

Report
**Fostering the rail
sector through the
European Green
Deal: Rail–port
synergies**

Manuscript completed in July 2022

Neither the Agency nor any person acting on behalf of the Agency is responsible for the use which might be made of the following information.

Luxembourg: Publications Office of the European Union, 2022

PDF ISBN 978-92-9477-417-0 doi:10.2821/66464 TR-08-22-266-EN-N

Cover photo: © serijob74/Adobe Stock

© European Union Agency for Railways, 2022

Reproduction is authorised provided the source is acknowledged. For any use or reproduction of individual photos or illustrations, permission must be sought directly from the copyright holders.

Contents

- **List of figures**.....3
- **List of tables**4
- **Abbreviations**5
- **Country codes**.....6
- **Executive summary**.....7
- **Introduction**8
- **1. Status of rail–port connectivity**..... 11
 - | The importance of ports for European and global trade12
 - | Ports unequally but well connected to the railway network: survey results16
 - | Ports’ rail strategies19
- **2. Strengthening the potential of rail in ports**..... 23
 - | Infrastructure development inside and outside ports.....26
 - | The key role of digitalisation (including the technical specification for interoperability relating to the telematics applications for freight) in improving operations.....29
 - | Management of railway operations in ports.....32
 - | Combined transport, market and technological evolutions.....33
 - | Regulatory frameworks, policy incentives and rail charging models37
- **3. Case studies** 40
 - | HAROPA.....41
 - | Port of Antwerp.....44
- **Conclusions** 50
- **Annexes**..... 51
 - | Annex 1. List of ports participating in the EU rail–port synergies survey.....52
 - | Annex 2. List of ports participating in structured interviews, in chronological order55
 - | Annex 3. Overview of modal shares, trends and goals.....56
 - | Annex 4. Key elements noted by the different ports interviewed in relation to infrastructure development.....59
 - | Annex 5. Key elements noted by the different ports interviewed in relation to digitalisation...62
 - | Annex 6. Summary of proposed changes to the TAF TSI that would facilitate coordination with stakeholders outside the rail sector.....64
 - | Annex 7. Key elements noted by the different ports interviewed in relation to management of railway operations in ports.....65
 - | Annex 8. Key elements noted by the different ports interviewed in relation to rail services, technology and market evolution.....67
 - | Annex 9. Key elements noted by the different ports interviewed in relation to regulatory frameworks, policy incentives and rail charging models69
 - | Annex 10. Programme and summary of the Multimodal Freight Conference70

List of figures

- Figure 1: Mode of transport used for goods traded to and from the EU, 2007 and 2019
- Figure 2: Energy intensity of different modes of transport, 2017–2019
- Figure 3: Main extra-EU flows by gross weight of freight handled in main EU ports, 2020
- Figure 4: Top 20 cargo ports and other main cargo ports in the EU based on gross weight of goods handled, 2018
- Figure 5: The five main EU ports by port calls from different ship types, 2019–2021
- Figure 6: International maritime trade by cargo type for selected years (millions of tonnes loaded globally)
- Figure 7: Volume of containers handled in the main ports in the EU, 2005–2020
- Figure 8: Types of imported and exported goods (by tonnage) shipped by sea, 2019
- Figure 9: Types of ports replying to the EU survey (%)
- Figure 10: Percentage of respondents identifying organisations managing the port’s rail infrastructure (multiple choice question)
- Figure 11: Percentage of respondents with types of rail infrastructure in their port
- Figure 12: Ports with a plan to improve the modal share of rail (%)
- Figure 13: Rail modal shares (%), trends and objectives by type of port
- Figure 14: Percentage of respondents identifying barriers to rail performance in their ports
- Figure 15: Percentage of respondents stating that initiatives influencing rail performance are carried out in their ports
- Figure 16: The importance of digitalisation and the TAF TSI for the ports (%)
- Figure 17: Potential for modal shift from road to rail
- Figure 18: Percentage of respondents taking action to decarbonise railway operations inside their ports
- Figure 19: Unloading a container ship in one of the maritime terminals in Port 2000
- Figure 20: LH2T, a multimodal terminal in Le Havre port
- Figure 21: Railway line Serqueux–Gisors
- Figure 22: Main operational railway control centre of the port railway network in Le Havre
- Figure 23: The Havenhuis, the headquarters of the port authority of the Port of Antwerp–Bruges
- Figure 24: Port of Antwerp rail network
- Figure 25: Shunting yard of Antwerp North
- Figure 26: Locations of ports participating in the survey

List of tables

Table 1: Rail modal share and objective for selected inland ports

Table 2: Rail modal share and objective for selected maritime ports

Abbreviations

ERA	European Union Agency for Railways
EU	European Union
HAROPA	Le Havre–Rouen–Paris
ILU	intermodal loading unit
NSA	national safety authority
ro-ro	roll-on, roll-off
RU	railway undertaking
TAF	Telematics Applications for Freight
TEN-T	Trans-European Transport Network
TEU	20-foot equivalent unit
TSI	Technical Specification for Interoperability
UIRR	International Union for Road-Rail Combined Transport
UNECE	United Nations Economic Commission for Europe

Country codes

AT	Austria
BE	Belgium
BG	Bulgaria
CH	Switzerland
CY	Cyprus
CZ	Czechia
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	United Kingdom

Executive summary

The 2020 sustainable and smart mobility strategy set as a modal shift objective the doubling of rail freight traffic by 2050. Improving the rail modal share depends on a multitude of factors, but one key element is the link between ports and railways for the efficient hinterland transport of goods. Ports are increasingly becoming multimodal hubs through which the rail sector can increase its market share.

Through desk research, a survey and interviews with stakeholders, the European Union Agency for Railways explored the relationship between the rail sector and the waterborne transport sector, with a focus on aspects of freight transport. The findings are detailed in this report, which includes:

- a snapshot of European ports' rail connectivity and the modal share of rail in the hinterland transport of goods;
- stakeholders' views on infrastructure, regulatory frameworks, digitalisation and barriers affecting rail modal share and hindering the full exploitation of the potential of rail transport;
- best practices and measures that could improve rail–port connectivity;
- case studies on two maritime ports.

The current level of rail connectivity to ports and inside ports is, on average, rather good; it hides significant variation between ports with a modern infrastructure and those with an ageing infrastructure that need investments in modernisation. Many ports consider that their competitiveness will increasingly be judged by their rail connectivity. Therefore, most of the ports are investing in increasing their rail capacity and rail modal share by developing their rail infrastructure. The diversification of hinterland transport is seen as a major commercial driver by the ports.

Digitalisation, new technologies, the management of railway operations inside the ports and associated decarbonisation, and rail service offers are among the other topics analysed in this report.

This report informs decision-makers about measures to improve the relationship between the rail sector and the waterborne transport sector, to increase the rail modal share in the hinterland transport of goods and thus to help facilitate the modal shift objectives in the freight transport sector.

Introduction

The European Commission's European Green Deal outlines the 2011 modal shift objectives for rail ⁽¹⁾. The 2020 sustainable and smart mobility strategy ⁽²⁾ specified one modal shift objective as the doubling of rail freight traffic by 2050 ⁽³⁾. Yet, based on past experiences, this goal will be tremendously challenging to achieve.

Although the volume of freight traffic has increased significantly in the past few decades, this has been mostly due to an increase in the volume of freight traffic in the road sector, which holds a share of about 75 %. There was a decrease of 7 % in tonne-kilometres of rail freight in 2020 compared with 2019 ⁽⁴⁾, and the modal share was approximately 18.7 % ⁽⁵⁾. This faltering modal share of rail has substantial economic and environmental consequences.

Improving the modal share of rail depends on a multitude of factors, but one key element is the link between ports and railways. The maritime sector is vital for global and European trade. In 2019, about 77 % of goods imported to or exported from the EU were transported through European ports, and cargo volumes are constantly increasing (Figure 1) ⁽⁶⁾. According to the United Nations Conference on Trade and Development, global maritime traffic suffered less during the pandemic than initially feared and recovered faster than in previous recessions. In the EU, there are approximately 300 Trans-European Transport Network (TEN-T) maritime ports ⁽⁷⁾ and about 250 inland ports, which are part of a 20 000-km network of waterways.

European ports are faced with congestion ⁽⁸⁾, and maintaining the efficiency of hinterland transport connections is of paramount importance. To achieve the rail modal shift objective, it is essential to maximise the synergy between the rail sector and the waterborne transport sector. Doing so will not only contribute to the decarbonisation of the EU economy but also reinforce the energy independence of the EU, as rail is and will remain substantially more energy efficient than road transport (Figure 2).

⁽¹⁾ <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52011DC0144>

⁽²⁾ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789>

⁽³⁾ This means increasing the volume of freight transported by rail from the approximately 385 billion tonne-kilometres recorded in 2015 to 770 billion tonne-kilometres in 2050, with an intermediate goal of transporting 575 billion tonne-kilometres by 2030 (equivalent to a 50 % increase in rail freight traffic). A total of 455 billion tonne-kilometres was transported by rail in 2019.

⁽⁴⁾ <https://op.europa.eu/en/publication-detail/-/publication/e55576d1-e894-11ec-a534-01aa75ed71a1/language-en>

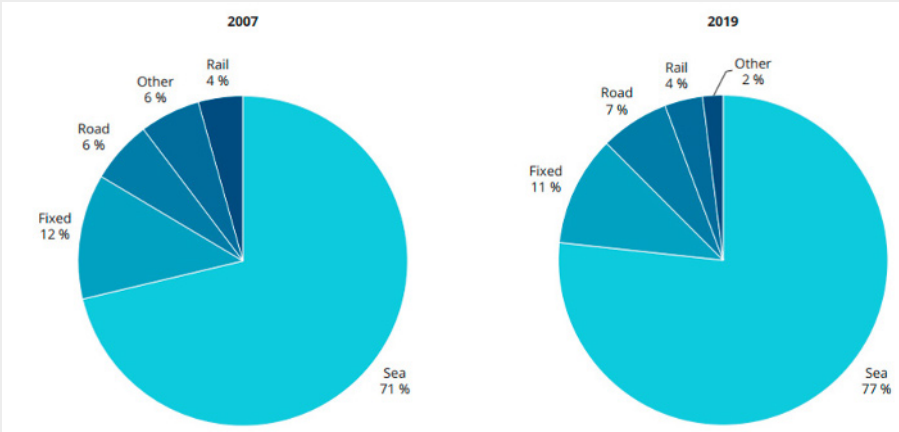
⁽⁵⁾ <https://ec.europa.eu/transport/sites/transport/files/com20210005-7th-rmms-report.pdf>

⁽⁶⁾ The United Nations Conference on Trade and Development projects shipping volumes to grow 2.4 % annually over 2022–2026, while containerised trade is expected to grow twice as much.

⁽⁷⁾ https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/site/brochures_images/ports2013_brochure_low-res.pdf#:~:text=These%20are%20328%20ports%20in%20total%2C%20including%20those,guarantee%20equal%20conditions%20for%20competition%20and%20legal%20certainty

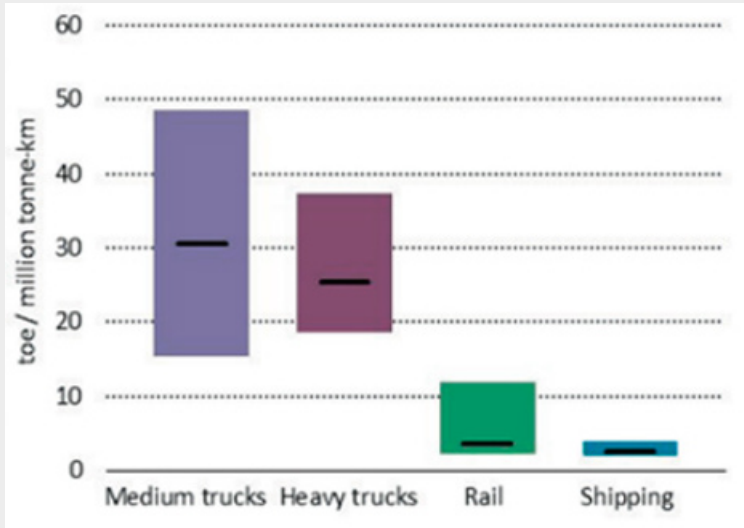
⁽⁸⁾ Congestion can be due to multiple factors, such as peak volumes of freight due to large vessels, the availability of staff during these peaks, decreased vessel reliability, a lack of lorry drivers and a lack of storage capacity.

Figure 1: Mode of transport used for goods traded to and from the EU, 2007 and 2019



Source: Eurostat, 2020.

Figure 2: Energy intensity of different modes of transport, 2017–2019



Source: International Energy Agency, *The Future of Rail – Opportunities for energy and the environment*, Paris, 2019.

The large number of goods being transported through European ports play a crucial role in the multimodal logistics chains and will play an even more important role in ensuring the modal shift to rail. Especially in recent years, ports have evolved from their traditional role as loading/unloading areas to clusters of industry/logistics, intermodal terminals and energy providers integrated in the ‘blue economy’. Ports are increasingly becoming multimodal hubs through which the rail sector can increase its market share.

The aim of this report is to give a snapshot of rail–port synergies and the related challenges hampering the growth of the rail modal share in alignment with the latest EU policy objectives. Given the large freight volumes, increasing the modal share of rail in ports is a key factor in increasing the share of rail freight in hinterland transport.

In this report, through analysing desk research, a survey ⁽⁹⁾ and interviews with stakeholders, the European Union Agency for Railways (ERA) explores in detail the relationship be-

⁽⁹⁾ <https://ec.europa.eu/eusurvey/runner/port-rail-synergies>

tween the rail sector and the waterborne transport sector. The report focuses on aspects of freight transport including:

- the current level of rail connectivity with European ports and the modal share of rail in the hinterland transport of goods;
- stakeholders' views on infrastructure, regulatory frameworks, digitalisation and barriers affecting the rail modal share and hindering the full exploitation of the potential of rail transport;
- best practices and measures that could improve rail–port connectivity;
- case studies on two maritime ports.

In addition to these four main topics, this report also investigates the decarbonisation strategies of railway operations in ports and the interest of ports in using the technical specification for interoperability relating to the telematics applications for freight (TAF TSI) ⁽¹⁰⁾, taking into account the latest developments ⁽¹¹⁾. In fact, it is expected that in 2022 the TAF TSI will be revised to include ports and terminals in the scope of digital messaging exchanges of railway undertakings (RUs) / infrastructure managers.

This report informs decision-makers about measures to improve the relationship between the rail sector and the waterborne transport sector, to increase the modal share of rail in the hinterland transport of goods and thus to help facilitate the modal shift objectives in the freight sector.

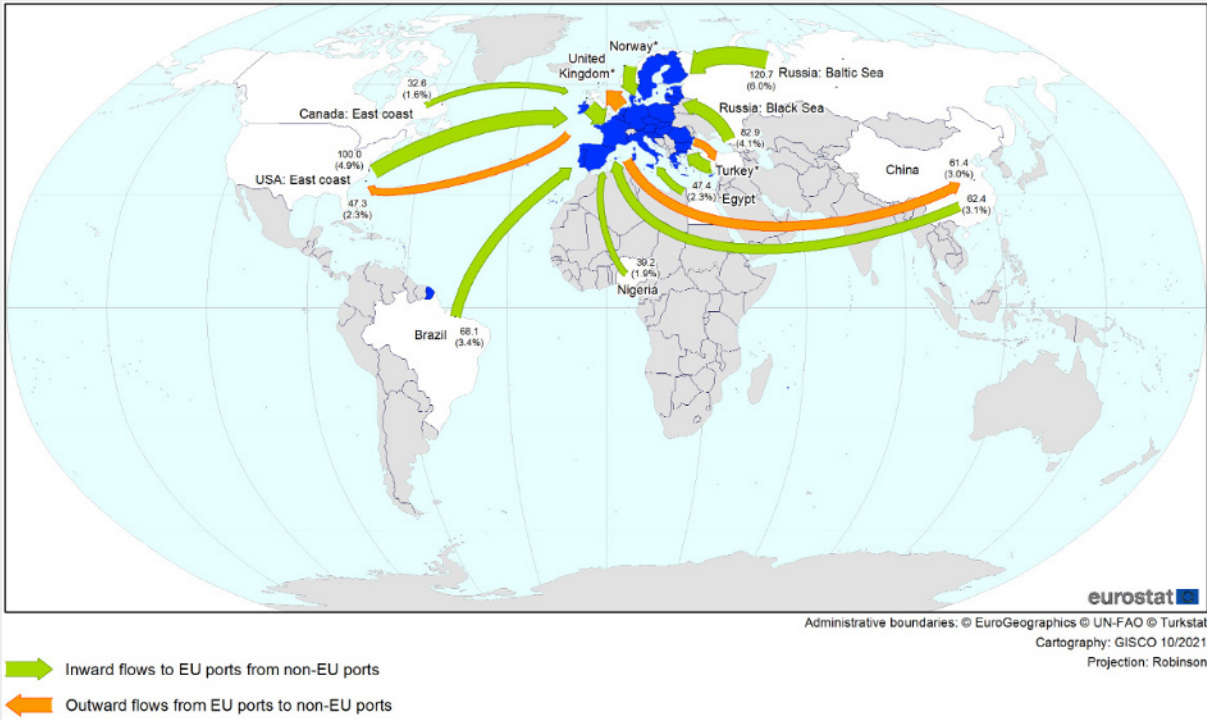
⁽¹⁰⁾ https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJL_2021.108.01.0019.01.ENG&toc=O-J%3AL%3A2021%3A108%3ATO

⁽¹¹⁾ Three additional pieces of information are needed by the port authority (terminal manager or service facility operator): consignment order, train composition and wagon movement. These will be included in the future release of TAF TSI.

1. Status of rail–port connectivity

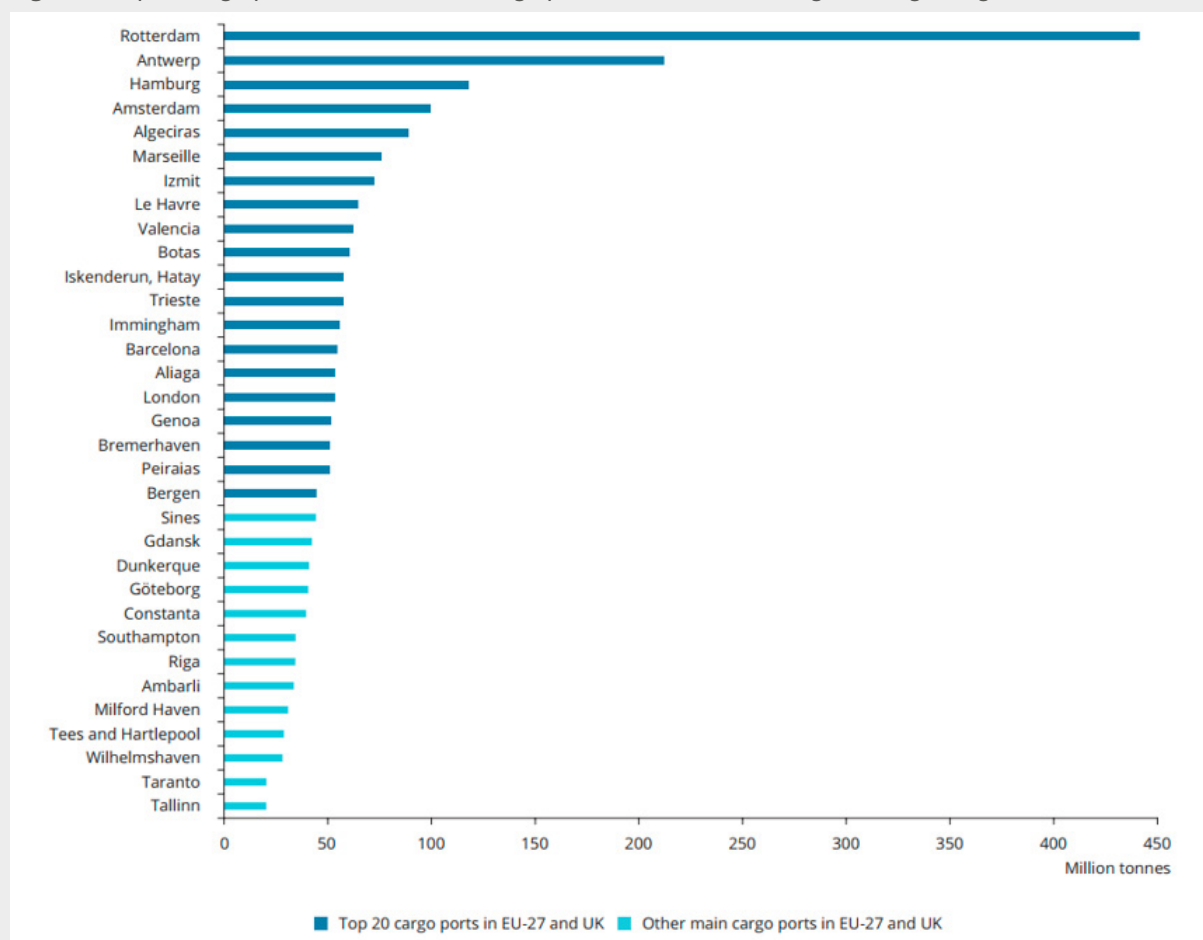
The importance of ports for European and global trade

Figure 3: Main extra-EU flows by gross weight of freight handled in main EU ports, 2020



Some 18 ports in the EU (around 6 % of the total) account for more than a quarter (26.7 %) of port call activity (Figure 3). In Europe, the main ports in terms of port call activity are Rotterdam, Antwerp, Algeciras and Piraeus, while in terms of the gross weight of goods handled, Rotterdam, Antwerp and Hamburg remained the top three ports in Europe in 2019 (Figure 4).

Figure 4: Top 20 cargo ports and other main cargo ports in the EU based on gross weight of goods handled, 2018



Source: Eurostat, 2019.

Figure 5: The five main EU ports by port calls from different ship types, 2019–2021

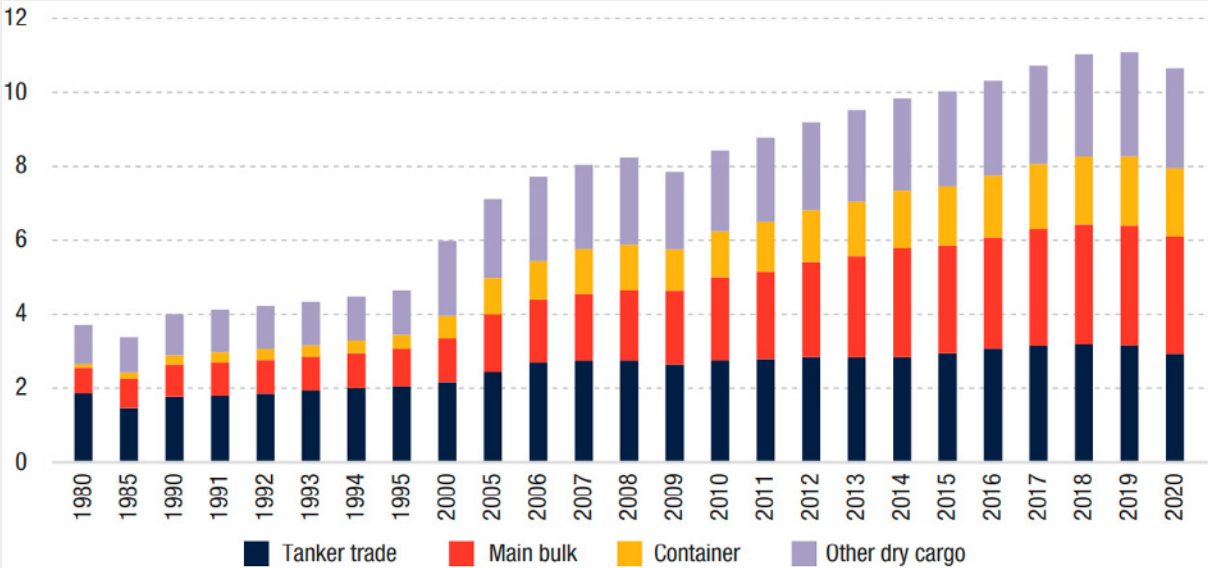
Cruise ship		Oil tanker		Ro-pax ship		Gas carriers		Container ship	
Barcelona	3.5 %	Piraeus	6.4 %	Messina	3.6 %	Antwerp	15.2 %	Rotterdam	13.0 %
Civitavecchia	3.2 %	Antwerp	5.8 %	Algeciras	3.1 %	Honningsvag	6.8 %	Hamburg	7.9 %
Dubrovnik	2.8 %	Gothenburg	5.1 %	Calais	2.6 %	Rotterdam	4.9 %	Antwerp	6.8 %
Piraeus	2.8 %	Algeciras	4.6 %	Patras	2.1 %	Augusta	3.8 %	Algeciras	4.2 %
Palma	2.6 %	Rotterdam	4.1 %	Rodbyhavn	1.9 %	Terneuzen	3.4 %	Piraeus	3.8 %
Bulk carriers		Ro-ro cargo ship		General cargo ship		Chemical tanker		Ferries	
Costantza	4.0 %	Zeebrugge	8.5 %	Karmsund	3.5 %	Antwerp	11.8 %	Naples	6.1 %
Rotterdam	3.9 %	Rotterdam	6.4 %	Antwerp	3.3 %	Rotterdam	11.1 %	Stavanger	5.5 %
Antwerp	3.6 %	Antwerp	6.2 %	Rotterdam	3.3 %	Augusta	4.2 %	Ibiza	5.4 %
Augusta	3.5 %	Dublin	3.6 %	Hamburg	1.7 %	Amsterdam	2.7 %	Lisbon	4.5 %
Volos	2.5 %	Livorno	3.5 %	Klaipeda	1.5 %	Le Havre	2.2 %	Oslo	3.4 %

Source: European Maritime Safety Agency and European Environment Agency, European Maritime Transport Environmental Report 2021, Publications Office of the European Union, Luxembourg, 2021.

Today, the main goods transported by rail are metal products, which represent 43 % of the goods transported, followed by raw materials (29 %), chemicals (14 %), agricultural and forestry products (8 %), and food and drink (6 %). It is clear from the shares of goods transported by rail that the focus is on heavy materials and dangerous goods. However, segments of the market such as steel and petroleum products and especially coal are slowing down. In the case of coal, a decreasing demand is the main factor explaining the decrease in the rail modal share. Nonetheless, the intermodal transport of goods has grown in recent decades, and it remains the most important driver of rail market growth (Figure 5).

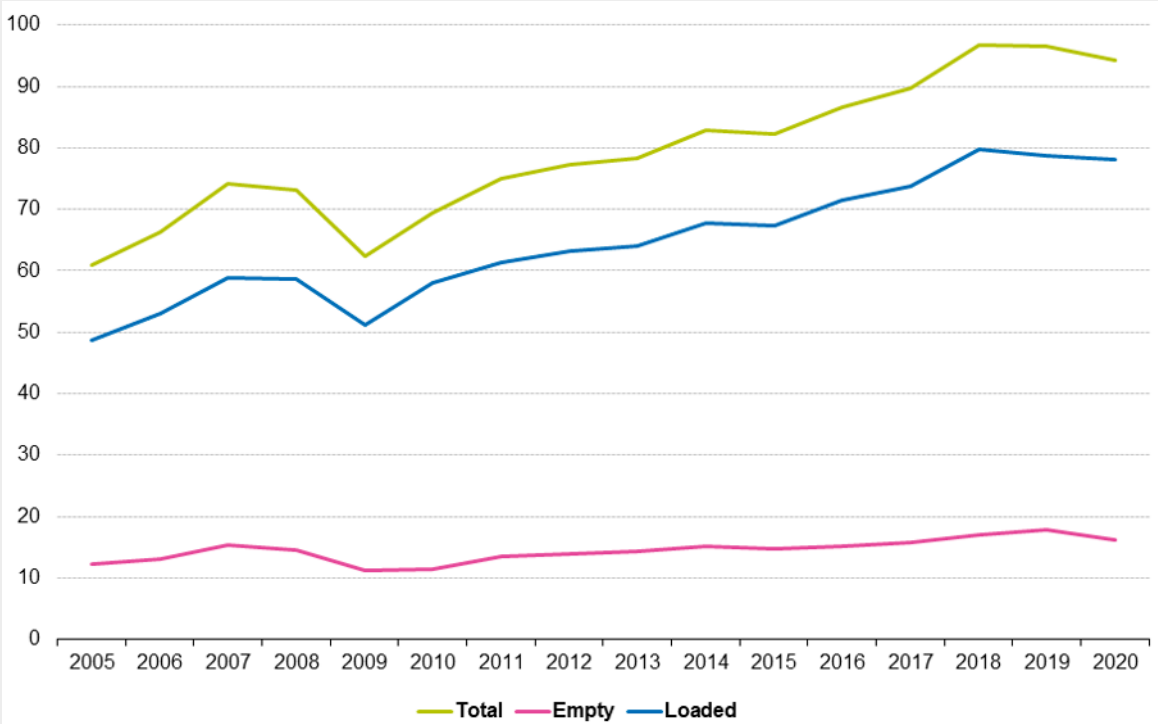
The type of goods transported has also changed, with a strong increase in the transport of containers globally and in the EU as a result of the increasing importance of trade flows with Asia for manufactured goods (see Figures 6 and 7). Containers will continue to be the focus for increasing the rail modal share; hence, it is important to improve rail–port connectivity. The reefer segment of the market is particularly dynamic for the transport of fresh products, wines/spirits and pharmaceutical products.

Figure 6: International maritime trade by cargo type for selected years (millions of tonnes loaded globally)



Source: United Nations Conference on Trade and Development (UNCTAD), Review of Maritime Transport 2021, United Nations, New York, 2021.

Figure 7: Volume of containers handled in the main ports in the EU, 2005–2020

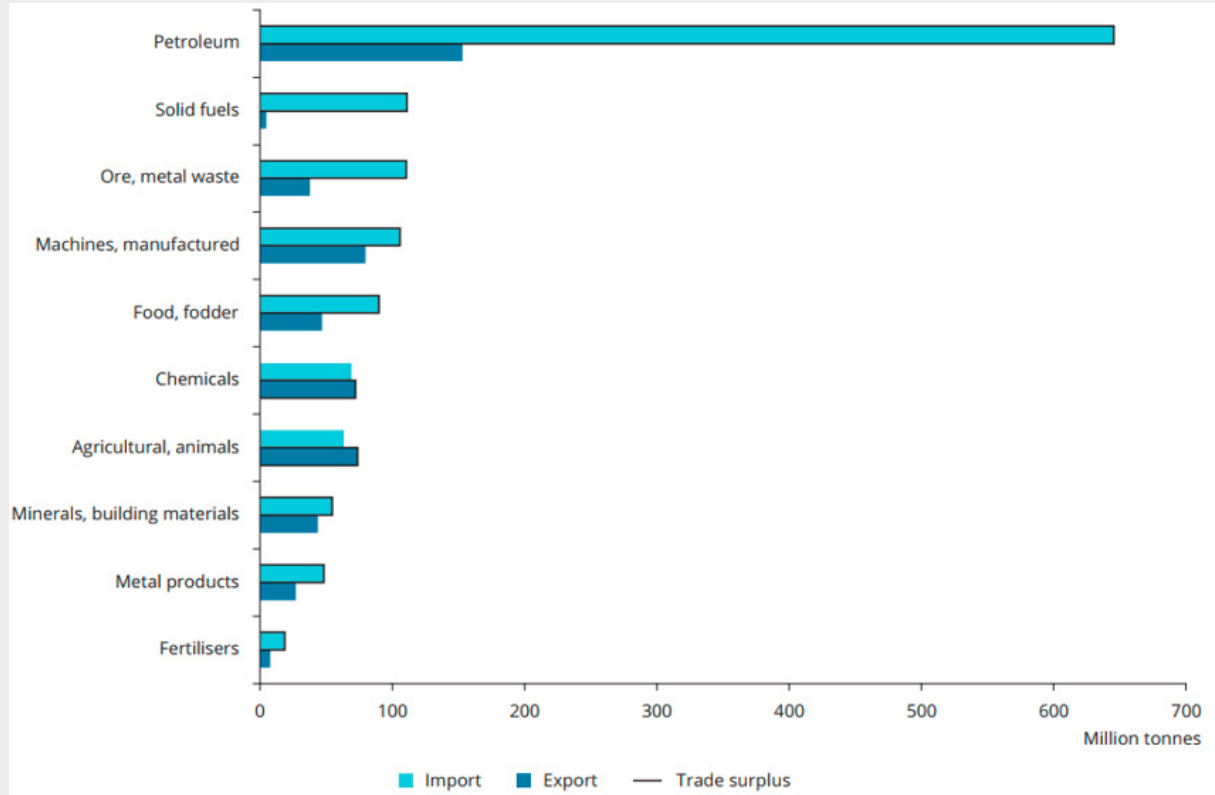


Source: Eurostat.

Market growth for goods with a low rail affinity, especially grouped goods, is proceeding strongly, while for goods with a high rail affinity, such as metal products, there is a negative trend (Figure 8). Thus, goods with a low rail affinity typically share specific characteristics: the shipment sizes are small, they are time-sensitive, and last-mile access to the rail track network is available at both ends of the transport chain.

The same trends are visible in the maritime sector, with, for instance, coal being transported less than it used to be. However, recently there has been an increase in the transport of agricultural products, especially cereals, which have a high rail affinity, through some ports.

Figure 8: Types of imported and exported goods (by tonnage) shipped by sea, 2019



Source: Eurostat, 2019.

Ports unequally but well connected to the railway network: survey results

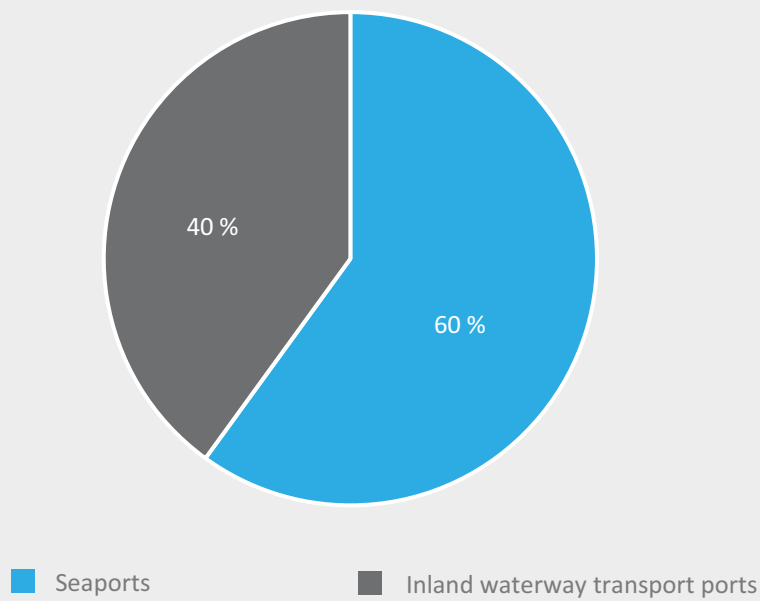
In their joint position paper, the European Sea Ports Organisation and the European Federation of Inland Ports indicated that ‘European ports’ efficacy relies on their ability to optimise water, road and railway transport links across the entire transport network. Efficient railway operations and links to and from the ports, as well as within the port, are essential to maximise the use of rail as a sustainable transport mode and to comply with the priorities set in the TEN-T legislation.’⁽¹²⁾

To understand the level of rail connectivity of European ports, the ERA sent a survey questionnaire to the European ports with the support of the European Federation of Inland Ports and the European Sea Ports Organisation. A total of 37 ports⁽¹³⁾ responded, with a good geographical spread and a good diversity of large, medium and small ports and of inland and maritime ports (Figure 9).

⁽¹²⁾ European Sea Ports Organisation (ESPO) and European Federation of Inland Ports (EFIP), *Ports in the European Rail System – Joint position paper of the European Sea Ports Organisation (ESPO) and the European Federation of Inland Ports (EFIP): 2019, 2019.*

⁽¹³⁾ See list of respondents in Annex 1.

Figure 9: Types of ports replying to the EU survey (%)



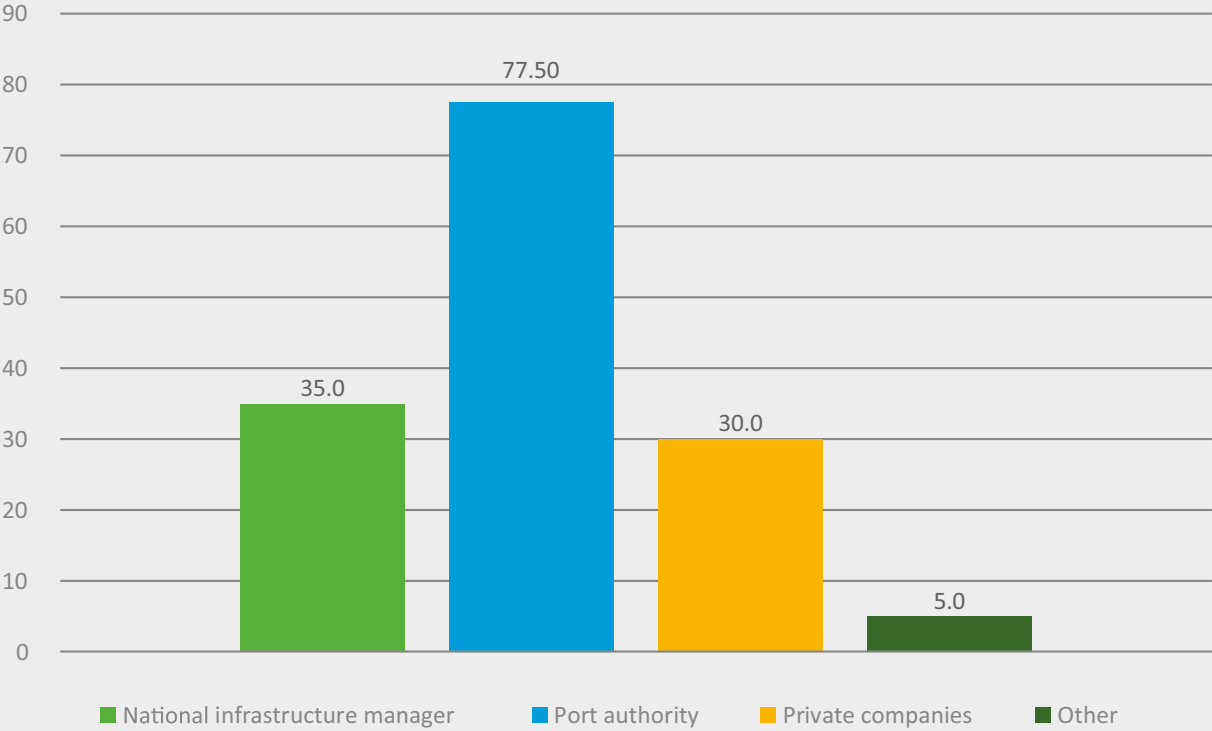
Source: ERA, 2022.

Among the responding port authorities, more than 75 % manage the rail infrastructure for their port (such as in Hamburg or in the Spanish ports) or at least have a role to play in managing the rail infrastructure (e.g. in light maintenance of the infrastructure) (Figure 10). Others stated that it is the national infrastructure manager that manages the rail infrastructure for their port.

An important point is that many private companies are involved in managing rail infrastructure. However, this is mostly only true for the rail infrastructure inside the terminals (e.g. in the Port of Valencia, terminals are managed not by the port authority but by terminal operators, including the circulation/manoeuvring of trains inside them). Generally, terminal operators manage the rail infrastructure inside the terminals in close cooperation with either the port authorities or the national infrastructure manager.

The diversity of models of railway operations management in ports is often linked to the national context and the specificities of the rail infrastructure inside the ports. The different models have their pros and cons and will be further analysed in Section 2.

Figure 10: Percentage of respondents identifying organisations managing the port’s rail infrastructure (multiple choice question)

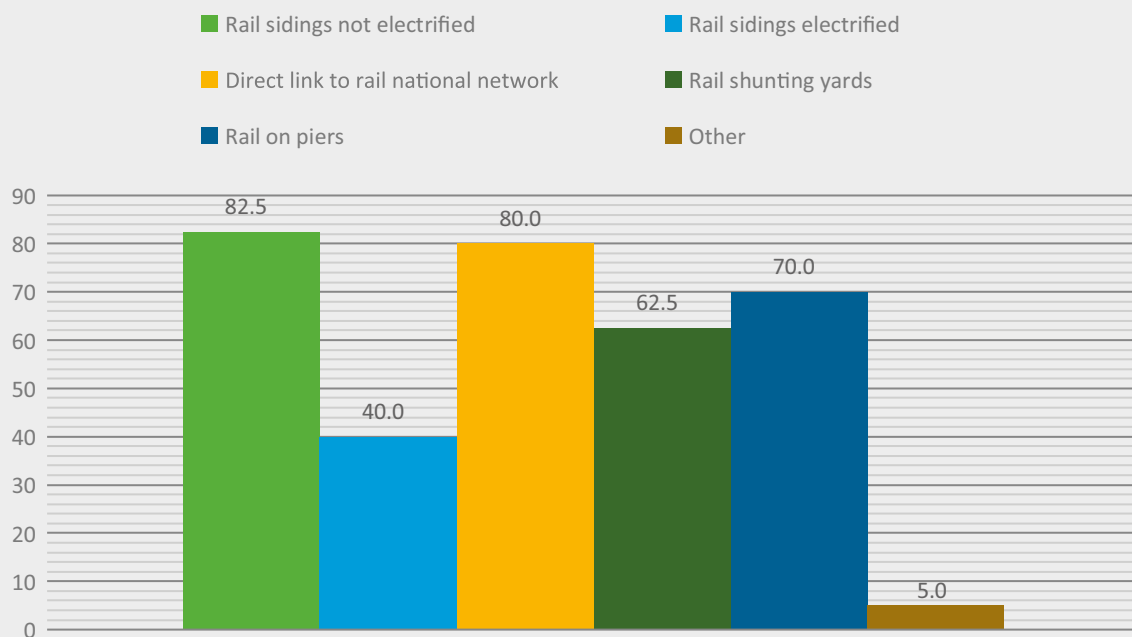


Source: ERA, 2022.

All survey respondents have rail infrastructure in their port, and 32 have direct access to the national rail network. Interestingly, in most of the ports the rail sidings are not electrified. Aside from that, 70 % of respondents said that their ports have rails on piers for direct ship/train transfer (Figure 11).

Although the level of rail connectivity seems, on average, to be rather good inside the ports, the large variation between ports with a modern infrastructure and those with an ageing infrastructure that requires investment in modernisation is hidden.

Figure 11: Percentage of respondents with types of rail infrastructure in their port



Source: ERA, 2022.

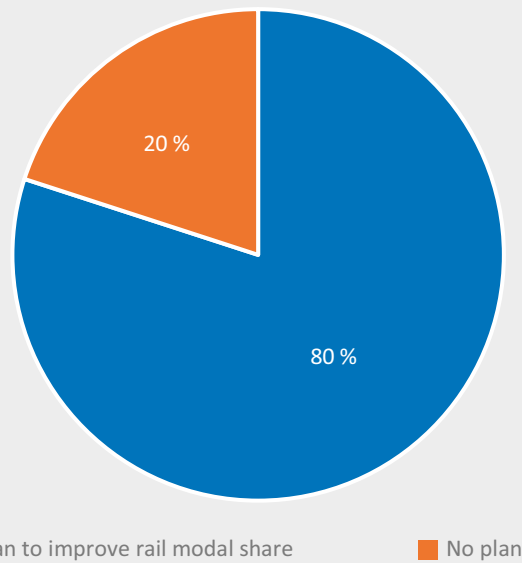
Ports' rail strategies

Many ports consider that their competitiveness will increasingly be judged by their rail connectivity. This is one reason why most of the responding ports have a plan to improve their rail modal share (Figure 12). For instance, the Port of Koper indicates in its 2020 annual report ⁽¹⁴⁾ that if the railway lines to the port reach their maximum capacity, large shippers, especially for containerised goods, divert cargo elsewhere. The report adds that 'when logistics operators are choosing ports, the key decision-making factor is the railway connection with the hinterland ... Nowadays, competition between ports is taking place on the railway'.

The few ports that do not see rail as an asset are usually in a specific situation, such as the Dublin Port Company: Ireland is an island, with a large part of the population close to Dublin Port; therefore, rail is not considered an appropriate solution for relatively short-distance freight transport.

⁽¹⁴⁾ <https://www.luka-kp.si/wp-content/uploads/2021/06/Annual-report-2020-ENG.pdf>

Figure 12: Ports with a plan to improve the modal share of rail (%)



Source: ERA, 2022.

Most of the ports consider that the best way to increase their capacity and the rail modal share is by developing their rail infrastructure. Ports mentioned a large number of infrastructure improvements that should increase the rail modal share, including:

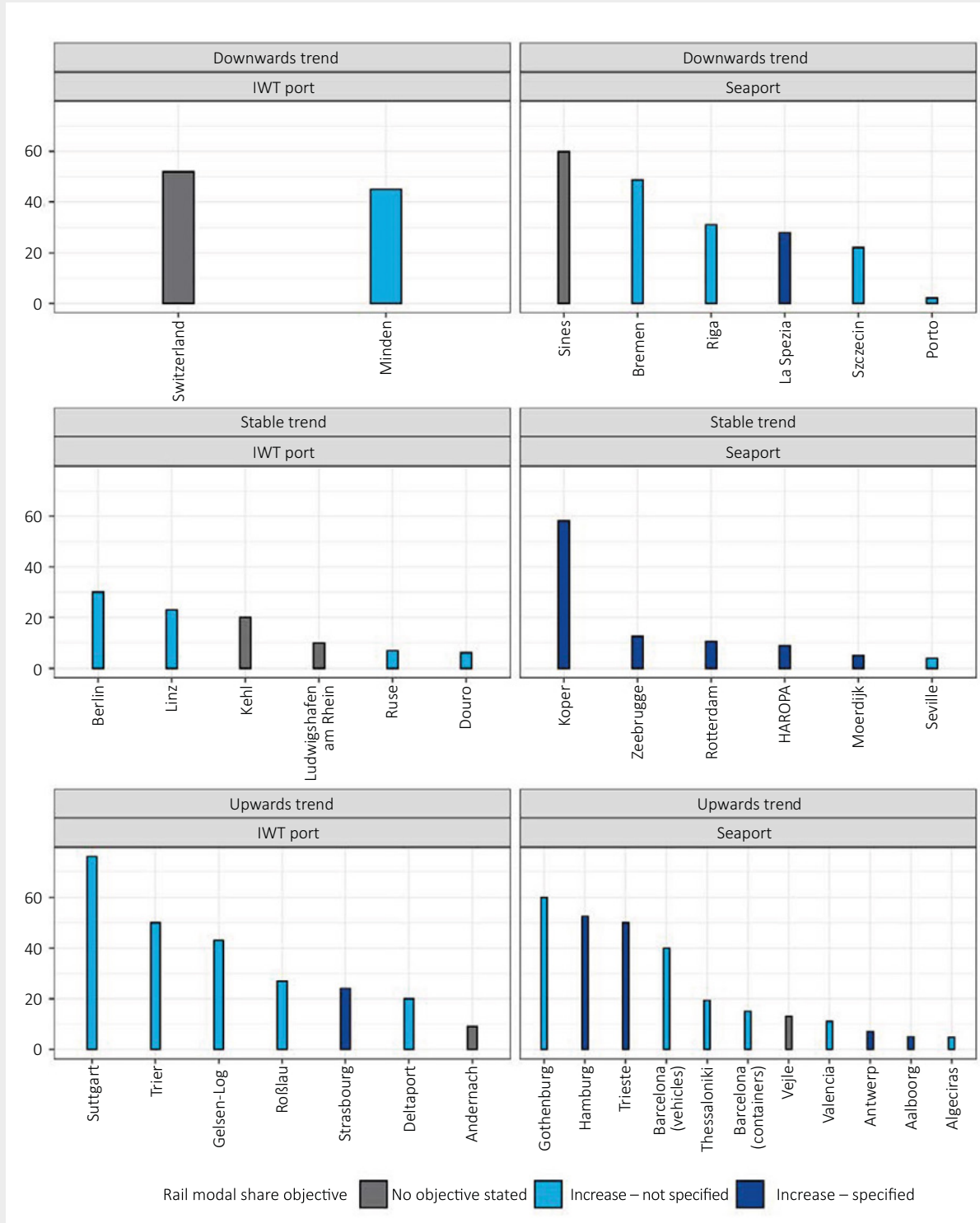
- building new links (and/or improving the existing connections) to the national railway network;
- extending tracks and yards to accommodate 740-m-long trains;
- upgrading infrastructure to accommodate the expected growth;
- eliminating bottlenecks (whether inside the port or in the hinterland) through creating additional operating capacity;
- creating bypasses for urban agglomerations;
- adding direct links between stations to increase flexibility and capacity;
- developing rail infrastructure for block trains;
- constructing infrastructure to facilitate access to port platforms;
- constructing intermodal terminals;
- electrifying tracks and sidings wherever possible;
- constructing new rail buffer sidings.

Figure 13 provides an overview of the respondents, split by seaports and inland waterway transport ports, with their current modal share, and indicates whether there is an upwards or downwards trend in the modal share of rail ⁽¹⁵⁾. The colour codes indicate whether the port has a clear objective of increasing the modal share of rail.

The figure illustrates that most ports have either a stable share or an increasing modal share of rail. Almost all the ports state that they are aiming to increase the modal share of rail. However, only some explicitly state exactly what this share should be.

⁽¹⁵⁾ See Annex 3 for an overview of modal shares, trends and objectives.

Figure 13: Rail modal shares (%), trends and objectives by type of port



NB: HAROPA, Le Havre–Rouen–Paris; IWT, inland waterway transport. Source: ERA, 2022.

HAROPA and Antwerp: examples of rail strategies

Two of the main issues of the ports in increasing the share of goods transported by rail are the cost and the reliability of the railway services. Despite these issues, many ports are willing to increase the share of goods transported by rail through their own initiatives.

Seaports' authorities are often interested in developing rail or barge connections because the ports are usually fully integrated into urban areas. Increasing the modal share of rail and barge transport in these areas is essential to reduce road congestion.

For example, the objective of the Le Havre–Rouen–Paris (HAROPA) port is to transport 20 % of goods by train in 2025 through improving the Normandy–Île-de-France railway line, going around the north of Paris, and improving urban logistics with partners such as Sogaris. This is a steep increase on the current 4 % rail modal share.

Another interesting example is the Port of Antwerp, Europe's second largest port, whose main driver of growth in the past 20 years has been maritime container transport. To accommodate this growth, important investments will need to be channelled into constructing new terminals and building the port's capacity for transporting goods. These include investments in new rail infrastructure, as well as in the building and rebuilding of terminals.

Currently, 7 % of the containers are transported by rail, and the port aims to increase this to 15 % by 2030. The regional government of Flanders supports the sustainable development of the port and wants it to reduce its impact in terms of road congestion.

It is in this context that the Port of Antwerp, Infrabel and Railport announced their joint plans to increase the port's share of goods transported by rail at the end of March 2021 with a strategy containing seven pillars. These pillars cover the various aspects of increasing the rail modal share, from parking policy to smart investments, and from the development of a regulatory framework to the development of a digital platform for the mutual exchange of data.

2. Strengthening the potential of rail in ports

From an operational and investment point of view, ports cannot be treated like any other kind of infrastructure on the European railway network. To increase the share of freight transported by rail, rail–port connectivity must be optimised.

The ports participating in the ERA's survey and in the structured interviews expressed their views on the barriers to rail development and on future opportunities for development. The ERA asked about the stakeholders' views specifically on the following topics:

- infrastructure development inside and outside ports, including last-mile connections;
- digitalisation, including the TAF TSI and operational issues;
- rail governance models;
- rail-related services offered, market evolution and combined transport;
- rail charging models;
- regulatory frameworks and policy incentives.

The ports with the highest throughput in the EU were targeted for the investigation. However, geographical location and other characteristics, such as 20-foot equivalent units (TEU) handled and type of port, were considered when sampling ports for analysis.

Figure 14, showing barriers to rail transport in the ports analysed, and Figure 15, showing actions that the ports are taking to facilitate rail transport, reveal that the ports consider investing in infrastructure a key factor for further developing their capacity and increasing the modal share of rail for the hinterland transport of goods. Indeed, most of the participants in the survey agreed that the most important initiatives influencing the performance of rail are investments in infrastructure and improving last-mile connections inside and outside ports.

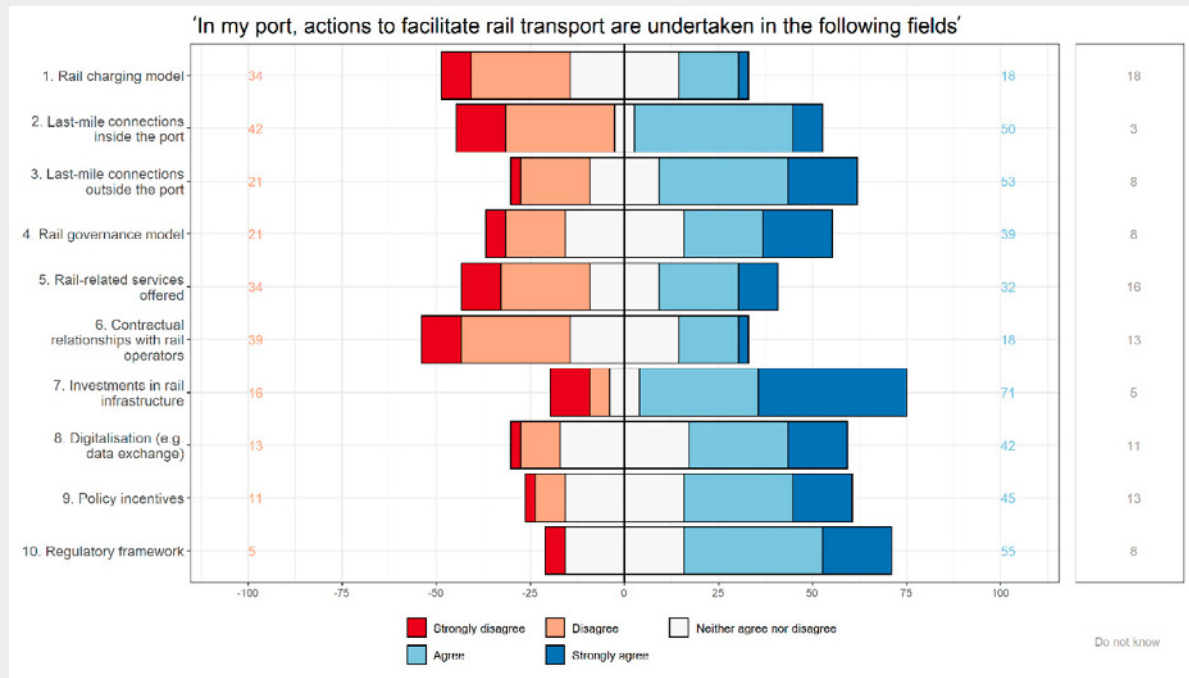
Participants also pointed out the importance of strengthening digitalisation and data exchange between stakeholders. Most of the ports have a digitalisation strategy for their own operations, including railway operations. Infrastructure development and digitalisation are therefore considered the most important aspects for the future development of the ports.

However, even if digitalisation is very high on the agenda of the ports, those with an ageing infrastructure indicated that digitalisation could happen only after the modernisation of the infrastructure, considering the high costs and the urgency of the latter.

Finally, regulatory frameworks and policy incentives also influence the choice of transport for freight. For instance, in Spain a national regulation has introduced a 50 % reduction in port fees for freight moved by train to promote a modal shift towards rail.

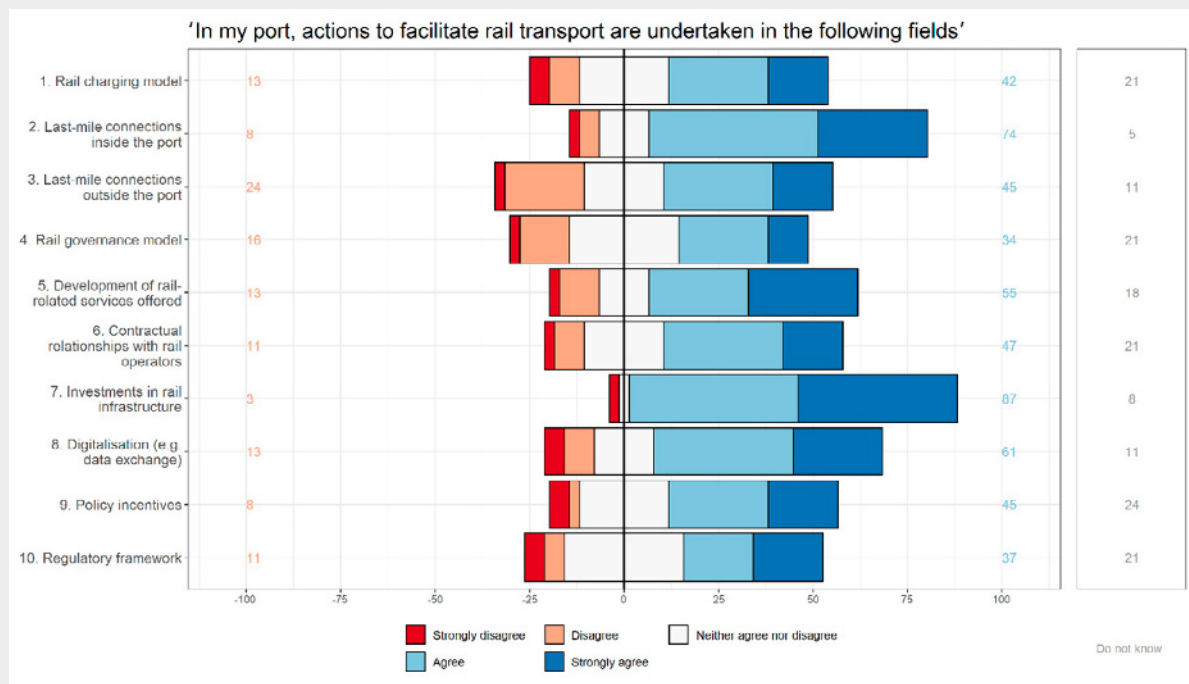
Fewer ports identified barriers on which ports probably have less influence: rail charging models and contractual relationships with rail operators. However, market evolution and the role of combined transport were frequently mentioned during the interviews.

Figure 14: Percentage of respondents identifying barriers to rail performance in their ports



Source: ERA, 2022.

Figure 15: Percentage of respondents stating that initiatives influencing rail performance are carried out in their ports



Source: ERA, 2022.

Infrastructure development inside and outside ports

The key element to foster synergies between the rail sector and ports is clearly the state of the rail infrastructure in the port and its connection with the main rail network ⁽¹⁶⁾. In fact, the ports with the highest rail modal share, including Hamburg, Gothenburg, Trieste and Koper, have good infrastructures and are investing in modernising them further.

Most of the ports define their infrastructure needs based on their capacity (e.g. single-track issues in Deltaport) and their use of terminals. For instance, the Port of Barcelona pointed out that the lack of terminals within a short distance limit its rail performance. The Port of Thessaloniki invested in the construction of a dry port in Sofia to promote its rail development. While there is now a daily rail shuttle between the Port of Rotterdam and the ports of Strasbourg and Kehl, the potential for rail transport between these ports could be further increased. However, owing to capacity restrictions in Rotterdam and last-mile handling in France and Germany, this is not possible at the moment.

The ports are also in constant negotiations with the main infrastructure manager and the national authorities to resolve infrastructure issues outside the port, such as cross-border connections. An example is the connection between France and Spain through the Port of Barcelona or the improvement of the Zaragoza–Teruel–Sagunto–Valencia line to better connect the Port of Valencia with its hinterland.

In many cases, as pointed out by the Port of Hamburg, revenues from track access charges cannot cover the important expenditures associated with necessary infrastructure development; therefore, public funding is needed to modernise the network.

The identification of bottlenecks, whether inside the port or outside the port, is also critical to plan future works to improve rail infrastructure. A major bottleneck for the hinterland transport of goods for the Port of Rotterdam is the link between Emmerich in the Netherlands and Oberhausen in Germany. Works to build a third track are ongoing and will increase the capacity of the line. This should also increase the rail modal share of the Port of Rotterdam. The works are planned to be finalised by 2025.

Rail activities are considered strategic by most of the ports, and ports also compete with each other in terms of rail development. The ports are under pressure to modernise the rail infrastructure, deriving from both internal factors (e.g. municipalities wanting to reduce congestion on their roads) and external factors (e.g. customers wanting to green their logistic chain). Consequently, most of the ports are investing significantly in rail infrastructure and rail activities. These investments can be made directly by the port itself and/or with the support of public authorities (the EU, the state and/or local authorities). Most of the investments are dedicated to:

- increasing capacity to accommodate 740-m-long trains (e.g. along the Zaragoza–Teruel–Sagunto–Valencia line for the port of Valencia);
- upgrading from single tracks to double tracks (e.g. along the Koper–Divača line);
- developing marshalling/shunting yards (e.g. in the Port of Hamburg);
- developing infrastructure to avoid passenger traffic (e.g. a new 2.5-km link from Adif's network to the Port of Seville);
- electrification (e.g. in Antwerp).

Finally, having a good network of terminals close to the port (up to 200–300 km) is of major importance for the success of the ports' modal shift from road to rail.

⁽¹⁶⁾ Annex 4 summarises the key elements noted by the different ports interviewed in relation to infrastructure developments.

Some ports mentioned that good rail infrastructure, even if this is not primarily the objective, provides an opportunity to shift not only from road to rail but also from short-sea shipping to rail, especially for domestic traffic. It also depends on the vertical integration of the shippers (e.g. Seville–A Coruña by short-sea shipping, which could be done by rail).

Developing rail infrastructure inside and outside ports is important not only to further increase the rail modal share but also to maintain current transport volumes, (positive) trends and rail competitiveness. The Port of Algeciras, for example, has registered in recent years a constant and spontaneous increase in the modal share of rail (100 % per year), despite weak rail connectivity. If the trend continues, the port authority foresees possible issues in satisfying the demand in next 2–3 years if the ongoing railway projects (besides those already completed) are not finalised. Sidings are also an important instrument to allow the better use of rail capacity, as noted by the main Lithuanian infrastructure manager while explaining the project creating a new track to the Port of Klaipeda: ‘One way to get more freight on green trains is to build rail sidings, making it as easy as possible for businesses to use the rail network’⁽¹⁷⁾.

EU funds are an important and efficient source of funding for infrastructure development both inside and outside ports (given the high costs of these projects) for the Spanish ports, while for other ports (e.g. Hamburg and HAROPA), EU funds are important but do not determine whether or not an investment is made. The vast majority of port projects financed by the European Investment Bank have a component on rail infrastructure.

It is also important to note that investments in high-speed lines usually free up some capacity for rail freight transport on conventional lines, so any investment in high-speed passenger transport should eventually have a positive impact on the freight sector⁽¹⁸⁾. The ports of Kehl, Seville and Algeciras indicated that the competition between passenger and freight traffic and the fact that the tracks were not separated between the two market segments were detrimental to freight traffic. The lack of available paths on the main line is an important issue together with the language barrier for cross-border traffic, as indicated by the Port of Bremen.

Many ports identified a lack of electrification of some tracks inside and outside ports as a serious barrier to operating more direct trains to/from the ports. This was the case, for instance, for Bremen, with the Strasbourg–Lauterbourg–Wörth line; for Algeciras, with the line to Córdoba; for Deltaport, with a feeder line; and for Antwerp, where electrified tracks within the port are limited and mostly up to the Antwerp North station. The Swiss Parliament has decided to instruct the Federal Council to enter into negotiations with France to electrify the Strasbourg–Lauterbourg–Wörth railway line on the left bank of the Rhine and upgrade it to the corridor parameters. The expansion is to be carried out with financial support from Switzerland. The aim is to eliminate the biggest bottleneck on the TEN-T corridor from Rotterdam to Genoa in a short period. The Swiss decision to invest in the rail infrastructure of other countries is quite revolutionary. The justification given by the Swiss authorities is that Switzerland might not have reached its goal of limiting the number of lorries on the road network to a maximum of 650 000 in 2021 (the number of transalpine lorry journeys was 860 000). This supposed failure suggested the need for more plans and investments to achieve the necessary rail freight modal split, including investments outside the country.

From the infrastructure point of view, the loading gauge limitations (e.g. the Port of Bremen indicated that trains with P400 loading gauges are not allowed on the line going towards Nancy) or high gradients (e.g. up to 24 mm for the Port of Algeciras) are also elements impeding the increased use of rail for the hinterland transport of goods. Regarding loading gauges, the Port of Valencia reported the ongoing development inside the port of third tracks with 1 435-mm international loading gauges, to make the rail infra-

⁽¹⁷⁾ https://www.railfreight.com/railfreight/2022/01/14/new-tracks-at-klaipeda-port-bring-oil-products-on-rail/?utm_source=newsletter&utm_medium=email&utm_campaign=Newsletter%20week%202022-02

⁽¹⁸⁾ European Union Agency for Railways (ERA), *Fostering the railway sector through the European Green Deal*, pp. 16–21, 2020 (https://www.era.europa.eu/sites/default/files/events-news/docs/fostering_railway_sector_through_european_green_deal_en.pdf).

structure inside the port fully compliant with the TEN-T requirements by the end of 2022. The space available to build more infrastructure is very often insufficient (e.g. as reported by Deltaport) or there is insufficient infrastructure at the destination (e.g. as reported by Gelsen-Log).

Finally, it is important to note that ports that allow rail access to deep-sea container ships are considered to have a competitive advantage over ports that do not. The port of Zeebrugge indicated that ports that can transport higher volumes of goods (massification), for example deep-sea ports and ports with good railway and/or inland waterway connections, have a competitive advantage through increasing their use of rail infrastructure.

Rail is the most competitive transport mode on busy routes, but the first and last miles tend to be very costly, both for goods and passengers. A modal shift will not be the result of railways completely replacing other transport modes. On the contrary, goods and passengers will shift to railways as long as they are better integrated in the wider transport and mobility system. Therefore, to increase the modal share of rail freight transport, it is necessary to develop a green transport logistics chain where the synergies between modes of transport are optimised. The transport of goods requires simple and efficient transfer from road to rail, as well as from vessels to railways in ports.

Key messages on infrastructure development

Rail activities are considered strategic by most of the ports. Some ports even considered that, in the future, the competition between ports will be about rail connectivity and capacity. Even if transport volumes for rail are lower than for other modes of transport, there is pressure to modernise rail infrastructure. This pressure comes from both internal factors – the growth of ports should be sustained with inland waterways and rail because municipalities do not want more congestion on their roads – and external factors – customers want to green their logistics chains and are keen to develop the rail services they offer. Therefore, most of the ports are investing a lot in rail infrastructure and rail activities.

Most of the investments are dedicated to the electrification of the rail network, to increasing rail capacity by 750 m of rail tracks, to doubling single tracks and to avoiding passenger traffic. For many rail projects, access to EU funds is essential, although several ports mentioned that even without EU funds they would have made investments. Finally, the importance of having a good network of terminals close to the ports is fundamental to increase the modal share of rail in the hinterland transport of goods.

In general, the ports considered that their cooperation with the main national infrastructure managers was good, although projects to expand and modernise rail infrastructure are often very slow to be agreed on and implemented, especially when they concern cross-border infrastructure.

The key role of digitalisation (including the technical specification for interoperability relating to the telematics applications for freight) in improving operations

While the development and modernisation of rail infrastructure is considered the key factor in increasing the rail modal share, operational issues mostly linked to a lack of digitalisation have also been identified. These issues include mechanisms for coordination between stakeholders, high-quality slot allocation, information exchange and data sharing (about the movement of freight and estimated times of arrival, etc.) ⁽¹⁹⁾.

For instance, the Port of Moerdijk clearly indicated that new IT solutions could help to optimise shunting operations. It also considered that legal changes would be needed, as until now third parties have not been allowed to handle others' wagons. The HAROPA port indicated that an important barrier from an operational perspective is the maintenance works carried out at night, a period during which combined transport freight trains run over long distances. Even though those maintenance works on infrastructure are essential to ensure a good level of service for the freight trains, they have been neglected in recent years, creating a backlog. Ports consider it very important to ensure the highest level of coordination between stakeholders to avoid, or at least minimise, the disruption of traffic. In Denmark, the objective to fully implement the European Rail Traffic Management System and electrify the rail network by 2030 is positive in a way, as eventually it will result in an increase in the capacity of the network. However, it has also been causing some significant disruption to traffic and even blockages for some weeks, as the freight situation has not been fully considered when prioritising and organising the infrastructure works.

The Port of Antwerp explained that there is a clear lack of coordination between port operations and rail transport; the regulatory and operational frameworks of rail are not adapted to the needs and operational requirements of ports and their customers. Port/terminal operations are having to adapt to railway operations, while, according to the Port of Antwerp, it should be the other way around. While for other, smaller ports, such as the Port of Aalborg, the railway operators are mostly responsible for digitalisation, this digitalisation should be integrated into the port's system.

Digitalisation plays a key role in reinforcing the situation of rail. It is integrated in the broader digitalisation of ports' operations, such as smart customs procedures, systems for tracking and tracing containers, and the need for data availability and interoperability for logistics chains in general. When asked about the need to increase operational communication with rail, almost half of the ports considered that implementing new systems will be a key success factor in increasing the quality of rail transport services and increasing the rail modal share.

There are also national strategic projects around digitalisation, such as the Simplification of Processes for a Logistic Enhancement project, led by the Ports of the State in Spain. This project aims to bring together all the necessary information from the logistics chains and interoperability between the different modes of transport to optimise the efficiency of the transactions between stakeholders. The results are expected in spring 2023. The Port of Algeciras, for instance, is waiting for the finalisation of this project to build on it once the final framework has been defined. However, the port is already implementing a system for automatic image capturing. However, some other ports are looking for solutions outside of the EU. For instance, the Port of Gothenburg has liaised with the Port of Los Angeles to adopt the latter's track and trace system to follow containers from ships through inland terminals to rail in all directions. Finally, some ports are developing their own system. For example, the Port of Hamburg provides a data platform, 'transPORT rail', to operators to improve planning opportunities for operations such as checking the track assignment or transmission of dangerous goods data. The aim is to expand this kind of platform to

⁽¹⁹⁾ Annex 5 summarises the key elements noted by the different ports interviewed in relation to digitalisation.

provide more detailed data to operators. The Port of Koper also uses an internal IT system in conjunction with the Slovenian infrastructure manager and railway operators for daily planning. In recent years, the Port of Linz has invested a lot in digitalisation, for example buying a new camera to take pictures of trains for commercial and operational purposes so that nothing needs to be written by hand. This port is currently installing a system that will provide a overview of the port's activities in real time, showing where the trains are and the part of the infrastructure they are on and allowing anomalies to be detected quicker so that they can be handled better.

The ports are also exchanging information on this topic. The Port of Riga considers digitalisation a weak point in the management of logistics chains and is connected with the Port of Rotterdam, which gives access to some support and allows the ports to exchange experiences. At this stage, the Port of Riga has very limited data exchange with railway stakeholders using old-fashioned methods. In particular, the port does not have information on track volumes or container types and is struggling to find ways to exchange data. This is also the case between the port authority and the terminals for which a government database can be used to track information and check its validity. The port is looking at different options for tracking systems to monitor freight flows in and out of the port and allow information to be exchanged with terminal operators and railway stakeholders. This port also considers that the automation of port processes will be an important factor in gaining efficiency. The Port of Rotterdam developed a pilot application that was unable to be fully implemented. The 'On track' system, aimed at coordinating rail flows, failed due to the unwillingness of parties across the supply chain to coordinate and align their IT systems. At the beginning of April 2022, an agreement was signed with 19 rail stakeholders to jointly develop a new application as part of the 'rail connected' programme. This port-based community system will integrate most of the available data to improve and increase the use of the ports' capacity.

The Port of Seville is very active in this field and is part of several projects.

- **Synchro-modal traffic and transport information services (AIRIS II Synchro).** This project focuses on the synchronisation in the Port of Seville between maritime and land transport, monitoring the navigation conditions and controlling the operations in the docks. AIRIS II Synchro optimises the control and coordination of the different modes of transport in real time and implements multimodal planning to link up ships, trains and lorries. It integrates databases and systems extracted from the digitalisation of river traffic carried out under the first AIRIS project using smart transport systems and land terminals.
- **Interoperational capacity of the railway system (I Rail).** The port authorities of Seville and Valencia are taking part in the I Rail project, which will adapt railway operations to European standards through digitalisation and the use of European standards for information exchange between administrators and railway operators (details of loads, trains, positions, etc.).
- **Ferro Port System II (smart railway system).** The main objective of Ferro Port System II is to develop and implement an advanced, innovative, smart system to automate railway operations and management in the port that is fully connected with the general railway network. Enabling the exchange of information across this multimodal logistics platform will help to make the port more efficient, accessible and secure. Its aim is to save time, lower costs and promote rail as a sustainable means of transport.

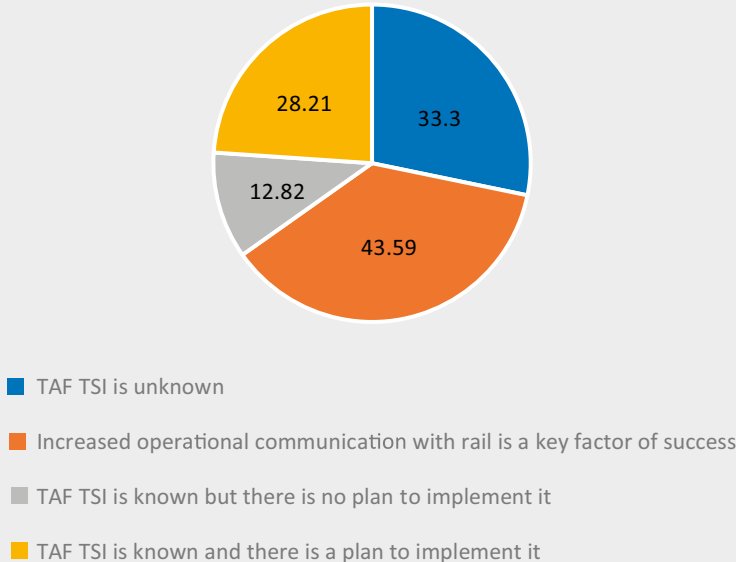
Following an order from the European Commission, in January 2022 the ERA put forward a recommendation for the revision of the TAF TSI. With the proposed changes, the TAF TSI will allow the integration of rail/ports and terminals' stakeholders to ensure that data and messages can be exchanged between stakeholders active in other modes of transport and, in particular, the port authorities. This will be done by extending the communication to stakeholders outside of the rail sector. The proposed revision, expected to enter into force in late 2022, also contains several changes to the legal text and to technical documents with a view to reinforcing multimodality.

There will be a fundamental change in the approach of the TAF TSI ⁽²⁰⁾. Considering that the rail sector connects ports that are fragmented, to facilitate information exchange between these, it is necessary to accept different message formats (e.g. 'train ready' systems). With the soft compliance approach, the structure of a message may be different between stakeholders but the mandatory content of the message will be the same.

At the time of the survey, a third of the respondents did not know about the TAF TSI (Figure 16). However, two thirds of them knew about the TAF TSI and considered that improving the communication between the different modes of transport was important to achieve the modal shift objective.

In addition, new provisions on intermodal loading units (ILUs) will be incorporated in TAF TSI reference data, with corresponding messages to track ILUs. The references for ILUs will be encoded in a dedicated database managed by the International Union for Road-Rail Combined Transport (UIRR). The database does not contain information on maritime containers; its inclusion may be considered in the future. However, the container's number can already be found in the train composition information, so information on these containers can be retrieved to a certain extent. An updated recommendation for the revision of the TAF TSI was submitted by the ERA to the Commission in summer 2022 to add to the ILU reference database.

Figure 16: The importance of digitalisation and the TAF TSI for the ports (%)



Source: ERA, 2022.

The dissemination of the TAF TSI is important to raise awareness among stakeholders outside the rail sector. The UIRR is committed to supporting dissemination activities among intermodal terminal operators, including ports, and plans to be involved in the development of dedicated IT infrastructure with the terminal operators. In addition, any stakeholder seeking support in the implementation of the TAF TSI can contact their national contact point ⁽²¹⁾.

Until now, the TAF TSI has been designed to cover mostly 'push messages', for example on estimated time of arrival or consignment. However, nowadays customers and stakeholders are looking for more interactive ways of exchanging messages to, for instance, enquire about the real-time positioning of a wagon through, for example, the train information system of Ibérica Tecnología en Sistemas de Seguridad Ferroviarios (ITSS). The port authorities are looking for this information, which could be covered in a future revision of the TAF TSI.

⁽²⁰⁾ Annex 6 summarises the main proposed changes in the TAF TSI that could facilitate coordination with stakeholders outside the rail sector.

⁽²¹⁾ https://www.era.europa.eu/sites/default/files/activities/docs/ncp_taf_2021_en.pdf

Key messages on digitalisation

Developing rail infrastructure appears to be the top priority for ports, but digitalisation comes a close second. The port authorities play a key role in the coordination of shippers, terminal operators and railway stakeholders. A lack of communication and data exchange is often perceived as an important barrier to developing further rail activities. Therefore, many ports are investing in the development of specific IT tools that facilitate the coordination of different port stakeholders with the aim of speeding up processes and improving control of railway operations.

However, the current level of awareness of the TAF TSI is rather low compared with its potential use as a harmonised system that could serve the needs of the different stakeholders. The dissemination of the TAF TSI is important to raise awareness among stakeholders outside the rail sector.

Management of railway operations in ports

Different ports use different models for the management of railway operations, each with pros and cons ⁽²²⁾. Some port authorities are, or are planning to become, rail infrastructure managers (e.g. the Port Authority of Trieste). Some port authorities own the rail infrastructure but entrust traffic management to the national infrastructure manager (e.g. HAROPA, which delegates traffic management to Société nationale des chemins de fer français (SNCF) Réseau). Some are responsible for the railway tracks within the port but are separate from the main rail infrastructure manager and also conduct the light maintenance of the rail infrastructure. Finally, in some ports the national infrastructure manager owns and operates the entire port infrastructure (e.g. Infrabel in the Port of Antwerp and ProRail in the Port of Rotterdam). The situation is thus quite diverse.

While having the national infrastructure manager operate the rail network in the port is generally advantageous to reach a better balance between costs and revenue, ports that are more dependent on the national infrastructure manager regularly experience significant delays in the implementation of railway projects, especially those inside the ports. In fact, the national infrastructure managers' investment plans are usually on a national scale and investment priorities may not always include the small but important upgrades that individual ports need.

The complexity of the decision-making process for making rail investments also differs significantly between ports even when their rail governance models are similar. For instance, the Port of Gothenburg has constant discussions with the Swedish Transport Administration (the Swedish infrastructure manager), and investment planning is mostly proactive, that is to prepare for the future increase in the demand. In the case of the Spanish ports, their cooperation with Adif is good but the rail infrastructure is in worse condition (e.g. 100 km of single track is not electrified and there is a telephonic block system on the line from Algeciras to Córdoba) and therefore affects the decisions made on the investments, which are more reactive. However, whatever the rail governance model is, globally ports have achieved very good cooperation with the national infrastructure managers. One important element is to make sure that all the stakeholders are regularly exchanging information. For instance, in Denmark a panel of terminals, operators, rail stakeholders and all the port authorities meets 4–5 times a year to discuss the evolution of the market and to share their experiences.

Considering that good rail connections give ports a competitive advantage, ports that have more flexibility in their investment decision-making processes will probably be better equipped to react to evolutions in the market and customer needs.

⁽²²⁾ Annex 7 summarises the key elements noted by the different ports interviewed in relation to the management of rail operations in ports.

Regulations also affect safety oversight and operations. In fact, there is currently a variety of approaches across ports to the application of EU rail safety legislation. Some ports' rail infrastructure is not within the scope of such legislation, while for others (e.g. Antwerp) the infrastructure is considered part of the national rail infrastructure for the purposes of applying EU rail safety legislation, and the legislation is applicable to all operators and RUs. Moreover, in Italy in 2017 the national safety authority (NSA) signed a framework agreement ⁽²³⁾ with the Italian Ports Association clarifying that all relevant EU and national legal frameworks as well as train protection systems are applicable to ports' infrastructure regardless of whether port authorities are a rail infrastructure manager or they delegate that function to another rail infrastructure manager.

Finally, at this stage there is no way to obtain an overview of ports that are infrastructure managers. Although according to Article 12(4) of the rail safety directive (Directive (EU) 2016/798) NSAs are supposed to inform the ERA of the safety authorisations issued by infrastructure managers, this is not done consistently. The ERA has started to put in place a systematic approach to treating and publishing the information received, following the agreement of eight NSAs.

Key messages on the management of railway operations in ports

The study shows very different models for the management of railway operations in ports, from a port authority being a fully fledged rail infrastructure manager to a port authority having very limited capacity to influence the development of rail infrastructure in their port. Although the different models have their own advantages and disadvantages, ports that are not too dependent on the national infrastructure manager have considerably more flexibility to decide on rail investments and the future of the rail activities within the ports. This may be an advantage in the years to come in achieving the modal shift objective, if sufficient funding is available. However, good coordination between the different stakeholders can overcome this lack of flexibility.

Combined transport, market and technological evolutions

In 2019, combined transport operators transported 4.4 million truckloads of cargo, which resulted in 80 billion tonne-kilometres of output (an increase of 55 % between 2009 and 2019). According to an International Union of Railways report ⁽²⁴⁾, every second freight train in Europe today is an intermodal train and over 50 % of rail freight tonne-kilometres can be attributed to combined transport. While combined transport is developed in the whole of the EU, the North–South axis (Rotterdam–Genoa) has been the most frequently used route in recent years.

In recent decades, the competition between shippers and ports has been becoming more and more a competition between logistics chains to provide customers with an end-to-end transport solution. The development of the transport of standardised maritime containers on trains to 62 % of the market – swap bodies now represent 21 % and semi-trailers now represent 17 % of the combined transport market – is part of this change and indicates a strong need to transform the railway fleet by investing more and more in intermodal wagons.

In addition, only a small fraction of trailers used in Europe is craneable. This means that special technologies, such as Modalohr ⁽²⁵⁾ and CargoBeamer ⁽²⁶⁾, are necessary for putting such trailers on trains.

⁽²³⁾ https://www.ansfisa.gov.it/accordi-nazionali/-/asset_publisher/TfdVoSLNsgGp/content/web-content-display-options-close-accordo-quadro-tra-ministero-delle-infrastrutture-e-trasporti-agenzia-nazionale-per-la-sicurezza-delle-ferrovie-asso

⁽²⁴⁾ https://uic.org/IMG/pdf/2020_report_on_combined_transport_in_europe.pdf

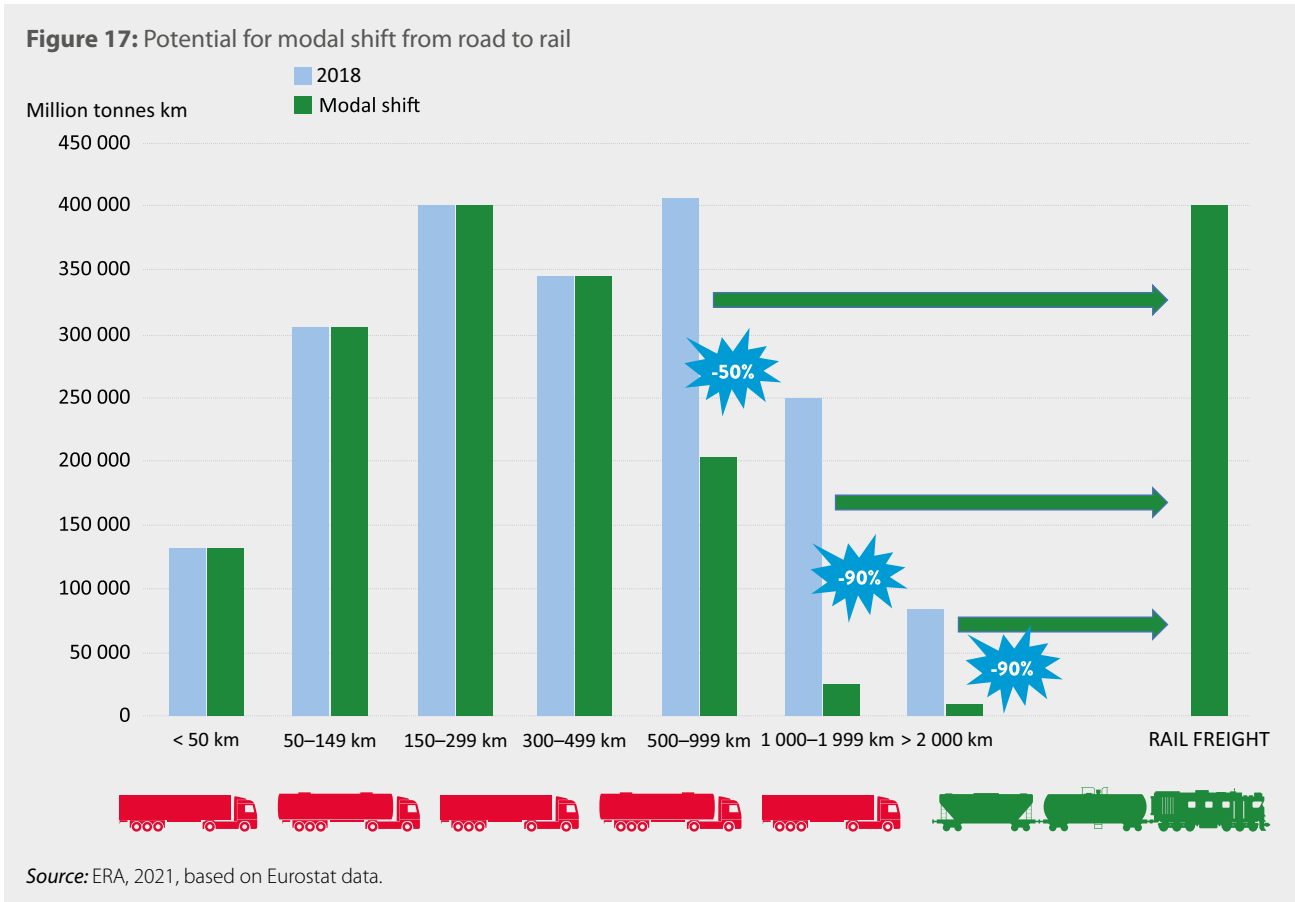
⁽²⁵⁾ <https://lohr.fr/fr/lohr-railway-system/les-wagons-lohr-uic/>

⁽²⁶⁾ <https://www.cargobeamer.eu/>

On long-distance transport, freight forwarders are using semi-trailers to move goods around Europe. Different techniques exist to accommodate these trailers on specialised wagons, which work by adding a special device to either the trailer or the wagon. Investments have been made in both systems, but improvements to the craneability of semi-trailers could further increase the use of combined transport.

A recent study by the European Commission on a comparative evaluation of transshipment technologies for intermodal transport and their costs estimated that removing network limitations for each TEN-T corridor (especially the adaptation of railways to accommodate trains with P400 loading gauges in Spain, France and Italy), considering both the costs of upgrading the rail network to allow the transport of semi-trailers and the costs of upgrading terminals and constructing new terminals, would result in an investment need of about EUR 7 735 million ⁽²⁷⁾.

The same study concluded that 'in general, the standard vertical transshipment technologies (gantry crane / reach stacker) in combination with containers become competitive with road-only transport at distances of around 1000 km. At the same time, when looking through the lens of environmental performance, already at 600 km most intermodal transport chains would have lower external costs than road-only transport.'⁽²⁸⁾ The ERA came to the same conclusions in 2021 (Figure 17).



⁽²⁷⁾ https://transport.ec.europa.eu/news/study-analyses-transshipment-options-more-competitive-intermodal-transport-and-terminal-capacity-ten-2022-05-05_en

⁽²⁸⁾ In addition to this study, the FERRMED study (<http://www.ferrmed.com/ACTIVITY/studies>) should be published after summer 2022, providing a large overview of the network and needs of terminals.

According to the UIRR, in the relationship between shippers, terminal operators and railway stakeholders, the port authorities have a key role to play in coordinating the stakeholders who do not liaise enough and have the power to impose measures to establish more efficient cooperation.

Several ports identified a need on the part of rail operators to better anticipate the needs of customers and the requirement to improve sales capacity at the levels of both the rail operators and the ports to attract more customers. The Port of Gothenburg has a high rail modal share for the containers market (60 %), and it handles 52 % of the containers market in Sweden. The infrastructure within the port and outside the port is considered satisfactory, and improvements have been made, such as new signalling systems, the electrification of the tracks some years ago, and the construction of a double track and a tunnel to avoid residential areas. All the roll-on, roll-off (ro-ro) terminals and logistics warehouses are connected by rail so that no bottlenecks are identified inside or outside the port. In addition, the port is about to introduce a track and trace system to follow containers from the ship to the inland terminal to rail in both directions, following a proven system established by the Port of Los Angeles. So, according to this port, the next step to further improve the rail modal share is to improve its sales capacity. The timetabling process with the infrastructure manager only takes place once per year, which makes it more complicated to attract new customers willing to use the rail system. The infrastructure managers are working on using new IT tools to further improve the timetabling process and make it more flexible and adaptive.

Ports' experiences

For combined traffic with an origin or destination in a port, the market segment for freight transport within 300 km can also be competitive, favouring rail over road transport. Indeed, many ports have regular rail connections to terminals within a range of 100 km and are very important to reducing road congestion and its negative externalities in urban areas.

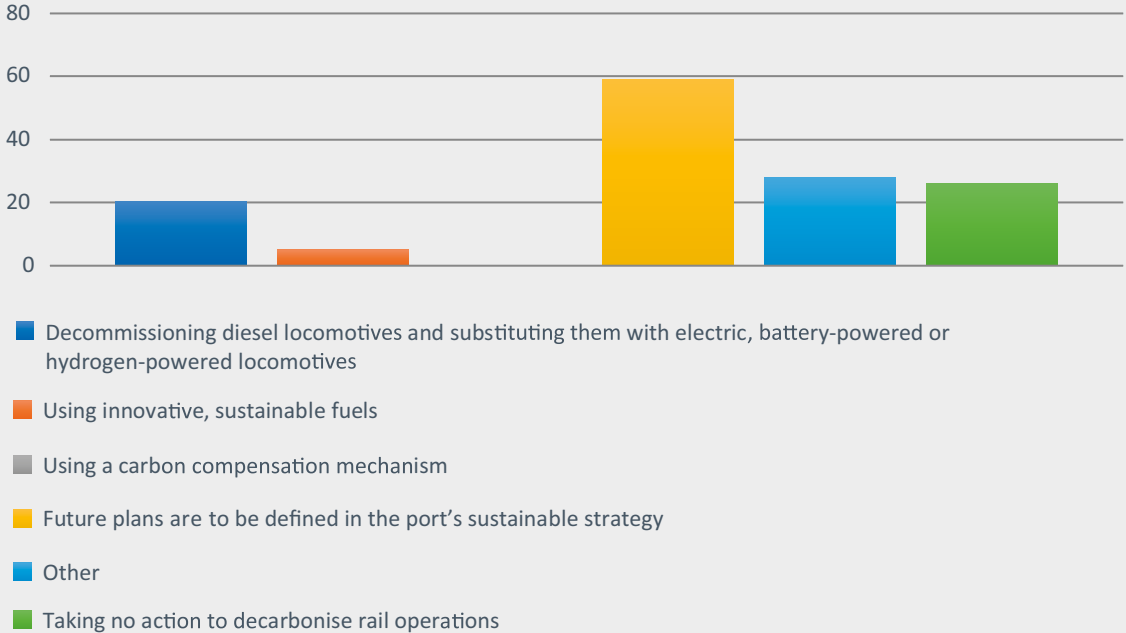
For instance, in Barcelona three trains transport bulk freight daily from the mines in Suria to the port, which is only 80 km away. A total of three trains travel daily from a car factory in Martorell to the port, which is 30 km away, and container trains travel daily to the port from Tarragona and Lleida, which are both 100 km away, and from other locations within a 300-km range, such as Monzón. The first intermodal corridor created in Spain was the Port of Barcelona–Zaragoza (300 km apart), with more than six container trains passing through daily.

Finally, the recent significant growth of the Port of Trieste is a good example of the functional integration of 'retro terminals' in close proximity to a port. Since 2016, the port authority of Trieste has also managed the port of Monfalcone, which is only 30 km away from Trieste. Both ports are very well linked to the railway network – and are therefore able to operate in accordance with EU standards for freight trains – and to two important freight villages (*interporto*), Ferneti and Cervignano del Friuli. By developing the concept of logistics satellites, these two freight villages work as extended quays of the port and are used to optimise the port's services. In addition, since 2015 the port has started to provide shunting services through its company Adriafer, facilitating the railway operations. Nowadays, 50 % of containers arrive at the port by train along with 25 % of lorries, with constant growth in recent years. A total of EUR 200 million is planned to be invested in increasing railway capacities from 13 000–15 000 trains/year to 30 000 trains/year in 2026–2030, but, thanks to the current 10 000 trains operated, the Port of Trieste takes the lead as the top Italian rail port in terms of capacity. The high use of capacity necessitates optimising the synergies between modes of transport and railway stakeholders in order to guarantee capacity on the railway node.

The ERA's survey provided an opportunity to investigate the decarbonisation strategies of railway operations in the ports ⁽²⁹⁾. A little less than 75 % of respondents expressed their intention to decarbonise railway operations in their ports but, at this stage, less than 25 % of the ports have a clear plan (Figure 18). Most of the ports are still in the process of developing plans as part of their sustainability strategies. Among ports that have already implemented concrete measures, these have generally involved further electrifying railway operations or decommissioning old diesel locomotives and modernising the fleet with hydrogen- and battery-powered locomotives. For the moment, hydrogen- and battery-powered locomotives are mostly considered innovative pilot products to be studied but not yet implemented in practice. Some ports have focused on prioritising the use of sustainable fuels.

In Italy, Adriafer, a railway company providing shunting and traction services to and from the Port of Trieste, has established cooperation with the University of Trieste to implement research projects aimed at tackling environmental and energy issues to improve the efficiency of rail freight transport. The joint efforts have set the railway company on the path to reducing the emissions from its port activities through adopting innovative solutions and digital technologies.

Figure 18: Percentage of respondents taking action to decarbonise railway operations inside their ports



Source: ERA, 2022.

⁽²⁹⁾ Annex 8 summarises the key elements noted by the different ports interviewed in relation to market and technological evolutions, combined transport and rail-related services offered.

A rail manufacturer has reacted to the results of the survey. This manufacturer explained that hydrogen-powered passenger trains already exist, having been put into action before shunting locomotives. The fuel cell technology is not considered mature enough at this stage to reach the necessary traction power (300 kN, or 202.4 MW). Although they are confident that this technology will be used in the future, it will probably start to be dispersed in the United States, as the locomotives there are much heavier and transport bigger volumes, so that more fuel cell systems can be integrated. For shunting locomotives in Europe, the priority is to develop dual-mode electric–diesel locomotives that can run on both electrified and non-electrified sections of lines. This would facilitate their operation in ports' shunting yards. The next step is to substitute the diesel part with a high-powered battery. This would make it possible to have zero carbon emissions for shunting movement with battery-powered locomotives, which would be sufficient to perform the last-mile operations. One of the advantages of this technology is its modularity. The battery cells can be placed modularly (in terms of their physical positions and quantity), which would facilitate standardisation. The maintenance costs would also be reduced, as currently maintaining diesel engines is quite expensive. However, as in the automotive industry, there is a risk to be considered in accessing the raw materials required to produce the batteries. In addition, circular and ecological means of production will eventually have to be developed so that the electrification of the network as far as possible is still considered the most environmentally friendly solution.

Key messages on rail services, technological developments and market evolution

In terms of rail services, although they are generally reliable and environmentally friendly, they are not flexible, especially in responding quickly to increased demand for services. The improvement of sales capacity by railway operators is considered an important element to further increase the rail modal share. In the context of a lack of lorry drivers and increasing diesel prices, rail is often perceived as a mode of transport with the potential to overcome these issues, especially if new technologies, such as digital automatic coupling, are implemented.

With regard to market evolution, the volumes of coal and metal ores transported are decreasing ⁽²⁰⁾. They have been partially replaced by other products, but the positive trend in the transport of containers remains.

Finally, the ports are conscious of decarbonisation objectives but are mostly focusing on their own activities rather than railway operations, although some relevant projects are ongoing.

Regulatory frameworks, policy incentives and rail charging models

Many ports acknowledged that the commercial offers from rail providers are not as flexible as those from road haulers (e.g. Gelsen-Log, Vejle, Zeebrugge and Antwerp) ⁽³¹⁾. In addition, there is a lack of knowledge among potential customers of the rail services offered, and some ports indicated that the rail service providers are not active enough to attract new customers. The costs of the rail services offered are also regularly considered higher than those of road services, although increased fuel costs and a lack of lorry drivers are currently balancing the competitiveness of the two modes of transport. However, regular

⁽²⁰⁾ Considering the war in Ukraine and the reopening of coal power plants, the trend in coal transport may temporarily change.

⁽³¹⁾ Annex 9 summarises the key elements noted by the different ports interviewed in relation to regulatory frameworks, policy incentives and rail charging models.

difficulties in the economic model of rail freight transport are experienced (e.g. HAROPA) due to the costs involved in breaks in load (change of mode of transport) for combined transport, and the fees for booking train paths and electricity charges borne by RUs. According to the Port of Antwerp, the main issue occurs inside the port, as on average 15 % of rail transport costs are incurred during last-mile operations in ports and can sometimes be prohibitive for the modal shift to rail ⁽³²⁾. Cost reduction for the railway operations inside ports is therefore considered essential for this port. According to the Community of European Railway and Infrastructure Companies, the reduction in track access charges to cope with the effects of the COVID-19 crisis has improved rail freight competitiveness. However, despite this measure, the current traffic is still approximately 10 % lower than before the COVID-19 pandemic. In addition, not all infrastructure managers have received compensation for the decrease in revenue due to the reduction in track access charges.

In Spain, a national regulation allows for a discount of 50 % on the fees due to ports associated with the movement/transport of ships/trains to boost the rail sector. However, the effect of this rule on improving the rail modal share has not been studied at this stage. With the increase in the size of ships, the number of port calls will probably decrease in the future, so part of the ports' revenue may also decrease.

Even if rail is perceived as cheaper by market players, the rail sector is perceived as unreliable and not flexible: 'You know when your good enters the railway system but you do not know when it will get out', and 'After one hour, you can get a transport offer from a lorry company, while this is not the case with rail' are sentences that you often hear from customers. The Belgian Rail Freight Forum, a group uniting railway stakeholders and policymakers, has developed a plan to increase rail modal share. According to Thierry Vanelslander, a professor in the Department of Transport and Regional Economics at the University of Antwerp, the conclusions are straightforward: there is a need for drastic measures such as infrastructure investments, pricing schemes and regulatory improvements. In terms of pricing measures, a level playing field between modes of transport needs to finally be established. For instance, in Belgium all modes of transport are heavily subsidised: trains transporting containers are subsidised; lorries are massively subsidised, with a special tax regime on red diesel instead of applying standard excise; and inland waterway transport is subsidised through a Flemish rebate. In the end, the externalities produced by the different modes of transport are not paid, while subsidies are thrown away with no coherent approach. In a more transparent system, the rail sector would be better off than the other modes of transport.

Among the most important shipping companies, some have decided to invest in rail freight operators or even set up new ones. For instance, MSC acquired the former national Portuguese rail freight operator CP Cargo, which became Medway. This rail operator was mostly active in Spain, Italy and Portugal but has recently started to extend its activities to Belgium, Germany and the Netherlands. In 2021 CMA CGM acquired Continental Rail, one of the main private operators in the Iberian peninsula. This situation is becoming more common, with the idea of ensuring the vertical integration of the market, optimising the supply chain and offering door-to-door and all-in-one solutions for customers. This also highlights a cultural shift in the mindset of significant shippers, who are now more and more looking at alternative modes of transport to road haulage.

The price of transport is obviously an important factor influencing the choices of customers. However, more and more customers are willing to green their logistics chains. A simple and quick way of doing so is by shifting from road to rail. For instance, in Valencia a partnership between Maersk and IKEA has been set up for a short-distance rail service. This is also true for Inditex in Algeciras. Indeed, many companies also have environmental goals to become climate-neutral or even climate-positive by a set date, with decarbonising their logistics a part of their objectives.

One of the most important aspects regularly mentioned and linked to rail charging models is fair competition between modes of transport. For rail to be chosen more frequently for

⁽³²⁾ <https://fsr.eui.eu/sea-ports-rail-transport-and-state-aid-some-reflections-on-the-way-forward/>

the hinterland transport of goods, a level playing field with road transport should finally be achieved. The Port of Hamburg clearly indicated that pricing should reflect the actual proportions of pollution resulting from road traffic compared with that resulting from rail, meaning that the external costs should be internalised. At this stage, the Port of Hamburg considers that funding options, regulations and costs are not ensuring fair competition between modes of transport, hindering the further development of rail.

Another key element is the funding required to launch rail investments. Many ports consider EU funding a bonus, but one that does not necessarily play a decisive role in the decision-making process. Although most ports try to have their projects co-funded by the EU, EU funds are not always considered a reliable source of funding, owing to the uncertainty around whether or not their projects will be selected. For instance, Hamburg's port authority has identified two funding schemes that it is eligible for:

- EU funds, in particular the Connecting Europe Facility, which represents 20–30 % of its investment needs but without a guarantee of funding over a period of years.
- Federal Republic of Germany funds of EUR 25 million per year, which is relatively low but reliable.

In addition, the current regulatory framework is not fully designed to boost cooperation between modes of transport. For instance, rail-related investment needs account for up to 20 % of the ports' total needs ⁽³³⁾. However, there is no legislative initiative aimed at eliminating the administrative burdens impeding the efficiency of work between modes of transport. There is also no framework for multimodal digitalisation. Most of the ports have their own digitalisation strategy but it is usually independent of the digitalisation of railway operations. For instance, the Freeport of Riga complained about the lack of supply chain data available, while the Port of Seville mentioned the project AIRIS II Synchro, focusing on the synchronisation of maritime and land transport. The project looked at ways to optimise the control and coordination of the different forms of transport in real time and conduct multimodal planning to link up ships, trains and lorries.

Finally, one of the critical problems is the priority given to rail passenger traffic in terms of both investments and operational activities. This is affecting rail competitiveness in the freight sector. According to the UIRR, night train services could be developed at the expense of the freight sector, as night schedules are traditionally used by freight trains. In 2020, for example, an independent report found that in the past 15 years, ProRail, the Dutch rail infrastructure manager, has prioritised the passenger network over freight operations, reducing the efficiency of freight transport in the Dutch network. The network needs more maintenance, frequently disrupting freight train traffic. ProRail is now reacting but will have to catch up on years of disinvestment in maintenance designated for rail freight. This situation is comparable among many EU Member States.

Key messages on regulatory frameworks, policy incentives and rail charging models

While for some ports the availability of EU funds does not determine rail investments, for many others the EU's contribution is considered vital to fund their projects. EU funds allow ports to develop their rail infrastructure, the key element for increasing the rail modal share. However, another major factor in reaching the modal shift objective is fair competition between modes of transport. To increase rail's competitiveness, a level playing field with road transport should finally be achieved in terms of tax policies and charging schemes. Finally, the priority given to passenger traffic from both operational and investment perspectives diminishes rail's attractiveness as a mode of transport.

⁽³³⁾ ESPO, *The infrastructure investment needs and financing challenge of European ports*, Brussels, 2018.

3. Case studies

HAROPA

The HAROPA port was established after the merging of two inland ports, Rouen and Paris, and one maritime port, Le Havre, on the River Seine, on 1 June 2021. As a result of this merging, the HAROPA port is considered the fifth port of the Hamburg–Le Havre area and the first French port for global trade. In 2019, the HAROPA port transhipped 93 million tonnes of maritime traffic and 29 million tonnes of river traffic, with 2.9 million TEU and 60 million tonnes of solid and liquid bulk. As the port of the Paris area, it has the potential to serve approximately 25 million consumers, one of the largest markets in the EU. Le Havre is a deep seaport, allowing the largest ships to access the terminals in Port 2000 (Figure 19).

Figure 19: Unloading a container ship in one of the maritime terminals in Port 2000



Source: ERA, 2022.

The HAROPA port, with the support of the French State, will invest massively until 2027 in modernising the port's infrastructures and in promoting the modal shift to rail and inland waterways. Currently, the port has four multimodal terminals in Le Havre, Rouen, Gennevilliers and Bonneuil-sur-Marne (see Figure 20).

Figure 20: LH2T, a multimodal terminal in Le Havre port



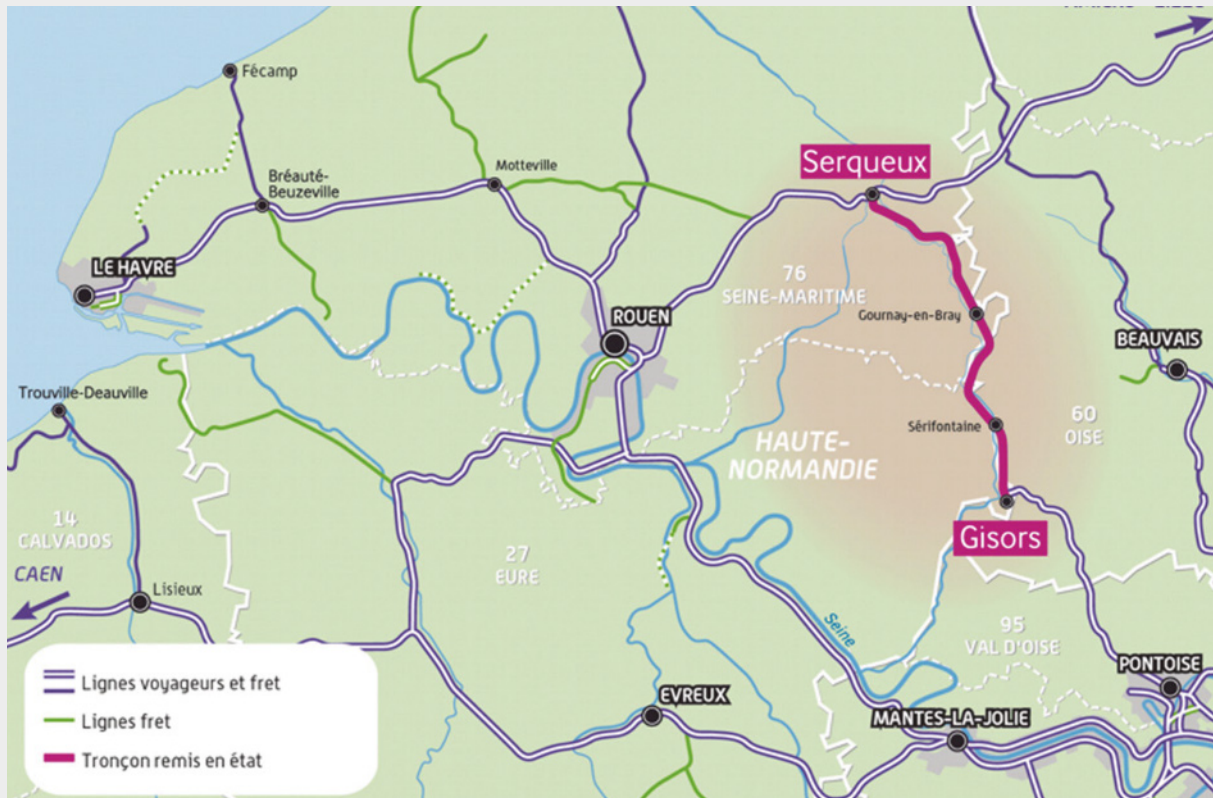
Source: ERA, 2022.

At this stage, 60 weekly railway connections are operated from/to the port, with the aim of further developing combined transport. One of the major elements contributing to fostering the modal shift to rail was the modernisation of the railway line Serqueux–Gisors (Figure 21), which was finalised in March 2021. The works performed had two objectives:

- to create a new alternative railway route to increase the railway capacity of Le Havre port;
- to offer additional capacity for freight trains going to and from the ports of Normandy and the Paris area, considering the congestion on the line to Mantes-la-Jolie.

The works were funded through subsidies from the French government (EUR 90 million), the Normandy region (EUR 90 million) and the EU (through the Connecting Europe Facility) (EUR 66 million) totalling EUR 246 million. The line was electrified by installing 2 000 catenary poles, a new connecting line of 1.3 km has been created and 9 level crossings have been removed. These works have increased the capacity of the line to 12 daily connections and 25 new daily train paths, to be utilised by railway operators with the potential of removing approximately 6 000 lorries from the roads per week.

Figure 21: Railway line Serqueux–Gisors



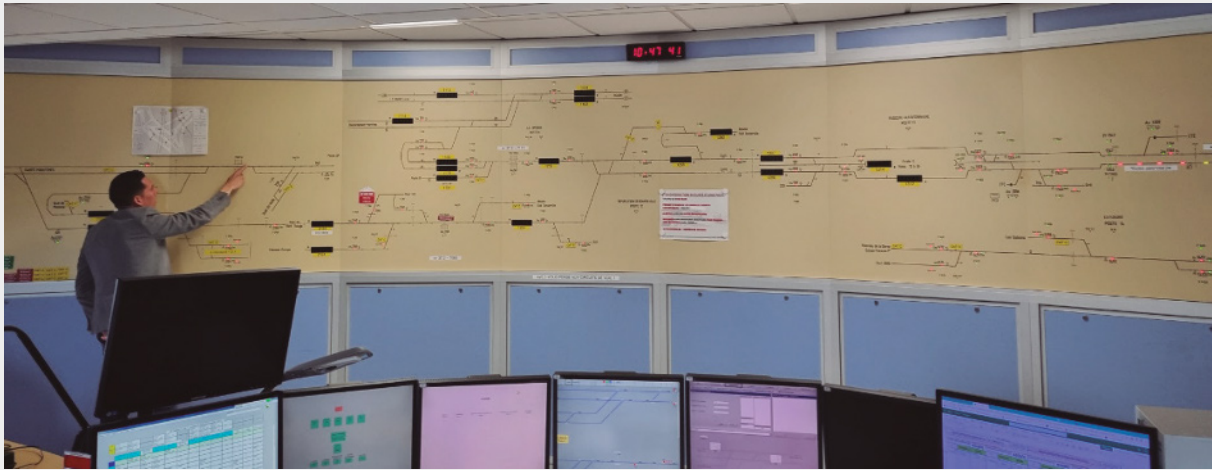
Source: Direction Régionale de l'Environnement, de l'Aménagement et du Logement Normandie, 2021.

The port railway network of Le Havre is composed of 160 km of tracks of which 40 km are electrified. The network has three points of interconnection with the national railway network. In 2008, the ownership of the port–rail infrastructure was transferred from SNCF Réseau to the port. The Autonomous Port of Paris / HAROPA received a safety authorisation as rail infrastructure manager on 1 July 2022, valid until 1 July 2027. In practice, the HAROPA port has delegated to SNCF Réseau the traffic management of approximately 3 500 trains running on this network, with 60 % transporting chemical products and 40 % transporting containers, for example cement in ISO tank containers to the terminal of Gennevilliers. A total of seven RUs operate in the ports, with one specific railway operator dedicated to shunting services. The inland port of Rouen has a railway network of 80 km and manages approximately 2 200 trains per year, 60 % of which transport cereals.

Anticipating the works that are ongoing as part of the development of the greater Paris area, a new port on the River Seine in the west of the French capital will be built. It should be partially in service in 2025, with the aim of being exclusively dedicated to the building industry. When fully operational in around 2040, it should accelerate the modal shift to inland waterways and rail for the hinterland transport of building materials.

Since the transfer of the port railway network, the HAROPA port has developed the rail infrastructure inside Le Havre port (see Figure 22). A total of 23.5 km of new railway tracks have been built to increase the capacity in the Port 2000 area, and a new railway connection to the multimodal terminal and a new signal box to better manage the railway capacity have also been constructed. The maintenance of the rail infrastructure has been considered more flexible since the transfer.

Figure 22: Main operational railway control centre of the port railway network in Le Havre



Source: ERA, 2022.

Taking into account the investments made in rail infrastructure inside and outside the port, the HAROPA port has set an ambitious target of transporting 20 % of goods by train in 2025.

Port of Antwerp

With currently 290 million tonnes of cargo, including 12 million TEU, handled, the Port of Antwerp is the second largest port in Europe and a key gateway to more than 800 destinations globally. The port handles all types of traffic, from containers to dry, break and liquid bulk, and since May 2022, following a merger, a single port authority has been managing both the Port of Antwerp and the Port of Bruges (Figure 23). Within the enormous 12 000 ha area of the Port of Antwerp, larger than the city of Antwerp itself, the port has six deep-sea container terminals, refineries, seven intermodal terminals and several bulk terminals, with a leading role in transporting liquid bulk, mostly chemicals and oil.

The hinterland transport of cargo is primarily towards Germany and Benelux, and the rail modal share of containerised goods is currently only 7 %. In fact, a large proportion of cargo is transported by pipelines and inland waterways, and more than 50 % is transported by road, generating severe congestion on the motorways across Belgium and associated externalities.

Figure 23: The Havenhuis, the headquarters of the port authority of the Port of Antwerp–Bruges



Source: ERA, 2022.

The railway network within the port area has more than 1 000 km of tracks (largely not electrified, shown as red lines in the map in Figure 24) with more than 20 sidings and more than 70 private rail connections serving all sorts of terminals and piers.

The shunting facility of Antwerp North is the sole single wagon load terminal in Belgium and a key piece of infrastructure, handling more than 100 trains a day. The port authority only owns the land and is in charge of groundworks and marine-related infrastructure and operations, while Infrabel, the national Belgian rail infrastructure manager, oversees the entire rail network within the port and traffic management.

There are about 10 RUs and several intermodal operators active in the port, with Lineas (the former State-owned incumbent railway operator) having a leading market share with regard to traction and especially shunting operations. Lineas is the sole undertaking that provides single wagon load operations at Antwerp North.

Figure 24: Port of Antwerp rail network



Source: Port of Antwerp–Bruges, 2022.

Currently, 250 intermodal trains transport freight weekly from the Port of Antwerp to 70 destinations in over 20 countries served by rail and 50 % of all freight trains running in Belgium have come from or are destined for the Port of Antwerp. However, railway operations are currently experiencing several issues contributing to limiting the growth of the rail modal share. The most important issues are as follows.

- Infrastructure.** The port's rail network is largely non-electrified, which is not only a concern in terms of emissions but also an important limitation with regard to direct trains to final destinations originating at the port's terminals. In fact, on account of the need to use diesel traction, trains need to be shunted and constructed to allow a locomotive change, as most of the main line operations use electric locomotives. Owing to the size of Belgium, often locomotives need to be changed again quite close to the port to cross the country's borders. In fact, Belgium's rail network is powered by a 3-kV system, which is different from the systems powering rail networks in neighbouring countries. Few RUs own multisystem locomotives that can cross borders by switching the traction power system.

Antwerp North is a key shunting node for the port (Figure 25) and for single wagon loads the hump is currently underutilised owing to complexity and the need for locomotives to have an on-board IT system installed that is compatible with the facility. Currently only Lineas has such a system. As a result of the installation cost, other RUs do not see a business case to perform single wagon load shunting in Antwerp North.

Moreover, due to the geographic configuration of the Port of Antwerp, rail tracks are often deployed along roads, and trains need to share the use of drawbridges with lorries, reducing the capacity of the rail network.

Figure 25: Shunting yard of Antwerp North



Source: ERA, 2022.

- **Governance.** Infrabel manages and maintains the whole of the port's rail network up until a few metres from the entries to terminals, where private sidings are installed. The national network statement, charging policy, path allocation, safety, and operational and interoperability rules applicable across the Belgian network are also applicable within the port. Infrabel is a State-owned company controlled by the Belgian federal government, while the port authority is controlled by the municipalities of Antwerp and Bruges. Within the governance structure of Belgium, the regional government of Flanders is responsible for the port's policies and most of road infrastructure around and within the port, while railways are controlled by the federal government. This generates an additional level of governance complexity.

The port authority cooperates with Infrabel on day-to-day issues; however, the port authority has no formal ownership of the port's rail network. The coordination on rail issues is more indirect than on the road network because of the different levels of govern-

ment involved. Infrabel management is accountable to the federal government on rail infrastructure management across the whole of Belgium, both freight and passengers, and therefore the Port of Antwerp is considered part of the network without a dedicated governance structure involving the port authority.

- **Investments planning and financing.** As a result of the governance structure, investing in the port's rail network is the responsibility of Infrabel and of the federal government. As landowner, the port authority only funds groundworks for hard infrastructure, but the investment planning for the port's network is done as part of the national plans of Infrabel. Therefore, because of the long investment cycle, which may not coincide with the port's current needs, projects at federal level are to be budgeted in a balanced manner between Belgium's regions. This situation adds uncertainty and inflexibility to investments in the port's rail network. According to the port authority, there are also legal constraints that would not allow the port to provide funding to Infrabel even if it wanted to.
- **Traffic management and operations.** Infrabel performs traffic management and path allocation within the port's rail network. The current design of the infrastructure, with a leading role for the Antwerp North shunting yard and a largely non-electrified network, makes traffic management complex. For example, paths allocated by rail freight corridors only originate at Antwerp North and trains are often routed there even if they are not related to maritime traffic but simply because of the importance of that facility for Belgium's rail freight operations.

There are capacity constraints, and, given the large number of competing RUs operating in the port, path allocation is not optimal. Often shunting requires very short train runs across the port, with trains moving just a few wagons from the same terminals for similar customers.

Traffic management follows the normal rules of the national rail network and therefore priorities set for different trains are not necessarily aligned with the immediate needs of terminals and maritime operations. The entire port's rail network is also not operational every week from Saturday afternoon until Sunday evening owing to maintenance works by Infrabel. The network is closed for the simplicity of maintenance planning but this also restricts the use of tracks, which may not be under maintenance every week.

Eventually, even for shunting between terminals, RUs and their drivers operating in the port must be certified in accordance with EU requirements as for rail transport operations across Belgium. There are also no parking fees for wagons and the port's network is often used as a free-of-charge siding by RUs.

- **Digitalisation.** Lorries and especially barges have digital solutions that allow integrated data exchange with terminals and maritime operations. Rail operations are not yet digitalised and integrated, resulting in slow, manual processes for handling trains, wagon loading and shunting. Even liquid bulk terminals with recurrent customers handle orders through email and Excel files. The reliability and predictability of trains' schedules are not optimal and terminals cannot properly manage their capacity based on the estimated time of arrival of ships and trains. This, in turn, leads to the inefficient management of (excess) capacity.

At the end of 2019, Infrabel and the Port of Antwerp–Bruges signed a cooperation agreement, announced in March 2021 as part of the sustainable rail vision for the port of Antwerp. This important engagement has the goal of increasing the rail modal share for containerised goods at the Port of Antwerp from the current 7 % share to 15 % by 2030. The vision is based on seven pillars, which are paramount for improving rail connectivity and competitiveness in Antwerp, namely:

1. optimum management of traffic flows at the port across the entire logistics chain;
2. a high-performance parking policy for the efficient use of available rail capacity;

3. the operation of Antwerp North marshalling yard in a neutral manner, with combined traffic volumes and higher utilisation;
4. targeted investments in various port areas with the highest potential for growth;
5. the efficient use of rail infrastructure;
6. separate frameworks for regulation and port-specific rail policies;
7. a common digital platform for the mutual exchange of information in compliance with competition law.

The rail vision is a policy initiative associated with the general goals of greening freight transport to achieve carbon neutrality within the port by 2050, but it is also important for the Extra Container Capacity Antwerp project. This project involves building a new tidal dock on the west side of the port and is aimed at increasing container capacity by 7.2 million TEU. The Connecting Europe Facility provided in 2021 EUR 10 million in funding for studies, and the Extra Container Capacity Antwerp project is currently undergoing the permitting procedures required to start construction. Increasing the rail modal share is, in fact, a key element for local authorities and communities, given that the Antwerp area is already experiencing severe congestion on its roads.

The target of a 15 % modal share of rail by 2030 risks remaining an ambition if additional engagement is not ensured by involving further federal and regional authorities, terminal operators and shipping companies. The involvement of authorities to ensure action with regard to the regulatory framework for rail and their alignment on investments in the rail network outside the port is critical. For example, across Belgium limitations continue to exist in terms of maximum axle load, train length and traffic management conflicts with passenger trains, which are given priority. Hinterland connectivity and cross-border bottlenecks remain another critical issue to resolve. Moreover, the current statistics of rail modal share need to be improved, given that currently figures are calculated by matching ports' handling statistics with the number of trains passing through.

Some elements of the rail vision are developing, though. The port authority is investing in a digital system called the rail traffic system, currently in the testing phase, which aims to connect railway operators, terminals and third parties to plan and process the transport of trains or railcars. All parties involved will also be able to track the routes and view the real-time positions of trains and railcars. The rail traffic system is to be compliant with the TAF TSI.

Conclusions

‘We already have the transport of the future, as each time rail is used to transport goods, we are in 2050’ – Antoine Berbain, Delegated Director-General of HAROPA, Paris.

Improving the synergy between ports and the rail sector is a way to increase the modal share of rail. The modal shift to rail will not only contribute to the decarbonisation of the EU economy but also reinforce its energy independence, as rail is and will remain substantially more energy efficient than road transport. This modal shift to rail is important not only for the rail sector but also for the port and maritime sectors. The massification of transport offered by large vessels brings opportunities to reduce both the cost of transport and its ecological impact. However, it also brings challenges, as, if all the traffic flows that result were to be on roads, congestion would be guaranteed.

Many ports consider that their competitiveness will increasingly be judged by their rail connectivity. Therefore, most of the ports are investing in increasing their rail capacity and rail modal share by developing their rail infrastructure. The diversification of hinterland transport is seen as a major commercial driver by the ports. The European Investment Bank has indicated that, in recent years, all the port projects that it has appraised have included a component on enhancing rail activity.

While infrastructure is the top priority, a lack of communication and data exchange is often perceived as an important barrier to developing further rail activities. The port authorities play a key role in the coordination of shippers, terminal operators and railway stakeholders. Therefore, many ports are also investing in the development of specific IT tools that facilitate coordination between different port stakeholders, with the aim of speeding up processes and integrating railway operations. The dissemination of the TAF TSI in this context is important to raise awareness among stakeholders outside the rail sector.

Besides the recent positive developments in infrastructure development and digitalisation, another important aspect is the management of railway operations within ports. Rail–port operations are quite specific compared with the railway operations on the main network and there is a need for clarification regarding the legal framework applicable to rail safety and interoperability. Currently, Member States are applying EU railway laws in diverse ways within their ports, and determining the applicable legal framework is important to ensure certainty and avoid overregulation within ports or, on the contrary, the deregulation of safety-critical railway operations. Very different models are followed, each of them with its own advantages, but there is currently a patchwork of widely varying interpretations of EU rules across Member States. Further analysis on the scope of application of 4th railway package legislation within ports is needed.

‘The battle of the ports will be on land,’ says Stéphane Raison, General-Director of the HAROPA port. The rail sector and the ports are already working closely together. The ports are willing to improve the attractiveness of rail as a mode of transport, and, with a good mix of investments, regulatory measures and political willingness, the ports’ traffic flow could provide a significant contribution to the modal shift to rail and to increasing the modal share of rail in hinterland transport as a whole.

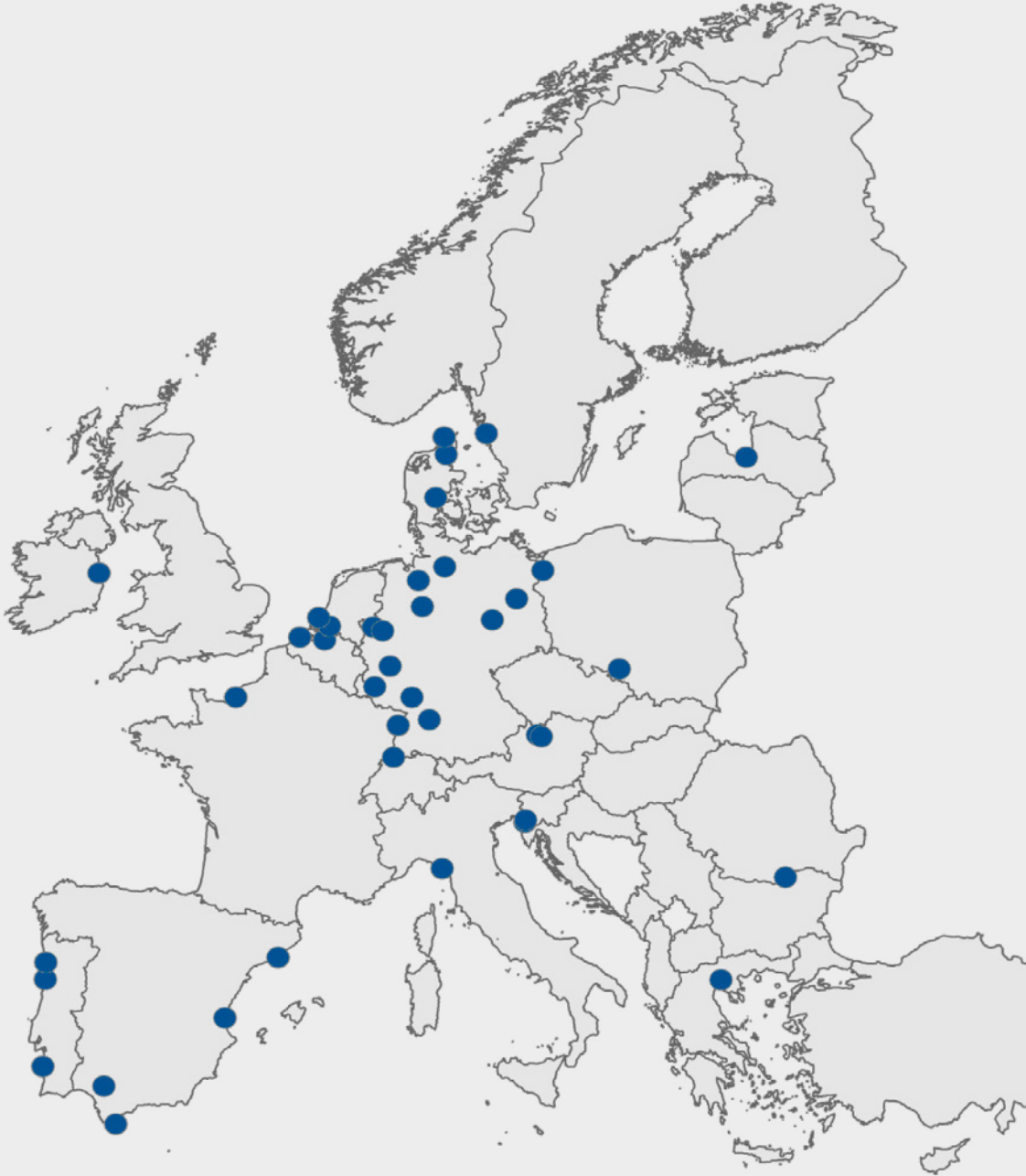
Annexes

Annex 1. List of ports participating in the EU rail–port synergies survey

1. Port of Aalborg
2. Port of Algeciras Bay Authority
3. Stadtwerke Andernach GmbH
4. Port of Antwerp
5. Port of Barcelona
6. Berliner Hafen- und Lagerhausgesellschaft mbH
7. Ministry of Science and Ports, Bremen
8. DeltaPort GmbH & Co. KG
9. Administração dos Portos do Douro, Leixões e Viana do Castelo, S.A.
10. Gelsen-Log
11. Dublin Port Company
12. Hamburg Port Authority AöR
13. HAROPA port
14. Hafenbetriebe Ludwigshafen am Rhein GmbH
15. Hafenverwaltung Kehl KdöR
16. Port of Hirtshals
17. Kędzierzyn-Koźle Terminale S.A.
18. Port of Koper
19. Linz Service GmbH – Bereich Hafen
20. Mindener Hafen GmbH
21. Port of Moerdijk
22. Administração do Porto de Aveiro, S.A.
23. Freeport of Riga Authority
24. Industriehafen Roßlau GmbH
25. Port of Rotterdam
26. Port Complex – Ruse J.S.Co
27. Port Authority of Seville
28. Port of Sines and the Algarve Authority

29. Port Authority of the Eastern Ligurian Sea (Port of La Spezia)
30. Port of Strasbourg
31. Hafen Stuttgart GmbH
32. Port of Switzerland
33. Szczecin and Świnoujście Seaports Authority S.A.
34. Thessaloniki Port Authority SA
35. Hafen Trier
36. Port of Vejle
37. Port of Zeebrugge

Figure 26: Locations of ports participating in the survey and the structured interviews



Source: ERA, 2022.

Annex 2. List of ports participating in structured interviews, in chronological order

1. Port Authority of Seville
2. Port Authority of Valencia
3. Ennshafen port
4. Hamburg Port Authority AÖR
5. Port of Algeciras Bay Authority
6. Port of Gothenburg
7. Port Authority of the Eastern Ligurian Sea (Port of La Spezia)
8. Thessaloniki Port Authority SA
9. Hafenverwaltung Kehl KdÖR
10. Port of Strasbourg
11. Linz Service GmbH – Bereich Hafen
12. Port Network Authority of the Eastern Adriatic Sea, Port of Trieste and Monfalcone
13. Port of Koper
14. Port of Rotterdam
15. Port of Aalborg
16. Szczecin and Świnoujście Seaports Authority S.A.
17. Freeport of Riga Authority
18. The HAROPA port
19. Port of Antwerp

Annex 3. Overview of modal shares, trends and goals

Table 1: Rail modal share and objective for selected inland ports

Port	Country	Current rail modal share (latest data available) (%)	Trend (*)	Objective	Target date
Aalborg	Denmark	5	↗	To increase rail modal share with new container traffic	2022
Andernach	Germany	9	↗	No objective	NA
Berlin	Germany	30	=	To increase rail modal share but no specific target	No specific date
Deltaport	Germany	20	↗	To increase rail modal share but no specific target	No specific date
Douro	Portugal	6	=	To increase rail modal share but no specific target	No specific date
Gelsen-Log	Germany	43	↗	To increase rail modal share but no specific target	No specific date
Ludwigshafen am Rhein	Germany	10	=	No objective	NA
Kehl	Germany	20	=	No objective	NA
Hirtshals	Denmark	0	=	To increase rail modal share by 10-15 %	2025
Kędzierzyn-Koźle	Poland	0	↘	Negotiations to connect the port to the main national network	NA
Linz	Austria	23	=	To increase rail modal share but no specific target	No specific date
Minden	Germany	45	↘	To increase rail modal share but no specific target	No specific date
Roßlau	Germany	27	↗	To increase rail modal share but no specific target	No specific date
Ruse	Bulgaria	7	=	To increase rail modal share but no specific target	No specific date
Seville	Spain	4	=	To increase rail modal share but no specific target	No specific date
Strasbourg	France	24	↗	To double rail traffic volume	2030

Port	Country	Current rail modal share (latest data available) (%)	Trend (*)	Objective	Target date
Stuttgart	Germany	76	↗	To increase rail modal share but no specific target	No specific date
Switzerland	Switzerland	52	↘	No objective	NA
Trier	Germany	50	↗	To increase rail modal share but no specific target	No specific date

(*) Trend in the modal share of rail over the last 3 years (2019–2021).

NB: NA, not applicable.

Source: ERA, 2022.

Table 2: Rail modal share and objective for selected maritime ports

Port	Country	Current rail modal share (latest data available) (%)	Trend	Objective	Target date
Algeciras	Spain	4.82	↗	To increase rail modal share, but no specific target	No specific date
Antwerp (1)	Belgium	7.00 (for containers)	↗	To double rail modal share	2030
Barcelona	Spain	15.00 (for containers) 40.00 (vehicles)	↗	To increase rail modal share, but no specific target	No specific date
Bremen	Germany	48.70 (for containers)	↘	To increase rail modal share, but no specific target	No specific date
Dublin	Ireland	0.00	=	No objective	NA
Gothenburg	Sweden	60.00 (for containers)	↗	To increase rail modal share, but no specific target	No specific date
Hamburg	Germany	52.50	↗	To reach a rail modal share of 65 %	2040
Le Havre (2)	France	4.00	=	To increase rail modal share by 20 %	2025
La Spezia (3)	Italy	28.00	=	To increase rail modal share by 50 %	2025
Koper	Slovenia	58.00	=	To increase rail modal share by 70 %	2025
Moerdijk	Netherlands	5.00	=	To increase rail traffic volume by 25 %	2025
Porto	Portugal	2.00	↘	To increase rail modal share, but no specific target	No specific date
Riga	Latvia	31.00	↘	To increase rail modal share, but no specific target	No specific date
Rotterdam	Netherlands	10.50	=	To increase rail modal share by 20 %	2035
Sines	Portugal	59.85	↘	No objective	NA
Szczecin	Poland	22.00	↘	To increase rail modal share, but no specific target	No specific date
Thessaloniki	Greece	19.40	↗	To increase rail modal share, but no specific target	No specific date

Port	Country	Current rail modal share (latest data available) (%)	Trend	Objective	Target date
Trieste ⁽¹⁾	Italy	50.00 (for containers)	↗	To double rail traffic volume	NA
Valencia	Spain	11.00	↗	To increase rail modal share, but no specific target	No specific date
Vejle	Denmark	13.00	↗	No objective	NA
Zeebrugge	Belgium	12.70	=	Merging with Antwerp will require more rail transport	2022

⁽¹⁾ The city of Antwerp and the city of Bruges agreed to merge their ports in February 2021. On 22 April 2022, the Port of Antwerp and the Port of Zeebrugge officially merged and the unified organisation now operates under the name Port of Antwerp-Bruges. This report only partially considers this new reality and focuses mostly on the Port of Antwerp.

⁽²⁾ The port of Le Havre is managed by the HAROPA port authority. This report focuses only partially on the seaport of Le Havre.

⁽³⁾ The maritime port of La Spezia is managed by the Port Authority of the Eastern Ligurian Sea, which also includes the maritime port of Marina di Carrara. In this report, only the Port of La Spezia is considered.

⁽⁴⁾ The maritime port of Trieste is managed by the Port Network Authority of the Eastern Adriatic Sea, which also includes the seaport of Monfalcone. In this report, only the Port of Trieste is considered.

NB: NA, not applicable.

Source: ERA, 2022.

Annex 4. Key elements noted by the different ports interviewed in relation to infrastructure development

Port	Key elements noted in relation to infrastructure development
Aalborg	<ul style="list-style-type: none"> • The port has a total of 17 km of rail infrastructure and seven terminals outside of the city. • EUR 7 million has been invested since 2009 to develop rail activities, with no subsidy. • A new logistics centre of 150 000 m² with a new terminal and new tracks together with the old terminals will be built to create better infrastructure to transport goods. • New terminal with 800 m of track will be built in the next couple of years.
Algeciras	<ul style="list-style-type: none"> • There is a plan to build new rail infrastructure in the port. It is currently in the design phase; works should start in 2024. • There are three terminals in the port. The main one is where most of the activity is carried out, and the second one is used when needed (it will be used more after the development of the rolling highway). The third one is not used at all. • The main problem is the last mile outside the port: there is a lack of electrification and signalling (telephonic block system) and no sidings to cross. A total of four sidings are planned to be constructed in four areas; on the route to Madrid at least nine sidings will be needed (for 750-m-long trains). • Geographical constraints are high because the port is surrounded by a natural park.
Ennshafen	<ul style="list-style-type: none"> • A total of 32 km of railway lines are free of congestion. • Some enlargement is planned (a need for additional tracks is anticipated) but the implementation of measures for noise protection is also planned (e.g. protection walls).
Gothenburg	<ul style="list-style-type: none"> • All ro-ro terminals, energy ports and logistic warehouses are connected by rail. • New traffic signal systems have been installed so that trains can be run closer together. • Tracks were electrified a couple of years ago and now a double track is being constructed and will be finalised by 2023/2024. This will avoid congestion on the rail infrastructure. • A new route through tunnels instead of residential areas is under construction. This will significantly increase the quality of the rail service.
Hamburg	<ul style="list-style-type: none"> • The port's railway network spans 300 km: the western area is more used than the eastern area. • There are four container terminals; three are in the western part. The Container Terminal Altenwerder, built in 2002, is highly automated and is the biggest railway terminal in Europe (handles almost 1 million TEU per year by rail). The port can handle 16 million TEU per year and at the moment it handles 9 million TEU. • A bridge has been built to bring the heavy traffic from the western side of the port to the eastern side of the port. • DB Netz is building a tunnel so that the trains going out of the port area can reach the eastern side of the port. • There is a plan to build a new marshalling yard in the western side of the port (the planning phase will start in 2023, and the yard will be completed in the early 2030s) and a bypass to keep traffic away from the two large container terminals on the western side of the port. • Bigger ships could be a challenge in the future. Ports will have to adapt, which will incur extra costs (to build more tracks and increase capacity, and to adapt the infrastructure to withstand the peaks expected).

Port	Key elements noted in relation to infrastructure development
Koper	<ul style="list-style-type: none"> • Doubling the length of track between Koper and Divača is to be finalised by 2026/2027, together with works on many sections of the Slovenian network, which will reinforce the rail capacity to and from the port. • There are some capacity limits on the shunting station outside the port, which will be increased in the light of the second track to be constructed. • Inside the port, 740-m-long trains can be operated. This is a result of the last investments made in the container and car terminal. In the shunting yard only six tracks are available for 700-m-long trains; however, the maximum train length is in fact 525 m owing to constraints on the Slovenian rail network. Ongoing modernisation of the Slovenian network will increase this length step by step to 600 m and then 740 m.
La Spezia	<ul style="list-style-type: none"> • In 2022–2023, important investments were made in the rail infrastructure. • Rail connections to the port have been modernised, with a new station with tracks for 750-m-long trains. • A new rail yard has been built within the container terminal with five tracks for 600-m-long trains under cranes.
Linz	<ul style="list-style-type: none"> • The port is connected to the main railway network in the industrial area of the city free of congestion. • The four-lane expansion of the ‘Gleisgruppe G’ to accommodate 740-m-long trains was completed in January 2022. After successfully completing the trial operation, the fully electrified Gleisgruppe G has been available to customers since mid March 2022. In May 2022, the expansion and electrification of the ‘Gleisgruppe K’ began. After its completion in summer 2022, the entire area will be completely electrified. • The construction of a new container terminal ingate is also planned, which should take place by the end of 2023.
Riga	<ul style="list-style-type: none"> • By 2026, construction to connect the Freeport of Riga with Rail Baltica will have started. In the changing geopolitical environment, for the Freeport of Riga to compete with western seaports it needs to be connected to TEN-T rail infrastructure. • In times when the port was handling significant volumes of up to 40 million TEU, it suffered from bottlenecks and a lack of capacity in its terminals. The bottlenecks developed when wagons were stopped to be unloaded, so there was a need for new tracks for shunting purposes. However, in the past 4–5 years the volume has decreased. • Nowadays, more investment is needed in the modernisation of the railway rather than increasing its capacity.
Rotterdam	<ul style="list-style-type: none"> • There are plans to build a new rail yard in the Maasvlakte area in 2024–2026. • The electrification process is going very slowly and potential subsidies are still under discussion. • In November 2021, new rail infrastructure was constructed to avoid a bridge. • Significant issues related to the maintenance of the port’s railway lines have been highlighted by ProRail. ProRail set out a maintenance programme that should improve the situation in the next few years, but the problem might be the lack of capacity inside the port and on the national network. • Adapting the infrastructure to operate 740-m-long trains would be beneficial, but important investments are needed to do so.
Seville	<ul style="list-style-type: none"> • Railway lines run around the perimeter of the port to facilitate land transport between the terminals and the public docks (a project that was co-financed by the EU). The port is connected to the main routes through the south of the peninsula and has a railway terminal on the container dock that can handle 750-m-long trains. • Currently, the link between the Adif network and the port is not efficient enough, with a major detour and with points of intersection/conflict with the passenger services (which take priority over freight transport services). • A new link of 2.5 km from the Adif network to the port (to avoid the longer route and conflicts with passenger services) will be built together with a new and bigger rail yard.

Port	Key elements noted in relation to infrastructure development
Strasbourg	<ul style="list-style-type: none"> Investments as part of the 'Contrat de plan Etat-Région' are planned for the electrification of the tracks and to allow 750-m-long trains to operate. A project will be conducted to increase the capacity of the container terminal to increase hinterland traffic. The project will involve the extension of the southern terminal between 2023 and 2026, with a study co-financed with funds from the Connecting Europe Facility.
Szczecin/ Świnoujście	<ul style="list-style-type: none"> The ports of Szczecin and Świnoujście are connected to the national railway network infrastructure through the lines E-59 and CE-59. The modernisation of rail infrastructure within both ports was completed in 2011–2014, when 36 km of tracks and 134 junctions were rebuilt. The modernisation of the last mile of railway access to the ports is in progress, with completion planned for 2025. In Szczecin, this involves the construction of a viaduct over Gdanska Street and a rail bridge across the Parnica River, the modernisation of rail configuration and electrification. In Świnoujście, this involves the construction of a second track between the passenger and cargo stations, thus eliminating the bottleneck. The construction of a deep-water container terminal in the external port in Świnoujście will have a significant impact on the increase in the share of rail transport from/to the hinterland of the port.
Thessaloniki	<ul style="list-style-type: none"> Electrification along the Thessaloniki–Strymonas–Promachon line towards Sofia, localised interventions for the improvement of the line and railway stations in the section, and the installation of automatic level crossing systems are taking place. The construction of a new line (deviation) in the section Polykastro–Eidomeni, approximately 21 km long, of the Thessaloniki–Eidomeni line is being finalised, with signalling, telecommunications and electrification, the installation of a modern telecommunications and signalling ETCS level I system in the greater section Thessaloniki–Polykastro–Eidomeni, and a total length of 80 km. Numerous missing links remain, with most of the multimodal connections between Hungary, Bulgaria, Romania and Greece yet to be constructed or substantially upgraded. Inside the port, 3.5 km of new lines have been constructed and studies on electrification and a new station in the port have been conducted.
Trieste	<ul style="list-style-type: none"> The revitalisation of the Villa Opicina station in 2021 has taken place only for containers so far. Through the NextGenerationEU fund, a new railway station in Servola will be constructed by 2026, with 10 tracks for 750-m-long trains. It is one of the 10 strategic actions of the national recovery plan.
Valencia	<ul style="list-style-type: none"> There are three main ports (Segunto, Valencia and Gandia), with three main terminals (two containers and one ro-ro) connected by rail. Inside the port, level crossings are being removed, a third track with a standard gauge is being developed and the length of tracks has been increased to accommodate 750-m-long trains. By the end of 2022, the port's rail infrastructure should be fully compliant with the TEN-T requirements. Improvements have been made to the Zaragoza–Teruel–Sagunto–Valencia line: electrification works are under way and investments are being made to allow 750-m-long trains along the length of the track.

Annex 5. Key elements noted by the different ports interviewed in relation to digitalisation

Port	Key elements noted in relation to digitalisation
Aalborg	<ul style="list-style-type: none"> • There have been severe disruptions to freight traffic since the implementation of the European Rail Traffic Management System on the Danish rail network. • Digitalisation is mostly the responsibility of railway operators and could therefore be integrated into the port's system.
Algeciras	<ul style="list-style-type: none"> • The port is waiting for the results of the national project SIMPLE by Puertos del Estado, which is targeting the digitalisation of processes inside all Spanish ports (including railway activities).
Ennschafen	<ul style="list-style-type: none"> • By the end of 2024, the aim is to digitalise most of the port's operations, not only those linked to railway activities. Especially with regard to railway operations, the goal is to improve communication between stakeholders and to increase the speed of path allocation.
Gothenburg	<ul style="list-style-type: none"> • A track and trace system is about to be introduced that will allow containers to be followed from ship to inland terminal to rail in both directions. • An app entitled PortOptimizer has been created by General Electric.
Hamburg	<ul style="list-style-type: none"> • Data platforms (such as the 'transPORT Rail' platform) have been provided to operators for better planning possibilities for operations. These platforms are being expanded to provide more detailed data for operators. • The customs declaration is connected to the Hamburg Port Authority software system (operational digital solution). • There is a need for clearer EU legislation on who owns the data.
Koper	<ul style="list-style-type: none"> • The TAF TSI is not used yet. An IT system is used by the port and the Slovenian railway operators for daily planning.
La Spezia	<ul style="list-style-type: none"> • In 2015, fast corridor and fast customs procedures were implemented; this was the first port in Italy to implement this system.
Linz	<ul style="list-style-type: none"> • In recent years, lots of investment has been made in digitalisation, such as cameras to photograph the trains for commercial and operational purposes so that nothing needs to be written by hand. • Currently, the port is installing a system that will provide an overview of railway operations inside the port in real time, showing where the trains are and the part of the infrastructure they are on, and to detect anomalies quickly so that the rail infrastructure can be better managed. • A digital rail gate was operating last year.
Riga	<ul style="list-style-type: none"> • There is a lack of data available on the supply chain and low data exchange in general. • The port is working on a tracking system to monitor cargo flow in and out of the port and allow data exchange between the port and the terminals and with the railway stakeholders.

Port	Key elements noted in relation to digitalisation
Rotterdam	<ul style="list-style-type: none"> • There is a lack of communication and planning between all parties involved. • The port is leading a project to enhance the digital exchange of information between all parties involved in the handling of trains in the port area, to speed up processes and improve competitiveness. A total of 19 rail stakeholders have agreed to work together to develop data exchange processes.
Seville	<ul style="list-style-type: none"> • There is a plan to adapt to the TAF TSI standards, automate rail processes and synchronise rail with other modes of transport. • Several projects/investments are ongoing, mainly co-financed by the EU.
Thessaloniki	<ul style="list-style-type: none"> • The only digitalised service at the moment is a lorry appointment system. • The next service to be developed is a procedure for picking up the containers from the port. • Digitalisation requires more effort and is a priority given the current limited use of information and communications technology.
Trieste	<ul style="list-style-type: none"> • The port is developing its port community system with the main aim of facilitating customs procedures.
Valencia	<ul style="list-style-type: none"> • The port has a tightly linked port community, owing to innovative elements such as its Quality Mark and the valenciaportpcs.net technology platform, comprising all public and private economic agents providing services through the ports of Valencia, Sagunto and Gandía. • To reduce issues related to customs, it is implementing an automatic optical recognition system. • It is adapting to the TAF TSI through the I Rail project.

Annex 6. Summary of proposed changes to the TAF TSI that would facilitate coordination with stakeholders outside the rail sector

In revising the TAF TSI, the ERA has also incorporated key change requests (CRs) that facilitate the integration of the railway stakeholders with the ports. CR 429 was triggered by the European Sea Ports Organisation following a statement from the Hamburg Port Authority. This CR will ensure that when exchanging information on consignment orders, train composition or train readiness and wagon events, the messages can also reach the last-mile operators, in particular the port authorities. CR 317, on the other hand, will allow real-time data and train data to be linked through a multimodal perspective. CR 366 will facilitate combined transport by providing the estimated time of arrival not only to railway stakeholders but also to last-mile operators, especially the port authorities. In addition, a new Annex IV will be included in the TAF TSI to harmonise the previous definition of timeliness of transport with the revised version with the objective of increasing quality of operation. CR 438 will allow the combination of all modes of transport when issuing consignment orders with the possibility of exchanging information following the electronic freight transport information regulation⁽³⁴⁾. Finally, CR 382 will include new definitions in the TAF TSI glossaries to more precisely cover combined transport and ports' activities. The number of stakeholders (companies) that can engage in this framework will be drastically increased with the change of the codification system from numeric to alphanumeric. This will allow the enlargement of the scope from the sole RUs, infrastructure managers and wagon keepers to other stakeholders outside the railway system.

The ERA submitted its recommendation to the European Commission in January 2022 and the adoption of the revised TAF TSI regulation is expected in late 2022.

⁽³⁴⁾ Regulation (EU) 2020/1056 on electronic freight transport information (<https://eur-lex.europa.eu/eli/reg/2020/1056/oj>).

Annex 7. Key elements noted by the different ports interviewed in relation to management of railway operations in ports

Port	Key elements noted in relation to rail governance
Aalborg	<ul style="list-style-type: none"> • The tracks belonged to the municipality. An agreement was reached that the port should buy the tracks and the terminals. The tracks were bought for a low price but the port committed to invest. • The main tracks to the port are managed by Banedanmark; the terminals and 17 km of port–rail infrastructure are handled by the port. • There is a branch panel, an organisation that meets 4–5 times a year with terminals, operators, rail stakeholders and all the ports to exchange experiences.
Algeciras	<ul style="list-style-type: none"> • The Ports Algeciras Bay Authority is a public organisation that belongs to the Ministry of Transport, Mobility and Urban Agenda. • The port authority manages the rail infrastructure in the port. • Private terminal operators only carry out loading/unloading, and all manoeuvres/traffic are handled by the port authority.
Ennshafen	<ul style="list-style-type: none"> • The port is a private–public partnership. The port works in close partnership with transshipment and terminal operators. • With regard to railway operation, the port is the second private railway system in Austria and operates feeder lines to the main railway system. • The port has very close relationship with ÖBB-Infrastruktur.
Gothenburg	<ul style="list-style-type: none"> • Three private operators are responsible for the tracks within the terminal (for ro-ro), and the main infrastructure manager is responsible for the State-owned infrastructure. • The port is responsible for ensuring coordination between stakeholders, for the marshalling between the State-owned rail infrastructure and the terminals, and for the maintenance of infrastructure in close cooperation with the State and private operators.
Hamburg	<ul style="list-style-type: none"> • The port of Hamburg owns and manages 290 km of tracks and there are 77 private sidings and tracks in terminal areas (an additional 130 km of tracks). There are three connection points with the DB Netz network.
Koper	<ul style="list-style-type: none"> • The port is responsible for shunting operations within the port. The shunting station outside the port is managed by the national company and they cooperate daily. • There is a concession agreement for the railway activities within the port agreement.

Port	Key elements noted in relation to rail governance
La Spezia	<ul style="list-style-type: none"> The port ensures the maintenance of the rail infrastructure from the port until the La Spezia Marittima station; Rete Ferroviaria Italiana manages the maintenance between La Spezia Marittima and the other stations of the La Spezia railway system (La Spezia Migliarina and Santo Stefano di Magra). A unique operator composed of two operators (Mercitalia Shunting & Terminal and La Spezia Shunting Railways) is in charge of shunting operations in the last-mile connections.
Linz	<ul style="list-style-type: none"> The port is responsible for the maintenance and the investments. ÖBB-Infrastruktur manages the operations and the transport of the wagons while the port manages the rail infrastructure.
Riga	<ul style="list-style-type: none"> Within the port, the tracks are owned by the port, private companies and Latvian Railways. Each entity is responsible for its own track maintenance. A daughter company of the port is in charge of the infrastructure maintained by the port.
Rotterdam	<ul style="list-style-type: none"> ProRail is in charge of the rail activities within the port.
Seville	<ul style="list-style-type: none"> The port authority is the public body responsible for managing the State-run Port of Seville; it also manages the rail infrastructure in the port (investments, maintenance and operations).
Strasbourg	<ul style="list-style-type: none"> The port delegates the heavy maintenance and management of the rail infrastructure to SNCF Réseau while taking care of the light maintenance.
Szczecin/ Świnoujście	<ul style="list-style-type: none"> The port authority is responsible for the construction, expansion, modernisation, maintenance and management of port infrastructure (including rail tracks within the ports). The railway operations within the ports are conducted by rail operators and port terminal operators depending on their mutual agreements/contracts.
Thessaloniki	<ul style="list-style-type: none"> Since 2018, the port has been operated by an investor consortium, under a concession agreement with the Greek State; ThPA SA is the sole operator of the port. ThPA SA also operates a dry port in Sofia, Bulgaria.
Trieste	<ul style="list-style-type: none"> The port has applied for safety authorisation to become an independent infrastructure manager.
Valencia	<ul style="list-style-type: none"> The port owns the land and is the infrastructure manager inside the port, meaning that the port invests in and maintains the rail infrastructure and manages the traffic. The terminals are out of their scope of competence in terms of operation.

Annex 8. Key elements noted by the different ports interviewed in relation to rail services, technology and market evolution

Port	Key elements noted in relation to rail services, technology and market evolution
Aalborg	<ul style="list-style-type: none"> • The transport of coal is decreasing and will disappear. The transport of plastic fragments is increasing. • There is huge potential for the transport of containers. • A key selling point for rail is its reliability, and when local storage is available buffer stock ensures that production does not break down if the products are not there. This is safer than a just-in-time approach.
Algeciras	<ul style="list-style-type: none"> • The Zaragoza–Algeciras route is important in continuing with cargo to northern Africa, as the route can extend via short-sea to Morocco. Adif has plans to launch a rolling highway between the two destinations. • Agricultural products from Morocco arrive constantly, which gives rail huge potential. • Railways were not expected to expand but they are, and if the same trend as seen over the last 3 years continues the port could experience some issues in satisfying the demand in 2–3 years' time without important infrastructure works. • The port is considering using battery-powered locomotives, especially in Terminal 2 (when it begins to serve the rolling highway).
Ennshafen	<ul style="list-style-type: none"> • Once the network is fully electrified, the next pillar in the decarbonisation strategy will be to completely stop using conventional fuel. • Inland waterways can free some capacity for the rail infrastructure, so it is important to make the best use of their capacity.
Gothenburg	<ul style="list-style-type: none"> • Conducting a yearly scheduling process with the Swedish Transport Administration is not flexible enough to attract new customers and potentiate the use of rail. • The use of trailers on railways is increasing because of a lack of lorry drivers, the increase in diesel prices, the lesser environmental impact of rail and the improvements in craneability. • Rail performance is good. Most of the rail services are no more than an 8-h trip. The punctuality of trains is above 90 %. • All the tracks are electrified so that the only distance travelled by diesel locomotives is between the marshalling yard and the port. There are plans to electrify the 500–600 m of remaining tracks and the connection between the tracks and the intermodal terminals to eliminate the use of diesel locomotives. • Some alternative locomotives are being studied and, following their development and when there are good alternatives, the ports will invest in new technologies.

Port	Key elements noted in relation to rail services, technology and market evolution
Hamburg	<ul style="list-style-type: none"> • Bigger ships could be a challenge in the future, as ports will have to adapt, incurring extra costs (for increasing the number of tracks and capacity, and adapting the infrastructure to withstand the peaks expected). • Germany is expected to stop using coal by 2030 so that the transport of coal will decrease until it disappears. In 2023, the Port of Hamburg will lose up to 1 million tonnes of coal, which could be replaced by cement, sand, rocks and wheat. • The construction of solar power systems is planned in some rail-related sites where the systems can be reasonably installed and operated. • The port is considering decommissioning diesel locomotives and replacing them with hydrogen-powered locomotives.
Koper	<ul style="list-style-type: none"> • All kinds of commodities can go on trains: containers, cars, dry bulk cargo and liquids. Cars are mostly transported by lorries; containers are transported equally by both while ores are fully transported by rail. • Transporting freight along the Koper–Budapest line takes between 20 h and 24 h. The locomotive is changed at the border. The ERA must work on cross-border issues because they contribute significantly to loss of time. • Electric cranes have been bought.
La Spezia	<ul style="list-style-type: none"> • The vertical integration of the logistic chain depends on investments made by big players in rail operations such as COSCO, Maersk and MSC.
Linz	<ul style="list-style-type: none"> • Digital automatic coupling will be important for automation and a huge benefit for railway operations. • It is difficult to capture the future evolution of the transport of liquid bulk.
Riga	<ul style="list-style-type: none"> • The Baltic states are a gateway for Russian energy (coal, oil and fertiliser), especially Latvia. When Russia started to develop its own port, the volume of this cargo started to decrease. Owing to the war, the volume of goods handled has dropped from 40 million tonnes to 16 million tonnes. • Baltic ports are in close contact with the Ukrainian authorities for the transport of cereals. • The port is also trying to develop alternative routes for Chinese block trains (container trains). • The use of offshore wind energy is also a possibility. • The electrification of the port of Riga would be very difficult, so hydrogen-/battery-powered locomotives are of more interest.
Seville	<ul style="list-style-type: none"> • The port started a project to get funds to construct/test a prototype for a hydrogen-powered locomotive and potentially a battery-powered locomotive to be used in the port area (as electrification is not an option). The project is under development.
Strasbourg	<ul style="list-style-type: none"> • All new projects are linked to waste management and transport.
Szczecin/ Świnoujście	<ul style="list-style-type: none"> • A decrease in the rail share has resulted from a change in the structure of transshipments of large groups of goods, such as coal and metal ores. These decreases were (in 2019) 9 % for coal and as much as 30 % for metal ores. In 2020, there was a decrease in the transshipment of metal ores by another 26 % (compared with 2019) and 18.3 % for coal. In 2021, the trend was stopped and the share of rail transport slightly increased (to 22.3 %).
Thessaloniki	<ul style="list-style-type: none"> • Greek company Hellenic Train (formerly TrainOSE) should address manning and working schedules; companies must be adequately staffed to provide service 24/7, which is not the case currently. • Hellenic Train needs to obtain and deploy new 80-foot wagons (currently, mostly 60-foot wagons are in operation). The global market trend is to transport more 40-foot containers, while the share of 20-foot containers transported is gradually decreasing, which reduces the utilisation rate and increases costs per TEU transported and, as a result, makes the connection less competitive. • The use of advanced biofuel for rail transport in waterborne multimodal hubs is being piloted. This reduces CO₂ produced per litre of fuel used by at least 60 %, and 270 t less CO₂ is produced with the use of biofuel compared with diesel, determined by over 18 months of tests on two locomotives.
Trieste	<ul style="list-style-type: none"> • The shunting operator, Adriafer, is studying the possibility of using hydrogen-powered locomotives.
Valencia	<ul style="list-style-type: none"> • The port is the base for Maersk's trains carrying the goods of IKEA to its Spanish distribution centre. • The port is conducting sustainability projects as part of its activities but is not really focusing on rail/operations aspects (such as electrification or hydrogen-powered locomotives).

Annex 9. Key elements noted by the different ports interviewed in relation to regulatory frameworks, policy incentives and rail charging models

Port	Key elements noted in relation to regulatory framework, policy incentives and rail charging models
Aalborg	<ul style="list-style-type: none"> • The prioritisation of passenger investment over freight is a problem, especially as freight was not mentioned at all in the new investment plans. • The port is pushing to be a part of the infrastructure becoming electrified by 2030. • Private sidings in the corridors could be created as an incentive to use rail.
Algeciras	<ul style="list-style-type: none"> • A national regulation foresees a reduction in the port fees/taxes for freight moving through rail.
Gothenburg	<ul style="list-style-type: none"> • Rail development does not involve subsidies (no bonuses, no incentives and no rebates).
Hamburg	<ul style="list-style-type: none"> • The port experienced a difficult situation with the Directorate-General for Competition in 2018. Port railways are financed by track access charges and public funding but, according to the Directorate-General for Competition, obtaining public funding is not possible, as the Port of Hamburg is not part of the main rail infrastructure.
Koper	<ul style="list-style-type: none"> • The prioritisation of passenger transport over freight transport is a problem. • Coordination mechanisms at the border are often not efficient enough.
La Spezia	<ul style="list-style-type: none"> • The port of La Spezia is planning to put in place some incentives to perform short-range railway transport over 7 km to the dry port of Santo Stefano di Magra. • The port of La Spezia is investing in an IT platform to aid the modal shift to rail thanks to EU funds / projects co-financed by the EU.
Seville	<ul style="list-style-type: none"> • It is difficult to estimate the possible increase in the rail modal share owing to investments/measures, mainly because of the tough competition in Spain between lorries and trains but also because of the priority rules favouring passenger transport over freight transport. • Investments usually use EU funds (given the high costs), with the partial financial participation of the port itself.
Strasbourg	<ul style="list-style-type: none"> • Connecting Europe Facility funds are vital for the development of rail infrastructure. • The border stations and the conditions for accessing them are not well defined.
Thessaloniki	<ul style="list-style-type: none"> • Regulatory frameworks differ from country to country or are subject to change; representatives of the port are in contact with the various relevant authorities.
Valencia	<ul style="list-style-type: none"> • The port is massively investing thanks to EU funds / projects co-financed by the EU. Besides the financial contributions, the port's participation in EU calls helps in better planning the projects.

Annex 10. Programme and summary of the Multimodal Freight Conference

The Multimodal Freight Conference was organised by the ERA and the HAROPA port authority in Le Havre, France, on 22 June 2022.

9.00–9.15	Opening speech	Jean-Baptiste Gastinne, Deputy Mayor of Le Havre and Vice-President of Le Havre Seine Métropole
9.15–9.55	Introduction	Josef Doppelbauer, Executive Director of the ERA; Stéphane Raison, the HAROPA port's Director-General
9.55–10.00	Video message	Ralf-Charley Schultze, President of the International Union for Road-Rail Combined Transport (UIRR)
10.00–11.00	Experts' panel I – Rail-port connectivity	Moderator: Idriss Pagand, ERA Speakers: Laurence Zenner, Chief Executive Officer of the CFL Cargo group; Laurent Cébulski, Director-General of the French National Railway Safety Authority (EPSF); Eric Champeyrol, Director-General of Naviland Cargo; Daniel Mansholt, Head of Railway Development of the Hamburg Port Authority (HPA)
11.15–12.30	Experts' panel II – Reinforcing the synergies between the railway sector and the ports	Moderation: Cédric Virciglio, the HAROPA port Speakers: Conor Feighan, Secretary-General of the European Rail Freight Association (ERFA); José Rino, Transport Division of the European Investment Bank (EIB); Enno Wiebe, Technical Director of the Community of European Railway and Infrastructure Companies (CER); Koen Cuypers, Mobility Expert of the Port of Antwerp–Bruges
14.00–15.00	Experts' panel III – Combined transport	Moderation: Tommaso Spanevello, the HAROPA port Speakers: Turi Fiorito, Director of the European Federation of Inland Ports (EFIP); Eric Feyen, Technical Director of the UIRR; Mickael Varga, Project Manager for the TAF TSI of the ERA; Mitchell van Balen, economist for the ERA;
15.00–15.45	Conclusions	Karima Delli, member of the European Parliament and Chair of the Committee on Transport and Tourism; Antoine Berbain, Delegated Director-General of the HAROPA port, Paris; Josef Doppelbauer, Executive Director of the ERA

Opening speech

Jean-Baptiste Gastinne, Deputy Mayor of Le Havre and Vice-President of Le Havre-Seine Métropole, opened the conference by indicating that multimodal freight was an excellent and important topic. Organising it in Le Havre was also a good idea, as it is a harbour open to Europe and a good example of a harbour integrated into a city. However, its weakness is its connection to the railway, as the transfer from the sea to the railway is not optimal. A new railway connection, funded partially by the EU with EUR 17 million, was inaugurated 15 months ago, which should increase the rail modal share.

Introduction

Josef Doppelbauer, the ERA's Executive Director, described the role of the ERA, in particular its role in the implementation of the 4th railway package. He explained the reason for organising the conference following the one organised in Brussels in 2019. The objective of reducing CO₂ emissions in the transport sector by 90 % by 2050, energy efficiency and the resilience of the transport are important areas in which actions are needed. Investments in infrastructure, digitalisation and combined transport will be needed to reach our common objectives. Multimodality, while not a new concept, is clearly one of the challenges of the years and decades to come.

Stéphane Raison, the HAROPA port's Director-General, introduced his speech by saying that the port's battle will be won on land. He also mentioned the constant exchanges between ports in Europe and in the world and used the case of the Port of Hamburg as an example, with more than 1 000 trains per week passing through. He stated that the current rail modal share of 4 % in Le Havre is not considered enough. Progress is necessary in this respect because the volume of containers transported has increased, by 13 % in 2021, which implies a huge challenge in the massification of transport. If everything is transported by road, congestion is guaranteed. In addition, he highlighted the work done on merging the ports of Le Havre, Rouen and Paris to make one of the first maritime/river ports in Europe. Massification is important to reduce both the cost of transport and its ecological impact. The modernisation of infrastructure, bypassing Paris, conflict between freight and passenger trains, and combined transport platforms will be the challenges for the years to come.

Video message

Ralf-Charley Schultze, President of the UIRR, explained that the evolution of combined transport is positive, with transported volumes increasing by 11 % in tonne-kilometres in 2021 and the number of jobs in this area increasing by 8.5 %. The French government has an ambitious plan to increase rail freight through the modernisation and adaptation of French infrastructure. Multimodality will be promoted through the internalisation of external costs, the energy savings certificate and the development of terminals for both continental and maritime traffic. For the UIRR, the objective is to reach zero-carbon combined transport to achieve the targets of the European Green Deal.

Experts' panel I – Rail–port connectivity

Laurence Zenner, Chief Executive Officer of the CFL Cargo group, briefly introduced the CFL Cargo group, which has six companies in five countries (Denmark, Germany, France, Luxembourg and Sweden). Many intermodal trains pass through Bettembourg, and CFL Cargo Sweden is working closely with the port of Gothenburg. Ms Zenner explained the difference between the trailer market and the container market. CFL Cargo is also working in particular with the ports of Kiel, Rostock and Trieste. To reinforce the links with the harbours, the key factor for success is network capacity and the optimisation of the management of this capacity with good coordination at European level. Another important aspect is the craneability of trailers: currently, most of them are not craneable. Consequently, it is often much easier for a customer to choose road-only transport. Finally, unexpected events must be managed efficiently. Rail companies must work to convince customers of the advantages of rail transport.

Laurent Cébalski, Director-General of the French National Railway Safety Authority, explained the French situation with regard to the management of railway operations in ports. In 2007, a regulation was introduced integrating seven French ports and two autonomous ports (Dunkerque, Rouen, Le Havre, Saint-Nazaire, La Rochelle, Marseille, Bordeaux, Paris and Strasbourg) to apply the European legal framework. The railway networks in the ports were considered comparable to the French national network. The ports needed to acquire the relevant safety authorisations, and so these nine ports became infrastructure managers representing approximately 820 km of network. All ports were not in the same situation in terms of rail infrastructure, but all followed the same rules. During the checks subsequently carried out by the NSA, it was common to find non-compliance, resulting in frustration for the ports and the authority. With the 4th railway package, a certain number of exclusions were made possible. A new legal framework adapted to the situation of the ports has been developed, simplifying the authorisation process for the ports with the *'préfets'*, national authorities at local level. This new approach is better suited to the ports' circumstances and no breach in safety has been detected.

Eric Champeyrol, Director-General of Naviland Cargo, presented the company, which is active in both the rail and the road markets, and the most important relevant statistics. In particular, he estimated that 70 million km of road transport had been avoided thanks to the rail activity of Naviland Cargo. The road market has actually allowed the further development of the company's rail activity through a multimodal approach. Some 80 % of the activity is related to the transport of containers and therefore connected with ports' activities. Road connections are established that can be then switched to rail as a way of attracting new customers to rail. The challenge of doubling rail freight is reliant on the capacity of the network, so the infrastructure needs to be prepared to allow an increase in rail traffic. This is the right moment to do it, considering the low emissions of rail and the price of fuel. Orléans in France is a good example, as it has huge potential to divert traffic to rail, but there is no terminal. The other important aspect is the lack of maintenance and the time it takes to make the appropriate decisions. Another aspect to consider is the extent of the work; while a ship will be taken care of 24/7, a train requires two shifts, 5 days per week, leaving a lot of production capacity unexploited. Finally, the difficulty of crossing borders is still important, despite all the work on interoperability. For example, it is not reasonable to require a safety certificate to be obtained for a different country just for one train crossing the border.

Daniel Mansholt, Head of Railway Development of the HPA, explained how ports' railways work in Germany. HPA is the landlord of the port area and has two contracts with terminal operators: one is to lease the land and the second is for the connection between the rail infrastructure of the port and the private sidings of the terminals. A total of 160 employees out of 1 800 work on the railway activities in the port. HPA manages the rail infrastructure with support for some parts of the activity from DB Netz's staff, working on behalf of HPA. On average, the port manages 210 trains daily over 290 km of tracks and with a rail modal share of hinterland container transport of 51 %. For bigger vessels that can transport goods to 40 to 50 trains, the challenge is managing the peak workload and the rail capacity. The growth in rail traffic is sustained through infrastructure development. Digitalisation is advantageous, but developing infrastructure is more important. HPA has built parking spaces for the locomotives, a locomotive workshop, and diesel and sand filling stations, and has a rail-port community system with transPORT rail. Finally, the charging model and parking charges, which have increased, are key, as is the categorisation of the tracks for the charging system, with 4 h free charging to try to keep the turnaround time as short as possible. The rail modal share has increased from 21 % to 51 % over the last 15 years, with important investments being made and a focus on the customers.

Experts' panel II – Reinforcing the synergies between the rail sector and the ports

Conor Feighan, Secretary-General of ERFA, explained that the success of rail freight will depend on its synergies with other modes of transport. He provided an overview of the state of the rail freight market today as a very diverse and competitive market. He pointed

out that among the new international entrants, several are not originally from the railway market, such as Metrans, which grew out of a terminal operator active in the Port of Hamburg, and Medway, which is owned by MSC, a large shipping company. One of the biggest trends is in the intermodal traffic originating from ports, with a level of growth that is quite promising. The rail modal share is relatively low and Hamburg is an exception, but the potential is there considering those trends. The larger vessels provide opportunities for massification. Improving the interoperability of rail systems, improving cross-border capacity management and determining who is responsible for planning the operations in ports are key considerations.

José Rino, from the Transport Division of the EIB, talked about the role of the EIB as the public bank of the EU. The Projects Directorate assesses projects from technical, economic and environmental perspectives. The EIB funds projects in both the rail sector and the maritime sector. The support is generally provided through loans or more complicated structures such as guarantees and blended mechanisms (loans with grants from the EU). A large amount of funding has been going to rail in recent years. Some years ago, funding in this area tended to be dedicated to the construction of new ports and the expansion of ports, whereas now it is provided mainly for reorganisation, the enhancement of terminals and small expansions as part of green port investments entailing decarbonisation efforts. The diversification of hinterland transport is seen as a major commercial driver by the ports. Most of the port projects appraised in recent years have included a component on the enhancement of rail activity. Rail connections to the hinterland are seen as a significant aspect of ports' competitiveness.

Enno Wiebe, Technical Director of the CER, pointed out the direct and indirect impacts of the war in Ukraine and the COVID-19 pandemic on European ports' activity: the volatility of energy prices, increases in the costs of raw materials and disruption to logistics chains. Ports are also more congested, with a risk of saturation when Chinese traffic recovers. Mr Wiebe also mentioned solidarity corridors with Ukraine: the challenge for rail operators has been in transporting Ukrainian grain to European ports, and the risk of transferring congestion from the rail network to the ports. In order for the rail network to be able to face such challenges, some technical investments must be made in the network, such as the adaptation of the network to accommodate 740-m-long trains, electrification, the construction of new lines and sidings, the development of infrastructure to improve access to ports' terminals and the building of intermodal terminals.

Koen Cuypers, Mobility Expert of the Port of Antwerp–Bruges, highlighted that the objective of the port was to reach a 15 % rail modal share by 2030; the modal share is currently 7 %. Lorry traffic is creating congestion in the city of Antwerp and new development in the harbour is met with suspicion by the local population. Therefore, it must be guaranteed that the development of the port will not generate additional congestion. At the end of 2019, an agreement was signed between the Port of Antwerp, Railport and Infrabel to move towards achieving the modal share objective. Mr Cuypers explained that in Belgium the port's rail infrastructure was managed by the national infrastructure manager, Infrabel, in contrast to the situation in Germany and France. The agreement was based on seven pillars: traffic management, track capacity, marshalling yards, targeted investments, future-proof infrastructure, service facilities with simplified procedures and IT platforms.

Experts' panel III – Combined transport

Eric Feyen, Technical Director of the UIRR, introduced the UIRR, an association of combined transport operators with 45 members. He indicated that tripling combined transport would require a 7–8 % annual growth rate, which had already been achieved between the mid 1990s and 2008. Currently, the growth in combined transport is rather positive, with an increase of 8.15 % in total number of consignments and an increase of 10.94 % in total tonne-kilometres in 2021. The UIRR launched a campaign called 'Combined Transport for Europe 2021–23' to promote combined transport as an effective solution for decarbonisation, reducing pollution and congestion, boosting energy independence and mitigating the shortage of lorry drivers in Europe. It has been found that combined transport is

40–70 % more energy efficient than unimodal transport and has a 60–90 % smaller carbon footprint with the technologies that are available today. The revision of the combined transport directive will be a key enabler of combined transport development.

Mickael Varga, Project Manager for the TAF TSI of the ERA, presented the EU regulation on the TAF TSI for the standardisation of communication processes and the exchange of data and, eventually, to facilitate interactions between the different stakeholders in the rail market. The idea is to avoid creating a patchwork of different processes among Member States. Mr Varga discussed different levels of implementation in the Member States, for example in relation to company codes and train composition.

Mitchell van Balen, an economist for the ERA, explained the agency's contributions to the latest TSI revision package to overcome interoperability barriers, particularly in the field of combined transport. The measurement and codification of wagons, lines and intermodal loading units is today rather complex because of different norms and practices among Member States and organisations. Because of these varying practices, combined transport is often considered exceptional transport, which brings an additional administrative burden. The revision of TSIs ensures that broadly accepted practices and codifications are embedded in the EU legal framework, leading to greater harmonisation. Thus, rules can be set for when combined transport should be considered exceptional and when it should not. Finally, a new mechanism to provide information in the European Register of Infrastructure on combined transport gauges will be developed and an application guide will be produced to clearly explain the impact of these changes on the sector.

Turi Fiorito, Director of EFIP, pointed out that inland ports are always at the intersection between road, inland waterways and railway, so multimodality is a core activity of inland ports. The goal is to prepare the European transport network to stay competitive and to make it more sustainable. The system has faced a lot of shocks in the last 2–3 years, between droughts making navigation more difficult, COVID-19 and the war in Ukraine. An important aspect that is worth mentioning in this context is the resilience of the transport system. The best way to make any system resilient is to multiply the fallback options, and for that multimodality is key. On the revision of the combined transport directive, there are two major points. The impact of a multimodal chain should be considered from a holistic perspective, and the combined transport directive's scope could be extended to cover the full scope of multimodality.

Conclusions

Antoine Berbain, Delegated Director-General of the HAROPA port, Paris, affirmed that we already have the transport of the future, as each time rail is used to transport goods we are already in 2050. Developing multimodality is really the priority of harbours. All authorities, local, national or European, and all stakeholders will have to work together to achieve the European objectives. Renovating and modernising the infrastructure, developing multimodal terminals and managing railways are among the important tasks that will need to be undertaken in the years to come.

Josef Doppelbauer, the ERA's Executive Director, on the subject of the road to zero-carbon transport, stressed that action is needed now, as we cannot afford to lose any more time. The case of the Port of Hamburg demonstrates that it is possible to achieve a high rail modal share. In our context, infrastructure development is the most important action to take, considering the need for technical and operational interoperability and resilience.

Karima Delli, a member of the European Parliament and Chair of the Committee on Transport and Tourism, spoke about the mini plenary session on the Fit for 55 package of the European Parliament. The objective of achieving a carbon-neutral economy was discussed, with the transport sector the only sector in which emissions are increasing. Rail freight emits much less CO₂ than road freight, which is one of the reasons to promote it. A joint declaration has been signed by 16 Member States on increasing the rail modal share. It is time to change our model in a pragmatic way. Now, the political willingness and commitment of Member States is needed. We need more than 16 Member States; all the

other Member States need to be on board. Clear and ambitious objectives will be required to achieve a 30 % rail freight modal share by 2030. Major investments favouring rail are needed, and Member States must act.

The full conference is available on the ERA's YouTube channel (<https://www.youtube.com/watch?v=XD9x3sBpnN8&t=3249s>) and the presentations made by the various speakers are available on the ERA's website (https://www.era.europa.eu/content/multimodal-freight-conference_en).

Getting in touch with the EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en)

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696,
- via the following form: european-union.europa.eu/contact-eu/write-us_en.

Finding information about the EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (europa.eu).

EU publications

You can view or order EU publications at op.europa.eu/en/publications. Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (europeanunion.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

Open data from the EU

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

European Union Agency for Railways

120 rue Marc Lefrancq
BP 20392
FR-59307 Valenciennes Cedex
Tel. +33 (0)327 09 65 00

era.europa.eu
[Twitter@ERA_railways](https://twitter.com/ERA_railways)

Moving Europe towards a sustainable and safe railway system without frontiers.

