RAIL FREIGHT CORRIDOR Rhine-Danube

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Corridor Information Document

Implementation Plan

Co-financed by the European Union
Connecting Europe Facility

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1 Introduction

In 2010 the European Parliament and the Council adopted Regulation (EU) No 913/2010 concerning a European rail network for competitive freight, which entered into force on 9th November 2010 (hereinafter referred to as Regulation), providing for establishment of international rail corridors for a European rail network for competitive freight. The purpose of creating Rail Freight Corridors is to increase international rail freight transport by making them more attractive and efficient. The Regulation lays down rules for the establishment and organisation of international rail corridors. It sets out rules for the selection, organisation, management and the indicative investment planning of freight corridors. In the Annex to the Regulation, there were 9 initial Rail Freight Corridors, providing respectively their implementation date in 2013 and in 2015.

The Annex II of Regulation (EU) No 1316/2013 of the European Parliament and of the Council concerning the establishment of the Connecting Europe Facility replaced the Annex of Regulation (EU) No 913/2010. According to the amended list of initial Rail Freight Corridors the Rhine-Danube RFC shall be established by 10th November 2020.

According to the Regulation, the corridor will connect the following nodes:

- Strasbourg-Mannheim-Frankfurt-Nürnberg-Wels
- Strasbourg-Stuttgart-München-Salzburg-Wels-Wien-Bratislava-Budapest-Arad-Brașov/Craiova-București-Constanța
- Čierna and Tisou (Slovak/ Ukrainian border)-Košice-Žilina-Horní Lideč-Praha-München/Nürnberg

The Rail Freight Corridors (hereinafter referred to as Corridors) can be considered as the most suitable instrument to fulfil the specific requirements of the rail freight market. The aim is to provide a high-quality service including a seamless crossing of national borders. Cooperation among Infrastructure Managers/Allocation Bodies will be realised by harmonising capacity allocation and restrictions, traffic management and investment planning.

The principal guidelines specified by the Regulation focus on:

- establishing a single contact point for designated capacity allocation on each Corridor;
- closer cooperation and harmonisation between Infrastructure Managers/Allocation Bodies and Member States both for the operational management of the infrastructures and for investments, in particular by putting in place a governance structure for each Corridor;
- increased coordination between the network and terminals (maritime and inland ports and marshalling yards);
- the stable and reliable provision of the necessary infrastructure capacities allocated to international rail freight on these Corridors.

The purpose of this document is:

- to create an inventory of the tasks that result from the establishment of the Rhine-Danube Corridor,
- to present main characteristics of the Corridor and
- to list measures taken so far for implementation of the procedures to make the Corridor fully operational.

2 Corridor Description

2.1 Key Parameters of Corridor Lines

The Rhine-Danube Corridor is the transport backbone linking West, Central and Eastern Europe by connecting France and Germany, Austria, Czech Republic, Slovakia, Hungary and Romania. The corridor runs from the Strasbourg area and South-West Germany to the Romanian port of the Black Sea and the Slovak-Ukrainian border (in two distinct branches).

According to the results of the Transport Market Study (hereinafter referred to as TMS) elaborated for the operation of the Corridor, the Management Board (hereinafter referred to as MB) agreed on the following routing consisting of principal lines, possible diversionary lines and connecting lines according to the traffic flows.

Country	Principal lines	Diversionary lines	Connecting lines
France	Strasbourg-Kehl		
Germany	Kehl-Appenweier-Rastatt-Durmersheim-Karlsruhe	Rastatt-Ettlingen West-Karlsruhe	
	Karlsruhe-Hockenheim-Mannheim	Karlsruhe-Bruchsal-Heidelberg-Mannheim	
	Mannheim-Darmstadt-Aschaffenburg-Gemünden	Mannheim-Groß Gerau-Frankfurt am Main-Hanau-Aschaffenburg	
	Gemünden-Schweinfurt-Bamberg-Nürnberg	Gmünden-Würzburg-Nürnberg	
	Nürnberg-Regensburg-München		
	Regensburg-Passau		
	Karlsruhe-Pforzheim-Mühlacker-Ludwigsburg	Bruchsal-Mühlacker	
	Ludwigsburg-Stuttgart-Ulm-Augsburg-München-Rosenheim-Freilassing-Salzburg	München-Mühldorf am Inn-Freilassing	
	Nürnberg-Schirnding-Cheb		
	Regensburg-Schwandorf-Furth im Wald-Domažlice		
Czech Republic	Cheb-Plzen		
	Domažlice-Plzen		
	Plzen-Praha-Poříčany-Kolín-Pardubice	Poříčany-Nymburk Praha-Lysá nad Labem-Nymburk-Velký Osek Kolín-Velký Osek	
	Pardubice-Choceň-Česká Třebová	Velký Osek-Hradec Králové-Choceň	
	Česká Třebová-Olomouc-Prosenice-Hranice na Moravě-Horní Lideč-Lúky pod Makytou		

	Hranice na Moravě-Ostrava-Dětmarovice-Český Těšín-Mosty u Jablunkova-Čadca		
	Ostrava-Český Těšín		
Slovakia	Čadca-Žilina		
	Lúky pod Makytou-Púchov-Žilina		
	Žilina-Vrútky-Liptovský Mikuláš-Poprad-Spišská Nová Ves-Kysak-Košice-Výh. Slivník-Čierna nad Tisou	Výh. Slivník-Maťovce	Čierna nad Tisou-Chop
	Barca-Košice		
	Barca-Haniska pri Košiciach		
Austria	Salzburg-Steindorf bei Straßwalchen-Vöcklabruck-Wels		
	Passau-Grieskirchen-Wels		
	Wels-Linz-Enns-Amstetten-St. Pölten-Wien-Bruck a. d. Leitha-Parndorf-Kittsee-Bratislava	Wels-Traun-Linz	
	Parndorf-Nickelsdorf-Hegyeshalom		
	Wien-Ebenfurth		
Hungary	Ebenfurth-Sopron-Győr		
	Bratislava-Rajka-Hegyeshalom		
	Hegyeshalom-Győr-Tata-Budapest-Újszász-Szolnok	Budapest-Cegléd-Szolnok	
	Szolnok-Szajol-Békéscsaba-Lőkösháza-Curtici	Szajol-Püspökladány-Biharkeresztes-Episcopia Bihor	
Romania	Curtici-Arad-Deva-Simeria-Coslariu-Sighisoara-Brasov-Ploiesti vest-Bucuresti	Episcopia Bihor-Cluj-Napoca-Coslariu	
	Arad-Timisoara-Caransbes-Filisi-Craiova-Videle-Bucuresti	Simeria-Târgu Jiu-Filiasi	
	Bucuresti-Lehliu-Fetesti-Constanta	Ploiești triaj-Buzău-Făurei-Fetești	

2.2 Corridor Terminals

The following service facilities (terminals, yards and container depots) were identified along the corridor by the TMS. The list includes all facilities which are maximum 10-15 km from the Corridor lines.

Detailed information about the Terminals can be found in Chapter 2 of CID Book 3.

Country	City	Terminal
France	Strasbourg	Port Autonome de Strasbourg
France	Strasbourg	Hausbergen marshalling yard
Germany	Karlsruhe	Contargo Karlsruhe Rheinhafen
Germany	Kehl	Klumpp + Müller GmbH & Co. KG
Germany	Kehl	ETK Euro Terminal Kehl GmbH
Germany	Karlsruhe	DUSS-Terminal Karlsruhe by DB
Germany	Karlsruhe	Fruchtcargo Container-Depot Wörth
Germany	Karlsruhe	Container Yard Speyer Contargo
Germany	Karlsruhe	Contargo Wörth
Germany	Mannheim	DP World Germersheim
Germany	Mannheim	DUSS-Terminal Mannheim-Handelshafen
Germany	Mannheim	RoRo-Terminal Mannheim
Germany	Mannheim	Kobler Container Depot
Germany	Mannheim	Contargo Rhein-Neckar Mannheim
Germany	Ludwigshafen	Kombi-Terminal Ludwigshafen KTL
Germany	Mannheim	Mannheimer Tankwagenreinigung Container Depot
Germany	Mannheim	Cotac Depot Mannheim
Germany	Mannheim	Terminal Worms, Rhenania Worms AG
Germany	Mannheim	Hempt Container-Depot Worms
Germany		GUT Gernsheimer Umschlags-und Terminalbetriebsgesellschaft GmbH & Co. KG
Germany	Frankfurt am Main	DUSS-Terminal Frankfurt/Main-Ost
Germany	Frankfurt am Main	Trimodal Container terminal Aschaffenburg -TCA
Germany	Frankfurt am Main	Contargo Rhein-Main GmbH, Contargo Frankfurt-Ost

Germany	Frankfurt am Main	Contargo Industriepark Frankfurt - Höchst GmbH
Germany	Mainz	Frankenbach Container Terminals GmbH
Germany	Nürnberg	TriCon Container Terminal Nürnberg
Germany	Nürnberg	DB Cargo AG
Germany	Nürnberg	CDN Container Depot Nürnberg GmbH
Germany	Stuttgart	SCT Stuttgarter Container Terminal GmbH
Germany	Kornwestweim (Stuttgart region)	DUSS-Terminal Kornwestheim
Germany	Augsburg	DUSS-Terminal Augsburg-Oberhausen
Germany	Augsburg	Kloiber Container Depot Augsburg
Germany	Ulm	DUSS-Terminal Ulm
Germany	München	CDM Container Depot München GmbH & Co. Service KG
Germany	München	DUSS-Terminal München-Riem
Germany	München	Parsdorfer Tankwagenreinigung Container Depot
Austria	Wels	Wels Vbf CCT/ROLA, ÖBB Infrastruktur AG
Austria	Linz	LINZ AG für Energie, Telekommunikation, Verkehr und Kommunale Dienste
Austria	Linz (Mauthausen)	Container Terminal Enns GmbH
Austria	Linz (Ybbs der Donau)	Ybbs by Schaufler GmbH
Austria	Linz (St. Pölten)	St. Pölten Alpenbahnhof CCT by Johann Dorner GmbH
Austria	Salzburg	CTS Container Terminal Salzburg GmbH
Austria	Salzburg	Salzburg Hbf RoLa, ÖBB-Infrastruktur AG
Austria	Vienna	Wiencont Container Terminal GmbH
Austria	Vienna	Terminal Wien Inzersdorf - Süd, ÖBB Infrastruktur AG
Austria	Vienna	Terminal Wiener Neudorf by CONTAINEX Container Handelsgesellschaft m.b.H.
Czech Republic	Plzeň	PCP Intermodal Logistics s.r.o.
Czech Republic	Prerov (Olomouc Region)	Terminal Praha-Uhrineves by METRANS, a.s.

Czech Republic	Praha	Terminal Praha Žižkov operated by - CSKD s.r.o.
Czech Republic	Pardubice	Terminal Pardubice by Ceské prístavy, j.s.c.
Czech Republic	Pardubice region	Rail Hub - Terminal Ceska Trebova, METRANS, a.s.
Czech Republic	Brno	Terminal Brno, a.s.
Czech Republic	Prerov	Rail Cargo Operator - CSKD s.r.o.
Czech Republic	Zlin	Terminal ZLIN - Zelechovice/Lipa
Czech Republic	Ostrava	Terminal Ostrava – Senov, METRANS
Slovakia	Zilina	Intermodal Transport Terminal Žilina -ITT ZA
Slovakia	Zilina	Rail Cargo Operator - CSKD s.r.o. (2 Terminals)
Slovakia	Košice	CSKD Terminal Košice, CSKD Intrans s.r.o.
Slovakia	Dobra	TransContainer Slovakia, a.s., TKD Dobra
Slovakia	Bratislava	Bratislava Palenisko by Slovenská plavba a prístavy (SPaP) a.s.
Slovakia	Bratislava	UKV Terminal Bratislava ÚNS
Slovakia	Bratislava	Dunajská Streda by Metrans (Danubia) a.s.
Slovakia	Komarno	Komárno by SPaP a.s. (Slovak Shipping and Ports JSC)
Hungary	Győr	Terminal ÁTI Györ by ÁTI DEPO Zrt.
Hungary	Sopron	Sopron container terminal by GYSEV CARGO Zrt.
Hungary	Budapest	Metrans Terminal Budapest by METRANS, a.s.
Hungary	Budapest	Mahart Container Center
Hungary	Budapest	Törökbálint Container Terminal by IntegRail Ltd.
Hungary	Budapest	Rail Cargo Terminal BILK Budapest by BILK Kombiterminal Co. Ltd.
Hungary	Baja	Ro-Ro Terminal Baja
Hungary	Szeged	MÁV Kombiterminál Szeged
Hungary	Szolnok	MÁV Kombiterminál Szolnok
Romania	Timisoara	Semenic, CFR Marfa S.A.
Romania	Curtici	Railport Arad Terminal by Railport Arad S.r.l.
Romania	Sibiu	Sibiu by CFR Marfa S.A.
Romania	Turnu	Turna by Rofersped S.A.

Romania	Vidin	
Romania	Brasov	Brasov by Rofersped S.A.
Romania	Craiova (Doli)	Craiova by CFR Marfa S.A.
Romania	București, Ilfov	Bucureşti Noi by SNTFM "CFR Marfă" SA
Romania	București, Ilfov	Bucharest Intermodal Terminal by Yusen Logistics Co., Ltd.
Romania	București, Ilfov	Bucuresti Sud by Rocombi SA

2.3 Bottlenecks

The bottlenecks, which hinder the smooth and competitive rail transportation, can be grouped into the following categories:

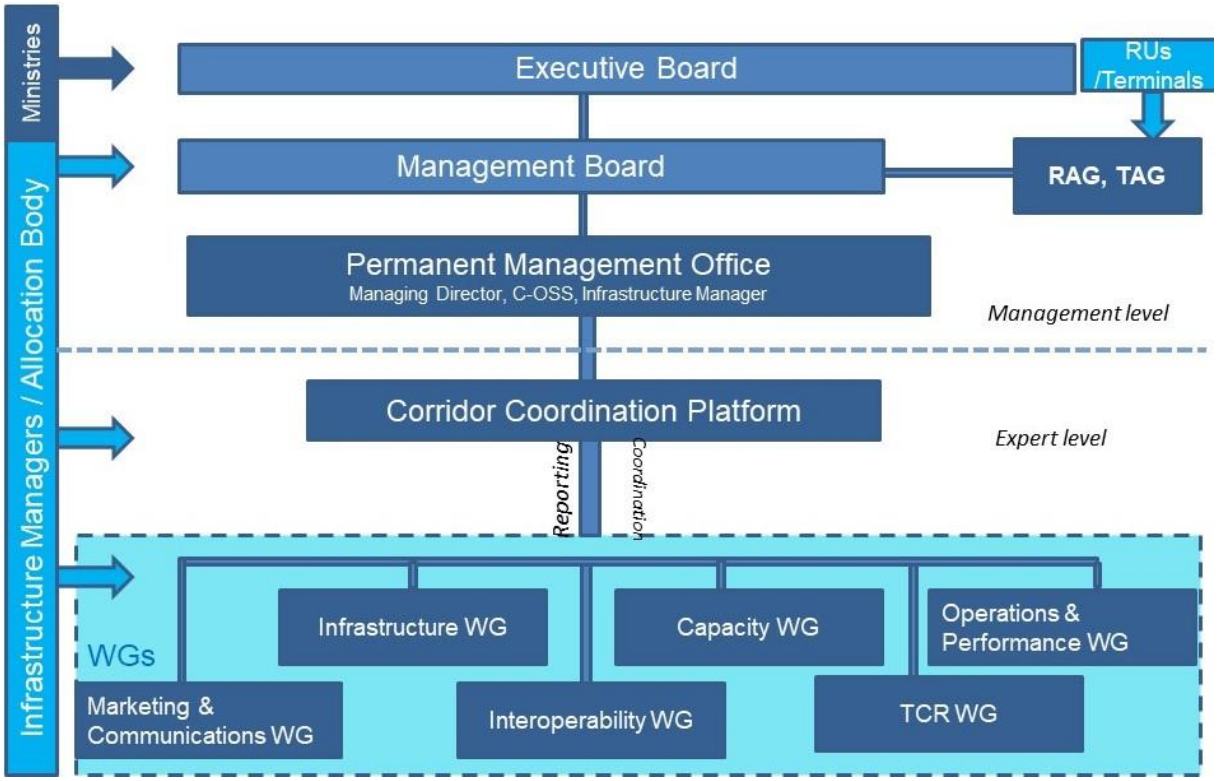
- infrastructural bottlenecks
  - Sections which do not meet the TEN-T requirements specified in Article 39 (2a) of the Regulation (EU) No 1315/2013 of the European Parliament and of the Council.
- operational bottlenecks
  - Capacity and traffic management issues during the train run
- administrative bottlenecks
  - Effects of non-harmonised rules and procedures
- capacity bottlenecks
  - Issues in relation with capacity planning and path allocation. This includes the lack of multi-annual planning works due to missing multi-annual financing environment.
- other bottlenecks

Detailed list of already identified bottlenecks together with the suggested measures towards their removal can be found in Annex 6.1.

A Capacity Improvement and Bottleneck Study is going to be elaborated until the end of 2020, which will identify the bottlenecks together with the necessary measures to remove these. The result of the study will be incorporated into the next update of the CID after 2020.

2.4 RFC Governance

According to the Regulation, the following Bodies and structures of the Corridor have been established.



3 Market Analysis Study

Background

In 2010, the EU mapped out 9 freight corridors with the objective to make rail freight transport more competitive, with the Rail Freight Corridor 9 Czech – Slovak (hereinafter referred to as RFC 9 CS) among them. This corridor has now been extended to form the Rail Freight Corridor 9 Rhine-Danube (hereinafter referred to as RFC 9 RHD) (Regulation (EU) No 913/2010; changes in Regulation (EU) No 1316/2013). As an essential part of the implementation plan for the freight corridor a Transport Market Study has to be carried out according to Article 9.3 of the Regulation - “Measures for implementing the freight rail corridor plan”.

The main objective of the TMS is to recommend a routing alignment for the Rail Freight Corridor 9 according to expected future traffic. Therefore, the TMS provides a detailed overview of the corridor’s current operational status and a fact-driven outlook regarding the freight market development and potential future customer demand along the corridor.

RFC 9 RHD has a highly important strategic role, being one of the main East-West links across Continental Europe.

Scope of Analysis

The study focuses on the following major areas:

- Analysis of the geographical characteristics of the catchment area and Member States in terms of relevance to transport;
- A detailed PEST-Analysis for the relevant Member States
- Analysis and evaluation of the current transport market situation covering all traffic modes;
- Multimodal traffic flow evaluation;
- Brief analysis of possible modal shift;
- Analysis of commodities;
- SWOT-Analysis of the rail freight traffic in the corridor;
- Forecast of the transport market development and traffic growth;
- Deduction of requirements to railway infrastructure and operational or organizational improvements in railway freight traffic to improve the railway sector’s competitiveness and to adequately meet market demand;
- Identification of logistic service opportunities;

Investigations and analyses have been carried out for major corridor sections, transport nodes, IWW networks, ports and multimodal terminals identifying gaps and proposing solutions to improve RFC 9 RHD.

Current situation

Economic development

Overall, the economic indicators suggest a fairly positive outlook regarding freight transport overall (all modes) with economic development expected to remain positive in the entire corridor region. Particularly relevant for rail freight transport is the development of the industrial production sector, as it generates goods that typically have a relatively high propensity of being transported via rail. With few exceptions, investments in industries have grown along the corridor over the past years. Given the positive macro-economic forecast, we can also expect further industrial growth. Investments in the industrial sector have grown particularly strongly in Germany, which at the same time also has the highest GDP/capita and therefore a dominant position in terms of trade (both imports and exports) with Asia among the countries located along the corridor. Even if only a minor share of this trade can be directed via RFC 9 RHD, it will be substantial.

Social and demographic development

Substantial demographic shifts have been happening along the corridor region over the past decade. While the population has grown strongly in Austria and Germany, substantial population decline could be observed especially in Hungary and Romania. These shifts have been driven by differentials in income levels and employment. Especially young, high-skilled workers have left the regions located in the Eastern part of the corridor. The population decline is expected to continue, however, to a lesser extent than it has been happening over past years. The same is true for population growth: especially Austria's population is expected to continue growing.

The population decline in the Eastern parts of the corridor region may lead to a lower local demand for goods in these regions. Local productivity is also likely to be negatively affected. However, due to the composition of the migrating population high-skilled professions are probably affected more; these in turn tend to produce goods with low rail-affinity (or services that do not require transport at all). Sectors that typically require low-skilled labour (e.g. mining) as input, and at the same time, produce goods with high rail-affinity, are likely to be less affected by the population decline. This seems to be in particular true for the car manufacturing sector: major car manufacturers, including German brands, have moved their production to lower-wage countries in Eastern Europe, in particular to Hungary and Slovakia (e.g. Audi in Győr, Volkswagen Slovakia in Bratislava).

The fact that within the corridor region migration is directed towards more productive areas with a substantial share of industry (e.g. Southern Germany), in turn is likely to increase imports and exports in those areas (e.g. trade between Germany and China), overall benefitting potential trade flow prospects on RFC 9 RHD.

Political development

With improved infrastructure that is in line with the standards, travel times are expected to decrease, and reliability and punctuality are expected to improve. Also, possibilities for multimodal transport are expected to improve, leading to shorter door-to-door travel times. This will lead to decreases in the inconvenience that rail has compared to road in terms of travel times and reliability.

However, besides the infrastructural factors, improvements are also necessary regarding operational procedures, for instance aiming at yielding reductions in waiting times at borders (which are often highly uncertain in duration) and offering more integrated and flexible logistics solutions (providing flexible door-to-door solutions).

Another important political aspect is to achieve a level playing field regarding the internalisation of external cost. The European Commission's "Green Deal" is very likely to launch relevant political measures to achieve this goal.

Geopolitically, trade relations with most Asian economies are stable, and for the main Asian trading partner, China, mostly governed by the WTO framework. New tariffs or other forms of trade barriers are rather unlikely to be established soon. On the contrary, negotiations for an investment Agreement between the European Union and China have been ongoing since 2013, as part of the EU-China 2020 Strategic Agenda for Cooperation. Nevertheless, there are specific policies that may affect trade between Europe and Asia, such as China regulating the sale of fossil-fuel vehicles by imposing quota for electric vehicles. Another one is the current subsidies provided by the Chinese government for Eurasian rail services (approximately 2000-5000 USD/TEU), which at some point might be phased out, leading to a yet higher price differential between rail and sea freight rates (ITF, 2019).

Technical development

Overall, in line with past developments, we expect freight transport demand to increase further due to more globalized supply chains and realignment towards emerging markets. This is in spite of some developments that may flatten freight transport volumes to some extent such as digitization and 3D-printing. The extent to which the freight volume increase can be captured by the rail sector depends, among other factors, on technological developments.

Currently, rail freight transport suffers from limited competitiveness compared to road transport: long travel times, unreliability, inflexibility. These are to a substantial extent caused by technological and infrastructure-related factors such as bottlenecks, border waiting times, limited technical and organizational compatibility & coordination, too national perspective of IMs Ministries/Authorities, no awareness of the international character of rail freight. If in the process of unification of the transport market substantial improvements and compliance with EU standards can be seen, a substantial increase in demand can be expected.

While the rail sector exhibits comparatively limited technological developments, the road sector may face several disruptive technologies in future years, among which are large-capacity vehicles (through mega-trucks and/or platooning), (at least partially) self-driving trucks and electrification. Especially the larger size vehicles and self-driving capabilities are expected to improve cost efficiency of road transport even further. Even if stricter environmental regulations, for instance in the form of marginal cost pricing, are implemented, the cost advantage of road transport would therefore likely prevail, rendering the outlook for rail traffic rather challenging from a cost perspective. However, it is currently uncertain when these technologies will be introduced on the market and to which extent, they are accommodated by adaptations in the legal framework as well as in the infrastructure.

Conclusion

The positive economic developments and more globalized supply chains result in a traffic increase in all modes. BUT: The modal share of road transport is still increasing both in the passenger as well as the freight sector in the Corridor area; however, there are differences in the modal split developments, with rail modal share increasing in some and decreasing in other countries. It is lowest in France (just above 10% in 2017), followed by Germany (17.8% in 2017), while it is highest in Slovakia (32.9% in 2017). Between 2010 and 2017, we observe a decline in rail modal share in Austria, Czech Republic, Slovakia. In the remaining countries, the rail modal share is fairly stable.

This is partly caused by different priorities in national governments infrastructure investments, as the Corridor countries typically perform highest per-capita infrastructure investment in road

transport (except for Austria); Germany and Romania also show significant investments in inland waterways.

Partly, the higher attractiveness of road transport is the result of

- hurdles of competitiveness of rail transport (long travel times, lack of reliability, inflexibility), partially caused by operational and administrative bottlenecks, border waiting times, limited technical and organizational compatibility & coordination and missing reliable multi-channel planning of works, partly due to lack of financing.
- comparatively limited technological developments, whereas road transport may undergo some disruptive developments within the next 1-2 decades (e.g. self-driving trucks leading to substantially lower operating costs; electric trucks leading to competitive road transport even under-pricing of (environmental) externalities; platooning, mega-trucks improving cost efficiency.

With improved infrastructure that is in line with the standards, travel times are expected to decrease, and reliability and punctuality are expected to improve. Also, possibilities for multimodal transport are expected to improve, leading to shorter door-to-door travel times. This will lead to decreases in the inconvenience that the rail has compared to road in terms of travel times and reliability.

In addition, the so-called “soft-measures” (i.e. requiring almost no investment) need to be executed to bolster the competitiveness of the corridor regarding speeding up the border-handling processes, the harmonization of rules and TSI among others.

Potentials to increase the modal share of rail transport also lie in digital cargo management/tracking and the increasing importance of environmental aspects, resulting in a higher relevance of the internalization of external cost in the political discussion (e.g. Handbook on external costs of transport). In addition, a highly flexible capacity allocation for ad-hoc transport needs is essential for the attractiveness of rail freight. Rail Net Europe has therefore introduced the TTR (Timetable Redesign) Project.

Regarding the external costs of freight transport rail freight transport is currently not competitive with road transport along various dimensions, which is one of the reasons for the low modal split of freight rail in most EU countries. Even with improvements in infrastructure, rail freight transport will still be subject to longer travel times and less flexibility than road transport along most routes, although the relative disadvantages are expected to become substantially smaller, as in many countries substantial investments in rail infrastructure are planned (e.g. in Germany and Austria).

External cost, such as local air pollution, greenhouse gases, noise, congestion, accidents, well-to-tank emission, habitat damage, are not reflected in the costs of transport yet. The external costs associated with heavy goods vehicles are higher in all countries than for rail, often by a factor exceeding 3. The difference would have been even more pronounced if congestion costs (which is mostly absent on the rail due to fixed timetables that already consider capacity constraints) had been included. The societal awareness about this issue is increasing in all countries along the corridor. The willingness to translate this higher awareness into concrete political measures (incentives, taxes etc.) still varies a lot among the different countries.

BUT: If the technological developments in the road sector are successfully introduced in the market (and allowed for by EU and national regulations and infrastructure provisions), the growth potential of the freight rail sector may still be limited due to a persistent lack of competitiveness, in terms of flexibility, speed and reliability (see also results from survey p. 137).

Although cost, time, and quality have been the relevant decision points in the past, the requirements for sustainable transport are growing with a significant impact on related

business models. According to the results from our survey, environmental issues will play a more significant role in the choice of mode of transport in the future; e.g. already today some customers from automotive require 100% green electricity in the logistics chain (as a result from national regulations in Germany).

In the face of environmental and climate concerns being increasingly present in the public discourse, and citizens increasingly expecting policy makers to act upon their concerns, policy makers at the EU level, but also at the national, regional and local level are expected to increasingly support regulations and policies that benefit the environment.

Recommended routing (please refer to figure 1 below)

Based on a two-step-approach, the principal lines, possible diversionary lines and, if suitable, connecting lines have been discussed with the relevant stakeholders and a recommendation for the final routing has been elaborated by the consultant. Final approval will be done by the relevant bodies. The routing contains:

Principal lines (blue),
Diversionary lines (red), and
Connecting lines (yellow) to Ukraine only.

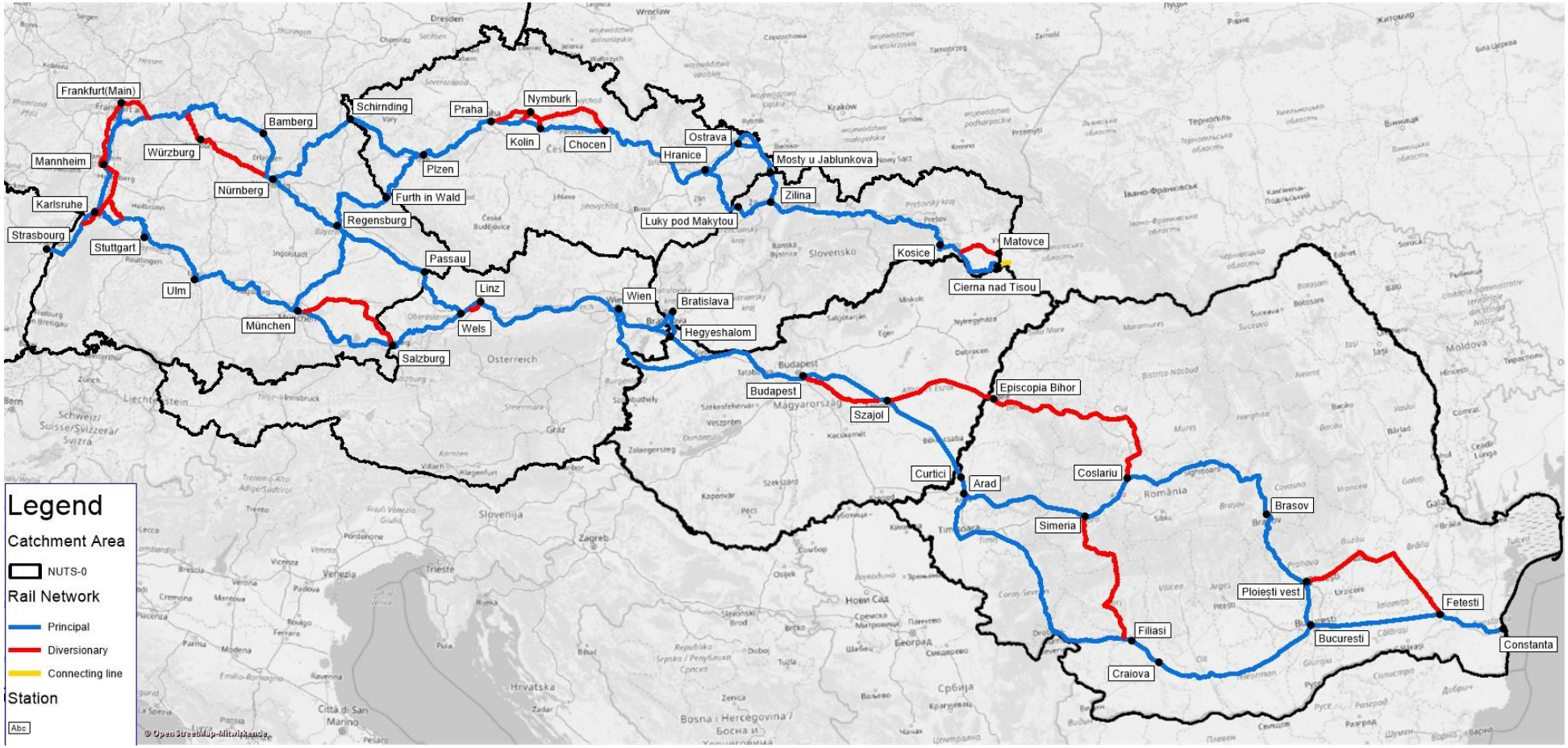


Figure 1: Recommended Routing RFC 9 RHD including principal, diversionary and connecting lines

Current traffic

In the following section the focus is put on corridor trains, defined as international trains passing at least one of the border crossing points defined along the RFC 9 RHD. This filter allows to concentrate on the relevant train numbers within the TMS, as e.g. transports within one and the same country will not be considered. Furthermore, the corridor trains will be reduced to border crossings relevant within the corridor. Thus, transports not directly crossing such a border are automatically filtered and not shown in the overall results.

The following table gives an overview with regard to the O-D Matrix of corridor trains along RFC 9 RHD in 2017 based on the existing data.

from / to	Austria	Czech Republic	France	Germany	Hungary	Romania	Slovakia	Ukraine
Austria				16.500	7.100	100	3.800	
Czech Republic				2.200			6.600	
France				200				
Germany	14.600	2.000	200		600	200	10	
Hungary	7.800			800		5.100		
Romania	100			200	5.100			
Slovakia	4.000	7.100		10				300
Ukraine							300	

Table 1: O-D-Matrix for corridor trains on the RFC 9 RHD in 2017

from / to	Austria	Czech Republic	France	Germany	Hungary	Romania	Slovakia	Ukraine
Austria				45.7000	8.000		6.000	
Czech Republic				33.400			34.700	
France				2.300				
Germany	44.900	23.800	2.400					
Hungary	8.400							
Romania								
Slovakia	6.000	31.600						23.500
Ukraine							23.500	

Table 2: O-D-Matrix for passenger trains on the RFC 9 RHD in 2017

Economic Areas

The following figure shows a graphical match of the recommended routing, all train data with 200 and more corridor trains per year – nearly one train per day – with the economic areas close to the corridor, mining, industrial, and service industry and the so-called ‘blue banana’ with more than 110 million inhabitants. In the Eastern part the Port of Constanta is both the gate to the Black Sea for import-export for the corridor, but even more important also the entry point to the world market for Eastern Countries. Finally, the terminals as hubs within this network are shown including a 50km (red circles) and 100 km (dotted circles) catchment area.

It can be clearly seen, that the RFC 9 RHD is connecting all relevant economic areas; the terminals are giving access to these areas within a suitable catchment area per terminal. Thus again showing that the proposed routing of the corridor aligns with the major economic hubs of the regions in a sensible way.

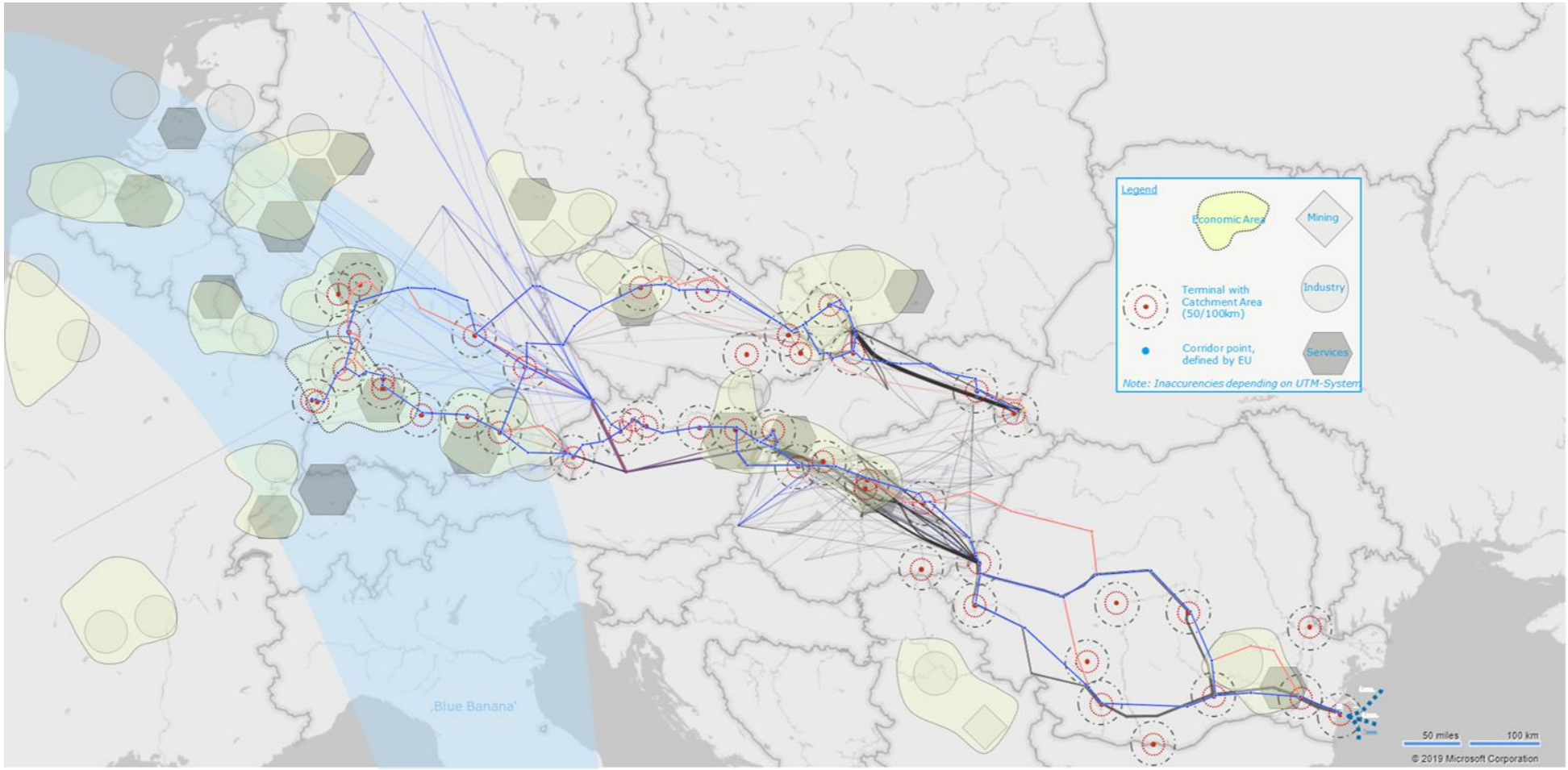


Figure 2: Main routing RFC 9 RHD and economical areas

Projections

Methodology

The traffic forecast is based on findings of the analysis of current situation and the PEST analysis. The results of the comprehensive PEST analysis are described in detail in chapter 3. The major socio-economic factors, having a special influence on the transport development in the corridor for the short-term forecast is the overall GDP development.

The forecast is based on the amount of trains running from country to country, crossing an international border. Here, the share of trains is split into three categories:

BT – Block Trains
CT – Combined Transport Trains
SW – Single Wagon Load Trains

In a next step the average gross and net tons, as well as wagons per train are combined with the amount of trains. The individual multiplication of trains and average tons transforms the basic data from trains into tonnage transported in 2017 per rail. This approach was chosen as forecasts using a Compound Annual Growth Rates (CAGR) for the time span between 2017 and 2022 can only be made on tons and later be transformed back into number of trains.

The utilization of trains has to be considered here as well. Additional tons gained (through growth) will first be covered by increasing the utilization of existing trains before establishing additional services.

The following figure gives an overview on the approach used.

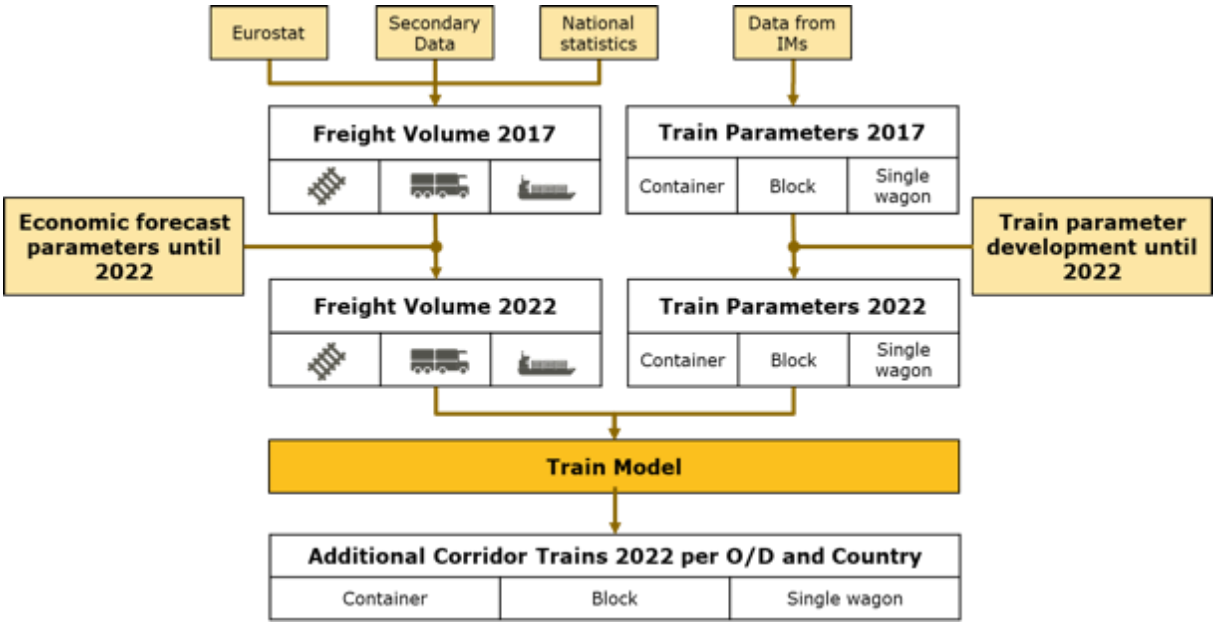


Figure 3: Forecasting process used

Forecast results 2017 - 2022

The following tables are showing the comparison of additional tons and trains for the forecast period. The growth with 7,5 million additional tons will result in 4,500 extra corridor trains along the corridor. Relatively speaking, an overall growth of about 9% in freight per ton will result in a 5 % growth on corridor trains overall, reflecting the increase of efficiency (better load ratio for existing trains) as well.

Category	2017	2022	Absolute growth	Relative growth
BT	48,100,600	52.748.600	4.648.000	8,81%
CT	17,084,100	18.875.100	1.791.000	9,49%
SW	10,168,000	11.192.300	1.024.300	9,15%
Total Tons	**75,352,700**	**82,816,000**	**7,463,300**	**9,01%**

Table 3: Comparison tons regarding BT, CT, and SW – 2017 and 2022

Category	2017	2022	Absolute growth	Relative growth
BT	50,700	53,500	2,800	5.23%
CT	17,500	18,420	920	4.99%
SW	14,900	15,700	800	5.10%
Total Trains	**83,100**	**87,620**	**4,520**	**5.16%**

Table 4: Comparison trains regarding BT, CT, and SW – 2017 and 2022

The following figure shows the destinations on a country level for 2022 and the changes from 2017. The thickness of the connecting line indicates the amount of corridor trains between the countries.

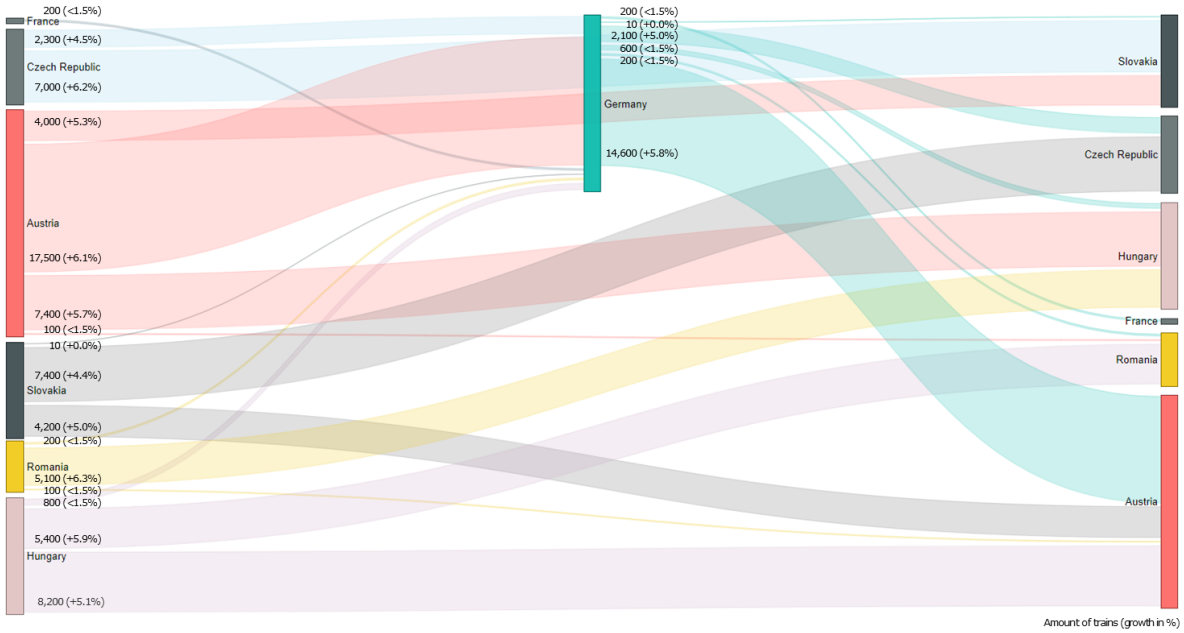


Figure 4: O-D-Graph for corridor trains on RFC 9 RHD in 2022 incl. growth rates from 2017

Results

Based on the results and the overall finding the following conclusions regarding the growth of corridor trains can be drawn from the consultant's point of view:

- The share of combined transport (CT) and single wagon load train (SW) is decreasing from the Western part to the Eastern part of the corridor. Single wagon trains can only survive with substantial governmental support through subsidies (e.g. in Austria). In many countries this willingness decreased substantially in recent years (e.g. in France).
- The increase of block trains to the east is also partly due to the fact that single wagon load trains cannot be clearly separated from this block trains within part of the data sets received. In addition, block trains are cheaper to run, so they are more competitive from a cost perspective.
- Taking into account the estimations of potential declining demands on BT and lower growth on SW plus its complex production system, the main focus in corridor train development should be put on CT along the corridor (especially regarding the development of access points, i.e. terminals) – but not necessarily the only one.
- The potential for higher growth regarding CT is based on the following facts:
    1. The production system itself is a viable solution for future transport requirements and development due to its flexibility.
    2. Shuttle-Systems with standardized transport equipment can be introduced.
    3. There is potential for increasing the utilization of trains with non-cranable semi-trailer (for instance using the Nikrasa technology).
    4. If the CT terminals are upgraded / promoted, then they are very likely to attract cargo from road and thus increase the modal split in favour of rail.

Conclusions and recommendations

Based on the results of a SWOT-Analysis the following conclusions have been developed on how to take advantage of the strengths and opportunities, by minimizing the threats and weaknesses (risks) from an IM point of view (taking into account where the IMs will be able to change or influence the parameters identified within the SWOT-Analysis).

Institutional

A coordinated implementation process concerning the institutional reform steps across all RFC 9 RHD countries in order to maximise the strengths, which the liberalisation brings to freight traffic growth, should be the goal of all stakeholders involved. A harmonised approach will help to overcome the different levels of implementation and harmonisation on the corridor concerning the EU-wide implementation of homogenous technical and safety regulations and rules in all member states of the RFC 9 RHD.

Economic

The future economic developments and the effects on RFC 9 RHD should be closely monitored. And the coherent (i.e. due to the economic development) needs for investments in order to fulfil EU-wide and national policies on moving freight from road to rail communicated. An efficient infrastructure pricing regime keeping rail freight competitive is also of high importance.

Organisational

This study provides the number of corridor trains on the major O/D relations and for specific line sections of the preliminary route for the current situation as well as a forecast for 2022.

These numbers are based in data provided by the IMs and may be used as one input for the development of the Pre-arranged paths (PaP) offer. Nonetheless, it has to be noted, that the current information available on corridor trains is hampered by the different data interfaces and information available in the IMs databases on corridor trains.

The current distribution of corridor trains clearly shows that the majority of corridor trains are not crossing more than 2 corridor borders. And this information is also not fully consistent due to a lack of additional information attached to the trains itself in the database.

This is contrary to the overall distribution of transport volumes along the corridor. This is likely to have its origins in the existing production system, where SW traffic at the border stations/yards is being consolidated into international trains, but also in the change of national to international train numbers (and vice versa) at these stations as well as with trains delayed more than 24hrs receiving new train numbers. This can be easily remedied within the current organisation and should help improve operations, and monitors the effect on the corridor trains in the future.

The establishment of a C-OSS along the whole RFC should be accompanied by the establishment of a transparent pricing and billing regime along RFC 9 RHD for corridor trains (including the national access fee regimes).

Cross-border harmonisation of path information management supporting the complete path management process chain including feasibility study, path request, capacity allocation, train operation monitoring and train performance management, billing and statistical reporting is clearly necessary. Following the standards set by RailNetEurope the related interfaces for information exchange with RU's and IM's should be further implemented and adapted to specific needs of the RFC 9 RHD.

A continuous conduction of regular stakeholder interviews or stakeholder conferences along the corridor, using the information to enhance the services of the C-OSS and to ensure the attractiveness and utilisation of the offered PaPs will clearly benefit the RFC 9 RHD and its commercial success.

Infrastructural, technical and logistical

To allow a higher train utilisation and hence support lowering of operational costs as well as higher transport volumes without additional train path capacity the (gradual) standardisation of technical parameters of network / terminals (depending on traffic demand), following the TEN-T standards for new and upgraded lines (train length 740m train, 22,5 t axle load) should be given priority.

To support further growth of intermodal transport, terminals should be developed according to customer requirements.

The harmonisation of signalling and train control systems with the establishment of ERTMS is also essential for the future success of the corridor.

Within the terminals the extension of storage capacity in coordination/cooperation with the terminal operators should be focused on together with the enhancement of terminal capacities including 7 days/24 hours-operation, where necessary.

Recommendations

Overall the RFC 9 RHD has a potential to attract continental freight load and to connect large Western European Markets with a maritime gate to the East – the Port of Constanta. Aim should be to foster the understanding of the RFC 9 RHD as a backbone, integrating different stakeholders (e.g. ministries, authorities) and forming a robust and attractive transport chain – for pre-, main-and on-carriage. To strengthen the overall competitiveness of rail freight, a focus should be put on the following issues:

- Increasing the availability of suitable (intermodal) transport loading units and (bulk) goods with access points (terminals) including enough storage and transhipment capabilities.
- Harmonized infrastructure approach regarding signalling (ERTMS) and train parameters (train length) and removal of bottleneck (infrastructural, administrative and operational).
- Short-term efficiency to be realized by so-called “soft-measures”, e.g. harmonized administrative processes and handling at borders, coordination of ongoing and planned works resulting in unexpected re-routings in connection with longer running times (see also Rail Technical and Operational Issues affecting Interoperability - Logbook).
- Harmonized processes at borders and enforcing interoperability.
- A harmonization of train data along RFC 9 RHD to allow for an automated data integration, an efficient traffic management (including performance supervision) and a precise definition of ETA in the future is also strongly recommended.
- Implementation of TTR along RFC 9 RHD.
- Implementation of language knowledge in Train Control Centre (English).
- Implementation of an efficient “border–regime” including the use of trusted hand-over (ATTI) among RUs, including “mitigation measures” where necessary, e.g. reduction of language requirements to a reasonable level from a practical point of view.
- Use the almost “historical” window of opportunity for environmental issues to increase political pressure to create a level-playing field among transport modes (e.g. regarding the internalisation of external costs).

4 List of Measures

4.1 Coordination of planned temporary capacity restrictions

Article 12 “Coordination of works” of Regulation (EU) No 913/2010 deals with Planned Temporary Capacity Restrictions (hereinafter referred to as TCRs) on the Corridor:

“the management board shall coordinate and ensure the publication in one place, in an appropriate manner and timeline, of their schedule for carrying out all the works on the infrastructure and its equipment that would restrict available capacity on the freight corridor”.

TCRs are necessary to keep the infrastructure and its equipment in operational condition to secure demanded capacity to satisfy market needs. To minimise their impact TCRs on the Corridor have to be coordinated within and between IMs, consulted with applicants, and published as mentioned above, thus also following the framework laid down in Annex VII to Directive 2012/34/EU (Commission Delegated Decision (EU) 2017/2075).

Coordination of TCRs on the Corridor takes the relevant RailNetEurope (hereinafter referred to as RNE) guidelines into account. The Corridor publishes the information about TCRs in a coordinated manner on the website using an appropriate IT tool.

More details are provided in chapter 4 of CID Book 4, – Coordination and publication of planned temporary capacity restrictions.

4.2 Corridor OSS

The tasks of the C-OSS, legal background and related documentation are described in Chapter 2 of CID Book 4 (and in the possible future C-OSS Operational Rules).

4.3 Capacity Allocation Principles

The current measures are described in Chapter 3 of CID Book 4.

4.4 Applicants

The current measures are described in point 3.2 of CID Book 4.

4.5 Traffic Management

In line with Article 16 of Regulation, the Management Board has put in place procedures for coordinating traffic management along the Corridor.

Traffic Management is the prerogative of the national IMs and is subject to national operational rules. The goal of Traffic Management is to guarantee the safety of train traffic and achieve high quality performance. Daily traffic shall operate as close as possible to the planning.

In case of disturbances, IMs work together with the RUs concerned and neighbouring IMs in order to limit the impact as far as possible and to reduce the overall recovery time of the network.

National IMs coordinate international traffic with neighbouring countries on a bilateral level. In this manner, they ensure that all traffic on the network is managed in the most optimal way. Detailed rules and procedures are described in Chapter 5 of CID Book 4.

4.6 Traffic Management in Event of Disturbance

The goal of traffic management in case of disturbance is to ensure the safety of train traffic, while aiming to quickly restore the normal situation and/or minimise the impact of the disruption. The overall aim should be to minimise the overall network recovery time.

In order to reach the above-mentioned goals, traffic management in case of disturbance needs an efficient communication flow between all involved parties and a good degree of predictability, obtained by applying predefined operational scenarios at the border.

The communication procedure and the available tools are described in Chapter 5 of CID Book 4.

4.6.1 International contingency Management Planning (ICM)

As the consequence of the Rastatt incident, DB Netz AG and RFC Rhine-Alpine early 2018 made an initiative to set up a Handbook for proper handling of international disturbances in duration of longer than 72 hours. After concluding the key elements and conclusions of the Rastatt incident a working document was elaborated which initiative was also supported by the sector and by the European Commission (DG Move).

In the ICM Handbook there is a detailed description about solutions to support the concerned dispatchers in case of big incidents. RNE will continuously update this document, which is the basic document for RFCs in Europe.

The members of the Operations & Performance Working Group (OP WG) provide the data to set up the rerouting overview and operational scenario. The MB approves the document in due time and it will be uploaded to the Corridor website. The Excel file consists of all the parameters of the available alternative routes if there is a disruption with a forecasted impact on the affected section of more than three calendar days or a disruption with high impact on international traffic.

The available re-routing overview is considered as the first step, and it could be developed in the future. If the costumers need more information for such cases, OP WG is the responsible body on the Corridor to discuss the proposals and work out a solution. The efficiency of the re-routing overview would be higher if the existing plans of RUs could be involved into the document.

4.7 Quality Evaluation

The provisions of Article 19 of the Regulation set requirements regarding the quality evaluation of rail freight services on the Corridor.

The performance of the Corridor is measured through indicators and targeted customer satisfaction surveys.

4.7.1 Performance Monitoring Report

According to Article 19 (2) of the Regulation the Management Board monitors the performance of rail freight services on the Corridor and publishes the results once a year. In order to fulfil this obligation and in parallel to have a harmonised RFC Network approach, the Corridors together with RNE elaborated the Guidelines of Key Performance Indicators of Rail Freight Corridors in 2015.

Based on the gained experiences and market feedback the common indicators have been fine-tuned and the RNE General Assembly approved the version 3.0 of the Guidelines in 2019.

On RFC Rhine-Danube the following common key performance indicators (KPIs) are measured:

Capacity Management					
Name of KPI	**Calculation formula**	**Source of data**	**Responsible entity**	**Timing of calculation**	**Other**
Volume of offered capacity (PaPs)	Km*days offered where km means PaP km between operation points without feeder and outflow sections	PAMT report in PCS	C-OSS	At X-11	There is a correction phase of the offer between X-11 – X-10.5 which has to be taken into consideration in the final KPI figure.
Volume of requested capacity (PaPs)	Km*days requested	PAMT report in PCS	C-OSS	At X-8	Feeder and outflow sections are not included.
Volume of requests (PaPs)	Number of PCS dossiers submitted	PAMT report in PCS	C-OSS	At X-8	
Number of conflicts (PaPs)	Number of PCS dossiers submitted which are in conflict with at least one other PCS dossier for PaPs on the same RFC	PAMT report in PCS	C-OSS	At X-8	Requests on PaPs are counted, not requested PaPs.

Name of KPI	Calculation formula	Source of data	Responsible entity	Timing of calculation	Other
Volume of pre-booked capacity (PaPs)	Km*days (pre-booking phase)	PAMT report in PCS	C-OSS	At X-7.5	Feeder and outflow sections are not included.
Volume of offered capacity (RC)	Km*days offered	PAMT report in PCS	C-OSS	At X-2	
Volume of requested capacity (RC)	Km*days requested	PAMT report in PCS	C-OSS	At X+12	
Volume of requests (RC)	Number of PCS dossiers requested	PAMT report in PCS	C-OSS	At X+12	
Average planned speed of PaPs	Average of the planned commercial speed of the PaPs on the O/D pair concerned per direction	PAMT report in PCS	C-OSS	At X-11	On pre-defined O/Ds per RFC (or on adjacent RFCs), the running time of all PaPs covering the entire O/D is taken, and the speed is calculated taking into account the length of the O/D axis. Calculated and published per O/D pair. The RFC may calculate an average figure in addition.

Operations					
Name of KPI	**Calculation formula**	**Source of data**	**Responsible entity**	**Timing of calculation**	**Other**
Punctuality at origin	The share of all RFC-related trains at RFC entry with a delay less than, or equal to, the threshold compared to all RFC-related trains at RFC entry.	TIS	OP WG	At the end of January after the timetable year concerned	International freight trains crossing a border of an RFC are considered as RFC trains in the calculation. 'Origin' is considered as RFC entry. The calculation is done both with 30-minute and 15-minute punctuality thresholds.
Punctuality at destination	The share of all RFC-related trains at RFC exit with a delay less than, or equal to, the threshold compared to all RFC-related trains at RFC exit.	TIS	OP WG	At the end of January after the timetable year concerned	International freight trains crossing a border of an RFC are considered as RFC trains in the calculation. 'Destination' is considered as RFC exit. The calculation is done both with 30-minute and 15-minute punctuality thresholds.
Overall number of trains on the RFC	Total number of train runs having a RA on selected pairs of border points	TIS	OP WG	At the end of January after the timetable year concerned	International freight trains crossing a border of an RFC are considered as RFC trains in the calculation. Pairs of border points are TIS points defined by the RFCs.

Market Development					
Name of KPI	**Calculation formula**	**Source of data**	**Responsible entity**	**Timing of calculation**	**Other**
Overall number of trains per border	Number of commercial freight trains crossing selected border points	IMs' national tools	OP WG	At the end of January after the timetable year concerned	No locos and service trains should be considered. Calculated per border. One IM per border point should provide the data to the RFC.
Ratio of the capacity allocated by the C-OSS and the total allocated capacity	Number of trains allocated in the yearly timetable by the C-OSS per RFC border/the total number of allocated international freight trains in the yearly timetable per RFC border	PCS for RFC capacity IMs' national tools for total allocated capacity	C-OSS & Capacity WG	In December before the start of the timetable year	Calculated per border

The above mentioned KPIs will be published in the yearly performance report of the Corridor to fulfil the requirements of Article 19 (2) of the Regulation.

The Management Board reserves the right to implement further corridor specific indicator(s) in case of necessity.

4.7.2 User Satisfaction Survey

According to Article 19 of the Regulation the quality of service on the Corridor will be mesured through user satisfaction surveys conducted on a yearly basis. Inputs for this survey are delivered by the RAG/TAG members.

4.8 Corridor Information Document

According to Article 18 of Regulation the MB is obliged to publish Corridor Information Documents providing information on the rail infrastructure of each Rail Freight Corridor (RFC), in particular as regards commercial and legal access conditions, thus facilitating the Applicants' international business on RFCs. The Corridor Information Documents are published at least three months prior to the deadline for requests for infrastructure capacity.

The planned dates of the first publication of the Corridor Information Document Books are the following:

No	Title	Date of first publication
1	Generalities	12th October 2020
2	Network Statement Excerpts	12th October 2020
3	Terminal Description	12th October 2020
4	Procedures for Capacity and Traffic Management	12th October 2020
5	Implementation Plan	12th October 2020

The Corridor Information Document Books shall be published – in case an update is needed – by the 2nd Monday of January of the concerned year together with the PaP catalogue.

5 Objectives and performance of the corridor

The performance of the Corridor is mainly monitored via the KPIs set in Chapter 4.7.1. Objectives and possible targets can be defined by the Management Board.

5.1 Punctuality

Improving the punctuality of freight trains running on the Corridor is essential in order to increase the share of rail in the model split. Therefore, one of the Corridor's focus points is to undertake effective measures to put Train Performance Management (hereinafter TPM) to the next level.

Generally, the punctuality of a train will be measured on the basis of comparisons between the time planned in the timetable of a train identified by its train number and the actual running time at certain measuring points. A measuring point is a specific location on the route, where the trains running data is recorded. The comparison should always be done with an internationally agreed timetable for the whole train run.

Punctuality is calculated as the percentage of punctual trains out of the total number of trains. The calculation is done for two thresholds: 30 minutes and 15 minutes.

Punctuality objectives (30 min threshold): at least 60 % at origin and 60 % at destination.

The codified reasons for delay, in accordance with UIC leaflet 450-2, will be used for continuous and systematic monitoring.

5.2 Capacity

The C-OSS handles exclusively the capacity products on the Corridor (Pre-arranged Paths (hereinafter referred to as PaPs), Reserve Capacity etc.). PaPs for the annual timetable are provided by the IMs/AB to the C-OSS. The PaPs are based on standard parameters for rail freight and previously coordinated between the IMs/AB at the borders so to enable for attractive running times. The path catalogue of PaPs will be published by the C-OSS by the 2nd Monday of January of each year for the next timetable period. Reserve Capacity on the Corridor is available from October of each year on, to allow for ad-hoc path applications. The offer of the C-OSS will be displayed in the IT-application PCS (Path Coordination System) provided by RNE. According to the Regulation the aim is to offer capacity via the C-OSS is to have "one

face to the customer" for international path requests along the Corridor and at the end harmonized path offers across at least one border. Furthermore, the decision on the PaP pre-allocation will be done by the C-OSS by the end of April for the entire international PaP segment on basis of one harmonized allocation rule. As a result, the RUs will get an earlier information about the PaP pre-allocation.

Regardless of the above-mentioned procedures, there is a strong need from the market for more and better flexible and ad-hoc capacity products in order to ensure the competitiveness of rail compared to road transport. Meeting this requirement makes it necessary to develop an appropriate strategy on offering such kind of capacity products. Initiatives like the Timetable Redesign project of RNE could lead to a satisfactory solution of this issue.

5.3 Publication of performance information

In order to fulfil the requirements of Article 19 (2) of the Regulation yearly performance reports will be elaborated. The reports will be uploaded to the Corridor's website (http://rfc-rhine-danube.eu) and to the Customer Information Platform (hereinafter referred to as CIP). These yearly reports will always contain the actual figures of KPIs listed in Chapter 4.7.1.

Reporting elements to be published	**Location**
Key performance indicators	Corridor's and RNE's website
Monthly train performance reports	Corridor's website and CIP
Results of the yearly User Satisfaction Survey	Corridor's website and CIP

Detailed information about train performance management can be found in Chapter 6 of CID Book 4.

6 Investment Plan

6.1 Capacity Management Plan

The Corridor's Capacity Management Plan can be found in Annex 6.1.

6.2. List of Projects

The list of planned infrastructure development projects along the corridor can be found in Annex 6.2.

6.3 Deployment Plan

The ERTMS Deployment Plan of the Corridor can be found in Annex 6.3.

6.4 Reference to Union Contribution

The Infrastructure Managers and Allocation Body of the Corridor are beneficiaries of the Connecting Europe Facility (CEF) - Programme Support Action (PSA) on the basis of the Multi-annual Work Programme 2014-2020, entitled "Establishment of the Rail Freight Corridor Rhine-Danube (RFC 9)", action number 2016-PSA-RFC09.

The Action is a Programme Support Action in the meaning of Article 2(7) and 7(2)(j) of the CEF Regulation (EU) n°1316/2013 establishing the Connecting Europe Facility and contributes to the preparation of the following pre-identified project on the core network: Rail Freight Corridors (RFCs) established and developed in line with Regulation (EU) No 913/2010 forming the rail freight backbone of the TEN-T Core Network Corridors.

The Project Management activity itself is undertaken by the mandated Coordinator for the conclusion and management of the Grant Agreement (action number 2016-PSA-RFC11), which is ÖBB-Infrastruktur AG. There are 9 cooperating Parties in the PSA 8 IMs and 1 AB.

Besides the activities in connection with necessary activities for the implementation, a Study examining all types of bottlenecks (e.g. infrastructural, operational, administrative, capacity) is going to be carried out.

The Grant Agreement entered into force on 27/06/2018.

The Action concerns studies, managerial structures and activities for the establishment and the development of the Corridor in line with the provisions of Regulation (EU) No 913/2010 of 22 September 2010 (RFC Regulation). The general objective of the Action is to establish and have the Corridor operational by 10 November 2020, as defined in the Regulation.

Annexes

No	Title
6.1	Capacity Management Plan
6.2	List of projects
6.3	Deployment plan

Germany

Member state	IM	Line	Section		Bottleneck	Reasons	Suggestions how to Remove Bottlenecks			
			From	To			Project Name and Description	End Date	Costs in mil. of Euro	Financial Sources
Germany	DB Netz	Kehl - Appenweier	Kehl	Appenweier	travel time	Agreement between DE/FR to reduce travel time	ABS Kehl - Appenweier	2028		state budget
Germany	DB Netz	Stuttgart - München	Wendlingen	Ulm	capacity	More capacity for passenger- and freight trains is needed in this relation	NBS Wendlingen - Ulm	2025		state budget
Germany	DB Netz	Stuttgart - München	Ulm	Augsburg	capacity	More capacity for passenger- and freight trains is needed in this relation	ABS/NBS Ulm - Augsburg	Beyond 2030		state budget
Germany	DB Netz	Nürnberg - Schirnding (DE/CZ)	Nürnberg	Schirnding	no electrification	Not electrified	ABS Nürnberg - Marktredwitz - Border DE/CZ (- Cheb)	Beyond 2030		state budget
Germany	DB Netz	München - Mühldorf - Freilassing	Markt Schwaben	Freilassing	capacity	Not electrified and more capacity for freight trains is needed between Munich and AT	ABS Müchen - Mühldorf - Freilassing	Beyond 2030		state budget

Austria

Member state	IM	Line	Section		Bottleneck	Reasons	Suggestions How to Remove Bottlenecks			
			From	To			Project Name and Description	End Date	Costs in mil. of Euro	Financial Sources
Austria	ÖBB Infrastruktur	Principal line	Freilassing	Salzburg						
Austria	ÖBB Infrastruktur	Principal line	Salzburg	Steindorf bei Strasswalchen	2 track section on a predominant 4 track route	timetable based capacity overload	4 track upgrade		36 (planning only)	State (Rahmenplan 2018 - 2023)
Austria	ÖBB Infrastruktur	Principal line	Steindorf bei Strasswalchen	Vöcklabruck						
Austria	ÖBB Infrastruktur	Principal line	Vöcklabruck	Wels						
Austria	ÖBB Infrastruktur	Principal line	Passau Germany	Pyret						
Austria	ÖBB Infrastruktur	Principal line	Pyret	Grieskirchen						
Austria	ÖBB Infrastruktur	Principal line	Grieskirchen	Wels						
Austria	ÖBB Infrastruktur	Principal line	Wels	Linz	2 track section on a predominant 4 track route	timetable based capacity overload	4 track upgrade	2026	1 252	State (Rahmenplan 2018 - 2023)
Austria	ÖBB Infrastruktur	Principal line	Linz	Enns	only a short 2 track section between Linz Hbf and Linz Kleinmünchen on a predominant 4 track route	timetable based capacity overload	4 track upgrade	2030	451	State (Rahmenplan 2018 - 2023)
Austria	ÖBB Infrastruktur	Principal line	Enns	Amstetten						
Austria	ÖBB Infrastruktur	Principal line	Amstetten	St. Pölten						
Austria	ÖBB Infrastruktur	Principal line	St. Pölten	Wien						
Austria	ÖBB Infrastruktur	Principal line	Wien	Bruck a. d. Leitha						
Austria	ÖBB Infrastruktur	Principal line	Bruck a. d. Leitha	Parndorf						
Austria	ÖBB Infrastruktur	Principal line	Parndorf	Kittsee	single track line but no bottleneck currently					
Austria	ÖBB Infrastruktur	Principal line	Kittsee	Bratislava Slovakia	single track line but no bottleneck currently					
Austria	ÖBB Infrastruktur	Principal line	Parndorf	Nickelsdorf						
Austria	ÖBB Infrastruktur	Principal line	Wien	Ebenfurth	section wise single track line	timetable based capacity overload	Pottendorfer Line; double track upgrade	2026	680	State (Rahmenplan 2018 - 2023)
					train movements in Ebenfurth necessary to reach GYSEV line	missing connection link between Vienna and Sopron	junction Ebenfurth	2026	205	State (Rahmenplan 2018 - 2023)

Czech Republic

Member state	IM	Line	Section		Bottleneck	Reasons	Suggestions How to Remove Bottlenecks			
			From	To			Project Name and Description	End Date	Costs in mil. of Euro	Financial Sources
Czech Republic	SŽCZ	Praha – Česká Třebová	Praha	Česká Třebová	Line capacity consumption	5:00-20:00 capacity over 100 %				
Czech Republic	SŽCZ	Česká Třebová – Ústí nad Orlicí	Česká Třebová	Parník	Max. speed 75 - 90 km/h					
Czech Republic	SŽCZ	Ústí nad Orlicí – Brandýs nad Orlicí	Ústí nad Orlicí	Brandýs nad Orlicí	Max. speed 80 - 85 km/h					
Czech Republic	SŽCZ	Brandýs nad Orlicí – Choceň	Brandýs nad Orlicí	Choceň	Max. speed 80 - 85 km/h					
Czech Republic	SŽCZ	Praha node	Praha-Hostivař	Praha hl. n.	Speed drops, capacity		Optimization of the line Praha Hostivar - Praha hl.n. , 1st part (Praha Freight Bypass)	2021		
Czech Republic	SŽCZ	Přerov railway junction	Přerov	Přerov	Speed drops, capacity		Upgrade of Přerov railway junction, 2. phase	2021		
Czech Republic	SŽCZ	Praha node	Praha-Hostivař	Praha hl. n.	Line capacity consumption		Optimization of the line Praha-Hostivař – Praha hl.n., 2nd part - Praha-Hostivař – Praha hl.n.	2021		
Czech Republic	SŽCZ	Praha node	Praha hl. n.	Praha-Smíchov	Line capacity consumption		Upgrade of the Praha hl. n. – Praha-Smíchov railway line	2025		
Czech Republic	SŽCZ	Velim (including) – Poříčany (including)	Velim	Poříčany	unsatisfactory current state of the infrastructure	unsatisfactory current state of the infrastructure	Removing selected bottlenecks on pre-identified sections on the Core Network Corridors	2024		
Czech Republic	SŽCZ	Choceň (excluding) – Uhersko (including)	Choceň	Uhersko	unsatisfactory current state of the infrastructure	unsatisfactory current state of the infrastructure	Removing selected bottlenecks on pre-identified sections on the Core Network Corridors	2024		
Czech Republic	SŽCZ	Ústí nad Orlicí (excluding) – Brandýs nad Orlicí (including)	Ústí nad Orlicí	Brandys nad Orlicí	unsatisfactory current state of the infrastructure	unsatisfactory current state of the infrastructure	Removing selected bottlenecks on pre-identified sections on the Core Network Corridors	2024		
Czech Republic	SŽCZ	Lipník nad Bečvou (including) – Drahotuše	Lipník nad Bečvou	Drahotuše	unsatisfactory current state of the infrastructure	unsatisfactory current state of the infrastructure	Removing selected bottlenecks on pre-identified sections on the Core Network Corridors	2024		
Czech Republic	SŽCZ	Polom (including) – Suchdol nad Odrou (including) railway line RHD	Polom	Suchdol nad Odrou	unsatisfactory current state of the infrastructure	unsatisfactory current state of the infrastructure	Removing selected bottlenecks on pre-identified sections on the Core Network Corridors	2024		

Slovakia

Member state	IM	Line	Section		Bottleneck	Reasons	Suggestions How to Remove Bottlenecks			
			From	To			Project Name and Description	End Date	Costs in mil. of Euro	Financial Sources
Slovakia	ŽSR	Púchov - Žilina	Púchov	Považská Teplá	Reduced Capacity	Construction works	Púchov - Považská Teplá: railway modernisation to 160 km/h	2021	378	EU funds
Slovakia	ŽSR	Púchov - Žilina	Žilina zr.st	Žilina	Reduced speed	Tracks	Construction of maintenance centre for passenger railway vehicles in Zilina	2023	284	EU funds
Slovakia	ŽSR	Žilina - Spišská Nová Ves	Liptovský Mikuláš	Štrba	Reduced weight of the train, additional loco is required	Geological character of the landscape	Modernisation of railway line Žilina – Košice, section Lipt. Mikuláš – Poprad-Tatry (beyond), implementation phase Paludza – Lipt. Hrádok and Modernisation of railway line Žilina – Košice, section Lipt. Mikuláš – Poprad-Tatry (beyond), implementation phase Poprad-Tatry – Lučivná	2024	500	EU funds
Slovakia	ŽSR	Žilina - Spišská Nová Ves	Spišská Nová Ves	Štrba	Reduced weight of the train, additional loco is required	Geological character of the landscape	Modernisation of railway line Žilina – Košice, section Lipt. Mikuláš – Poprad-Tatry (beyond), implementation phase Paludza – Lipt. Hrádok and Modernisation of railway line Žilina – Košice, section Lipt. Mikuláš – Poprad-Tatry (beyond), implementation phase Poprad-Tatry – Lučivná	2024	500	EU funds
Slovakia	ŽSR	Spišská Nová Ves - Košice	Košice	Košice nákl.st.	Reduced length of the trains	Character of the Košice nákl.st. station	TBD			
Slovakia	ŽSR	Košice - Čierna nad Tisou	Nižná Myšľa	Ruskov	Reduced weight of the train, additional loco is required	Geological character of the landscape	TBD			
Slovakia	ŽSR	Košice - Čierna nad Tisou	Ruskov	Kuzmice	Reduced weight of the train, additional loco is required	Geological character of the landscape	TBD			
Slovakia	ŽSR	Čierna nad Tisou - Čop (UA)	Čierna nad Tisou	Čop	Reduced Capacity	customs inspections on the wide track	Out of competence			

Hungary

Member state	IM	Line	Section		Bottleneck	Reasons	Suggestions How to Remove Bottlenecks			
			From	To			Project Name and Description	End Date	Costs in mil. of Euro	Financial Sources
Hungary	GYSEV	1d	**Rajka**	Hegyeshalom	Rajka - Hegyeshalom	single track; max. 100 km/h track speed; max. 21 t axle load; track conditions deteriorating	Modernisation, upgrade of railw ay infrastructure		62	n/a
Hungary	GYSEV	8	**Sopron**	Győr	Sopron-Rendező - Pinnye	single track line; max. 100 km/h track speed; max. 21 t axle load; at least hourly regular interval commuter trains; every tw o hours Intercity trains; no ETCS/ERTMS	Modernisation, upgrade of railw ay infrastructure, construction of 2nd track			n/a
Hungary	GYSEV	8	**Sopron**	Győr	Pinnye - Fertőszentmiklós	single track line; max. 120 km/h track speed; max. 21 t axle load; at least hourly regular interval commuter trains; every tw o hours nterCity trains; no ETCS/ERTMS	Modernisation, upgrade of railw ay infrastructure, construction of 2nd track			n/a
Hungary	GYSEV	8	**Sopron**	Győr	Fertőszentmiklós - Petőháza	single track line; max. 100 km/h track speed; max. 21 t axle load; at least hourly regular interval commuter trains; every tw o hours Intercity trains; no ETCS/ERTMS	Modernisation, upgrade of railw ay infrastructure, construction of 2nd track			n/a
Hungary	GYSEV	8	**Sopron**	Győr	Csorna - Győr	single track line; max. 120 km/h track speed; max. 21 t axle load; high density of passenger trains at least hourly regular interval commuter trains; every hours Intercity trains; no ETCS/ERTMS	Modernisation, upgrade of railw ay infrastructure, construction of 2nd track		222	n/a
Hungary	MÁV	1	**Hegyeshalom border**	Hegyeshalom		-	-			
Hungary	MÁV	1	**Hegyeshalom border**	Győr	-	-	-			
Hungary	MÁV	1	**Győr**	Tatabánya	Almásfüzitő - Komárom	Lack of capacity	Track renew al and capacity improvment			
Hungary	MÁV	1	**Tatabánya**	Budapest	Danube bridge	Lack of capacity	Bridge renew al and capacity improvment			
					Kelenföld - Budaörs	Lack of capacity	Track renew al and capacity improvment			
Hungary	MÁV	120	**Budapest**	Szolnok	Lack of ETCS	Implementation in progress	ETCS L2 omplementation			
					Nagykáta - Újszász	Lack of capacity	Track renew al and capacity improvment			
					Rákos - Szolnok	Lack of capacity	Central traffic management improvement			
Hungary	MÁV	120	**Solnok**	Szajol	Lack of ETCS	Implementation in progress	ETCS L2 omplementation			
Hungary	MÁV	120	**Szajol**	Gyoma	Lack of ETCS	Implementation in progress	ETCS L2 omplementation			
Hungary	MÁV	120	**Gyoma**	Lökösháza	Lack of ETCS	Implementation in progress	ETCS L2 omplementation			
					Gyoma - Békéscsaba	Lack of capacity	Modernisation of signaling			
					Békéscsaba - Lökösháza	Lack of capacity	2nd track			
Hungary	MÁV	120	**Lökösháza**	Lökösháza border	Lack of ETCS	Implementation in progress	ETCS L2 omplementation			
Hungary	MÁV	101	**Szajol**	Püspökladány	Lack of ETCS	Implementation in progress	ETCS L2 omplementation			
Hungary	MÁV	101	**Püspökladámy**	Biharkeresztes	Lack of ETCS	Implementation in progress	ETCS L2 omplementation			
Hungary	MÁV	101	**Biharkeresztes**	Biharkeresztes border	Lack of ETCS	Implementation in progress	ETCS L2 omplementation			

Romania

Member state	IM	Line	Section		Bottleneck	Reasons	Suggestions How to Remove Bottlenecks			
			From	To			Project Name and Description	End Date	Costs in mil. of Euro	Financial Sources
Romania	CFR	Principal	Border HU/RO	Curtici	- Rehabilitated corridor section equipped with ERTMS-ETCS Level 2/GSM-R, which is not in operation; - Long waiting time in Curtici station. - The double track open line does not continue in Hungary.	- Trains are not handed over on trust (ATTI); - The Curtici station is not fully equipped with electronic interlocking system; - The Curtici station is not equipped with an electronic gauge control gate; - The border crossing operational rules between CFR and MAV are not harmonized (e.g. the buffer wagons); - The Intergovernmental Railway Agreement Romania-Hungary is not updated (harmonization of the control performed by the state authorities); - Commissioning of ERTMS/GSM-R is under preparation.	Trusted handover of freight trains in Curtici station (ATTI) Pilot Project	2020	-	-
							Fully equipping the Curtici station with electronic interlocking system	Proposals		
							Equipping of Curtici station with an electronic gauge control gate			
							Harmonization of the border crossing operational rules between CFR and MAV			
							Updating of the Intergovernmental Railway Agreement between Romania and Hungary			
			Curtici	Km 614 (Radna)	- Rehabilitated corridor section equipped with ERTMS-ETCS Level 2/GSM-R, which is not in operation.	- Commissioning of ERTMS-ETCS Level 2/GSM-R is under preparation.	Commissioning the ERTMS-ETCS Level 2/GSM-R within the rehabilitation project	2020	-	Cohesion funds + State Budget
			Km 614 (Radna)	Simeria	- Corridor section under rehabilitation, with ERTMS-ETCS Level 2/GSM-R under construction.	- The rehabilitation works are under execution; - Maximum train length (632 m - Deva station).	Rehabilitation of Km 614 (Radna) - Simeria line section at corridor level	2022	1 707,190	
			Simeria	Coșlariu		- The rehabilitation works are under execution; - Maximum train length (600 m).	Rehabilitation of Simeria - Coșlariu line section at corridor level	2021	464,246	
			Coșlariu	Sighișoara		- The rehabilitation works are under execution; - Maximum train length (600 m); - Speed restrictions.	Rehabilitation of Coșlariu - Sighișoara line section at corridor level		517,426	
			Sighișoara	Brașov	- Corridor section not rehabilitated and without ERTMS-ETCS Level 2/GSM-R.	- The rehabilitation works are in the tendering/awarding stage; - Maximum train length (600 m); - Speed restrictions.	Rehabilitation of Sighișoara - Brașov line section at corridor level	2024	1 335,640	CEF + State Budget
			Brașov	Predeal		- The elaboration of Feasibility Study for rehabilitation is in the tenders evaluation stage; - Maximum train length (640 m); - Maximum tonnage permitted on the line section; - Traffic restrictions for oversized transports due to existing tunnels.	Rehabilitation of Brașov - Predeal line section at corridor level	2027	418,000	Cohesion funds + State Budget
			Predeal	Constanța	- Rehabilitated corridor section equipped with ERTMS-ETCS Level 1/GSM-R, which is not in operation.	- The Feasibility Study for solution of commissioning ERTMS/GSM-R on Predeal-București-Constanța line section is under preparation for tendering; - Scarce capacity on Ploiești Triaj - Brazi line section; - Tonnage restrictions on Fetești - Saligny (2.200 t).	Commissioning the ERTMS/GSM-R (ETCS Level 1 or possible migration to ETCS Level 2) on Predeal - București - Constanța line section	2025	200,000	LIOP + State Budget

Romania

Member state	IM	Line	Section		Bottleneck	Reasons	Suggestions How to Remove Bottlenecks			
			From	To			Project Name and Description	End Date	Costs in mil. of Euro	Financial Sources
Romania	CFR	Principal	Arad	Timișoara	- Corridor section not rehabilitated and without ERTMS-ETCS Level 2/GSM-R.	- The Feasibility Study for rehabilitation is under elaboration; - Single track line; - Speed restrictions.	Rehabilitation of Arad - Timișoara line section at corridor level	2023	421,800	LIOP + State Budget
			Timișoara	Caransebeș		- The Feasibility Study for rehabilitation is under elaboration; - Single-track line; - Speed restrictions.	Rehabilitation of Timișoara - Caransebeș line section at corridor level		725,200	LIOP + State Budget
			Caransebeș	Craiova		- The Feasibility Study for rehabilitation is under elaboration; - Single track line (Caransebeș - Strehaia); - Speed restrictions; - Tonnage restrictions (Balota 1.000 t).	Rehabilitation of Caransebeș - Craiova line section at corridor level	2026	1 520,000	CEF + State Budget
			Craiova	București (Pajura Hm)		- The project for removing the speed restrictions (quick-wins) is under preparation for promotion; - Speed restrictions; - Track I closed on Malu Mare - Banu Mărăcine line section for rehabilitation works.	Removal of the speed restrictions on Craiova - București (Pajura Hm) line section	2022	41,800	LIOP + State Budget
						- The project for rehabilitation has not been promoted yet; - Speed restrictions.	Rehabilitation of Craiova - București (Hm Pajura) line section at corridor level	2025	836,000	Cohesion Funds + State Budget
		Diversionary	Ploiești Triaj	Buzău	- Line section not rehabilitated and without ERTMS-ETCS Level 2/GSM-R.	- The Feasibility Study for rehabilitation is under tenders evaluation stage; - Restrictions, speed restrictions; - Maximum train length permitted on the line section (Valea Călugărească - Buzău 650 m).	Rehabilitation of Ploiești Triaj - Buzău line section		345,600	Cohesion funds + State Budget
			Buzău	Fetești		- The project for rehabilitation has not been promoted yet; - Speed limitations and restrictions; - Maximum train length permitted on the line section (540 m).	Rehabilitation of Buzău - Fetești line section	2029	516,000	ERDF + State Budget
			Simeria	Filiași		- The project for rehabilitation has not been promoted yet; - Single track line (Livezeni - Tg. Jiu); - Maximum train length permitted on the line section (600 m); - Tonnage restrictions (Tg, Cărbunești 2.000 t).	Rehabilitation of Simeria - Petroșani - Filiași line section	2026	853,300	Structural funds + State Budget
			Coșlariu/Pod Mureș	Cluj		- The project for rehabilitation has not been promoted yet.	Rehabilitation of Coșlariu/Pod Mureș - Teiuș - Cluj line section	2029	562,000	Cohesion funds + State Budget
			Cluj	Border RO/HU		- The Feasibility Study for rehabilitation is under elaboration; - Single track line (Poieni - Aleșd); - Diesel traction (non-electrified line); - Stations equipped with SBW systems; - Lack of Automatic Block System in the open line.	Rehabilitation of Cluj - Episcopia Bihor - Border RO/HU line section	2023	1 250,000	

Germany

Status	Member state	IM	Line	Section		Category	Project name	Specification	Note	Start		End		Reached parameters						
				From	To					Month	Year	Month	Year	Estimated Financial	Financial Sources	Maximum speed [km*h^{-1}]	Axle load [t] / Line category	Maximum Train Lenght [m]	Traction power	ETCS Level	Track clearance	Interm. Code
Planned	Germany	DB Netz	Kehl - Appenweier	Kehl	Appenweier	Principal line	ABS Kehl - Appenweier	ETCS Implementation	Speed increase				2028			160	22,5	740	Electrified	Level 2	unknown	P/C 410/80
Under Construction	Germany	DB Netz	Stuttgart - München	Wendlingen	Ulm	Principal line	NBS Wendlingen - Ulm	Other	New construction of this line increases capacity on the existing freight traffic line between Stuttgart and Ulm				2025			250	22,5	740	Electrified	Level 2	GC	P/C 410/80
Planned	Germany	DB Netz	Stuttgart - München	Ulm	Augsburg	Principal line	ABS/NBS Ulm - Augsburg	Other	Partly new construction				Beyond 2030			250	22,5	740	Electrified	Level 2	GC	P/C 410/80
Planned	Germany	DB Netz	Nürnberg - Schirnding (DE/CZ)	Nürnberg	Schirnding	Principal line	ABS Nürnberg - Marktredwitz - Border DE/CZ (- Cheb)	Electrification					Beyond 2030			160	22,5	740	Electrified		GC	P/C 410/80
Planned	Germany	DB Netz	München - Mühldorf - Freilassing	Markt Schwaben	Freilassing	Diversionary line	ABS Müchen - Mühldorf - Freilassing	Electrification	double tracks				Beyond 2030			160	22,5	740	Electrified		GC	P/C 410/80

Austria

Status	Member state	IM	Line	Section		Category	Project name	Specification	Start		End		Reached parameters							
				From	To				Month	Year	Month	Year	Estimated Financial Requirments	Financial Sources	Maximum speed [km*h^{-1}]	Axle load [t] / Line category	Maximum Train Lenght [m]	Traction power	ETCS Level	Interm. Code
	Austria	ÖBB-I		Freilassing	Salzburg	Principal line														
planned	Austria	ÖBB-I	Westbound	Salzburg	Steindorf bei Stra	Principal line	Neumarkt K. - Salzburg; 4 track upgrade; planni	Reconstruction, modernization of the track					36 (planning	State (Rahmenpla	250	25t / E5	740	15 kV 16,7 Hz	Level 2	P/C 80/410
	Austria	ÖBB-I		Steindorf bei Stra	Vöcklabruck	Principal line														
	Austria	ÖBB-I		Vöcklabruck	Wels	Principal line														
	Austria	ÖBB-I		Passau Germany	Pyret	Principal line														
	Austria	ÖBB-I		Pyret	Grieskirchen	Principal line														
	Austria	ÖBB-I		Grieskirchen	Wels	Principal line														
planned	Austria	ÖBB-I		Wels	Linz	Principal line	Linz - Wels; 4 track upgrade	Reconstruction, modernization of the track		2021		2026	1 252	State (Rahmenpla	230	25t / E5	740	15 kV 16,7 Hz	Level 2	P/C 80/410
planned	Austria	ÖBB-I		Linz	Enns	Principal line	Linz Kleinmünchen - Linz Hbf; 4 track upgrade	Reconstruction, modernization of the track		2022		2030	451	State (Rahmenpla	120	25t / E5	740	15 kV 16,7 Hz	Level 2	P/C 80/410
	Austria	ÖBB-I	Westbound	Enns	Amstetten	Principal line														
	Austria	ÖBB-I		Amstetten	St. Pölten	Principal line														
	Austria	ÖBB-I		St. Pölten	Wien	Principal line														
planned	Austria	ÖBB-I		Wien	Bruck a. d. Leitha	Principal line	Himberg, station upgrade	Reconstruction, modernization of the track		2021		2023	20	State (Rahmenpla	160	25t / E5	740	15 kV 16,7 Hz	Level 2	P/C 80/410
	Austria	ÖBB-I		Bruck a. d. Leitha	Parndorf	Principal line														
	Austria	ÖBB-I	Eastbound	Parndorf	Kittsee	Principal line														
	Austria	ÖBB-I		Kittsee	Bratislava Slovaki	Principal line														
	Austria	ÖBB-I		Parndorf	Nickelsdorf	Principal line														
under construction	Austria	ÖBB-I	Pottendorfer Line	Wien	Ebenfurth	Principal line	Pottendorfer Line, double track upgrade	double track upgrade				2026	680	State (Rahmenpla	200	25t / E5	740	15 kV 16,7 Hz	Level 2	P/C 80/410
planned							junction Ebenfurth	bypass				2026	205	State (Rahmenpla	100	25t / E5	740	15 kV 16,7 Hz	Level 2	P/C 80/410

Czech Republic

Status	Member state	IM	Line	Section		Category	Project name	Specification	Start		End		Reached parameters						
				From	To				Month	Year	Month	Year	Estimated Financial Requirments	Financial Sources	Maximum speed [km*h^{-1}]	Axle load [t] / Line category	Maximum Train Lenght [m]	Traction power	ETCS Level	Interm. Code
Planned	Czechia	SŽCZ	Praha – Cheb – SRN border	Cheb	SRN border	Principal line	Optimization of the line Cheb (outside) – state	Electrification												
Under Construction	Czechia	SŽCZ	Praha – Beroun – Plzeň	Beroun	Plzeň	Principal line	ETCS on railway line Beroun – Plzeň	ETCS Implementation	2	2019	2	2021							Level 2	
Under Construction	Czechia	SŽCZ	D/CZ – Česká Kubice – Domažlic	Česká Kubice stat	Plzeň	Principal line	GSM-R on railway line Plzeň – Domažlice – Česk	GSM-R implementation	1	2019	12	2021								
Planned	Czechia	SŽCZ	Hranice na Moravě – Horní Lideč	Hranice na Moravě	Střelná	Principal line	GSM-R on railway line Hranice na Moravě – Horn	GSM-R implementation	6	2021	5	2023								
Planned	Czechia	SŽCZ	Hranice na Moravě – Přerov	Hranice na Moravě	Přerov	Principal line	Track speed increasing at Prosenice railway stat	Switches renewal	1	2020	3	2021								
Under Construction	Czechia	SŽCZ	Mosty u Jablunkova – Dětmarov	Mosty u Jablunkov	Dětmarovice	Principal line	ETCS on railway line Mosty u Jablunkova – Dětm	ETCS Implementation	6	2019	12	2022							Level 2	
Under Construction	Czechia	SŽCZ	Cheb – Beroun	Rokycany	Cheb	Principal line	Remote control Rokycany (excluding) – Cheb (ex	Modernization of the rail traffic management system	9	2019	4	2020								
Planned	Czechia	SŽCZ	Plzeň	Plzeň	Plzeň	Principal line	Plzen, 4. construction - Doubravka marshalling s	Reconstruction, modernization of the track	5	2024	6	2026								
Under Construction	Czechia	SŽCZ	Česká Třebová – Přerov	Přerov	Česká Třebová	Principal line	ETCS on railway line Česká Třebová - Přerov	ETCS Implementation	3	2018	1	2020								
Under Construction	Czechia	SŽCZ	(State border D / Dolní Žleb –)	Dolní Žleb	Kolín	Principal line	ETCS on 1st rail transit corridor: State Border (D	ETCS Implementation	3	2017	8	2023							Level 2	
Planned	Czechia	SŽCZ	Praha-Smíchov – Beroun	Praha-Vršovice	Beroun	Principal line	ETCS Praha-Smichov – Beroun	ETCS Implementation			7	2027								
Planned	Czechia	SŽCZ	Přerov	Přerov	Přerov	Principal line	Modernisation of the railway junction Přerov, 3rd	Reconstruction, modernization of the track	1	2021	3	2023								
Planned	Czechia	SŽCZ	Plzeň – Cheb	Cheb	Plzeň	Principal line	ETCS Plzeň (excluding) – Cheb	ETCS Implementation	5	2019	5	2021							Level 2	
Planned	Czechia	SŽCZ	Plzeň, 5. construction - Lobzy -	Plzeň	Plzeň	Principal line	Plzen, 5. construction - Lobzy - Koterov	Track and platform renewal, substructure improvement	3	2020	7	2021								
Under Construction	Czechia	SŽCZ	Plzeň junction	Plzeň	Plzeň	Principal line	Junction Plzen, 3rd construction - transposition	Reconstruction, modernization of the track	11	2017	3	2020								
Planned	Czechia	SŽCZ	Praha-Radotín – Praha-Vršovice	Praha-Radotín	Praha-Vršovice se	Principal line	Modernization of the section Praha-Radotín - Pra		1	2021	1	2023								
Planned	Czechia	SŽCZ	Praha node	Praha-Hostivař	Praha hl. n.	Diversionary lin	Optimization of the line Praha Hostivar - Praha		5	2020	6	2021								
Planned	Czechia	SŽCZ	Praha – Kolín	Praha	Kolín	Principal line	Reconstruction of the Pečky railway station		6	2023	6	2025								
Planned	Czechia	SŽCZ	Praha-Libeň – Praha-Malešice – Praha-Hostivař / Praha-Vršovice (Praha Freight	Praha	Praha	Principal line	Increasing capacity of the Freight line Praha-Lib		3	2024	9	2026								
Planned	Czechia	SŽCZ	Ostrava – Český Těšín	Ostrava	Český Těšín	Principal line	Reconstruction of the Havířov railway station		4	2021	4	2022								
Planned	Czechia	SŽCZ	Hranice na Moravě – Přerov	Hranice na Moravě	Přerov	Principal line	Reconstruction of the Hranice na Morave railway		9	2021	11	2022								
Planned	Czechia	SŽCZ	Český Těšín – Albrechtice u Čes	Český Těšín	Mosty u Jablunkov	Principal line	Optimization of the Česky Těšín (excluding) - Al		3	2022	3	2023								
Planned	Czechia	SŽCZ	Český Těšín – Albrechtice u Čes	Ostrava	Český Těšín	Principal line	Optimization of the Česky Těšín (excluding) - Al		3	2022	3	2023								
Under Construction	Czechia	SŽCZ	Valašské Meziříčí – Hustopeče n	Hranice na Moravě	Horní Lideč / Lúky	Principal line	Increasing line speed on Valašské Meziříčí – Hus		5	2019	12	2020								
Planned	Czechia	SŽCZ	Hranice na Moravě – Ostrava	Hranice na Moravě	Ostrava	Principal line	Optimization of the Ostrava-Kunčice (excluding)													
Planned	Czechia	SŽCZ	Valašské Meziříčí station	Valašské Meziříčí	Valašské Meziříčí	Principal line	Reconstruction of the Valasske Mezirici railway s		8	2023	12	2025								
Planned	Czechia	SŽCZ	Hranice na Moravě – Horní Lideč	Vsetín station	Vsetín station	Principal line	Reconstruction of the Vsetin railway station		6	2020	5	2022								

Czech Republic

Status	Member state	IM	Line	Section		Category	Project name	Specification	Start		End		Reached parameters							
				From	To				Month	Year	Month	Year	Estimated Financial Requirments	Financial Sources	Maximum speed [km*h^{-1}]	Axle load [t] / Line category	Maximum Train Lenght [m]	Traction power	ETCS Level	Interm. Code
Under Construction	Czechia	SŽCZ	Přerov railway junction	Přerov	Přerov	Principal line	Upgrade of the Přerov railway junction, phase 2		3	2019	12	2021								
Planned	Czechia	SŽCZ	Nymburk hl. n.	Nymburk hl. n.	Nymburk hl. n.	Diversionary line	Modernization of railway st. Nymburk hl. n.		12	2021	1	2023								
Planned	Czechia	SŽCZ	Praha node	Praha	Praha	Diversionary line	Railway tracks reconstruction in Vinohrady tunne		4	2022	4	2025								
Under Construction	Czechia	SŽCZ	Praha node	Praha-Hostivař	Praha hl.n.	Diversionary line	Optimization of the line Praha Hostivar - Praha		7	2017	10	2021								
Under Construction	Czechia	SŽCZ	Praha-Vršovice – Beroun	Praha-Vršovice	Beroun	Principal line	Optimization of Praha-Smíchov (excluding) - Čer		4	2019	9	2021								
Planned	Czechia	SŽCZ	Praha hl. n. – Praha-Smíchov	Praha hl. n.	Praha-Smíchov	Diversionary line	Upgrade of the Praha hl. n. – Praha-Smíchov rail		7	2021	8	2025								
Planned	Czechia	SŽCZ	Pardubice	Pardubice	Pardubice	Principal line	Modernization of the Pardubice railway junction	Reconstruction, modernization of the track	1	2020	2	2023								
Planned	Czechia	SŽCZ	Plzeň – Česká Kubice	Česká Kubice	Plzeň	Principal line	Modernization of the line Plzeň – Česká Kubice,		4	2021	10	2029								
Planned	Czechia	SŽCZ	Praha-Vršovice – Beroun	Černošice	Beroun	Principal line	Optimization of the line Černošice (incl.) - Beroı		1	2022	2	2028								
Planned	Czechia	SŽCZ	Ostrava	Ostrava	Ostrava	Principal line	Ostrava node modernisation		7	2024	12	2027								
Planned	Czechia	SŽCZ	Česká Třebová	Česká Třebová	Česká Třebová	Principal line	Modernization of the Česka Třebová railway junc		11	2021	11	2027								
Planned	Czechia	SŽCZ	Plzeň – Česká Kubice	Stod	Plzeň	Principal line	Modernization of the line Plzeň - Česká Kubice,		10	2022	4	2026								
Under Construction	Czechia	SŽCZ	Praha-Vysočany – Lysá nad Labe	Praha-Vysočany	Lysá nad Labem	Diversionary line	Optimization of the line Praha Vysocany- Lysa n		2	2017	6	2024								
Planned	Czechia	SŽCZ	Choceň – Pardubice	Ústí nad Orlicí	Choceň	Principal line	Modernization of the line Ústí nad Orlicí – Choce		1	2025	1	2030								
Under Construction	Czechia	SŽCZ	Velim (including) – Poříčany (inc	Velim	Poříčany	Principal line	Removing selected bottlenecks on pre-identified		8	2019	9	2024								
Under Construction	Czechia	SŽCZ	Choceň (excluding) – Uhersko (i	Choceň	Uhersko	Principal line			8	2019	9	2024								
Under Construction	Czechia	SŽCZ	Ústí nad Orlicí (excluding) – Bra	Ústí nad Orlicí	Brandys nad Orlic	Principal line			8	2019	9	2024								
Under Construction	Czechia	SŽCZ	Lipník nad Bečvou (including) –	Lipník nad Bečvou	Drahotuše	Principal line			8	2019	9	2024								
Under Construction	Czechia	SŽCZ	Polom (including) – Suchdol nad	Polom	Suchdol nad Odro	Principal line			8	2019	9	2024								
Planned	Czechia	SŽCZ	(Dečín – Všetaty –) Lysá nad La	Lysá nad Labem	Kolín	Diversionary line	Optimization of the line Dečín – Všetaty – Lysá	Other	4	2022	12	2030								
Planned	Czechia	SŽCZ	Praha	Praha	Praha	Principal line	ETCS at Prague node	ETCS Implementation											Level 2	
Planned	Czechia	SŽCZ	Hranice na Moravě – Horní Lideč	Hranice na Moravě	Střelná	Principal line	GSM-R Hranice na Moravě – Horní Lideč – Střelná	GSM-R implementation												
Planned	Czechia	SŽCZ	Hranice na Moravě – Přerov	Hranice na Moravě	Přerov	Principal line	Reconstruction of the Lipník nad Bečvou railway	Reconstruction, modernization of the track												
Planned	Czechia	SŽCZ	Hranice na Moravě – Přerov	Hranice na Moravě	Přerov	Principal line	Reconstruction of the Drahotuše railway station	Reconstruction, modernization of the track												
Planned	Czechia	SŽCZ	Lysá nad Labem – Kolín	Lysá nad Labem	Kolín	Diversionary line	ETCS + remote control of section Kolín – Nymbu	ETCS Implementation												
Planned	Czechia	SŽCZ	Hranice na Moravě – Horní Lideč	Hranice na Moravě	Horní Lideč	Principal line	State border Slovakia (Střelná) – Hranice na Mor	Reconstruction, modernization of the track												

Slovakia

Status	Member state	IM	Line	Section		Category	Project name	Specification	Start		End		Reached parameters						
				From	To				Month	Year	Month	Year	Estimated Financial Requirments	Financial Sources	Maximum speed [km*h^{-1}]	Axle load [t] / Line category	Maximum Train Lenght [m]	Traction power	ETCS Level	Interm. Code
Planned	Slovakia	ŽSR	Čadca št.hr. - Žilina	Čadca	Krásno nad Kysuc	Principal line	Modernisation of railway corridor State border C	Reconstruction, modernization of the track	1	2022	3	2025	220	Co-financed EU	according minimum TEN-T requirements	according minimum TEN-T requirements	according minimum TEN-T requirements	according minimum TEN-T requirements	Level 2	TEN-T project ID - 1088
Planned	Slovakia	ŽSR	Čadca št.hr. - Žilina	state dorder CZ/S	Čadca (outside)	Principal line	Modernisation of railway corridor State border C	Reconstruction, modernization of the track	9	2020	8	2022	78	Co-financed EU					Level 2	TEN-T project ID - 9028
Planned	Slovakia	ŽSR	Považská Teplá - Žilina	Žilina	Žilina	Principal line	Modernisation of railway node Žilina (documenta	Reconstruction, modernization of the track	7	2020	12	2023	284	Co-financed EU						TEN-T project ID - 1089
Under Construction	Slovakia	ŽSR	Púchov - Považská Teplá	Púchov	Považská Teplá	Principal line	Púchov - Považská Teplá: railway modernisation	Reconstruction, modernization of the track	9	2016	12	2021	378	Co-financed EU					Level 1	TEN-T project ID - 1087
Planned	Slovakia	ŽSR	Node Bratislava	Bratislava	Bratislava	Principal line	Rail Node Bratislava - Project Documentation	Reconstruction, modernization of the track	1	2020	12	2025	25							TEN-T project ID - 9039
Planned	Slovakia	ŽSR	Node Bratislava	Bratislava	Bratislava	Principal line	Rail Node Bratislava - Works	Reconstruction, modernization of the track	1	2026	12	eyond 203	TBD							TEN-T project ID - 9452
Planned	Slovakia	ŽSR	Žilina - Košice	Palúdza	Liptovský Hrádok	Principal line	Modernisation of railway line Žilina – Košice, se	Reconstruction, modernization of the track	8	2021	8	2024		Project will be fin					Level 2	TEN-T project ID - 9032
Planned	Slovakia	ŽSR	Žilina - Košice	Poprad -Tatry	Lučivná	Principal line	Modernisation of railway line Žilina – Košice, se	Reconstruction, modernization of the track	12	2019	12	2021		Financing of the p					Level 2	TEN-T project ID - 9033
Planned	Slovakia	ŽSR	Žilina - Košice	Spišská Nová Ves	Poprad -Tatry	Principal line	Modernisation of railway line Žilina – Košice, se	Reconstruction, modernization of the track	1	2022	3	2025		Funding source is					Level 2	TEN-T project ID - 9034
Planned	Slovakia	ŽSR	Žilina - Košice	Poprad -Tatry	Krompachy	Principal line	Modernisation of Poprad-Tatry - Spišská Nová V	Reconstruction, modernization of the track						TBD						TEN-T project ID - 9443

Hungary

Status	Member state	IM	Line	Section		Category	Project name	Specification	Start		End		Reached parameters						
				From	To				Month	Year	Month	Year	Estimated Financial Requirments	Financial Sources	Maximum speed [km*h^{-1}]	Axle load [t] / Line category	Maximum Train Lenght [m]	Traction power	ETCS Level	Interm. Code
	Hungary	MÁV	No. 1	Almásfűzítő	Komárom	Principal line	Elimination of bottleneck	Reconstruction, modernization of the track							160					
	Hungary	MÁV	No. 1	Kelenföld	Budaörs	Principal line	Elimination of bottleneck	Reconstruction, modernization of the track							140					
	Hungary	MÁV	No. 1	Kelenföld	Ferencváros	Principal line	Modernisation of the Danube bridge	Reconstruction, modernization of the track								22,5				
	Hungary	MÁV	No. 120	Nagykáta	Újszász	Principal line	Elimination of bottleneck	Reconstruction, modernization of the track								22,5				
	Hungary	MÁV	No. 120	Rákos	Szolnok	Principal line	Central trafic management	Modernization of the rail traffic management system												
	Hungary	MÁV	No. 120	Rákos	Szolnok	Principal line	Renewal of bridges	Bridge renewal								22,5				
	Hungary	MÁV	No. 120	Gyoma	Békéscsaba	Principal line	Modernisation of signaling system	Other												
	Hungary	MÁV	No. 120	Ferencváros	Lökösháza	Principal line	ETCS2	ETCS Implementation											Level 2	
	Hungary	MÁV	No. 120	Békéscsaba	Lökösháza	Principal line	2nd track	Reconstruction, modernization of the track							160	22,5				
planned	Hungary	GYSEV	Rajka s.b. - Hegyeshalom	Rajka s.b.	Hegyeshalom	main line	Modernization, upgrade of railway infrastructure	-					62		100	C2	750	25 kV / 50 Hz	Level 1	C21/340
planned	Hungary	GYSEV	Sopron - Győr	Sopron-Rendező	Pinnye	main line	Modernization, upgrade of railway infrastructure	Reconstruction, modernization of the track							100	C4	600	26 kV / 50 Hz		C21/341
planned	Hungary	GYSEV	Sopron - Győr	Pinnye	Fertőszentmiklós	main line	Modernization, upgrade of railway infrastructure	Reconstruction, modernization of the track							120	D4	600	27 kV / 50 Hz		C21/342
planned	Hungary	GYSEV	Sopron - Győr	Fertőszentmiklós	Petőháza	main line	Modernization, upgrade of railway infrastructure	Reconstruction, modernization of the track							100	C4	600	28 kV / 50 Hz		C21/343
planned	Hungary	GYSEV	Sopron - Győr	Petőháza	Győr	main line	Modernization, upgrade of railway infrastructure	Reconstruction, modernization of the track					222		120	D4	600	29 kV / 50 Hz		C21/344
planned	Hungary	GYSEV	Sopron - Győr				Modernization, upgrade of railway infrastructure	GSM-R implementation		2019		2022								

Romania

Status	Member state	IM	Line	Section		Category	Project name	Specification	Start		End		Reached parameters						
				From	To				Month	Year	Month	Year	Estimated Financial Requirments	Financial Sources	Maximum speed [km*h^{-1}]	Axle load [t] / Line category	Maximum Train Lenght [m]	Traction power	ETCS Level	Interm. Code
Ongoing	Romania	CFR	HU/RO Border – Curtici - Simeria	Border HU/RO	Km 614 (Radna)	Principal line	Rehabilitation of the railway line section Border	Modernization of the existing conventional electrified double track for increased speed; Implementation of electronic interlocking, ETCS-Level 2 and GSM-R		2012		2019	248,5015476	Cohesion Funds + State Budget	120 km/h for freight trains and 160 km/h for	22,5t/C3	750	25 kV/50 Hz	L2	45/375
				Km 614 (Radna)	Bârzava		Rehabilitation of the railway line section Km 61						367,3585926							
				Bârzava	Ilteu		Rehabilitation of the railway line section Bârzav						383,3214057							
				Ilteu	Gurasada		Rehabilitation of the railway line section Ilteu -						325,8432621							
				Gurasada	Simeria		Rehabilitation of the railway line section Gurasa			2017		2022	573,1198366							
			Simeria - Sighișoara	Simeria	Vințu de Jos		Rehabilitation of the railway line section Simeri	Modernization of the existing conventional electrified double track for increased speed		2013		2019	310,6080436							
				Vințu de Jos	Coșlariu		Rehabilitation of the railway line section Vințu d			2011		2020	176,3856552							
				Coșlariu	Micăsasa		Rehabilitation of the railway line section Coșlari						162,6342572							
				Micăsasa	Atel		Rehabilitation of the railway line section Micăsa						168,4122856							
				Atel	Sighișoara		Rehabilitation of the railway line section Atel -			2012		2019	195,2894433						L2	
				Simeria	Sighișoara		Implementation of electronic interlocking, ETCS	Implementation of electronic interlocking, ETCS-Level 2 and GSM-R		2014		2020	113,37	SOP-T 2007-2013/LIOP 2014-2020 + State Bu						
Tenders under evaluation				Sighișoara	Cața		Rehabilitation of the railway line section Sighiș						371,743							
			Sighișoara - Brașov	Cața	Apața		Rehabilitation of the railway line section Cata -	Modernization of the existing conventional electrified double track for increased speed; Implementation of electronic interlocking, ETCS-Level 2 and GSM-R					608,9053078	CEF + State Budget							
				Apața	Brașov		Rehabilitation of the railway line section Apata					2024	305,656							
Ongoing				Brașov - Predeal	Brașov	Principal line	Feasibility study for the rehabilitation of the rai			2020		2022	4,14							
Under preparation for promotion				Brazi	Buftea		Operational pilot project for the implementation	Implementation of electronic interlocking, ETCS-Level 2 and GSM-R		2011		2019	37,88212407	SOPT 2007-2013 + State Budget						
			Predeal - Constanța	Predeal	Constanța		Feasibility study for putting into operation the E	Putting into operation ERTMS and GSM-R		2020		2020	2,1	LIOP 2014-2020 + State Budget					L1/L2	
Ongoing				Constanța	Constanța Port		Feasibility study for the modernization of the ra	Modernization of the existing conventional track layout for increased speed		2019		2021	1,953	CEF + State Budget	100 km/h for freight trains				-	
			Arad - Craiova	Arad	Caransebeș		Feasibility study for the rehabilitation of the rai	Modernization of the existing conventional electrified single/double track for increased		2016			1,67	State Budget	120 km/h for freight trains and				L2	
				Caransebeș	Craiova		Feasibility study for the rehabilitation of the rai	speed;		2018		2020	5	CEF + State Budget	160 km/h for passenger trains					
Under preparation for promotion			Craiova - București	Craiova	București		Speed restrictions removal (quick wins) on Craio	Removal of speed restrictions		2021		2022	41,8	ERDF + State Budget	80 km/h for freight trains and 120 km/h for passenger trains				-	
To be promoted							Rehabilitation of the railway line section Craiova	Modernization of the existing conventional electrified double track for increased speed; Implementation of electronic interlocking, ETCS-Level 2 and GSM-R		2023		2025	836	Cohesion Funds + State Budget	120 km/h for freight trains and 160 km/h for passenger trains				L2	
				Coșlariu/Pod Mureș	Cluj		Rehabilitation of the railway line section Coșlari					2029	562		80 km/h for freight trains and					
Ongoing			Cluj - Border RO/HU	Cluj	Border RO/HU		Feasibility study for the electrification and rehat			2027		2020	0,968	LIOP 2014-2020 + State Budget	120 km/h for freight trains and					
To be promoted			Simeria - Filiași	Simeria	Filiași	Diversionary line	Rehabilitation of the railway line section Simeri	Modernization of the existing conventional electrified single/double track for increased speed; Implementation of electronic interlocking, ETCS-Level 2 and GSM-R		2023		2026	853	ERDF + State Budget	60 km/h for freight trains and 100 km/h for passenger trains					
Under tendering			Ploiești Triaj - Focșani	Ploiești Triaj	Buzău		Feasibility study for the rehabilitation of the rai	Modernization of the existing conventional electrified double track for increased speed; Implementation of electronic interlocking, ETCS-Level 2 and GSM-R		2020		2022	4,21	LIOP 2014-2020 + State Budget	120 km/h for freight trains and 160 km/h for passenger trains					
To be promoted			Buzău - Feteşti	Buzău	Făurei		Rehabilitation of the railway line section Buzău			2023		2025	160	ERDF + State Budget						
				Făurei	Feteşti		Rehabilitation of the railway line section Făurei			2027		2029	356							

France

Plan for implementation of interoperable system on RFC 9 RHD																				Remarks
Line (current situation)							GSM-R (marked green)		Status of GSM-R				ETCS (marked green)			Status of ETCS				
No.	From	To	Type	Length of line (km)	Number of tracks	Current train control system	Yes	No	Under realization		Planned		L1	L2	L3	Under realization		Planned		
									Start	Finalization	Start	Finalization				Start	Finalization	Start	Finalization	
1.	Strasbourg	Kehl (DE border)	Principal	5	2	NS + GSM-R			In operation											

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Germany

Plan for implementation of interoperable system on RFC 9 RHD																								Remarks
Line (current situation)								GSM-R (marked green)		Status of GSM-R				ETCS (marked green)			Status of ETCS						
										Under realization		Planned					Under realization			Planned			
No.	From	To	Type	Length of line (km)	Number of tracks	VZG	Current train control system	Yes	No	Start	Finalization	Start	Finalization	L1	L2	L3	Start	Finalization	note	Start	Finalization		
2	Appenweier	Durmersheim	Principal	44	2/2/(2)	4000/4020 (4280 KaBa Rastatter Tunnel)	PZB;LZB							n.a.	n.a.	n.a.				n.a.	n.a.		
3	Durmersheim	Karlsruhe	Principal	14	2	4020	PZB;LZB							n.a.	n.a.	n.a.	2015	~2022		n.a.	n.a.		
4	Rastatt Süd	Karlsruhe	diversionary	29	2	4000	PZB							in some areas					Corridor Rhine-Alpine				
5	Karlsruhe	Heidelberg	diversionary	56	2	4000	PZB													tbd	after 2030		
6	Heidelberg	Mannheim	diversionary	18	2	4000	PZB										2015	~2022		tbd	after 2030		
7	Karlsruhe	Hockenheim	Principal	39	2	4020	PZB							in some areas			2015	~2022	Corridor Rhine-Alpine				
8	Hockenheim	Mannheim	Principal	22	2	4020	PZB							in some areas			2015	~2022	Corridor Rhine-Alpine				
9	Mannheim	Darmstadt	Principal	58	2	3601	PZB							in some areas					Corridor Rhine-Alpine				
10	Darmstadt	Frankfurt am Main	Principal	28	2	3601	PZB													tbd	after 2030		
11	Mannheim	Groß Gerau	diversionary	54	2	4010	PZB;LZB							in some areas					ETCS-Ausrüstung im Rahmen ESTW Riedbahn	2020	2026		
12	Groß Gerau	Frankfurt am Main	diversionary	25	2	4010	PZB													tbd	after 2030		
13	Frankfurt am Main	Würzburg	Principal	136	2/2/2	3600/3660/5200	PZB													tbd	after 2030		
14	Würzburg	Nürnberg	Principal	102	2/2	5910/5900	PZB;LZB													tbd	after 2030		
15	Nürnberg	Regensburg	Principal	101	2	5850	PZB												ETCS-Ausrüstung Passau - Feucht	2019	2030		
16	Regensburg	München	diversionary	138	2	5500	PZB													tbd	after 2030		
17	Regensburg	Passau	Principal	118	2/2	5500/5830	PZB							in some areas					ETCS-Ausrüstung Passau - Feucht	2019	2030		
18	Karlsruhe	Pforzheim	Principal	31	2	4200	PZB													tbd	after 2030		
19	Pforzheim	Mühlacker	Principal	13	2	4200	PZB													tbd	after 2030		
20	Bruchsal	Mühlacker	diversionary	33	2/2	4130/4800	PZB													tbd	after 2030		
21	Mühlacker	Ludwigsburg	Principal	33	2	4800	PZB													tbd	after 2030		
22	Ludwigsburg	Stuttgart	Principal	14	2	4800	PZB													tbd	after 2030		
23	Stuttgart	Ulm	Principal	86	2	4813 (SFS)	PZB												NBS Wendlingen - Ulm bis 2022	2020	2025		
24	Ulm	Augsburg	Principal	86	2	5302	PZB;LZB												Neuoffing - Augsburg DSD Starterpaket Scan-Med	tbd	after 2030		
25	Augsburg	München	Principal	62	2	5503	PZB												DSD Starterpaket Scan-Med	~ 2020	2030		
26	München	Mühldorf am Inn	Principal	85	2/2(1 on 43km)	5510/5600	PZB												DSD Starterpaket Scan-Med/ABS 38 München - Mühldorf - Freilassing	~2020	2030		
27	Mühldorf am Inn	Freilassing	Principal	73	1	5723	PZB													tbd	after 2030		
28	Freilassing	Salzburg	Principal	3	2	5703	PZB												Freilassing - Grenze AT bis 2030	tbd	after 2030		
29	Nürnberg	Schirnding	Principal	141	2(1 on 17 km))	5903	PZB												Nürnberg - Neuhaus(Pegnitz) DSD Starterpaket Scan-Med	tbd	after 2030		
30	Schirnding	Cheb	Principal	10	1	5903	PZB												Schirnding (Arzberg) - Grenze Cz bis 2025	2019	2025		
31	Regensburg	Schwandorf	diversionary	43	2	5860	PZB													tbd	after 2030		
32	Schwandorf	Furth im Wald	diversionary	68	1	5800	PZB													tbd	after 2030		
33	Furth im Wald Germany	Stankov (CZ)	Principal	39	1	5801	PZB													tbd	after 2030		

Czech Republic

Plan for implementation of interoperable system on RFC 9 RHD																				Remarks
Line (current situation)							GSM-R (marked green)		Status of GSM-R				ETCS (marked green)			Status of ETCS				
No.	From	To	Type	Length of line (km)	Number of tracks	Current train control system	Yes	No	Under realization		Planned		L1	L2	L3	Under realization		Planned		
									Start	Finalization	Start	Finalization				Start	Finalization	Start	Finalization	
1	Česká Kubice st.hr.	Domažlice	Principal	16	1	-						after 2023							after 2023	
2	Domažlice	Plzeň hl.n.	Principal	60	1	LS Plzeň - Stod						after 2023							after 2023	
1	Cheb st.hr	Cheb	Principal	12,1	1	INDUSI/PZB												05/2020	11/2021	
2	Cheb	Plzeň hl.n.	Principal	105,9	1/2	LS												05/2020	11/2021	
3	Plzeň hl.n.	Beroun os.n.	Principal	64	2	LS												05/2020	11/2021	
4	Beroun os.n.	Praha - Radotín	Principal	29,2	2	-													after 2023	
5	Praha - Radotín	Praha Krč	Principal	9,2	1	-													after 2023	
6	Praha Krč	Praha Zahr.město	Principal	5,3	1	-													after 2023	
7	Praha Zahr.město	Praha Malešice	Principal	4	1	LS													after 2023	
8	Praha Malešice	Praha-Libeň	Principal	3,9	1	-													after 2023	
9	Praha Malešice	Praha - Běchovice	Principal	4,3	2	LS										08/2019	12/2020			
10	Praha-Libeň	Poříčany	Principal	35	3	LS										08/2019	12/2023			
11	Poříčany	Nymburk hl.n.	Diversionary	15,7	1	-													after 2023	
12	Poříčany	Kolín	Principal	22	2	LS										08/2019	12/2023			
13	Kolín	Česká Třebová	Principal	102	2	LS														
14	Praha-Libeň	Praha Vysočany	Diversionary	1,229	1	LS													after 2023	
15	Praha Vysočany	Lysá nad Labem	Diversionary	29,102	2	-													after 2023	
16	Lysá nad Labem	Nymburk hl.n.	Diversionary	15,3	2	LS													after 2023	
17	Nymburk hl.n.	Velký Osek	Diversionary	15	2	LS													after 2023	
18	Velký Osek	Kolín	Diversionary	9	2	LS													after 2023	
19	Velký Osek	Hradec Králové	Diversionary	51	1	-						after 2023							after 2023	
20	Hradec Králové	Choceň	Diversionary	45	1	-						after 2023							after 2023	
21	Česká Třebová	Olomouc	Principal	110	2	LS										08/2018	12/2020			
22	Olomouc	Dluhonice	Principal	19	2	LS										08/2018	12/2020			
23	Dluhonice	Prosenice	Principal	8,8	2	LS										08/2018	12/2020			
24	Prosenice	Hranice na Moravě	Principal	20,4	2	LS										06/2017	12/2019			
25	Dluhonice	Přerov os.n.	Principal	3,4	2	LS										08/2018	12/2020			
26	Přerov os.n.	Přerov přednádraží	Principal	1,7	2	LS										06/2017	12/2019			
27	Přerov os.n.	Prosenice	Principal	7,9	2	LS										06/2017	12/2019			
28	Hranice na Moravě	Horní Lideč	Principal	63	2	LS*						after 2023							after 2023	
29	Horní Lideč	Střelná st.hr.	Principal	7	2	LS						after 2023							after 2023	
30	Hranice na Moravě	Ostrava hl.n.	Principal	55,4	2	LS										06/2017	12/2019			
31	Ostrava hl.n.	Dětmarovice	Principal	17,2	2	LS										06/2017	12/2019			
32	Dětmarovice	Český Těšín	Principal	21,1	2	LS												2020	2022	
33	Český Těšín	Mosty u Jablunkova z	Principal	30,8	2	LS												2020	2022	
34	Mosty u Jablunkova z	Mosty u Jabl. st. hr.	Principal	3	2	LS												2020	2022	
35	Výhybna Polanka n/O	Odbočka Odra	Diversionary	2,1	1	LS													after 2023	
36	Odbočka Odra	Český Těšín	Diversionary	36,5	2	LS													after 2023	

Slovakia

Plan for implementation of interoperable system on RFC 9 RHD																						Remarks
Line (current situation)							GSM-R (marked green)		Status of GSM-R				ETCS (marked green)			Status of ETCS					
No.	From	To	Type	Length of line (km)	Number of tracks	Current train control system	Yes	No	Under realization		Planned		L1	L2	L3	Under realization		Planned			
									Start	Finalization	Start	Finalization				Start	Finalization	Start	Finalization		
1	Čadca št.hr.	Žilina	Principal	37	2	ETCS L2 + GSM-R			In operation						-	In operation					
2	Lúky pod Makytou	Púchov	Principal	21	2	NS			-	-	TBD	2030			-	-	-	TBD	2030		
3	Púchov	Považská Teplá	Principal	17		NS + GSM-R			In operation						-	-	2023				
3	Považská Teplá	Žilina	Principal	29	2	ETCS L1 + GSM-R			In operation						-	In operation					
4	Žilina	Vrútky	Principal	21	2	NS			-	-	TBD	2023			-	-	-	TBD	2030		
5	Vrútky	Liptovský Mikuláš	Principal	62	2	NS			-	-	TBD	2023			-	-	-	TBD	2030		
6	Liptovský Mikuláš	Poprad	Principal	58	2	NS			-	-	TBD	2023			-	-	-	TBD	2030		
7	Poprad	Spišská Nová Ves	Principal	26	2	NS			-	-	TBD	2023			-	-	-	TBD	2030		
8	Spišská Nová Ves	Kysak	Principal	59	2	NS			-	-	TBD	2023			-	-	-	TBD	2050		
9	Kysak	Košice	Principal	16	2	NS			-	-	TBD	2023			-	-	-	TBD	2030		
10	Košice	Čierna nad Tisou	Principal	95	2	NS			-	-	TBD	2023			-	-	-	TBD	2030		
11	Čierna nad Tisou	Chop	Feeder		1	NS			-	-	TBD	2023			-	-	-	TBD	2030		
12	Barca	Košice	Feeder		2	NS			-	-	TBD	2023			-	-	-	TBD	2030		
13	Barca	Haniska pri Košiciach	Connecting	10,6	2	NS			-	-	TBD	2023			-	-	-	TBD	2030		
14	Košice	Maťovce	Diversionary	55,9	1	NS			-	-	TBD	2023			-	-	-	TBD	2030		
15	Bratislava	Rajka	Principal	14,69	1	NS + GSM-R			In operation						-	-	-		2030		

Austria

Plan for implementation of interoperable system on RFC 9 RHD																						Remarks
Line (current situation)							GSM-R (marked green)		Status of GSM-R				ETCS (marked green)			Status of ETCS					
No.	From	To	Type	Length of line (km)	Number of tracks	Current train control system	Yes	No	Under realization		Planned		L1	L2	L3	Under realization		Planned			
									Start	Finalization	Start	Finalization				Start	Finalization	Start	Finalization		
1	Salzburg	Steindorf bei Straßwalchen	Main						In operation				X	X				2035	2038		
2	Steindorf bei Straßwalchen	Vöcklabruck	Main						In operation				X	X				2033	2036		
3	Vöcklabruck	Wels	Main						In operation					X				2020	2022		
4	Passau Germany	Pyret	Main						In operation					X				2023	2026		
5	Pyret	Grieskirchen	Main						In operation					X				2023	2026		
6	Grieskirchen	Wels	Main						In operation					X				2023	2026		
7	Wels	Linz	Main						In operation					X				2020	2022		
8	Linz	Enns	Main						In operation					X				2026	2029		
9	Enns	Amstetten	Main						In operation					X				2027	2030		
10	Amstetten	St. Pölten	Main						In operation					X				2021	2024		
11	St. Pölten	Wien	Main						In operation					X				2021	2024		
12	Wien	Bruck a. d. Leitha	Main						In operation					X				2020	2023		
13	Bruck a. d. Leitha	Parndorf	Main						In operation					X				2020	2023		
14	Parndorf	Kittsee	Main						In operation					X				2029	2032		
15	Kittsee	Bratislava Slovakia	Main						In operation					X				2029	2032		
16	Parndorf	Nickelsdorf	Main						In operation					X				2020	2023		
17	Wien	Ebenfurth	diversionary						In operation					X				2021	2024		
18	Ebenfurth	Sopron (HU)	diversionary																		

Hungary - GYSEV

Plan for implementation of interoperable system on RFC 9 RHD																						Remarks
Line (current situation)							GSM-R (marked green)		Status of GSM-R				ETCS (marked green)			Status of ETCS						
									Under realization		Planned					Under realization		Planned				
No.	From	To	Type	Length of line (km)	Number of tracks	Current train control system	Yes	No	Start	Finalization	Start	Finalization	L1	L2	L3	Start	Finalization	Start	Finalization			
1	Hegyeshalom	Rajka	Principal	13	1	ETCS L1					n/a	n/a										
2	Ebenfurth	Sopron	Principal	30	1	INDUSI/PZB					n/a	n/a						n/a	n/a			
3	Sopron	Győr	Principal	85	1	EVM			2019	2022	n/a	n/a						n/a	n/a			

Hungary – MÁV

Plan for implementation of interoperable system on RFC 9 RHD																				Remarks
Line (current situation)							GSM-R (marked green)		Status of GSM-R				ETCS (marked green)			Status of ETCS				
									Under realization		Planned					Under realization		Planned		
No.	From	To	Type	Length of line (km)	Number of tracks	Current train control system	Yes	No	Start	Finalization	Start	Finalization	L1	L2	L3	Start	Finalization	Start	Finalization	
1	Hegyeshalom border AT/HU	Hegyeshalom	Main	4,7	2	NS, ETCS L1	-		2015	2020	-	-		-	-	In operation		2020	2022	In operation with 2.2.2, upgrade to 2.3.0d
2	Hegyeshalom	Győr	Main	46,5	2	NS, ETCS L1	-		2015	2020	-	-		-	-	In operation		2020	2022	In operation with 2.2.2, upgrade to 2.3.0d
3	Győr	Komárom	Main	37,4	2	NS, ETCS L1	-		2015	2020	-	-		-	-	In operation		2020	2022	In operation with 2.2.2, upgrade to 2.3.0d
4	Komárom	Tata	Main	20,1	2	NS, ETCS L1	-		2015	2020	-	-		-	-	In operation		2020	2022	In operation with 2.2.2, upgrade to 2.3.0d
5	Tata	Kelenföld	Main	68,5	2	NS, ETCS L1	-		2015	2020	-	-		-	-	In operation		2020	2022	In operation with 2.2.2, upgrade to 2.3.0d
6	Kelenföld	Ferencváros	Main	5,7	2	NS	-		2015	2020	-	-	-	-	-	2014	2020	-	-	L2 2.3.0d
7	Ferencváros	Kőbánya felső	Main	4,7	2	NS	-		2015	2020	-	-	-	-	-	-	-	-	2030	
8	Kőbánya felső	Rákos	Main	3,3	2	NS	-		2015	2020	-	-	-	-	-	-	-	-	2030	
9	Rákos	Újszász	Main	76,1	2	NS	-		2018	2023	-	-	-	-	-	-	-	-	2050	
10	Újszász	Szolnok	Main	17,3	2	NS	-		2018	2023	-	-	-	-	-	-	-	-	2050	
11	Szolnok	Szajol	Main	10,3	2	NS	-		2015	2020	-	-	-	-	-	2014	2022	-	-	L2 2.3.0d
12	Szajol	Békéscsaba	Main	85,3	2	NS	-		2015	2020	-	-	-	-	-	2014	2022	-	-	L2 2.3.0d
13	Békéscsaba	Lőkösháza	Main	29	1	NS, ETCS L1	-		2015	2020	-	-		-	-	In operation		-	-	In operation with 2.3.0d
14	Lőkösháza	Lőkösháza border HU/RO	Main	2,7	1	without	-		2015	2020	-	-	-	-	-	2014	2022	-	-	
15	Szajol	Püspökladány	diversionary	67	2	NS	-		2015	2020	-	-	-	-	-	2020	2022	-	-	L2 2.3.0d
16	Püspökladány	Biharkeresztes	diversionary	50,1	1	without	-		2018	2023	-	-	-	-	-	-	-	-	2050	
17	Biharkeresztes	Biharkeresztes border HU/RO	diversionary	6,7	1	without	-		2018	2023	-	-	-	-	-	-	-	-	2050	
18	Ferencváros	Soroksári út	diversionary	1,8	2	NS	-		2015	2020	-	-	-	-	-	2020	2022	-	-	L2 2.3.0d
19	Soroksári út	Soroksár	diversionary	7,1	1	NS	-		2015	2020	-	-	-	-	-	2020	2022	-	-	L2 2.3.0d
20	Soroksár	Soroksár-Terminál	diversionary	3,5	1	NS	-		2015	2020	-	-	-	-	-	2020	2022	-	-	L2 2.3.0d
21	Ferencváros	Kőbánya-Kispest	diversionary	5,1	2	NS	-		2015	2020	-	-	-	-	-	2014	2022	-	-	L2 2.3.0d
22	Kőbánya-Kispest	Szolnok	diversionary	89,6	2	NS	-		2015	2020	-	-	-	-	-	2014	2022	-	-	L2 2.3.0d

Romania

Plan for implementation of interoperable system on RFC 9 RHD																				Remarks
Line (current situation)							GSM-R (marked green)		Status of GSM-R				ETCS (marked green)			Status of ETCS				
									Under realization		Planned					Under realization		Planned		
No.	From	To	Type	Length of line (km)	Number of tracks	Current train control system	Yes	No	Start	Finalization	Start	Finalization	L1	L2	L3	Start	Finalization	Start	Finalization	
1	Border RO/HU	Km.614	Principal	41,185	2	NS, ETCS L2 + GSM-R not in operation			2012	2020						2012	2020			in authorisation process to obtain putting in operation
2	Km.614	Ilteu	Principal	78,499	2	NS			2018	2022						2018	2022			
3	Ilteu	Gurasada	Principal	24,531	2	NS			2018	2022						2018	2022			
4	Gurasada	Simeria	Principal	38,546	2	NS			2014	2022						2014	2022			
5	Simeria	Sighișoara	Principal	173,948	2	NS			2014	2021						2014	2021			
6	Sighișoara	Cața	Principal	45,061	2	NS					2020	2024						2020	2024	
7	Cața	Apața	Principal	45,721	2	NS					2020	2024						2020	2024	
8	Apața	Brașov	Principal	37,83	2	NS					2020	2024						2020	2024	
9	Brașov	Predeal	Principal	26,236	2	NS					2023	2027						2023	2027	
10	Predeal	Câmpina	Principal	50,273	2	NS					2022	2025						2022	2025	
11	Câmpina	Brazi	Principal	41,898	2	NS, ETCS L1 2.2.2 not in operation					2022	2025						2022	2025	
12	Brazi	Buftea	Principal	34,565	2	NS, ETCS L2 + GSM-R not in operation			2011	2019						2011	2019			in authorisation process to obtain putting in operation
13	Buftea	Chitila	Principal	7,436	2	NS, ETCS L1 2.2.2 not in operation					2022	2025						2022	2025	
14	Chitila	H.M. Pajura	Principal	3,996	2	NS, ETCS L1 2.2.2 not in operation					2022	2025						2022	2025	
15	H.M. Pajura	București Băneasa	Principal	1,148	1	NS, ETCS L1 2.3.0d not in operation					2022	2025						2022	2025	
16	București Băneasa	Fetești	Principal	139,952	2	NS, ETCS L1 2.3.0d not in operation					2022	2025						2022	2025	
17	Fetești	Constanța	Principal	78,273	2	NS, ETCS L1 2.3.0d not in operation					2022	2025						2022	2025	
18	Arad	Caransebeș	Principal	153,553	1	NS					2020	2023						2020	2023	
19	Caransebeș	Strehaia	Principal	166,257	1	NS					2022	2026						2022	2026	
20	Strehaia	Craiova	Principal	59,916	2	NS					2022	2026						2022	2026	
21	Craiova	Chitila	Principal	202,862	2	NS					2023	2025						2023	2025	
22	Ploiești	Buzău	diversionary	71,47	2	NS					2023	2025						2023	2025	installation of ETCS level 1 or ETCS level 2 will be decided after feasibility study (according to NIP Romania)
23	Buzău	Făurei	diversionary	40,459	2	NS					2023	2025						2023	2025	installation of ETCS level 1 or ETCS level 2 will be decided after feasibility study (according to NIP Romania)
24	Făurei	Fetești	diversionary	89,07	2	NS					2027	2029						2027	2029	installation of ETCS level 1 or ETCS level 2 will be decided after feasibility study (according to NIP Romania)
25	Simeria	Livezeni	diversionary	84,306	2	NS					2023	2026						2023	2026	installation of ETCS level 1 or ETCS level 2 will be decided after feasibility study (according to NIP Romania)
26	Livezeni	Târgu Jiu	diversionary	48,058	1	NS					2023	2026						2023	2026	installation of ETCS level 1 or ETCS level 2 will be decided after feasibility study (according to NIP Romania)
27	Târgu Jiu	Filiasi	diversionary	70,287	1	NS					2023	2026						2023	2026	installation of ETCS level 1 or ETCS level 2 will be decided after feasibility study (according to NIP Romania)
28	Coșlariu	Cluj	diversionary	106,327	2	NS					2027	2029						2027	2029	installation of ETCS level 1 or ETCS level 2 will be decided after feasibility study (according to NIP Romania)
29	Cluj	Episcopia Bihor	diversionary	157,67	1	NS					2021	2023						2021	2023	
30	Episcopia Bihor	Border RO/HU	diversionary	6,629	1	NS					2021	2023						2021	2023	