
Joint Position Paper

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30 by 2030 – how rail freight achieves its goals

The European Rail Freight sector has committed itself to the goal of 30% rail modal share by 2030

- In 2018, the members of the Rail Freight Forward (RFF) initiative, representing 90% of the European rail freight market, committed to an increase of rail modal share from 18% today to 30% by 2030 in order to neutralize the negative impact of the expected strong growth of the land-based transport market on environment and society. Achieving this requires interaction of the three main players – RUs (Railway Undertakings), IMs (Infrastructure Managers) and Authorities
- Meanwhile, the European Commission has proposed the Green Deal with the objective to transform Europe into the first carbon-neutral continent by 2050 and enhance Europe's CO₂-emission targets from 40% to 50% by 2030 in comparison to 1990 levels. Adopting the 30% rail modal share would contribute to these targets with 25 m tons of avoided emissions of CO₂ equivalents and approximately 25 bn EUR in avoided external costs from 2030 onwards¹
- The importance of rail freight for the economy was only recently highlighted by the COVID-19 crisis: railway transport proved not only to be safe and sustainable but also to be extremely resilient with rail freight being the only mode of transport, which was not significantly affected by the lockdowns.
- The objective of this paper is to explain, how the proposed program outlined below contributes to achieving the targets of the green deal by deploying key technologies for a modern, digitized railway system in Europe - thereby ensuring sufficient capacity and easier access to capacity as well as better products for the benefit of customers and society at large.

Currently, the rail freight sector is not able to deliver the aspired modal shift

- The European rail freight sector is currently not living up to its full potential as all players of the rail freight system face substantial challenges. Without major change, the aspired modal shift to 30% by 2030 will not be reached
- The framework for operations of the RUs is not favourable:
 - The Single European Railway Area (SERA) has so far not been realized, yet it is of particular importance for rail freight with 50%² of all travel being international. Progress in eliminating the traditional lack of interoperability has been very slow due uncoordinated and delayed deployment of technologies such as ERTMS
 - In comparison to road, infrastructure capacity access and allocation is not adequate for rail freight being a competitive stakeholder in end-to-end supply chain logistics
 - Rail freight is put at a disadvantage in comparison to its main competitor road, as road transport's higher external costs (9.0 ct/tkm vs. 1.3 ct/tkm for rail freight)³ is borne by society and currently not internalized into transport prices
- However, RUs do not consistently reap the benefits of process automation and digitization, leading to labour intensive working procedures and for certain market

¹ European Commission, "Handbook on the external costs of transport", (Version 2019 – 1.1)

² Source: European Commission, Rail Market Monitoring Report 2020

³ European Commission, "Handbook on the external costs of transport", (Version 2019 – 1.1)

segments to an even less competitive cost base with the main competitor road. A majority of rail freight transports meanwhile involves several RUs, which in turn creates challenges due to immature exchange of operational data via bilateral interfaces, low data quality, etc. Hence, rail products do not always meet customer expectations in terms of reliability, transport time, and transparency (e.g., Track&Trace).

To achieve the goal of 30% modal share by 2030, RFF has identified 5 enabling, interlinked technologies which require a coordinated, sector-wide rollout across the EU

- The identified issues lead to the following strategic objectives for the Rail Freight system to support the aspired modal shift
 - RUs offer superior innovative products to seamlessly integrate into the value chain of customers
 - IMs provide sufficient capacity and service that makes running international trains "as easy as running trucks"
 - Authorities provide a level playing field for rail
- These objectives may only be reached by fully leveraging technology in order to enable a stringent automation and digitization of the rail freight processes. The Rail Freight Forward coalition has identified five technologies that are relevant on a system level and should be rolled-out by the entire sector to reap their full benefits
- RUs should fully adopt 3 key technologies until 2030
 - *Digital Automatic Coupling (DAC)*: as coupling/decoupling is one of the two main procedures in train operations (train assembly, train driving), its automation is of utmost importance. Europe is trailing the world in this respect, as it is the last continent to use standard manual couplers. We propose to fully deploy the DAC technology latest until 2030 which will significantly improve competitiveness of the rail sector's operations by providing electricity and data bus line across train, automated brake testing, electro-pneumatic brakes, and will enable train consistency checks which is a infrastructural prerequisite required for the introduction of ERTMS level 3
 - *Autonomous Train Operations (ATO)*: Automizing the other main procedure, train driving, is of similar importance. We propose to fully deploy driving with supervision by a driver (Grade of Autonomy (GoA) 2) on long haul and full autonomous train operations without driver (GoA 4) in shunting yards, on the first and last mile, and for fenced-in main line infrastructure. The freight sector aspires to be the first-mover show case for a consistent deployment of this technology in Europe
 - *Digital Platforms (DP)*: the sector wants to unlock the true value of the multitude of available operational data by enabling a seamless operational data exchange between all players of Rail Freight Sector via a Digital Platform Ecosystem; in addition, a framework for attracting 3rd parties to drive innovation utilizing these data will be set-up to deliver additional value
- IMs should deploy 2 technologies until 2030, at least on the main international rail freight corridors including deviation routes and access routes to main large customers, terminals and rail ports:

- *ERTMS⁴ Level 3 (“moving blocks”)*: For RUs provisioning of one On Board Unit (OBU) to operate on all main international freight relations equipped with technically harmonized ERTMS level 3 is a prerequisite to avoid investment into several OBUs for individual national legacy systems originating from the current interoperability of rail infrastructure. Only the synchronized rollout of one harmonized ERTMS level 3 with “moving blocks” can provide the significant capacity improvements on the same track superstructure needed to accommodate the projected rail freight growth
- *Digital Capacity Management (DCM)*: fast access to transparent and dedicated rail freight infrastructure capacity requires a step-change from assemble-to-order processes to automated and digitized train path construction and allocation. This is also paving the way to real-time capacity management (infrastructure operations).

The deployment of these key enabling technologies will provide strong benefits to customers in terms of rail freight product quality, cost reduction, available capacity, and improved working conditions until 2030

- The selected technologies consistently contribute at various levels to the main requirements for an enhanced modal share of rail: higher RU product quality, cost reduction, and better utilisation of available infrastructure capacity in order to accommodate the projected rail freight volume growth. In addition, employees in the rail freight sector will benefit from substantially improved working conditions
- The 5 technologies will allow RUs to provide better rail-based transport. This should lead to a significant increase in reliability due to more infrastructure capacity, fewer track-side signalling failures, much better visibility of shipments due to enhanced European-wide data transparency, and ultimately better resource utilization in driving and coupling. Fairer capacity allocation between infrastructure users, better international train paths with less stops, and higher maximum speed due to EP-braking will allow for shorter transport times, esp. for block train-based products like intermodal. Lastly, customers will finally experience the expected transparency on booking and shipment status due to the improved booking of train paths, European-scale Track&Trace and ETA (Estimated time of arrival), and the seamless integration of transport chains via DP
- Deployment of the key technologies will allow for strong capacity increase by approximately 54% on current track superstructure without construction of entire new lines. The main contribution to this increase originates from ERTMS level 3 with approx. 40%⁵, followed by ATO with approx. 10%, and DCM with approx. 4%⁶. The impact of DAC can currently not yet be quantified
- Working conditions in the rail freight sector will be significantly improved through more ergonomic working conditions, higher safety for personnel, and higher attractiveness as employer
- We expect the proposed program to significantly contribute to achieving the goals of the green deal with an avoidance of 25bn EUR external costs annually from 2030 onwards

⁴ European Rail Traffic Management System of which ETCS (European Train Control System) is one of the components along with GSM-R (dedicated railway communication system) and ETML (European Traffic Management Layer)

⁵ S2R: combined effect of ERTMS Level 3 with ATO 50%; expert estimate of additional effect of ATO in case of ERTMS Level 3 “moving blocks”: 10%

⁶ DB Netz

- We expect the cost of rail transport to decrease by on average 10-15%⁷ until 2030. This order of magnitude is indicative as RUs have widely differing cost structures and projected savings per cost category vary between 5% for wagons and 30% for locomotives. Given the high level of intermodal and intramodal competition, we expect that a substantial share of these cost benefits will go to the market, i.e., cannot be used to finance the R&I and deployment of these technologies. Since road transport can be expected to reap equal to even higher cost savings, the proposed program will not enhance the relative cost position of rail freight. Introduction of an adequate CO₂-pricing scheme to reflect the real costs of transportation across all modes of transport is therefore advisable.

Deployment of the key technologies requires investments of roughly 18 bn EUR until 2030 and funding by the EU

- The overall investment need subject to public funding of 18 bn EUR in the time frame of 2020 – 2030 is mainly driven by DAC with ~12.0 bn EUR and the ERTMS OBUs with ~5.0 bn EUR⁸. The remaining 3 technologies DP, ATO, and DCM require in total “only” ~1.0 bn EUR. The five technologies can be grouped in 3 categories relating to different rationales for the need of public funding: _
 - DAC (~12.0 bn EUR)⁹ along with DP (~0,4 bn EUR)¹⁰ require a coordinated deployment across the whole network in order to reap full benefits. This requires a robust governance mechanism at European level to ensure full adoption along with substantial public financing on the European level due to the high investment requirement, the long lead-times of benefits (only after migration of a large part of the wagon pool for DAC), along with the low financing capacity of the sector due to a current lack of profitability
 - ATO requires a continuation within the successor S2R for R&I along with financing of “first mover” showcase pilots. Proper deployment of ATO has the potential to allow RUs to finance deployment through expected savings
 - ERTMS Onboard units (~5.0 bn EUR) and DCM (~0,5 bn EUR)¹¹ are equivalent to investments in new physical infrastructure while being a lot more efficient (less lead-time at significantly lower costs at an order of magnitude of 5-10%¹²). According to current financing logic, they should therefore be borne by society.

⁷ Rough business case based on the combined effects on the cost positions of freight RUs (track, energy, locomotives, drivers, wagons, stations). For details on assumptions refer to the appendices of the main documentation

⁸ Work Plan 2020 if the European Coordinator for ERTMS, May 2020

⁹ “Development of a concept for the EU-wide migration to a digital automatic coupling system (DAC) for rail freight transportation” Final Report to the Federal Ministry of Transport and Digital Infrastructure (BMVI) in Germany, 29.6.2020

¹⁰ Estimate of the working group

¹¹ RNE document of project “Redesign of the international time tabling process (TTR): TTR migration concept and IT landscape, 20.5.2020

¹² Rough calculation for illustration purpose: 40% additional capacity on 25% of the European network (ambition of ERTMS rollout) at 3 Mio. EUR per km would cost roughly 80bn EUR initial investments; continuous maintenance not considered

For successful deployment of the enabling technologies, the governance must be articulated around strong R&I and a robust deployment mechanism

- In light of the past deployment track record of technologies in the rail sector (example ERTMS), the Rail Freight Forward Initiative believes that robust governance mechanisms are needed
- With respect to the set-up of the Shift-2-Rail successor as the future R&I vehicle for the sector, Rail Freight Forward calls for the following prerequisites to be fulfilled:
 - Within the proposed System pillar a dedicated freight representation
 - Participation of the whole rail freight sector in S2R, esp. smaller RUs and IMs via differentiated roles
 - Proposals for specifications/ standards need to be developed and approved with strong involvement of the System Pillar
- Most of the available public funding will be required for the deployment phase. A dedicated deployment governance is therefore indispensable to ensure the successful transformation of the rail (freight) sector. The deployment governance needs to be built around a supplier/customer relationship between the sector/society and supplying industry. Furthermore, the governance of the deployment phase must reflect the fundamental differences between R&I and deployment (e.g., different (roles of) stakeholders, different sources for financing). Mechanisms should amongst others include deployment regulation, deployment planning aligned with the sector, frequent deployment monitoring and escalation, financial incentives to adhere to agreed deployment plans, etc.

This sector program relying on the engagement of the entire rail sector and authorities is the cornerstone for delivering the aspired modal share of 30% by 2030

About CER

The Community of European Railway and Infrastructure Companies (CER) brings together railway undertakings, their national associations as well as infrastructure managers and vehicle leasing companies. The membership is made up of long-established bodies, new entrants and both private and public enterprises, representing 71% of the rail network length, 76% of the rail freight business and about 92% of rail passenger operations in EU, EFTA and EU accession countries. CER represents the interests of its members towards EU policy makers and transport stakeholders, advocating rail as the backbone of a competitive and sustainable transport system in Europe. For more information, visit www.cer.be or follow [@CER_railways](https://twitter.com/CER_railways) on Twitter.

About Rail Freight Forward

Rail Freight Forward is a coalition of European rail freight companies that are committed to drastically reduce the negative impact of freight transport on the planet and mobility, through innovation and a more intelligent transport mix. It currently consists of 18 members. The coalition has the ambition to increase the modal share of rail freight in Europe from currently 18% to 30% by 2030 as the macro-economic better solution for European growth.

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