownership) is provided in the UIC's *Combined transport in Europe 2018* report[136].

The lack of suitable rolling stock is often cited as one of the main reasons for the decline and limited uptake of **(cross-border) night train services, as well as for the limited development of cross-border (long-distance) passenger rail services.** For night trains, a dedicated part of the rolling stock is equipped with couchettes or beds. Since such rolling stock can only be used for night services, it idles during the day time. This not only increases the acquisition costs of these vehicles, but also limits productive operating hours. Furthermore, a lack of interoperable high-speed trains and rolling stock hampers the introduction of cross-border high-speed and conventional services by new-entrant companies or other companies wishing to expand their business.

In its study on long-distance cross-border passenger rail services, the Commission will investigate to what extent lack of suitable rolling stock is a real obstacle to the development of new services and will look at possible ways to remove this obstacle.

[136] https://uic.org/IMG/pdf/2018_report_on_combined_transport_in_europe.pdf .

Finally, the lack of access to qualified personnel for rolling stock (together with the high initial cost of purchasing the rolling stock and interoperability/technical barriers) is also reported (by IRG-Rail[137]) as one of the most commonly observed barriers to entry in both passenger and freight rail markets.

Ticketing

The choice for consumers to purchase cross-border/cross-operator rail tickets is rather restricted today. This situation strongly reduces the possibility to aggregate different travel options and combine separate tickets or even buy a single ticket covering the entire journey (through-ticketing), especially when multiple train operators are involved. This harms passengers' choice and hinders fair competition between different rail transport providers.

The Commission published in 2019 a study that highlighted the challenges of delivering EU-wide integrated ticketing and payment systems and set out possible actions and initiatives at EU level in pursuit of this goal[138].

In addition, Directive 2016/2370[139] enables the Commission to monitor developments related to the availability of common information and through-ticketing systems. By 31 December 2022, the Commission must produce a report, to be accompanied, if appropriate, by legislative proposals.

Removing the barriers to ticket distribution will ensure a truly level playing field among operators and across Member States, help open the market, better integrate rail into the wider transport system and benefit consumers.

5.10 State aid

Public funding represents a significant part of rail sector financing, not only to build and maintain railway infrastructure, but also to fund unprofitable passenger transport services.

Specific Commission guidelines[140] concern the implementation of Articles 93 and 107 of the Treaty on the Functioning of the European Union (TFEU) clarifying the rules governing public funding for railway undertakings. They deal in particular with the following aspects:

- public financing of railway undertakings by means of infrastructure funding;
- aid for the purchase and renewal of rolling stock;
- debt cancellation by states with a view to the financial rejuvenation of railway undertakings;
- aid for restructuring railway undertakings;
- aid for the needs of transport coordination; and
- state guarantees for railway undertakings.

[137] *Eighth Annual Market Monitoring Working Document*, IRG-Rail 2020. The direct award of PSO contracts was also indicated as a main entry barrier specifically for the PSO segment.

[138] https://op.europa.eu/en/publication-detail/-/publication/af05b3eb-df43-11e9-9c4e-01aa75ed71a1 .

[139] Directive 2016/2370 of the European Parliament and the Council amending Directive 2012/34/EU as regards the opening of the market for domestic passenger transport services by rail and the governance of rail infrastructure.

[140] The Commission guidelines provide guidance on the compatibility with the TFEU of State aid to railway undertakings (Communication from the Commission — Community guidelines on State aid for railway undertakings, OJ C 184, 22.7.2008, p. 13–31 available at https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52008XC0722%2804%29)

Table 15 provides a list of the State aid cases for which a decision was taken during the reference period of the RMMS report (2015-2018).

Table 15: State aid decisions 2015-2018

Case number	Working title	Member state	Decision date	Decision document/link
SA.38115	Prodloužení režimu Interoperabilita v železniční dopravě (ex N 469/2008 a SA.35948)	Czechia	25-03-2015	http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_38115
SA.40404	Régime d'aide au service transitoire d'autoroute ferroviaire alpine	France	26-05-2015	https://ec.europa.eu/competition/state_aid/cases/256142/256142_1724084_217_2.pdf
SA.39606	Régime d'aide transitoire au service transitoire d'autoroute ferroviaire alpine	Italy	26-05-2015	https://ec.europa.eu/competition/state_aid/cases/256238/256238_1724080_210_2.pdf
SA.38229	Régime d'aides luxembourgeoises au transport combiné	Luxembourg	03-06-2015	http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_38229
SA.41472	Prolongation of a scheme to operate scheduled services of combined transport of goods	Belgium	09-07-2015	http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_41472
SA.41100	Innovationsförderprogramm Kombinierter Güterverkehr	Austria	11-08-2015	http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_41100
SA.39962	Aid scheme for the modernisation and construction of combined transport terminals. Czech Republic.	Czechia	12-08-2015	https://ec.europa.eu/competition/state_aid/cases/255511/255511_1685635_116_2.pdf
SA.42476	Betuweroute - compensation to rail during construction works 2016 - 2020	Netherlands	18-04-2016	https://ec.europa.eu/competition/state_aid/cases/261568/261568_1830631_109_2.pdf
SA.45156	Plateforme multimodale à Bettembourg / Dudelange	Luxembourg	16-06-2016	https://ec.europa.eu/competition/state_aid/cases/263877/263877_1846377_77_2.pdf
SA.43666	Reduction of the KWKG surcharge for railways	Germany	22-08-2016	https://ec.europa.eu/competition/state_aid/cases/261435/261435_1834096_110_2.pdf
SA.44627	Ferrobonus – incentive for rail transport	Italy	24-11-2016	https://ec.europa.eu/competition/state_aid/cases/264873/264873_1872028_67_2.pdf
SA.43008	Guidelines on funding for Transhipment Facilities for Combined Transport - Aid scheme prolongation	Germany	14-12-2016	http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_43008
SA.45482	Rail freight transport scheme	Italy	19-12-2016	https://ec.europa.eu/competition/state_aid/cases/265803/265803_1871682_140_2.pdf
SA.46720	Guidelines on the construction, extension and reactivation of private railway sidings	Germany	21-12-2016	https://ec.europa.eu/competition/state_aid/cases/266640/266640_1856227_75_2.pdf
SA.46341	Scheme on funding for transhipment facilities for combined transport of non-federal companies	Germany	04-01-2017	https://ec.europa.eu/competition/state_aid/cases1/201921/265853_2070613_119_2.pdf
SA.44621	Securing interoperability of railways transport (Individual subprograms annex 1, A)	Czechia	07-04-2017	https://ec.europa.eu/competition/state_aid/cases/263043/263043_1923128_167_4.pdf
SA.46672	Exemption from the excise duty of the fuel used in rail and inland waterway transportation	Hungary	12-04-2017	https://ec.europa.eu/competition/state_aid/cases/266524/266524_2054545_139_2.pdf
SA.46749	Aid for investment in logistics centre in the Port of Pitea	Sweden	19-04-2017	https://ec.europa.eu/competition/state_aid/cases/266720/266720_1898414_86_2.pdf
SA.46046	Exemption from the excise duty of the fuel used in the inland waterway transportation	Slovakia	03-05-2017	https://ec.europa.eu/competition/state_aid/cases/266732/266732_1904651_80_2.pdf
SA.47109	Prolongation du régime de promotion du transport combiné ferroviaire et du trafic diffus pour 2017-2020	Belgium	06-06-2017	http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_47109
SA.47779	Friuli Venezia Giulia - Interventi per lo sviluppo del trasporto combinato	Italy	14-06-2017	http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_47779
SA.32544	Restructuring of the Greek Railway Group - TRAINOSE S.A. Positive	Greece	16-06-2017	https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_32544
SA.31250	Measure implemented by Bulgaria in favour of BDZ Holding EAD SA, BDZ Passenger EOOD and BDZ Cargo EOOD.	Bulgaria	16-06-2017	https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_31250
SA.45997	Liaison express directe entre l'aéroport Charles-de-Gaulle et la Gare de l'Est	France	26-06-2017	https://ec.europa.eu/competition/state_aid/cases/268612/268612_1991029_170_4.pdf
SA.38283	ERTMS funding for Danish rail freight operators	Denmark	11-07-2017	http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_38283
SA.46806	Aid for combined transport in the Province of Trento	Italy	25-07-2017	https://ec.europa.eu/competition/state_aid/cases/266882/266882_1931637_96_2.pdf
SA.48485	BMVIT - Prolongation of a programme supporting the development of connecting railways and transfer terminals in intermodal transport 2018 – 2022	Austria	15-09-2017	https://ec.europa.eu/competition/state_aid/cases/270030/270030_1939480_90_2.pdf
SA.48634	Subsidy Scheme Rail Freight	Denmark	12-10-2017	https://ec.europa.eu/competition/state_aid/cases/270299/270299_1950845_105_2.pdf
SA.48759	Prolongation of IT freight transport scheme	Italy	25-10-2017	https://ec.europa.eu/competition/state_aid/cases/270506/270506_1946056_102_2.pdf
SA.48390	Aid scheme supporting rail freight transport in certain production forms 2018–2022	Austria	25-10-2017	https://prodmx.comp.cec.eu.int/isis/case_detail/index.cfm?case_key_value=269739

SA.48093	Intermodal Transport	Poland	31-10-2017	https://ec.europa.eu/competition/state_aid/cases/269295/269295_1946510_106_2.pdf
SA.47429	Incentives for combined transport in Croatia	Croatia	06-11-2017	https://ec.europa.eu/competition/state_aid/cases/267973/267973_1945583_56_2.pdf
SA.48858	Incentivazione del trasporto combinato	Italy	06-12-2017	https://ec.europa.eu/competition/state_aid/cases/270658/270658_1957380_68_2.pdf
SA.49631	State aid scheme for RO-LA Combined Transport	Romania	13-12-2017	https://ec.europa.eu/competition/state_aid/cases/272053/272053_1971630_115_2.pdf
SA.48972	Verlängerung FörderRL IaTPS	Germany	13-12-2017	https://ec.europa.eu/competition/state_aid/cases/270845/270845_1953877_76_2.pdf
SA.48483	Régime d''aides aux installations terminales embranchées (ITE)	France	03-01-2018	https://ec.europa.eu/competition/state_aid/cases/271735/271735_1966772_79_2.pdf
SA.50395	Offshore-surcharge reduction for railway undertakings in Germany	Germany	27-03-2018	https://ec.europa.eu/competition/state_aid/cases/273319/273319_1989766_99_2.pdf
SA.49749	Environmental compensation for rail freight transport	Sweden	20-04-2018	https://ec.europa.eu/competition/state_aid/cases/272227/272227_1984674_114_2.pdf
SA.49153	Podpora přepravních jednotek kombinované dopravy	Czechia	15-05-2018	https://ec.europa.eu/competition/state_aid/cases/271167/271167_1989527_132_3.pdf
SA.48804	Prolongation du PLAN D'AIDES A LA MODERNISATION ET A L'INNOVATION (PAMI)	France	29-05-2018	https://ec.europa.eu/competition/state_aid/cases/270577/270577_2007190_113_2.pdf
SA.51036	Modification of scheme SA. 48093 (2017/N) – Aid for the implementation of intermodal transport projects	Poland	07-06-2018	https://ec.europa.eu/competition/state_aid/cases/274522/274522_1991727_80_2.pdf
C5/2010	Railway company Cargo Slovakia a.s. (ZSSK Cargo)	Slovakia	20-07-2018	https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_C5_2010
SA.50165	Support for the promotion of energy efficiency in rail transport	Germany	26-07-2018	https://ec.europa.eu/competition/state_aid/cases/272954/272954_2028683_135_2.pdf
SA.50584	Structural aid measure reducing the cost disadvantage of bundling volumes transported by rail/inland waterways to and from Flemish seaports in order to promote a modal shift	Belgium	24-10-2018	https://ec.europa.eu/competition/state_aid/cases/275891/275891_2026100_166_2.pdf
SA.51956	Richtlinie zur Förderung des Schienengüterverkehrs über eine anteilige Finanzierung der genehmigten Trassenentgelte (af-TP)	Germany	10-12-2018	https://ec.europa.eu/competition/state_aid/cases/276131/276131_2035014_97_2.pdf
SA.51229	NORMA RETROFIT: Measures to support the rail transport of goods in Italy	Italy	18-12-2018	https://ec.europa.eu/competition/state_aid/cases/277288/277288_2050978_99_2.pdf
SA.50115	FVG Region- Intermodal rail transport of iron slabs	Italy	20-12-2018	https://ec.europa.eu/competition/state_aid/cases/272838/272838_2051050_129_2.pdf

Source: DG COMP.

5.11 Regulatory bodies

Under Directive 2012/34/EU, regulatory bodies have the power to act, of their own accord or in response to a complaint, to:

- prevent/redress discrimination;
- check access to the network and service facilities, charging, capacity allocation;
- monitor the competitive situation;
- adopt non-binding opinions on the infrastructure managers' business plans, contractual agreements with the Member States on infrastructure financing, capacity enhancement plans;
- audit the accounts of railway undertakings, operators of service facilities and infrastructure managers to check accounting separation;
- draw conclusions from the accounts on State aid, informing competent authorities; and
- perform the economic equilibrium test.

The Fourth Railway Package further extended the scope of regulatory bodies' powers to check:

- discrimination in traffic management, infrastructure renewals, maintenance;
- compliance with separation requirements; and
- conflicts of interest.

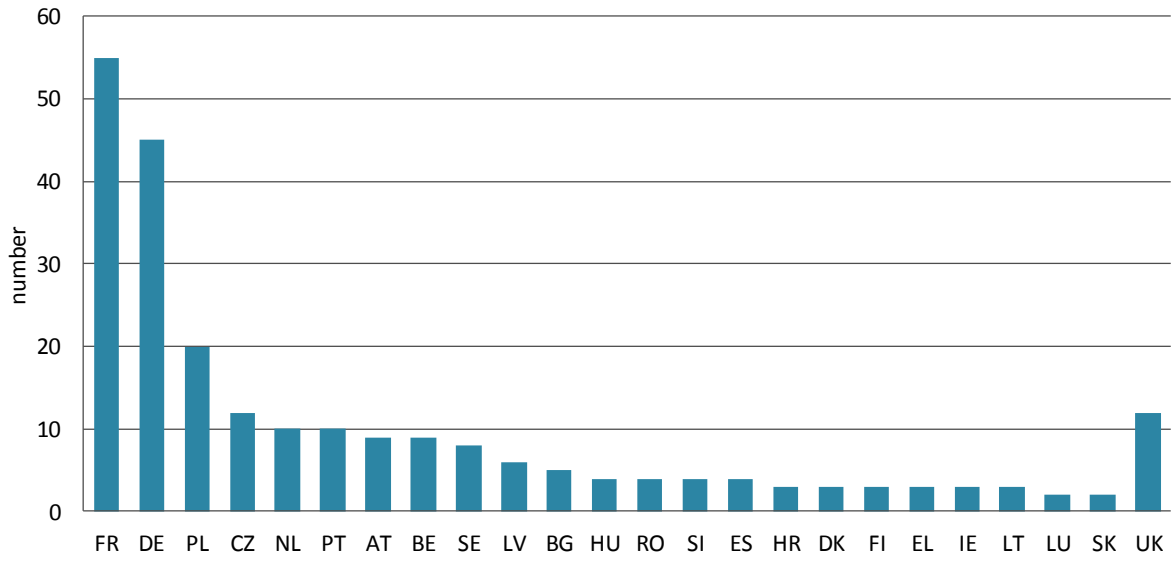
To comply with their duties, EU law gives regulators the power to request information, including data for market monitoring, from all actors and to impose penalties and fines if there is no reply. Regulatory bodies' decisions, which must be published, should be immediately binding and not subject to control by another administrative instance (judicial review).

Directive 2012/34/EU (Article 57) requires national regulatory bodies to cooperate among themselves and with other authorities. Regulatory bodies must exchange information on decision-making principles and practice and on the problems of interpreting transposed EU railway law; in order to do so, they have to participate and work together in a network that convenes at regular intervals, i.e. the European Network of Rail Regulatory Bodies (ENRRB).

Directive 2012/34/EU requires Member States to staff and manage their regulatory bodies in a way that guarantees their independence.

Figure 87 shows the reported numbers of staff in the regulatory bodies per country.

Figure 87: Regulatory bodies staff dealing with rail market access, (number, available to the Commission on 1st April 2020)

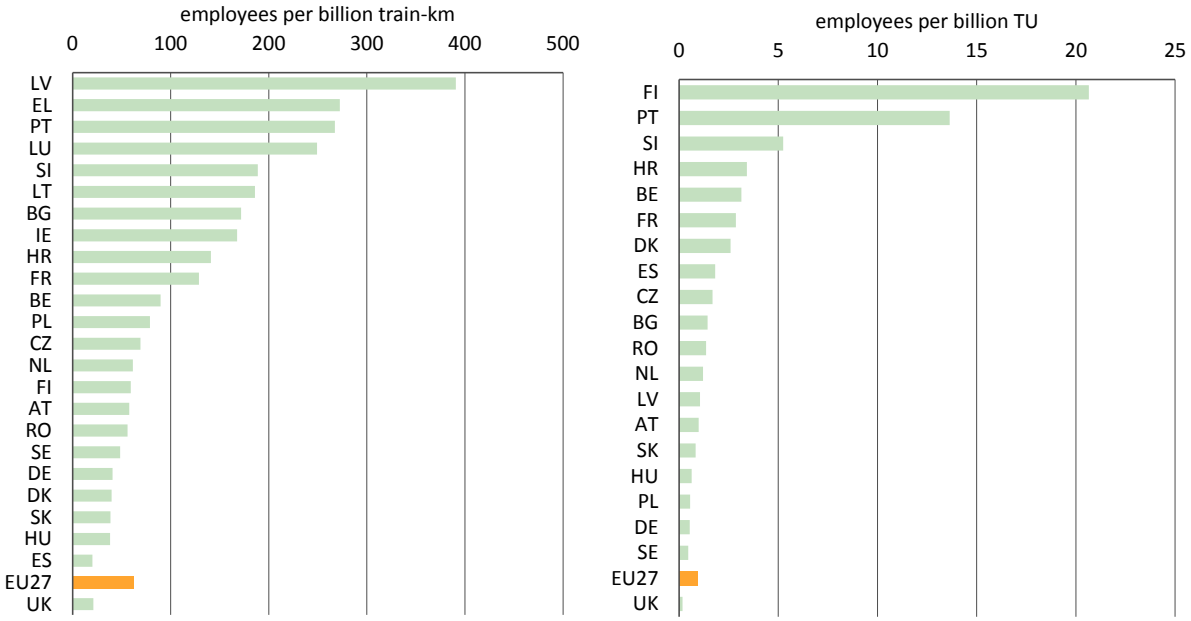


Source: DG MOVE, 2020. EE, IT and NO not available.

In the EU27, there are 227 employees of regulatory bodies dealing with rail market access (239 including the UK).

Figure 88 relates the number of each regulatory body's employees to the total passenger and freight train kilometres as a measure of the market they have to regulate.

Figure 88: Regulatory bodies staff dealing with rail market access (employees, as available to the Commission on 1 April 2020, per billion train-km and per billion transport units[141], 2018)



Source: DG MOVE, data on staff of regulatory bodies as available in April 2020, train-km 2018. No data for EE, IT and NO.

Rail regulatory bodies in the EU are mainly funded by the state budget (including ministerial resources) and fees paid by regulated operators (infrastructure managers, railway undertakings, or both), as shown in Table 16.

[141] Transport units defined here as the sum of all passenger kilometres and all tonne kilometres.

Table 16: Regulatory bodies' sources of funding (2018)

MS	Name of the RB	Funding (who)
AT	Schienen-Control Kommission (SCK)	Industry
BE	Service de Régulation du Transport ferroviaire et de l'Exploitation de l'Aéroport de Bruxelles-National	Infrastructure manager and Brussels airport
BG	Railway Administration Executive Agency	From the budget of the Ministry of Transport, Information Technology and Communications
CZ	Urad pro pristup k dopravni infrastrukutre - Transport Access Infrastructure Authority	State budget
DE	Bundesnetzagentur	State budget
DK	Danish Rail Regulatory Body (Jernbanenaevnet)	State budget
EE	Estonian Competition Authority (Konkurentsiamet)	State budget
EL	Regulatory Authority for Railways (RAS)	State budget
ES	CNMC	State budget
FI	Finnish Rail Regulatory Body	State budget
FR	ART (Autorité de régulation des transports)	State budget, fees paid by railway undertakings (+ coach and highways undertakings since 2016)
HR	Croatian Regulatory Authority for Network Industries HAKOM	Fee from infrastructure manager collected in turn from railway undertakings (percentage of total gross revenue of the railway services)
HU	Ministry for Innovation and Technology, National transport authority (Unit for Railway Regulation)	Actors of the railway market (supervisory fee, administrative fee); state budget
IE	Commission for Railway Regulation	Department of Transport and industry levy
IT	Autorità di Regolazione dei Trasporti (ART)	Fees from regulated companies
LT	Communications Regulatory Authority of the Republic of Lithuania	Fee from railway undertakings
LU	Institut Luxembourgeois de Régulation	Rail fund
LV	State Railway Administration	Funded by industry as a levy from infrastructure manager
NL	Authority for Consumers & Markets (ACM)	Ministry of Economic Affairs
NO	Norwegian Railway Authority	
PL	The Office of Rail Transport (Urząd Transportu Kolejowego)	State budget
PT	Autoridade da Mobilidade e dos Transportes (AMT)	Regulatory fees charged to regulated entities
RO	National Railway Supervision Council (Consiliul National de Supraveghere din Domeniul Feroviar)	State budget
SE	Transportstyrelsen	State budget
SI	AKOS Agencija za komunikacijska omrežja in storitve RS	Industry (IM, RUs)
SK	Dopravný úrad (Transport authority) NSAT	State budget
UK	Office of Rail and Road	Rail industry through licence fees and safety levy

Source: DG MOVE, 2020.

It is also interesting to look at the scope of rail regulatory bodies' competences. In some countries, a regulatory body can be both the rail licensing authority and the rail safety authority. It can also be in charge of regulation in sectors other than rail, or it can be the competition authority of the country, as shown in Table 17.

Table 17: Regulatory bodies with integrated competences for the rail market (2018)

MS	Name of the RB	Licensing authority?	Competition authority?	National safety authority?	Multimodal?
AT	Schienen-Control Kommission (SCK)	N	Y	N	N
BE	Service de Régulation du Transport ferroviaire et de l'Exploitation de l'Aéroport de Bruxelles-National	N	Y	N	Airport of Brussels national
BG	Railway Administration Executive Agency	N	N	Y	N
CZ	Urad pro pristup k dopravni infrastrukutre - Transport Access Infrastructure Authority	N	N	N	Aviation, road
DE	Bundesnetzagentur	N	N	N	Telecom, postal, energy
DK	Danish Rail Regulatory Body (Jernbanenaevnet)	N	N	N	N
EE	Estonian Competition Authority (Konkurentsiamet)	N	Y	N	Energy, water, postal, communications
EL	Regulatory Authority for Railways (RAS)	Y	N	N	N
ES	CNMC	N	Y	N	Media, energy, postal, telecommunications, aviation,
FI	Finnish Rail Regulatory Body	N	N	Y	N
FR	ART (Autorité de régulation des transports)	N	N	N	Road, airports
HR	Croatian Regulatory Authority for Network Industries HAKOM	N	N	N	Communications, postal
HU	Ministry for Innovation and Technology, National transport authority (Unit for Railway Regulation)	Y	N	N	N
IE	Commission for Railway Regulation	Y	N	Y	N
IT	Autorità di Regolazione dei Trasporti (ART)	N	N	N	Port, airports and road
LT	Communications Regulatory Authority of the Republic of Lithuania	N	N	N	Electronic communications, postal services
LU	Institut Luxembourgeois de Régulation	N	N	N	Telecommunications, energy, postal
LV	State Railway Administration	Y	N	N	N
NL	Authority for Consumers & Markets (ACM)	N	Y	N	Telecommunications; transport; postal services; healthcare; energy
NO	Norwegian Railway Authority	N	N	Y	N
PL	The Office of Rail Transport (Urząd Transportu Kolejowego)	Y	N	Y	N
PT	Autoridade da Mobilidade e dos Transportes (AMT)	N	N	N	Road, shipping logistics
RO	National Railway Supervision Council (Consiliul National de Supraveghere din Domeniul Feroviar)	N	Y	N	N
SE	Transportstyrelsen	Y	N	Y	Road, shipping, aviation
SI	AKOS Agencija za komunikacijska omrežja in storitve RS	N	N	N	Telecommunications, postal, media
SK	Dopravný úrad (Transport authority) NSAT	Y	N	Y	Road
UK	Office of Rail and Road	Y	Y	Y	Road

Source: DG MOVE, 2020.

5.12 Development of employment and social conditions in the rail market

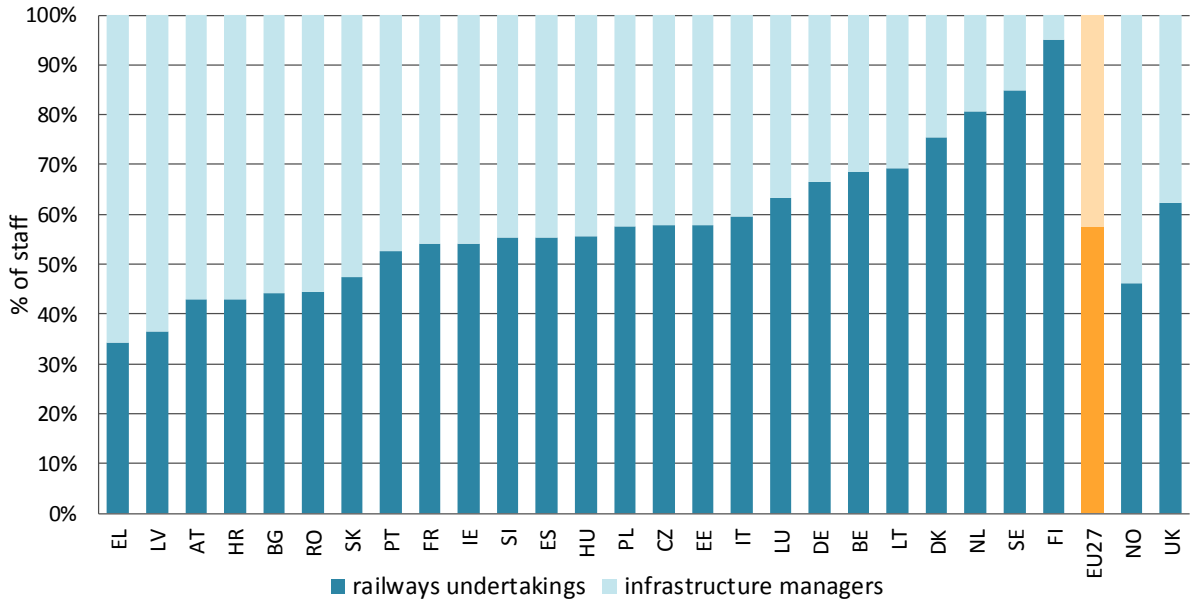
5.12.1 Employment in rail

In 2018, just over 916 000 people were reported as employed in the EU27 railway sector, about 527 000 of them by railway undertakings (both main and alternative operators) and 389 000 by infrastructure managers. For the EU28, just over 1 034 000 were employed, about 600 000 of them by railway undertakings and 434 000 by infrastructure managers[142].

Labour force of the rail market (infrastructure managers and railway undertakings)

Figure 89 shows the reported distribution of railway employees between infrastructure managers and railway undertakings per country in 2018.

Figure 89: Proportion of infrastructure managers and railway undertakings on total rail employees per country, (% in 2018)



Source: RMMS, 2020.

On average in 2018, railway undertakings employed 58% of all EU27 railway staff (same percentage for EU28). The proportion of the railway undertakings' staff of total rail staff appears to be the highest in Finland (95%) and the lowest in Greece (34%).

The distribution of staff between railway undertakings and infrastructure managers can differ strongly across countries for several reasons, for example:

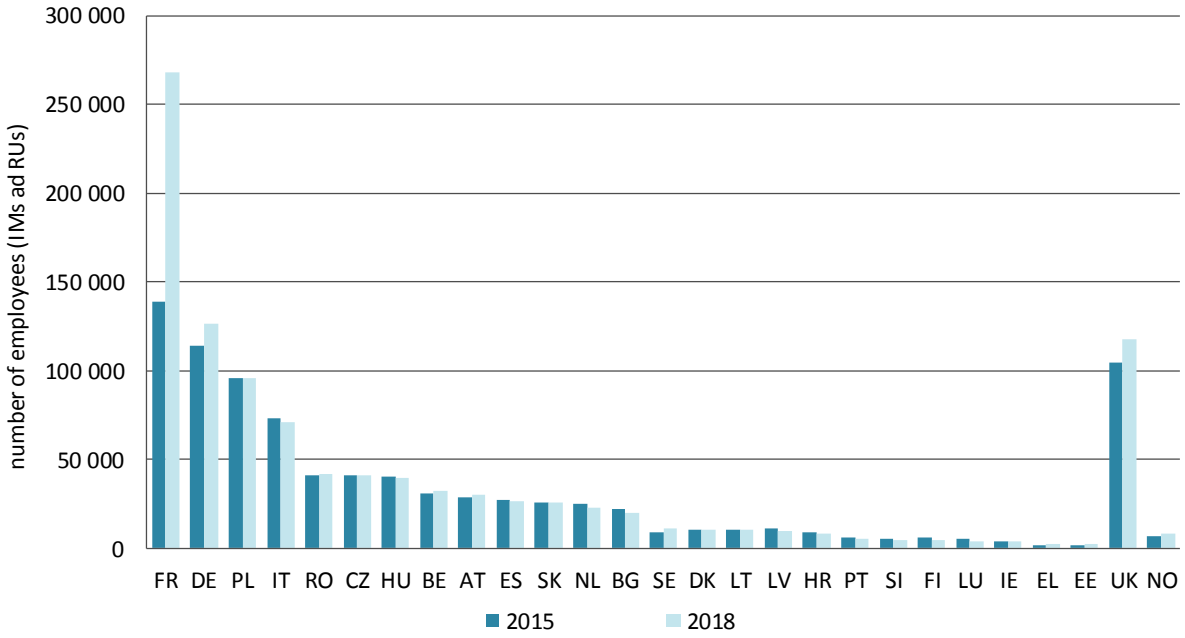
– The different roles played by infrastructure managers and railway undertakings. Some activities can be the responsibility of infrastructure managers in a country and of railway undertakings in another (e.g. staffing stations, providing passenger information, security).

[142] Total employment data reported in the RMMS are not directly comparable with the Statistical pocketbook. This is because the Statistical pocketbook's figures are based on Eurostat data, plus estimates, and refer only to railway undertakings' staff.

– The degree of outsourcing which infrastructure managers or railway undertakings use. The staff of external providers do not appear in their statistics. Typical examples are maintenance and cleaning staff, staff responsible for the management and provision of rolling stock and staff carrying out work on infrastructure renewals and enhancements.

Figure 90 compares how the absolute number of staff of the railway sector (infrastructure managers plus railway undertakings) evolved between 2015 and 2018 in each country.

Figure 90: Total number of employees in the rail market (infrastructure managers plus railway undertakings) per country (number, 2015 and 2018)



Source: RMMS, 2020. Series break for FR between 2015 and 2018.

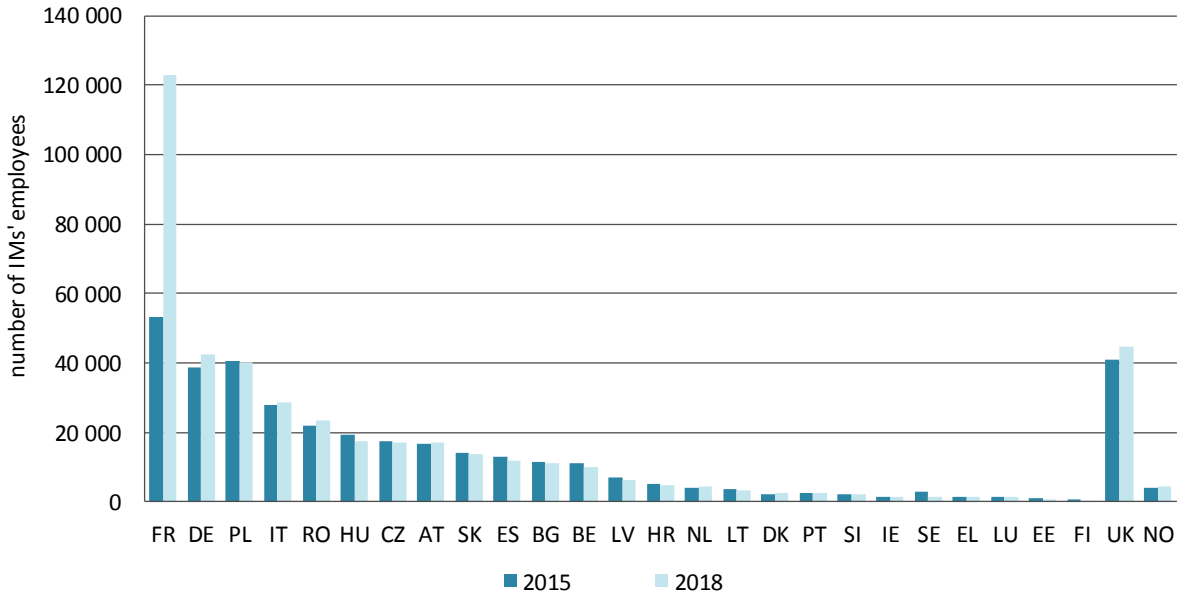
Apart from France, for which the break in the employment time series reported from 2016 onward remains unexplained, Germany, the United Kingdom, Poland and Italy are the countries with most staff (all have more than 70 000 employees).

Estonia and Greece appear to have the fewest rail staff (about 2 000 employees reported each). Excluding again France, the countries where the number of staff increased most between 2015 and 2018 are the United Kingdom and Germany (around 13 000 and 12 000 more staff respectively). In Italy, Bulgaria and the Netherlands staff numbers decreased over the same period by slightly more than 2 000 employees.

Labour force of the rail infrastructure managers

Figure 91 compares how the absolute number of staff of the infrastructure managers (both the main one and the others – if any) evolved between 2015 and 2018 in each country.

Figure 91: Total number of employees of the infrastructure managers per country (number, 2015 and 2018)



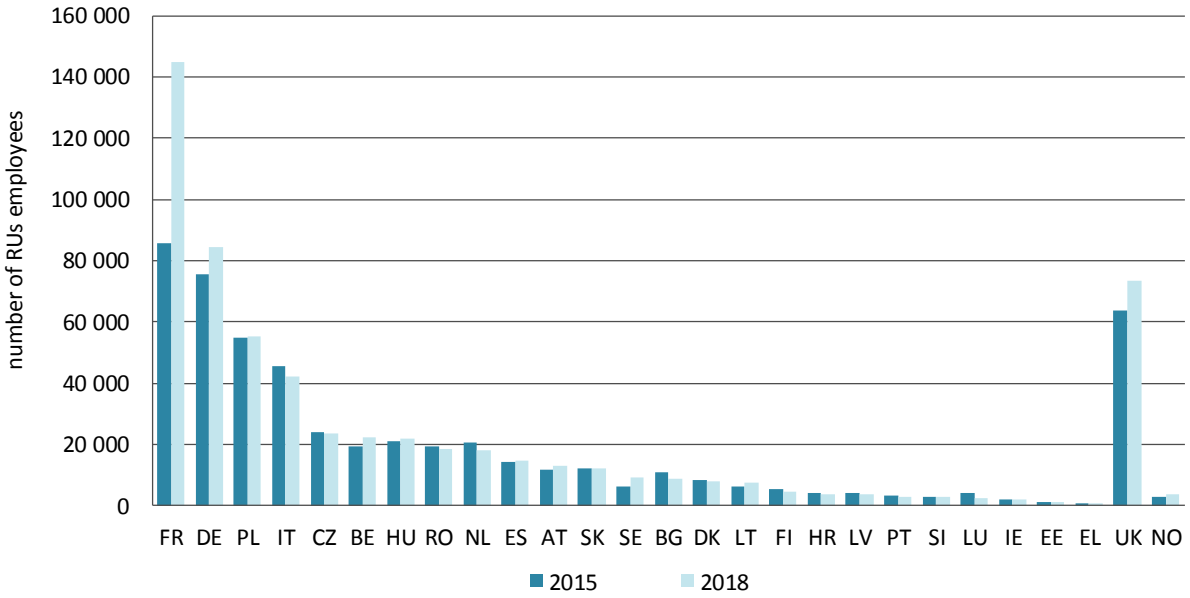
Source: RMMS, 2020. DK and SE 2015 not available, Series break for FR between 2015 and 2018.

Apart from France, the largest number of employees of infrastructure managers in 2018 were reported by the United Kingdom, Germany and Poland (all more than 40 000), whereas Finland and Estonia reported less than 1 000 employees. Based on RMMS data, excluding France, both the United Kingdom and Germany reported the highest increase in the number of infrastructure managers' staff (both adding more than 3 000 employees over the surveyed period), whereas Hungary, Spain and Sweden reported a decrease of more than 1 000 employees.

Labour force of the railway undertakings

Figure 92 compares changes in the absolute number of staff of the railway undertakings (irrespective of whether they are incumbents or alternative operators) between 2015 and 2018 in each country.

Figure 92: Total number of employees of the railway undertakings per country (number, 2015 and 2018)



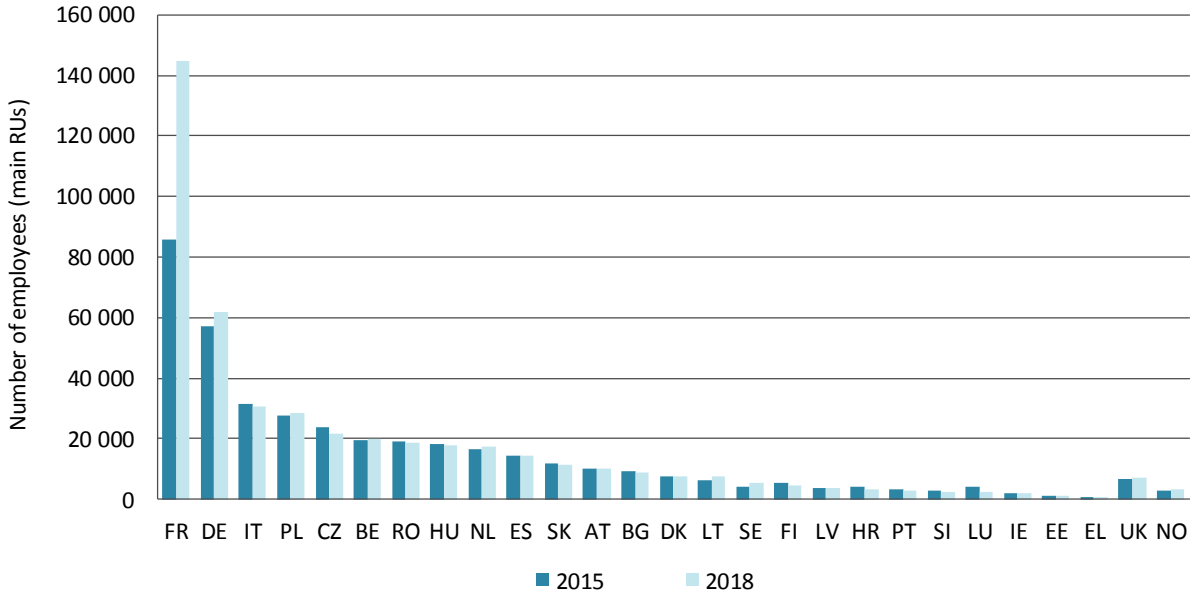
Source: RMMS, 2020. BE, CZ, SI, NO 2015 not available, Series break for FR between 2015 and 2018.

Apart from France, the highest number of staff for railway undertakings was reported by Germany, the United Kingdom, Poland and Italy (all with more than 40 000 employees). The smallest number of railway undertakings' employees is in Greece, well below 1 000 employees. Based on RMMS data (and excluding France), the highest increase in railway undertakings' staff between 2015 and 2018 was reported by the United Kingdom and Germany (more than 8 000 employees in both cases). In Italy, the Netherlands and Bulgaria, staff decreased by more than 2 000 employees.

For comprehensive monitoring of the developments in the rail market, it is important to look at how employment evolved separately both in historical operators and in new entrants in the markets.

Figure 93 shows the reported total number of employees of the incumbent or other main railway undertakings for 2015 and 2018 per country.

Figure 93: Number of employees of the main railway undertaking per country (number, 2015 and 2018)

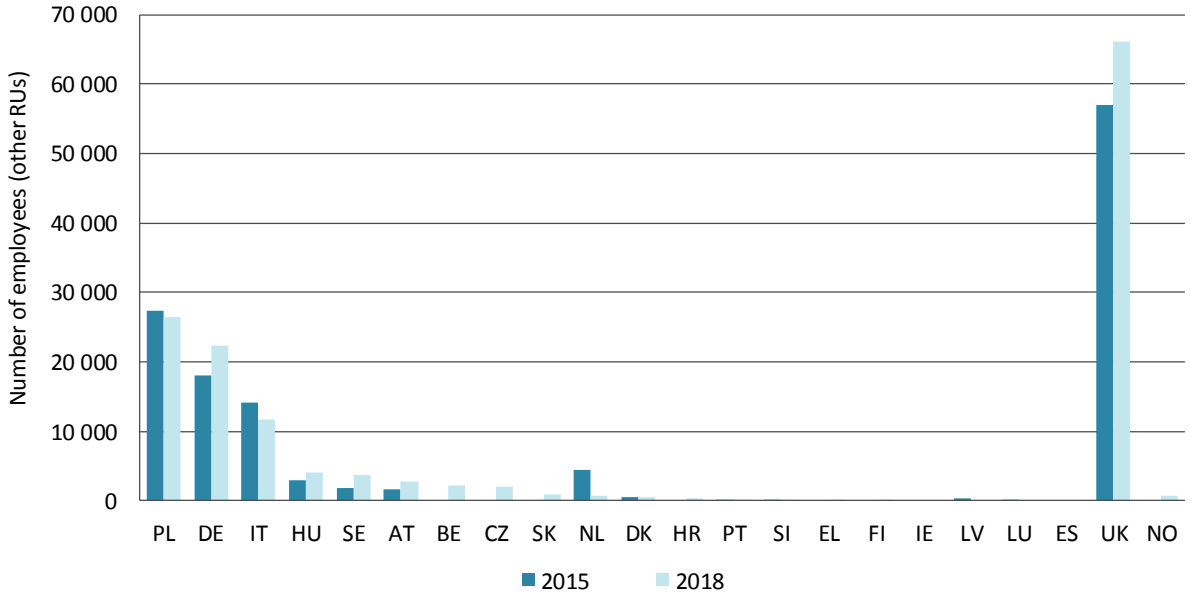


Source: RMMS, 2020.

Apart from France, the largest number of employees of the main railway undertaking in 2018 was in Germany and Italy (both more than 30 000 employees), whereas Greece reported fewer than 1 000 employees. RMMS data suggest that apart from France, the largest increase in staff of the main railway undertaking between 2015 and 2018 was in Germany (more than 4 000 employees), whereas a significant decrease appears in Czechia (more than 2 000 employees fewer than in 2015).

Figure 94 shows the reported total number of employees of other railway undertakings (alternative operators) for 2015 and 2018 per country.

Figure 94: Number of employees of other railway undertakings per country (number, 2015 and 2018)



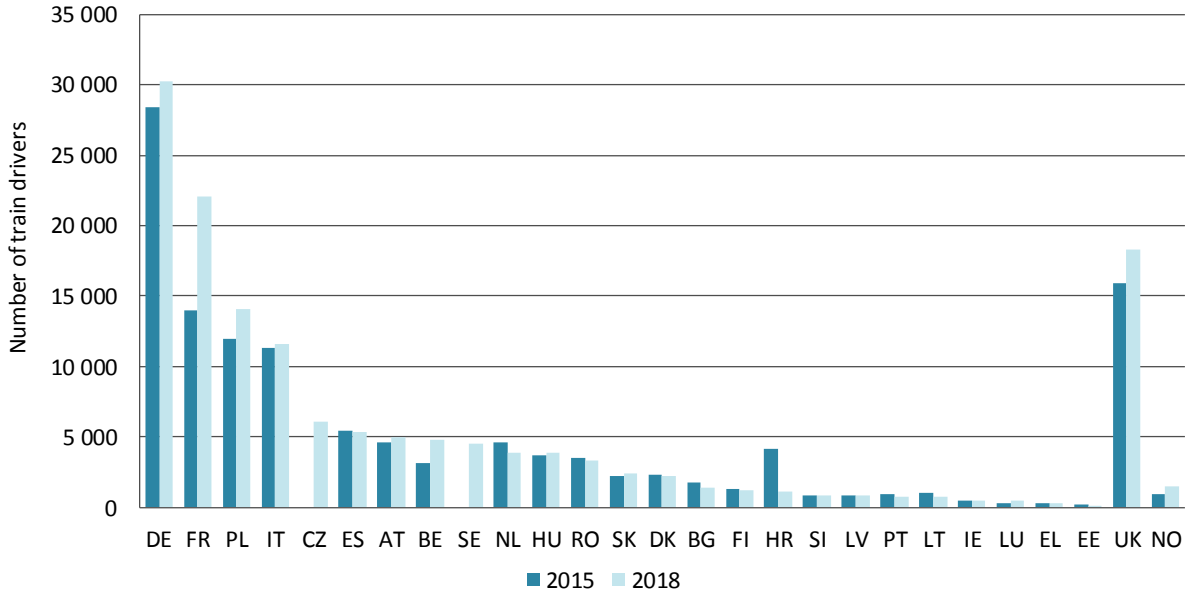
Source: RMMS, 2020. BE, CZ, SI, NO 2015 not available.

The United Kingdom appears to have by far the largest number of staff working in alternative operators in 2018. Poland, Germany and Italy also had more than 10 000 employees working for operators other than the incumbent. Among the countries that reported figures on this point for the RMMS, Finland, Greece and Slovenia all reported fewer than 100 employees working for alternative operators. Based on available data, between 2015 and 2018 the staff working for alternative operators increased more in the United Kingdom and Germany (more than 4 000 additional employees in both cases). The most significant decreases were in the Netherlands and Italy, which each lost more than 2 000 employees in these undertakings.

Train drivers

Figure 95 shows the reported total number of train drivers employed by main and other railway undertakings for 2015 and 2018 per country.

Figure 95: Number of train drivers of main and other railway undertakings per country (number, 2015 and 2018)



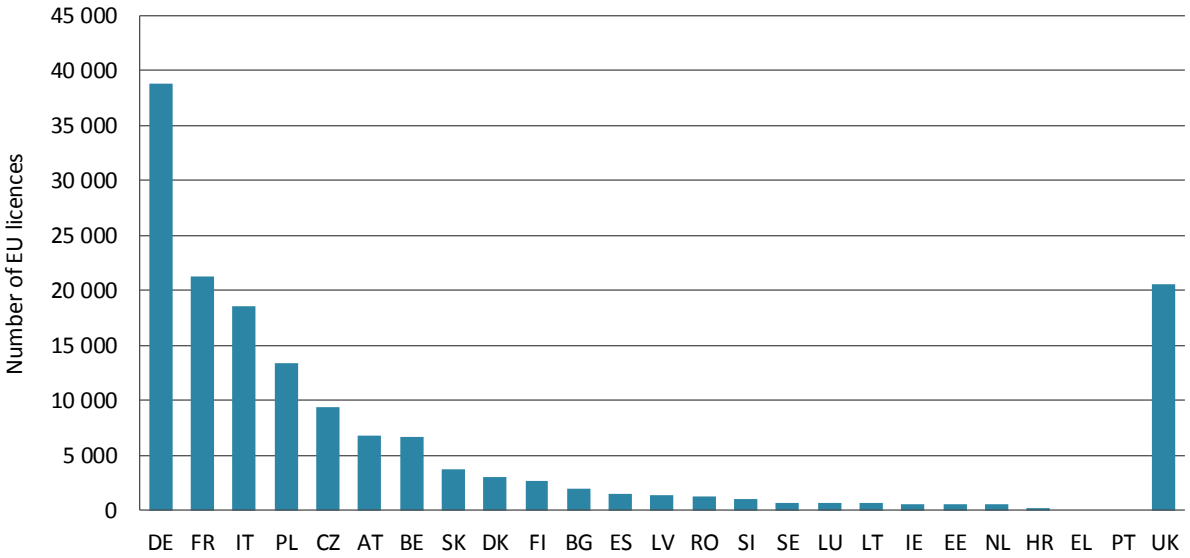
Source: RMMS, 2020. BE, SE 2015 not available.

In Germany, France, United Kingdom, Poland and Italy, more than 10 000 train drivers were working for railway undertakings. Estonia reported the lowest number of employed train drivers in 2018 (158). France in particular appears to have significantly increased the number of train drivers (an increase of more than 8 000 between 2015 and 2018), followed by Poland, Germany and Belgium (all reporting an increase of more than 1 500 train drivers in the surveyed period). A significant decrease of more than 3 000 train drivers has been reported for Croatia.

The RMMS collects information about the number of employees working for railway undertakings as train drivers. However, not necessarily all staff that have a train driver licence are in active employment as a train driver. It is interesting therefore to look at the number of train driver licences, as this could provide a rough idea of available resources in case of a shortage of such a specialised and skilled function.

Directive 2007/59/EC introduced an EU certification scheme for train drivers including the issuing of European train driver licences by the national safety authorities and harmonised complementary certificates by the employer. All train drivers should hold a European licence from October 2018 onwards. Figure 96 shows the reported total number of valid EU train driver licences in 2018 per country, as collected by ERA from the national safety authorities.

Figure 96: Number of valid EU train driver licences, (2018)



Source: European Union Agency for Railways (ERA). HU not available.

Germany has issued the highest absolute number of EU train driver licences, followed by France, Italy and Poland (all more than 10 000 licences). Some reported a lower number of EU licences issued than active train drivers. This is partly due to a delayed implementation of the EU train driver licence scheme in some countries and partly to train drivers' mobility. For example, Greece and Portugal reported no EU licence issued as of end-2018.

Box 12: Language pilot train drivers (Translate4rail)

The Commission has created the legal basis for exploring alternative options to the current train drivers' language requirements, in the framework of pilot projects. The alternative options could consist, for example, in a set of standard messages or electronic translation tools that help drivers ensure effective and efficient communication with the infrastructure manager and ensure a safety level at least equal with the current requirements. The legal basis in this case is provided by Commission Regulation (EU) 2019/554 of 5 April 2019, which revises Annex VI to Directive 2007/59/EC on the certification of train drivers operating locomotives and trains on the railway system in the Community. It is possible to request a derogation from the Commission for conducting pilot projects to test alternative options with train drivers having a level of language competence lower than B1 (the level currently required).

The project Translate4Rail (translation for breaking language barriers in the railway field) is funded by the Shift2Rail Joint Undertaking and coordinated by the Freight Department of the International Union of Railways (UIC). The project kicked off in December 2019 and has a duration of 24 months. It aims to develop a language tool that will provide drivers and traffic controllers with a set of predefined messages in normal and exceptional circumstances in all countries. Pilot testing will take place on different corridors. More information is available here: https://translate4rail.eu/

5.12.2 Socio-demographic structure of the rail labour market

The rail sector is traditionally characterised by an ageing workforce and a predominance of male workers.

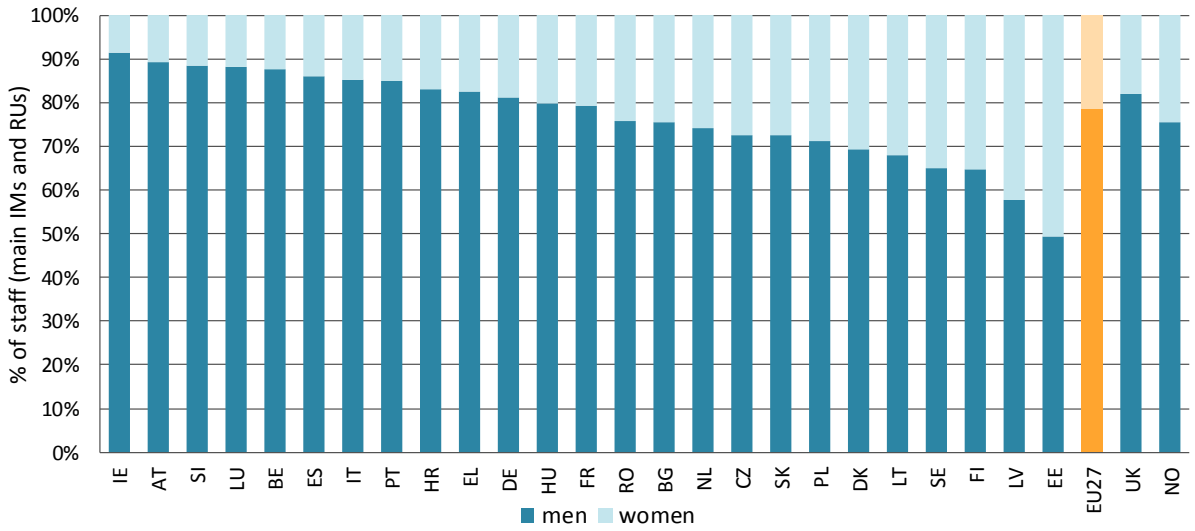
Further to these traditional characteristics, technological developments and digitalisation are profoundly impacting the employment structure and characteristics.

Structure by gender

Women account for about 21% of both the EU27 and EU28 railway workforce: for some professional categories of the rail sector, the gender gap can be even higher.

Figure 97 shows the gender mix of railway staff (main infrastructure managers and railway undertakings) per country in 2018, as reported in the RMMS.

Figure 97: Total employees (main infrastructure managers plus railway undertakings) by gender structure, (% in 2018)

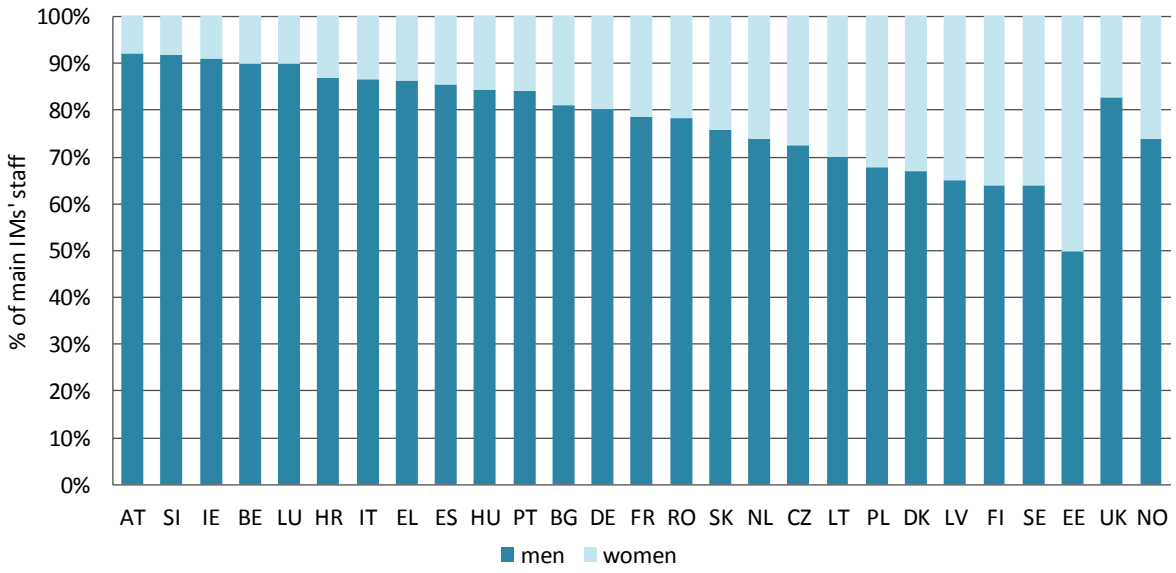


Source: RMMS, 2020.

The highest share of women on the total workforce was reported by Estonia (51%) followed by other Baltic and northern countries such as Latvia, Lithuania, Finland, Sweden and Denmark. Ireland reported the lowest share (9%).

The RMMS collects information on the gender mix, also distinguishing between employees of main infrastructure managers and railway undertakings. Figure 98 shows the gender mix of main infrastructure managers' staff per country in 2018.

Figure 98: Main infrastructure managers' employees by gender structure (% in 2018)

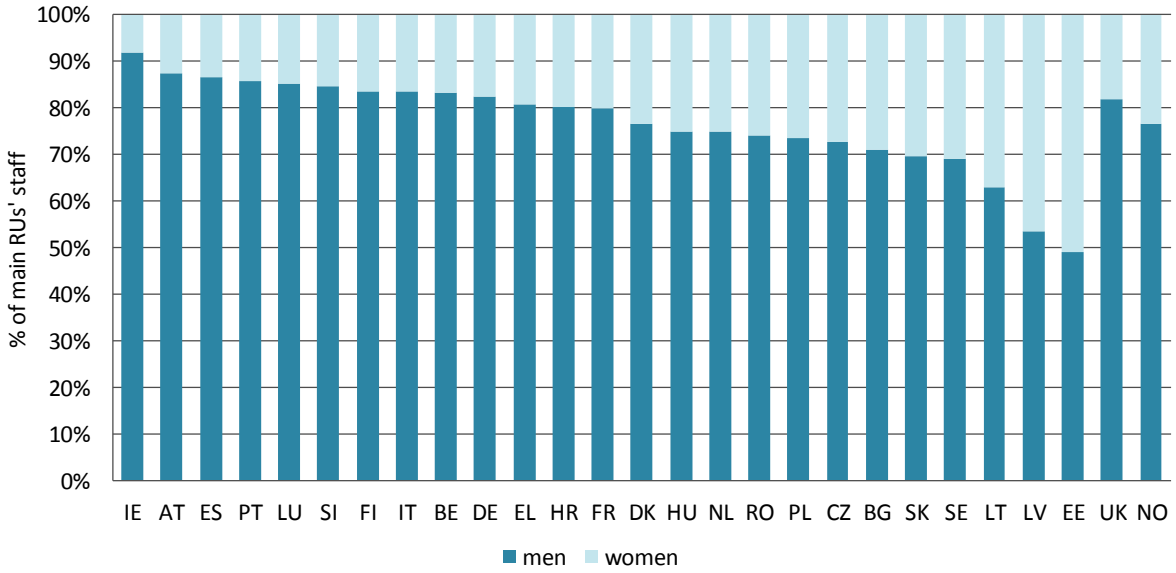


Source: RMMS, 2020.

Estonia is still the country with the largest share of women (50%). For infrastructure managers the lowest share has been reported by Austria and Slovenia (8%).

Figure 99 shows the gender mix this time for the main railway undertakings' staff (data 2018 by country).

Figure 99: Main railway undertakings' employees by gender structure (% in 2018)



Source: RMMS, 2020.

Again, Estonia reported the highest share of women (51%). Ireland reported the lowest (8%).

Box 13: Gender aspects in rail

The transport sector is not gender balanced. Within it, the rail sector remains a male-dominated sector, especially in technical positions such as drivers or technicians and managerial positions.

The objective of the Women in Transport – EU Platform for change, launched on 27 November 2017, is to strengthen women's employment and equal opportunities for women and men in the transport sector[143].

Several EU associations from the rail sector have joined the platform, as well as the European Union Agency for Railways and Shift2Rail Joint Undertaking. The EU associations may directly bring actions to the platform or channel actions from their members: 15 actions had been shared by June 2020, out of which eight are from the rail sector.

The website of the platform contains a declaration (signed by a number of rail actors) to ensure equal opportunities for women and men in the transport sector, an online module to exchange good practices and examples of measures that can be taken at company level to improve gender balance[144].

On 26 September 2019, the High-Level Conference 'Towards a more inclusive and diverse transport sector' took place, with the aim of promoting diversity and of raising awareness on its importance. At this event, the Commissioner for Transport launched a wide network of EU 'diversity ambassadors' for the transport sector.

Finally, the Commission published in December 2018 the report *Business case to increase female employment in transport*[145]. In the report, a number of case studies are performed with companies that are advanced in implementing gender equality policies and measures across all transport modes. A cost-benefit analysis is applied to these measures. Their transferability to smaller, not yet gender balanced, companies is also assessed.

Structure by age

An ageing workforce continues to be a concern for the sector, given the risk of losing specialised skills in the medium term.

Figure 100 shows how in 2018 in the EU27 the average proportion of staff of railway undertakings who were older than 50 years was 42.4%. This is an increase of 2.2 percentage points compared to the 40.2% of 2015 (percentages for EU28 were 42.1% and 40% respectively, up by 2.1 percentage points). However, the share of younger employees (below 30 years) working for railway undertakings has also increased in the EU27: from 8.2% in 2015 to 10.6% in 2018 (8.4% and 10.6% respectively for the EU28).

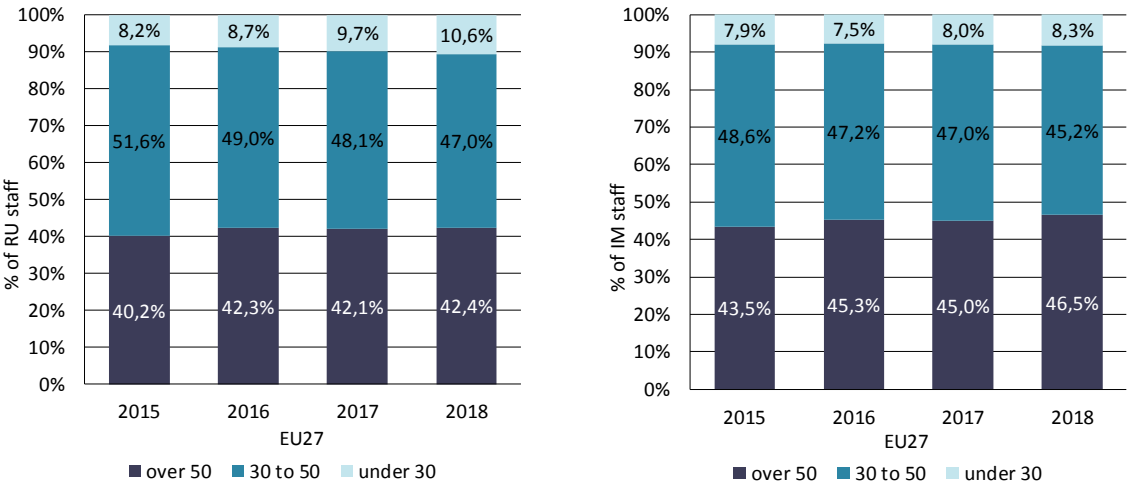
Infrastructure managers tend to have an older workforce, but the share of younger employees increased also for them between 2015 and 2018: from 7.9% to 8.3% in the EU27 (Figure 100) and from 8.4% to 8.7 in the EU28.

143 https://ec.europa.eu/transport/themes/social/women-transport-eu-platform-change_en

144 https://ec.europa.eu/transport/themes/social/women-transport-eu-platform-change_en

145 The study is available here: https://op.europa.eu/en/publication-detail/-/publication/6f833428-54f9-11e9-a8ed-01aa75ed71a1/language-en/format-PDF/source-93300850 .

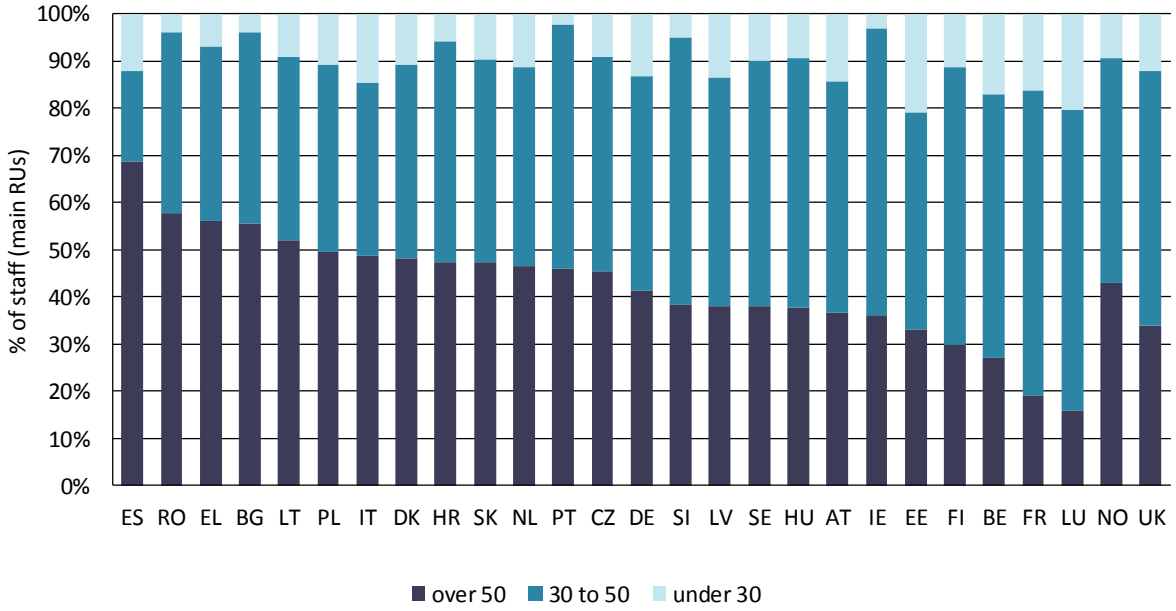
Figure 100: Employees by age group, main railway undertakings and infrastructure managers (%, 2015-2018)



Source: RMMS, 2020. Data for 2015 were not available for RUs in LV, LU, ES and SE. Data for 2015 were not available for IMs in ES, LU and LV.

If we look at the distribution of main railway undertakings' staff by age group per country (Figure 101), the proportion of more aged workforce is largest in Spain, Romania, Greece, Bulgaria and Lithuania, where over 50% of the workforce was over 50 in 2018. By contrast, less than 30% of the workforce was over 50 in Luxembourg, France, Belgium and Finland. Estonia and Luxembourg are also the only countries to have reported a proportion of workers under 30 higher than 20%.

Figure 101: Main railway undertakings' employees by age group and country, (% in 2018)

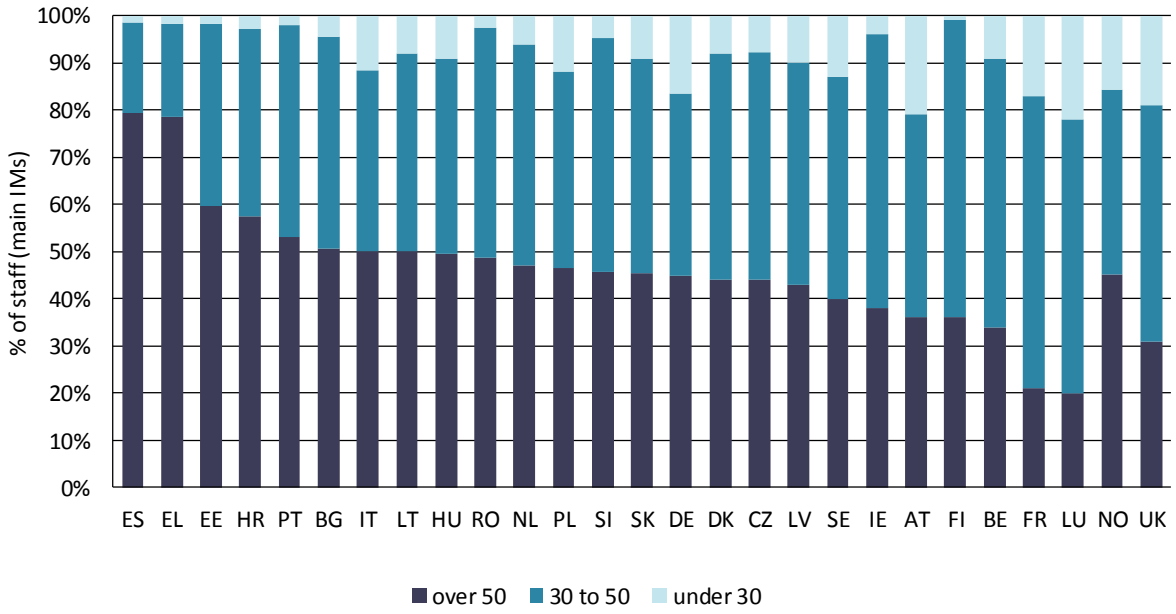


Source: RMMS, 2020.

If we look at the distribution of main infrastructure managers' staff by age group per country (Figure 102), the proportion of more aged workforce is greatest in Spain, Greece and Estonia, where over 60% of the workforce was older than 50 years in 2018. In contrast, less than 30% of the workforce

were over 50 in France and Luxembourg. Luxembourg is also the only country to have reported a proportion of workers under 30 higher than 20%.

Figure 102: Main infrastructure managers' employees by age group and country, (% in 2018)



Source: RMMS, 2020.

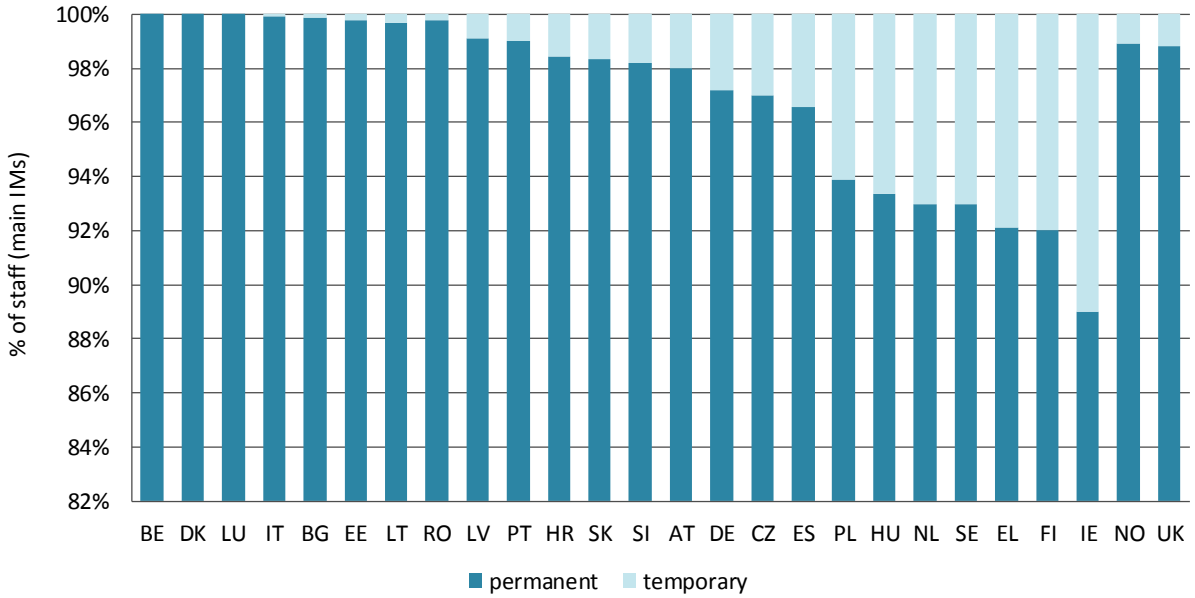
Structure by contract type

The RMMS also collects information on three aspects of employment contracts, both for the main infrastructure manager and for the incumbent/other main railway undertakings:

- permanent or temporary contracts;
- full-time or part-time working hours; and
- apprenticeships/training.

Figure 103 and Figure 104 show the proportions of temporary and permanent employees of the main infrastructure manager and the incumbent/other main railway undertakings respectively, per country in 2018.

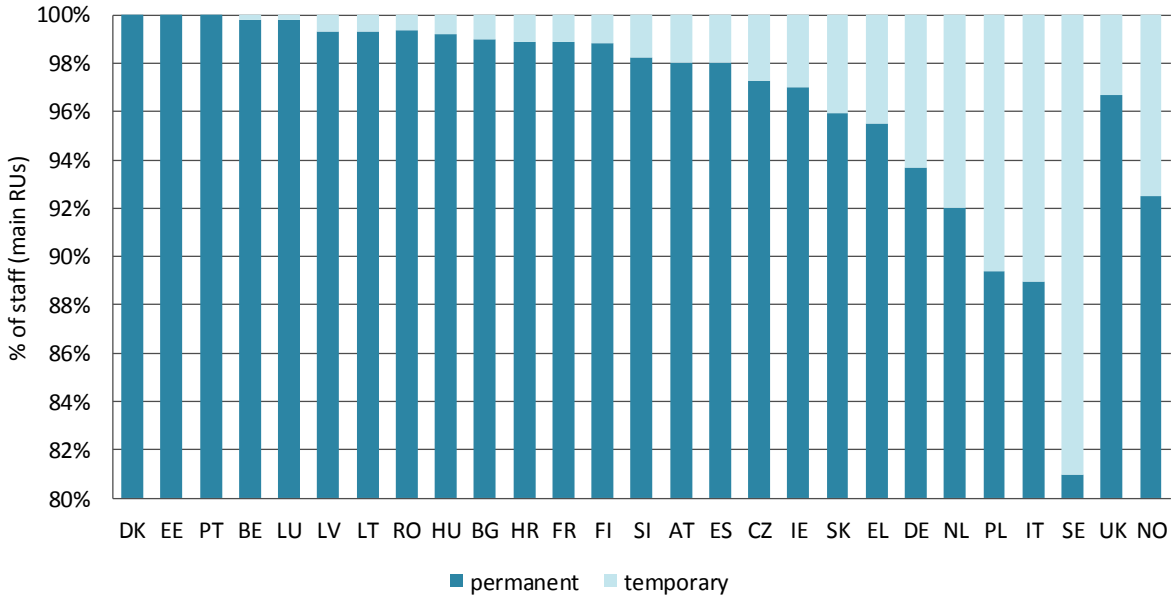
Figure 103: Employees of main infrastructure manager by contract type (permanent or temporary) per country, (% in 2018)



Source: RMMS, 2020. PT 2018 adjusted, FR 2018 not available.

All employees of infrastructure managers appear to have permanent contracts in Belgium, Denmark and Luxembourg, whereas in Ireland only 89% of them do.

Figure 104: Employees of main railway undertaking by contract type (permanent or temporary) per country, (% in 2018)

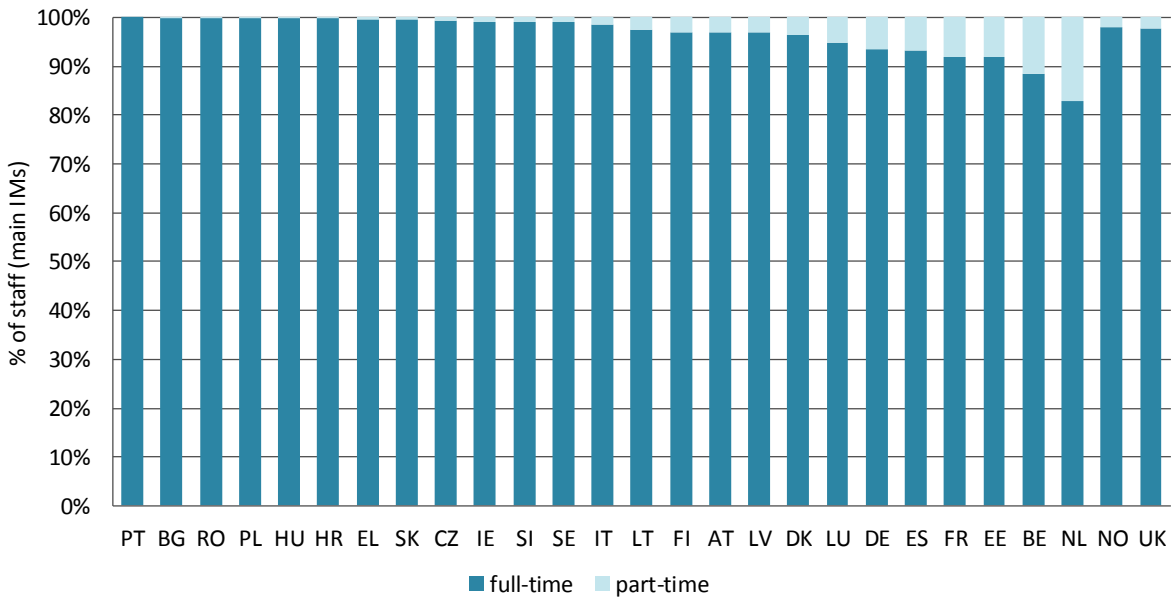


Source: RMMS, 2020.

All employees of railway undertakings' employees appear to have permanent contracts in Denmark, Estonia and Portugal, but in general the proportion is quite high almost everywhere. Only Sweden, Italy, Poland, the Netherlands, Germany and Norway have a proportion of railway undertakings' employees with permanent contracts lower than 95%.

Looking at contracts from the point of view of working hours, Figure 105 and Figure 106 show the proportions of full-time and part-time employees per country in 2018 for the main infrastructure managers and the main railway undertakings respectively.

Figure 105: Employees of main infrastructure manager by contract type (full-time or part-time) per country, (% in 2018)

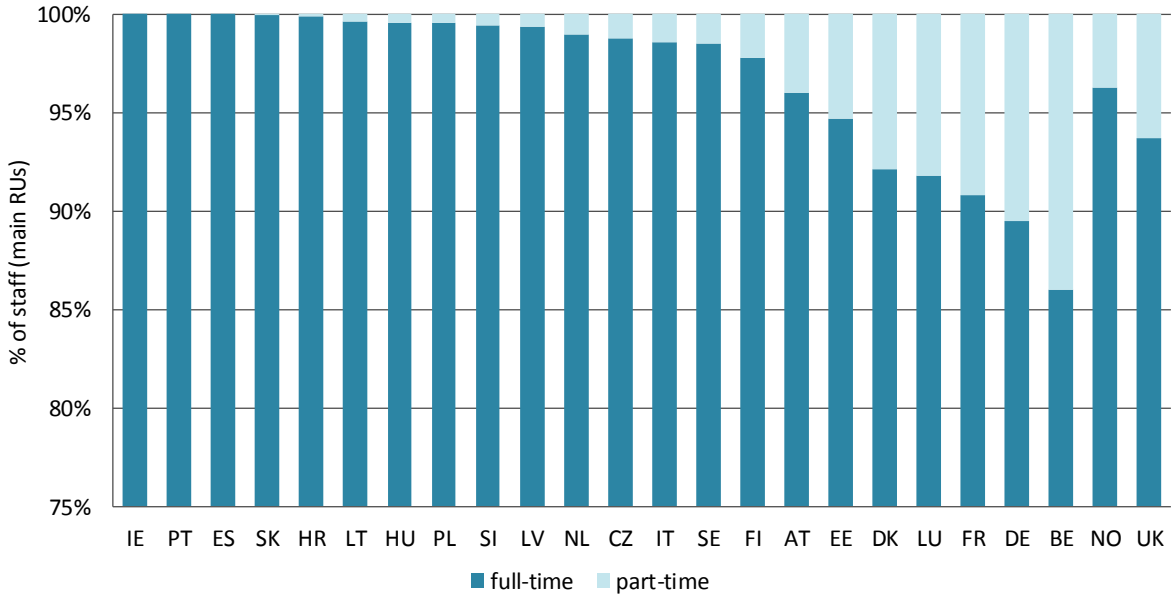


Source: RMMS, 2020.

All infrastructure manager's employees appear to have full-time contracts in Portugal. The lowest share of full-time contracts can be found in the Netherlands (83%) and Belgium (88%).

As for the main railway undertakings, all employees appear to have full-time contracts in Ireland, Portugal and Spain. The lowest share of full-time contracts can be found in Belgium (86%).

Figure 106: Employees of main railway undertaking by contract type (full-time or part-time) per country, (% in 2018)

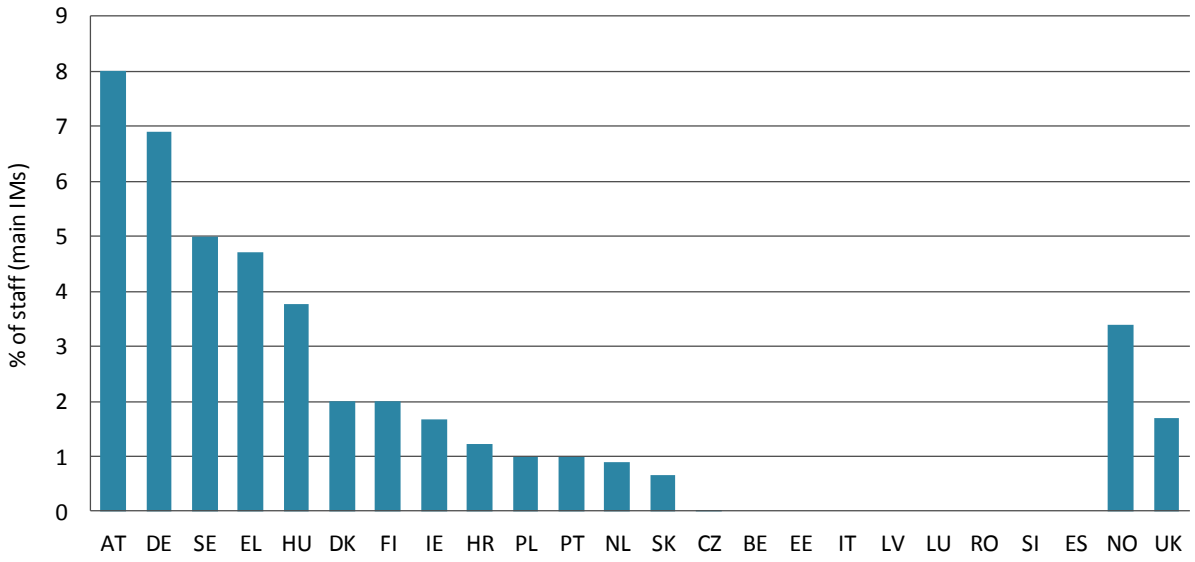


Source: RMMS, 2020. No data 2018 for BG, EL and RO.

Finally, Figure 107 and Figure 108 show the proportions of staff of the main infrastructure manager and the incumbent/other main railway undertaking respectively who are currently in an apprenticeship or other training (data 2018, per country[146]).

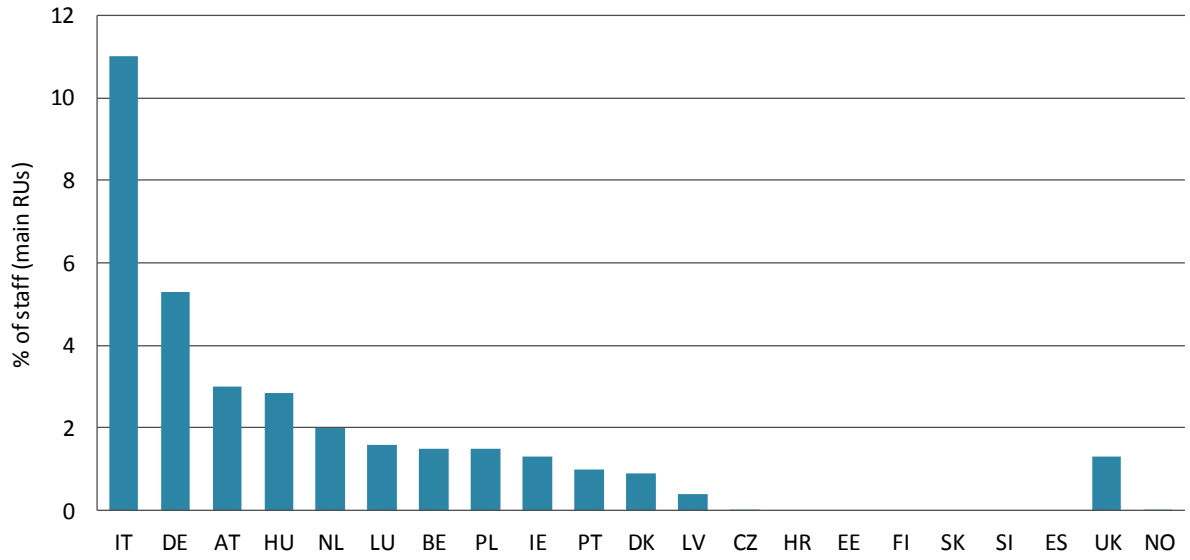
[146] Data reported for these aspects have been not always consistent over the years.

Figure 107: Employees of main infrastructure manager in training per country, (% in 2018)



Source: RMMS, 2020. No data for BG, FR and LT 2018.

Figure 108: Employees of main railway undertaking in training per country, (% in 2018)



Source: RMMS, 2020. No data for BG, FR, EL, LT, RO and SE.

Training needs are a fundamental aspect of employment in the railway sector, given increased digitalisation, the development of mobility as a service and the age structure of the staff. The Shift2Rail Joint Undertaking contracted out three studies in the 'Human capital' working area of its research programme:

- to study the socio-economic context of the rail sector: this study analyses the socio-economic aspects of human capital, notably the skills that will be needed in the future for the different categories of railway staff, from workers to engineers, railway managers and researchers[147];
- to develop a preliminary prognosis on the impact of the market introduction of the Shift2Rrail research and innovation programme and its technologies on human capital[148];
- to develop strategies and trainings based on the above analyses to bridge the skill gaps, with a special attention to ensuring increased flexibility of railway staff[149].

Box 14: Skills shortages, Blueprint initiative and the rail sector

There are long-standing and emerging skill shortages for drivers, engineers and other technical professions in the European railway sector. The EU supports a number of initiatives aiming at improving skills availability and the sector's attractiveness.

With a budget of EUR 4 million, 'Rail supply and transport industries' (including both manufacturing and provision of services) is one of the sectors included in the 4th wave of the Blueprint initiative, starting in 2021. The Blueprint, launched as part of the Commission's skills agenda, is a framework for strategic cooperation between key stakeholders such as businesses, education and training providers, social partners and public authorities to deliver sector-specific skills solutions for a number of issues. In the rail sector, digitalisation has a strong impact on production, processes, operations and skill needs. The key digital innovations include driverless operations, automation of planning, predictive maintenance and automation of traffic control. Under the coordination of the University of Genoa, the STAFFER (Skill Training Alliance For the Future European Rail System) Alliance, including key European suppliers, operators, infrastructure managers and universities, will address the shortages in particular occupational fields such as system engineers and architects, software developers, IT security specialists and big data analysts. The project started on 1 November 2020 and will have a duration of 4 years.

5.13 Digitalisation

Digital technologies are a key enabler for enhancing railways' performance. A wider implementation of digital solutions will benefit customers and businesses alike. On the other side, digital loopholes and asymmetric implementation can generate technical market access barriers and hinder smooth rail transport across borders.

[147] https://op.europa.eu/en/publication-detail/-/publication/e904c88d-cec3-11e9-992f-01aa75ed71a1/language-en/format-PDF/source-search

[148] https://op.europa.eu/en/publication-detail/-/publication/101a3662-ced5-11e9-992f-01aa75ed71a1/language-en/format-PDF/source-search

[149] https://op.europa.eu/en/publication-detail/-/publication/6fd5b502-cecb-11e9-992f-01aa75ed71a1/language-en/format-PDF/source-104143013

ERTMS

The European Rail Traffic Management System (ERTMS) has several advantages in comparison to class-B systems[150]. In addition to cross-border interoperability, ERTMS allows for higher safety, capacity and reliability, and a potential reduction in maintenance costs.

Discussions on a European rail traffic management system have been ongoing for almost 40 years. However, climate change, and in particular the pivotal role railways will play in transport's contribution to the reduction of GHG emissions, as well as the overall move to digitalised railways, has made the swift deployment of the European Train Control System (ETCS) and the Future Railway Mobile Communication System (FRMCS) more urgent than ever.

Long disputed, the implementation of ERTMS is now no longer questioned. With ageing national systems, many Member States see ERTMS as the answer to the overall necessary modernisation of their railway systems.

The question today is how quickly the transition from old, national systems can be organised, how the future evolution of ERTMS can be made simpler, and how rapid rollout can be ensured while ensuring that investments are not lost with future developments as ERTMS will constitute the backbone for a digital, connected single European railway area.

Modernising railway operations through digitalisation is additionally an important European industrial project: ERTMS is already now the gold standard for rail traffic management systems, as can be seen in its deployment in a growing number of countries around the world.

ERTMS is set out in the technical specification for interoperability, the CCS-TSI[151].

The TEN-T guidelines[152] establish ERTMS as one of the requirements for railway infrastructure and sets out a deadline for its deployment on the core network by 2030 and on the comprehensive network by 2050. Building on this, the ERTMS European deployment plan (EDP[153]), adopted by the European Commission in January 2017, sets out deadlines for deploying ERTMS on some sections of the core network corridors (CNCs) for the period 2017-2023. The number of km planned for each year are shown in the figure below:

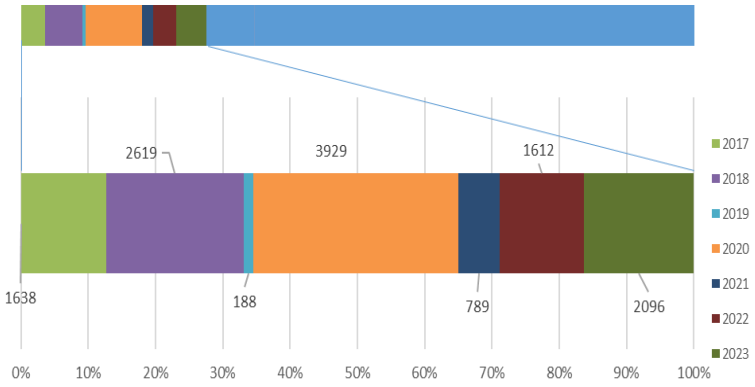
[150] Class-B systems are national legacy signalling systems. In some countries, they need to co-exist with ERTMS. They make the ERTMS installations more complex and expensive to realise.

[151] Commission Regulation (EU) 2016/919 of 27 May 2016 on the technical specification for interoperability relating to the control-command and signalling subsystems of the rail system in the European Union (consolidated version) available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02016R0919-20200311.

[152] Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network.

[153] Commission Implementing Regulation (EU) 2017/6 on the European Rail Traffic Management System European deployment plan on 5 January 2017.

Figure 109: ERTMS deployment on CNCs for the period 2017-2023



Note: Indicative number of km for each year in the EDP. The top bar shows the overall obligations by 2030 and the bottom bar indicates the obligation broken down by years in the period from 2017 to 2023.

The planning and the state of deployment of ERTMS are constantly monitored by the Commission and in particular by Matthias Ruete, the European Coordinator for ERTMS, who in June 2020 published his work plan.

In April 2020, 12% of the core network corridors were in operation with ETCS (i.e. 6 120 km) and 63% of the core network corridors with GSM-R[154]. According to the EDP, this signalling system should be deployed on 15 682 kilometres of track by 2023; so far, the system has been installed on 5 906 kilometres of the planned track length (or 38%), which represents 78% of the target planned for the end of 2019.

Most delays are due to insufficient national budgets, while another reason is that the lines are usually modernised prior to ERTMS deployment. Any delays in the works due to longer tendering procedures, insufficient quality of documentation or a lack of industrial capacity affect subsequent ERTMS deployment. In some cases, national systems currently in use have not reached obsolescence or there is a limited amount of rolling stock equipped with ERTMS: this can result in a lack of urgency from the infrastructure manager's point of view. Finally, lack of experience with the new ETCS Baseline 3 and availability of latest ETCS products are another of the recurrent reasons for delays.

In the last 5 years, approximately 5 000 new vehicles have been introduced in Europe. However, only some 900 of the new vehicles are equipped with ERTMS as most of them were subject to some derogations or were exempted from the requirement to fit ERTMS (for example because of use on regional services). The total number of vehicles already retrofitted is estimated at approximately 2 700.

It is evident that delays in one Member State jeopardise investments made by other Member States on the same corridor. The Commission considers that a greater effort is needed to ensure that deadlines previously agreed are met.

[154] All data provided in this work plan are based on the alignment of the core network corridors and deployment deadlines as set out in the EDP in force, including the UK.

In order to mitigate some of the previously stated reasons for delays, the European Coordinator for ERTMS and the European Commission have taken since 2017 a very active role in the monitoring of trackside deployment and on-board retrofitting, with the support of the ERTMS Deployment Management Team (DMT[155]). Deployment monitoring reports and lessons learnt for different ERTMS challenges have been produced and are dealt with mainly through ERTMS Stakeholders Platform and ERTMS Action Plan[156].

Provision of digitally enhanced passenger services

Developing mobility as a service (MaaS) calls for a good level of integrated mobility domestically and across borders, providing people with a sustainable alternative to private car use and ownership. The efficient integration of rail passenger transport into the wider network of public transport has two main prerequisites:

- a shared, integrated information system; and
- a shared, integrated ticketing system.

A shared, integrated ticketing system needs wide-ranging agreements, common ticketing/commercial tools and the existence of reference standards and technical interfaces for data exchange.

A shared, integrated information system is needed to make relevant information easily available to all actors, including passengers, on: (i) the service planned (availability of the service); (ii) the service as it is deployed (real-time information); and (iii) pricing, ticketing, etc.

Some tools have already been developed for urban and suburban rail transport, the aim being to reach the following objectives:

- Accurate real-time localization using satellite-based positioning for tracking and tracing is being gradually deployed in rail and urban public transport vehicles, providing the necessary data about the vehicle position to the integrated information systems. The standardised use of position navigation timing (PNT) services for rail logistics will be included in 2022 TSI revision (TAF TSI). On satellite positioning / enhanced odometry using global navigation satellite system (GNSS) for rail signalling, it will be important to leverage on best practices across transport modes and from the aerospace and defence sectors.

- Smart card tickets enable passengers to carry a pass covering a journey, line or number of zones, permitting unlimited travel for a period. Smart card tickets can also be pre-loaded with cash to allow pay as you go (PAYG) for individual journeys. A national smart card system, OVchipkaart, now operates in the Netherlands.

- ‘Contactless’ payment, developed in London but being licensed to other cities, allows passengers to use a credit or debit card, or a mobile phone, to register the start and end of each journey and to pay in arrears. However, most PAYG systems require that passengers present their tickets at readers or ticket barriers at the start, and sometimes the end, of each journey. PAYG systems not based on ticket gates but on mobile phone apps with check-in and permanent localisation of the customer are being implemented or are already in the

[155] DMT is a consultant facility established by the Commission.
[156] ERTMS deployment action plan. European Commission. 2017. Available online: https://ec.europa.eu/transport/sites/transport/files/2017-ertms-deployment-action-plan.pdf

rollout phase in some Member States. Provision of information, however, raises a number of challenges for the industry and for regulatory bodies and competition authorities. For example:

- To establish a level playing field between rail operators, new entrants may need to be given non-discriminate full technical and commercial access to the existing pan-European booking platforms, which have historically been controlled by the incumbent operator.
- To be better able to connect and compete with other modes, full timetable and pricing information needs to be available sufficiently far in advance for potential passengers to plan and book with confidence. Airlines typically offer booking 1 year ahead, but in the case of railways this may only be possible up to 3 months ahead.

However, framework conditions in the sector still need to evolve:

- Real-time data based on accurate vehicle localization relying on European satellite-based positioning systems (i.e. Galileo) needs to be available so that in case of disruptions railway undertakings and ticket vendors can properly inform passengers via websites, apps and station information displays.
- Where smart cards or PAYG systems are used, mechanisms backed by contractual agreements are needed to: (i) identify or estimate on which service(s) the passenger travelled and to which operator(s) their fares should be allocated or apportioned, including clearing between the involved operators; and (ii) make the appropriate payments.
- So far, smart card and PAYG systems are often confined to a city or region. However, PAYG systems using existing smartphone infrastructure are in the rollout phase in some Member States.
- Shared ticketing and information systems would avoid market fragmentation and enable the passenger to choose the most suitable offer.

Provision of digitally enhanced freight services

Digitalisation provides the opportunity for railways to offer better services to customers and to be better integrated into multimodal logistics chains from an administrative, contractual and operational point of view.

Collection and exchange of reliable data improve the efficiency, reliability and maintenance of transport operations, allow for smooth modal integration and ultimately add value to transport itself (tracking and tracing, smart contracts, certification of goods conditions, electronic exchange of documentation cutting red tape, etc.).

The Commission supports several initiatives concerning the railway and logistics ‘data layer’:

- Initiatives intended to achieve a more efficient and responsive capacity allocation process across networks:
  - TimeTable Redesign (TTR) (led by RailNetEurope – RNE)

- Temporary Capacity Restriction (TCR) (led by RailNetEurope – RNE)
- Evolution of capacity and traffic management at European level (by the PRIME Digital subgroup).

- Initiatives intended to increase the available real-time information on trains, wagons and goods, both for business-to-business (B2B) and business-to-administration (B2A) processes:
  - Issueslog No 3, linking a **train** to its **status** (ready/running etc.), **position** and **composition**
  - defining **train identifiers,** developing a good estimated time of arrival (ETA) methodology with electronic exchange of information on estimated time of arrival (ELETA)
  - linking the real-time available information to the **intermodal loading units** (when relevant) and eventually to the **goods** transported – the e-consignment note, for business purposes ('B2B') and the electronic freight transport information (eFTI) for administrative authorities ('B2A').

Box 15: Issues logbook - Provision for interoperability and harmonisation of operations

Cross-border operational and interoperability issues remain one of the biggest and more urgent obstacles hindering cross-border traffic, particularly rail freight, and are hindering the full exploitation of existing infrastructure and infrastructure investment.

To overcome those obstacles, since May 2018 DG MOVE has strengthened its joint initiative with the European Union Agency for Railways (ERA), involving the rail freight corridors, stakeholders, sector associations and the relevant authorities. The solution to these issues takes the form of a 'rail technical operational issues logbook[157]'. The logbook is a tool to monitor the progress of the actions performed to resolve the main technical operational issues hampering international rail freight traffic.

Following a stakeholder consultation, the Commission identified three priorities with great impact on the issues listed and focused the collective work on those three areas, so that quick resolutions are achieved.

In September 2018, the Commission established a core team and a project plan dedicated to each priority in order to find concrete solutions to the three issues, which are:

- braking
- tests and technical checks at borders and within Member States
- real-time communication about train composition.

Significant progress has been made since then in particular in the analysis of the national safety and operation rules (from Member States or infrastructure managers) and in the setting-up of pilot projects to prove that solutions on paper also work on the ground. What is still missing is the deployment of those solutions at European level, which the Commission hopes will lead to a significant improvement for efficient rail freight cross-border operations.

[157] The logbook and its explanatory documents are available on DG MOVE website: https://ec.europa.eu/transport/modes/rail/interoperability/interoperability/ope-tsi_en.

Box 16: Regulation on electronic Freight Transport Information (eFTI)

The Regulation on electronic freight transport information (eFTI), a new regulation that aims to reduce administrative burden and promote digitalisation in transport and logistics, was adopted in July 2020[158]. By establishing a set of general and harmonised requirements for the electronic exchange of information between operators and authorities, the regulation will enable digital business-to-authority exchanges of the information necessary to check compliance with a range of EU and national legislation on freight transport. The authorities will be required to accept the information presented by the operators electronically when the operators do so in compliance with the requirements of the regulation. The operators, by contrast, will have the option, not the obligation, to use digital means instead of paper. In addition, the standards to be set, such as the data model and requirements concerning identification, authentication, user rights and cybersecurity, will also facilitate information exchanges between businesses themselves, including in the context of multimodal transport operations.
The eFTI Regulation applies to information requirements set in several EU legal acts that regulate rail freight transport: Regulation No 11/1960 on non-discrimination of tariffs, Directive 2008/68 on dangerous goods, Directive 92/106 on combined transport and Regulation 1013/2006 on waste shipments. Transport information required by national legislation regulating rail freight will also be concerned. In addition, if any future implementing or delegated act under Directive (EU) 2016/797 on rail interoperability refers to freight information to be exchanged by rail operators with the authorities, that information will also be concerned.

The eFTI Regulation will start to apply as of mid-2024, with authorities under a full obligation to accept the electronic information applying as of mid-2025. Within the next 3 years, the Commission will prepare and adopt implementation specifications, on the basis of which the Member State authorities and the economic operators will develop and implement the necessary IT tools. A wide group of experts – the Digital Transport and Logistics Forum (DTLF) – in which the rail sector is also strongly represented, assists and advises the Commission in developing the specifications for implementation.

5.14 External dimension of rail transport policy

The implementation of the EU rail *acquis* by Switzerland and EEA Countries ensures a level of harmonisation and interoperability for the rail industries, as the basis for free market access.

The bilateral Land Transport Agreement ensures cooperation between Switzerland and the EU in rail matters, providing for reciprocal opening of land transport and complementing the Free Trade Agreement. Through the implementation provisions to the Railway Ordinance, Switzerland applies the European technical specifications for interoperability (TSIs) as accepted standards and rules of diligence.

The Commission provides support to the candidate countries and potential candidates for EU membership, particularly on the development and financing of the rail component of trans-European transport networks, and for the transposition and implementation of the EU rail transport *acquis*. The European Union Agency for Railways provides technical assistance to the beneficiaries of the instrument for pre-accession assistance (IPA). In December 2019, ERA and the Commission's Directorate-General for Neighbourhood and Enlargement Negotiations signed a new grant agreement for the period 2020-2022.

In the Western Balkans region, the Commission is also active through the Transport Community Treaty[159]. The Transport Community is based on the progressive integration of transport markets and

[158] Regulation (EU) 2020/1056 of the European Parliament and of the Council of 15 July 2020 on electronic freight transport information ('the eFTI Regulation') (https://eur-lex.europa.eu/eli/reg/2020/1056/oj).
[159] Treaty establishing the Transport Community, OJ L 278, 27.10.2017, p. 3.

networks on the basis of the relevant EU legislation, including on technical standards, interoperability, safety, security, traffic management, competition, social policy, public procurement and the environment. It is supported by a Permanent Secretariat, based in Belgrade, Serbia. On 10 December 2018, the six regional partners adopted a Joint declaration for a new Regional Rail Strategy, endorsed by Transport Ministers and representatives at the second Ministerial Council of the Transport Community. At the Western Balkans Summit in Poznan in July 2019, the EU confirmed its commitment to strengthen cooperation and to support the new regional rail strategy. During the second half of 2019, the Transport Community's Technical Committee on Railways developed a comprehensive rail action plan focusing on market opening, rail border-crossing operations, interoperability and the modernisation of the rail network infrastructure.

As regards the opening of the rail market in the Western Balkans, some important development are worth mentioning. Currently, there are five private railway undertakings in Serbia, with 15% of the market share, two in Albania, with 40% of the market share and one in Kosovo, with 45% of the market share. Montenegro's rail legislation is in line with the rail market opening but no company has showed interest so far. On the other hand, North Macedonia and Bosnia and Herzegovina still have to remove some pieces of legislation that are not compliant with rail market opening. These obligations are stated in the Rail Action Plan. More information can be found at https://www.transport-community.org/

The development of southern rail transport connectivity involves close cooperation with Turkey. EU cooperation and technical assistance in the rail sector also extends further towards the neighbouring countries, notably in the Mediterranean and in the southern and eastern regions.

At international level, the Commission continues to contribute to the activities of the Intergovernmental Organisation for International Carriage by Rail (OTIF), including in two new bodies established in 2019 (the Working Group of Legal Experts and Ad Hoc Committee on Cooperation). The European Union acceded to the Convention concerning International Carriage by Rail (COTIF[160]) in July 2011, and became a member of OTIF with the status of 'regional economic integration organisation'. OTIF develops uniform legal regimes for international rail transport as regards technical interoperability, dangerous goods and railway contract law. OTIF and the European Commission, assisted by the European Union Agency for Railways, cooperate to maintain equivalence between EU and OTIF legislation concerning railway interoperability and safety to the extent necessary for international rail traffic, in order to facilitate rail transport services between the EU Member States and non-EU OTIF Contracting States.

The Organization for Cooperation between Railways (OSJD) is a platform for rail cooperation at ministerial level and between railway companies. The OSJD brings together 28 countries (including nine EU Member States), with a view to creating a common rail transport space in Eurasia. The Commission, with the assistance of ERA, contributes to OSJD work through its participation, coordination and active role in relevant initiatives. Important developments are taking place with regard to the ongoing reform process to adapt OSJD to the current administrative, legal and economic situation in the rail sector. The Commission sees potential to promote further alignment of OTIF and OSJD regimes to contribute to more favourable rail transport conditions between Europe and Asia, which in turn will underpin new business opportunities for EU industry as a whole.

[160] Council Decision 2013/103/EU of 16 June 2011 on the signing and conclusion of the Agreement between the European Union and the Intergovernmental Organisation for International Carriage by Rail on the Accession of the European Union to the Convention concerning International Carriage by Rail (COTIF) of 9 May 1980, as amended by the Vilnius Protocol of 3 June 1999, OJ L 51, 23.2.2013, p. 1.

The Commission and several EU Member States also participate in the Group of Experts towards Unified Rail Law (GEURL) within the United Nations Economic Commission for Europe (UNECE). In February 2013, the project received political support when 37 member countries of UNECE signed the Joint Declaration on the promotion of Euro-Asian rail transport and activities towards unified railway law. In April 2019, the Commission submitted a formal document[161] to the 19th session of the GEURL stressing the importance of developing unified railway law using a pragmatic and step-by-step approach. The paper analysed the opportunity and benefits of creating, as a first step, a single legal and liability regime for Euro-Asia rail freight traffic, through the adoption of a global convention for the contract of international carriage of goods by rail.

The EU rail transport sector can benefit from increased engagement with strategic partners and high-growth economies beyond the direct neighbourhood. In 2019, this reflection resulted in the organisation of a joint EU-India seminar on common rail issues in New Delhi together with the Indian Ministry of Transport. The EU-India summit of 2020 will be an opportunity to discuss follow-up actions and further cooperation activities. In 2020, the Commission will explore possible increased cooperation with the ASEAN region and with Africa.

[161] Commission Staff Working Document SWD(2019) 152 final, 27.3.2019 'Contribution to the 19th session of the UN ECE Group of Experts towards Unified Railways Law: Options available for converting URL into a legally binding instrument – URL as contract of carriage's convention'.

6. The quality of rail services

6.1 Safety

Safety remains the top priority for the development of the single European railway area.

Directive (EU) 2016/798 was included in the Fourth Railway Package as a recast of the Safety Directive (Directive 2004/49/EC). Directive 2016/798 aims to improve access to the market for rail transport services by laying down common principles for the management, regulation and supervision of railway safety, and by providing for more effective safety certification arrangements and the migration to a single safety certificate. With the full transposition by Member States, the Directive also provides for a framework to be put in place to ensure equal conditions for all entities in charge of vehicle maintenance through application of the same certification requirements and conditions across the EU. The purpose of this certification system is to provide a framework for harmonising requirements and methods to assess the ability of entities in charge of maintenance across the EU.

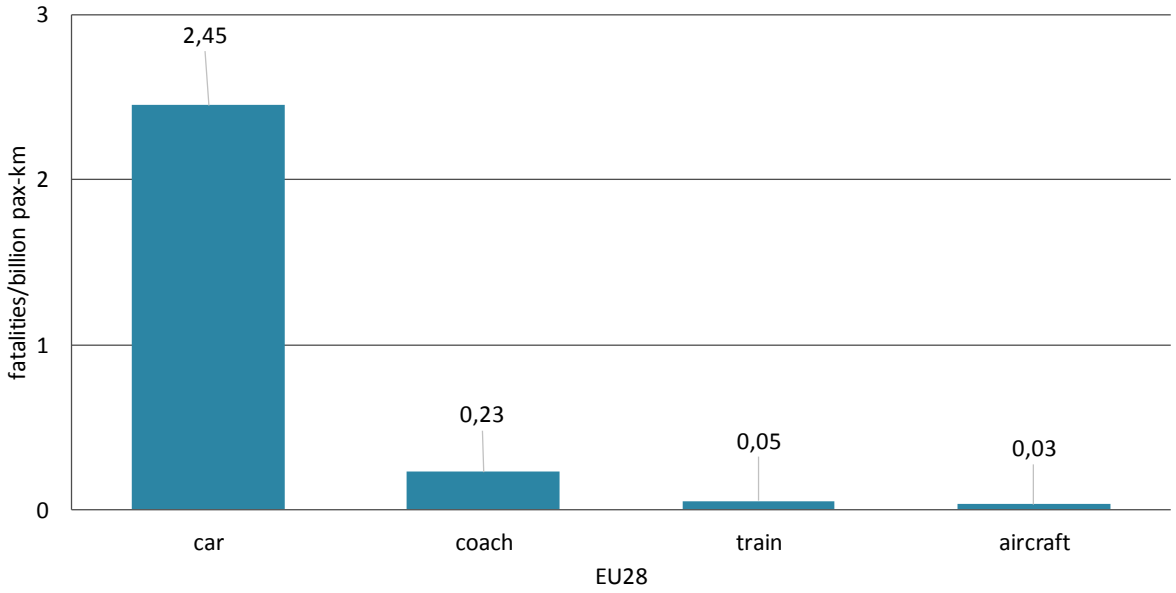
The European Union Agency for Railways became an EU-wide authority for safety certification of railway undertakings. By the beginning of June 2020, ERA had issued 14 single safety certificates, including for major players in the sector. National safety authorities continue to act as the principal supervisors for railway undertakings and issue safety authorisations for infrastructure managers. ERA monitors the activities of national safety authorities (NSAs), their performance and organisation through three-year cycle audits and through heightened collaboration with the NSA network, ensuring the alignment of criteria and procedures with those used by the Agency itself.

The Agency monitors the progress on safety and interoperability of the EU rail system, as mandated by Regulation (EU) 2016/796. Every 2 years the Agency publishes a report on progress on safety and interoperability in the single European railway area[162] together with a number of other technical monitoring reports.

[162] See the *Report on Railway Safety and Interoperability in the EU 2020* available at https://www.era.europa.eu/library/corporate-publications/safety-and-interoperability-progress-reports_en.

Figure 110 shows the risk of a fatal accident per billion passenger kilometres for different modes in 2014-2018 as reported by the Agency for the EU28.

Figure 110: Fatality risks of different transport modes (fatalities per billion pax-km, 2014-2018)

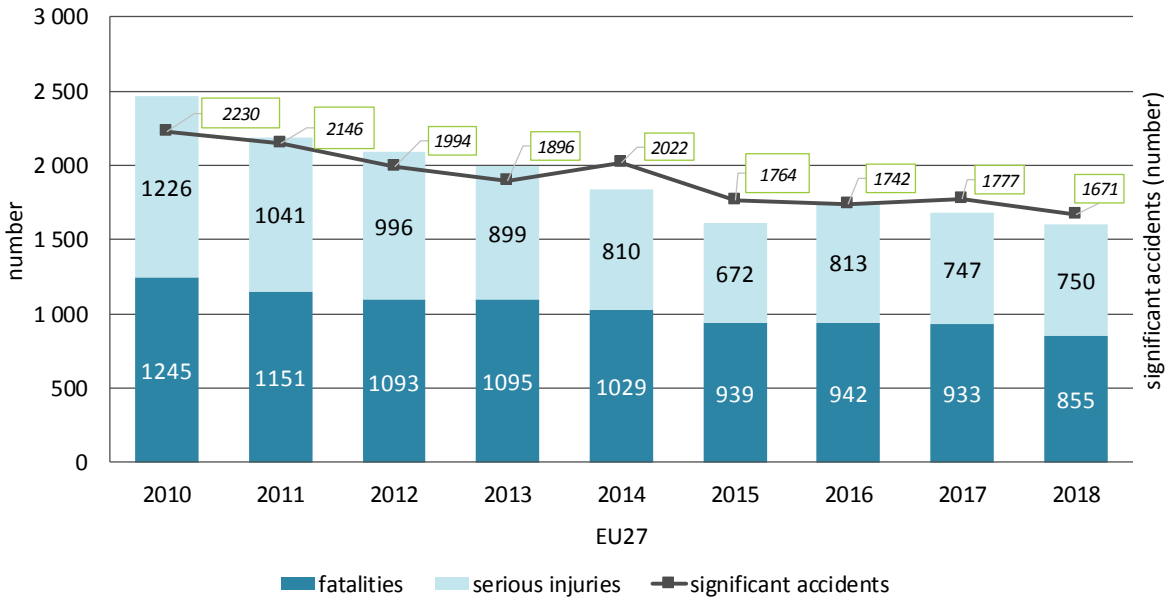


Source: European Union Agency for Railways (ERA).

The fatality risk of travelling by car is almost 50 times higher than travelling by train. Travelling by bus has a fatality risk almost four times higher than travelling by train. Road is the riskiest, whereas aircrafts remain the safest mean of transport with a fatality risk equivalent to about two thirds that of rail.

Figure 111 shows the number of significant rail accidents, fatalities and serious injuries over the period 2010 to 2018 as provided by the Agency for the EU27[163].

Figure 111: Significant rail accidents and resulting casualties (number, 2010-2018)



Source: European Union Agency for Railways (ERA).

Rail safety is continuously improving. Significant accidents decreased by 25%, serious injuries by 39% and fatalities by 31%.

[163] Figures for EU28 are available in the *Report on Railway Safety and Interoperability in the EU 2020* (https://www.era.europa.eu/sites/default/files/library/docs/safety_interoperability_progress_reports/report_on_railway_safety_and_interoperability_in_the_eu_2020_en.pdf).

Table 18 lists the most serious train accidents of the latest 2 years.

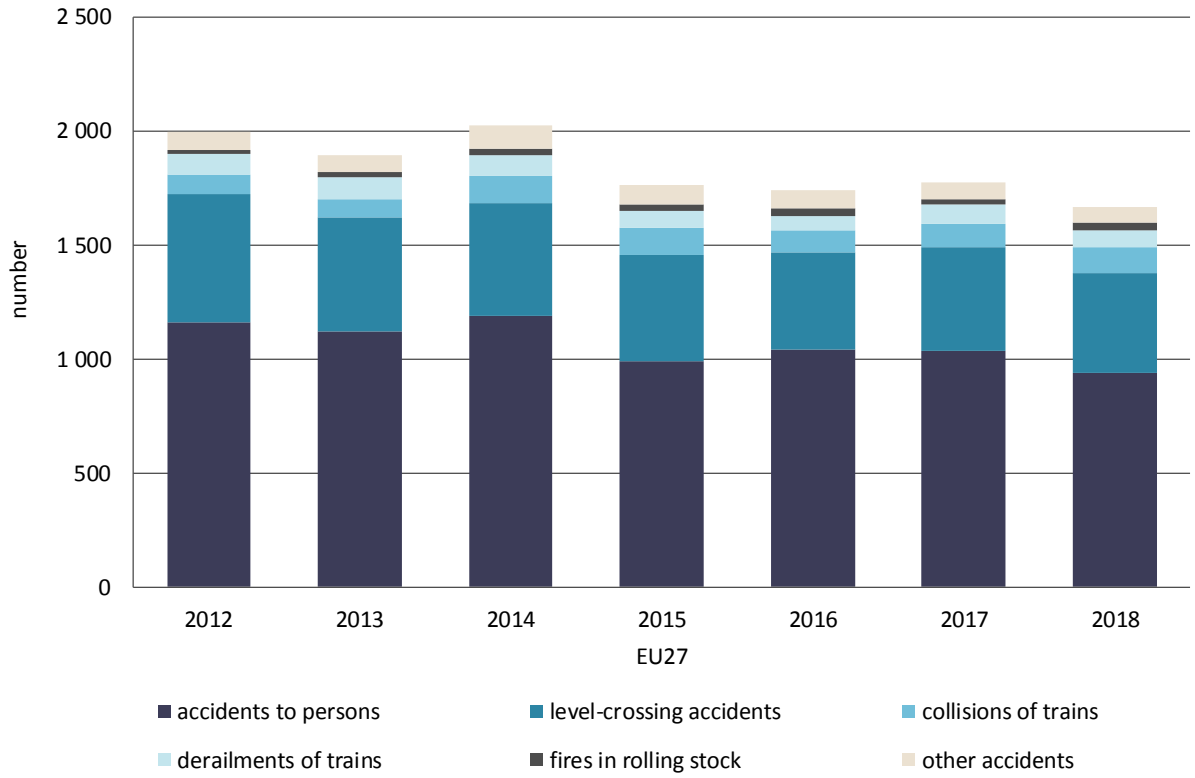
Table 18: Serious accidents 2019-2020 (update 15 August 2020)

Date	Location	Description
		2019
2 Jan	Storebælt Low Bridge near Nyborg (DK)	A passenger train collided with a road lorry trailer. Eight passengers killed and 16 others injured.
6 Feb	Unkel Station (DE)	Fire on a freight train causing serious disruption to rail services in the Rhein Valley.
8 Feb	Castellgali (ES)	Two trains collided. One fatality, 12 others seriously injured with many other passengers having suffered less serious or minor injuries.
15 Jun	Kąty Wrocławskie – Mietków	A passenger train hit a car at a level crossing. The five people in the car were killed.
25 Jun	Hrastovlje (SI)	Derailment of a train, no fatalites or injuries.
14 Jul	Cernozice (CZ)	Four people killed in a level crossing accident.
15 Jul	Avenay-Val-d'Or (FR)	A passenger train hit a car at a level crossing.
		2020
6 Feb	Lodi (IT)	A Frecciarossa high-speed train that set off from Milan derailed at Ospedaletto Lodigiano (Lodi) along the Milan-Bologna line. The accident resulted in two fatalities (the two train drivers) as well as 31 people with injuries.
5 March	Close to Saverne, Alsace (FR)	A TGV train of the line Strasbourg-Paris derailed. One fatality and 20 injured.
2 Apr	Auggen (DE)	A 100-tonne concrete slab fell from a railway bridge onto the railway line. A train ran into the obstacle.
2 Jun	La Hiniesta (ES)	A high-speed passenger train collided with a car outside a level crossing and derailed. The collision resulted in two fatalities.
7 Jul	Pernink (CZ)	Two passenger trains collided on a regional railway line near station Pernink, on a single track line Karlovy Vary – Johanngeorgenstadt (DE), resulting in two fatalities and nine serious injuries.
14 Jul	near Český Brod Station (eastern Prague) (CZ)	A passenger train and a freight train collided, killing a driver and injuring dozens of passengers.
31 Jul	near Soure (PT)	A high-speed train (Alfa Pendular) collided with a railway maintenance machine killing two people and injuring at least 30 other people.
12 Aug	Carmont near Stonehaven (Scotland, UK)	A train derailment caused three fatalities and six injuries.

Source: Desk research by DG MOVE.

Figure 112 represents significant rail accidents by different types over the period 2012 to 2018, as provided by the Agency for the EU27[164].

Figure 112: Significant rail accidents by type of accident (number, 2012-2018)



Source: European Union Agency for Railways (ERA).

The major types of accidents decreased during the period 2012 to 2018. Accidents to persons (currently 56% of all rail accidents) were reduced by 19%, and level-crossing accidents (currently 26% of all rail accidents) were reduced by 22% compared to 2012.

Box 17: Second safety culture twinning programme

The multi annual work programme 2014-2020 under the Connecting Europe Facility gave the Commission the opportunity to launch a programme support action in the field of 'safe and secure infrastructure'.

A first twinning programme was undertaken by a consortium of 12 EU infrastructure managers in 2017 to assist European rail infrastructure managers in sharing knowledge and best practice across railways to support new approaches to safety management[165].

Encouraged by the results obtained, the Commission decided to launch twinning programme II, enlarging the scope of participation to all relevant stakeholders in the domain of safety: national safety agencies, national investigation bodies, railway undertakings and infrastructure managers.

[164] Figures for EU28 are available in the *Report on Railway Safety and Interoperability in the EU 2020* (https://www.era.europa.eu/sites/default/files/library/docs/safety_interoperability_progress_reports/report_on_railway_safety_and_interoperability_in_the_eu_2020_en.pdf).

[165] Final report of the twinning programme is available here: https://safety.networkrail.co.uk/safety/industry-groups/european-safety-culture-twinning-programme/ .

The twinning programme II will run from the third quarter of 2020 to 2022 and will cover different topics including:

- safety management and behaviours;
- development of common principles for management of railway safety;
- occurrence reporting and use of information safety-related tools (E-rail, SAIT, own resources);
- transition towards a more mature safety culture; and
- implementation of safety culture and management, both within organisations and across borders.

By working collaboratively for a period of time in a twin host organisation, participants will be able to share information, challenges, good practice and innovation in safety processes, systems and culture. This is an opportunity to share good practices and useful experience with peers in similar circumstances and to overcome the traditional separate working practices of rail stakeholders.

The twinning programme II should result in a structured approach and a shared understanding of both the opportunities and benefits, and of the barriers to a more mature and fair safety culture. It should also reinforce the practices used in occurrence reporting in railways.

6.2 Punctuality and reliability of passenger services

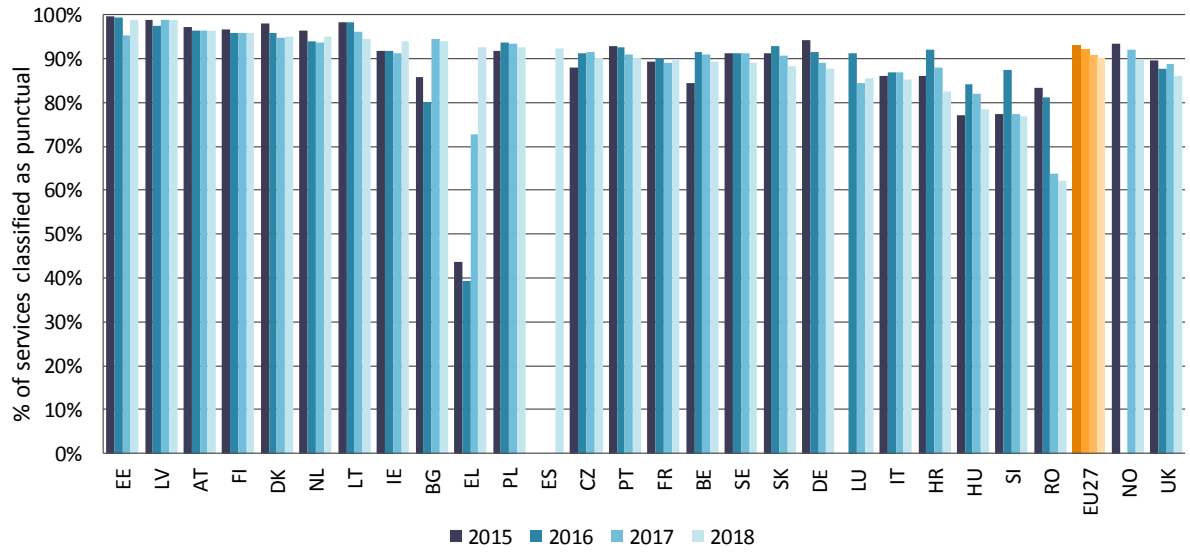
6.2.1 Punctuality by category of passenger services

Under the RMMS, Member States are requested to report the number of passenger services arriving on time (meaning with a delay of five minutes or less). However, different definitions of punctuality applied in Member States and the variability in the quality of data provided at the beginning of the implementation of Regulation 2015/1100 make it difficult to obtain fully comparable data across countries and years[166].

Figure 113 shows the reported punctuality of services classified as regional or local per country for the years 2015 to 2018.

[166] This is another aspect that should be improved in the future revision of Regulation 2015/10.

Figure 113: Punctuality of regional and local passenger services per country (%, 2015-2018)

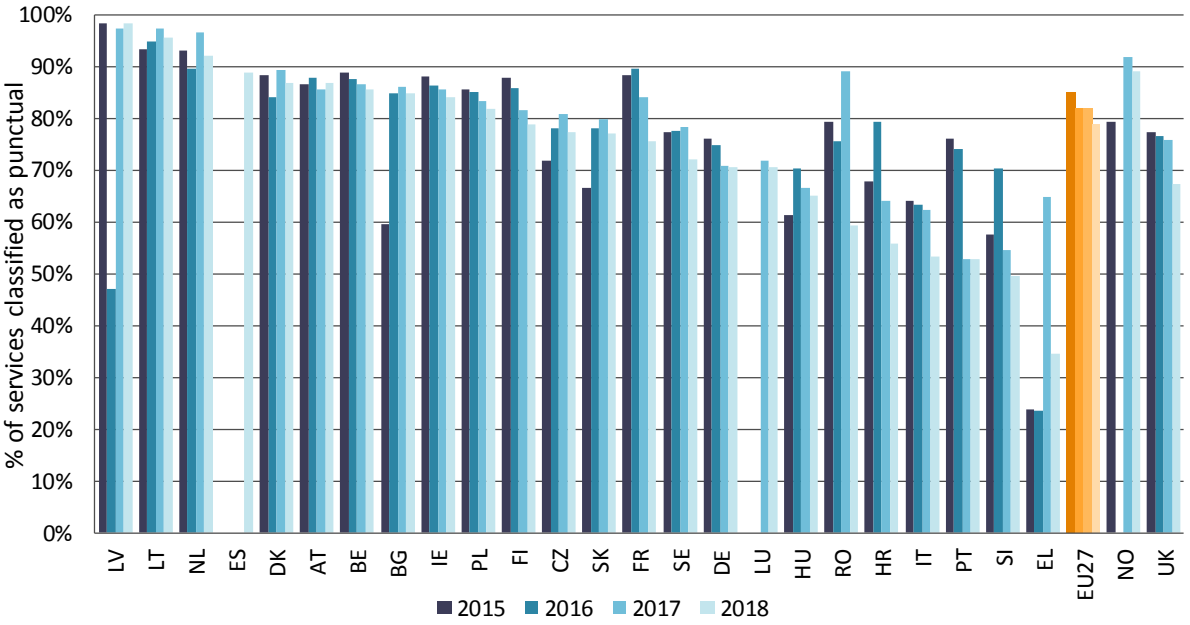


Source: RMMS, 2020. No data 2015 for ES, LU; no data 2016 for ES, NO; no data 2017 for ES.

The EU27 average punctuality of regional and local passenger services slightly decreased from 93.1% in 2015 to 90.2% in 2018 (92.5% to 89.6% in EU28). Estonia and Latvia reported the highest punctuality level in 2018 (99.0%), whereas countries such as Hungary, Slovenia and Romania are currently at the lowest end of the EU27 sample. In Greece, punctuality seems to have significantly improved (from 43.7% to 92.7%), whereas in Romania it decreased from 83.5% to 62.1%.

Figure 114 shows the reported punctuality of services classified as long-distance or high-speed per country for the years 2015 to 2018.

Figure 114: Punctuality of long-distance and high-speed passenger services per country (%, 2015-2018)



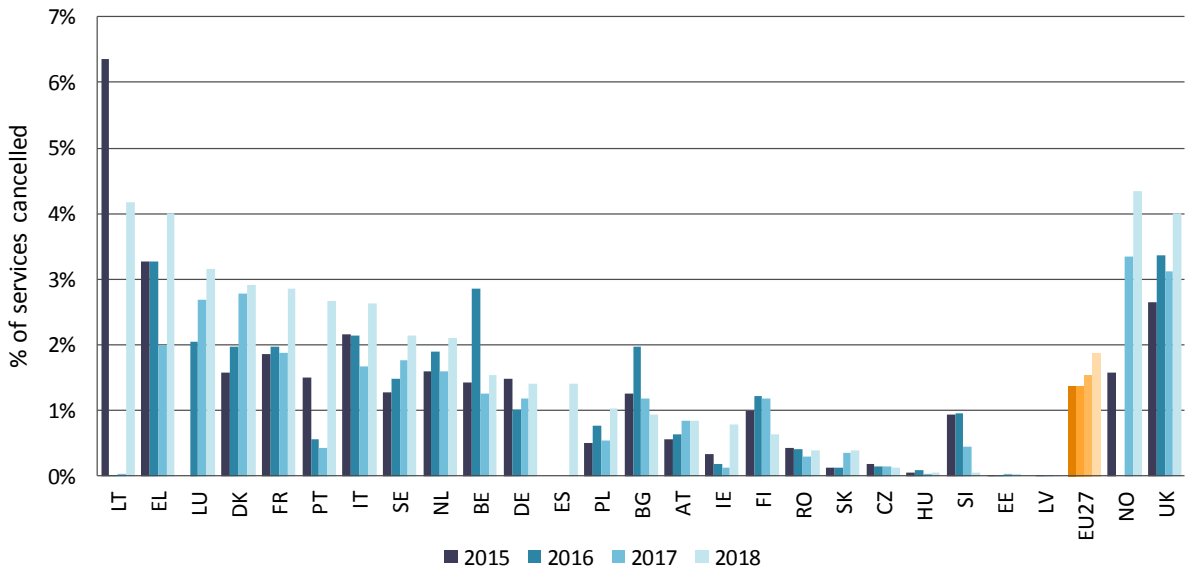
Source: RMMS, 2020. No 2015 data for EE, ES, LU; no data 2016 for EE, ES, LU and NO; no data 2017 for EE, ES.

The EU27 average punctuality of long-distance and high-speed passenger services decreased from 84.9% in 2015 to 78.7% in 2018 (84.2% to 77.4% for the EU28). Latvia reported the highest punctuality level for 2018 (98.3%), whereas countries such as Slovenia and Greece are currently at the lowest end of the EU27 sample. Punctuality in this category appears to have significantly improved in Bulgaria (from 59.5% to 84.7%), whereas Portugal reported a significant decrease (from 76.1% to 52.8%).

6.2.2 Reliability by category of passenger services

The average reliability of local and regional passenger services in the EU27, measured as the share of cancelled services on total services, decreased between 2015 and 2018 (Figure 115). A higher bar in the chart means a higher percentage of services cancelled on total and thus a lower reliability. The share of cancelled services passed from 1.4% to 1.9% (1.6% to 2.2% for EU28). Lithuania reported the highest share of cancellations in 2018 (4.2%), whereas reliability was higher (at least in 2018) in countries such as Slovenia, Estonia and Latvia.

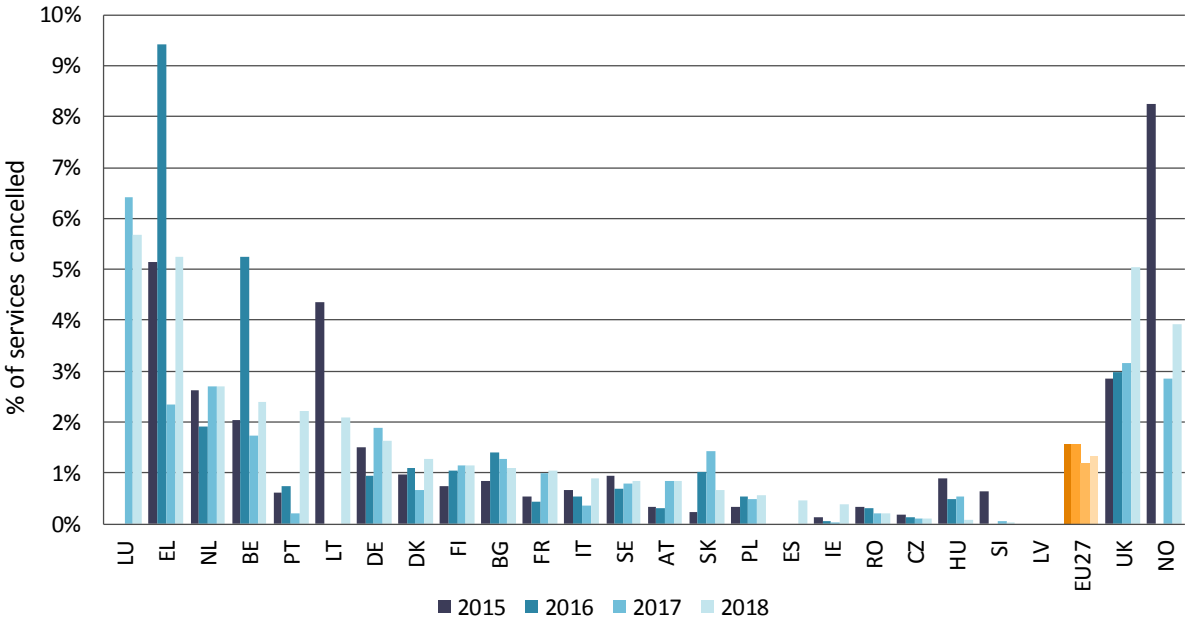
Figure 115: Reliability of regional and local passenger services per country, (%, 2015-2018)



Source: RMMS, 2020. Estimates for NL 2016. HR 2017 and 2018 not available.

Figure 116 shows the reported reliability of long-distance and high-speed passenger services, measured as the share of cancelled services on total services. Here too, a higher bar in the chart means a higher percentage of services cancelled on total and thus a lower reliability.

Figure 116: Reliability of long-distance and high-speed passenger services per country (%, 2015-2018)



Source: RMMS, 2020. Estimates for NL 2016. HR 2017 and 2018 not available.

The EU27 average reliability of long-distance and high-speed passenger services increased between 2015 and 2018, with the share of cancelled services passing from 1.5% to 1.3%. In the EU28, however, reliability decreased, with the share of cancelled services passing from 1.7% to 1.8%. Luxembourg reported the highest share of cancellations in 2018 (5.7%), whereas reliability was highest (at least in 2018) in countries such as Slovenia and Latvia.

6.2.3 Frequency, frequency intensity and average speed of direct passenger rail connections

To explore more in depth the performance of the rail network in Europe, a geographical approach is required, although to produce indicators it is necessary to collect, transform and harmonise complex datasets from various rail service providers across Europe.

This analysis uses the information extracted from timetables of rail passenger services in Europe[167], applying the approach from Poelman and Ackermans (2016[168]). The main data source was the MERITS database of rail timetables from the UIC[169], integrated with datasets of national and regional operators for a better coverage. To prepare the timetable information and to create a georeferenced dataset, the data has been converted to the GTFS data model[170].

[167] Data coverage to be improved in further versions of the analysis (e.g. coverage of the Zaragoza–Teruel–Valencia link in Spain).

[168] Poelman, H. and Ackermans, L., *Towards regional and urban indicators on rail passenger services, using timetable information*, European Commission, DG Regional and Urban Policy, Brussels, 2016 http://ec.europa.eu/regional_policy/en/information/publications/working-papers/2016/from-rail-timetables-to-regional-and-urban-indicators-on-rail-passenger-services.

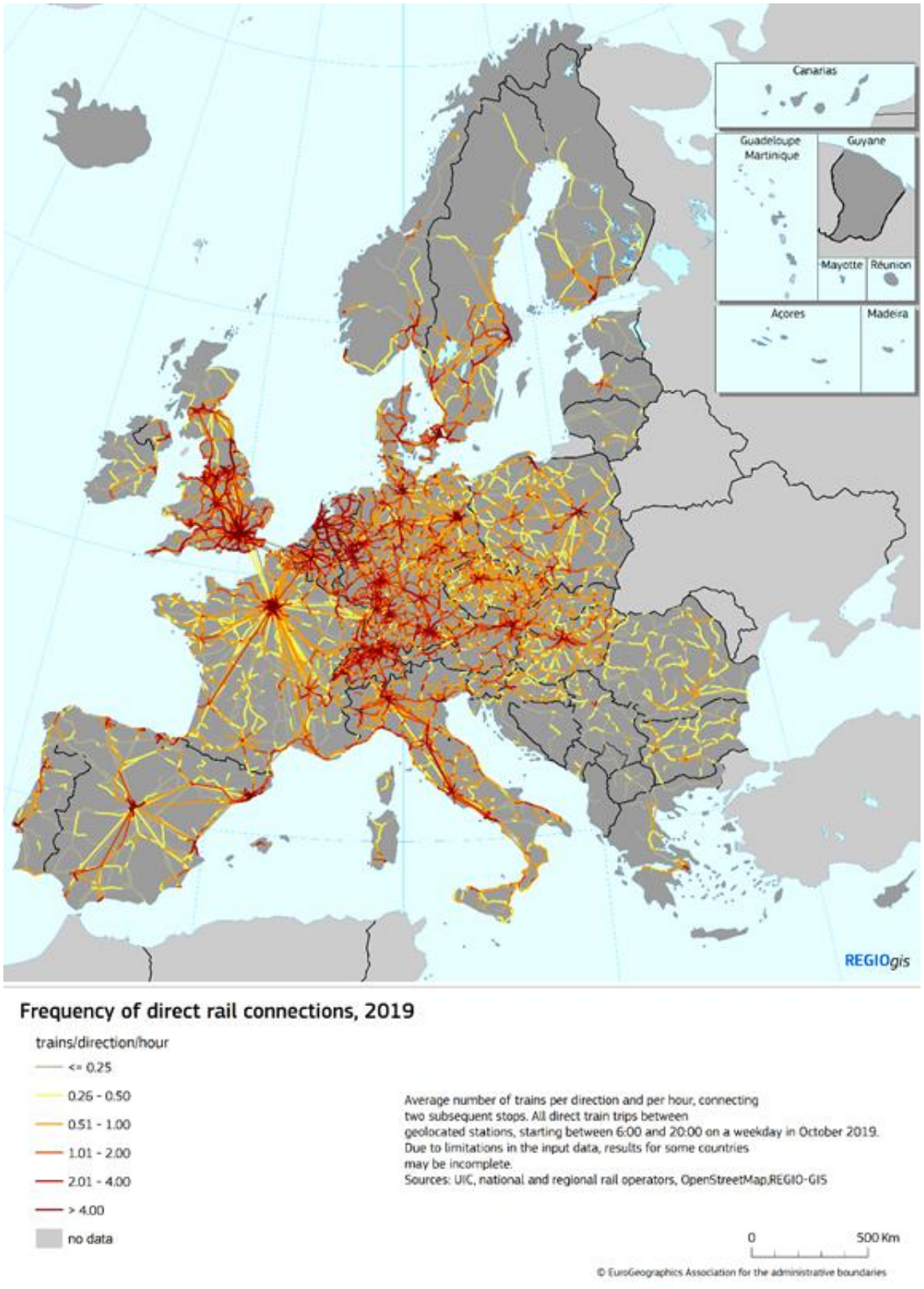
[169] https://uic.org/passenger/passenger-services-group/merits.

[170] For a description of the GTFS specification, see: https://developers.google.com/transit/gtfs/reference.

The basic unit of analysis is any direct train trip connecting two train stations and leaving between 6:00 and 20:00 on a weekday in October 2019. The analysis covers all EU countries, EFTA countries, the United Kingdom and Western Balkan countries. For each connection between two subsequent stops, frequency is calculated as the average hourly number of trips by direction. For the network speeds, due to the lack of geographic data for the physical railway network, estimates are calculated using straight lines (Euclidean speeds), which are therefore lower than the actual vehicle speeds.

Figure 117 shows the frequency of direct train trips. Many high-frequency connections can be found around major European cities, especially in Germany, Belgium, the Netherlands, Switzerland, Denmark and Austria. Frequencies are low in Bulgaria, Romania, Lithuania and Greece, and in areas beyond commuting distance of the main cities in Portugal, Spain, Sweden and Finland.

Figure 117: Frequencies of direct rail connections, 2019

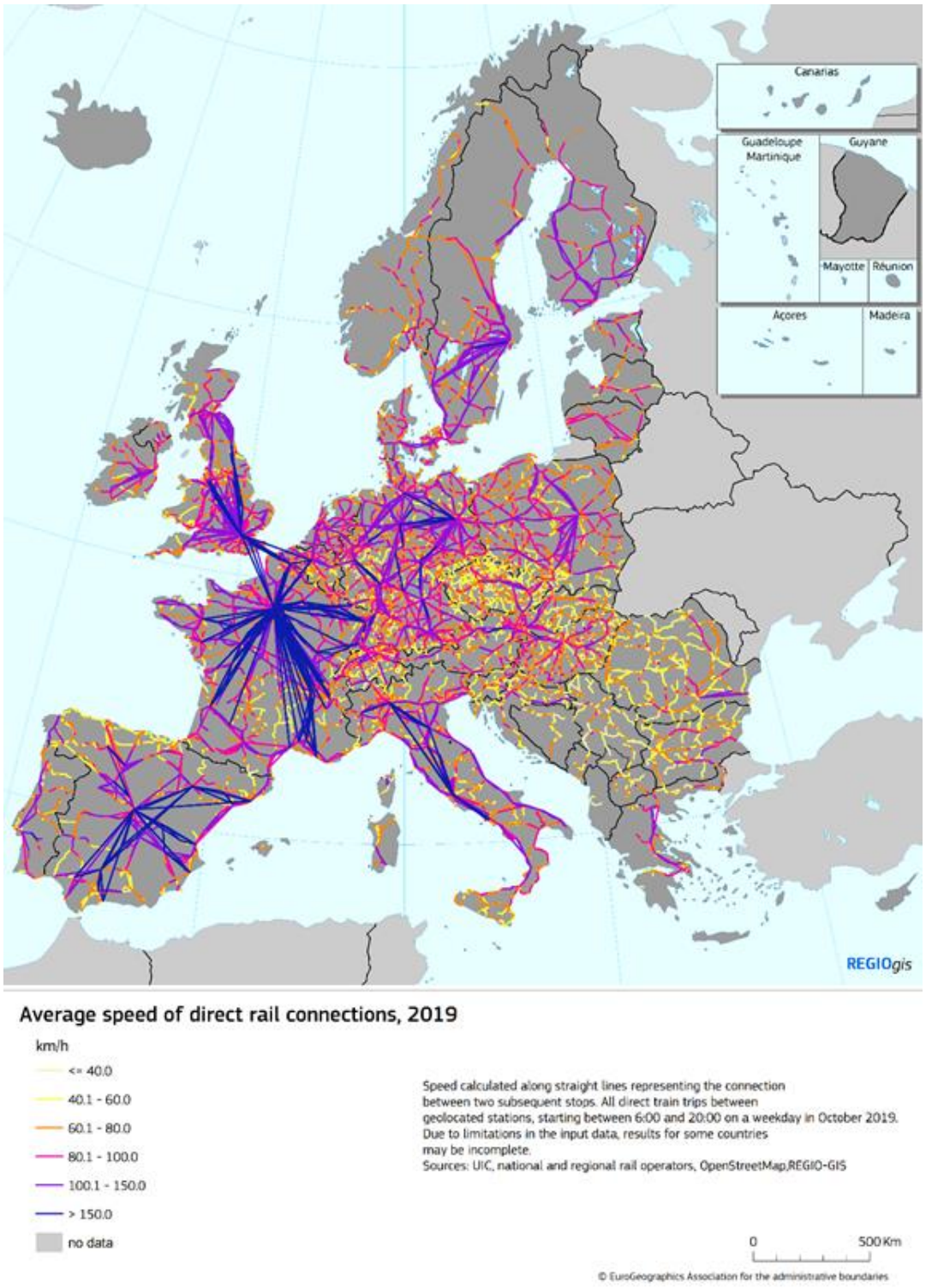


Source: DG REGIO and Joint Research Centre calculations from sources specified in the chart.

Figure 118 shows the estimated speeds of the direct rail connections, providing a complementary look to the frequencies. In fact, the presence of high-speed rail services in countries like Spain, France, Germany and Italy, as well as the use of tilting trains to reach high speeds in conventional railway lines in northern Europe, compensates for lower frequencies in longer distances. On the other hand, it is more visible how in eastern Europe rail services are also comparatively slower.

Secondary lines in several countries also operate at lower speeds, often due to physical geographical limitations.

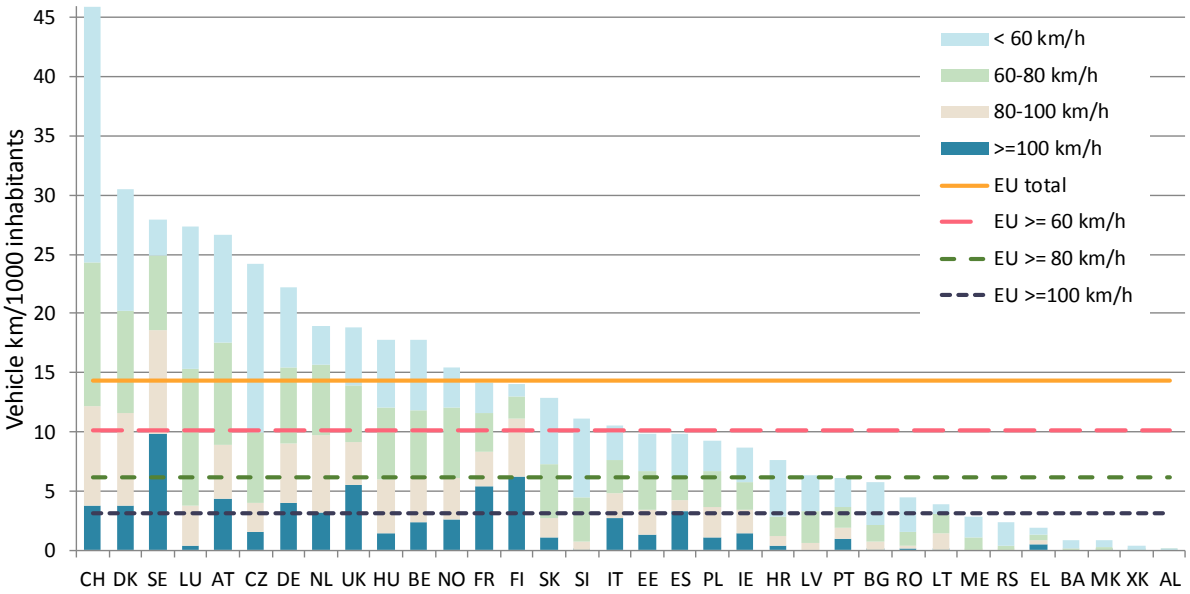
Figure 118: Average speeds of direct rail connections, 2019



Source: DG REGIO and Joint Research Centre calculations from sources specified in the chart.

Timetable information makes it possible to calculate an indicator of service intensity, dividing the aggregated vehicle trip length (in vehicle-kilometres) by the total population of the country. The indicator can be broken down by speed category. The results are shown in Figure 119.

Figure 119: Length by inhabitant of rail connections departing in the country, by speed category, 2019



Rail connections departing between 6:00 and 20:00 on a weekday in October 2019 from any station in the country.
Speed calculated along straight lines representing the connection between two subsequent stops.
Due to limitations in the input data results may be incomplete for some countries.
Sources: UIC, national and regional rail operators, OpenStreetMap, REGIO-GIS

Source: DG REGIO and Joint Research Centre calculations from sources specified in the chart.

The graph highlights the substantial difference in service intensity between countries, as well as the share of higher speed services in the total length of all trips. Relatively high-speed trips above 100 km/h account for a large share in Finland, Sweden and France, whereas the availability of rail services is higher in Denmark, Sweden, Luxembourg and Austria, and outside the EU, in Switzerland. Except Sweden, these countries have a smaller area and a lower population than the others in Europe have, but are transit countries, hence the high service intensities. On the other hand, eastern European countries tend to have an availability of rail connections per capita lower than the EU average, indicating both low frequencies and low service speeds.

6.3 Punctuality and reliability of freight services

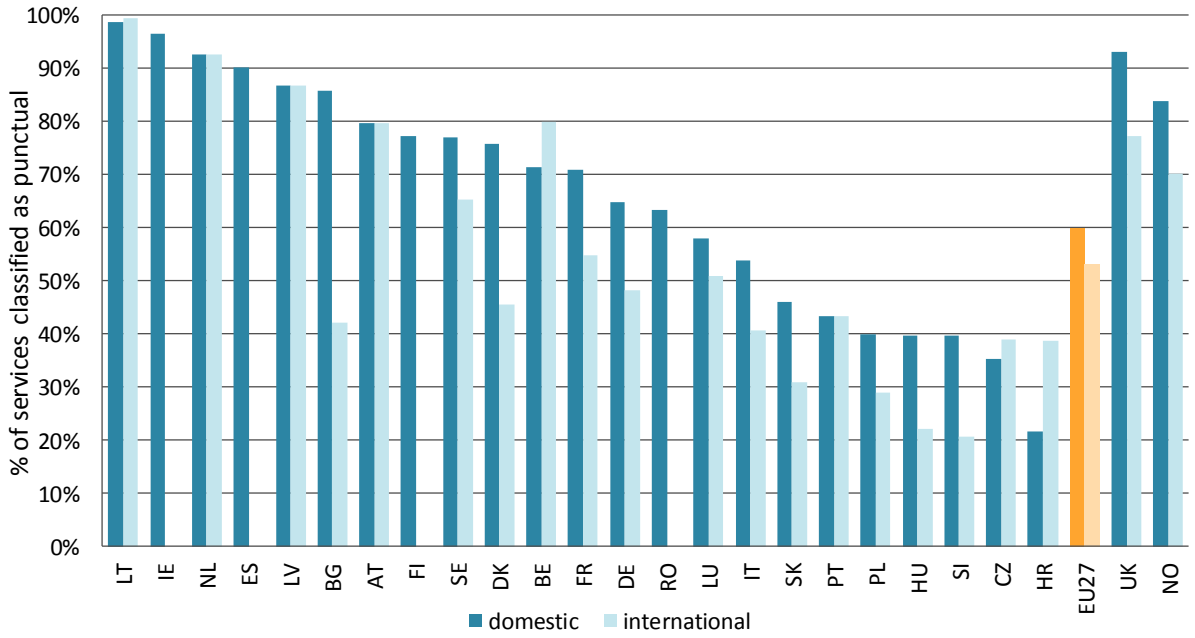
6.3.1 Punctuality by category of freight

Under the RMMS, Member States are requested to report the number of freight services arriving on time (defined as those having a delay of 15 minutes or less). However, different definitions of punctuality applied in Member States and the variability in quality of data provided at the beginning

of the implementation of Regulation 2015/1100 make it difficult to obtain fully comparable data across countries and years[171].

Figure 120 shows the reported punctuality of domestic and international freight services per country in 2018.

Figure 120: Punctuality of domestic and international freight services per country (% in 2018)



Source: RMMS, 2020. Data for EL and RO not available.

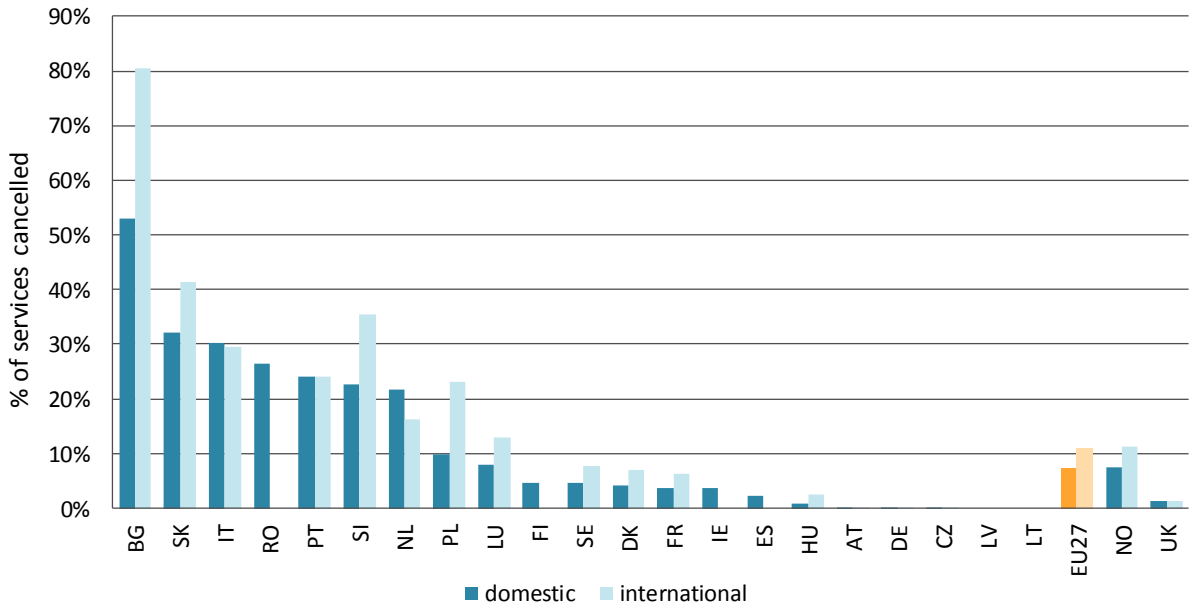
On average, the EU27 punctuality in 2018 was 60.0% for domestic and 53.2% for international freight services (for EU28 punctuality was 63.0% and 53.2% respectively). Lithuania reported the highest punctuality (98.7% for domestic, 99.5% for international freight services), whereas in Croatia freight services appear to be less punctual (21.7% for domestic, 38.8% for international).

6.3.2 Reliability by category of freight

Figure 121 shows the reported reliability of domestic and international freight services, measured as the share of cancelled services on total services, for the year 2018. A higher bar in the chart means a higher percentage of services cancelled on total and thus a lower reliability.

[171] This is another aspect that should be improved in the future revision of Regulation 2015/1100.

Figure 121: Reliability of domestic and international freight services per country (% in 2018)



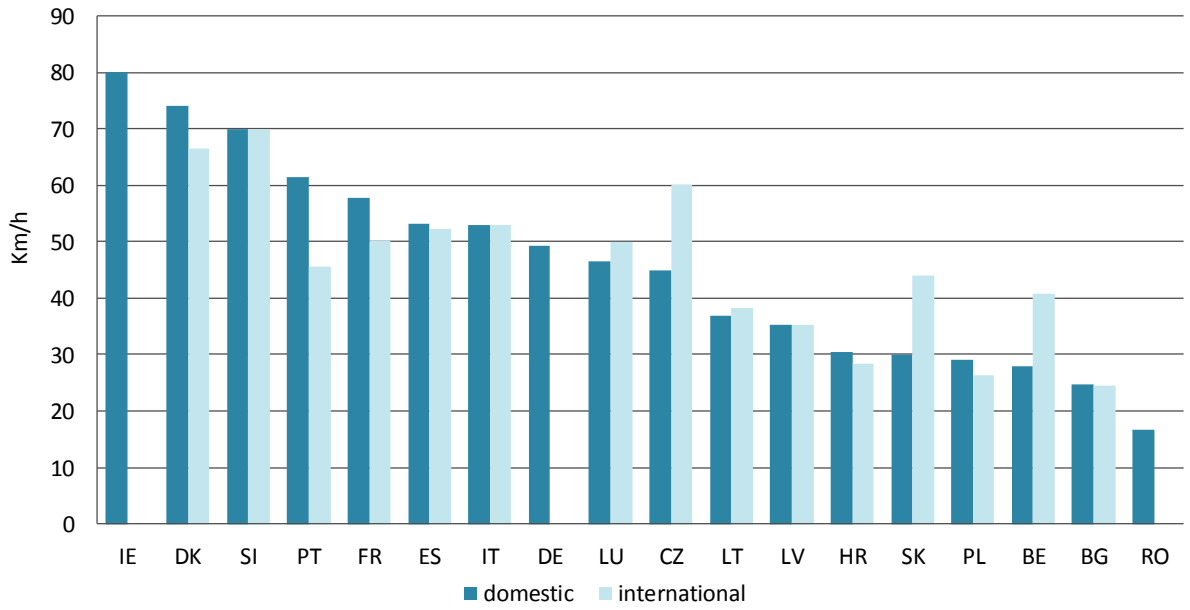
Source: RMMS, 2020. HR not available.

On average, in 2018 7.3% of domestic and 11.0% of international freight services were cancelled in the EU27 (6.8% and 11.0% respectively for the EU28). Bulgaria reported the highest cancellation rates (53.0% domestic, 80.6% international), whereas Latvia and Lithuania appear to have enjoyed the most reliable freight services in 2018.

6.3.3 Average timetabled speed of freight services

The RMMS collects data on the average timetabled speed of both domestic and international freight services, on a voluntary basis. A majority of Member States provided this information in the RMMS (Figure 122 shows the reported figures for 2018).

Figure 122: Average timetabled speed of freight services per country, (Km/h, 2018)



Source: RMMS, 2020.

The reported average timetabled speed of domestic freight services ranges from 17 km per hour (Romania) up to 80 km per hour (Ireland). The reported average timetabled speed of international freight services ranges from 25 km per hour (Bulgaria) up to 70 km per hour (Slovenia). International freight services appear to be significantly faster than domestic freight services in Czechia, Slovakia and Belgium; the reverse is valid for Portugal, Denmark and France.

6.4 Passenger rights

Regulation (EC) No 1371/2007 on rail passengers' rights and obligations[172] establishes:

- passengers' rights to information, reservations and tickets;
- assistance, care and compensation in the event of delay or cancellation;
- free of charge assistance (for people with disabilities or reduced mobility);
- compensation in the event of an accident;
- a quick and accessible system of complaint handling; and
- full application and effective enforcement of EU law through national enforcement bodies (NEBs) designated by Member States.

On 1 October 2020, the European Parliament and the Council reached a political agreement[173] on the recast of the Regulation. The new rules are expected to enter into force in the first half of 2021 and will apply after a two-year transition period.

[172] Regulation (EC) No 1371/2007 of the European Parliament and of the Council of 23 October 2007 on rail passengers' rights and obligations, OJ L 315, 3.12.2007, p. 14–41.

[173] https://www.europarl.europa.eu/meetdocs/2014_2019/plmrep/COMMITTEES/TRAN/DV/2020/10-28/RAILPAXconsolidatedtextoftheprovisionalagreement_EN.pdf

The most important new rules include:

a) a provision on real-time traffic and travel information, which would make it possible to further develop the ticketing market;

b) an obligation for rail carriers belonging to one sole undertaking (100% ownership of subsidiary companies included) and performing international, long-distance domestic and regional rail services to offer such services on the basis of a through-ticket;

c) the reduction of the pre-notification periods (from 48 hours to 24 hours) when people with disabilities or reduced mobility request assistance, so that they can travel more spontaneously without facing obstacles to their journey;

d) the passenger's right to self-rerouting and reimbursement of the additional public transport (rail or bus) ticket where carriers do not offer a timely solution (within 100 minutes) to continue the journey;

e) the possibility to transport assembled bicycles on board new and major refurbished trains, which would increase the options for multi-modal and green journeys; and

f) the introduction of a 'force majeure' clause, exempting carriers from liability to pay compensation for delays, missed connections and cancellations in 'extraordinary circumstances'; this would ensure a level playing field with other transport modes[174].

While the scope of the Regulation covers all railway services, Member States may decide to exempt urban, suburban and regional services (apart from certain mandatory requirements). Member States that currently have in place exemptions for domestic rail services may keep them until their expiry date in December 2024. Beyond that date, an exemption for domestic long-distance rail services may be granted only: (i) by one of the Member States currently applying an exemption; (ii) only from certain exhaustively listed provisions; and (iii) only for a period not exceeding 5 years. Where it is technically not feasible for an infrastructure manager to distribute real-time data to any railway undertaking, ticket vendor, tour operator or station manager, the respective Member State may apply an exemption from the provision on real-time information for a maximum of 9 years but will have to re-assess the technical impossibility every second year at the latest. Member States will have to notify the Commission, providing information on the reasons that made the exemption necessary and indicating the measures they envisage taking to improve the situation.

[174] Carriers may be exempted from paying compensation, but not from other financial obligations such as reimbursement of the ticket price and re-routing to the final destination, payments for killed/injured passengers or damaged/lost luggage/mobility equipment. Strikes by rail carriers' staff and acts or omissions by other railway undertakings using the same infrastructure, or by infrastructure or station managers, cannot trigger the force majeure clause. The 'extraordinary circumstances' are events that the carrier could neither avoid nor prevent in spite of having taken the care required. The provision covers, among others, extreme weather conditions, major public health crisis and terrorist attacks.

Box 18: Eurobarometer on passenger rights

The latest Eurobarometer on passenger rights (EB Special No 485, field work February-March 2019), shows that while 34% of EU citizens used long-distance rail transport in the year to February-March 2019, only 8% are aware that the EU has established specific passenger rights in that field. Among rail transport users, only a minority feel they were well informed by the transport company about their passenger rights: 26% before travel, 23% during and 19% after. The most common disruption to rail travel is a delay in departure of 1 to 2 hours. More than 4 in 10 rail travellers (43%) who have experienced at least one disruption to their travel in the 12 months preceding the survey say that some form of remedial action was taken, most commonly the reimbursement of the ticket (17%). Thinking about the most significant disruption faced by rail travellers in that same period, 44% say they were satisfied with the way it was handled by the railway undertaking. Only one quarter (24%) of the respondents who experienced disruption during rail travel lodge an official complaint, compared to 37% in air transport.

Passenger rights rules should be easily understandable and provide legal certainty to passengers, the industry and the competent authorities.

7. Conclusions

The rail sector makes a substantial contribution to EU27 economic and social cohesion, directly employing more than 900 000 people and moving some 1.6 billion tonnes of freight[175] and 7.1 billion passengers[176] each year.

Greater use of rail is critical to satisfy the demand for more sustainable transport and would have substantial positive effects on pollution and energy consumption, helping to achieve the ambitious emission cuts set out in the European Green Deal.

While rail passenger volumes have increased consistently over the past few years, rail freight volumes have increased more unevenly. Train movements, both for passengers and freight, have remained stable, while demand for sustainable forms of transport has increased together with public awareness about climate change.

Despite these positive developments, rail is not yet achieving its full potential. Rail transport needs to become more punctual and reliable compared to other modes by increasing its customer orientation and making better use of innovation. It must also become more efficient and affordable.

To help the sector face its main market challenges, EU action is focusing on four objectives:

1. A competitive market

   Fair access to the market for all operators will allow for the introduction of new, multimodal offers and increased choice for passengers and businesses.

   To this end, the market pillar of the Fourth Railway Package introduced competitive tendering as the standard procedure for attributing public service contracts, with a transition period until December 2023. It also opened access to commercial provision of rail domestic passenger services, starting with the 2021 timetable. The Commission will be particularly vigilant in monitoring the correct transposition and application of the Fourth Railway Package, to ensure it achieves its full potential in the medium term.

   Fair competition between transport modes should also be promoted, by ensuring each mode pays for its external costs.

2. Improved cross-border rail services

   Crossing internal EU borders must become a smoother process in order to increase rail's modal share. Removal of interoperability barriers, deployment of the ERTMS, availability of appropriate rolling stock and availability of train drivers are fundamental to this goal.

   At the request of the European Parliament, the Commission launched a study on cross-border, long-distance connections, with a special focus on night train services; a report is expected by mid-2021.

[175] Eurostat, EU27 except BE, which labelled data confidential.
[176] Eurostat, EU27 except BE, HU, NL and PL, which labelled data confidential.

3. Better rail infrastructure performance

Ensuring the efficient provision of rail transport services requires a well-developed infrastructure free of bottlenecks and missing links. The EU will continue its infrastructure development policy through the Trans-European Transport Network (TEN-T), with significant financial support being provided to rail under the Connecting Europe Facility. A more extensive high-performance and high-speed network will become available by the end of 2030 with the completion of major TEN-T projects.

The rail sector absorbs a significant amount of public funding. A growing green bond market could allow a switch towards private financing of sustainable investments. The Taxonomy Regulation[177] and its delegated acts establish the necessary framework and criteria for a clear classification system to identify sustainable activities.

Increasing levels of congestion are creating bottlenecks, particularly along the main rail corridors, and major maintenance works are preventing the efficient use of the network. The Commission supports the sector's new approaches to capacity allocation and management based on interconnected digital platforms/tools and their prompt implementation.

4. More customer orientation

Rail services must meet customers' needs. Improved punctuality and reliability and better access to services in rail facilities are a priority for both passenger and freight services.

Passengers' rights to information, assistance, journey continuation and compensation must be guaranteed to boost the use of rail. The proposal of the Commission to recast Regulation (EC) 1371/2007[178], on which an agreement was reached in October 2020 with the European Parliament and the Council, should improve the rights of passengers with disabilities or reduced mobility, clarify rules on enforcement and complaint-handling and ensure better passenger protection in cases of travel disruption.

The rail freight corridors remain the key element of the Commission's policy to boost rail freight. The evaluation of the legal framework for Regulation 913/2010[179] is preparing the ground for additional legislative measures.

The Commission fully supports initiatives to improve the efficiency and flexibility of the timetabling process, the process for dealing with contingency situations and the coordination of temporary capacity restrictions.

177 Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088, OJ L 198, 22.6.2020, p. 13-43.

178 Regulation (EC) No 1371/2007 of the European Parliament and of the Council of 23 October 2007 on rail passengers' rights and obligations, OJ L 315, 3.12.2007, p. 14-41.

179 Regulation (EU) No 913/2010 of the European Parliament and of the Council of 22 September 2010 concerning a European rail network for competitive freight, OJ L 276, 20.10.2010, p. 22-32.

Promoting digitalisation is fundamental for making rail more attractive to businesses. The new Regulation on electronic freight transport information (eFTI[180]) will enable digital business-to-authority exchanges of information. The Commission is also planning to put forward a proposal for a European Partnership on Rail Research and Innovation, building upon the current Shift2Rail Joint Undertaking. The future partnership will focus on accelerating research and development of innovative technologies and operational solutions, facilitated by digitalisation and automation.

The European Year of Rail 2021 will further support efforts to increase the share of passengers and freight moving by rail, sharing knowledge and best practices.

[180] Regulation (EU) 2020/1056 of the European Parliament and of the Council of 15 July 2020 on electronic freight transport information, OJ L 249, 31.7.2020, p. 33-48.