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REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

Eighth 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

{COM(2023) 510 final}

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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
CINEA	European Climate, Infrastructure and Environment Executive Agency
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
IPA	Instrument for Pre-Accession assistance
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
SSMS	European Commission Sustainable and Smart Mobility Strategy
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
WBIF	Western Balkans Investment Framework
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	
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 Commissions staff working document accompanies the *Eight Report from the Commission to the Council and the European Parliament on monitoring development of the rail market* ('the Eight 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 Eighth Report and this accompanying staff working document is on developments between 2015 and 2020. When the RMMS Regulation is the only source, trends are assessed for the period 2015-2020 to ensure data comparability. When using other sources, trends may be presented over a longer time period. In addition, where relevant the report also includes references to trends

[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.

and policy developments extending beyond the reporting period up until the preparation date of the present report.

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.

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 Eighth Report is the third report to actually draw on the mandatory data collection set out in the Commission Implementing **Regulation (EU) 2015/1100 for rail market monitoring**[8] ('the RMMS Regulation') applicable from 1 January 2016. 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. 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 two 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 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 which ended in 2018 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

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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 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.

data that may make it desirable to amend the RMMS questionnaire in the Annex to the RMMS Regulation.

1. 1. Rail and sustainability

Reducing pollution and promoting healthier habits and ways of life that are more respectful of our environment has rapidly become a major political objective across Europe. Customers, passengers and businesses alike are increasingly conscious of the sustainability of their choices.

The European Green Deal[9] calls for a 90% reduction in greenhouse gas emissions from transport, in order for the EU to become a climate-neutral economy by 2050, while also working towards a zero-pollution ambition.

This requires ambitious changes in transport and a greater use of generally greener transport modes, such as rail.

The Sustainable and Smart Mobility Strategy[10] sets out a roadmap for putting European transport firmly on the right track for a sustainable and smart future. For rail:

- Doubling high-speed traffic by 2030, tripling it by 2050
- Making scheduled collective travel of under 500 km carbon neutral within the EU by 2030
- Doubling rail freight traffic by 2050
- Making the multimodal Trans-European Transport Network (TEN-T) equipped for sustainable and smart transport with high-speed connectivity will be operational for the comprehensive network by 2050.

1.1 1.1 Environmental performance of rail

Rail has the potential to play a significant role in accelerating the reduction of transport emissions, being among the most carbon-efficient motorised ways to travel. In 2020, rail accounted for only 1.9% of total EU27 energy consumption in transport, while carrying 11.5% of goods and 5.5% of passengers of all transport modes (land, air and waterways).

1.1.1 1.1.1 Emissions

The transport sector (including international aviation and maritime) accounts for 23.2% of the total GHG emissions[11] in the EU27. Within the transport sector, Figure 1 shows how rail represented only 0.4% of GHG emissions from all transport modes in the EU27. Rail is the only mode[12] to have almost continuously reduced such emissions since 1990[13] while substantially increasing the volumes of traffic.

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9 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).

10 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 - Sustainable and Smart Mobility Strategy – putting European transport on track for the future (COM/2020/789 final).

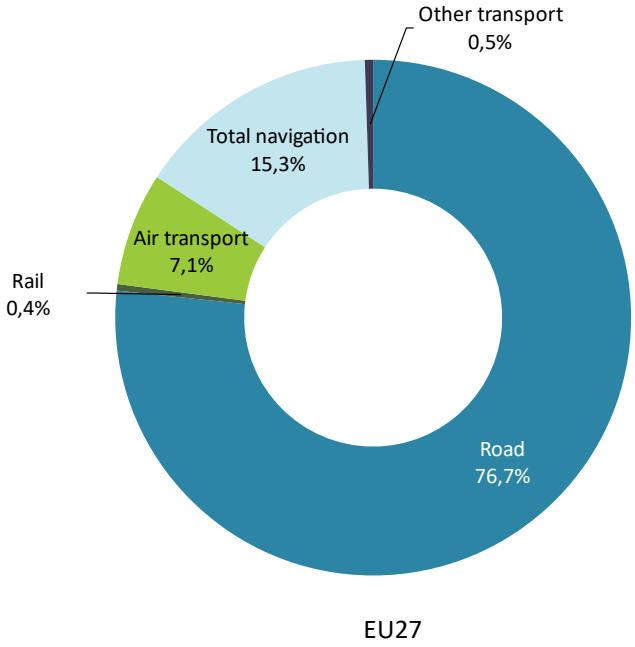
11 GHG emissions from transport by mode, including international bunkers and indirect CO_2 but excluding land use, land use change and forestry. Rail excluding indirect emissions from electricity consumption. The European Environment Agency (EEA, https://www.eea.europa.eu/) is the main provider for EU-wide 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).

12 In 2020, the share of GHG emissions from air transport shrank to 7.1% from 13.2% in 2018. It can be assumed that this reduction is due to the COVID travel restrictions.

13 The Statistical pocketbook 2022 provides further details by country, sector, and mode.

The reduction in emissions from rail transport is mainly the result of the electrification of the rail network and the declining carbon intensity of the EU's electricity mix[14].

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 2020)[15]



Source: Statistical pocketbook, 2022.

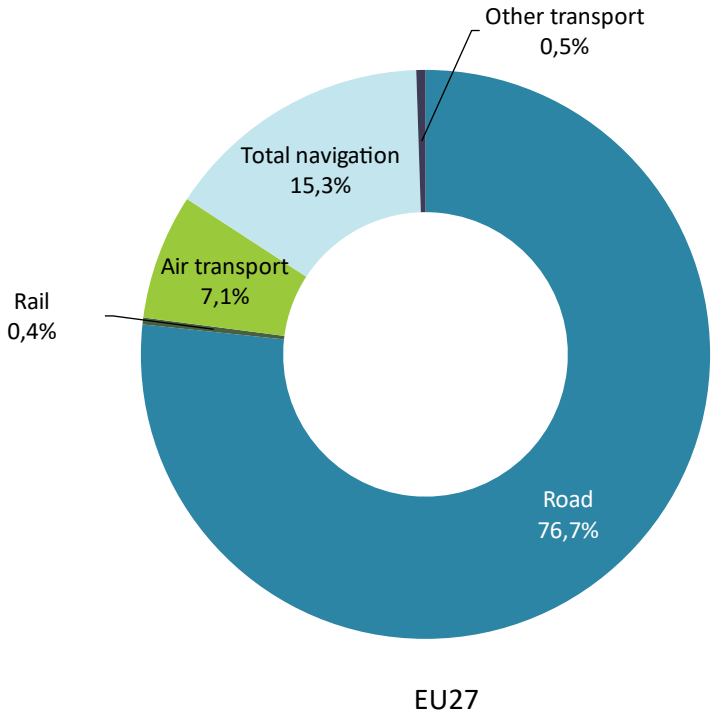
Figure 2 shows how within the transport sector rail represented only 0.4% of CO_2 emissions from all transport modes in the EU27. Rail has continued to be the only transport mode to have almost continuously reduced these emissions since 1990[16].

[14] European Environment Agency, "Rail and waterborne — best for low-carbon motorised transport" (https://www.eea.europa.eu/publications/rail-and-waterborne-transport)

[15] GHG emissions from transport by mode, including international bunkers and indirect CO2 but excluding land use, land use change and forestry. Rail excluding indirect emissions from electricity consumption.

[16] The Statistical pocketbook 2022 provides further details by country, sector, and mode.

Figure 2: Share of CO_2 emissions of transport modes (rail, road, domestic aviation, domestic navigation, pipeline transport, etc.) (% of million tonnes, EU27 2020

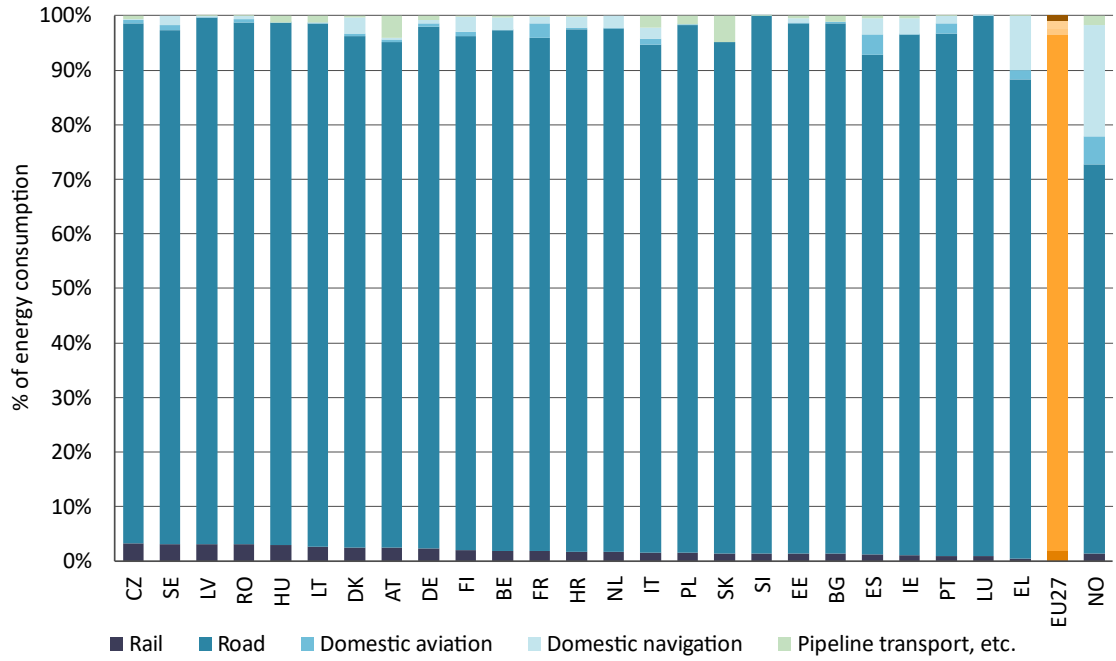


Source: Statistical pocketbook, 2022.

1.1.2 1.1.2 Energy consumption

The transport sector accounted for 28.4% of the total final energy consumption in the EU27 in 2020; by contrast, within the transport sector, rail accounted for only 1.9% of the final energy consumption. 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 2020)



Source: Statistical pocketbook, 2022.

1.1.3 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[17]. 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[18]). 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;

[17] 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.

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

- the technical specification for interoperability (TSI) on noise, which was revised in 2019[19];
- financial assistance under the CEF for the retrofitting of rail freight wagons with 'silent' brake technology[20] (which to date has allowed for the co-financing of retrofitting of some 207 000 'noisy' wagons, with the recent 2021 CEF-call still to be implemented); and
- until December 2021, a European framework laying down modalities for noise-differentiated track access charges[21].

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[22]. 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 viable.

The Commission has evaluated Commission Implementing Regulation on noise differentiated track access charges (EU) 2015/429 (NDTAC). Based on the results of the evaluation, the Commission is contemplating next steps.

1.2 1.2 Infrastructure expenditure and PSO compensation cost

In 2020, the total infrastructure expenditure (irrespective of the funding source[23]) amounted to EUR 41.8 billion. Track access charges (constituting a total revenue of about 16.3 billion in 2020 for passenger and freight service combined) contributed in part; yet, the large majority of this expenditure relies on public funding.

Public budgets also provided compensation for public service obligations (PSO) for around EUR 28.7 billion.

Altogether, infrastructure expenditure and PSO compensation cost amounted to EUR 157.72 per EU27 inhabitant, which is an increase of 20.8% compared to 2015. Whereas infrastructure expenditure increased by 5.9%, PSO compensation increased by 51.9% in the same period according to the figures reported in the RMMS (Figure 4).

[19] 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.

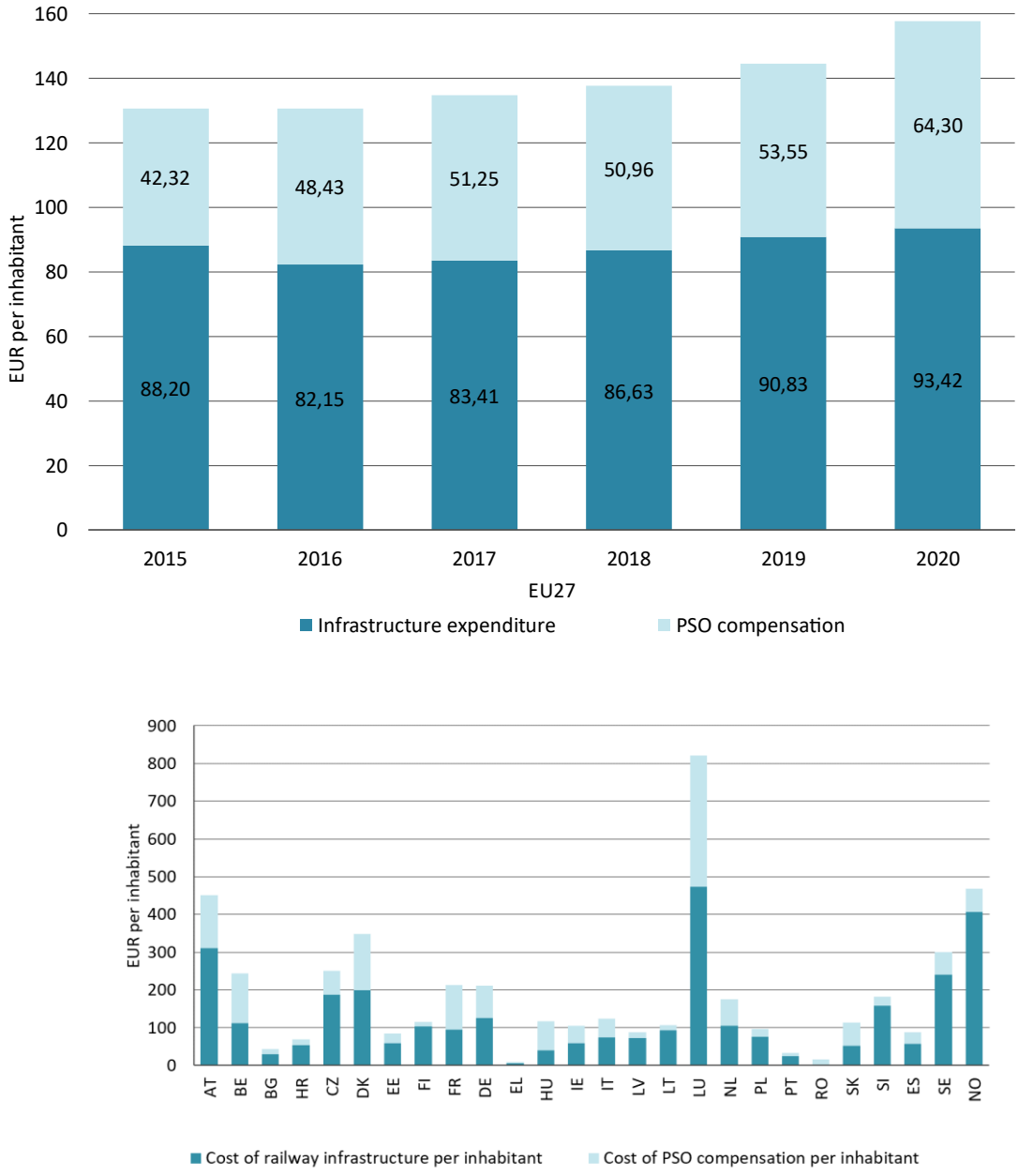
[20] Regulation (EU) 1316/2013 of 11 December 2013 establishing the Connecting Europe Facility, amending Regulation (EU) 913/2010 and repealing Regulations (EC) 680/2007 and (EC) 67/2010.

[21] 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.

[22] 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).

[23] 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.

Figure 4: Cost of railways per inhabitant (infrastructure expenditure plus PSO compensation) 2015-2020



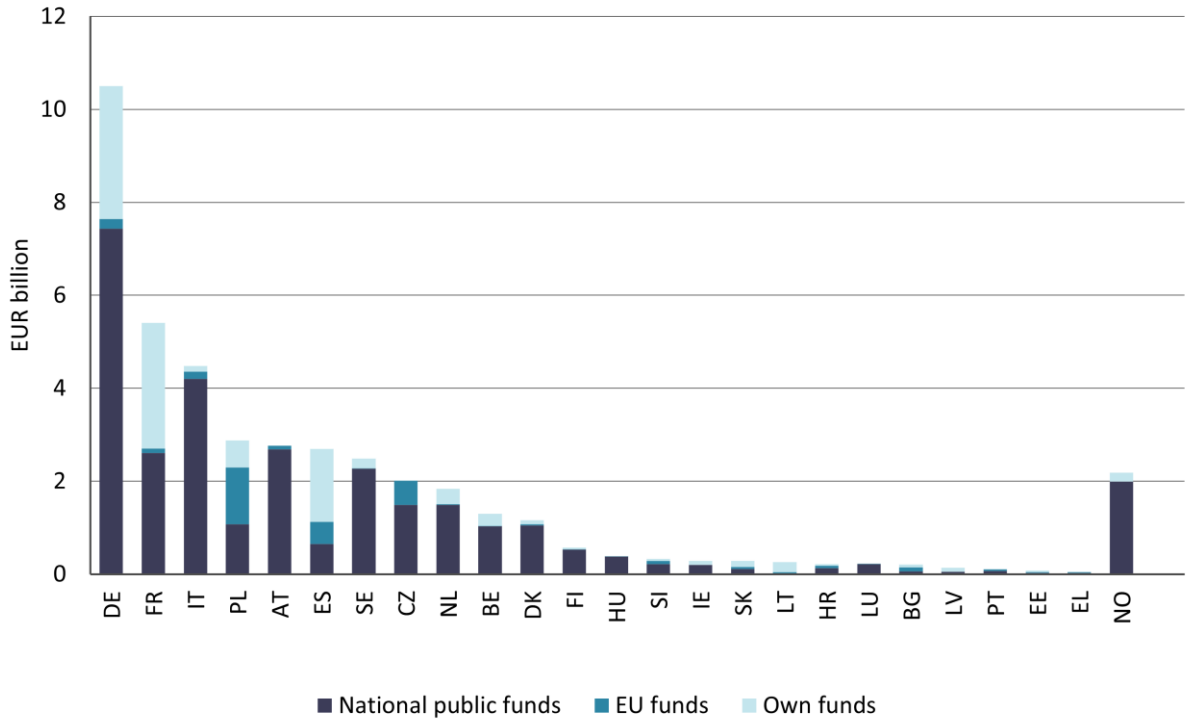
Source: RMMS, 2022, Eurostat, 2022.

1.3 1.3 EU funding

Overall, the EU27 Member States reported EUR 40.65 billion of total funding for rail infrastructure in 2020. On average, national budgets contributed to total expenditure and investment by 69%, whereas EU co-financing accounted for 8%. The remaining 23% share of financing came from other sources,

including loans, equity financing and charges[24]. Germany and France show a significant share of own funds, whereas the highest share of EU funds was received by Poland (Figure 5).

Figure 5: Rail infrastructure funding by source and country (EUR billion, 2020)



Source: RMMS, 2022. PT own funds and total RO not available.

1.3.1 1.3.1 The Connecting Europe Facility

The Connecting Europe Facility (CEF) [25] is an EU funding instrument that supports the development of high performing, sustainable and efficiently interconnected trans-European networks in the fields of transport, energy and digital services.

With a budget of EUR 30.5 billion for the years 2014 to 2020 and EUR 33.7 billion for the years 2021 to 2027, it is a crucial component of the European Green Deal and an important enabler towards the Union's decarbonisation objectives for 2030 and 2050.

Within the CEF, the CEF Transport is the funding arm of the Trans-European Transport Network (TEN-T) policy. It aims at supporting investments in new transport infrastructure in Europe or at rehabilitating and upgrading the existing one. It focuses on removing bottlenecks or bridging missing links, as well as on cross-border projects and horizontal priorities such as traffic management systems.

[24] 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

[25] Source: CINEA "The Connecting Europe Facility - Supporting European Infrastructure" (June 2022) - https://cinea.ec.europa.eu/publications/investing-european-networks_en . Further information available on https://cinea.ec.europa.eu/programmes/connecting-europe-facility/transport-infrastructure_en

It also supports innovation in the transport system in order to improve the use of infrastructure, reduce the environmental impact of transport, enhance energy efficiency and increase safety. Finally, it contributes to a more environmentally friendly transport sector with more than 80% of the planned investments addressing sustainable transport modes.

CEF Transport 2021-2027

Between 2021 and 2027, CINEA will manage EUR 25.8 billion to support transport infrastructure projects throughout the EU and beyond. A total of EUR 11.29 billion will be earmarked for countries eligible to receive support from the cohesion Fund. CEF transport will also earmark EUR 1.69 billion to improve military mobility within the EU, by making infrastructure compatible for both civilian and military needs.

The multi-annual work programme for the years 2021-2023 envisages an amount of EUR 18 billion to be invested into transport infrastructure on the TEN-T, out of which EUR 1.6 billion is earmarked for the Alternative Fuel Infrastructure Facility.

CEF Transport 2014-2020

A total of 32 calls for proposals have been concluded for the implementation of 2014-2020 financial envelope of the CEF, supporting 1 036 Actions with EUR 23.2 billion of funding.

A predominant part of the CEF grants (70%) has been allocated to railway actions, as shown in Table 1. Many actions have already been successfully concluded, but other actions are expected to continue in the coming years.

Table 1: CEF funding by transport mode (EUR billion, number of Actions)

CEF Transport Mode	Number of Projects	Actual funding (EUR bn)	% funding
Rail	448	16.5	70%
Road	223	2.2	9%
Maritime	186	1.6	7%
Air	74	1.5	6%
Inland waterways	101	1.3	6%
Mutli-modal	4	0.5	2%
Grand Total	1036	23.6	100%

Source: CINEA, 2022.

A total of 104 CEF Transport co-funded actions aim to adapt, upgrade and improve several thousand kilometres of railway lines all over Europe. The total investment in these actions is EUR 18.1 billion, of which EUR 10.2 billion is EU support. CEF Transport actions will in particular:

- Electrify 2 052 km of line tracks and sidings;
- Improve 2 896 km of railway lines for freight; and
- Adapt 642 km of railway to the European standard gauge.

The European Rail Traffic Management System – ERTMS (a command and control system composed of the European Train Control System ETCS and the radio communication system GSM-R) is a major EU horizontal railway priority aiming at increasing rail transport safety, capacity and interoperability of the railway network. CEF Transport funds 74 actions implementing ERTMS for a total investment of over EUR 1.5 billion of which more than EUR 840 million in EU support. CEF Transport actions contribute to:

1. ERTMS track-side deployment
   - 4 976 km of first deployment; and
   - Upgrade on 885 km of railway lines.
2. ERTMS on-board deployment
   - Retrofitting of 1 565 vehicles;
   - Upgrade of 637 vehicles;
   - Fitment of 526 vehicles; and
   - Prototype on 146 vehicles.

In 2017 the CEF Transport Blending call was launched, combining the CEF support for the trans-European transport infrastructure with financing from the European Fund for Strategic Investments (EFSI), the European Investment Bank (EIB), National Promotional Banks[26] or private sector investors. The call resulted in the selection of 72 projects for a total investment of EUR 6.2 billion (with an EU contribution of EUR 1.4 billion).

To further promote the participation of private sector investors and financial institutions in projects contributing to the environmental sustainability and efficiency of transport, in 2019 the CEF Transport Blending Facility was launched. The Blending Facility focused on two areas:

- the deployment of the European Railway Traffic Management System (ERTMS); and
- the deployment of Alternative Fuels

Blending Operations, supported through a cooperation framework between the European Commission and various implementing partners including the EIB, are investments combining the use of grants and/or financial instruments from the EU budget and financing from implementing partners (loans, debts, equities or any other repayable form of support).

1.3.2 1.3.2 Financial instruments

In addition to grants, the EU supports investments through financial guarantees, in partnership with the EIB and other Promotional Banks. As of 2022, such guarantees are provided under the InvestEU Programme[27].

InvestEU consolidates under the same umbrella both the EU financial instruments and their related advisory facilities. It is expected to mobilise more than EUR 372 billion of public and private investment through an EU budget guarantee of EUR 26.2 billion that backs the investment of financial partners such as the European Investment Bank (EIB) Group and others.

InvestEU supports four Policy Windows, focusing on investments where the EU can add the most value:

1. **Sustainable infrastructure**

   Financing projects in sustainable energy, digital connectivity, transport, the circular economy, water, waste, other environment infrastructure and more.

[26] National promotional banks and institutions are legal entities carrying out financial, development and promotional activities on a professional basis which are given a mandate by a Member State at central, regional or local level.

[27] https://investeu.europa.eu/what-investeu-programme/investeu-fund/about-investeu-fund_en. The EU has also developed blending instruments combining grants with loans or guarantees, as explained in the previous paragraph.

2. **Research, innovation and digitalisation**

   Financing projects in research and innovation, taking research results to the market, digitisation of industry, scaling up larger innovative companies, artificial intelligence and more.

3. **Small and medium-sized companies**

   Facilitating access to finance for small and medium-sized companies (SMEs), small mid-cap companies, including innovative ones and those operating in the cultural and creative sectors.

4. **Social investment and skills**

   Financing projects in skills, education, training, social housing, schools, universities, hospitals, social innovation, healthcare, long-term care and accessibility, microfinance, social enterprise, integration of migrants, refugees and vulnerable people, and more.

The EU guarantee for the Sustainable Infrastructure window amounts to EUR 9.9 billion without ringfencing between infrastructure sectors, as the instrument is demand-driven. Under this policy window, at least 60% of the investment should contribute to meeting the Union objectives on climate and environment. Rail infrastructure and rolling stock will be eligible for support.

1.3.3 1.3.3 Horizon Europe

Within the Horizon Europe's second pillar dedicated to global challenges and European industrial competitiveness, EUR 15.2 billion have been allocated to cluster 5, which includes mobility.

Figure 6: Pillar 2 – Budget for clusters and for Joint Research Centre (EUR)

		in current prices
Cluster 1	Health	€ 8.246 billion (including €1.35 billion from NGEU)
Cluster 2	Culture, Creativity & Inclusive Societies	€ 2.280 billion
Cluster 3	Civil Security for Society	€1.596 billion
Cluster 4	Cluster 4 Digital, Industry & Space	€ 15.349 billion (including €1.35 billion from NGEU)
Cluster 5	Cluster 5 Climate, Energy & Mobility	€15.123 billion (including €1.35 billion from NGEU)
Cluster 6	Cluster 6 Food, Bioeconomy, Natural Resources, Agriculture & Environment	€ 8.952 billion
	JRC (non-nuclear direct actions)	€ 1.970 billion

Clusters are including a budget for Partnerships and Missions
NGEU is Next Generation EU programme – Recovery Fund

Source: EC, 2021.

1.3.4 1.3.4 Research and innovation – Shift2Rail and Europe's Rail Joint Undertaking

The rail research and innovation is carried out beyond traditional work programmes in Horizon Europe by the Shift2Rail Joint Undertaking, established by Council Regulation (EU) No 642/2014 of 16 June 2014.

Shift2Rail's R&I activities in 2020 contributed to the progress of solutions which are due to be industrialised. Some key achievements include successful pilot line tests for automated train operation for both passenger and freight operations, line tests on digital automatic couplers, installation of

enhanced switches and crossings, testing of multi-modal travel companion social services for passengers.

Shift2Rail was also active in building relationships with regions and organisations. During 2020, Shift2Rail further expanded its collaboration across Europe and beyond by signing three new Memoranda of Understanding with the Basque Country, the Canadian Urban Transit Research & Innovation Consortium (CUTRIC) and the Permanent Secretariat of the Transport Community – a major achievement and precedent for future collaboration.

Following the 2020 Call for Proposals, Shift2Rail cumulatively invested almost €0.8 billion in Research & Innovation activities, enabling the delivery of the Programme's innovative solutions. This resulted in research and innovation activities performed by the Members and third parties for an estimated cumulative value of €1.0 billion by the end of the Programme, with a measurable leverage effect on answering the needs of rail clients and freight businesses.

The successor programme to Shift2Rail's is Europe's Rail Joint Undertaking (EU-Rail)[28], established by Council Regulation (EU) No 2021/2085[29]. The general aim of the EU-Rail partnership is to ensure a fast transition to more attractive, user-friendly, competitive, affordable, easy to maintain, efficient and sustainable European rail system, integrated into the wider mobility system. EU-Rail will support the development of a strong and globally competitive European rail industry while contributing towards the achievement of the Single European Railway Area (SERA).

1.3.5 1.3.5 Recovery and Resilience Facility

The Recovery and Resilience Facility (RRF) is a temporary recovery instrument which entered into force in February 2021. It aims to mitigate the economic and social impact of the coronavirus pandemic and make European economies and societies more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions.

The RRF finances reforms and investments in Member States from the start of the pandemic in February 2020 until 31 December 2026. It makes available to Member States EUR 723.8 billion (in current prices), part in the form of loans (EUR 385.8 billion) and part in the form of grants (EUR 338 billion).

The RRF allows the Commission to raise funds to help Member States implement reforms and investments that are in line with the EU's priorities and that address the challenges identified in country-specific recommendations under the European Semester framework of economic and social policy coordination.

The RRF is structured around six pillars:

1. Green transition;
2. Digital transformation;
3. Smart sustainable and inclusive growth,
4. Social and territorial cohesion;
5. Health and economic, social and institutional resilience; and

[28] https://rail-research.europa.eu/

[29] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R2085
The Horizon Europe cluster 5 contains also a number of cross-modal topics for which the rail supply industry may apply

6. Policies for the next generation.

To benefit from the support of the RRF, Member States submit their recovery and resilience plans (RRPs) to the European Commission. Each plan sets out the reforms and investments to be implemented by end-2026 and Member States can receive financing up to a previously agreed allocation.

Each plan should effectively address challenges identified in the European Semester, particularly the country-specific recommendations of 2019 and 2020 adopted by the Council. It should also advance the green and digital transitions and make Member States' economies and societies more resilient.

The RRF is performance based. Fulfilment of agreed milestones and targets towards achieving the reforms and investments in the plans will unlock regular payment[30].

Under the national RRPs financed by the RRF, almost EUR 50 billion is allocated to the railways. This represents the majority of the RRF funding benefitting the transport sector. The rail investments planned in 21 Member States relate mainly to the development of the rail infrastructure (creation and upgrade of lines, stations, ERTMS equipment), including on the TEN-T network, but also to digitalisation (e.g. ticketing, information system), accessibility for passengers with reduced mobility and deployment of new more environment-friendly rolling stock.

In May 2022 the Commission proposed to make targeted amendments to the RRF Regulation to integrate dedicated REPowerEU chapters in Member States' existing RRPs. The REPowerEU Plan is the Commission's response to the socio-economic hardships and global energy market disruption caused by Russia's invasion of Ukraine[31].

The RRF is the centrepiece of NextGenerationEU, a more than EUR 800 billion temporary recovery instrument to help repair the immediate economic and social damage brought about by the coronavirus pandemic and help Europe becoming greener, more digital, more resilient and better fit for the current and forthcoming challenges. Further to the RRF, NextGenerationEU also includes EUR 50.6 billion for the Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU), an initiative whose funds will be made available in 2021-2022 to the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the European Fund for Aid to the Most Deprived (FEAD). NextGenerationEU also brought additional money to other European programmes or funds such as Horizon2020, InvestEU, rural development or the Just Transition Fund (JTF). To finance NextGenerationEU, the European Commission, on behalf of the EU, will borrow on the capital markets[32].

1.3.6 1.3.6 Cohesion policy funding

Cohesion policy is delivered through the European Regional Development Fund (ERDF), to invest in the social and economic development of all EU regions and cities, the Cohesion Fund (CF), to invest in environment and transport in the less prosperous EU countries, the European Social Fund Plus (ESF+), to support jobs and create a fair and socially inclusive society in EU countries, and the Just Transition Fund (JTF) to support the regions most affected by the transition towards climate neutrality. In 2021-2027 EU funds allocated to Cohesion policy amount to EUR 392 billion. With the national co-financing, about half a trillion euro will be available to finance the programmes in the EU regions and countries.

The ERDF and the CF aim at strengthening economic, social, and territorial cohesion in the EU by correcting imbalances between its regions. The CF provides support to Member States with a gross

[30] https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en
[31] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3131
[32] https://ec.europa.eu/info/strategy/recovery-plan-europe_en

national income (GNI) per capita below 90% EU-27 average, financing investments in the field of environment and trans-European networks in the area if transport infrastructure (TEN-T). In 2021-2027, these funds will enable investments in a smarter, greener, more connected and more social Europe that is closer to its citizens. The ERDF and CF finance programmes in shared responsibility between the European Commission and national and regional authorities in Member States. The Member States' administrations choose which projects to finance and take responsibility for day-to-day management.

Cohesion policy is the most important source of EU co-funding for investment in a sustainable European transport system. One of the objectives in 2021-2027 is supporting the development of sustainable transport and better transport infrastructures, promoting a shift to rail, in line with the ambition of the European Green Deal and the Sustainable and Smart Mobility Strategy.

There is a wide range of measures where railways benefit from Cohesion policy support, such as building or upgrading rail infrastructure, rolling stock, digitising transport, making stations and trains accessible for people with reduced mobility. In the 2014-2020 period, Cohesion policy provides significant support to the European railway system with EUR 17.6 billion for rail investments. As a result, 579 km of new railway lines will have been built and almost 6000 km of existing rail lines reconstructed by the end of 2023. For 2021-2027, Member States have committed to investing another EUR 18.2 billion of ERDF and Cohesion Fund, realising almost 1200 km of new or upgraded railways, more than 4600 km of reconstructed or modernised railways, and modernising 313 railway stations and stops. An additional EUR 11.8 billion has been transferred from the Cohesion Fund to the CEF in 2021-2027.

1.4 1.4 Impact of COVID-19 pandemic on the rail sector

The COVID-19 pandemic had a significant impact on the European rail sector in 2020, particularly on passenger services, as the demand declined due to travel restrictions and confinement measures.

The monthly rail traffic figures provided to the Commission by infrastructure managers in the context of Regulation (EU) 2020/1429[33] show that the pandemic had in general a higher impact on passenger services than on freight services, despite differences among Member States.

Passenger services

Regarding passenger services, the drastic effects of the decrease in demand due to the pandemic are shown in Figure 19. Passenger kilometres dropped from 412 billion passenger kilometres in 2019 to 223 billion passenger kilometres in 2020, equivalent to a decline of 46% in the EU27. The impact on passenger traffic is also illustrated in Figure 20 at country level. The declines vary from 27% in Bulgaria compared to 2019, up to a 65% reduction of passenger kilometres in Ireland.

This also led to a decline in railway undertaking's revenues from passenger services. The total volume in the EU27 declined from EUR 57.5 billion in 2019 to EUR 46.67 billion in 2020 (see Figure 31). The pandemic affected PSO and commercial passenger services to a very different extent (see Figure 34). While in certain Countries the level of commercial services remains below pre-pandemic levels, in other Countries traffic volumes are back to (and in some cases even exceed) 2019 levels. In some countries, commercial passenger services stopped during 2020 and only slowly restarted in 2021. On the contrary, passenger trains operating under a public service contract recovered more rapidly and

[33] 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. 1–5.

to a larger extent than commercial services, which likely reflects the presence of contractual obligations and public compensation from competent authorities.

According to the CER Crisis Impact Tracker[34], in March 2022 CER members' revenues for passenger services were still down by -20% compared to the same period of 2019. Members' revenues from freight services however almost stabilised to their pre-crisis level between December 2021 and March 2022.

As shown in Figure 27, the proportion of international passenger traffic almost halved to 3.6% in 2020, as international mobility was more restricted than domestic mobility due to the pandemic.

Freight services

Freight services registered a smaller impact, as the provision of goods had to be maintained due to its crucial role for basic services. Figure 19 shows that the total tonne kilometres declined from 439 billion in 2019 to 404 billion in 2020, equivalent to an 8% in the EU27.

Consequently, the reduction of railway undertakings' revenues was also lower for the freight services than for passenger services, with a decline of 9% between 2019 and 2020 (see Figure 40). In contrast to the passenger services, the proportion of international traffic remained stable with a share of 53% in 2020 (see Figure 37).

Measures by the Commission

The Commission adopted or proposed a number of initiatives to support the transport sector so hardly hit by the consequences of the pandemic.

In the case of railways, the Commission proposed to the European Parliament and the Council to adopt the Regulation (EU) 2020/1429 allowing Member States to reduce, waive or suspend access charges due by the railway undertakings to infrastructure managers, to counteract the negative economic effects of the COVID-19 outbreak in March 2020.

The Regulation takes a balanced approach leaving to Member States the ultimate decision whether to derogate from the current charging rules of Directive 2012/34/EU. The Regulation requires Member States to compensate infrastructure managers for the related financial losses.

The reference period of the Regulation was extended four times, until December 31, 2022.

In 2023, the Commission will launch a study to assess the financial impact of the COVID-19 pandemic on the rail sector.

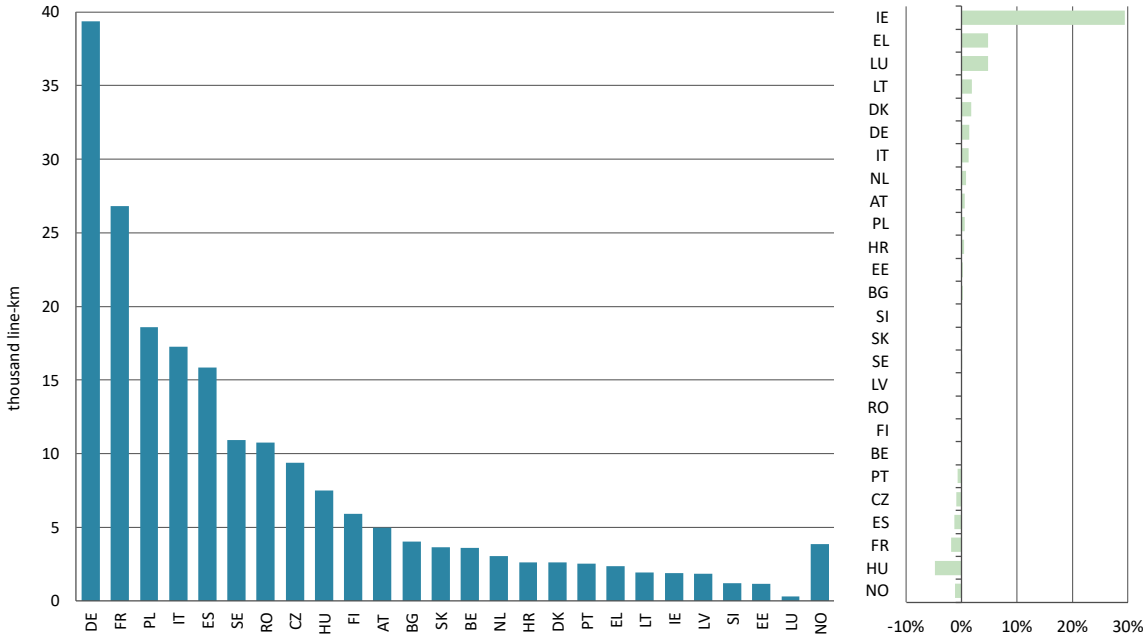
[34] Issue of April 2022 (https://www.cer.be/sites/default/files/press-release/2022-05-30_CER%20Press%20Release_Crisis%20Impact%20Tracker_0.pdf)

2. 2. The state of the EU's railway network

2.1 2.1 Description

Regarding domestic networks, the reported length of the national rail networks of the EU Member States and Norway[35] are shown in Figure 7.

Figure 7: Length of national networks per country (thousand line-km, 2020) and relative change (2015-2020)



Source: Statistical pocketbook, 2022.

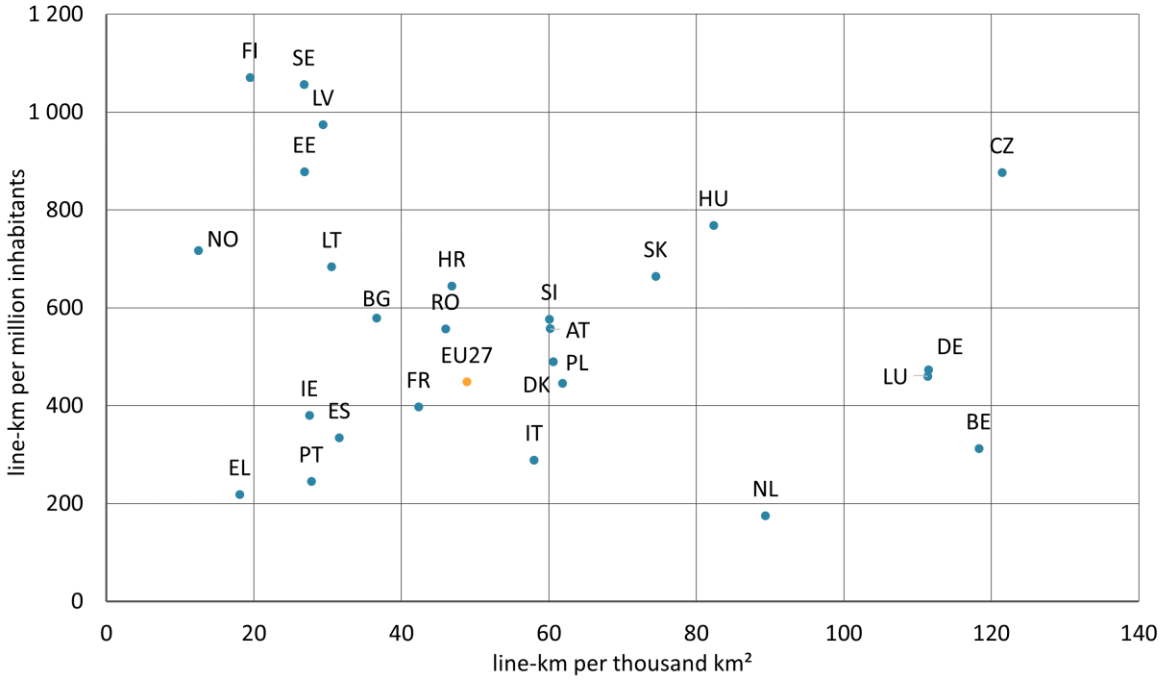
In 2020, the total length of the EU27 rail network was around 200 100 line-kilometres, a slight increase of 0.2% compared to 2015. Ireland, Greece and Luxemburg show the highest relative increase since 2015, whereas Germany had the largest network with more than 39 000 line-kilometres.

2.1.1 2.1.1 Infrastructure density

Figure 8 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.

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

Figure 8: Density of railway network relative to surface area and population per country (line-km per million people and line-km per thousand km2, 2020)



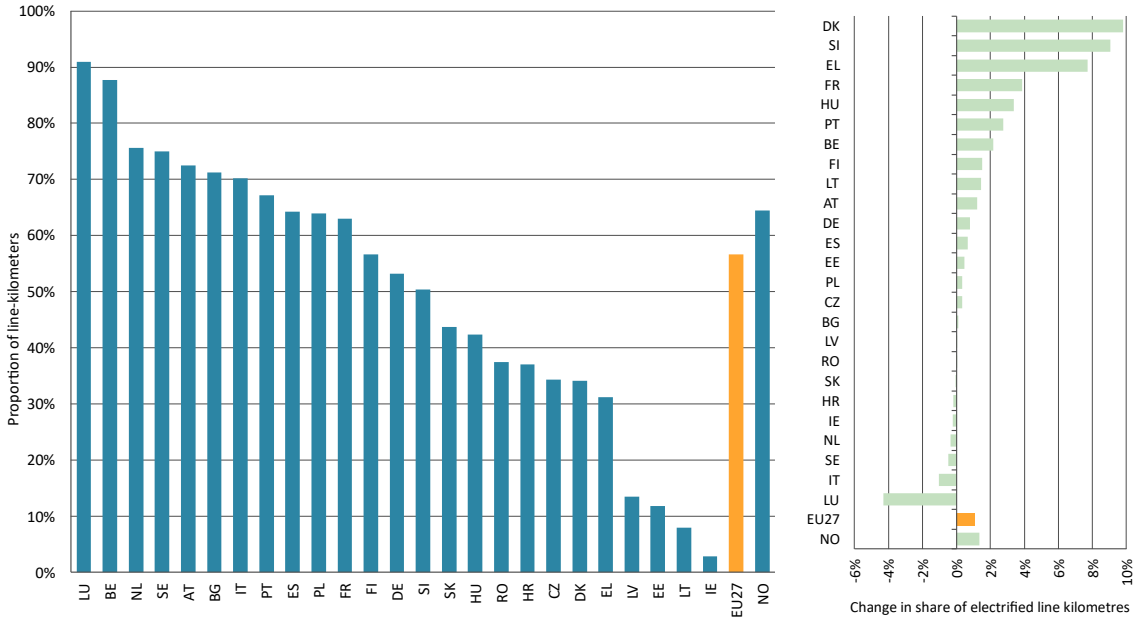
Source: Statistical pocketbook, 2022.

The figure 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, countries like Belgium, Germany, Luxembourg, and the Netherlands, have a very dense rail network when related to their territory, but sparse when related to their population (especially in the Netherlands). In Greece, the rail network is sparse both in relation to the population and the country's surface area, whereas Czechia has the densest network looking in terms of both indicators.

2.1.2 2.1.2 Electrified lines

Figure 9 shows the proportion of the electrified network in 2020, measured in line-kilometres, and the relative change compared to 2015.

Figure 9: Percentage of electrified network per country (2020) and change in the percentage of electrified network (2015 vs 2020)



Source: Statistical pocketbook, 2022.

In 2020 57% of the total EU27 had been network electrified, although the proportion varies from 3% in Ireland to 91% in Luxembourg. Since 2015 the network electrification rate has increased by 1.1%. It should be noted that changes in the percentage of the electrified network may also result from changes in the length of the network. As regards the TEN-T network, rail electrification compliance of the operational network is 74% on the Core and 55.5% on the Comprehensive Network.

According to the latest PRIME benchmarking report, in 2020, around 81.6% of total train-kilometres were travelled thanks to electricity-powered trains[36] .

2.1.3 2.1.3 High-speed lines

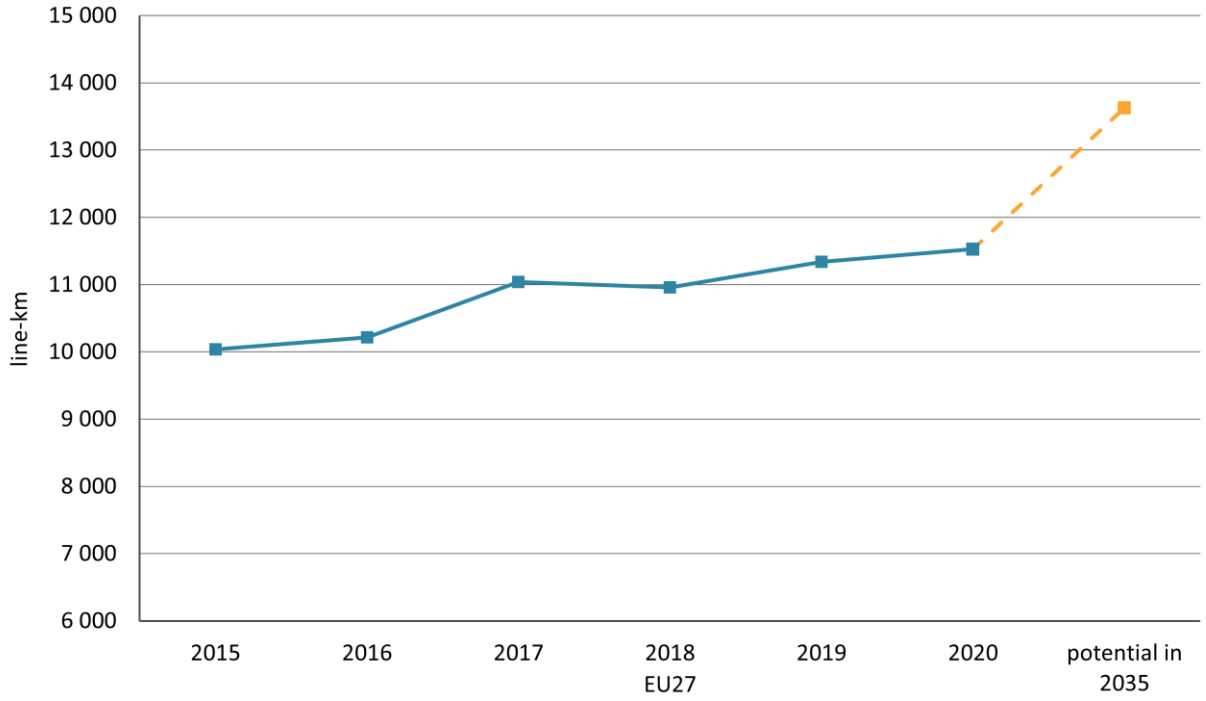
The Commission reports every year statistics on high-speed lines, which are defined as the lines or sections of lines on which trains can go faster than 250 km/h at some point during the journey[37].

Figure 10 shows the development of the EU's high-speed network, which by the end of 2020 extended to 11 526 line-kilometres. When considering also the length of high-speed lines currently reported under construction, the estimated EU27 network will increase to 13 630 line-kilometres in 2035.

36 https://wikis.ec.europa.eu/display/primeinfrastructure/Prime+Infrastructure+Homepage?preview=/44167372/55902568/PRIME_External%20Report_Final%20Version_2022_05_20.pdf

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

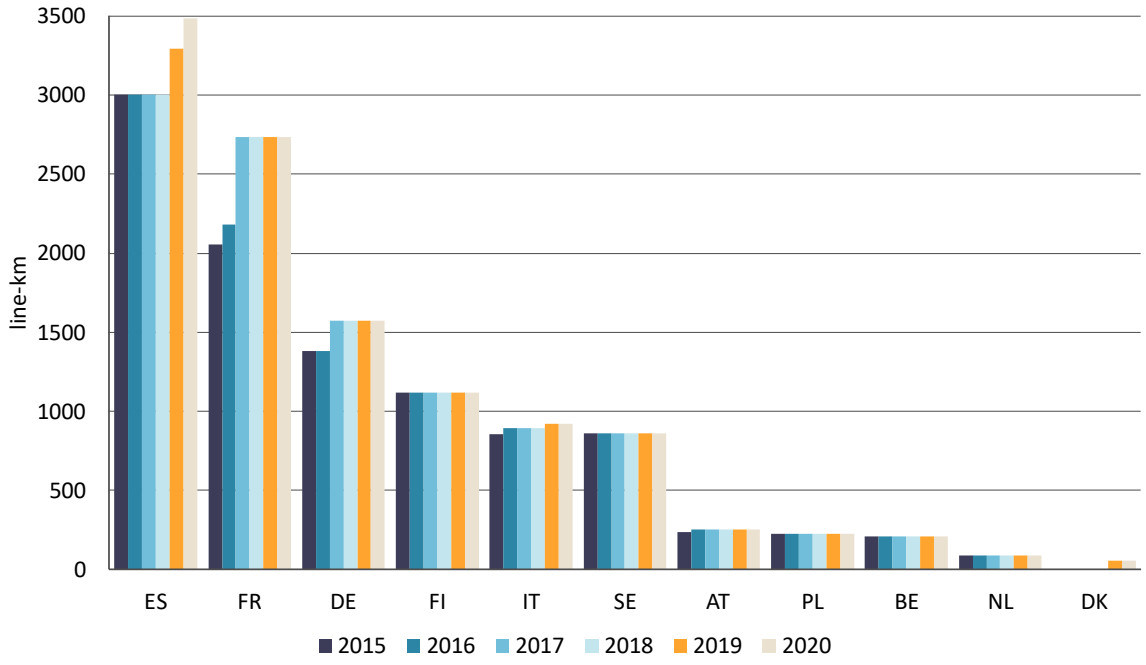
Figure 10: Development of high-speed lines in Europe, current and potential (line-km, current 2015-2020, further for those under construction)



Source: Statistical pocketbook, 2022.

The EU27 high-speed network increased by almost 1 500 km between 2015 and 2020. Figure 11 shows how the length of high-speed lines evolved from 2015 to 2020 in different countries. It should be noted that the length of high-speed network refers to lines dedicated to high-speed services and does not include mixed-use lines.

Figure 11: Length of dedicated high-speed line per country (line-km, 2015-2020)



Source: Statistical pocketbook, 2022.

Spain is the country with the largest high-speed network with almost 3500 line-kilometres in 2020. No new lines were added to the relatively small networks in Poland, Belgium, and the Netherlands between 2015 and 2020. The largest increase since 2015 can be seen in France and Spain, with 676 and 485 additional line-kilometres respectively.

2.2 2.2 Infrastructure management

2.2.1 2.2.1 Infrastructure governance

An efficient management and adequate funding of the rail infrastructure is crucial for the provision of efficient and sustainable rail transport 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 (2020)

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	76%

Source: Tenth Annual Market Monitoring Working Document, IRG-Rail 2022.

2.2.2 2.2.2 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 incentivise infrastructure managers to perform better.

Article 30(2) of Directive 2012/34/EU requires that a contractual agreement 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 3 shows the contractual agreements as reported in 2020 by Member States in the RMMS.

Table 3: Contractual agreements between competent authorities and infrastructure managers

	Number of contractual agreements	Performance indicators included	Monitoring body
AT	1	YES	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	14	YES (5) NO (9)	YES (12) NO (2)
LT	1	YES	YES
LU	1	NO	NO
LV	1	YES	NO
NL	1	YES	YES
PL	4	YES (all)	YES (3) NO (1)
PT	3	YES (all)	YES (all)
RO	1	YES	YES
SE	2	NO NO	NO NO
SI	1	NO	YES
SK	1	YES	YES
NO	1	YES	NO

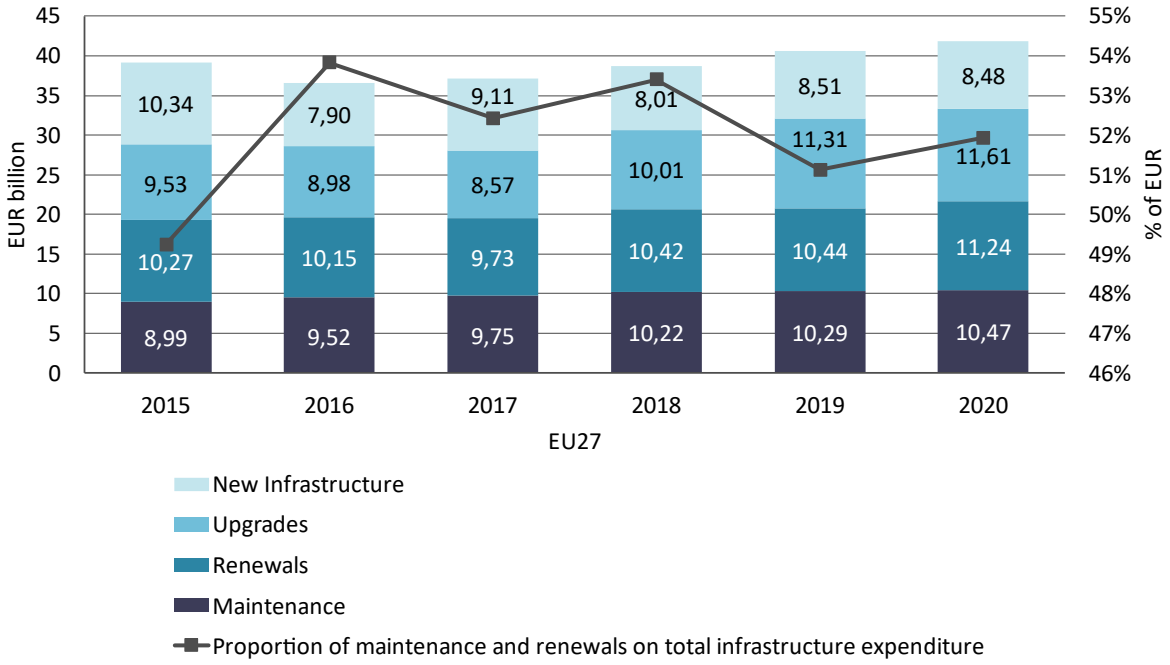
Source: RMMS, 2022. Note: for some Countries, the table only include the contractual agreement with the Country's main Infrastructure Manager

2.2.3 2.2.3 Infrastructure expenditure

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 12 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 2020 for EU27. The dotted line indicates the share of maintenance and renewals on total infrastructure expenditure.

Figure 12: Expenditure on infrastructure and proportion of maintenance and renewals (EUR billion, 2011-2020)



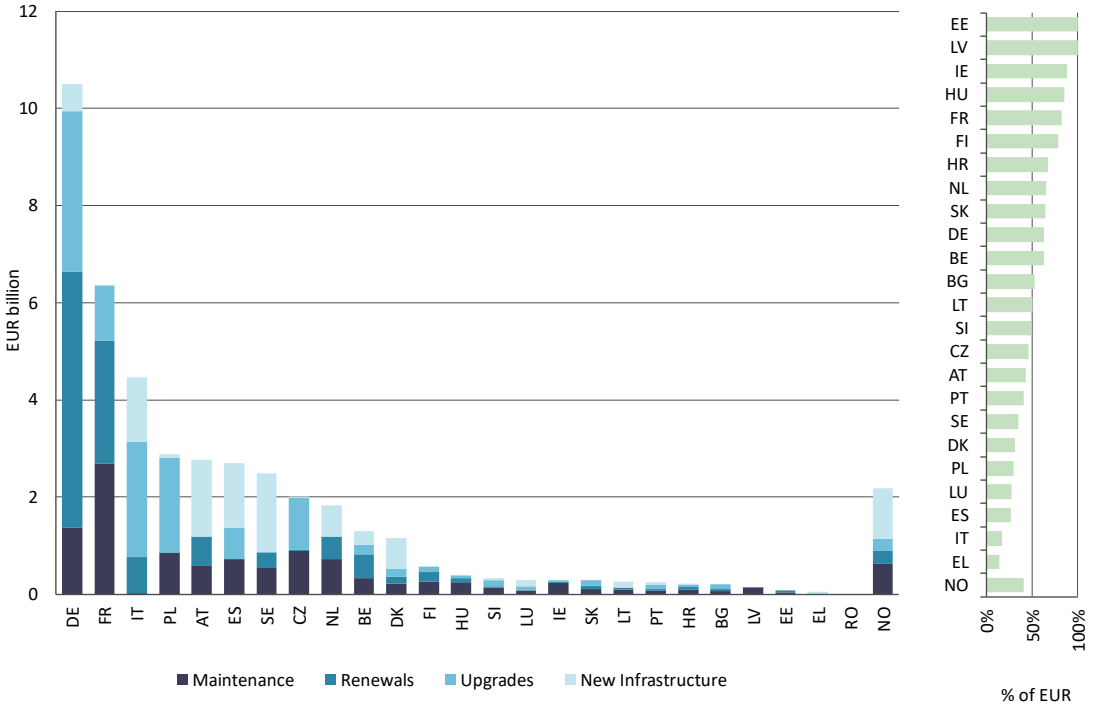
Source: RMMS, 2022.

Total EU27 infrastructure expenditure rose from EUR 39.1 billion in 2015 to EUR 41.8 billion in 2020. In 2020, 25% of the expenditure was on maintenance, 27% on renewals, 28% on upgrades and 20% on investments into new infrastructure.

Between 2015 and 2020, the share of maintenance, renewals, and upgrades expenditures into the existing network slightly increased, whereas the share of new investments decreased in 2016, probably due to budgetary reasons, and has not reached the level of 2015 since then.

Figure 13 shows the total annual infrastructure expenditure per country in 2020 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 13: Expenditure on infrastructure and proportion of maintenance and renewals per country (EUR billion, 2020)



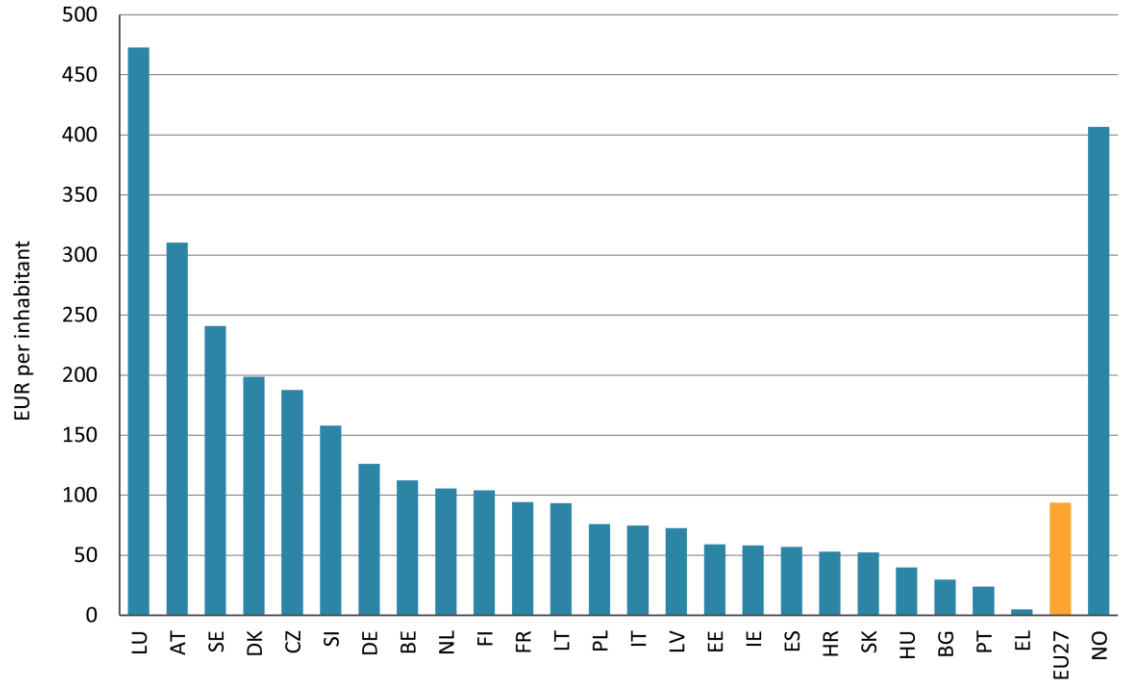
Source: RMMS, 2022.

Total infrastructure expenditure in 2020 was highest in Germany, France, Italy, and Poland. Austria, Spain, Sweden, and Italy had the highest expenditure for new infrastructure, whereas the highest expenditure for infrastructure upgrades was reported in Germany, Italy and Poland[38]. In 2020, total maintenance and renewal expenditure in the EU27 amounted to EUR 21.7 billion, i.e. 52% of the total expenditure. The highest proportion was for Latvia and Estonia (100%), and the lowest was for Greece (14%).

Figure 14 shows the total annual infrastructure expenditure per inhabitant in 2020 per country.

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

Figure 14: Expenditure on infrastructure per inhabitant per country (EUR, 2020)



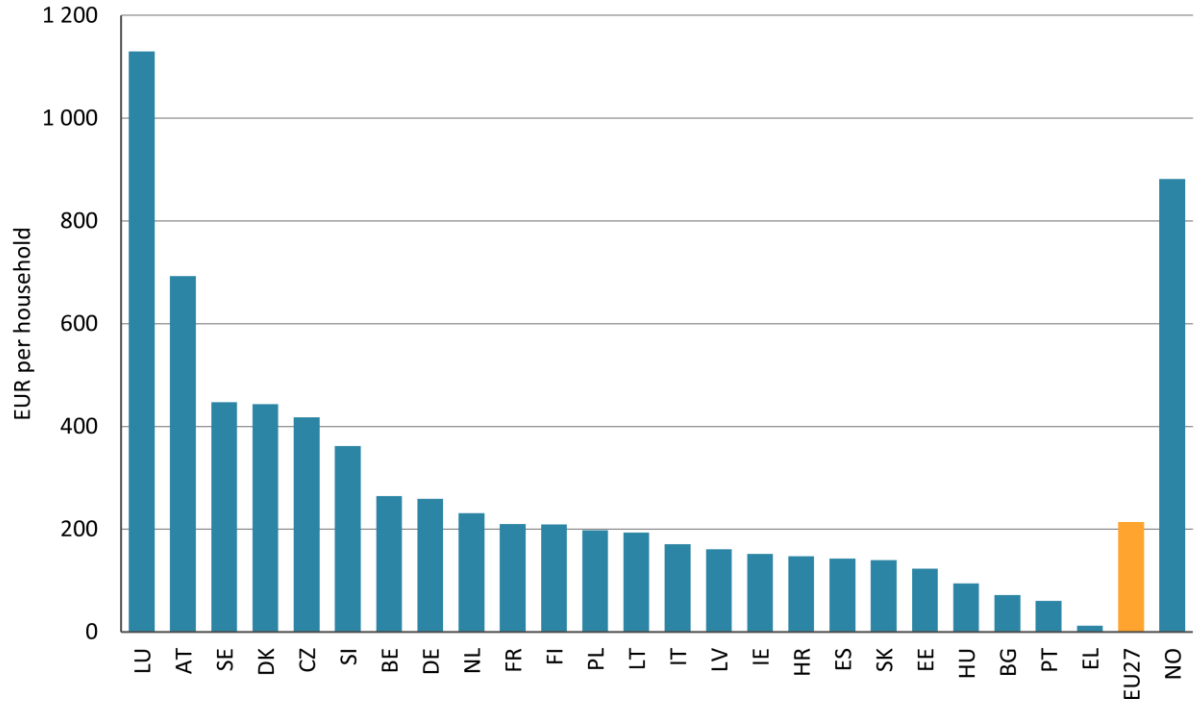
Source: RMMS, 2022, Eurostat, 2022. RO not available.

In 2020 the average infrastructure expenditure per inhabitant in the EU27 was EUR 93.71. The highest expenditures were made in Luxembourg, with EUR 472.76 per inhabitant, and the lowest in Greece with 5.11 per inhabitant.

If the infrastructure expenditure is expressed per household, the EU27 average was EUR 214 in 2020. Looking at the distribution per country (Figure 15), again Luxembourg reports the highest value with EUR 1,130 per household.

Between 2015 and 2020, the highest increase in the average expenditure per inhabitant was recorded in Estonia (1 040%), Portugal (156%) and Germany (64%). Over the same period, the highest decrease recorded were in Greece (-79%), Latvia (-63%) and – despite the high infrastructure expenditure per inhabitant in absolute terms – Luxembourg (-30%).

Figure 15: Expenditure on infrastructure per household per country (EUR, 2020)

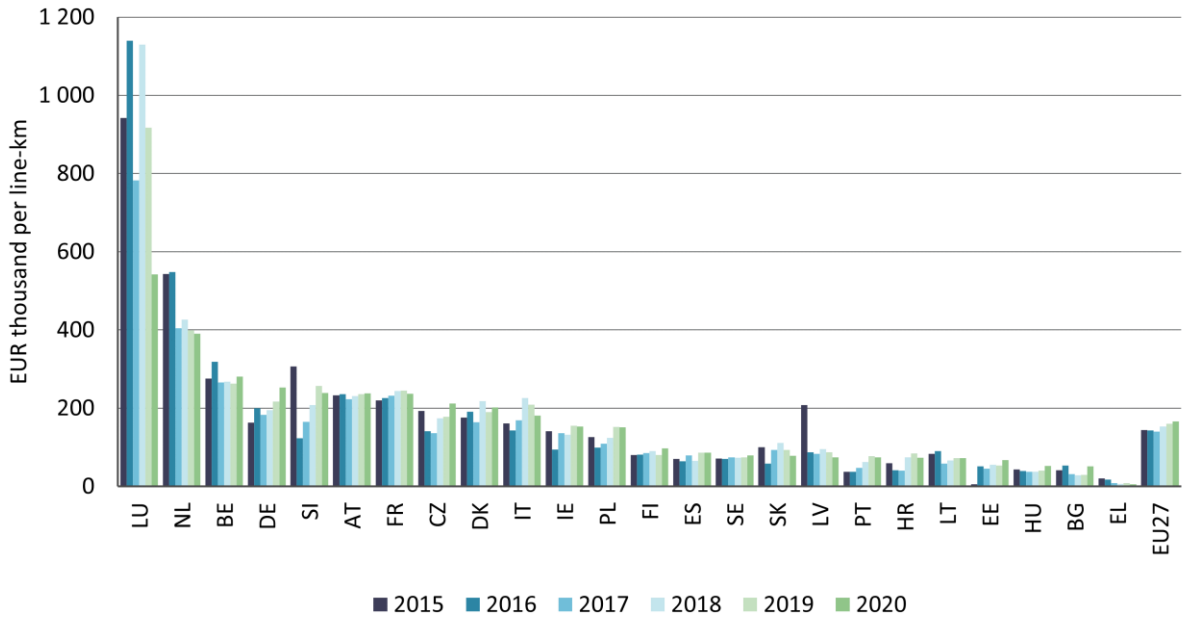


Source: RMMS, 2022, Eurostat, 2022. RO not available. Household data for NO not available in Eurostat, taken from Statistics Norway[39].

Figure 16 shows the sum of annual infrastructure maintenance, renewal, and enhancement expenditure per line kilometre per country for the years 2015 to 2020.

39 https://www.ssb.no/en/statbank/table/09747/tableViewLayout1/

Figure 16: Expenditure on maintenance, renewal, and enhancement per line-km per country (EUR thousand, 2015-2020)

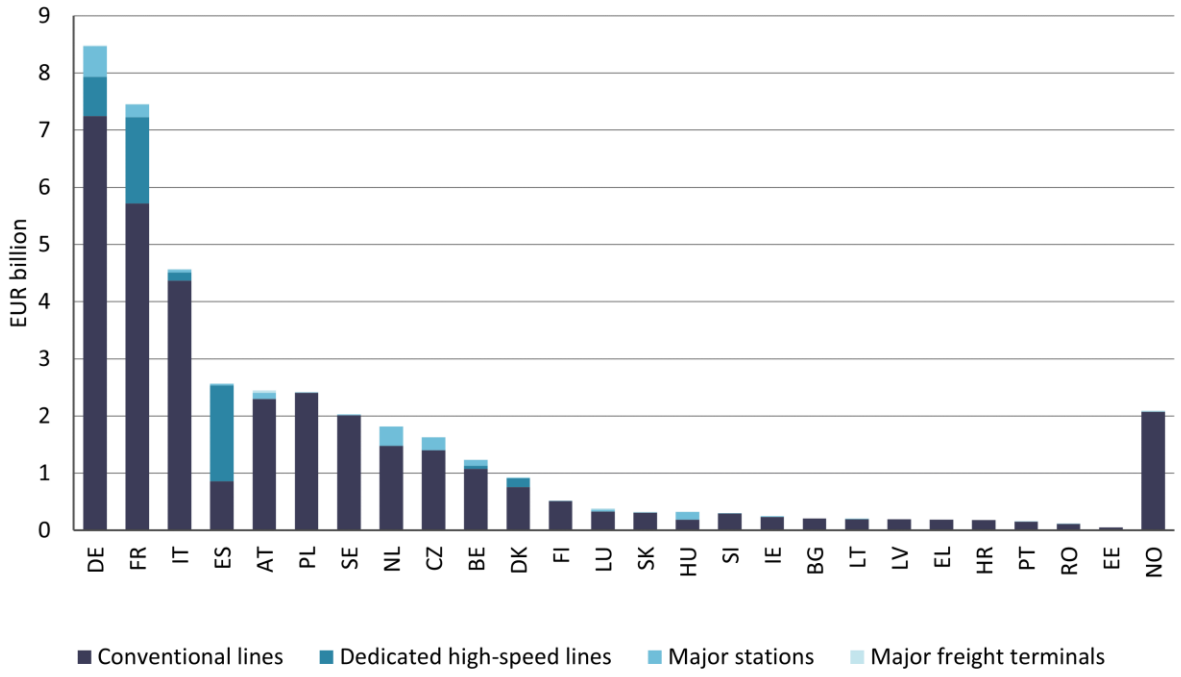


Source: RMMS, 2022, Statistical pocketbook, 2022. RO not available.

The EU27 average increased from around EUR 144,100 per line-kilometre in 2015 to EUR 166,500 per line kilometre in 2020. Luxembourg reported the highest expenditure, whereas Greece and Romania are at the lowest end of the surveyed countries.

Figure 17 shows the average annual infrastructure expenditure per country from 2015 to 2020 as a sum of average expenditures for conventional lines, high-speed lines, major stations, and major freight terminals.

Figure 17: Expenditure by category by country (EUR billion, average of 2015-2020)



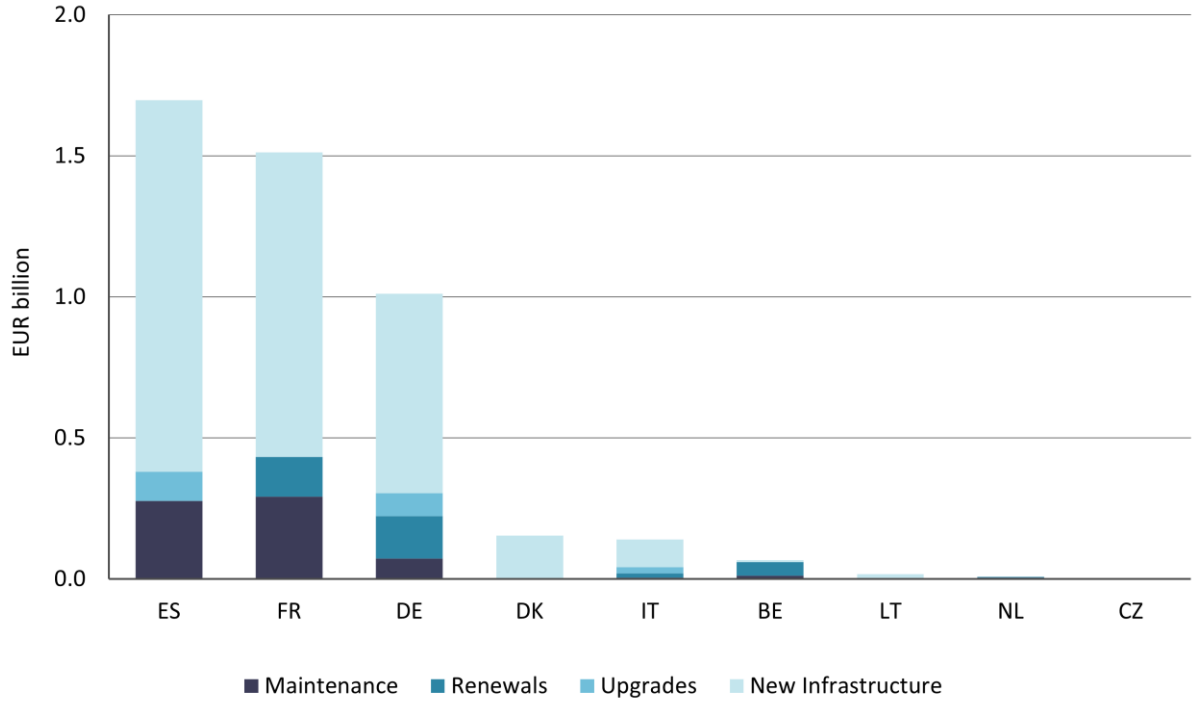
Source: RMMS, 2022.

Average total infrastructure expenditure was highest in Germany, France, and Italy. 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[40], expenditure for major stations was highest in Germany, the Netherlands and France, while expenditure for major freight terminals was highest in Austria.

Figure 18 shows the data available on average annual expenditure dedicated to high-speed lines between 2015 and 2020.

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

Figure 18: Expenditure on high-speed rail by typology of expenditure and by Member State (EUR billion, average 2015-2020)



Source: RMMS, 2022. Partially missing data for BE, CZ, ES, FR, DE, DK, IT, LT, NL.

Spain was the Member State which allocated most of its expenditure on high-speed rail between 2015 and 2020 (on average EUR 1.7 billion per year), followed by France and Germany with EUR 1.5 and 1.0 respectively. In these three countries, most funds were allocated to new infrastructure, whereas upgrades and renewals played a minor role.

On 14 December 2021 the European Commission published its proposal for a revised Trans-European-Transport Network (TEN-T) Regulation as part of a wider package of measures to make mobility greener and more efficient[41]. The objective is to ensure reliable connectivity throughout the EU by 2050, and at the same time to promote green mobility and to reduce the impact of transport on environment and climate change. To this end, the proposed revision of the TEN-T Regulation includes new and reinforced quality standards for all transport modes, but puts a special emphasis on railways. To give a few examples:

- Introduction of a P400 loading gauge requirement to allow for the circulation of semi-trailers;
- A 160 km/h minimum line speed requirement for passenger lines of the extended core network;
- A better distribution of multimodal freight terminals with adequate transhipment capacity across Europe;
- An increased number of multimodal passenger hubs and a better connection of airports to the long-distance railway infrastructure;
- The integration of the Rail Freight Corridors with the Core Network Corridors into European Transport Corridors;
- The deployment of ERTMS and the de-commissioning of national class-B systems by 2040.

Overall, the vision is to gradually develop a trans-European transport network at highest standards in three steps: the completion of a core network by 2030, of an extended core network by 2040 and the completion of the comprehensive network by 2050[42].

In order to implement the current TEN-T Regulation, total investment needs over the period 2021-2030 are estimated at about EUR 500 billion for the TEN-T core network (EUR 50 billion per year on average), and at about EUR 1.5 trillion for the TEN-T comprehensive network and other transport investments up to 2050 (EUR 50 billion per year on average). The measures introduced through the revised TEN-T Regulation would lead to additional investment needs of around EUR 16.4 billion per year on average from 2025-2050.[43]

The proposal of the Commission is currently being negotiated with the European Parliament and Council with a planned adoption date towards the end of 2023.

[41] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM%3A2021%3A812%3AFIN

[42] The revised TEN-T comprises three network types:
- the core network includes the most important connections, linking the most important nodes.
- the extended core network comprising certain priority sections of the comprehensive network and
- the comprehensive network covers all European regions.

The strategically most important sections of the core network and parts of the extended core network are represented in the proposal by nine core network corridors, with the aim to streamline and facilitate the coordinated development of the core network.

[43] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021SC0472&from=EN

3. 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).

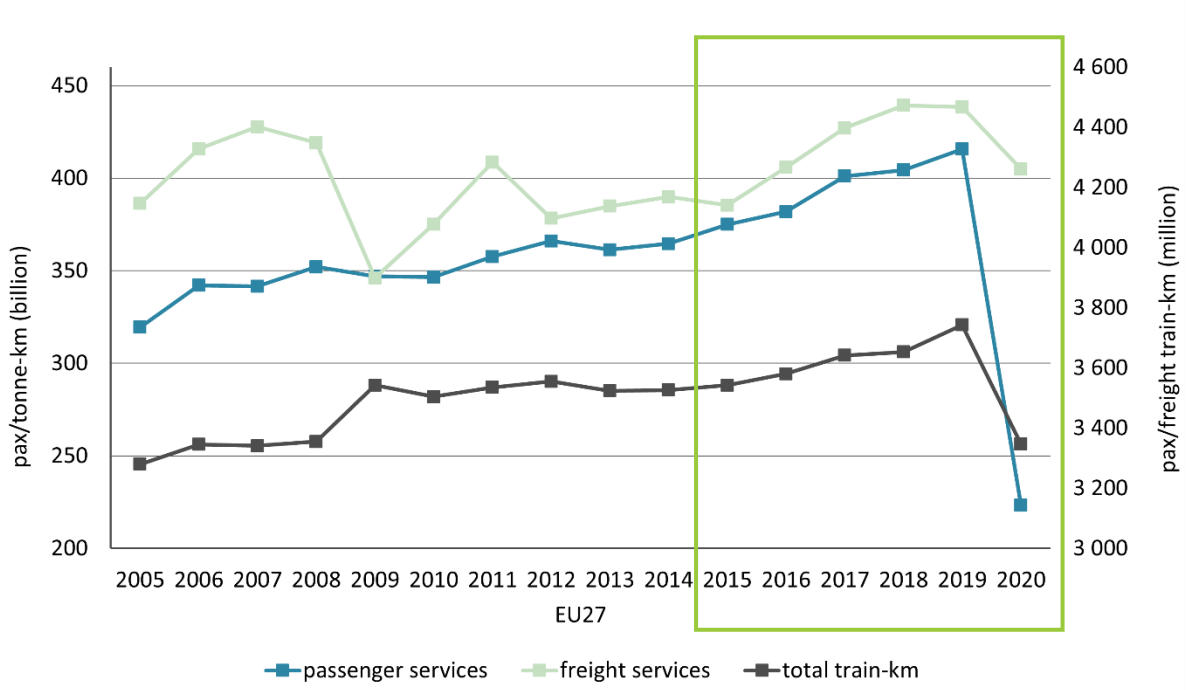
Since data on train kilometres has been reported in the RMMS only after the entry into force of Regulation 2015/1100, figures reported by Eurostat, UIC and IRG-Rail have been combined to acquire a dataset as complete as possible for the years before 2015.

Finally, to assess the modal split, which requires combining the data of different modes, only Eurostat data from the Statistical Pocketbook is used.

3.1 3.1 Traffic volumes

In 2020, rail transported some 1.4 billion tonnes of freight and 4.2 billion passengers in the EU27[44]. The effects of the COVID-19 pandemic are clear, looking in particular at the number of transported passengers, which almost halved compared to 2019. The impact of the pandemic was more limited on rail freight traffic, which decreased by less than 10% compared to 2019 levels.

Figure 19: Passenger and freight volumes (pax-km, tonne-km and train-km, 2005-2020)



Source: RMMS, 2022. Infill data from various other sources and estimates. RO 2014 and PT 2020 were corrected due to an error of magnitude. RO 2015, LU 2015, LU 2016, HU 2016, LU 2019, HR 2019, NL 2019, LV 2020, and PL 2020 are EC estimates.

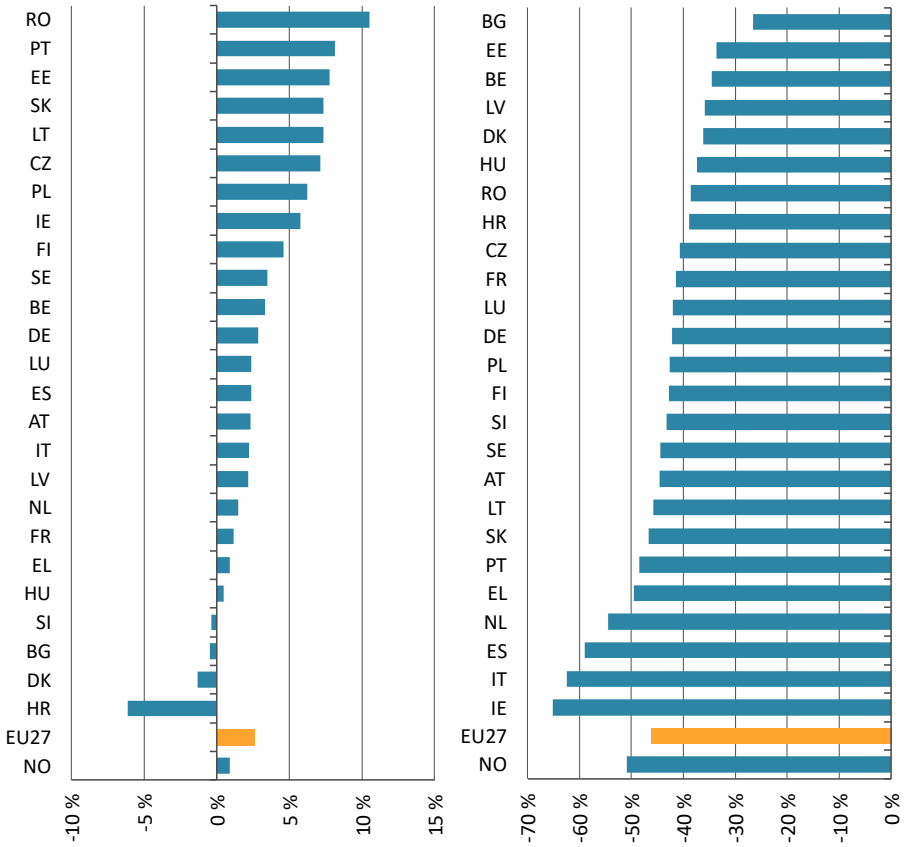
[44] Source Eurostat. Freight data EU27 do not include BE and EL which labelled data confidential; passenger data EU27 do not include BE, LU, HU, NL and PL, which labelled data confidential.

Total train kilometres, including both passenger and freight train movements, remained mostly 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 steadily until 2019 and plummeted abruptly in 2020 due to the COVID-19 pandemic and consequent confinement measures in many countries. The freight services measured in tonne kilometres increased comparatively more between 2009 and 2019, albeit with a few ups and downs, but shrank less during the pandemic.

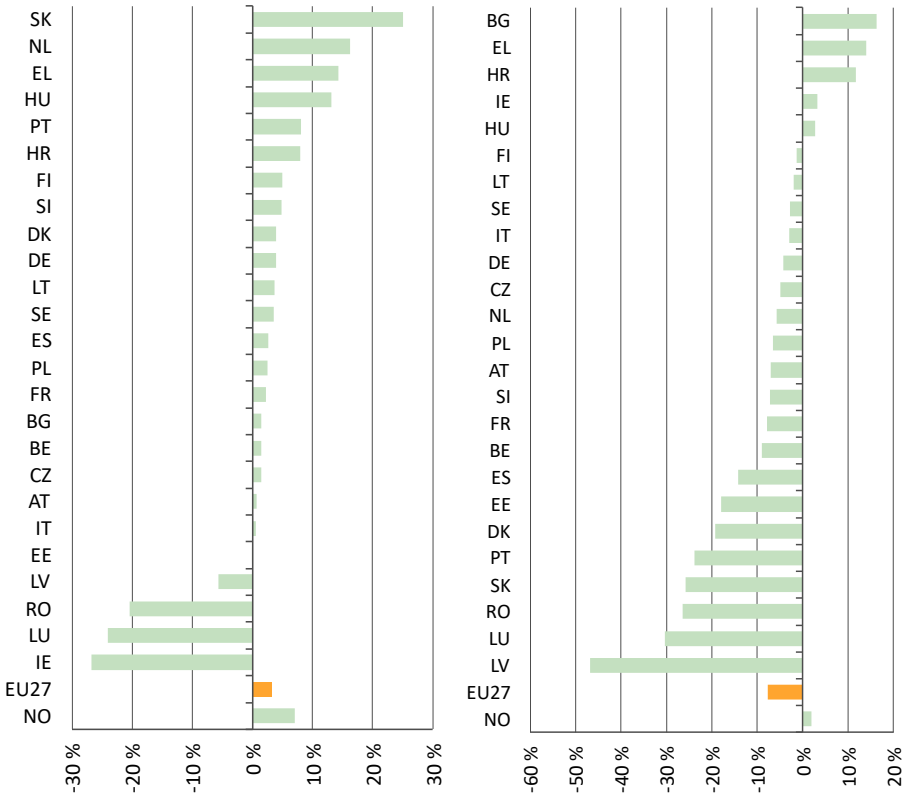
On average, passenger traffic in terms of passenger kilometres in Europe increased by 3% annually between 2015 and 2019 (CAGR), as shown by Figure 20. However, in 2020 due to the COVID-19 pandemic the passenger kilometres shrank dramatically by 46% in the EU27 due to confinement or travel restrictions. The countries experiencing the largest reduction were Ireland (- 65%), Italy (- 62%) and Spain (-59%).

Between 2015 and 2019, freight traffic in terms of tonne kilometres also increased annually by 3% (CAGR). Yet the reduction from 2019 to 2020 was less radical than for passenger services, with an 8% decline in the EU27, as freight service was necessary to maintain the provision of basic goods. In some countries, like Bulgaria, Greece and Croatia the tonne kilometres even increased compared to 2019.

Figure 20: Passenger and freight volumes, compound annual growth rate per country (%, 2015-2019 and 2019-2020)



passenger services 2015-2019 passenger services 2019-2020



freight services 2015-2019

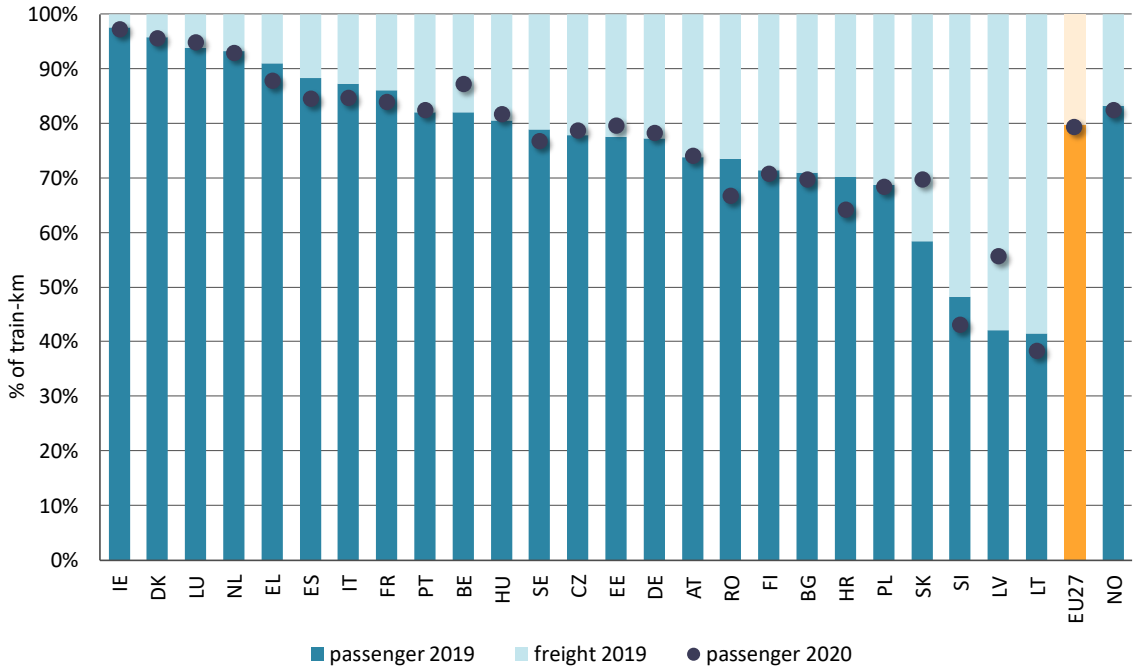
freight services 2019-2020

Source: RMMS, 2022. RO 2015, LU 2015, LU 2016, HU 2016, LU 2019, HR 2019, NL 2019, LV 2020, and PL 2020 are EC estimates. Data for SK 2019 from Statistical Pocketbook.

The focus of rail transport varies between countries. On average, 80% of all train kilometres run in the EU27 in 2019 were passenger services, and also in 2020 with the COVID-19 pandemic the ratio remained stable with 79%.

Figure 21 shows that the highest share of passenger services in 2020 is reported for Ireland (97%), Denmark (96%), Luxembourg (94%) and the Netherlands (93%). The highest share of freight services in 2020 is reported for Lithuania (62%), Slovenia (57%) and Latvia (44%). In most countries the ratio of passenger and freight train kilometres barely changed, whereas in Slovakia the relative share of passenger services increased (from 58% to 70%) significantly and Latvia the relative share of rail freight decreased notably already in 2019 (from 58% to 44%).

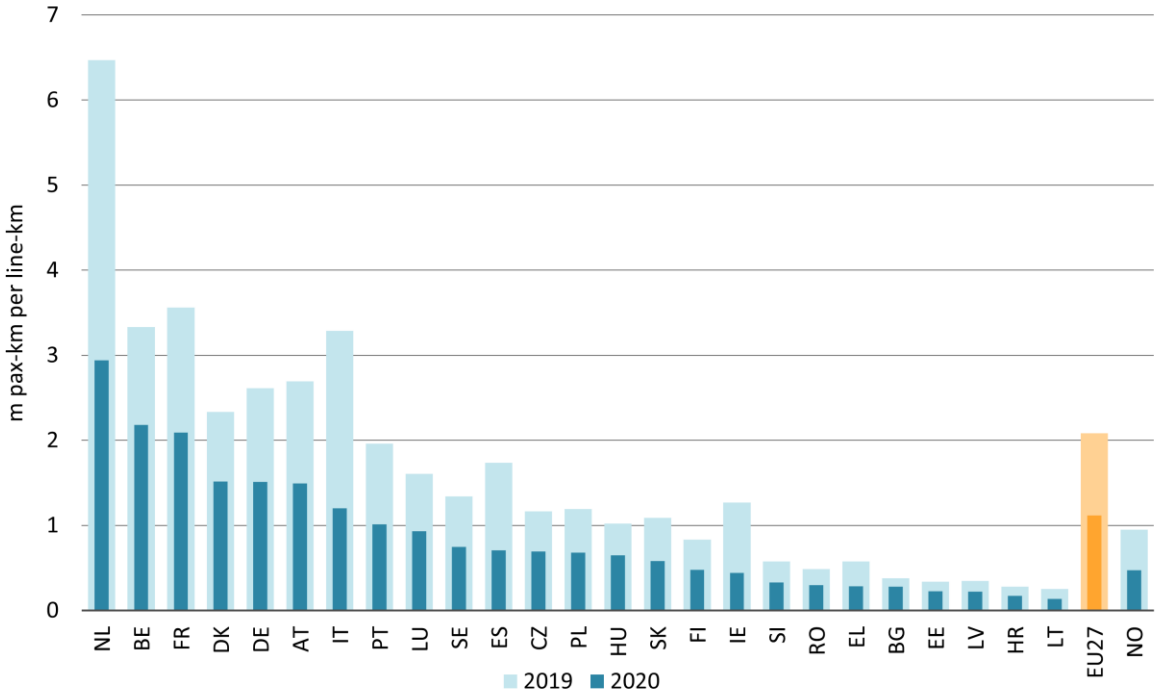
Figure 21: Relative share of passenger and freight train-km on total train-km per country (%, 2019 and 2020)



Source: RMMS, 2022. PT 2010 and PT 2020 were corrected due to an error of magnitude. LU 2015 and 2016 are EC estimates.

Figure 22 shows the intensity of use of the rail network for passenger transport measured in million passenger kilometres per line kilometre in 2020 per country, as well as the evolution compared to 2019.

Figure 22: Utilisation of rail infrastructure for passenger transport per country (millions of pax-km per line-km, 2019 and 2020)

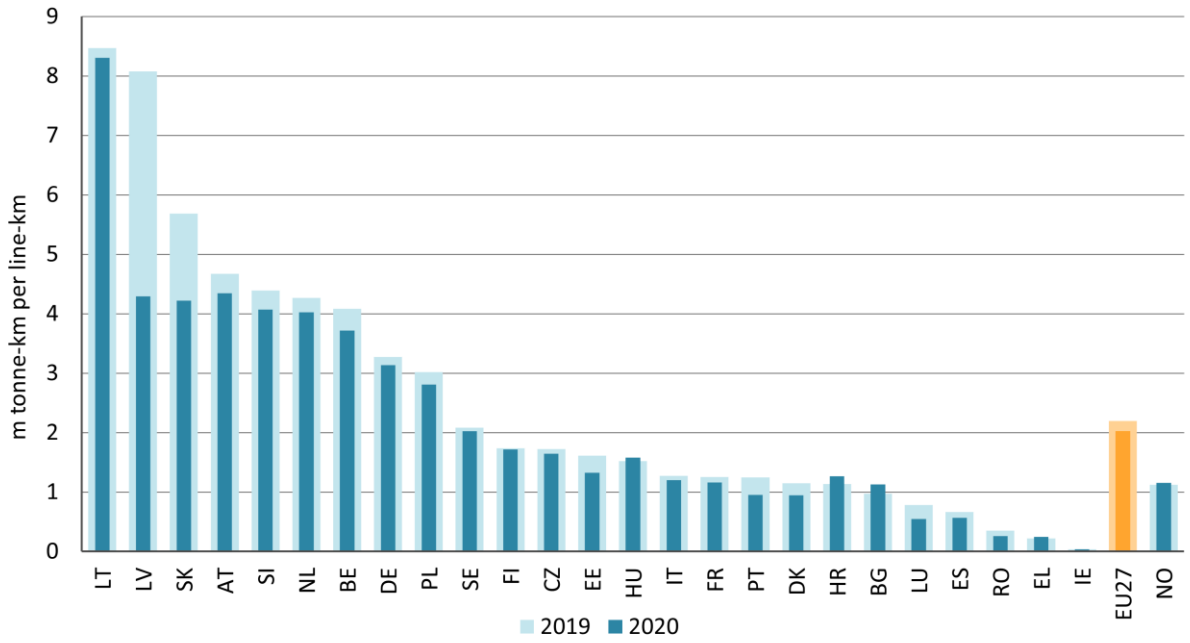


Source: RMMS, 2022, Statistical pocketbook, 2022, NL 2019, and HR 2019 are EC estimates.

In 2020 the EU27 network was used by 1.12 million passenger kilometres per line kilometre on average. The Netherlands had by far the highest passenger traffic density (2.94), while Latvia had the lowest (0.14). Overall, between 2019 and 2020 European passenger traffic density increased by 0.95 million passenger kilometres per line kilometre. According to data available in the RMMS, over the same period the Netherlands reported the highest decrease (- 3.53 million passenger kilometres per line kilometre).

Figure 23 shows the intensity of use of the rail network for freight transport measured in million tonne kilometres per line kilometre in 2020 per country, as well as the evolution compared to 2019.

Figure 23: Utilisation of rail infrastructure for freight transport per country (millions of tonne-km per line-km, 2019 and 2020)



Source: RMMS, 2022, Statistical pocketbook, 2022. LU 2019, LV 2020, and PL 2020 are EC estimates.

On average, in 2020 the EU27 network was used by 2.02 million tonne kilometres per line kilometre. Latvia by far had the highest freight traffic density with 8.3 tonne kilometres per line kilometre, while Ireland had the lowest (0.04). Overall, between 2019 and 2020 freight traffic density in the EU27 decreased slightly by 0.17 million tonne kilometres per line kilometre. According to data available in the RMMS, over the same period Bulgaria reported the highest increase (+ 0.16 million tonne kilometres per line kilometre) and Latvia the highest decrease (- 3.78)[45].

[45] The decrease of rail freight in Latvia started already in 2018, before COVID-19, according to the Central Statistics Bureau https://stat.gov.lv/en/statistics-themes/business-sectors/freight-transport/press-releases/2160-transport-activities-2019.

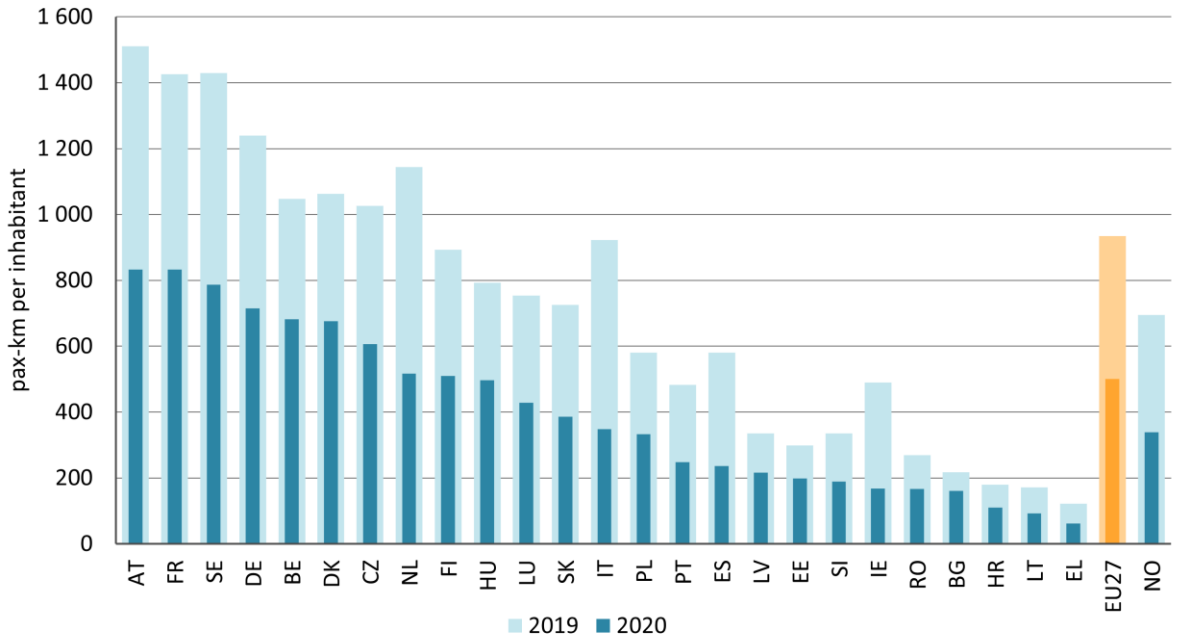
3.2 3.2 The rail passenger market

3.2.1 3.2.1 Evolution of rail passenger volumes

The propensity of EU citizens to travel by rail was 500 passengers-kilometres per inhabitant on average annually in 2020, which is a dramatic decrease compared to 2019 with 934 km. The highest propensity to travel by rail can be observed in Austria (833 km), and the lowest in Greece (62 km). Compared to 2019, Ireland and Italy showed the largest reduction in passenger kilometres per inhabitant with a 66% and 62% decline respectively. However, all countries experienced a decrease in the propensity to travel by rail due to the pandemic, with an average decline of 46% in the EU27.

Figure 24 shows how propensity to travel by rail, measured as annual passenger kilometres per inhabitant, varies significantly between states.

Figure 24: Propensity to travel by rail (pax-km per inhabitant, 2019 and 2020)



Source: RMMS, 2022, Statistical pocketbook, 2022. RO 2015, LU 2015, NL 2019, and HR 2019 are EC estimates. Data for SK 2019 from Statistical Pocketbook.

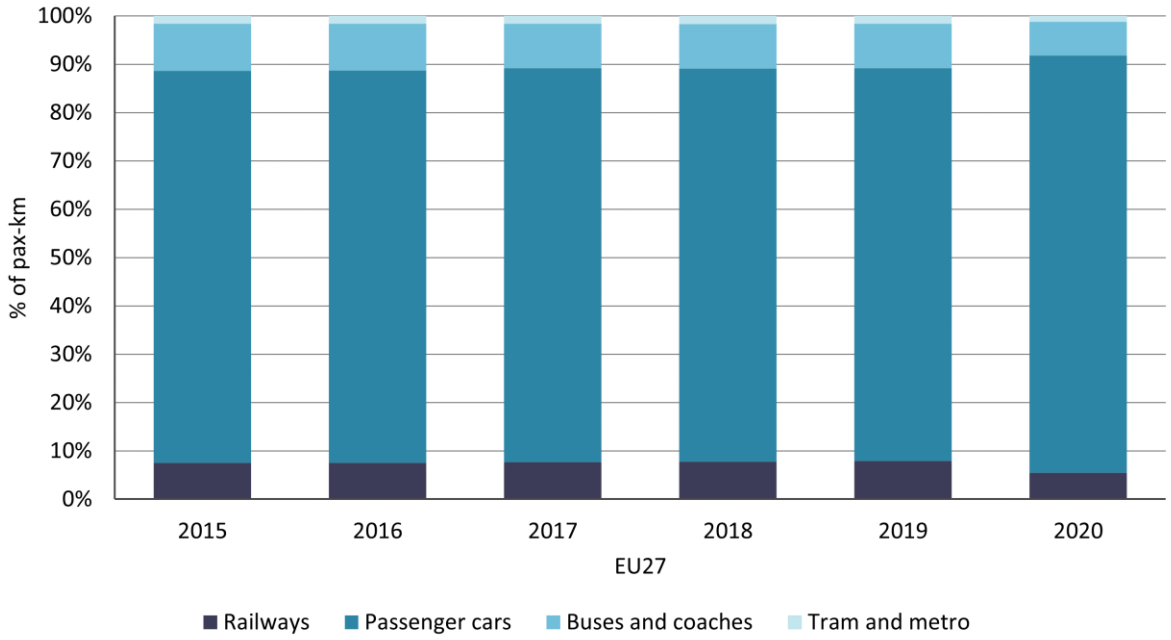
Passenger transport modal split

Looking at the EU27 performance by mode (all modes included i.e. land, air and sea transport modes), in 2020, railways had a modal share of only 5.1% against 86.2% for passenger cars[46] across all modes for intra.

[46] See Statistical pocketbook 2022.

Figure 25 shows the passenger land transport modal split between 2015 and 2020 in the EU27, with land transport including passenger cars, buses and coaches, railways and tram and metro.

Figure 25: Passenger land transport modal split (% in 2015-2020)



Source: Statistical pocketbook, 2022.

Passenger car transport dominates total passenger land transport within the EU27, with a share consistently higher than 80% between 2015 and 2020. Between 2015 and 2019, the rail modal share rose from 7.5% to 7.9%, while tram and metro's modal share remained stable at 1.6%. At the same time, the modal share of bus and coach transport fell from 9.8% to 7.0%.

In 2020, Austria, France, the Netherlands, Czechia, and Sweden were the countries with the highest rail share (more than 7%), as shown in Figure 26. Between 2015 and 2019, in most countries the modal share of rail transport increased slightly, on average by 0.45 percentage points. However, in 2020, due to the pandemic, the share decreased by 2.4 percentage points in the EU27. Figure 25 shows how the travel measures linked to the pandemic pushed passengers towards the use of individual means of transport (cars).

Figure 26: Passenger land transport modal split by country (% in 2020) and change in percentage points for rail (2015-2019 and 2019-2020)

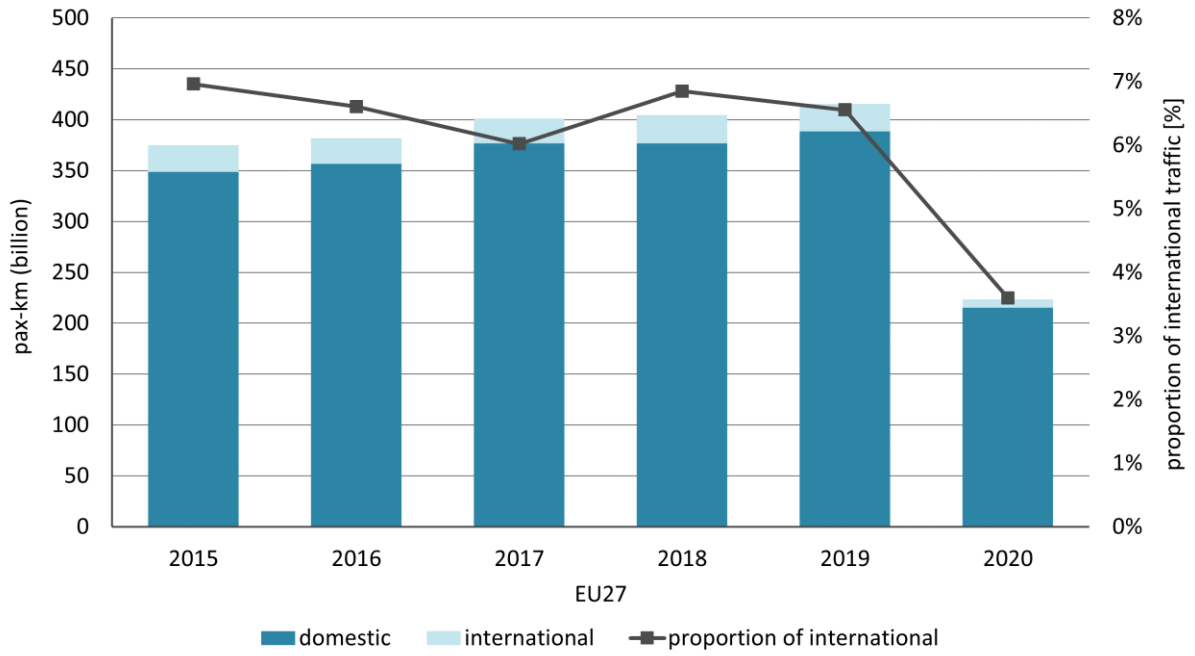
Source: Statistical pocketbook, 2022; excluding CY and MT.

Evolution of rail passenger volumes

In 2020, railways transported some 4.2 billion passengers[47] in the EU27, almost half the number of those transported in 2019.

Figure 27 shows the evolution of rail passenger traffic as a sum of domestic and international services for the EU27 between 2015 and 2020. The dotted line indicates the share of international in total passenger traffic services.

Figure 27: Evolution of rail passenger traffic volumes (domestic, international and proportion of international in total traffic) (billion pax-km, 2015-2020)



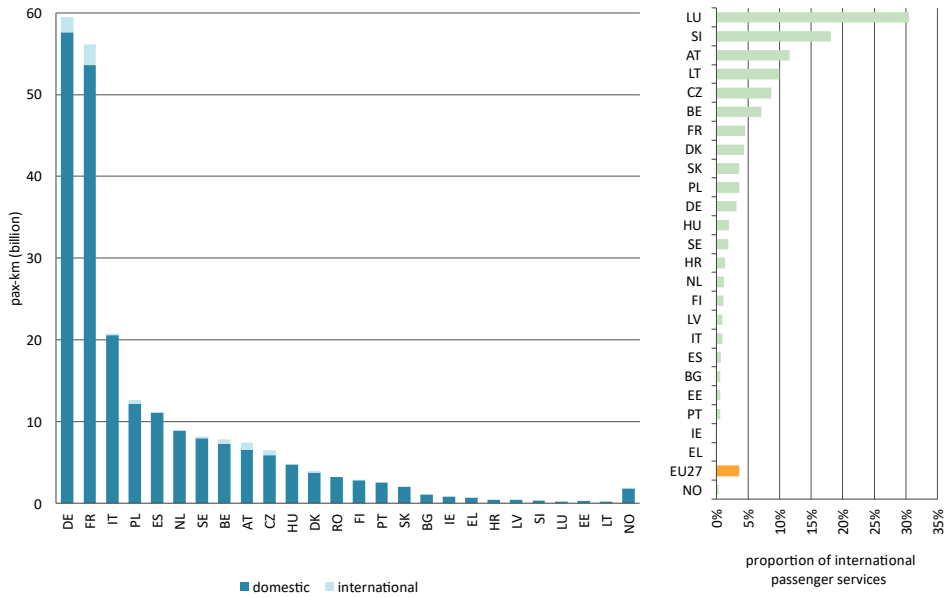
Source: RMMS, 2022. RO 2015, LU 2015, NL 2019, and HR 2019 are EC estimates.

Total EU27 rail passenger traffic rose relatively continuously, from 375 billion passenger kilometres in 2015 to 415.7 billion passenger kilometres in 2019. Domestic services increased from 348.9 to 388.4 billion passenger kilometres between 2015 and 2019 and fell to 215.3 in 2020 due to the pandemic. The proportion of international passenger services ranged around 7% between 2015 and 2019, and shrank to 4% in 2020.

Figure 28 shows the volumes of domestic and international passenger rail travel, measured in passenger kilometres, and the proportion of international traffic by country in 2020.

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

Figure 28: Passenger traffic volumes (domestic, international and proportion of international on total) by country (pax-km in 2020)

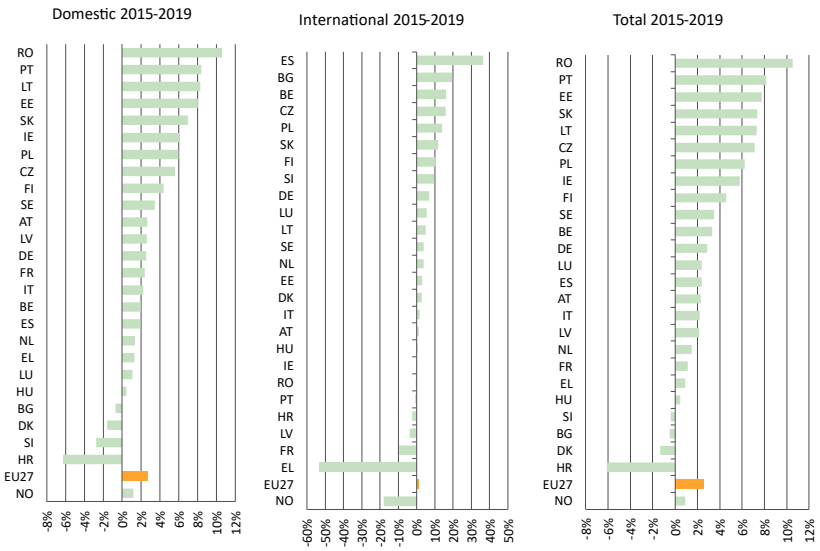


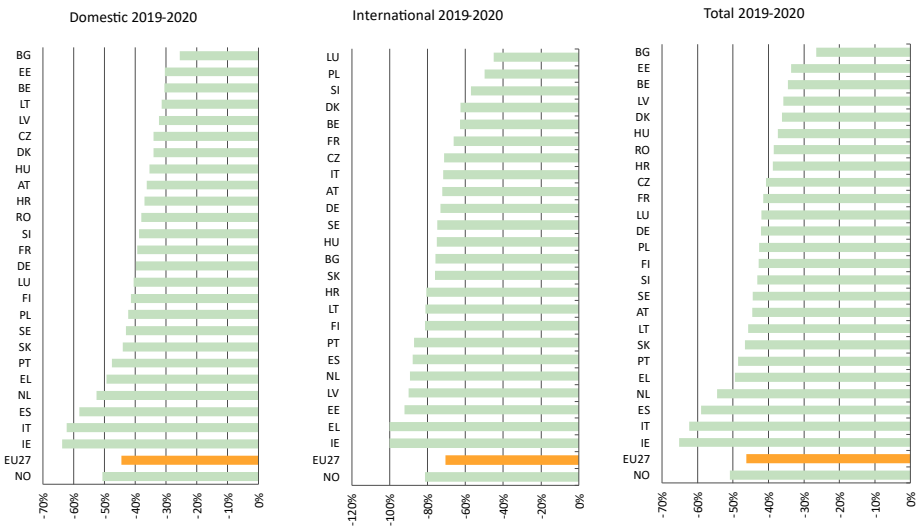
Source: RMMS, 2022. RO 2015, LU 2015, NL 2019, and HR 2019 are EC estimates.

The largest rail passenger markets are in Germany, France, and Italy. In 2020 more than 96% of all passenger kilometres in the EU27 stemmed from domestic passenger services. Due to the COVID-19 pandemic and travel restrictions, the share of domestic services increased in 2020, while the total passenger volumes decreased significantly. Unsurprisingly, considering its size, Luxembourg is the country with the most internationally oriented rail passenger market (30% of the total passenger traffic), whereas Ireland and Greece had the lowest proportion of international passenger travel.

Figure 29 shows the compound annual growth rates for domestic, international and total passenger traffic volumes from 2015 to 2020 for each country.

Figure 29: Compound annual growth rates of domestic, international and total passenger traffic volumes per country (%, 2015-2019 and 2019-2020)





Source: RMMS, 2022. RO 2015, LU 2015, NL 2019, SK 2019, and HR 2019 are EC estimates.

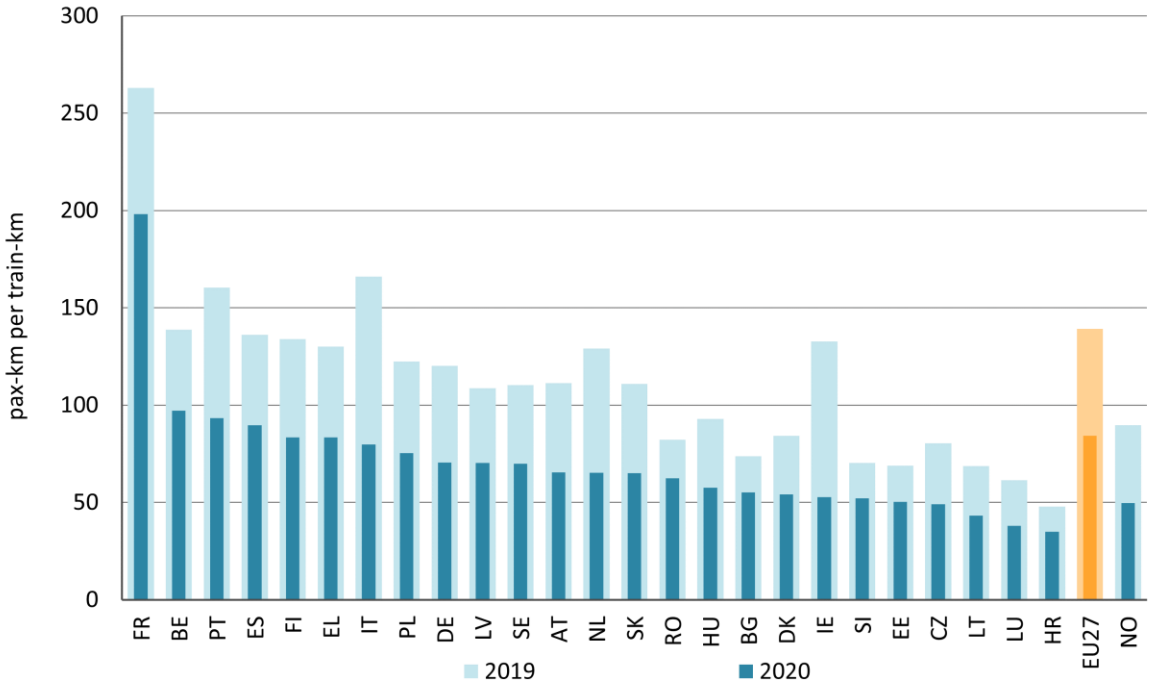
Total passenger traffic increased by 2.6% annually in the EU27 between 2015 and 2019. Passenger volumes decreased only in Bulgaria, Denmark, Slovenia and Croatia. However, between 2019 and 2020 total passenger traffic decreased in all countries, on average by 46.3%.

For the period 2015 to 2019, domestic passenger kilometres increased by 2.7% annually in the EU27, but decreased by 44.6% from 2019 to 2020.

International passenger kilometres increased by 1.1% annually in the EU27, altough a number of countries reported a decrease in international passenger volumes, including Greece, France, Latvia and Croatia. For the period 2019 to 2020 the decrease in international passenger kilometres was even more pronounced than for domestic, with an average decline of 70.5%, due to international travel restrictions because of the COVID-19 pandemic.

Figure 30 provides an overview of passenger trains' load factor, measured as the ratio between passenger kilometres and passenger train kilometres per country in 2020, and its evolution compared to 2019. Since no train occupancy rate (expressed for example as the percentage of available seats occupied) is available, this indicator allows an alternative assessment of how the supply of rail passenger services matches the demand.

Figure 30: Number of passengers per train per country (passenger trains' load factor, 2019 and 2020)



Source: RMMS, 2022. PT 2020 was corrected due to an error of magnitude. RO 2015, LU 2015, LU 2016, NL 2019, and HR 2019 are EC estimates.

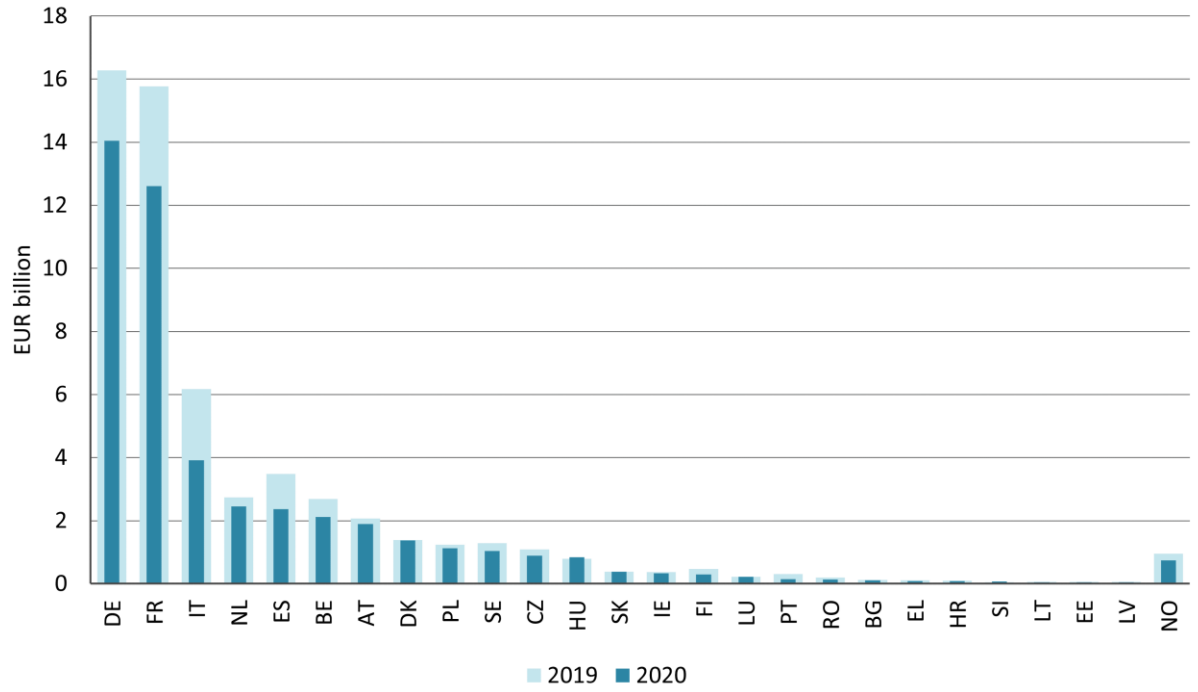
On average in 2020, EU27 passenger trains were loaded with 84 passengers, compared to 138 in 2019. This drastic decline due to the COVID-19 pandemic can be observed in all countries, except for Slovakia. Ireland and Italy stand out with the largest reduction of 60% and 52% respectively. Both in 2019 and 2020 France had by far the highest load factor.

3.2.2 3.2.2 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 31 shows the reported revenues from passenger transport services per country in 2020 as well as the evolution compared to 2019.

Figure 31: Railway undertakings' revenues from passenger transport services per country (billion EUR, 2019 and 2020)

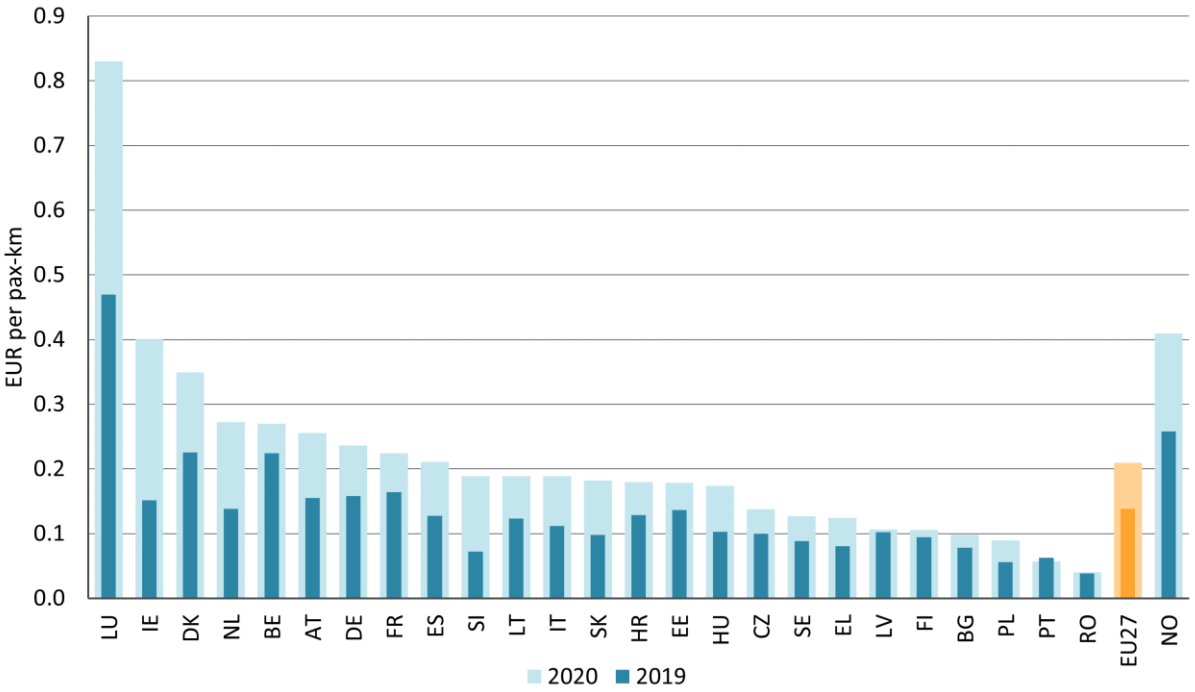


Source: RMMS, 2022.

Germany and France have had by far the highest amounts of revenues from passenger transport services in 2020 (EUR 14.05 and 12.60 billion respectively). The lowest amount was reported for Latvia (EUR 0.04 billion). In most countries the revenues of railway undertakings diminished compared to 2019, as revenues from commercial decreased due to the pandemic.

Figure 32 shows the railway undertakings' revenues from passenger transport services in 2020 per country as well as the evolution compared to 2019, measured in EUR per passenger kilometre.

Figure 32: Railway undertakings' revenues from passenger transport services per pax-km per country (EUR per passenger-km, 2019 and 2020)



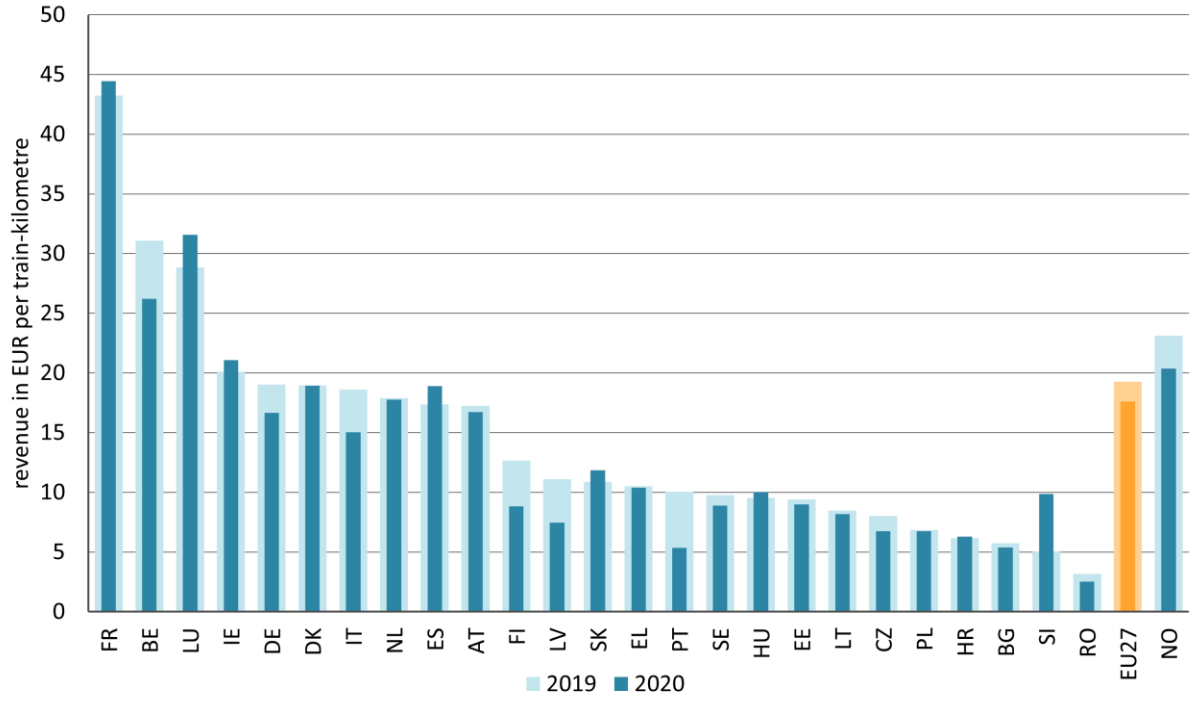
Source: RMMS, 2022. SK 2019 is an EC estimate.

In 2020, the EU27 railway undertakings' revenue per passenger kilometre was on average EUR 0.21. Luxembourg had by far the highest unit revenue (EUR 0.83)[48], and Romania the lowest (EUR 0.04). Unit revenues based on passenger kilometres increased between 2019 and 2020 by EUR 0.07 in the EU27. According to RMMS reporting, Luxemburg had the highest increase (+EUR 0.38), Romania the only decrease (-EUR 0.01).

Figure 33 shows the railway undertakings' revenues from passenger transport services in 2020 per country as well as the evolution compared to 2015, measured in EUR per passenger train kilometre.

[48] It should be noted that public transport in Luxembourg has been free since 29 February 2020 for both residents and tourists (with the exception of tickets and subscriptions for 1st class services). This results in an atypical revenue structure for the public transport operator compared to that of other Countries.

Figure 33: Railway undertakings' revenues from passenger transport services per train-km per country (EUR per passenger train-km, 2019 and 2020)



Source: RMMS, 2022. PT train-km and total revenue of railway undertakings from passenger transport services in 2020 were corrected due to an error of magnitude.

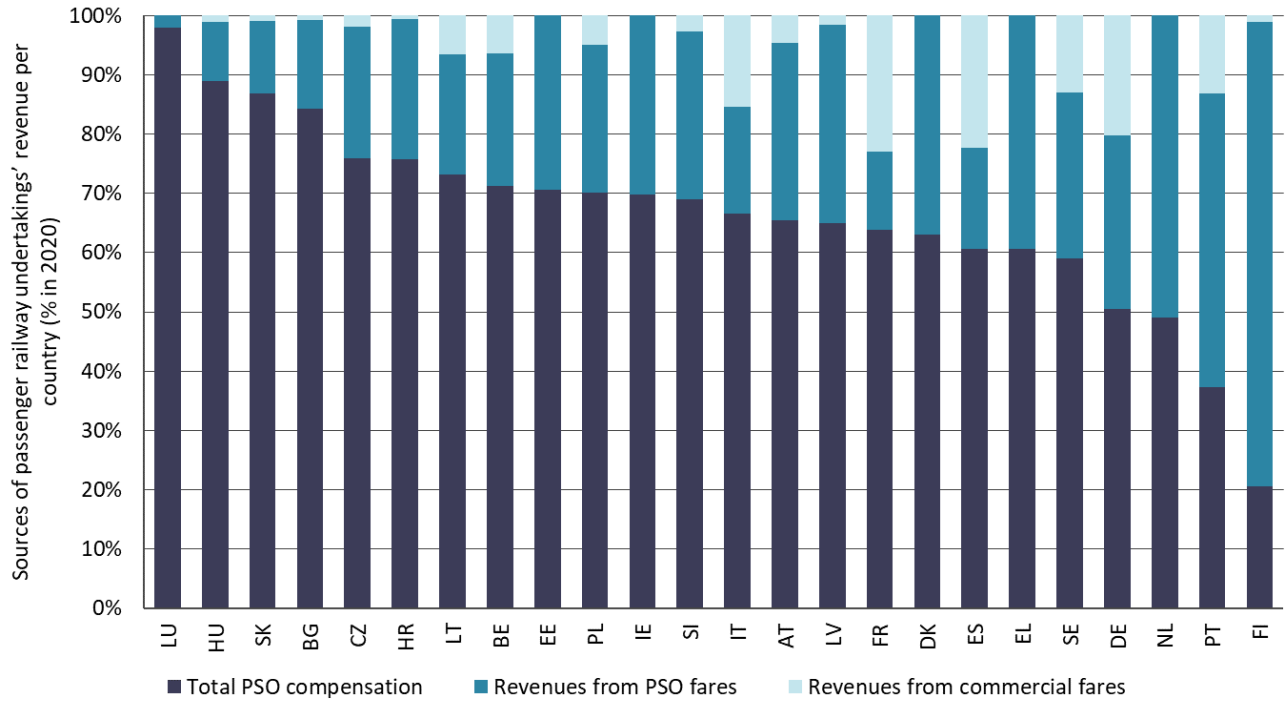
In 2020, the EU27 railway undertakings' revenue per train kilometres was on average EUR 17.60. France had the highest unit revenues (EUR 44.44), and Romania the lowest (EUR 2.51). In the EU27, unit revenues based on train kilometres decreased between 2019 and 2020 by EUR 0.66. According to RMMS reporting, Belgium had the highest decrease (-EUR 4.89), while Ireland had the highest increase (+ EUR 2.72).

Figure 34 shows the sources of railway undertakings' revenues from the provision of passenger services as reported in the RMMS for the year 2020.

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 34: Sources of passenger railway undertakings' revenue per country (% in 2020)



Source: RMMS, 2022. Norway declared data as confidential. PT 2020 is an EC estimate. LU public transport free since February 2020. No data available for commercial fares in RO

In many Member States, most of the railway undertakings' revenue is from PSO support from competent authorities. In 2020, reported revenues from commercial fares amounted to EUR 7.36 billion in the EU27, i.e. 39.7% of the total revenues. The relevance of revenues from commercial fares on total revenues decreased compared to the amount reported in the previous RMMS report. The lower number of passengers due to the pandemic reduced the revenues from fares both in absolute and relative terms.

3.2.3 3.2.3 Rail passenger policy developments

On 14 December 2021, the Commission adopted the Efficient and green mobility package[49], which includes the Action plan to boost long-distance and cross-border passenger rail. The Action plan follows up un the Sustainable and Smart Mobility Strategy of December 2020 and presents 10 areas of action to help remove obstacles to long-distance and cross-border passenger rail:

1. **Better implementation of the Union rail acquis and accelerated interoperability**: Correct and full implementation of the four railway packages, removal of redundant national rules, accelerated roll-out of ERTMS, a revision of the Technical Specifications for Interoperability and the work of the European Union Agency for Railways (ERA) and of Europe's Rail Joint Undertaking;
2. **A strengthened infrastructure for passenger rail**: Revision of the trans-European transport network (TEN-T) Regulation, which, among others, aims to improve the passenger rail network as well as its better integration within the multimodal transport system;

[49] https://transport.ec.europa.eu/news/efficient-and-green-mobility-2021-12-14_en

3. **Sufficient rolling stock availability**: A new financing platform of the European Investment Bank (EIB) and the preparation of specifications for "go-everywhere" rolling stock which will increase the geographical area in which rolling stock can be deployed;
4. **Bringing train drivers and railway staff training and certification in line with future needs**: Revised regulatory framework for train drivers as well as the 2022 Year of Youth as an opportunity to promote a career in rail to young people;
5. **A more efficient use of the networks**: A legislative initiative to improve capacity allocation and traffic management;
6. **Appropriate pricing for track access**: Guidelines on track access charges which support and encourage the development of long-distance and cross-border passenger services;
7. **User-friendly ticketing and access to the rail system**: An initiative for a new Regulation on multimodal digital mobility services as well as the monitoring of compliance with the recently revised Rail Passenger Rights Regulation;
8. **A level playing field with other transport modes**: Fit-for-55 package, a possible exemption of VAT on international train services and air-rail intermodality;
9. **Public Service Obligations to promote sustainable cross-border and/or multimodal collective transport**: Interpretative guidelines for applying the Land PSO Regulation;
10. **Empowering youth**: Erasmus reimbursement rules to promote the use of sustainable transport modes.

The Action plan introduces the possibility for stakeholders to submit, from 2022, proposals for pilot services to the Commission. Pilot services are meant to address obstacles identified in the Action plan. The Commission will support these pilots by facilitating contact with relevant stakeholders, by providing assistance and by investigating rail capacity and traffic management aspects through CEF technical assistance.

3.3 3.3 The rail freight market

3.3.1 3.3.1 Evolution of rail freight volumes

Freight transport modal split

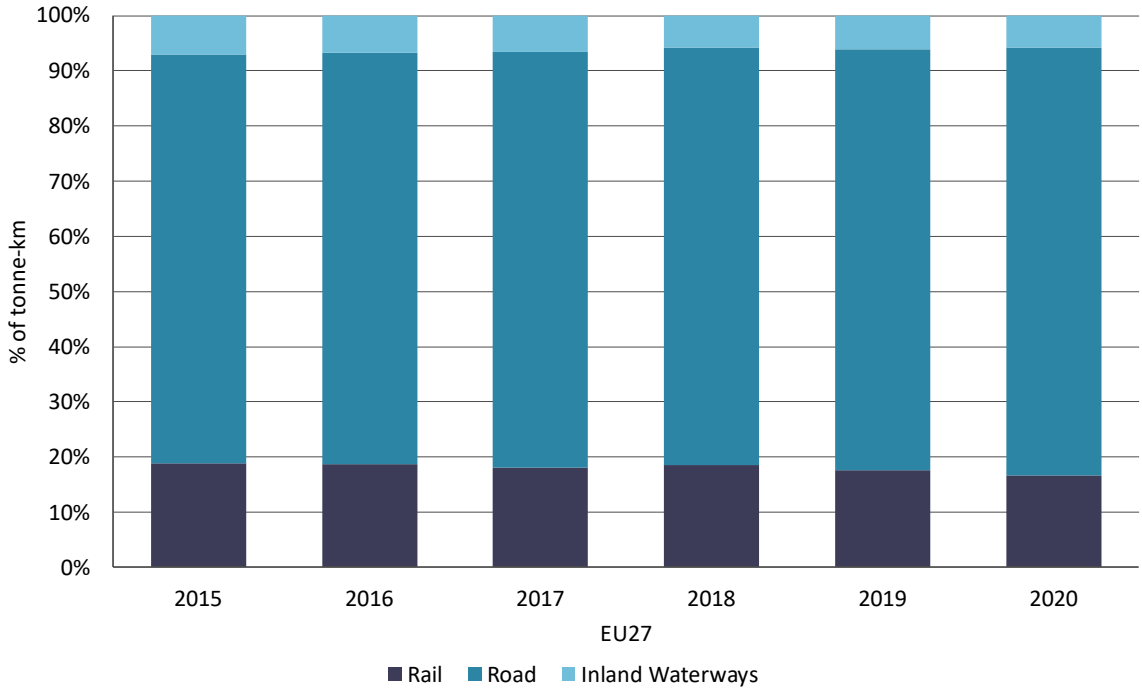
Looking at the EU27 performance of all modes (i.e. road, rail, inland waterways, pipelines, sea and air transport) in 2020, rail had a modal share of 11.5%[50].

Focusing instead only on land transport (road, rail and inland waterways but excluding pipelines[51]), rail represented 16.7% of the modal split.

Figure 35 shows the freight land transport modal split between 2015 and 2020 (pipelines excluded). Road transport dominates total freight land transport within the EU27, with a share consistently higher than 70% between 2015 and 2020. In 2020 the share of road transport reached 77.4%, a new maximum. Throughout the same period, the share of rail decreased from 18.9% to 16.7%. Inland waterways decreased from 7.0% to 5.8%.

[50] See Statistical pocketbook 2022.
[51] Figures related to land freight transport including pipelines are available in the Statistical pocketbook 2022.

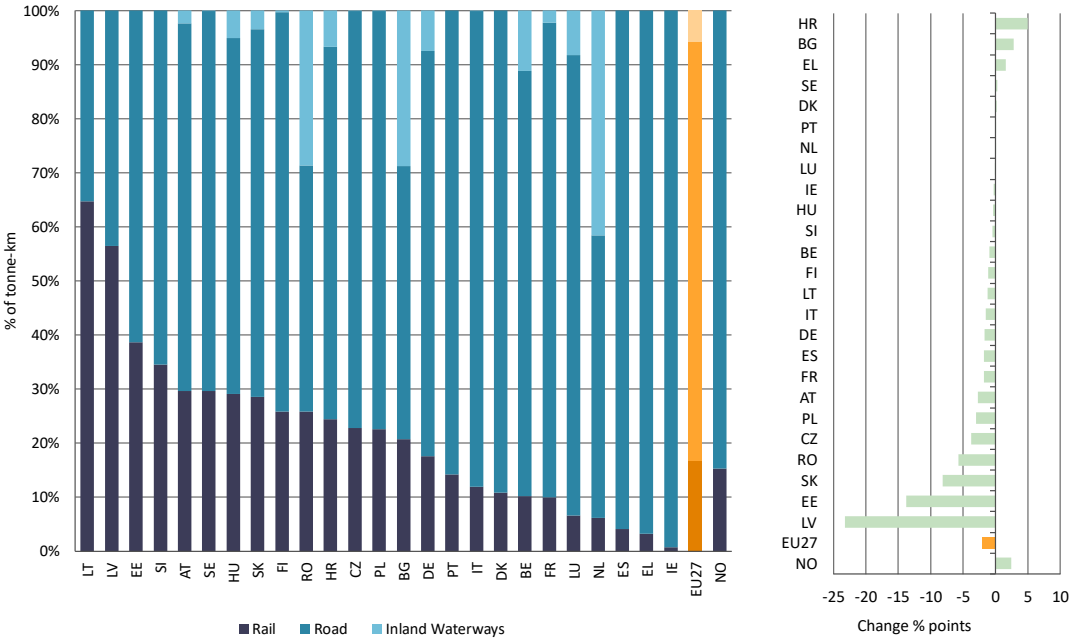
Figure 35: Freight land transport modal split (%, 2015-2020)



Source: Statistical pocketbook, 2022.

Figure 36 shows the modal shares for rail, road, and inland waterways in each Member State.

Figure 36: Freight land transport modal split by country (% in 2020) and change in percentage points for rail (2015-2020)



Source: Statistical pocketbook, 2022

In 2020, rail had the highest modal share in Latvia and Lithuania, primarily because their rail networks used to carry large volumes of transit traffic to and from the Russian Federation. Rail's share was also high for Estonia and Slovenia. In contrast, rail had the lowest modal share in Ireland, Greece and Spain.

Inland waterways are a relevant option for freight transport in Member States with access to major rivers including the Netherlands, Romania, Bulgaria and Belgium.

The evolution of modal share between 2015 and 2020 has been mixed. The modal share of rail increased most in Croatia, Bulgaria and Greece, and decreased significantly in Latvia, Estonia and Slovakia. However, in contrast to the passenger modal split, the EU27 average of the rail modal split barely changed (17.6% in 2019 vs. 16.7% in 2020).

Evolution of rail freight volumes

In 2020, around 1.4 billion tonnes of freight were carried on EU27 railways[52]. The impact of the pandemic was more limited on rail freight traffic, which decreased by less than 10% compared to 2019 levels, than for passenger traffic.

Figure 37 shows the evolution of rail freight traffic in Europe from 2015 to 2020 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).

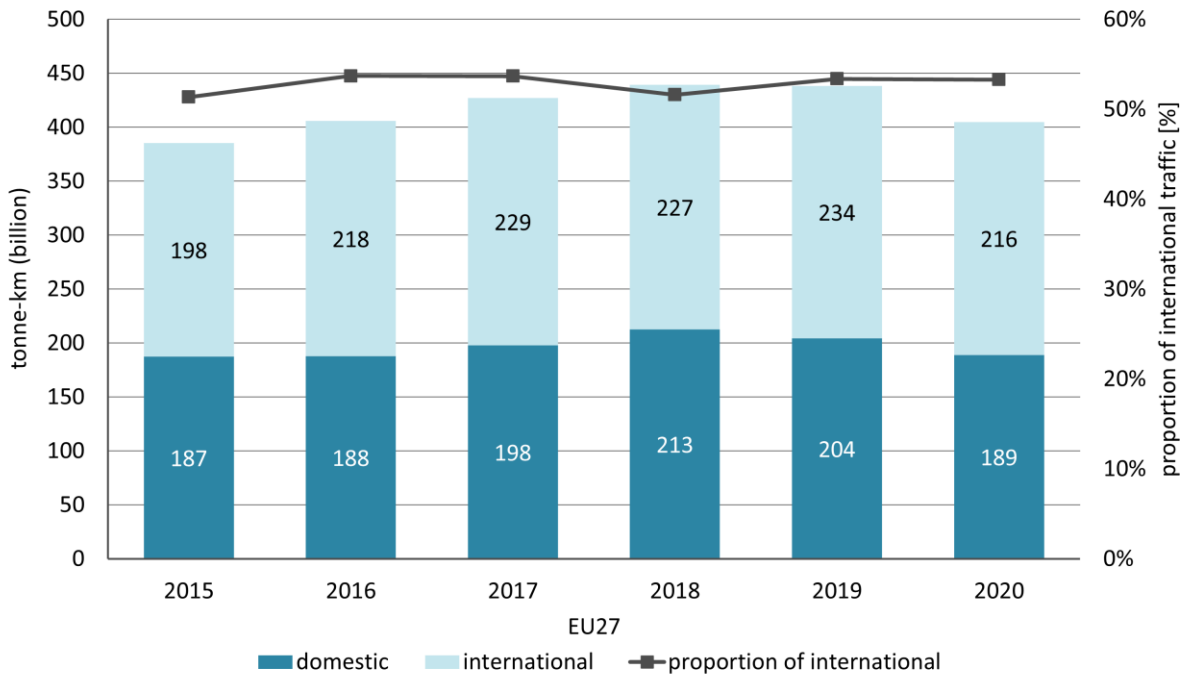
Total EU27 rail freight traffic rose from 385 billion tonne kilometres in 2015 to 404 billion tonne kilometres in 2020, including a decrease of 33 billion tonne kilometres between 2019 and 2020.

Domestic services decreased from 204 billion tonne kilometres in 2019 to 189 in 2020. A more significant decrease is observed for international services (from 234 billion tonne kilometres in 2019 to 216 billion tonne kilometres in 2020).

The proportion of international rail freight services remained consistently above 50% over the entire period in the EU27, peaking in 2016 and 2017 at 54% of total rail traffic, showing a significantly different impact of the pandemic on rail freight international connections compared to rail passenger international connections.

[52] Source Eurostat. Freight data EU27 do not include BE and EL which labelled data confidential.

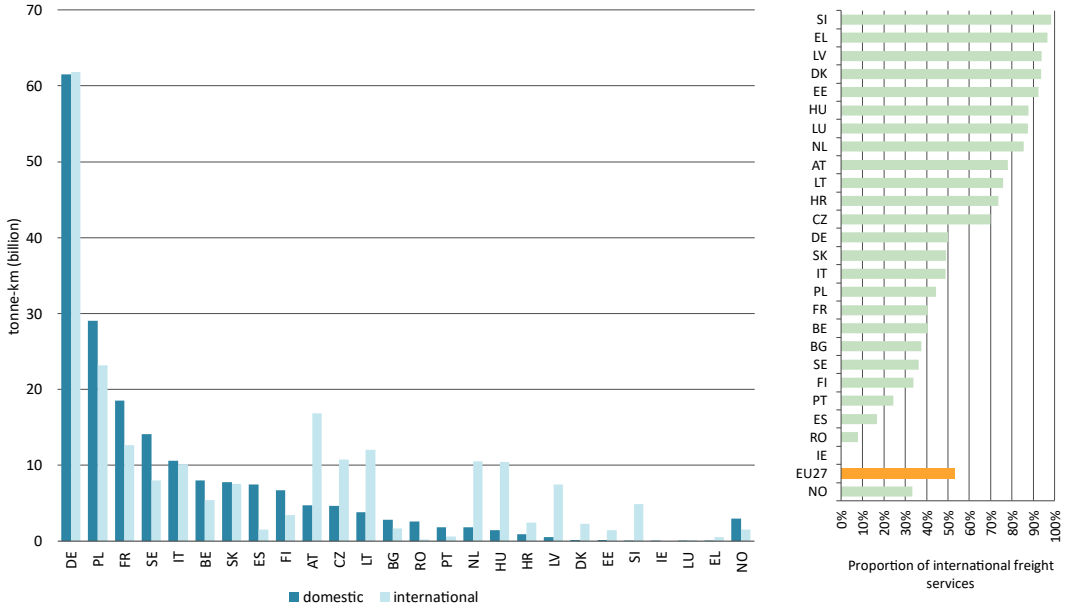
Figure 37: Evolution of rail freight traffic volumes (domestic, international and proportion of international in total traffic) (billion tonne-km, 2015-2020)



Source: RMMS, 2022. LU 2015, RO 2015, HU 2016, LU 2019, LV 2020, and PL 2020 are EC estimates.

Figure 38 shows the volumes of domestic and international rail freight traffic by country in 2020, as well as the proportion of international freight services in the total.

Figure 38: Rail freight traffic volumes (domestic, international and proportion of international on total) by country (tonne-km, 2020)

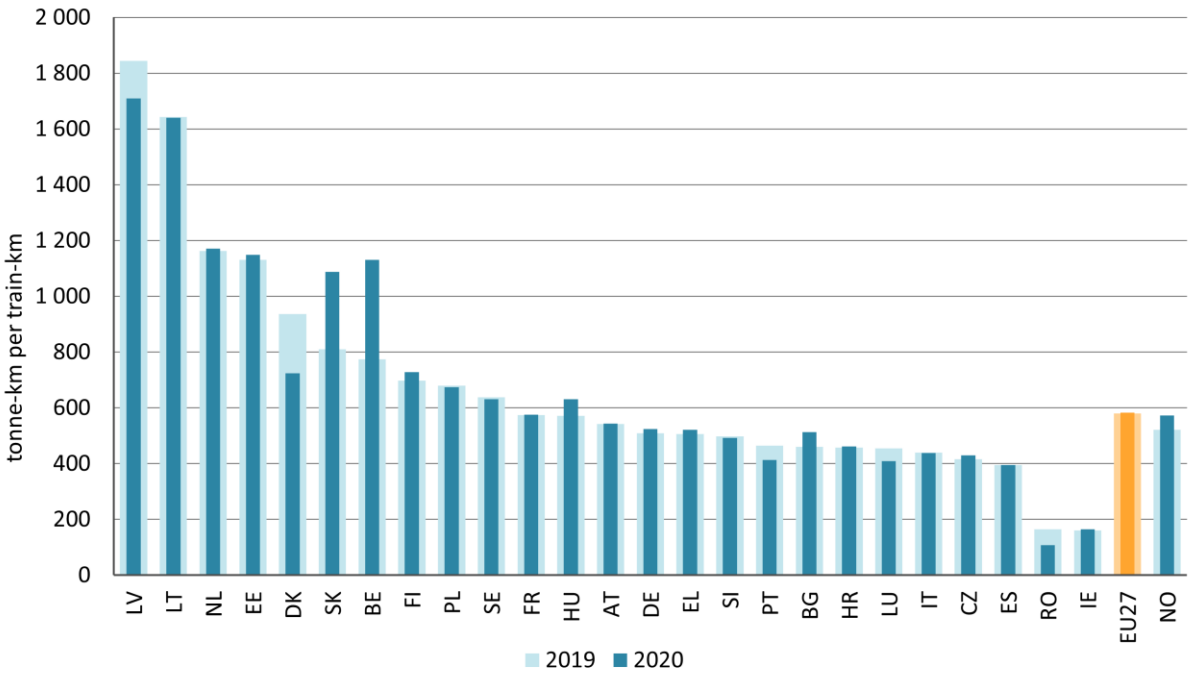


Source: RMMS, 2022. RO 2014 was corrected due to an error of magnitude. LU 2015, RO 2015, HU 2016, LU 2019, LV 2020, and PL 2020 are EC estimates.

Rail freight traffic volumes in 2020 were highest in Germany, Poland, and France. Slovenia reported the highest proportion of international rail freight traffic (98%) followed by Greece (97%).

Traffic expressed in tonne kilometres provides a first measure of the demand for rail freight services. Figure 39 gives an overview of the load factor of freight trains, measured as the number of tonnes per train per country, in 2020 and its evolution compared to 2019.

Figure 39: Number of tonnes per train per country (freight trains load factor, 2019 and 2020)



Source: RMMS, 2022. LU 2019, LV 2020, and PL 2020 are EC estimates.

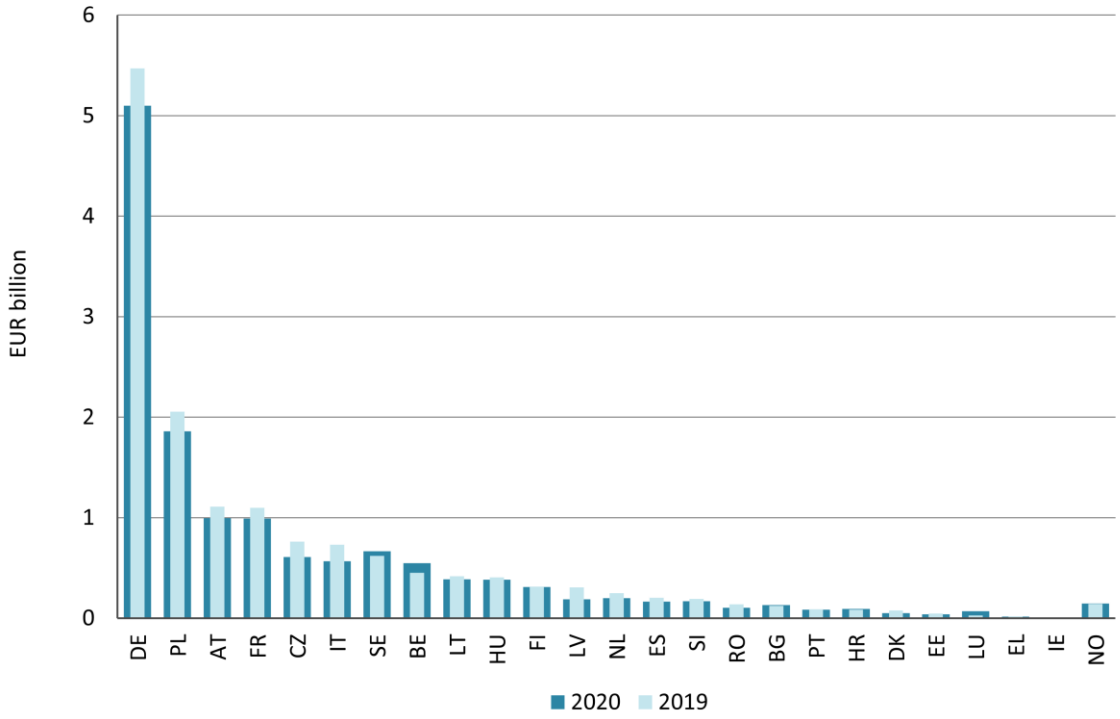
On average, EU27 freight trains were loaded with 583 tonnes in 2020. The Baltic countries have a significantly above-average load factor (the highest being in Latvia, with 1709 tonnes); the lowest load factor is in Romania (107 tonnes). Overall, the load factor in the EU27 between 2019 and 2020 increased by 46 tonnes per train. Based on RMMS data, the highest increase can be found in Belgium (+356) and Slovakia (+278), whereas Denmark experienced a decrease of 212 tonnes per train compared to 2019.

3.3.2 3.3.2 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 40 shows the reported revenues from rail freight per country in 2020 as well as the evolution compared to 2019.

Figure 40: Railway undertakings' revenues from freight transport services per country (billion EUR, 2019 and 2020)

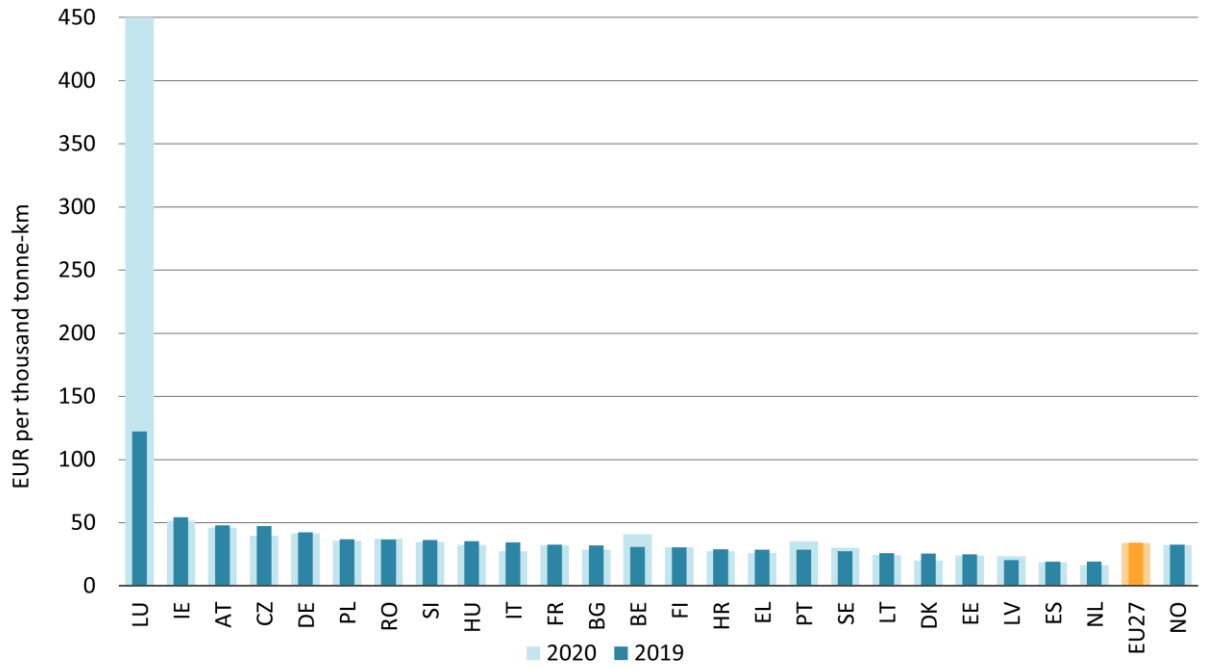


Source: RMMS, 2022.

Germany reported by far the highest rail freight revenues in 2020 (EUR 5.10 billion), while Ireland reported the lowest (almost zero). Based on RMMS data, Belgium experienced the highest increase (+EUR 0.10 billion), while Germany recorded the highest decrease (-EUR 0.37 billion) compared to 2019.

Figure 41 shows the railway undertakings' revenues from freight transport services in 2020 per country, as well as the evolution compared to 2019, measured in EUR per thousand tonne kilometres.

Figure 41: Railway undertakings' revenues from freight transport services in tonne-km per country (EUR per thousand tonne-km, 2019 and 2020)

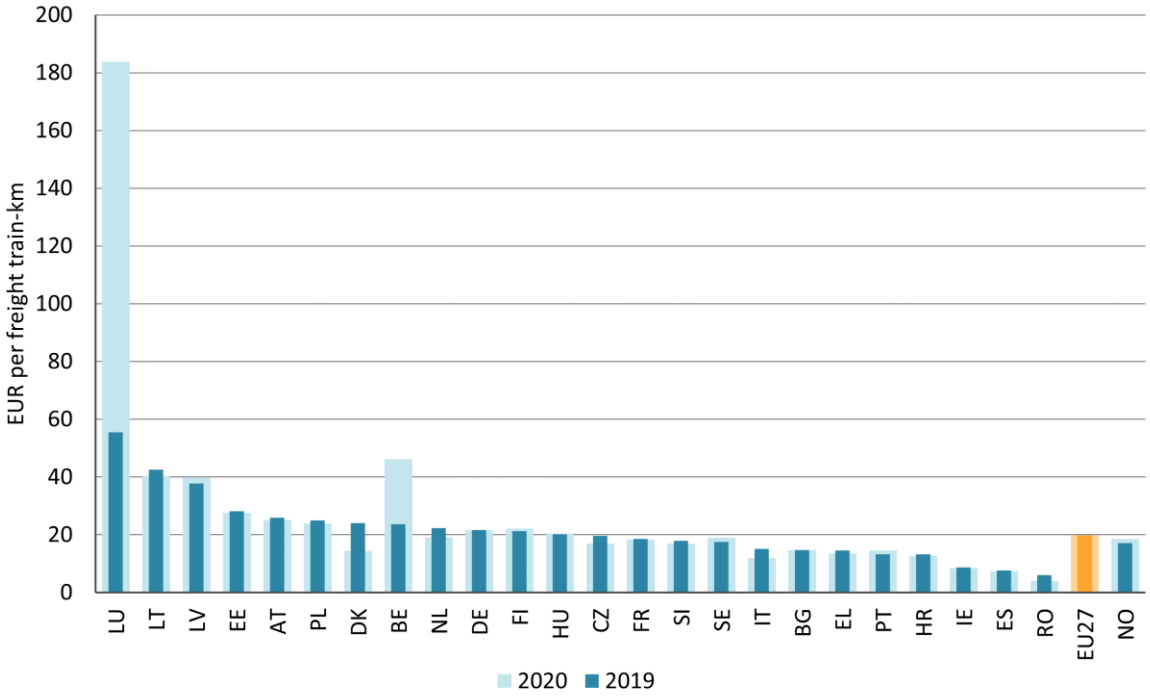


Source: RMMS, 2022. HU 2019, LU 2019, LV 2020, and PL 2020 are EC estimates.

On average, in 2020 the EU27 railway undertakings' revenues from freight transport services were EUR 34 per thousand tonne kilometres. Luxembourg reported by far the highest freight revenues per thousand tonne kilometres (EUR 450), while the Netherlands had the lowest (EUR 16).

Figure 42 shows the railway undertakings' revenues from freight transport services in 2020 per country and the evolution compared to 2019, measured in EUR per freight train kilometres.

Figure 42: Railway undertakings' revenues from freight transport services in freight train-km per country (EUR per freight train-km, 2019 and 2020)



Source: RMMS, 2022.

On average, in 2020 the freight revenues of railway undertakings in the EU27 were EUR 19.74 per train kilometre. Luxembourg reported the highest revenues per train kilometre (EUR 183.80), while Romania reported the lowest (EUR 4.02). Based on RMMS data, Luxemburg reported the highest increase compared to 2019 (+EUR 128.25 per train kilometre), while Denmark reported the highest decrease (-EUR 9.55).

3.3.3 3.3.3 Rail freight policy developments

Increasing the modal share of rail freight remains a Commission policy objective, highlighted in the Communication on the European Green Deal[53] and in the Commission's Sustainable and Smart Mobility Strategy[54].

Rail freight transport continues to face difficulties in competing with road transport, particularly in terms of punctuality and reliability. The sector struggles with infrastructure bottlenecks, interoperability problems, and digitalisation. In terms of planning and operations, there are challenges with the provision of capacity (train paths) of sufficient quality and quantity, inefficient operational processes at borders between networks, and ineffective management of incidents and crisis situations.

[53] 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).

[54] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Sustainable and Smart Mobility Strategy – putting European transport on track for the future, COM/2020/789 final (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789)

The overall situation of rail freight thus remains unsatisfactory: its modal share is around 19%. Figure 35 shows that road transport is still predominant with more than 70% of the modal split.

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.' The Sustainable and Smart Mobility Strategy details the objectives defined in the Green Deal, setting the milestone of doubling rail freight transport until 2050 compared to its level in 2015. In addition, the strategy sets out a programme of initiatives to accelerate the migration towards a smart and sustainable European transport system. An action plan proposed 82 concrete initiatives to be launched in the period from 2021 to 2024.

Several of these initiatives are relevant for rail freight transport. Key examples of initiatives very close to the sector include:

- The revision of the TEN-T Regulation
- Measures to better manage and coordinate cross-border rail traffic
- A revision of the technical specifications for rail interoperability
- The revision of the rules on certification of train drivers
- The further development of the R&I partnership for the rail sector
- Europe's Rail Joint Undertaking
- A revision of the guidelines for State aid in support of railways

In addition, the Commission's Sustainable and Smart Mobility Strategy action plan comprises measures targeting transport in a transversal way, including initiatives to introduce harmonised methodologies for carbon and emission accounting for transport such as CountEmissions EU[55] and to review the regulatory framework for multimodal freight transport.

Rail freight transport has also been affected by recent geopolitical developments and has had an important role in addressing them.

During the COVID-19 pandemic rail freight transport has been a stable backbone for the EU's freight transport system. The EU and Member States have supported the sector through a variety of specific and temporary measures[56]. These measures aimed at ensuring the continuity of supply chains and at reducing regulatory burden and costs for transport companies, e.g. via waivers or postponements relating to certificates, licences and authorisations and through measures to ensure the cross-border mobility of transport staff. As specific support for the rail sector, Regulation (EU) 2020/1429[57] allows for temporary reductions or waivers of track access charges, providing financial relief to railway undertakings, a measure that was implemented by various Member States.

More recently, rail freight transport has been playing a crucial role in the European Union's response in the transport sector to Russia's war of aggression in Ukraine. The war has had a severe impact on the economy of Ukraine and beyond, as trade between Ukraine, the European Union and other partners has been severely hampered. The blockage of Ukraine's ports, in particular, has impeded the export of agricultural goods, of which 90% passed through Ukraine's Black Sea ports before the war and which are of crucial importance to Ukraine and its trading partners in Europe, Africa and China.

[55] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13217-Count-your-transport-emissions-%E2%80%98CountEmissions-EU%E2%80%99_en

[56] For an overview, see https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/transportation-during-pandemic_en.

[57] 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, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02020R1429-20220701.

The war has thus created the need to establish alternative logistics routes. Rail freight transport offers an important potential to increase transport. However, its potential is limited by several challenges including the limited availability of rolling stock, shortages in transhipment capacity between the Ukrainian and the European network due to the difference in track gauges (1520 mm vs. 1435 mm) and a few administrative barriers related to border-related controls and certifications.

To address the challenges, the European Commission launched an action plan for EU-Ukraine Solidarity Lanes in May 2022.[58] The initiative covers both the short term need to keep Ukraine integrated in global supply chains and the medium to long-term challenge to strengthen connectivity and interoperability of transport systems of the European Union and Ukraine.

In the short term, the Commission closely cooperates with Member States, Ukrainian authorities and industry stakeholders to set up a matchmaking platform to facilitate exchanges between logistic chain actors with a view to optimising cargo flows. The platform addresses issues such as the provision of rolling stock by private players, the identification of additional facilities to ensure a smooth flow of rail freight transport between the networks with European and Ukrainian track gauges, securing capacity on the European rail network and in European ports and the organisation of transport services. In addition, short-term measures relevant for all modes address barriers related to border controls, certification of transport staff and assets and other issues.

In the medium to long term, the key challenges are to rebuild transport infrastructure in Ukraine and to improve the interoperability and connectivity between the Union and Ukraine. The Commission therefore put forward an amendment to the Commission's proposal to revise the TEN- T Regulation on 27 July 2022.[59] The proposal includes an extension of four European Transport Corridors to Ukraine and Moldova, modifications to the indicative maps of the TEN-T network in Ukraine, the removal of the indicative maps of the TEN-T network for Russia and Belarus, the downgrade of cross-border connections to Russia and Belarus on EU territory and the definition of the 1435 mm track gauge as European standard gauge, with a view to removing the barriers created by the different track gauge in Ukraine.

More broadly, the Commission proposal on TEN-T, which is currently under discussion with the European Parliament and the Council [60], contains several measures in support of rail freight transport. In terms of infrastructure requirements, the proposal includes a new parameter enabling the ubiquitous circulation of intermodal trains along the core and comprehensive network (P400 loading gauge) and strengthens existing requirements, notably with respect to the ability to accommodate trains of 740 m length and ERTMS deployment. In terms of multimodality, there is a stronger focus and more stringent requirements on multimodal freight terminals, including the access lines linking them to the main rail network. Infrastructure requirements are gradually extended from the core to the comprehensive network and a new intermediate deadline of 2040 for compliance of the network is introduced in conjunction with the introduction of an 'extended core network'. An evolution of the corridor concept under the new umbrella of 'European Transport Corridors' strengthens synergies between the current core network corridors under the auspices of European Coordinators and the rail freight corridors governed by Member States and infrastructure managers. This should streamline work by introducing a unique geographical definition of the corridors, a streamlining of the competences with respects to infrastructure investment planning and a stronger cooperation on performance improvements in terms of infrastructure and operations.

Commission initiatives by themselves will not be sufficient to trigger growth of rail freight transport and multimodal transport involving rail. The ultimate success criterion for making rail freight transport

[58] COM(2022) 217 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022DC0217
[59] COM(2022) 384 final, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52022PC0384
[60] COM(2021) 812 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0812

an attractive choice is a competitive offer to those who choose between different transport options, i.e. the organisers of supply chains in logistics, industry and commerce. Improving the competitiveness of rail freight services therefore requires that policy initiatives proposed by the Commission are followed-up, supported and complemented by action on the part of Member States and operational players, including infrastructure managers, railway undertakings and other transport operators and service providers.

3.3.4 3.3.4 Multimodal and intermodal transport

Intermodal transport[61] continues to be the fastest-growing segment in rail transport and is expected by stakeholders to grow in the period 2019-2029 by approximately 49% (ton-km), while in the same period total rail freight is expected to grow by only 16%.[62] Despite the fact that no comprehensive and comparable data are currently gathered systematically on intermodal/multimodal transport in general, nor on intermodal/multimodal transport involving a rail leg, there are indications that constraints on terminal and network capacity are likely to hinder considerable growth in the short term. A recent study on intermodal transhipment technologies[63] estimates, based on current plans for both terminal upgrades and new terminal constructions, that terminal capacity in the EU will increase by only 18% until 2030. While current capacity is not used in full and the proposal for a new TEN-T Regulation[64] includes an effort to ensure additional terminal capacity, such investments take time and thus a major growth of intermodal/multimodal transport is only possible once capacity constraints have been removed. Therefore, according to current estimates, the terminal capacity might not be sufficient to accommodate the increase of intermodal transport expected by the stakeholders.

The growth of intermodal/multimodal transport is an important objective and the SSMS calls for action to achieve this.[65] Today's framework for direct support to intermodal transport is the Combined Transport Directive[66]. According to the 2017 Commission study, 58% of intermodal operations are covered by the Directive, while 37% are excluded from preferential treatment due to being national operations and further 5% are excluded for not fulfilling the different distance criteria in the Directive.[67] An average rail intermodal operation has a rail leg of 615 kilometres and involves 2.2

[61] The following definitions are used:
- '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 different legs distances and geographical scope are limited as defined in Directive 92/106/EEC.

[62] 2020 UIC-UIRR Report on Combined Transport in Europe https://uic.org/IMG/pdf/2020_report_on_combined_transport_in_europe.pdf

[63] Comparative evaluation of transhipment technologies for intermodal transport and their cost, 2022, https://op.europa.eu/en/publication-detail/-/publication/d37790ea-b6ef-11ec-b6f4-01aa75ed71a1

[64] Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Union guidelines for the development of the trans-European transport network, amending Regulation (EU) 2021/1153 and Regulation (EU) No 913/2010 and repealing Regulation (EU) 1315/2013

[65] Sustainable and Smart Mobility Strategy, https://transport.ec.europa.eu/transport-themes/mobility-strategy_en

[66] 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.

[67] 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).

transhipments. Road legs of such operations are on average 51 kilometres each (without the pre-and on-carriage of empty containers to/from depot, or 102 kilometres with the empty container depot-leg).

In November 2017, the Commission proposed to amend the Combined Transport Directive to increase the uptake of more sustainable modes of transport by providing new and more effective support measures. 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 decided to withdraw this proposal. It is currently working on a new, more ambitious proposal as well as reviewing other related EU instruments to strengthen intermodal transport. The resulting Greening of Freight Package is expected to be adopted in the first half of 2023. The new revision is planned to increase the ambition, simplify eligibility, and provide more effective support tools as well as introduce measures to improve analysis of the intermodal/multimodal transport market. The impact assessment for the revision is ongoing.

4. 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 to ensure 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.

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 to pave the way for the Commission to propose an amendment to Regulation 2015/1100 in order to improve the data gathering process on service facilities.

4.1 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[68] 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).

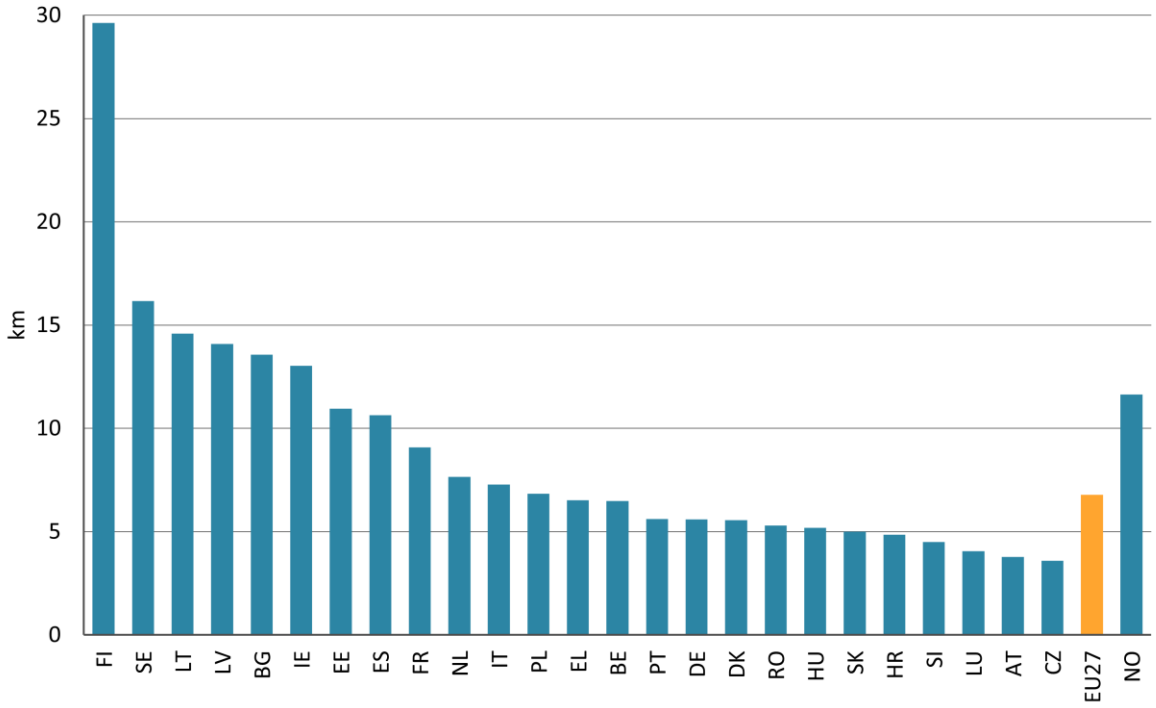
[68] Different service facility types and rail-related services are enumerated in points 2 to 4 of Annex II to Directive 2012/34/EU.

4.2 4.2 Passenger stations

According to TRAMOS-Rail there were more than 29,000 stations in the EU27 in 2020, a figure comparable to that of 2018. Out of these, 270 were large stations serving more than 25,000 travellers per day with a decline of over 30 stations compared to 2018, presumably as an effect of the COVID pandemics.

In 2020, the average distance between stations in the EU27 was 6.7 kilometres. In Finland there is by far the greatest average distance between stations (29.6 kilometres) whereas the Czech network has the shortest average distance between stations with 3.6 kilometres (Figure 43).

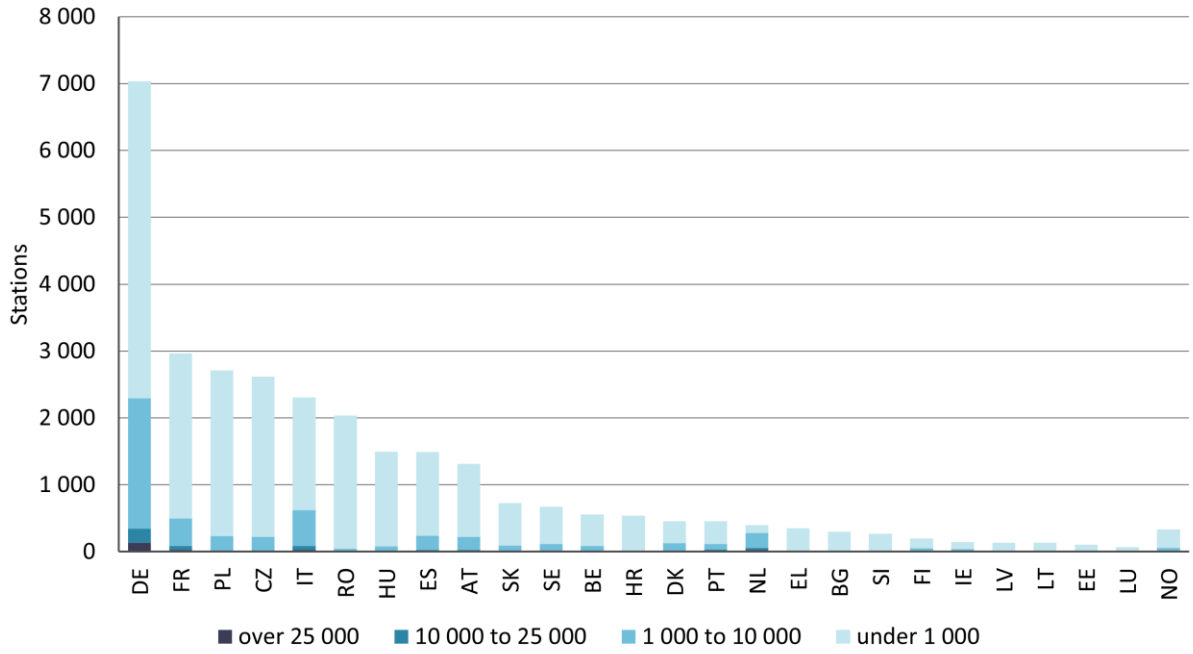
Figure 43: Average distance between stations by country (km, 2020)



Source: RMMS, 2022, Statistical pocketbook, 2022.

Figure 44 shows the number of stations with different passenger volumes per day in 2020 per country.

Figure 44: Number of stations by passengers per day by country (2020)

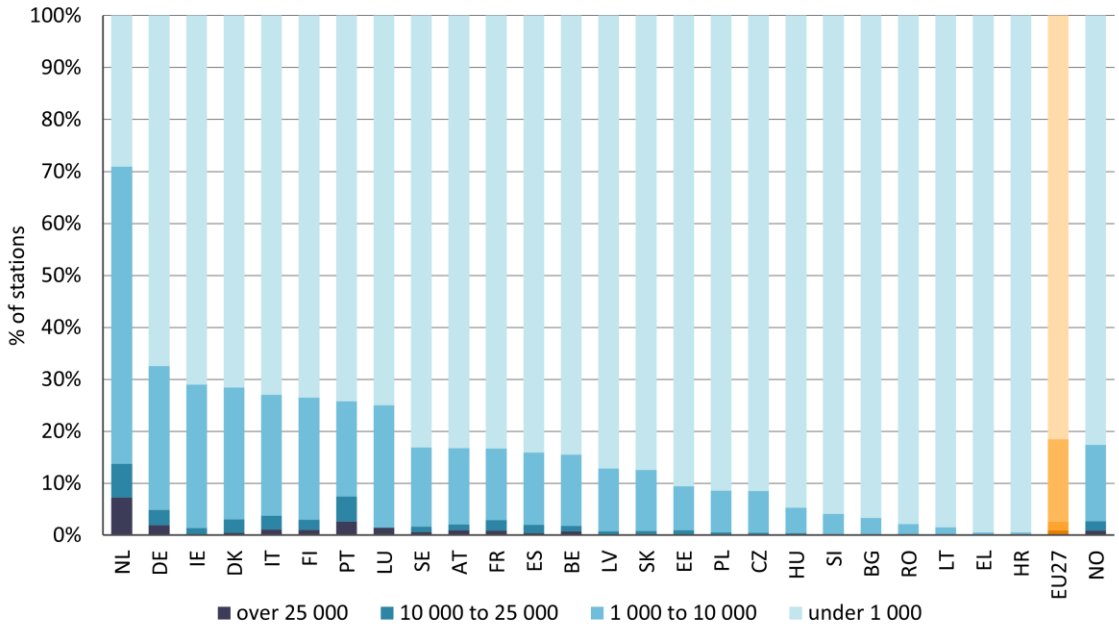


Source: RMMS, 2022.

Like in 2018, the highest number of stations by far was reported by Germany (7,033, 26.3% of the EU27 total), while the lowest was reported by Luxembourg (68).

Figure 45 shows the proportion of stations with different passenger volumes per day in 2020 per country.

Figure 45: Proportion of stations by passengers per day by country (2020)



Source: RMMS, 2022.

With the notable exception of the Netherlands, most of the stations on all networks serve fewer than a thousand travellers per day. These smaller stations make up the majority (82%) of all stations in the EU27. 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 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.

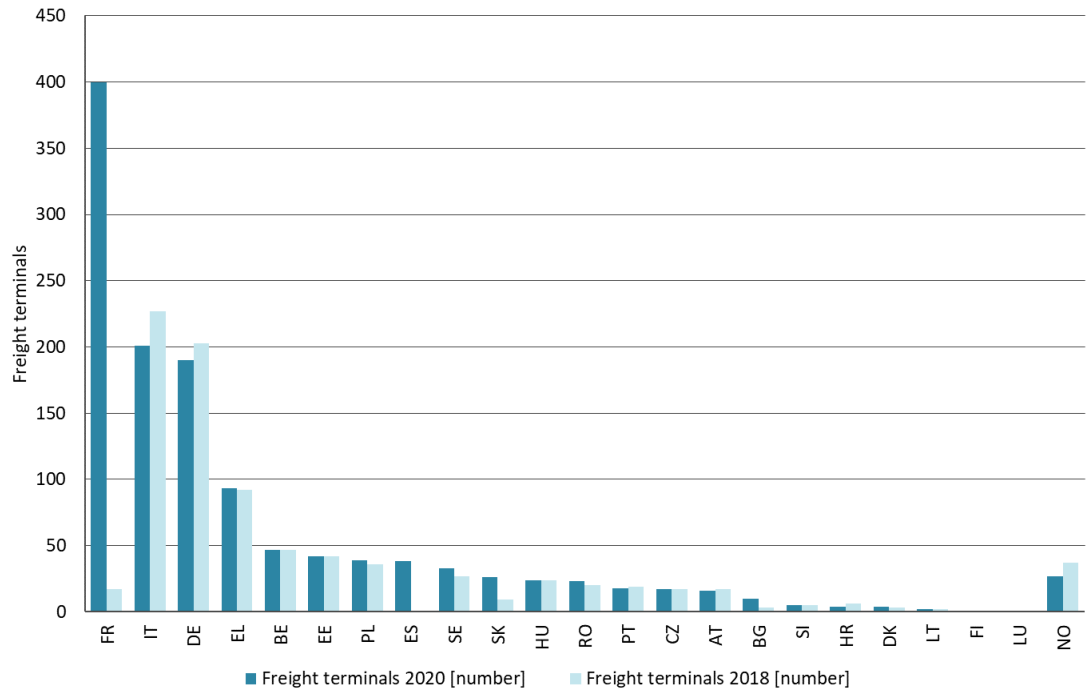
However, discrepancies in the definition of each type of service facility and gaps in input at national level limit the comparability of figures across Member States and across years, meaning that caution is necessary when drawing conclusions from the input received.

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, in 2020 the EU had 1,234 freight terminals. Figure 46 shows the reported number of freight terminals in 2018 and 2020 by state.

Figure 46: Number of freight terminals by country



Source: RMMS, 2018 and 2020; no data for IE, LV, ES (2018), NL.

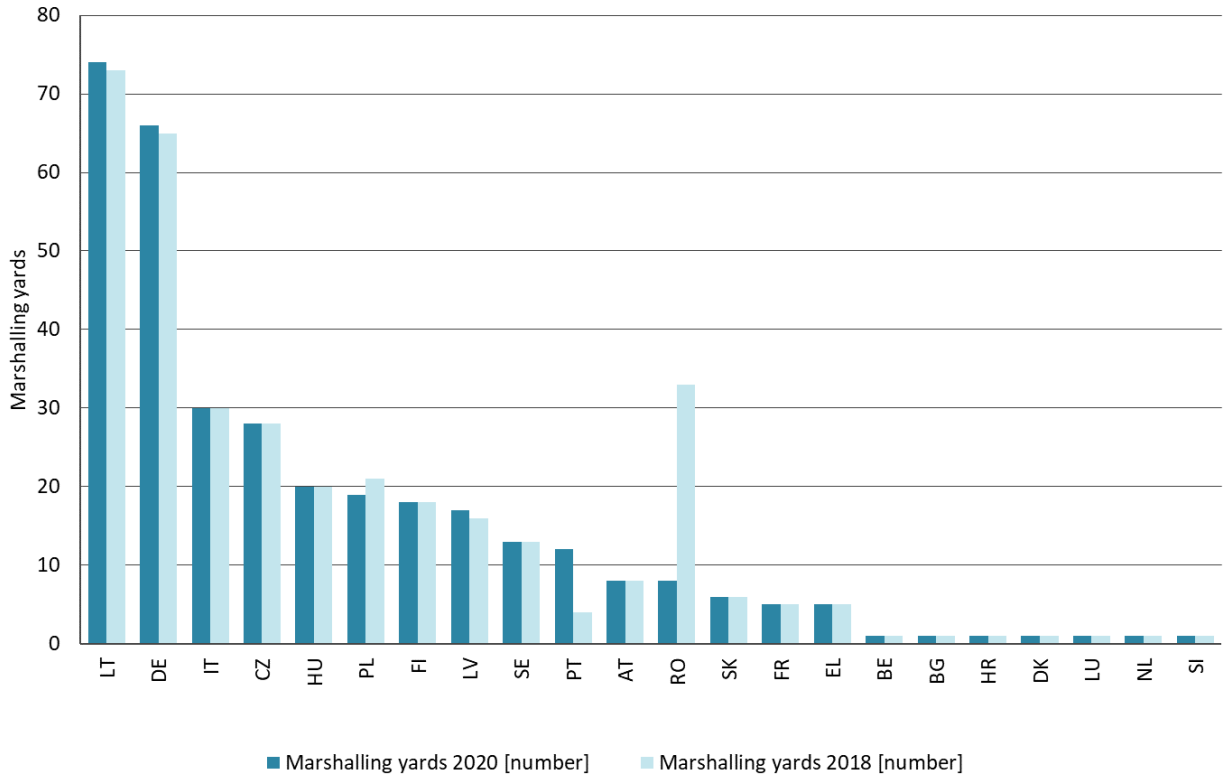
The RMMS Regulation defines freight terminals as a facility equipped for the transhipment and storage of intermodal transport units, where at least one of the modes of transport is rail. France reported the highest number of freight terminals in the EU27, with 400 terminals.

Marshalling yards and train formation facilities

Based on RMMS data, the EU27 had 336 marshalling yards and train formation facilities in 2020.

Figure 47 shows the reported number of marshalling yards and train formation facilities in 2018 and 2020 by country.

Figure 47: Number of marshalling yards by country



Source: RMMS, 2018, 2020.No data for EE, IE, ES and NO.

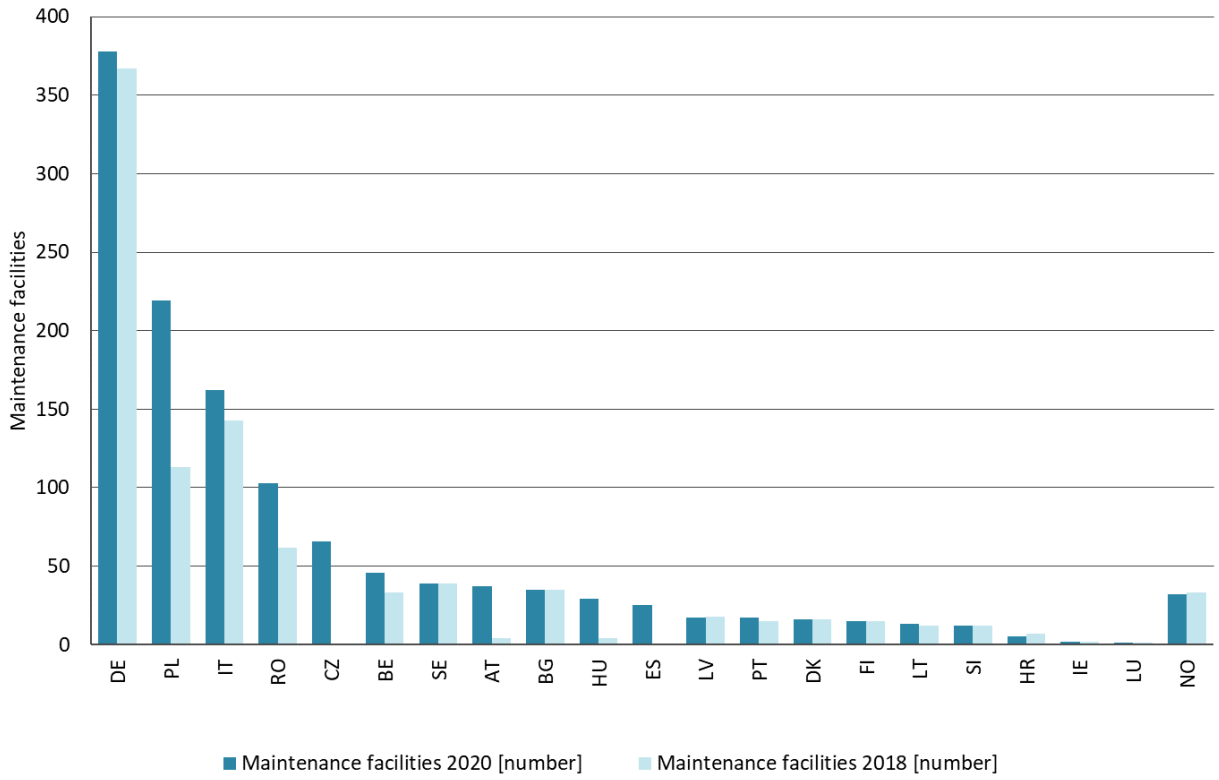
The RMMS Regulation defines a marshalling yard as a site or a part of a site equipped with several tracks or other equipment used for railway vehicle marshalling operations, including switching, and which use gravity as a means to form or rearrange trains.

Maintenance facilities

Based on RMMS data, there were around 1,237 maintenance facilities in the EU27 in 2020, nearly 300 more compared to 2018.

Figure 48 shows the reported number of maintenance facilities in 2018 and 2020 per country.

Figure 48: Number of maintenance facilities by country



Source: RMMS, 2020, 2022. No data for EE, FR, EL, NL and SK and for CZ (2018).

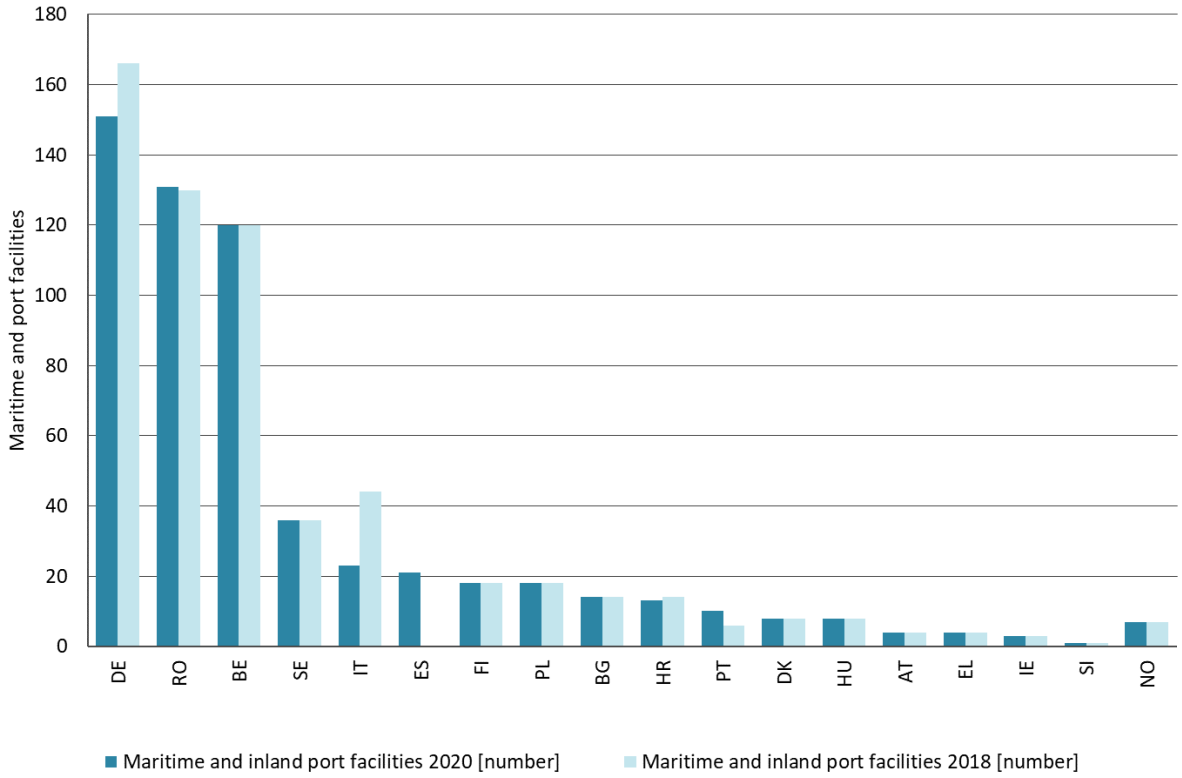
Maintenance facilities are facilities where rolling stock is maintained, including both heavy and light maintenance, to keep it in operation.

Maritime and port facilities

Based on RMMS data, in 2020 the EU27 had 583 maritime and port facilities, a decrease compared to the 635 maritime and port facilities in 2018.

Figure 49 shows the reported number of maritime and port facilities in 2018 and 2020 per country.

Figure 49: Number of maritime and port facilities linked to rail activity by country



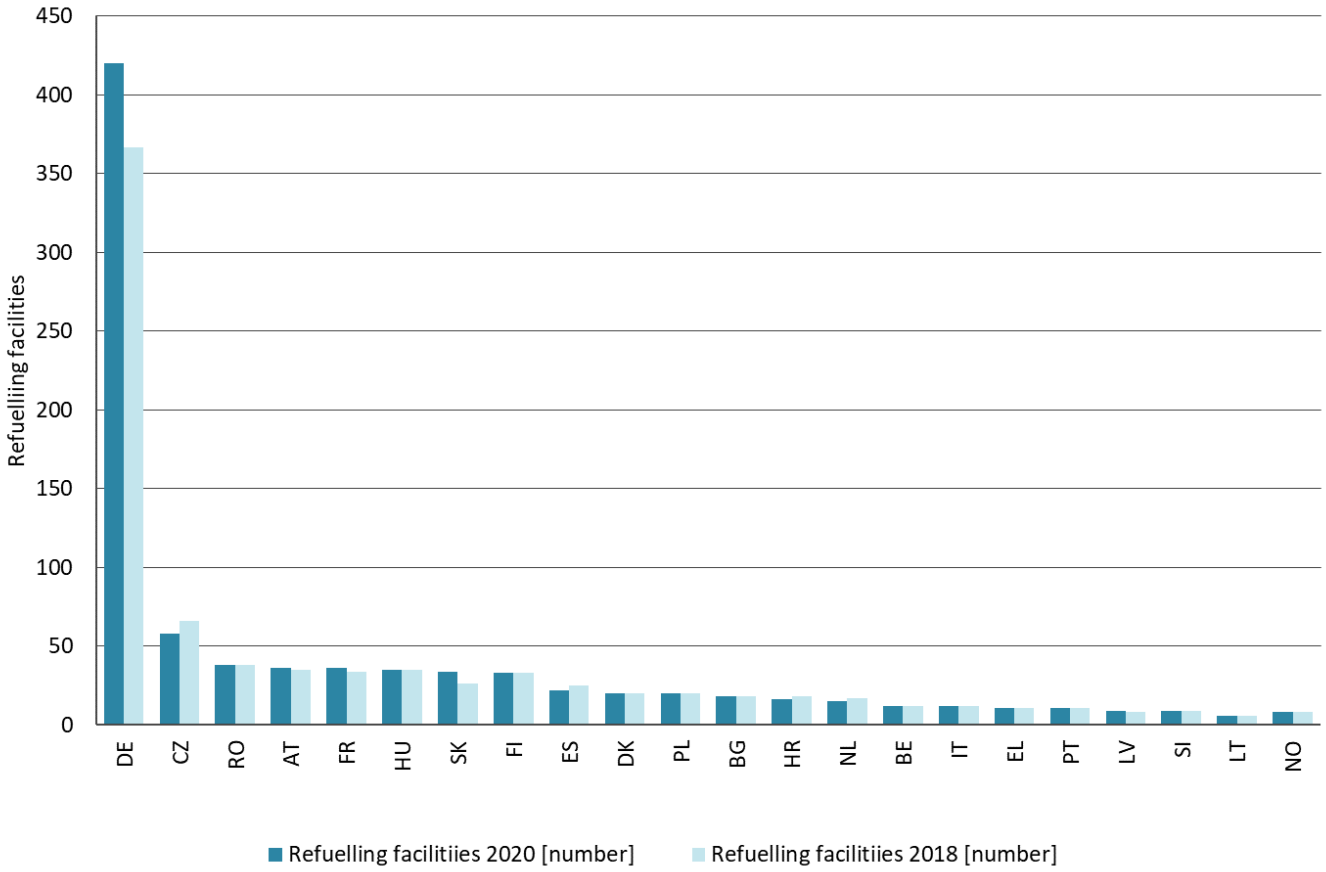
Source: RMMS, 2020, 2022. No data for CZ, EE, FR, LV, LU, NL and SK.

Refuelling facilities

Based on RMMS data, in 2020 the EU27 had 871 refuelling facilities.

Figure 50 shows the reported number of refuelling facilities (stations for refuelling for locomotives and multiple units) in 2018 and 2020 per country.

Figure 50: Number of refuelling facilities by country

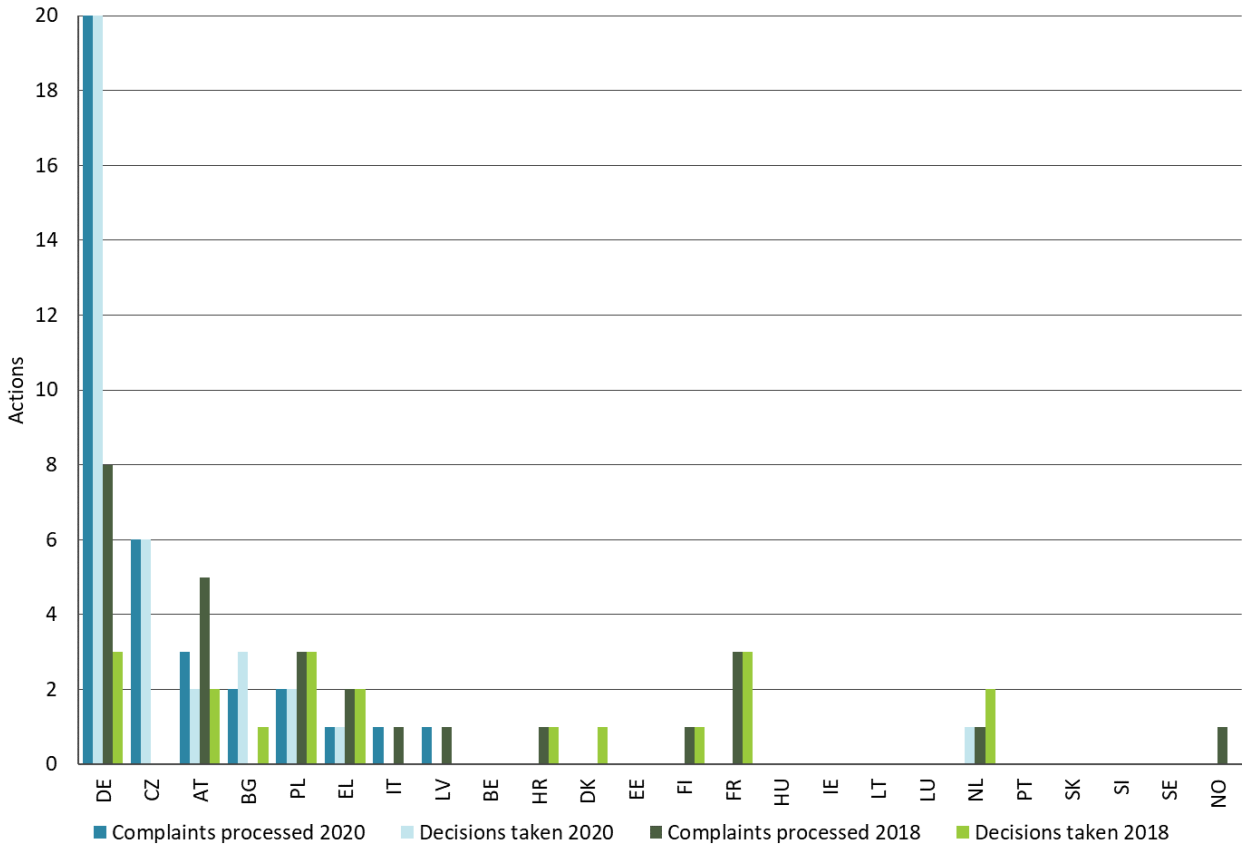


Source: RMMS, 2022. No data for EE, IE, LU and SE.

4.4 4.4 Complaints related to access to service facilities

Figure 51 shows the number of complaints being processed by regulators, as well as the number of decisions by regulators in 2018 and 2020 per country. It should be noted 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 51: Number of complaints being processed and decisions made by country



Source: RMMS, 2020, 2022. No data for RO and ES.

Germany's regulator processed the highest number of complaints on access to service facilities in 2020 (20) and took the same number of decisions (20) on such complaints.