Corridor Information Document

Book 5 – Implementation Plan

RFC5
Baltic-Adriatic Corridor

Baltic-Adriatic Rail Freight Corridor 5

Implementation Plan

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

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Implementation Plan

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>> 1. Introduction

On 22nd September 2010 the European Parliament and the Council adopted Regulation (EU) No 913/2010 concerning an European rail network for competitive freight, which entered into force on 9th November 2010 (hereinafter called Regulation), providing for establishment of international rail corridors for an European rail network for competitive freight.

Earlier, in 2006 the European Commission established together with railway stakeholders six rail transport corridors to be equipped with ERTMS, named from A to F.

The idea of creating Rail Freight Corridors is to harmonize different types of existing corridors, such as ERTMS- and RNE-corridors. They are also expected to be integrated with Core Network of the TEN-T Network. 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 for competitive rail freight. It sets out rules for the selection, organisation, management and the indicative investment planning of freight corridors. In the Annex to the Regulation there are 9 initial Rail Freight Corridors, providing respectively their implementation date in 2013 and in 2015.

The rail freight corridors can be considered as the most suitable method to fulfill specific needs in the freight market. The aim is to able freight trains running under high quality service and easily pass from one national network to another.

Cooperation of infrastructure managers will be expressed by harmonized: governance, investment planning, capacity allocation, traffic management, providing a high quality service and introduce the concept of corridor one-stop shop.

Furthermore, taking into account that RFC5 is one of nine rail Freight Corridors it is planned to harmonise terms of governance, participation rules, allocation of the capacity together with other rail freight Corridors. This statement reflects RFC5 openess on mutual cooperation with other actors involvement in rail freight transportation.

The principal guidelines specified by the Regulation focus on:

- establishing a single place for designated capacity allocation on the corridor;
- closer cooperation and harmonization between infrastructure managers 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 reliability of the infrastructure capacities allocated to international freight on these corridors.

The purpose of this document is to create an inventory of the tasks that result from establishment of the Baltic – Adriatic RFC 5, 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. RFC5 Description

Baltic–Adriatic Rail Freight Corridor 5, the north-south axis, connects ports in Poland, Slovenia and Italy with main land terminals of all the countries among the corridor.

The initial routing defined in the Annex to the Regulation 913/2010 was : "Gdynia – Katowice – Ostrava / Žilina – Bratislava / Vienna / Klagenfurt – Udine – Venice / Trieste / Bologna / Ravenna / Graz – Maribor – Ljubljana – Koper / Trieste", and it was one of the 9 initial Rail Freight Corridors included in the Regulation.

The routing of the corridor was changed by Regulation 1316/2013. According to this Regulation till 2018 additional branch have to be added, connecting the ports in Szczecin and Świnoujście in Poland. After these changes the Management Board and Executive Board decided to extend the corridor to the ports of Świnoujście and Szczecin already in 2015.

According to Regulation 1316/2013 new routing is as follows: "Świnoujście / Gdynia – Katowice – Ostrava / Žilina – Bratislava / Vienna / Klagenfurt – Udine –Venice / Trieste / Bologna / Ravenna / Graz – Maribor – Ljubljana – Koper / Trieste". Moreover the above Regulation changed names of all Rail Freight Corridors. According to this official name of the RFC 5 is Baltic-Adriatic Rail Freight Corridor 5. For the purpose of consistency of this document the name "RFC 5" will be used alternatively. RFC5 as infrastructure backbone creates connections and supports growing economies in Northern and Southern Europe.

RFC5 and its hinterland connections will allow flow of larger volumes of goods between industrial centres along the RFC5 and will assure bigger sea shipping shift to Adriatic and Baltic ports.

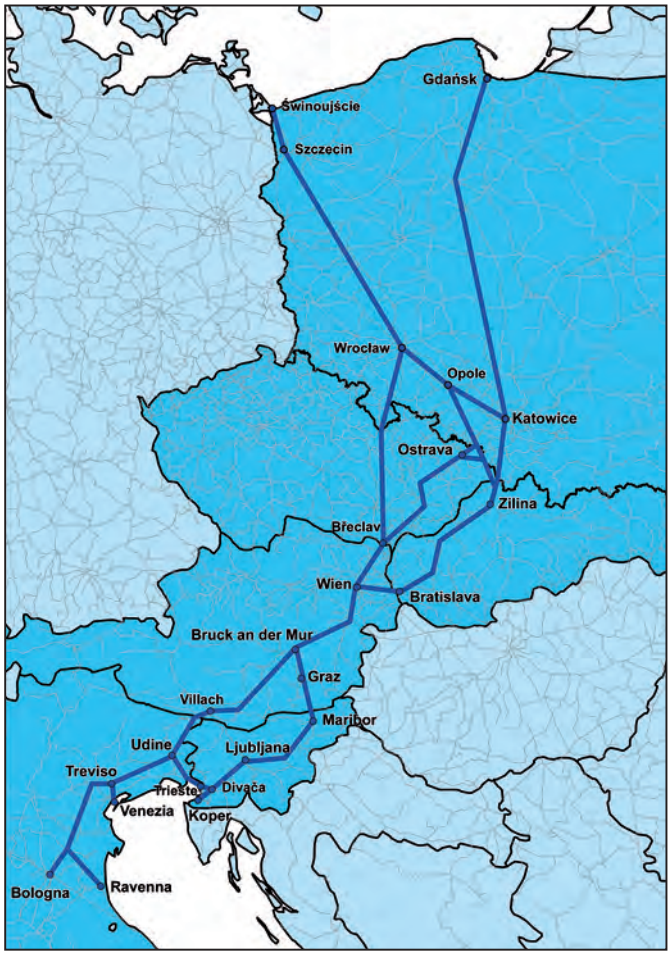


Figure 1: Scheme of RFC5

RFC 5 logo

2.1 Measures for creating RFC 5

Crucial organizational measure for creating the corridor was the establishment of the RFC 5 structure. This establishment was initiated already in the first half of 2011. That was the moment when Infrastructure Managers involved established the Coordination Group , which has been operating from March 2011 on led to the further development of the RFC 5 structure and resulted in establishing the Management Board. The Management Board consists of representatives of respective Infrastructure Managers and Allocation Bodies from these countries.

As Regulation (EU) 913/2010 foresees a governance structure on 2 levels, the Member States launched their work on the implementation of this Regulation, resulting in setting up the Executive Board. The Executive Board consists of representatives of Member States concerned (Poland, Czech Republic, Slovakia, Austria, Italy, Slovenia).

2.1.1 Management Board

Management Board of RFC 5 consists of representatives of 7 different companies from 6 Member States. It consists of representatives following companies: Správa železniční dopravní cesty, státní organizace; Železnice Slovenskej republiky, skrátenej forme "ŽSR"; ÖBB-Infrastruktur AG; RFI Rete Ferroviaria Italiana S.p.A.; SŽ Infrastruktura d.o.o., Javna agencija za železniški promet Republike Slovenije and PKP Polskie Linie Kolejowe S.A.

In order to make the RFC5 operational, the Management Board has undertaken or is to undertake a lot of activities, including:

- set up an Advisory Group made up of managers and owners of the terminals of the freight corridor including, where necessary, sea and inland waterway ports (Art.8(7));
- set up an Advisory Group made up of railway undertakings interested in the use of the freight corridor (Art.8(8));
- coordination in accordance with national and European deployment plans the use of interoperable IT applications or alternative solutions that may become available in the future to handle requests for international train paths and the operation of international traffic on the freight corridor (Art.8(9));
- drawing up an implementation plan of the freight corridor at the latest 6 months before making the freight corridor operational (Art.9);
- drawing up and periodically review an investment plan, which includes details of indicative medium and long-term investment for infrastructure on the freight corridor (Art.11);
- carrying out and periodically update a transport market study (Art.9 (3));
- introducing consultation mechanisms with a view to the proper participation of the applicants likely to use the freight corridor (Art.10);
- coordinating and ensuring the publication in one place of the schedule for carrying out all the works that would restrict available capacity on the freight corridor (Art.12);
- designating or setting up a joint body for applicants to request and to receive answers, in a single place and in a single operation, regarding infrastructure capacity for freight trains crossing at least one border along the freight corridor (one-stop shop) (Art.13),
- obligations related to capacity allocation and traffic management (Art.14, Art.16-17), i.a.:
  - to evaluate the need for capacity to be allocated to freight trains running on the freight corridor taking among others into account the transport market study (Art.14(1));
  - to promote coordination of priority rules relating to capacity allocation on the freight corridor (Art.14(6));
  - to put in place procedures to ensure optimal coordination of the allocation of capacity between infrastructure managers (Art.14(9));
  - to put in place procedures for coordinating traffic management along the freight corridor (Art.16(1));
  - to adopt common targets for punctuality and to study guidelines for traffic management in the event of disturbance to train movements on the freight corridor (Art.17(1));
  - to draw up, update and publish information on the conditions of use of the freight corridor (Art,18);
  - to monitor the performance of rail freight services and publish the results once a year (Art. 19(2));
  - organizing a satisfaction survey of the users of the freight corridor and publishing the results of it once a year (Art.19(3)).

The Management Board meets on regular basis, at least four times a year, alternately in every corridor country. The meetings are chaired by the Chairperson.

The Management Board is proceeding the establishment of European Economic Interest Grouping, basing on Council Regulation (EEC) No 2137/85 of 25 July 1985 on the European Economic Interest Grouping (EEIG).

First seat of EEIG is Warsaw. EEIG seat relocation principles have been agreed by the Management Board.

The working language of the RFC 5 is English.
The governance structure of RFC5 at the Management Board level which will turn into an EEIG is shown on the Figure no 2:

Planned RFC5 management structure is as follows:

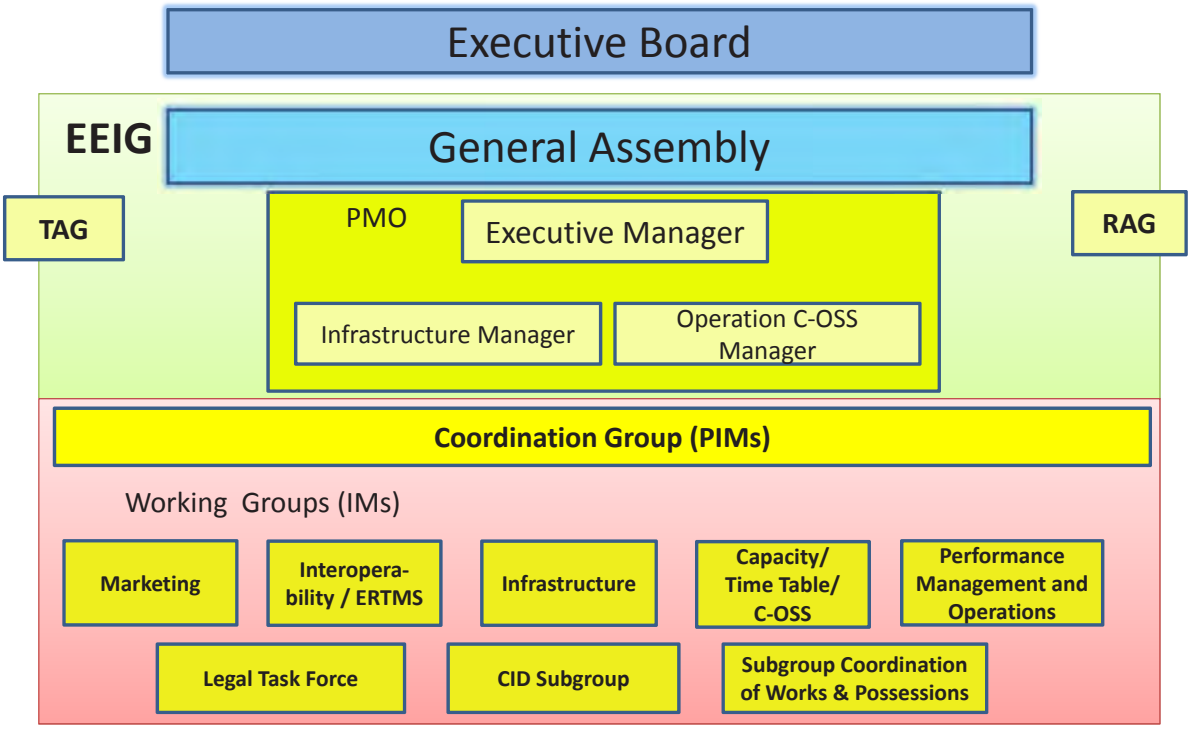


Figure 2: Planned RFC5 management structure

Legend:
EEIG –European Economic Interest Grouping;
PMO – Project Management Office
PIM - Project Implementation Manager
WG – Working Group

2.1.2 Executive Board

The Executive Board is composed of representatives from the Ministries responsible for transport of Poland, Czech Republic, Slovakia, Austria, Slovenia and Italy.

The Executive Board orientates the deployment of all actions foreseen by the implementation plan of the Management Board in order to complete the corridor's technical and economic interoperability.

The Executive Board decided to have an alternating chairmanship. The chairman maintains a close working relationship with the Management Board in order to ensure an optimal work flow. The Executive Board's meetings take place alternately in every corridor country. The meetings take place at least 3 times per year.

The European Commission is also taking part in the Executive Board work by participating at its meetings. The representatives of Regulatory Bodies and national Safety Authorities are invited to the ExBo meeting when appropriate.

2.1.3 Advisory Groups

Regulation (EU) 913/2010 sets out a number of obligations for the Management Board. One of them is setting up the Advisory Groups (AGs) in order to give customers and the terminals of the corridor the voice and to consult them.

In order to fulfil requirements of the Regulation, the AGs were set up:

- Railway Undertakings Advisory Group (RAG);
- Terminal Advisory Group (TAG).

First meeting of Advisory Groups took place in October 2013, establishment paper was signed in October 2014.

The RAG represents a platform for Railway Undertakings (RU) to facilitate the exchange of information, recommendations and mutual understanding about technical and operational issues and requirements, respectively strategic plans for improvements on this corridor in a non-discriminatory way with the MB. It may issue opinions on any proposal of the MB, which might have consequences for railway undertakings. It may also propose and deliver own-initiative opinions. The MB shall consider any of these opinions, as far as possible, in its work on the enhancement of the corridor. Proposals, which commonly might be raised and explained by the RAG will be carefully investigated and taken into account as far as they are feasible. However final decisions will remain the sole responsibility of the MB.

The TAG represents a platform for managers and owners of the terminals to facilitate the exchange of information, recommendations and mutual understanding about technical and operational issues and requirements, respectively strategic plans for improvements on this Corridor in a non-discriminatory way with the MB. Both RAG and TAG have the right to give advices to the MB. It may issue opinions on any proposal of the MB, which might have direct consequences for investment and the management of the terminals. It may also propose and

deliver own-initiative opinions. The MB shall consider any of these opinions, as far as possible, in its work on the enhancement of the Corridor. In case of disagreement between the MB and TAG, the latter may refer the matter to the Executive Board. The Executive Board shall act as an intermediary and provide its opinion in due time. However final decisions will remain the sole responsibility of the MB.

This is where the terminal owners and managers as well as the Railway Undertakings (RUs) have a role to play in the successful implementation of the rail freight corridors.

Both the AGs are chaired by the elected spokespersons.

2.2 RFC 5 characteristics

2.2.1 Routing

Besides the principal route outlined in the Regulation 913/2010/EC, the Corridor includes diversionary routes intended for re-routing trains in case of disturbance on the principal lines, and connecting lines, sections linking terminals and freight areas to the main lines. The length of the corridor RFC5 principal and diversionary lines is 4825 km. The total length of the corridor consists of sections in each involved countries. Poland has the longest part, about 1890 km corridor line (approx. 39 % of the total length), Czech Republic has part about 460 km (approx. 10 % of the total length), Slovakia has part about 440 km (approx. 9 % of the total length), Austria has part about 850 km (approx. 18 % of the total length), Slovenia has part about 450 km (approx. 9 % of the total length) and Italy has part about 730 km (approx. 15 % of the total length).

In geographical terms, there are three countries which have sea connection therefore their opportunities to sea ports and terminals are substantial for the corridor. On the coast of the Baltic Sea are seaports: Gdańsk, Gdynia, Świnoujście, Szczecin and on the cost of the Adriatic Sea are seaports: Koper, Trieste, Venezia and Ravenna.

The figure 3 shows the routing of RFC5 and the following figures 4- 9 shows sections of the RFC5 in countries along the corridor at the date of corridor implementation (10/11/2015).

Maps of the principal and diversionary lines of The Baltic – Adriatic Corridor

Rail Freight Corridor 5

Figure 3: Routing of RFC5

Poland

Figure 4: RFC5 sections in Poland

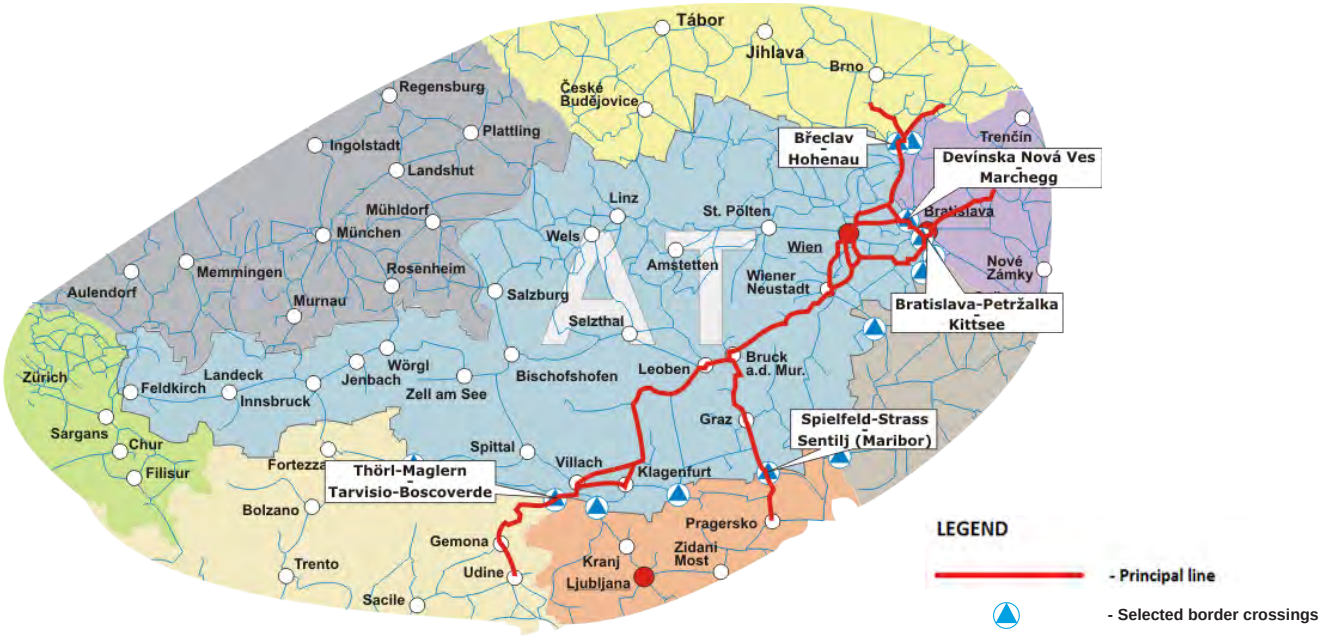
Czech Republic

Figure 5: RFC5 sections in Czech Republic

Slovakia

Figure 6: RFC5 sections in Slovakia

Austria



All lines in Austria are deemed to be principal lines. Whereas on parallel running lines, the capacity/reserve capacity will be offered depending on the respective availability.

Figure 7: RFC5 sections in Austria

Slovenia

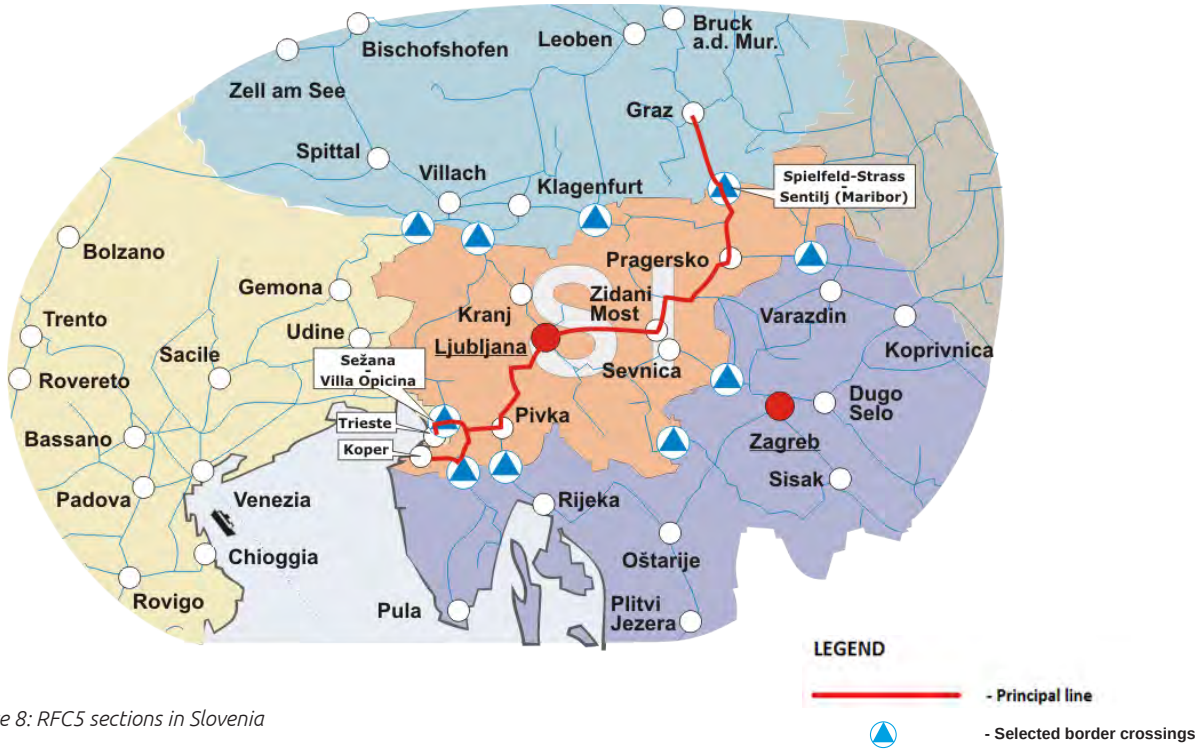


Figure 8: RFC5 sections in Slovenia

Italy

Figure 9: RFC5 sections in Italy

2.2.2 Infrastructure parameters

The detailed description of Rail Freight Corridor 5 is found in the table below and includes a list of:

- all railway lines or sections designated to the Corridor, with precise description of beginning and ending points,
- all terminals designated to the Corridor.

For designated lines, the description includes of all infrastructure parameters relevant for rail freight traffic. The main technical characteristics of the corridor overall are as follows:

- type of line, principal, diversionary, and connecting/feeder,
- section length, in kilometers,
- number of tracks, single or double track,
- maximum train length, maximum train length guaranteeing a flawless run along a whole section of the corridor, including traction,
- axle load, maximum loading gauge guaranteeing a flawless run along a whole section of the corridor,
- load per meter, maximum load per meter guaranteeing a flawless run along a whole section of the corridor,
- train speed, maximum general speed limit allowed on each line,
- loading gauge, maximum dimension for the freight vehicles especially in the tunnels,
- power supply, type of current and voltage for electrified lines (DC 1.500V, DC 3.000V, AC 15.000 V & 25.000V),
- signaling and interlocking systems, type of signaling systems implemented on each line.

Table 1: Infrastructure parameters of RFC5 (as of 1st May 2015)

Section No.	Country	Line section	Length of section (km)	Type of line		Number of tracks		Type of traction / Power supply				max train length							max axle load (tons / axle)			max load per meter (tons /			max line speed for freight				Speed limits			Profile (PC)	control and command														Telecommunication system					Access to terminal
				principal route	diversionary	connecting / feeder	Single track	Double track	3kV DC	15kV / 16.7Hz AC	25 kV/ 50 Hz AC	Diesel	400	450	500	550	600	650	700	750	20	21	22,5	6,4	7,2	8,0	v ≤ 60	60 < v ≤ 80	80 < v ≤ 100	100 < v ≤ 120	v > 120	No. of speed limits	Length of speed limits	Increase of time (for passenger trains)	Lowest speed	Length of lowest speed		Polish system - SHP	Czech and Slovak system class B - LS	Austrian system - PZB	Slovenian system - MO	Slovenian system - APB	Slovenian system - OO	Slovenian system - OP	Slovenian system - DPV	Italy system - class B -	ETCS L1	ETCS L2	PKP radio system 150 MHz	ZUG-FUNK 2000 (Kapsch)	Multikom	ZUG-FUNK(optical fibre	phone central	GSM-R	
1	PL	Gdynia Port - Gdynia Główna	1,66	x				x	x											750/ 750		x		x			30					0	-	-	-	G2 res.															Gdynia Port
2	PL	Gdynia Główna - Gdańsk Główny	21,37	x				x	x											750/ 750		x		x				100				4	0,88	5,10	30	0,88																
3	PL	Gdańsk Główny - Pszczółki	21,10	x				x	x											750/ 750		x		x					120			8	####	9,80	100	23,07															Gdańsk Port
4	PL	Pszczółki - Tczew	9,70	x				x	x											750/ 700		x		x					120			0	-	-	-	-															Gdańsk Port (connection via line no. 226, outside the Corridor)
5	PL	Tczew - Gołki	4,83	x				x	x											750/ 750		x		x				100				0	-	-	-	-															
6	PL	Gołki - Małęgmilianowo	114,23	x				x	x											750/ 750		x		x				100				19	5,92	7,10	20	0,06															
7	PL	Małęgmilianowo - Nowa Wieś Wielka	34,87	x				x	x											750/ 750	x			x			80					13	####	19,00	20	6,79															
8	PL	Nowa Wieś Wielka - Jałcie	12,78	x				x	x											750/ 750		x		x				100				1	0,02	0,60	70	0,02															
9	PL	Jałcie - Mimowola	8,47	x				x	x											750/ 750		x		x			80					3	0,05	2,60	30	0,03															
10	PL	Mimowola - Chorzew Siemkowice	196,86	x				x	x											750/ 750		x		x				100				73	####	133,70	20	9,36															Terminal Łódź (connection with via line no. 14, outside the Corridor) Terminal Kutno (connection via line no. 3, outside the Corridor)
11	PL	Chorzew Siemkowice - Bylom Kath	104,12	x				x	x									600/ 600				x		x				100				49	####	125,30	20	5,65															
12	PL	Bylom Kath - Chorzów Stary	7,85	x				x	x									600/ 600				x		x				100				6	4,10	4,30	20	0,20															
13	PL	Chorzów Stary - Katowice Szopienice Północne	12,13	x				x	x									600/ 600				x		x			50					17	####	28,20	20	6,89															
14	PL	Katowice Szopienice Północne - Stawiska podg	1,06	x				x	x									620				x		x			30					1	0,48	0,80	20	0,48															
15	PL	Stawiska podg - Stawiska podg	0,47	x				x	x									600			x			x			30					0	-	-	-	-															
16	PL	Stawiska podg - Mysłowice	0,93	x				x	x									600				x		x			30					1	1,28	1,60	20	1,28															
17	PL	Mysłowice - Mysłowice Brzezinka	6,78	x				x	x									600/ 600				x		x				90				7	8,85	16,20	20	4,89															
18	PL	Mysłowice Brzezinka - Oświęcim	17,78	x				x	x									600/ 600				x		x				90				19	####	24,60	10	0,20															
19	PL	Oświęcim - Czechowice Dziedzice	21,94	x				x	x										680/ 700			x		x				100				19	####	50,00	20	13,36															
20	PL	Czechowice Dziedzice - Chybie	14,11	x				x	x										650/ 650			x		x					120			12	####	23,90	30	8,70															
21	PL	Chybie - Zebrzydowice border PL/CZ	19,89	x				x	x									650/ 650				x		x				120				9	####	8,40	50	0,80															
22	PL	Czechowice Dziedzice - Zwardoń border PL/SK	69,58	x				x	x				330/ 360								x			x			120				33	####	33,10	20	0,54															
23	PL	Gdynia Główna - Małęgmilianowo	171,23		x		x			x										750		x		x			80					39	####	23,40	20	0,03															Gdynia Port
24	PL	Chorzew Siemkowice - Wycinki	48,60		x		x			x										750		x		x			40					5	0,47	1,70	20	0,02															
25	PL	Wycinki - Zawiercie	51,26	x				x	x				330/ 420											x			80					8	8,73	8,10	40	0,04															
26	PL	Zawiercie - Dąbrowa Górnicza Ząbkowice	18,67	x				x	x				330/ 420											x			80					8	9,42	6,60	20	0,00															Dąbrowa G.T

Section No.	Country	Line section	Length of section (km)	Type of line			Number of tracks		Type of traction / Power supply				max train length								max axle load (tons / axle)			max load per meter (tons /			max line speed for freight				Speed limits				Profile (PIC)	control and command																	Telecommunication system						Access to teminal
				principal route	diversionary	connecting / feeder	Single track	Double track	3kV DC	15kV / 16,7Hz AC	25 kV/ 50 Hz AC	Diesel	400	450	500	550	600	650	700	750	20	21	22,5	6,4	7,2	8,0	v ≤ 60	60 < v ≤ 80	80 < v ≤ 100	100 < v ≤ 120	v > 120	No. of speed limits	Length of speed limits	Increase of time (for passenger trains)	Lowest speed	Length of lowest speed		Polish system - SHP	Czech and Slovak system class B - LS	Austrian system - PZB	Slovenian system - MO	Slovenian system - APB	Slovenian system - OO	Slovenian system - OP	Slovenian system - DPV	Italy system - class B - ...	ETCS L1	ETCS L2	PKP radio system 150 MHz	ZUGFUNK 2000 (Kapsch)	Multikom	ZUGFUNK/optical fibre	phone central	GSM-R	
27	PL	Dąbrowa Górnicza Ząbkowice - Dorota	11,92		x			x	x								600/ 630						x		x			80				3	3,10	2,80	30	3,10	G2 res.	x													x						Terminal Sosnowiec Południowy (conection via linesno. 1, 171, 62 - sectionsoutside corridor)
28	PL	Dorota - Sosnowiec Maczki	3,50		x			x	x								600/ 630						x		x		50					6	4,36	5,90	20	0,04	G2 res.	x													x						Euroterminal Sławków
29	PL	Sosnowiec Maczki - Długoszyn	1,86		x		x		x								620/ 700					x			x		50					1	0,65	0,90	30	0,65	G2 res.	x													x						Terminal Kraików Krzeszowice (connection via lines 133 and 95 outside the Corridor)
30	PL	Długoszyn - Długoszyn	0,10		x		x		x								620/ 700					x			x		40					0	-	-	-	-	G2 res.	x													x						
31	PL	Długoszyn - Sosnowiec Jęzor	4,61		x		x		x								600/ 600					x			x			80				3	1,42	3,30	30	0,30	G2 res.	x													x						Terminal Kraików Krzeszowice (connection via lines 133 and 95 outside the Corridor)
32	PL	Sosnowiec Jęzor - Mysłowice Brzezinka	7,21		x		x		x									650			x				x		60					3	3,20	7,00	20	2,00	G2 res.	x													x						
33	PL	Świnoujście - Szczecin Dąbie	99,97	x				x	x								630					x			x		50					26	####	17,00	20	0,25	G2 res.	x													x						
34	PL	Szczecin Dąbie - Szczecin Podjuchy	6,44	x				x	x								630						x		x			80				4	0,60	1,30	20	0,00	G2 res.	x													x						
35	PL	Szczecin Port Centralny - Szczecin Podjuchy	5,87	x				x	x								630						x		x			70				5	1,37	1,10	60	0,30	G2 res.	x													x						
36	PL	Szczecin Podjuchy - Wrocław Muchobór	343,43	x				x	x								630					x			x				100			96	####	131,60	20	4,42	G2 res.	x													x						
37	PL	Wrocław Muchobór - Wrocław Stadion	3,30	x				x	x								630						x		x		60					1	0,28	1,40	20	0,28	G2 res.	x													x						
38	PL	Wrocław Stadion - Wrocław Brochów	8,09	x				x	x								630					x			x		60					7	6,17	25,10	10	3,70	G2 res.	x													x						
39	PL	Wrocław Brochów - Wrocław Brochów	3,55	x				x	x								600						x		x		30					0	-	-	-	-	G2 res.	x													x						
40	PL	Wrocław Brochów - Siechnice	2,73	x			x		x								600					x			x		30					1	0,65	3,70	10	0,65	G2 res.	x													x						
41	PL	Siechnice - Opole Groszowice	83,64	x				x	x								600				x				x					120		25	####	45,50	10	1,16	G2 res.	x													x						
42	PL	Opole Groszowice - Opole Groszowice	0,62	x				x	x								630						x		x		60					0	-	-	-	-	G2 res.	x													x						
43	PL	Opole Groszowice - Pyskowice	53,92	x				x	x								630						x		x					120		19	####	14,90	20	0,09	G2 res.	x													x						
44	PL	Pyskowice - Gliwice Łabędy	5,69	x				x	x									650					x		x				100			0	-	-	-	-	G2 res.	x													x						
45	PL	Gliwice Łabędy - Gliwice	5,89	x				x	x									650					x		x				100			4	1,62	5,00	40	0,62	G2 res.	x													x						
46	PL	Gliwice - Zabrze Biskupice	13,56	x				x	x									650				x			x			80				4	####	7,50	40	9,64	G2 res.	x													x						
47	PL	Zabrze Biskupice - Bytom	5,75	x				x	x								600/ 650						x		x		60					4	3,02	8,00	20	2,54	G2 res.	x													x						
48	PL	Opole Groszowice - Kędzierzyn Koźle	37,08	x				x	x								630					x			x			70				12	5,11	8,10	20	0,10	G2 res.	x													x						
49	PL	Kędzierzyn Koźle - Chałupki	53,72	x				x	x								600					x			x				100			48	####	46,60	20	1,60	G2 res.	x													x						
50	PL	Chałupki - Chałupki border PL/CZ	0,57	x			x		x									650					x		x				90			1	0,26	0,50	60	0,26	G2 res.	x													x						
51	PL	Chałupki - Chałupki border PL/CZ	0,57	x			x		x									650					x		x			90				1	0,26	0,50	60	0,26	G2 res.	x													x						
52	PL	Wrocław Brochów - Lamowice	2,39		x		x		x								600				x				x		40					1	1,50	5,30	10	1,50	G2 res.	x													x						
53	PL	Lamowice - Międzylesie border PL/CZ	130,31		x		x		x								600						x		x			80				49	####	66,60	20	4,21	G2 res.	x													x						

Section No.	Country	Line section	Length of section (km)	Type of line: principal route	Type of line: diversionary	Type of line: connecting / feeder	Number of tracks: Single track	Number of tracks: Double track	Type of traction / Power supply: 3kV DC	Type of traction / Power supply: 15kV / 16.7Hz AC	Type of traction / Power supply: 25 kV/ 50 Hz AC	Type of traction / Power supply: Diesel
54	SK	Skalité SK/PL border - Skalité	6,7	x			x		x			
55	SK	Skalité - Čadca	13,5	x			x		x			
56	SK	Čadca SK/CZ border - Čadca	16,7	x				x	x			
57	SK	Čadca - Žilina	30,5	x				x	x			
58	SK	Žilina --- Žilina - Teplička	6,9			x			x			
59	SK	Žilina - Púchov	44,2	x				x	x			
60	SK	Púchov - Nové Mesto nad Váhom	59	x				x			x	
61	SK	Nové Mesto nad Váhom - Bratislava Rača	91,9	x				x			x	
62	SK	Bratislava Rača - Bratislava hl. st.	7,4	x				x			x	
63	SK	Bratislava hl. st. - Devínska Nová Ves	12,8	x				x			x	
64	SK	Devínska Nová Ves - Devínska Nová Ves SR/AT border	3,7	x			x					x
65	SK	Bratislava Rača - Bratislava Východ	1,9	x			x				x	
66	SK	Bratislava Východ - Bratislava Predmestie	3,5	x				x			x	
67	SK	Bratislava Predmestie - Bratislava Nové Mesto	1,8	x				x			x	
68	SK	Bratislava Nové Mesto - Bratislava Petržalka	12,4	x				x			x	
69	SK	Bratislava Petržalka - Bratislava Petržalka SK/AT border	2,4	x			x			x		
70	SK	Bratislava Nové Mesto - Bratislava hl. st.	5,1	x			x				x	
71	SK	Leopoldov - Galanta	29,7			x		x			x	
72	SK	Odb. Močiar - Galanta	39,1			x		x			x	
73	SK	Odb. Močiar - Bratislava Predmestie	1,4			x	x				x	
74	SK	Odb. Močiar - Bratislava hl. st.	9,6			x		x			x	
75	SK	Bratislava Vajnory - Bratislava Východ	2,9			x	x				x	
76	SK	Odb. Močiar - Odb. Vinohrady	1,3			x	x				x	
77	SK	Bratislava Nové Mesto - Podunajské Biskupice	4,9			x	x					x
78	SK	Podunajské Biskupice - Dunajská Streda	34			x	x					x
79	CZ	Petrovice u Karviné border CZ/PL - Ostrava Svinov	27	x				x	x			
80	CZ	Ostrava Svinov - Hranice na Moravě	50	x				x	x			

Section No.	max train length: 400	450	500	550	600	650	700	750	max axle load (tons / axle): 20	21	22,5	max load per meter (tons / meter): 6,4	7,2	8,0	max line speed for freight: v ≤ 60	60 < v ≤ 80	80 < v ≤ 100	100 < v ≤ 120	v > 120
54											x			x		70			
55						650					x			x			100		
56							700				x			x			100		
57							700				x			x					140
58							700				x			x	60				
59						650					x			x				120	
60						650					x			x				120	
61						650					x			x					160
62						650					x			x			100		
63							700				x			x				120	
64							700				x			x		80			
65							700				x			x	40				
66						690					x			x	60				
67						690					x			x	60				
68						690					x			x		80			
69						690					x			x					140
70						690					x			x		80			
71						690					x			x			100		
72							700				x			x					140
73						690					x			x	60				
74							700				x			x				120	
75							700				x			x	50				
76							700				x			x	60				
77					625				x					x		80			
78					625						x			x		80			
79							700				x			x					140
80						690					x			x					160

Section No.	Speed limits: No. of speed limits	Length of speed limits	Increase of time (for passenger trains)	Lowest speed	Length of lowest speed	Profile (P/C)	control and command: Polish system - SHP	Czech and Slovak system class B - LS	Austrian system - PZB	Slovenian system - MO	Slovenian system - APB	Slovenian system - OO	Slovenian system - OP	Slovenian system - DPV	Italy system - class B -	ETCS L1	ETCS L2	Telecommunication system: PKP radio system 150 MHz	ZUGFUNK 2000 (Kapsch)	Multikom	ZUGFUNK/optical fibre	phone central	GSM-R	Access to terminal
54						GC/1-VM, P/C 80/400																		
55						GB/1-VM, P/C 80/400																		
56						GB/1-VM, P/C 80/400		x											x					
57						GB/1-VM, P/C 80/400		x											x					Railway station Žilina: INTRANS, a.s.
58						GB/1-VM, P/C 80/400													x					Žilina - Teplička marshalling yard
59						GB/1-VM, P/C 80/400		x											x					Railway station Žilina: INTRANS, a.s.
60						GB/1-VM, P/C 80/400													x	x				Trenčianska Teplá, Púchov marshalling yard
61						GC/2-VM, P/C 99/429										x			x	x				Trnava marshalling yard, Railway station Pezinok: BETA-CAR, s.r.o
62						GB/1-VM, P/C 80/400		x											x	x				Bratislava Východ marshalling yard
63						GB/1-VM, P/C 80/400		x																
64						GC/2-VM, P/C 80/400																		
65						GB/1-VM, P/C 80/400													x					Bratislava Východ marshalling yard
66						GB/1-VM, P/C 80/400		x											x					Bratislava Východ marshalling yard
67						GB/1-VM, P/C 80/400													x					
68						GB/1-VM, P/C 80/400													x					Railway station Bratislava ÚNS: Slovnaft, a.s., INTRANS, a.s., Slovenské plavby a prístavy, a.s.
69						GC/2-VM, P/C 80/400																		
70						GB/0-VM, P/C 80/400													x					
71						GC/2-VM, P/C 80/400													x					Leopoldov marshalling yards
72						GB/1-VM, P/C 80/400		x											x					Railway station Sládkovičovo: LÖRINCZ, s.r.o.
73						GB/1-VM, P/C 80/400																		
74						GB/1-VM, GB/02-VM, P/C 80/400		x											x					
75						GB/1-VM, P/C 80/400													x					Bratislava Východ marshalling yard
76						GB/1-VM, P/C 80/400																		
77						GB/0-VM, P/C 45/375														x				
78						GB/0-VM, P/C 45/375														x				Railway station Dunajská Streda: METRANS /Danubia/, a.s.
79						GC		x															x	Ostrava-Kunčice marshalling yard
80						GC		x															x	Terminals Ostrava-Paskov a Ostrava - Šenov

Section No.	Country	Line section	Length of section (km)	Type of line			Number of tracks		Type of traction / Power supply				max train length								max axle load (tons / axle)			max load per meter (tons /			max line speed for freight				Speed limits				Profile (PIC)	control and command																	Telecommunication system						Access to teminal
				principal route	diversionary	connecting / feeder	Single track	Double track	3kV DC	15kV / 16,7Hz AC	25 kV/ 50 Hz AC	Diesel	400	450	500	550	600	650	700	750	20	21	22,5	6,4	7,2	8,0	v ≤ 60	60 < v ≤ 80	80 < v ≤ 100	100 < v ≤ 120	v > 120	No. of speed limits	Length of speed limits	Increase of time (for passenger trains)	Lowest speed	Length of lowest speed		Polish system - SHP	Czech and Slovak system class B - LS	Austrian system - PZB	Slovenian system - MO	Slovenian system - APB	Slovenian system - OO	Slovenian system - OP	Slovenian system - DPV	Italy system - class B - ...	ETCS L1	ETCS L2	PKP radio system 150 MHz	ZUGFUNK 2000 (Kapsch)	Multicom	ZUGFUNK/optical fibre	phone central	GSM-R	
81	CZ	Hranice na Moravě - Přerov	29	x				x	x									690					x			x				160					GC		x																x	
82	CZ	Přerov - Nedakonice	52	x				x	x										700				x			x				160					GC		x																x	
83	CZ	Nedakonice - Břeclav	48	x				x			x								700				x			x				160					GC		x																x	Terminal Lipa nad Dřevnicí
84	CZ	Děmarovice - Mosty u Jablúnkova border CZ/SK	49	x				x	x									660					x			x				160					GC		x																x	
85	CZ	(Chałupki) border PL/CZ - Bohumín	3	x			x		x								600						x			x		100							Z-GČD																x	
86	CZ	(Chałupki) border PL/CZ - Bohumín - Vrbice	4	x			x		x								600						x			x		100							Z-GČD																x	
87	CZ	Lichkov border PL/CZ - Ústí nad Orlicí	36		x		x		x								600						x			x		90							GC																	
88	CZ	Ústí nad Orlicí - Česká Třebová	11		x			x	x									666					x			x				160					GC		x																x	Terminal Česká Třebová
89	CZ	Česká Třebová - Svitavy	17		x			x	x				397*				600						x			x				140					GC		x																x	
90	CZ	Svitavy - Brno	71		x			x			x						648						x			x				140					Z-GČD		x																x	
91	CZ	Brno - Břeclav	61		x			x			x		270*					669					x			x				160					Z-GČZ-GČD		x																x	Břeclav marshalling yard
92	AT	BA Petržalka - Parndorf	25	x			x			x						520							x			x				160					80 / 410			x														x	
93	AT	Parndorf - Wien Zvbf.	43	x				x		x								650					x			x				140					80 / 410			x														x	Wien Freudenau Hafen; Wien Nordwest
94	AT	Marchegg - Gänserndorf	18	x			x					x						650					x			x		100							80 / 410			x														x	
95	AT	Border AT/SK - Marchegg - Wien Stadlau	36	x			x					x						650					x			x			120							80 / 410			x														x	Wien Freudenau Hafen; Wien Nordwest
96	AT	Břeclav os.n. - Border CZ/AT - Gänserndorf	51	x				x		x								650					x			x				140					80 / 410			x													x	x	
97	AT	Gänserndorf - Wien Nord/ Matzl/Zvbf.	39	x				x		x								650					x			x				140					80 / 410			x													x	x	Wien Freudenau Hafen; Wien Nordwest
98	AT	Wien Nord/ Matzl/Zvbf. - Wiener Neustadt (via Liesing)	46	x				x		x								650					x			x				160					80 / 410			x														x	Wien Freudenau Hafen; Wien Nordwest
99	AT	Wien Nord/ Matzl/Zvbf. - Wiener Neustadt (via Ebreichsdorf)	50	x			x	x		x								650					x		x					140					80 / 410			x														x	Wien Freudenau Hafen; Wien Nordwest
100	AT	Wien Nord/ Matzl/Zvbf. - Wiener Neustadt (via Gramatneusiedl)	56	x			x	x		x								650					x			x				140					80 / 410			x														x	Wien Freudenau Hafen; Wien Nordwest
101	AT	Wiener Neustadt - Gloggnitz	27	x				x		x								650					x			x				150					80 / 410			x														x	
102	AT	Gloggnitz - Mürzzuschlag	42	x				x		x								650					x			x				150					50 / 380			x														x	
103	AT	Mürzszuschlag - Bruck an der Mur	41	x				x		x								650					x			x				150					80 / 410			x														x	Kapfenberg
104	AT	Bruck an der Mur - Graz Hbf.	53	x				x		x								650					x			x				140					80 / 410			x														x	Graz Süd
105	AT	Graz Hbf. - Spielfeld-Straß - Border AT/SL	47	x				x		x							550						x			x				160					80 / 410			x														x	Graz Süd
106	AT	Bruck an der Mur - St. Veit an der Glan	150	x				x		x								650					x			x				160					80 / 410			x														x	St. Michael
107	AT	St. Veit an der Glan - Villach Hbf. (via Klagenfurt Hbf.)	58	x				x		x								650					x			x				140					80 / 410			x														x	

Section No.	Country	Line section	Length of section (km)	Type of line			Number of tracks		Type of traction / Power supply				max train length								max axle load (tons / axle)			max load per meter (tons /			max line speed for freight				Speed limits				Profile (PC)	control and command																	Telecommunication system						Access to terminal
				principal route	diversionary	connecting / feeder	Single track	Double track	3kV DC	15kV / 16.7Hz AC	25 kV/ 50 Hz AC	Diesel	400	450	500	550	600	650	700	750	20	21	22.5	6,4	7,2	8,0	v ≤ 60	60 < v ≤ 80	80 < v ≤ 100	100 < v ≤ 120	v > 120	No. of speed limits	Length of speed limits	Increase of time (for passenger trains)	Lowest speed	Length of lowest speed		Polish system - SHP	Czech and Slovak system class B - LS	Austrian system - PZB	Slovenian system - MO	Slovenian system - APB	Slovenian system - OO	Slovenian system - OP	Slovenian system - DPV	Italy system - class B -	ETCS L1	ETCS L2	PKP radio system 150 MHz	ZUGFUNK 2000 (Kapsch)	Multikom	ZUGFUNK/optical fibre	phone central	GSM-R	
108	AT	St. Veit an der Glan - Villach Hbf. (via Sattendorf)	50	x			x			x								650					x			x			80																									
109	AT	Villach Hbf. - Tarvisio Boscoverde (Border AT/IT)	22	x				x		x						550							x			x					140					80 / 410			x															x	Villach Süd
110	SI	Šentilj s.b. - Maribor	16,5	x			x		x							560					x			x			80								G2 80/400				x													x	x		
111	SI	Maribor - Pragersko	18,7	x				x	x								597				x			x				100								G2 80/400				x													x	x		Maribor Tezno
112	SI	Pragersko - Zidani Most	73,2	x				x	x								597				x			x			80								G2 90/410				x	x												x	x		Celje tovorna
113	SI	Celje - Velenje	38			x	x					x		450							x			x			80								G2 70/390						x												x		Gorenje Velenje
114	SI	Zidani Most - Ljubljana	63,9	x				x	x							570							x	x			80								G2 99/429					x												x	x		Ljubljana Zalog, Ljubljana Moste
115	SI	Ljubljana- Novo mesto	76			x	x					x		460							x			x			75								G2 50/370						x												x		Revoz Novo mesto
116	SI	Ljubljana - Divača	103,7	x				x	x								600						x	x			80								G2 82/412				x	x		x	x									x	x		
117	SI	Divača - Sežana s.b.	12,9	x				x	x								600						x	x			75								G2 99/429				x			x										x	x		
118	SI	Divača - Koper	48	x			x		x						500								x	x			75								G2 90/410					x			x									x	x		Koper tovorna, Port of Koper
119	IT	Tarvisio Boscoverde (Border AT/IT) - Carnia	49,121	x				x	x								625						x			x					140					PC 80								x									x	
120	IT	Carnia - PMVAT	35,176	x				x	x								625						x			x					140					PC 80								x									x	
121	IT	PMVAT - Udine	4,493	x			x		x								625						x			x				120					PC 80								x									x	
122	IT	Udine-Gorizia	32,862	x				x	x							595							x			x					140d					PC 80								x									x	
123	IT	Gorizia-Bivio S.Polo	20,829	x				x	x							595							x			x		100								PC 80								x									x	
124	IT	Bivio S. Polo - Bivio d'Aurisina	14,183	x				x	x								600						x			x		100								PC 80								x									x	
125	IT	Bivio d'Aurisina - Trieste	14,539	x				x	x								600						x			x		100c								PC 80								x									x	
126	IT	Udine - Treviso	105,73	x				x	x							575							x			x					140					PC 80								x									x	
127	IT	Treviso - Venezia Mestre	20,9	x				x	x							575							x			x					140					PC 80								x									x	
128	IT	Treviso - Castelfranco Veneto	24,529	x				x	x							575							x			x					140					PC 80								x									x	
129	IT	Castelfranco Veneto - Camposampiero	12,057	x				x	x							575							x			x					125					PC 80								x									x	
130	IT	Camposampiero - Padova	18,179	x				x	x							575							x			x					130					PC 80								x									x	
131	IT	Padova - Monselice	22,802	x				x	x									625/ 650*					x			x					140					PC 80								x									x	
132	IT	Monselice - Rovigo	20,947	x				x	x									625/ 650*					x			x					140					PC 80								x									x	
133	IT	Rovigo - Ferrara	31,996	x				x	x									625/ 650*					x			x					140					PC 80								x									x	
134	IT	Ferrara - Ravenna	72,62	x			x		x					465/ 575*							x			x							140					PC 32								x									x	

APB automatic line block

MO station interdependence

OP bilateral traffic

DVP remote traffic control line (telecommand)

OO signing-off section

a) the bigger length only possible with special agreements

b) In some sections of the Urban Node max line speed is 60.

c) In some sections of the line max line speed is 85

d) In some sections of the line max line speed is 80

Section No.	Country	Line section	Length of section (km)	Type of line: principal route	Type of line: diversionary	Type of line: connecting / feeder	Number of tracks: Single track	Number of tracks: Double track	Type of traction / Power supply: 3kV DC	Type of traction / Power supply: 15kV / 16.7Hz AC	Type of traction / Power supply: 25 kV/ 50 Hz AC	Type of traction / Power supply: Diesel	max train length: 400	max train length: 450	max train length: 500	max train length: 550	max train length: 600	max train length: 650	max train length: 700	max train length: 750	max axle load (tons / axle): 20	max axle load (tons / axle): 21	max axle load (tons / axle): 22,5	max load per meter (tons / meter): 6,4	max load per meter (tons / meter): 7,2	max load per meter (tons / meter): 8,0
135	IT	Ferrara - S.Pietro in Casale	22,951	x				x	x									625/ 650a					x			x
136	IT	S.Pietro in Casale - Castelmaggiore	13,932	x				x	x									625/ 650a					x			x
137	IT	Castelmaggiore - Bologna	11,672	x				x	x									575					x			x
138	IT	Bologna - Bivio S.Vitale	2,613		x			x	x									575					x			x
139	IT	Bivio S.Vitale - Castelbolognese	37,8		x			x	x								600						x			x
140	IT	Castelbolognese- Ravenna	41,1		x		x		x					475/ 575a									x			x
141	IT	Castelbolognese - Faenza	7,23		x			x	x								600						x			x
142	IT	Faenza - Granarolo	8,915		x		x		x					480/ 575a									x			x
143	IT	Granarolo - Ravenna	24,494		x		x		x					475/ 575a									x			x
144	IT	Udine - Cervignano	28		x		x		x									625					x			x
145	IT	Cervignano - Ronchi dei Legionari sud	13		x			x	x								600						x			x
146	IT	Ronchi dei Legionari sud - Bivio S. Polo	2		x			x	x								600						x			x
147	IT	Bivio d'Aurisina - Villa Opicina	15,013	x				x	x								600						x			x

Section No.	max line speed for freight: v ≤ 60	max line speed for freight: 60 < v ≤ 80	max line speed for freight: 80 < v ≤ 100	max line speed for freight: 100 < v ≤ 120	max line speed for freight: v > 120	Speed limits: No. of speed limits	Speed limits: Length of speed limits	Speed limits: Increase of time (for passenger trains)	Speed limits: Lowest speed	Speed limits: Length of lowest speed	Profile (P/C)	control and command: Polish system - SHP	control and command: Czech and Slovak system class B - LS	control and command: Austrian system - PZB	control and command: Slovenian system - MO	control and command: Slovenian system - APB	control and command: Slovenian system - OO	control and command: Slovenian system - OP	control and command: Slovenian system - DPV	control and command: Italy system - class B -	control and command: ETCS L1	control and command: ETCS L2	Telecommunication system: PKP radio system 150 MHz	Telecommunication system: ZUGFUNK 2000 (Kapsch)	Telecommunication system: Multikom	Telecommunication system: ZUGFUNK/optical fibre	Telecommunication system: phone central	Telecommunication system: GSM-R	Access to terminal
135					140						P/C 80									x								x	
136					140						P/C 80									x								x	
137					140b						P/C 80									x								x	
138					140b						P/C 80									x								x	
139					150						P/C 80									x								x	
140				120							P/C 32									x								x	
141					180						P/C 80									x								x	
142			100								P/C 32									x								x	
143				120							P/C 32									x								x	
144			100								P/C 80									x								x	
145					140						P/C 80									x								x	
146			100								P/C 80									x								x	
147		80									P/C 80									x								x	

2.2.3 Bottlenecks

This document provides a description of categories of possible bottlenecks on the base of future development of freight traffic in RFC5, integrating information given by Infrastructure Managers. Bottlenecks are understood here as places of not sufficient capacity resulted from temporary bigger traffic needs than current infrastructure capacity.

RFC5 identified and analysed possible bottlenecks in traffic on the whole corridor. As a result, the bottlenecks were divided into three following groups:

- Bottlenecks resulting from actual status of the Infrastructure
- Bottlenecks resulting from operational reasons and
- Others bottlenecks.

In Table 2 *The list of bottlenecks along RFC5*, bottlenecks are shown respectively in three columns. Each of them is presenting one of three groups of bottlenecks: infrastructure, operational and others.

The RFC5 analyses all categories of bottlenekcs and proposal concerning measures and solutions will be presented in newly elaborated version of IP.

Table 2: The list of bottlenecks along RFC5

	Line section	Bottlenecks		
Country	**Line/section or station/terminal/junction**	**Infrastructure side (description)**	**Operational (description)**	**Others (description)**
PL	Port Szczecin	insufficient railway track condition on some sections, bad condition of engineering structures, bottlenecks limiting capacity	insufficient capacity due to insufficient number and lenght of station tracks, and axle-load	
PL	Port Gdańsk & Port Gdynia		insuficient capacity due to single track section (2nd track under reconstruction)	
PL	Wrocław - Jelcz - Opole	insufficient track condition on some sections, local speed restrictions caused mainly by bad state of engineering structures, capacity bottlenecks, signalling devices requiring reconstruction	insufficient capacity due to speed restrictions and single track section	
PL	Opole - Kędzierzyn Koźle	insufficient track condition on some sections, speed restrictions	insufficient capacity due to speed restrictions	
PL	Katowice - Tychy - Czechowice Dziedzice - Zebrzydowice	insufficient track condition on some sections, local speed restrictions caused mainly by bad state of engineering structures, bottlenecks restricting capacity	insufficient capacity due to speed restrictions, short station tracks, axle-load limitations, intensive passenger traffic	
PL	Gdynia - Gdańsk - Tczew	capacity is exhausted in the current railway operation - possible insufficient capacity	insufficient capacity due to intensive passenger traffic	
PL	Tczew - Katowice	insufficient track condition on some sections, local speed restrictions caused mainly by bad state of engineering structures, bottlenecks restricting capacity	insufficient capacity due to speed restrictions, unsufficient number of side tracks on some stations	
PL	Czechowice Dziedzice - Zwardoń border PL/SK	border crossing Skalité -Zwardoń, Single track, max train length 330/360m	border crossing Skalité -Zwardoń	
SK	Čadca -Skalité	border crossing Skalité -Zwardoń, Single track, max train length 330/360m -(*)	border crossing Skalité -Zwardoń	
SK	Junction Bratislava	- tunnels in section Bratislava Lamač – Bratislava hl.st. (often maintenance, mostly only one track available, lack of capacity), low speed - Existing single track Bratislava hl. St. – Bratislava Nové Mesto – exhausted capacity, proposal for doubling. Devínska Nová Ves - Devínska Nová Ves SR/AT border - only diesel (*)		in junction Bratislava : signalling track circuits with frequency of 25 Hz in stations BA- Nové Mesto and BA - ÚNS

	Line section	Bottlenecks		
Country	Line/section or station/terminal/junction	Infrastructure side (description)	Operational (description)	Others (description)
CZ	Petrovice u Karviné - Ostrava Svinov	Ostrava junction, capacity is exhausted in the current railway operation for all modes and low speed - insufficient capacity	Ostrava junction, insufficient capacity for all modes	
CZ	Dětmarovice - Mosty u Jablůnkova	low speed limits due to undermined area (close to Český Těšín)	low speed limits due to undermined area (close to Český Těšín)	
CZ	Ostrava Svinov - Hranice na Moravě		possible insufficient capacity on Ostrava - Přerov section (Insufficient capacity and insufficient speed according to TEN-T requirements), future plans of building new HS paralel lineOstrava - Přerov - Brno, in cca 2040	
CZ	Hranice na Moravě - Přerov		possible insufficient capacity on Ostrava - Přerov section, future plans of building new HS paralel line Ostrava - Přerov - Brno, in cca 2040	
AT	Gloggnitz-Mürzzuschlag	Bottlenecks regarding infrastructure parameters: + very low speed + very large gradients + limited gauge (because of tunnels)	possible inssufficient capacity, mountain line with very large gradients, additional traction units necessary	
AT	Wien Meidling - Wampersdorf	possible insufficient capacity (because of single-track line) in a mid- and longterm perspective	possible insufficient capacity due single track line	
AT	Wien – Marchegg – Devínska Nová Ves.	1.) Bottlenecks regarding infrastructure parameters: + no electrification between Wien-Stadlau an border AT/SK 2.) Possible insufficient capacity (because of single-track line) in a mid- and longterm perspective	possible insufficient capacity, single track line, no electrification, two times change of traction unit necessary	
AT	Werndorf - Border AT/SI	possible insufficient capacity (because of single-track line) in a mid- and longterm perspective	possible insufficient capacity, single track line	
SI	Station Divaca	Insufficient capacity, longer too short station tracks,		
SI	section Ljubljana - Divača	Short station tracks, lack of capacity	Insufficientr capacity, short station tracks,	
SI	section Divača - Koper	Limitation caused by loading gauge	Limitation caused by loading gauge	
SI	Station Ljubljana (node)	Insufficient capacity, only single track line,	Insufficient capacity, only single track line,	
SI	section Zidani Most - Pragersko	Insufficient capacity, short station tracks,	Insufficient capacity, short station tracks,	
SI	section Maribor - Šentilj	Lack of category (C3 to D4)	Insufficient capacity caused by lack of category (C3 to D4)	
IT	Udine Node	Capacity limitation due to one track	Capacity limitation due to traffic promiscuity (Mixed passenger and freight traffic)	
IT	Padova – Trieste / Tarvisio Line	Stations conditions and line resulting in limitation of trains length		
IT	Trieste Node	Station conditions resulting in limitation of trains length from/to Port of Trieste	Capacity limitation due to increasing of freight traffic from/to Port of Trieste	
IT	Venezia Node		Capacity limitation due to traffic promiscuity (Passenger and freight)	
		ITALY - All the Bottlenecks in the table have been considered on the base of the future development of freight traffics and Corridors. At the moment, in the short term, there are no bottlenecks on the corridor		

2.2.4 Corridor terminals

According to Article 2.2.c of Regulation 913/2010/EC, terminals are defined as those facilities provided along the freight corridor which have been specially arranged to allow either the loading and/or the unloading of goods onto/from freight trains and the integration of rail services with road, maritime, river and air services, and either the forming or modification of the composition of freight trains and where necessary, performing border procedures at borders with European third countries.

In this sub-chapter there are the lists of terminals in each country with their main parameters of connectivity.

PL	Connectivity infrastructure				
Main terminals	Road	Rail	Water	Tracks	Max.train length
BCT – Bałtycki Terminal Kontenerowy Gdynia*	x	x	x	3	300
DCT - Deepwater Container Terminal Gdańsk	x	x	x	4	1000
GCT - Gdynia Container Terminal	x	x	x	2	160
Container Terminal Łódź	x	x		2	400
Gliwice Terminal PCC	x	x		2	600
Gliwice Terminal Kontenerowy	x	x		2	450
Euroterminal Slawkow	x	x		6	850
Kraków-Krzesławice - Terminal Kontenerowy	x	x		2	300
Kutno Terminal Kontenerowy	x	x		4	700
Sosnowiec Południowy - Terminal Kontenerowy	x	x		3	230
Terminal Dąbrowa Górnicza	x	x		4	625
BALTCHEM S.A. - Zakłady Chemiczne w Szczecinie					
Bałtycka Baza Masowa					
Port Gdański Eksploatacja S.A.					
Bulk Cargo-Port Szczecin					
CARGOSPED-Terminal Braniewo					
Port Handlowy Świnoujście					
ŚLĄSKIE CENTRUM LOGISTYKI S.A.					
Terminal-marshalling yards					
Dąbrowa Górnicza Towarowa	Diversionary				
Gdańsk Port Północny					
Gdynia Port					
Jaworzno Szczakowa	Diversionary				
Szczecin Port Centralny					
Świnoujście					
Tarnowskie Góry					
Łazy	Diversionary				
Częstochowa Towarowa	Diversionary				
Wrocław Brochów					
Zabrzeg Czarnolesie					

(*) - 3 container tracks of 675 m each under two new rail gantry cranes and 2 new multipurpose tracks are planned to be completed on 30.11.2015

Figure 10: List of terminals along RFC5 in Poland

CZ	Connectivity infrastructure				
Main terminals	Road	Rail	Water	Tracks	Max.train length
Brno-Horní Heršpice	x	x		3	300
Přerov	x	x		1	215
Želechowice - Zlin	x	x		8	550
Kopřivnice	x	x		2	150
Ostrava-Paskov Terminal	x	x		3	270
Ostrava-Paskov terminal	x	x		1	270
Ostrava Senov	x	x		7	630
Terminal Česká Třebová	x	x		6	700
Terminal-marshalling yards					
Bohumin-Vrbice					
Ostrava					
Studénka					
Hranice na Moravě					
Přerov					
Břeclav					
Česká Třebová					
Brno - Maloměřice					

Figure 11: List of terminals along RFC5 in Czech Republic

SK	Connectivity infrastructure			
Main terminals	Road	Rail	Water	Connected in station
SLOVNAFT, a.s. freight	x	x		Bratislava ÚNS
RCO (INTRANS) multimodal	x	x		Žilina
Slovenské plavby a prístavy, a.s. multimodal freight	x	x	x	Bratislava ÚNS
BETA-CAR, s.r.o. freight	x	x		Pezinok
METRANS /Danubia/ multimodal	x	x		Dunajska Streda
LÖRINCZ multimodal	x	x		Sládkovičovo
Intermodal terminal in Žilina	x	x		Žilina - Teplička

Terminals – marshalling yards

Žilina – Teplička

Bratislava východ

Trenčianska Teplá zr. st.

Leopoldov

Puchov

Figure 12: List of terminals along RFC5 in Slovakia

A	Connectivity infrastructure				
Main terminals	Road	Rail	Water	Tracks	Max.train length
Graz Süd	x	x		4	700
Kapfenberg	x	x		2	330
St. Michael	x	x		2	370
Villach Süd	x	x		4	350
Vienna Freudenau Hafen	x	x	x	9	650
Vienna Nordwestbahnhof	x	x		6	400
Vienna Süd	(under construction)				

Terminals – marshalling yards

Wien Zentralverschiebebahnhof

Graz Verschiebebahnhof

Villach Süd Großverschiebebahnhof

Bruck a.d. Mur Frachtenbahnhof

Figure 13: List of terminals along RFC5 in Austria

SI	Connectivity infrastructure				
Main Terminals	Road	Rail	Water	Tracks	Max.train length
Ljubljana Moste	x	x		4	500
Koper Luka KT	x	x	x	5	671
Maribor	x	x		3	253
Celje	x	x		2	400
Private terminal Gorenje Velenje	x	x		8	300
Private terminal Revoz Novo mesto	x	x		4	250

Terminals – marshalling yards

Ljubljana

Figure 14: List of terminals along RFC5 in Slovenia

I	Connectivity infrastructure		
Terminals-Transfer Stations	Road	Rail	Water
Bologna Interporto	x	x	
Cervignano Interporto	x	x	
Osoppo	x	x	
Padova Interporto	x	x	
Ravenna	x	x	x
Udine Parco	x	x	
Cittadella	x	x	
Trieste Campo Marzio	x	x	x
Venezia Marghera Scalo	x	x	x
Lugo Terminal spa	x	x	

Figure 15: List of terminals along RFC5 in Italy

List of RFC 5 Seaports:

Baltic Sea
1. Gdańsk - www.portgdansk.pl
2. Gdynia - www.port.gdynia.pl
3. Port Świnoujście - www.otport.swinoujscie.pl
4. Port Szczecin - www.port.szczecin.pl

Adriatic Sea
1. Koper - www.luka-kp.si
2. Trieste - www.porto.trieste.it
3. Venezia - www.port.venice.it/
4. Ravenna - www.port.ravenna.it

>> 3. Essential elements of the Transport Market Study

3.1 Introduction

3.1.1. Background

The main objective of the Transport Market Study (TMS) for European Rail Freight Corridor 5 (RFC5) is to provide a clear understanding of the current conditions of the multimodal freight market along the Corridor together with short- and long-term freight traffic forecasts consequent to the implementation of the Corridor at the end of year 2015, and also to propose a measurement of the expected modal shift from road to rail.

The TMS serves as the basis for the assessment of customer needs, through a corridor perspective. The TMS analyses and presents the main market elements of the RFC5 and contributes to the preparation of the Implementation Plan of the Corridor, pursuant to Art. 9 of the Regulation (EU) 913/2010.

The TMS is divided into three main parts, namely
- Phase I – Analysis of current situation
- Phase II – Survey
- Phase III – Short- and long-term forecasts.

3.1.2. Corridor overview and investigation area

Initial Rail Freight Corridor draft according to the EU Regulation No 913/2010 has been updated during the project. Additionally, requested from corridor countries, new branches were added: the axis Świnoujście – Wrocław – Międzylesie (border) on Poland site and from Międzylesie (border) to Břeclav on the Czech Republic site. Figure 16 shows the routing of Rail Freight Corridor 5 (RFC5) and the investigation area for modelling the effects of introducing RFC services.

Presented routing of RFC5 comprises of principal and diversionary lines. Both types are described in more detail in sub-chapter 2.2.1.

Figure 16: Routing of RFC5 and investigation area for modelling purposes

The investigation area in terms of main modelling area for the freight transport model includes all RFC5 countries inclusive the east part of Germany and whole Hungary as well as Croatia.

3.2. Phase I: Analysis of current situation

3.2.1. Socio-economic determinants and transport policies

The global interrelation of economic activity measured in Gross Domestic Product (GDP) and trade between 1970 and 2015 is depicted in Figure 17. Whereas the red line describes the development of trade growth[1], the blue line indicates changes in GDP[2]. It illustrates that trade has grown faster than GDP in the last 45 years.

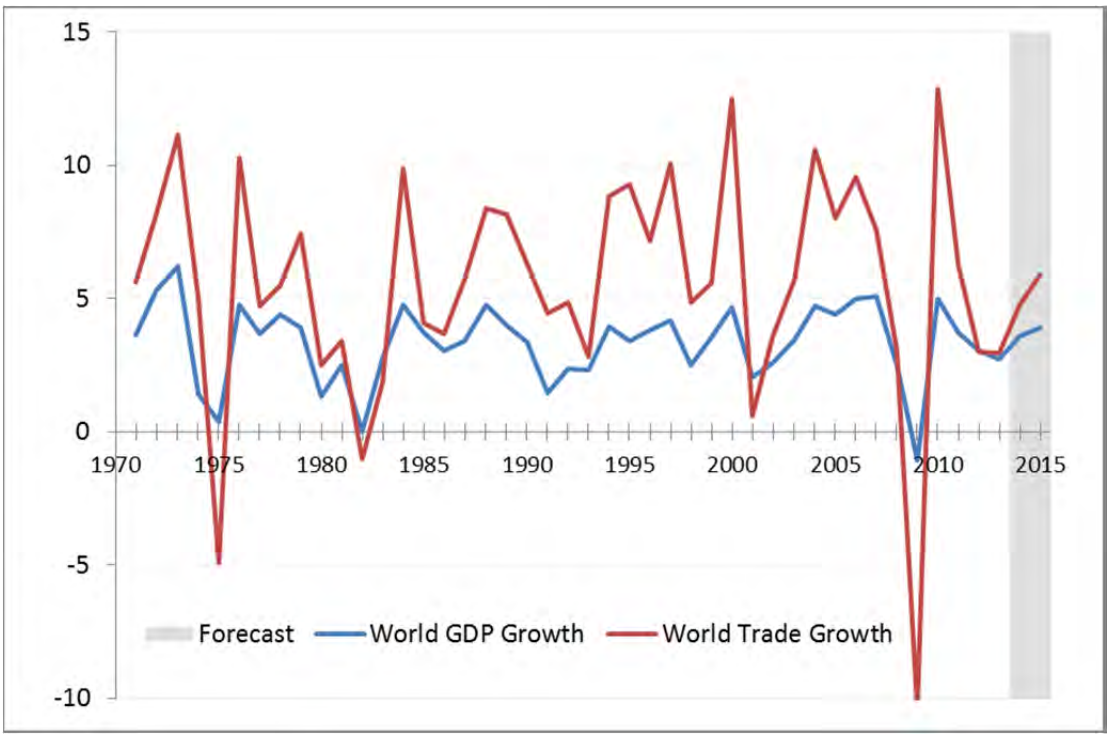


Figure 17: Development of GDP and world trade, 1970-2015 (Data source: OECD 2014).

When looking at long term developments it can be shown that the ratio of world trade growth and world GDP growth is roughly 2 to 1. However, the very recent figure for 2012 and 2013 do not reflect this relationship (they are almost equal). Reflecting the (slight) possibility that this 2:1 growth ratio represents a plateau phase and may decrease in the future[3], a lower trade to GDP growth ratio of 1:1 is used in the forecast scenarios in part 3 of this study.

The analysis of trade flows shows that roughly three quarters of goods and services are traded within Europe. For this reason, an overview of the inner-EU trade relations with respect to the

[1] Trade in goods and services, 2005 USD at an annualized rate
[2] Volume or real GDP growth adjusted for price changes (inflation/deflation)
[3] Krugman, Paul (2013): Should slowing trade growth worry us? NY times blog entry, September 30, accessed 03.03.2014. http://krugman.blogs.nytimes.com/2013/09/30/should-slowing-trade-growth-worry-us/?_php=true&_type=blogs&_r=1

year 2012 is given in form of a so-called chord diagram. Country groups were generated where necessary – such as in the RFC5 case – in order to improve readability[4]. Figure 18 shows the pairwise trade relations of 2012 denominated in billion EUR in which trade flows are coloured according to colour of the country of origin.

Germany clearly dominates the inner-European trade with export of 286 million tonnes (624 billion EUR) and imports of 382 million tonnes (593 billion EUR). The Netherlands are second, followed by the RFC5 country group with exports of 187 million tonnes (438 billion EUR) and imports of 197 million tonnes (435 billion EUR).

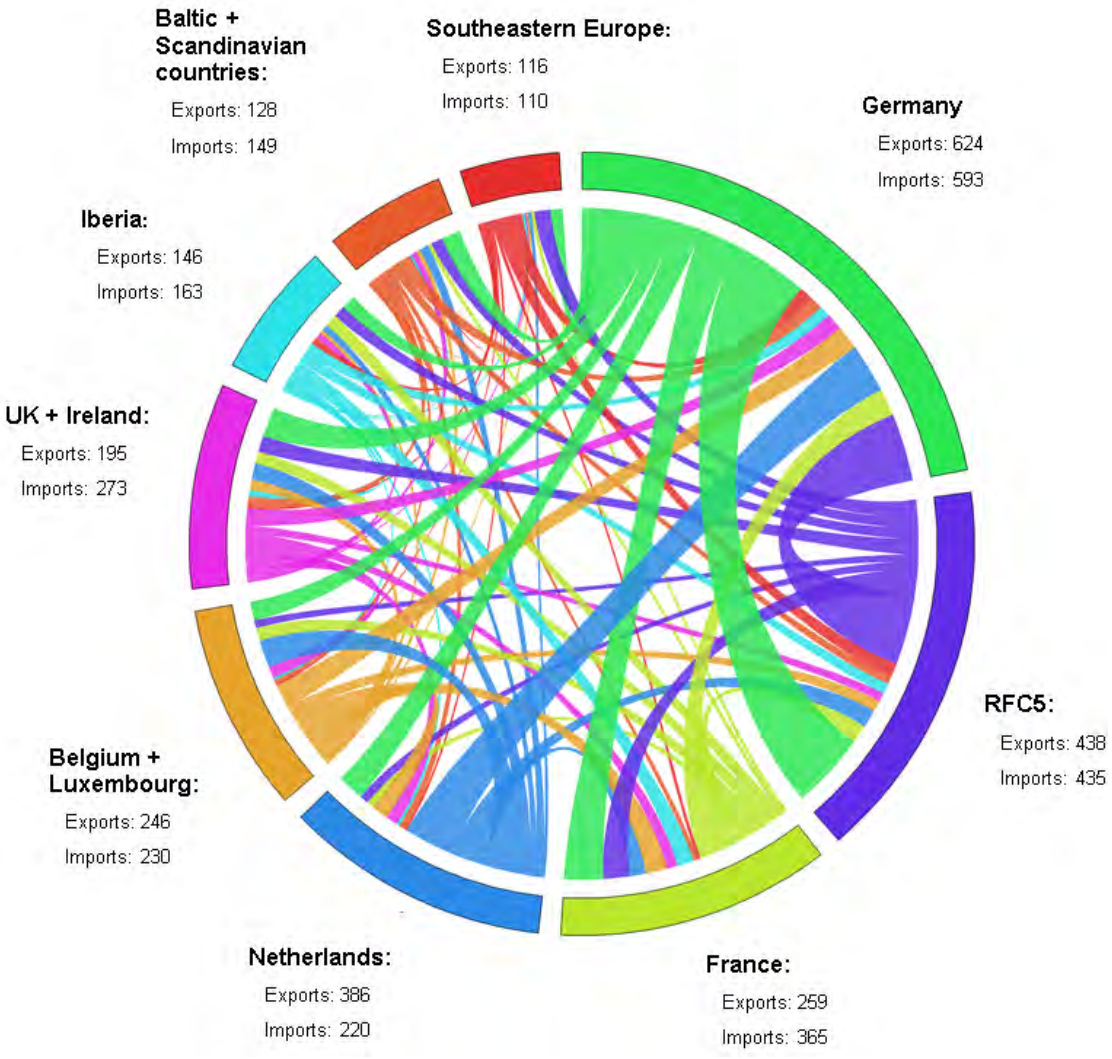


Figure 18: Intra-EU trade in Billion EUR, 2012.
(Source: Comext Database, Note: Trade flows are coloured according to their country of origin)

[4] The following country groupings were formed: RFC5: CZ, IT, AT, PL, SI, SK; Southeastern Europe: BG, EL, HU, RO; Baltic and Scandinavian countries: EE, FI, LT, LV, SE; Iberia: ES, PT.

Transport can basically be interpreted as a downstream activity of trade which, in turn, is often explained by economic activity. The main indicator representing economic activity is the Gross Domestic Product (GDP). Another important measure of market demand is the purchasing power or GDP per capita, which indicates the per capita wealth of a region and acts as a demand or trade attracting factor (Figure 19). The following figure provides a geographical overview of GDP per capita.

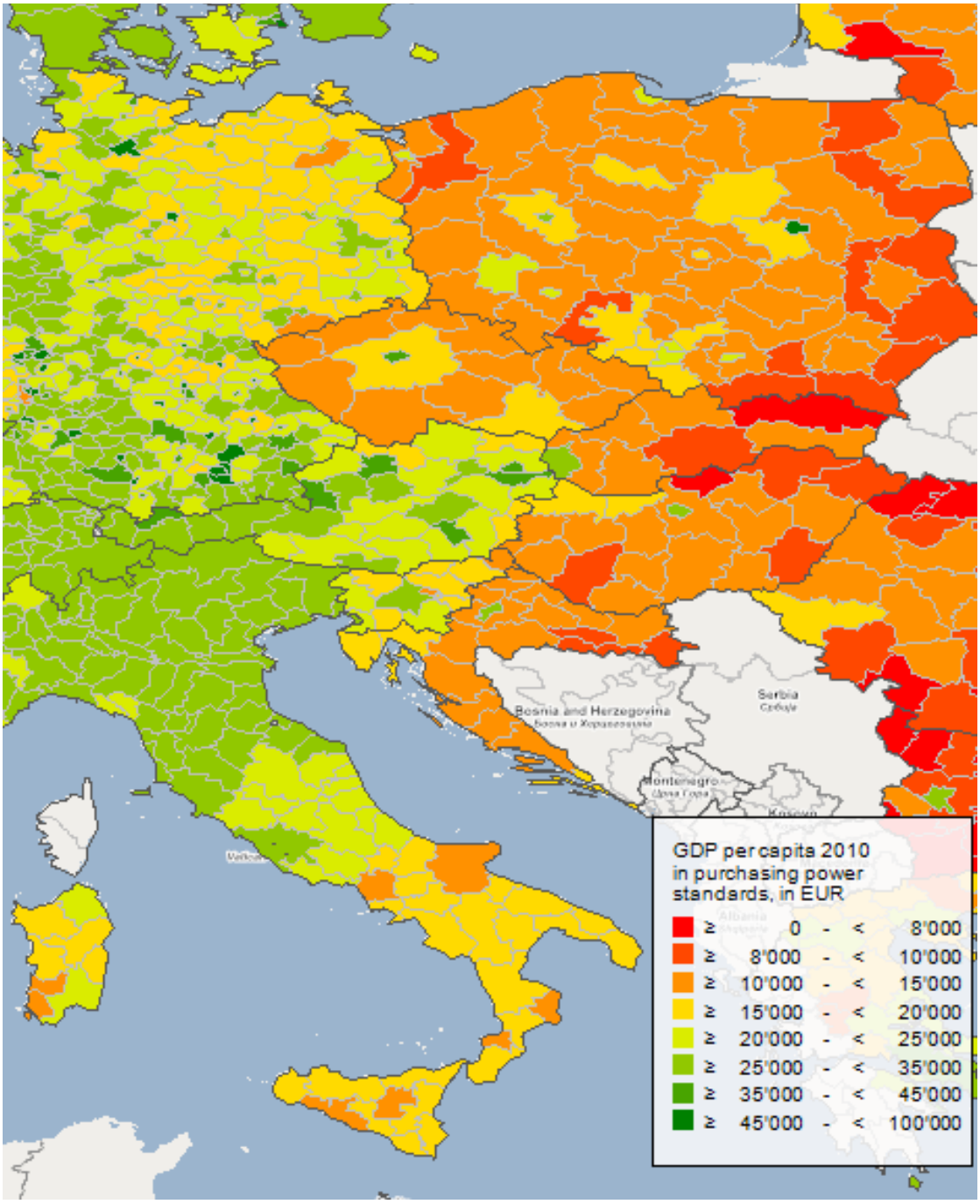


Figure 19: GDP per capita in purchasing power standards, 2010 in EUR (Source: Eurostat)

Figure 19 shows the NUTS3 level distribution of regional GDP per capita in purchasing power standard (PPS). In general, cities and especially capitals including surrounding areas as well as ports have higher PPS-adjusted GDP per capita whereas some remote areas lie far below the EU average. Next to the historically inherited division of Eastern and Western European countries, the rather clear north-south divide in Italy is noticeable.

When analysing the development of GDP over the last 10 years, following conclusion can be derived: Especially Slovakia and Poland but as well Slovenia and the Czech Republic had GDP increases far above the European average. Whereas Italy shows a very weak economic performance. This supports the general picture that eastern European countries are economically catching up to western European countries and underlines efforts for strengthening infrastructure connections between those countries.

Finally, all socio-economic developments have to be considered in the light of policies. The topic of transport policies is regulated on various intersecting levels. Figure 20 gives an overview of the different policy levels influencing goods transport on both rail and road, and also emphasizes how these two areas complement and influence each other.

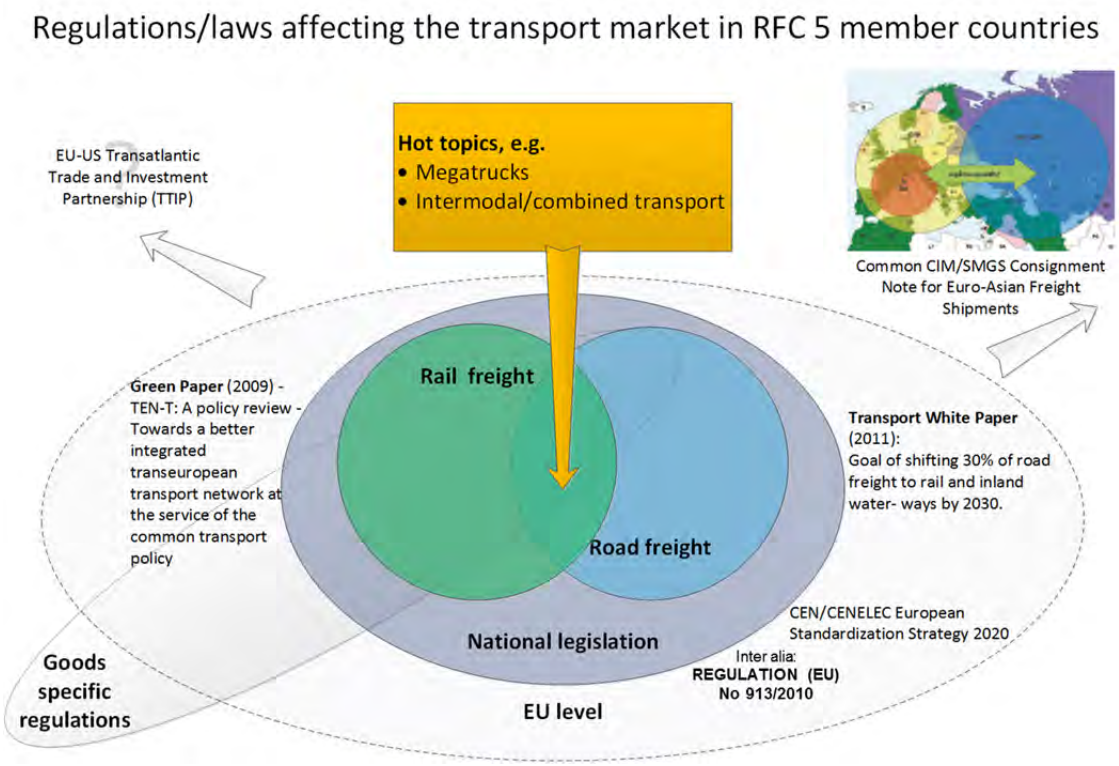


Figure 20: Overview of regulations and laws affecting the transport market in RFC5 member countries

Concluding on this, it is assumed that in the end costs will play a decisive role within the discussion of the future development of the European transport market. The most important cost factor in the future will be external effects and environmental considerations. Since these costs are usually not - or only partly - reflected in market prices, they should be subject to legislation. As rail transport generates the lowest specific CO2 emissions and is a more energy-efficient mode than road and air transport, future legal developments will most likely lead to significant cost advantages for rail, as external costs of transport become increasingly internalized.[5]

3.2.2. Transport market characteristics

In order to give an overview of the actual status of transport market characteristics the Logistics Performance Index (LPI) is used. The LPI is a rating compiled by the World Bank's International Trade Department (PRMTR). The assessment is performed by practitioners and a total of 155 countries are assessed by a weighted average of 6 different dimensions where every dimension can be scored from 1 (worst) to 5 (best)[6]. Electrification of Bratislava – Vienna line is planned.

These are:

- Efficiency of the clearance process (i.e. speed, simplicity and predictability of formalities) by border control agencies, including Customs;
- Quality of trade and transport related infrastructure (e.g. ports, railroads, roads, information technology);
- Ease of arranging competitively priced shipments;
- Competence and quality of logistics services (e.g., transport operators, customs brokers);
- Ability to track and trace consignments;
- Timeliness of shipments in reaching destination within the scheduled or expected delivery time.

Table 3: LPI overall score and partial scores for 2012
Source: The World Bank, 2012[7]

Country	Overall Rank	Score	Scores					
			Customs	Infrastructure	Int. Shipment	Log. Quality	Tracking & Tracing	Timeliness
Austria	11	3.89	3.77	4.05	3.71	4.1	3.97	3.79
Italy	24	3.67	3.34	3.74	3.53	3.65	3.73	4.05
Poland	30	3.43	3.3	3.1	3.47	3.3	3.32	4.04
Slovenia	34	3.29	3.05	3.24	3.34	3.25	3.2	3.6
Czech Republic	44	3.14	2.95	2.96	3.01	3.34	3.17	3.4
Slovakia	51	3.03	2.88	2.99	2.84	3.07	2.84	3.57

[5] CER - Community of European Railway and Infrastructure Companies (2013): Rail Freight Status Report 2013. Rail Freight after a decade of EU rail policy, April 2013, accessed 03.03.2014. http://www.cit-rail.org/files/public/Publications/FINAL_2__CER_Rail_Freight_Status_Report_2013.pdf?cid=388
[6] The World Bank (2012): Connecting to Compete 2012 - Trade Logistics in the Global Economy - The Logistics Performance Index and Its Indicators, Washington.
[7] The World Bank (2012): Connecting to Compete 2012 - Trade Logistics in the Global Economy - The Logistics Performance Index and Its Indicators, Washington.

In the Tables the countries are ordered by their overall rank and the best (green) and weakest (red) scores for the respective country are marked. What is striking for both reports is the fact that, except for Austria in 2012, all RFC5-Countries reach their highest scores in the dimension of Timeliness. The most common problematic factors identified are the customs procedures, where all countries score quite low results. Regarding the establishing of the RFC5 the weak Polish result for the infrastructure dimension in both years might be somewhat offset in the future[8].

As a conclusion to transport market analysis of RFC5 region there are three major scenarios that will influence the transport flows significantly. These will be presented here in a condensed way.

- Sea shipping shift to Adriatic ports: Due to the investment and upgrading plans of most of the Adriatic ports, it can be assumed, that the quantity of goods that have to be transferred from and to them will significantly rise over the coming years. Therefore the hinterland connection and with it the RFC5 will become increasingly important. Effects of these developments are explicitly covered in the freight transport model.
- Establishing of connection points to the Euro-Russian/Asian-Rail-System: This topic has been elaborated for a long time and many a study have been carried out to show the economic benefits of a link between the Russian broad gauge system and the central European rail system. Should these plans be realized, large amounts of rail bound goods would have to be distributed along the route of RFC5, as it will traverse the potential inbound and outbound lanes towards Russia and the whole Asian area. However due to the recent geopolitical developments involving Russia and the Ukraine, a completion of this project in the foreseeable future seems highly unlikely and therefore, effects were not included in the forecasts. Despite the current geopolitical situation the Euro-Asian land bridge could be very important for the future development of RFC5.
- Economic development of the Baltic ports and southern Poland: Mainly this point is an inner Polish matter, as the goods needed for the industrial production in the southern Polish regions will largely be imported through the North Sea and Baltic. However this will put pressure on the RFC5-Infrastructure to allow for larger amounts of goods being handled and transported along the now proposed lines. This topic is indirectly covered in the forecasts due to the inclusion of all relevant infrastructure investments along the RFC5.

3.2.3. Transport supply

Most of the Rail Freight Corridor 5 is on the level of 2-tracks but around 15% of total Corridor length is only single track. Almost whole Corridor 5 route is electrified except diversionary lines Gdynia – Bydgoszcz in Poland and Bratislava-Vienna via Marchegg, but there can be found three different electric systems along RFC5.

To give an impression of the rail transportation network in the investigation area, Figure 21 shows main rail network including RFC5 and all other relevant Rail Freight Corridors in this part of Europe.

[5] The World Bank (2012): Connecting to Compete 2012 - Trade Logistics in the Global Economy - The Logistics Performance Index and Its Indicators, Washington.

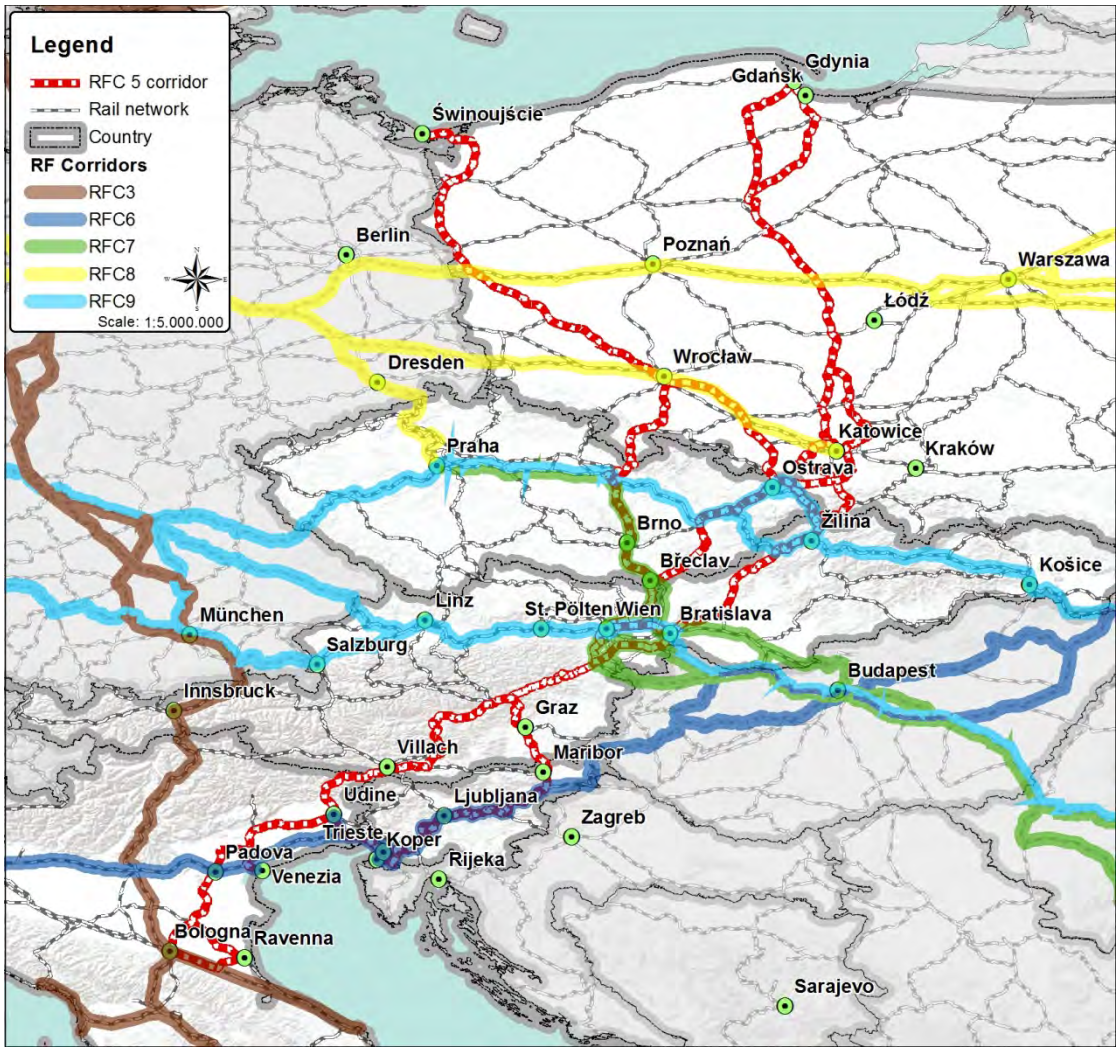


Figure 21: Rail Freight Corridor 5 (RFC5) and connections to other RFCs
Source: RNE, 2014

Main competing mode to rail transport on the RFC5 is road transport and therefore Figure 22 shows the comparison of road and rail network density for every RFC5 country in the year 2012. Since road statistics include only motorways, road density level is lower in all countries. Still it can be seen, that all countries have a quite well developed rail network. In Poland along RFC5 is A1 Motorway under construction and will be full developed until 2015. Road infrastructure in Czech Republic and Slovakia along RFC5 has not been completed yet but its completion is

forseen in coming years. Along the other parts of Corridor 5 (Austria, Slovenia and Italy), there can be found a good developed road network consisting of motorways with two or more lanes per direction.

Finally, Figure 23 shows a summary of the initial Corridor 5 rail route, with the main characteristics based on the RailNet Corridor 7, including important nodes (seaports, bigger cities and important terminals) and their multimodality and also Rail Freight Corridors that are crossing/connecting Corridor 5. Given transportation times between main nodes refer to block trains. New side branch Świnoujście – Wrocław – Międzylesie (border) in Poland and from Międzylesie (border) to Břeclav in the Czech Republic is not shown.

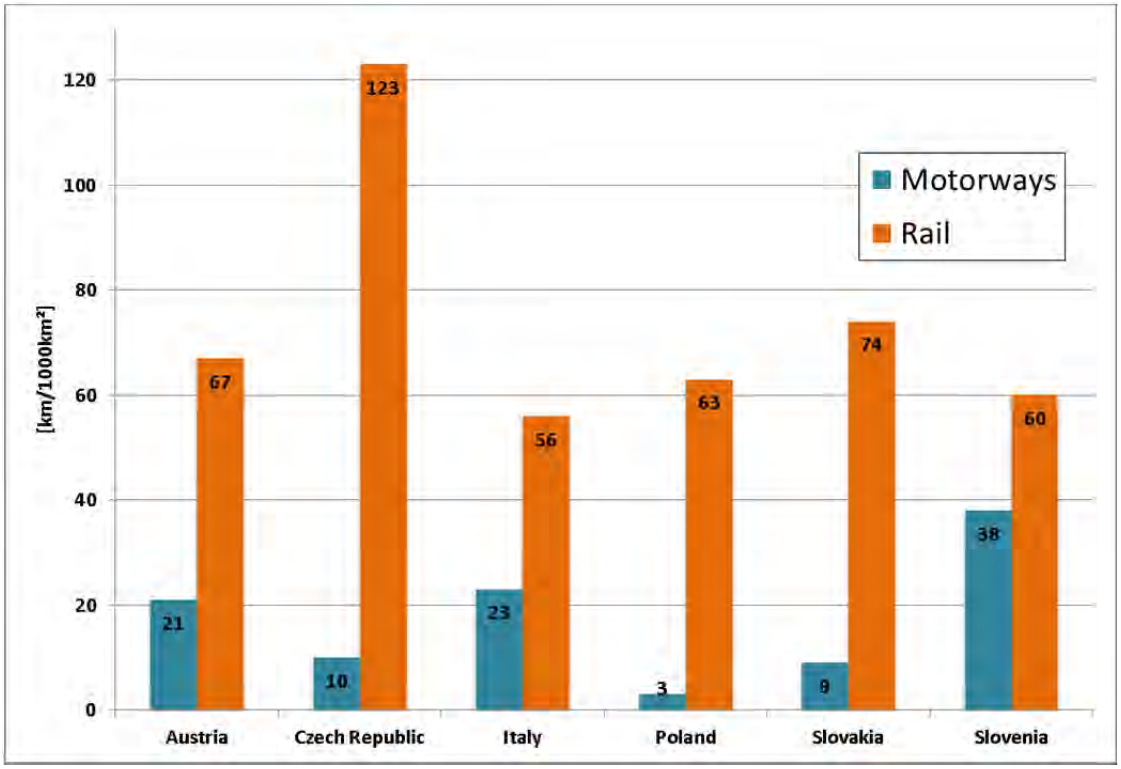


Figure 22: Road and rail network density per RFC5 country for 2012
Source: Eurostat table [tran_r_net]

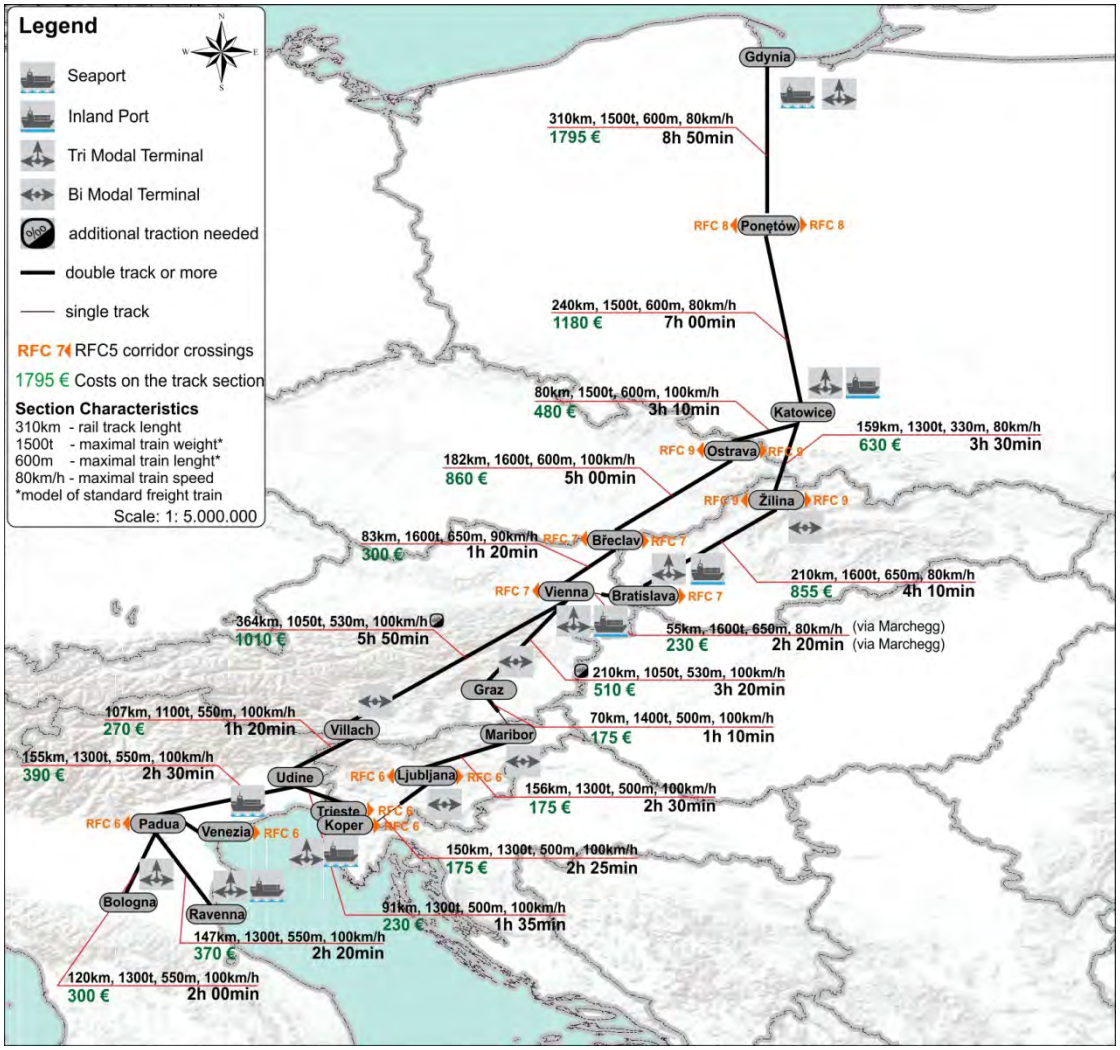


Figure 23: RNE07 route characteristics 2012
Source: RailNetEurope, http://www.rne.eu/

3.2.4. Freight demand

Freight transport demand is characterized in opposite to passenger transport through its large number of different goods to transport and their specific qualities as well as strong influences of different chaining of production processes for every branch of industry. Analysis of freight demand was differentiated in (i) market basics mainly covered by analysis of market characteristics and (ii) freight demand data and statistics as input for the transport model. Following figures show an overview of the freight demand development over the last years in RFC5 countries. More specific data and modelling results are given in part III (forecast) of the study.

As Figure 24 shows, rail freight demand development form the year 2003 to 2012 is strongly influenced by the effects of global economic crisis in the years of 2008/2009 and recovery period afterwards.

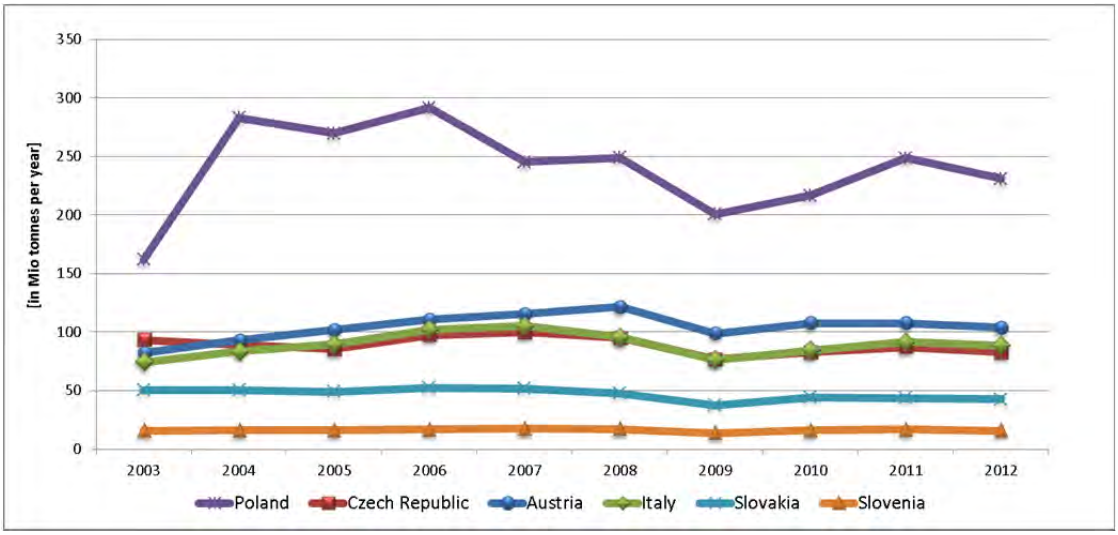


Figure 24: Development of rail freight transport 2003 – 2012;
Total amount of transported goods of import/export/domestic/transit
Source: Eurostat table [rail_go_typeall]

By comparing development of rail (Figure 24) to road (Figure 25) freight demand, especially Poland shows a weak performance of rail transport demand. While road freight demand was strongly rising since 2004 continuously even during economic crisis, rail freight demand lost absolutely and relatively market shares and is still not at the level of the years 2004 to 2006.

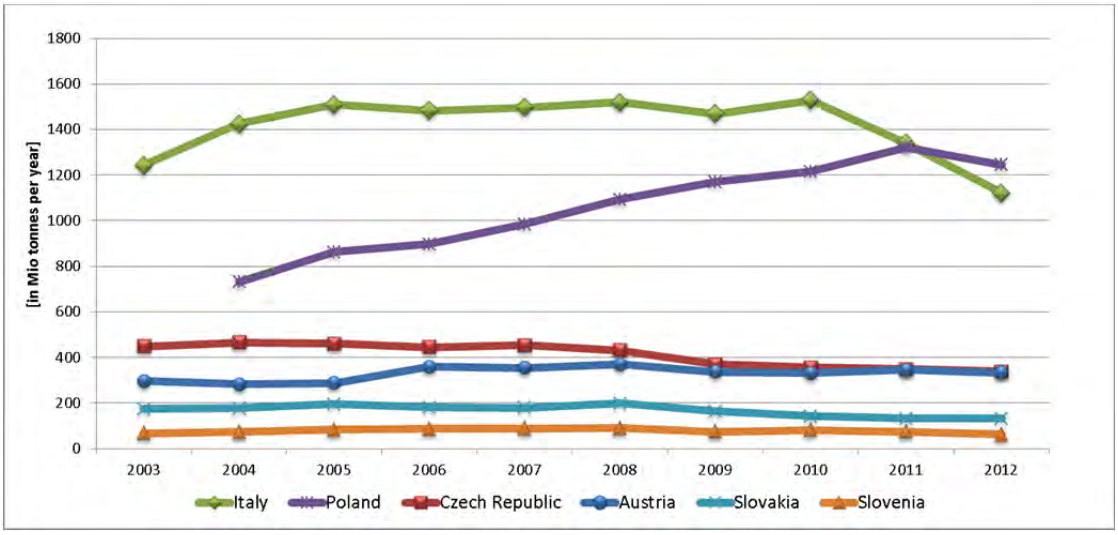


Figure 25: Development of road freight transport 2003 – 2012;
Total amount of transported goods of import/export/domestic/transit
Source: Eurostat table [road_go_ta_tott]

As already mentioned, rail freight transport on RFC5 is strongly influenced by the performance of sea ports in the Adriatic and Baltic Sea. Figure 26 shows total of in- and outgoing transported volumes per year for the RFC5 ports.

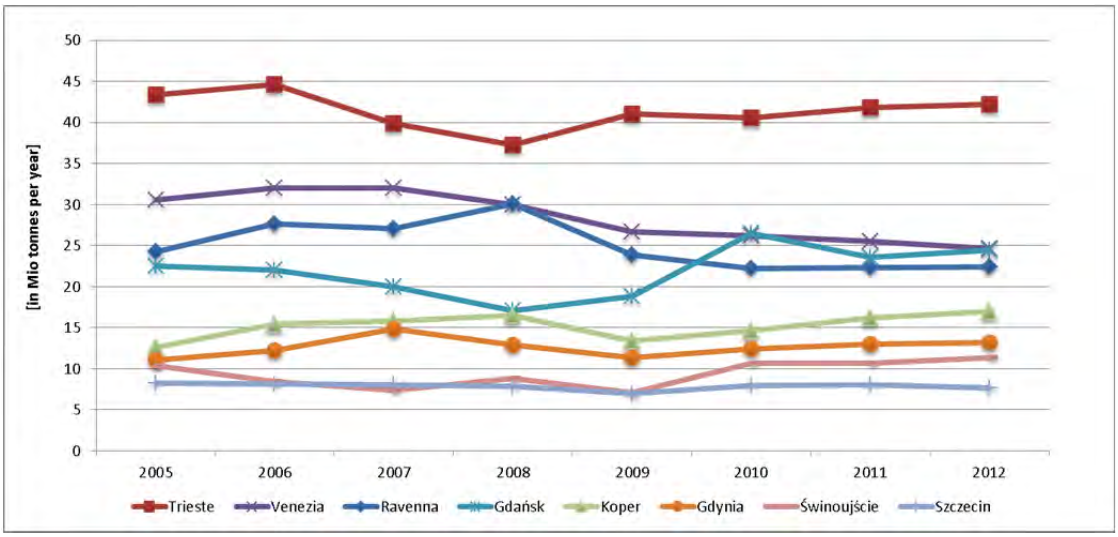


Figure 26: Maritime freight transport development 2005 – 2012; total sum in- and outgoing transported volumes per year
Source: Eurostat table [mar_go_aa]

Generally spoken, Italian ports excluding Trieste still struggle in reaching freight volumes before economic crisis while all other RFC5 ports show a strong development over the last years. By looking more deeply into statistics, especially container handling is growing rapidly almost at all ports and Trieste and Koper benefit strongly from growing world trade flows from e.g. China and South Korea in the last years.

3.3. Phase II: Survey

3.3.1. Objectives, procedure, target companies and response rate

The RFC5 will change the framework conditions for rail freight transports in Central Europe. Pre-arranged train paths will make the organisation and conduction of rail freight transports faster and easier, the flexibility of the overall rail transport system will be improved. Some of the aspects of the RFC5 – such as its rough routing – are already decided on, some other are still not determined. In order to provide a Rail Freight Corridor that meets the demands of its supposed users, a survey was conducted. It aims on identifying (i) how relevant companies assess the rail freight system in the RFC5 area, (ii) what they know about the RFC5, (iii) what their expect concerning the RFC5, (iv) how they will most likely react on the establishment of the RFC5 and (v) what requirements they have regarding the RFC5. Additionally, mode choice decisions were treated.

Four groups determine the success of the RFC5. These are

- shippers who order or receive freight transports (target number: 15 per country)
- logistic companies who organise or conduct shipments (15 per country)
- port and terminal operators as the entry points to the rail network(5 per country)
- railway undertakings operating trains (3 per country).

Companies from these four groups were the target group of the survey.

The survey had a two-stage approach: the first part included general questions on the RFC5. All participants were asked for

- characteristics describing their company (location, business field) and their tasks within their company (responsible for transport organisation, field of work),
- transport figures of their company (transport volume, modal split, origins and destinations),
- their assessment of the rail freight system in the RFC5 area,
- their knowledge and expectations concerning the RFC5,
- requirements and demands concerning the RFC5 as well as
- their most likely reactions in response to the implementations of the RFC5.

The second part addressed mode choice decisions of shippers and logistic companies including real-world decisions (Revealed Preferences) and a second part containing hypothetic choice decisions (Stated Preferences); respondents were asked to describe two shipments they had recently conducted or ordered for which rail transport could have been used. Additionally, features of not used alternatives were recorded. Stated preference experiments treating mode choice decision were developed based on the attribute values of the reference shipments. Each experiment concerned a mode choice decision; whereby the respondents had to select the alternative they would most likely choose (Figure 27). The alternatives were described by the attributes transport costs, transport time, percentage of delayed trips (more than 5% of transport time, at least 30 minutes) and percentage of damaged or lost goods. For the cost and time attribute, factors were selected according to an orthogonal design plan; they were multiplied with the attribute value of the reference shipment. For the delay and damage related attributes, fixed values were used according to the aforementioned design plan. Six experiments were conducted for each reference shipment each including a first and a second choice.

The survey started in April 2014 and was finished in September 2014. 288 companies participated to the survey, most of them by filling in the web-form. This also applies to terminal operators and railway undertakings that had access to all participation channels. The lowest number of participating companies was reached in Poland (40), the highest in Austria (65). 108 shippers, 81 logistic companies, 55 terminal operators and 44 railway undertakings participated to the survey. The target number was reached for all countries and target groups (Table 4). The participation rate – defined as the share of participants on those companies that could be reached by phone and who use rail transports at least sometimes – is 39% in average.

Experiment 2	Transport of 10 tons of x from x to x			
Main mode	**Train** 	**Truck** 	**Train** 	**None**
Transport costs (door-to-door)	1000 €	1150 €	850 €	
Scheduled transport time (door-to-door)	24 h	25.2 h	20.4 h	
Probability of a delay of more than 80 minutes	30 %	10 %	20 %	
Probability of 5% of goods lost/damaged	10 %	30 %	20 %	
What alternative would you prefer?	○	○	○	◉
What alternative would be your second choice?	○	○	○	◉

Figure 27: Example for a SP experiment

Table 4: Number of conducted interviews per country and group

	AT	CZ	IT	PL	SI	SK	Total number
Shipper (G1)	29	14	15	11	18	21	108
Log. Co. (G2)	15	11	14	12	21	8	81
T/P Op. (G3)	9	7	15	11	6	7	55
RUs (G4)	12	11	4	6	4	7	44
Total number	65	43	48	40	49	43	288

3.3.2. Assessment of the rail freight system in the RFC 5 area

In order to get an impression how the respondents assess the rail freight system, respondents were asked to rate the current status of several items related to rail freight transport and indicate if there is a need for improvements. The rating could either be done for a specific country or for the entire RFC5.

"Flexibility of train services", "harmonisation of rules/processes" and "rail transport costs" were rated badly, "crossing of borders", "contact to infrastructure operator", "terminal access", "risk of damages/goods lost/theft" and "safety systems" received above-average marks. However, respondents see many categories with a need for improvements – this includes those with a good rating: They consider improvements to be particularly important for hard factors such as "railway capacity", "frequency of train services", "flexibility of train services", "punctuality/reliability of train services", "rail transport costs", "harmonisation of rules/processes", "network access" and "total transport time (door-to-door)". The highest need for improvements was stated in the categories "transport costs" and "flexibility". A rather low need for improvements received only two categories: "risk of damages/goods lost/theft" and "contact to infrastructure operator".

Figure 28 shows the result of the assessment of the item "harmonisation of rules". The respondents were asked to rate the current status as "bad", "rather bad", "rather good" or "good" and the need for improvement as "high", "rather high", "rather low" or "low". The following figure shows the share of all companies answering "rather good" or "good" on all valid answers for the current status and the share of companies stating a "high" or "rather high" need concerning the need for improvements. For the entire RFC5, the current situation regarding "harmonised rules" is considered to be bad; only 20% assess the status of this item to be good or rather good. The corresponding value for the needs for improvements is high. Thus, from the low level of satisfaction with the current status evokes a high desire for improvements. This is also true for specific countries such as Italy and Poland, whereas the need for improvements is – based on a better evaluation of the current status – is lower for Austria, Slovakia and Slovenia. This might have two reasons: the companies might have already adapted their procedures to common standards why further improvements are not that important anymore or the same might refer to the systems of the countries.

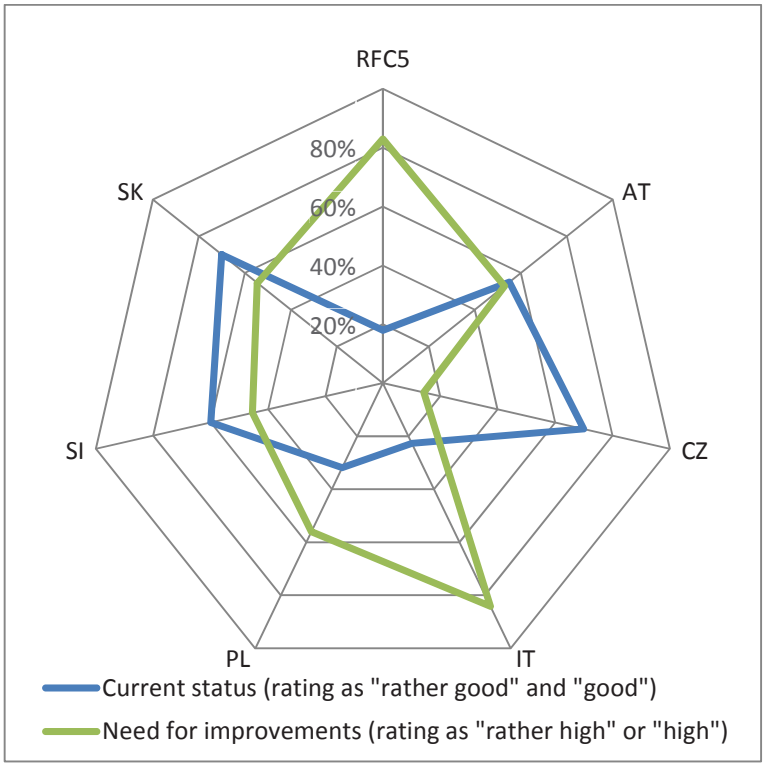


Figure 28: Harmonisation of rules (n=213)

3.3.3. Knowledge and expectations concerning the RFC5

A sound level of knowledge on the RFC5 is given among logistic companies, terminal and port operators and railway undertakings. The term "Baltic-Adriatic Corridor" is known as it is the rough route. Lacks of knowledge appear when more specialised questions are asked, in particular concerning the tools "authorised applicants" and "pre-arranged train paths". From this follows that the brand RFC5 is well known but further efforts are needed in order to introduce the core concepts (C-OSS, authorised applicants, PAPs, reserve capacity) to the target groups.

Respondents expect a relevant success of the RFC5. One of the major shortcomings of the rail freight system is a lack of flexibility. The answering persons expect that the tools associated to the RFC5 – the PAPs and the reserve capacity – will help solving this problem by providing more flexible solutions. Thus, they expect the PAPs to be well received by the market (Figure 29).

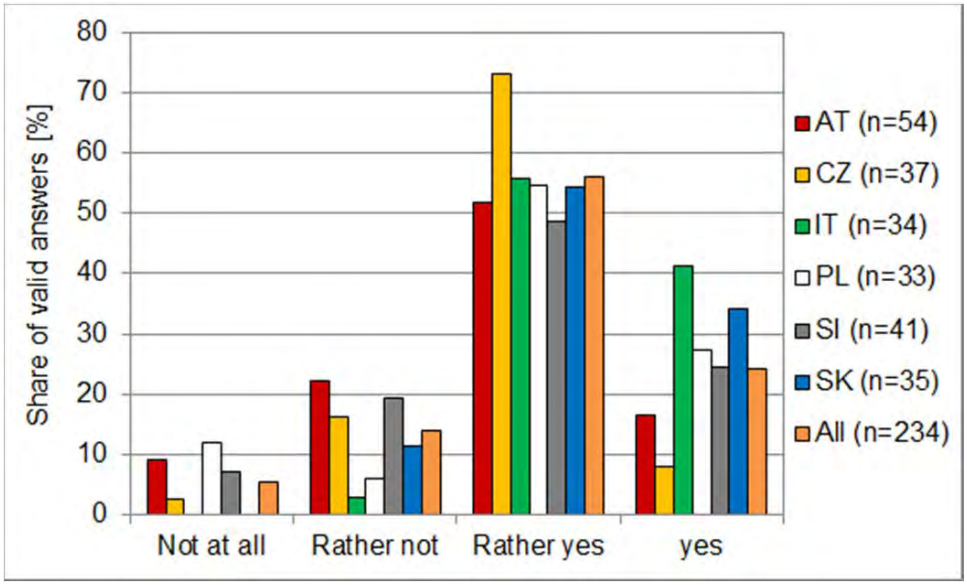


Figure 29: Will PAPs play a major role in the future by country?

Nearly all companies expect an increase of their transport volume or throughput capacity until 2020 – depicted for the example of shippers in Figure 30. The average expectations are above-average optimistic regarding the developments of rail transports including intermodal transports than for other modes. This refers to both, transports in the RFC5 area as well as the total transport volume. However, the expectations concerning the development of rail transports in the RFC5 area lay behind the corresponding expectations for the entire transport volumes.

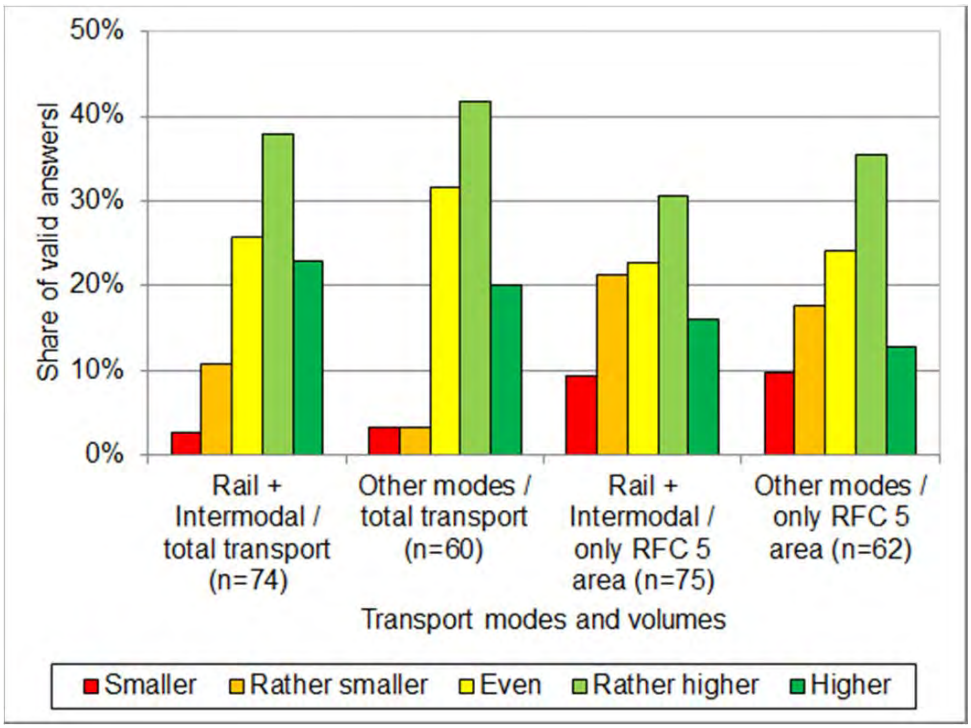


Figure 30: Expectations on the development of the modal split depending on the reference area of shippers (G1) until 2020

3.3.4. Most likely reactions on the establishment of the RFC5

The RFC5 might have impact companies in different ways. Many companies stated to develop new offers to their clients, use rail transports more often or invest in rail infrastructure or rolling stock. More than 50% of logistic companies and railway undertakings stated that they will likely or most likely change their services by providing other, more or new rail transports. This also applies to terminal and port operators. Every second railway undertaking and almost 40% of the logistic companies stated, that the RFC5 will have an influence on their investment decisions (Figure 31). The same refers to more than 65% of port and terminal operators who will invest into their railway infrastructure also due to the establishment of the RFC5.

Several companies consider the opportunity to get an authorised applicant as promising. This mainly refers to Czech and Italian companies but also to Polish and Slovenian enterprises (Figure 32). Nearly no interest exists among Austrian companies. The level of interest in becoming an authorised applicant is also limited for shippers and among logistic companies (only 25% will rather and 5% certainly become authorised applicant). Contrary, port and terminal operators and particularly railway undertakings will act as authorised applicants (Figure 33). This corresponds to experiences gathered from operating RFCs.

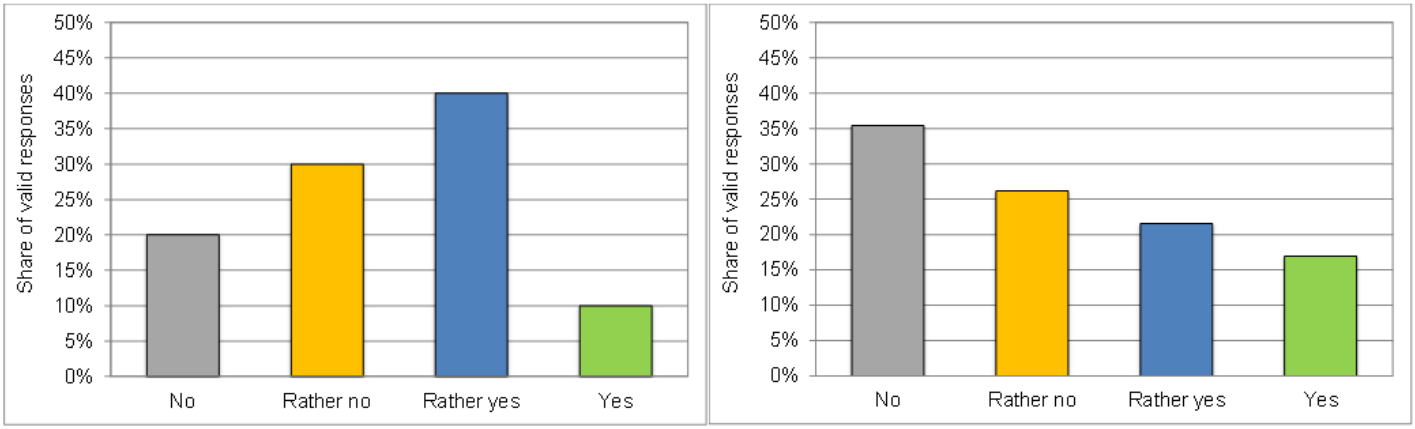


Figure 31: Influence of the RFC 5 on investment decisions (left: railway undertakings (n=40), right: logistic companies (n=65))

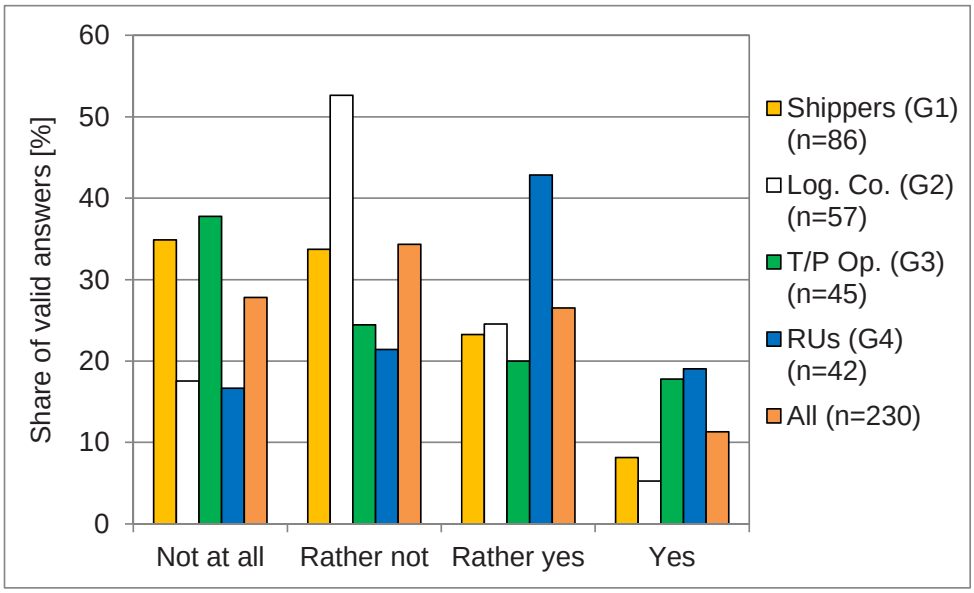


Figure 32: Intention to act as authorised applicant by target group (n=230)

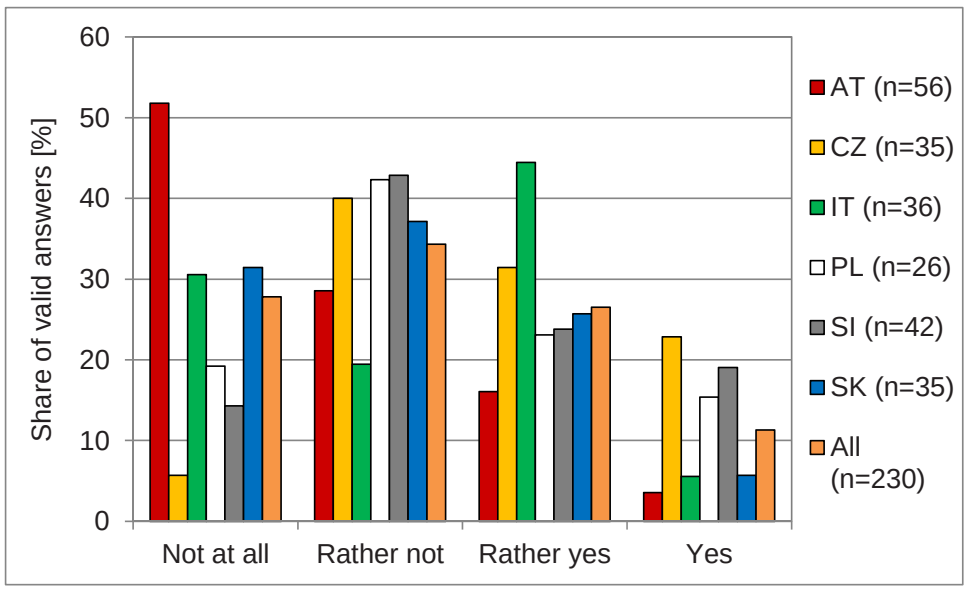


Figure 33: Intention to act as authorised applicant by country (n=230)

Companies intending to act as authorised applicants will apply for all kinds of train paths without clear tendency; reserve capacity – as the tool providing the highest flexibility – is asked for most often, but the differences to the demand for PAPs are only small. Shippers and companies from Slovenia and the Czech Republic are particular interested in applying for PAPs, while railway undertakings, Austrian, Slovakian, Italian and Polish companies expect that they will more often apply for reserve capacity.

3.3.5. Requirements concerning the RFC5

The respondents were invited to express their requirements concerning the RFC5 in terms of the arrangement of the RFC5. With regard to the routing of the RFC5, there is a high level of satisfaction with the preliminary suggestion (Figure 34). All most frequently mentioned cities and border crossings that should belong to a Baltic-Adriatic corridor are part of the preliminary route of the RFC5; frequently mentioned areas to be included into the RFC5 or to be connected to the RFC5 were the industrial area of Upper Austria, Warszawa, Praha or Germany.

According to the respondents, the C-OSS has to act as a real single contact point offering all organisational services needed in terms of the preparation and conduction or shipments. The paths offered should be flexible, the services costumer friendly. This includes the provision of information referring to both, the process of applying for tracks and shipments on the track. There is a particular demand for quick and short-term allocation of requested paths meaning that both, the time needed to decide about a request for a train path as well as the time period between the last possible application and the conduction of the shipment should be short.

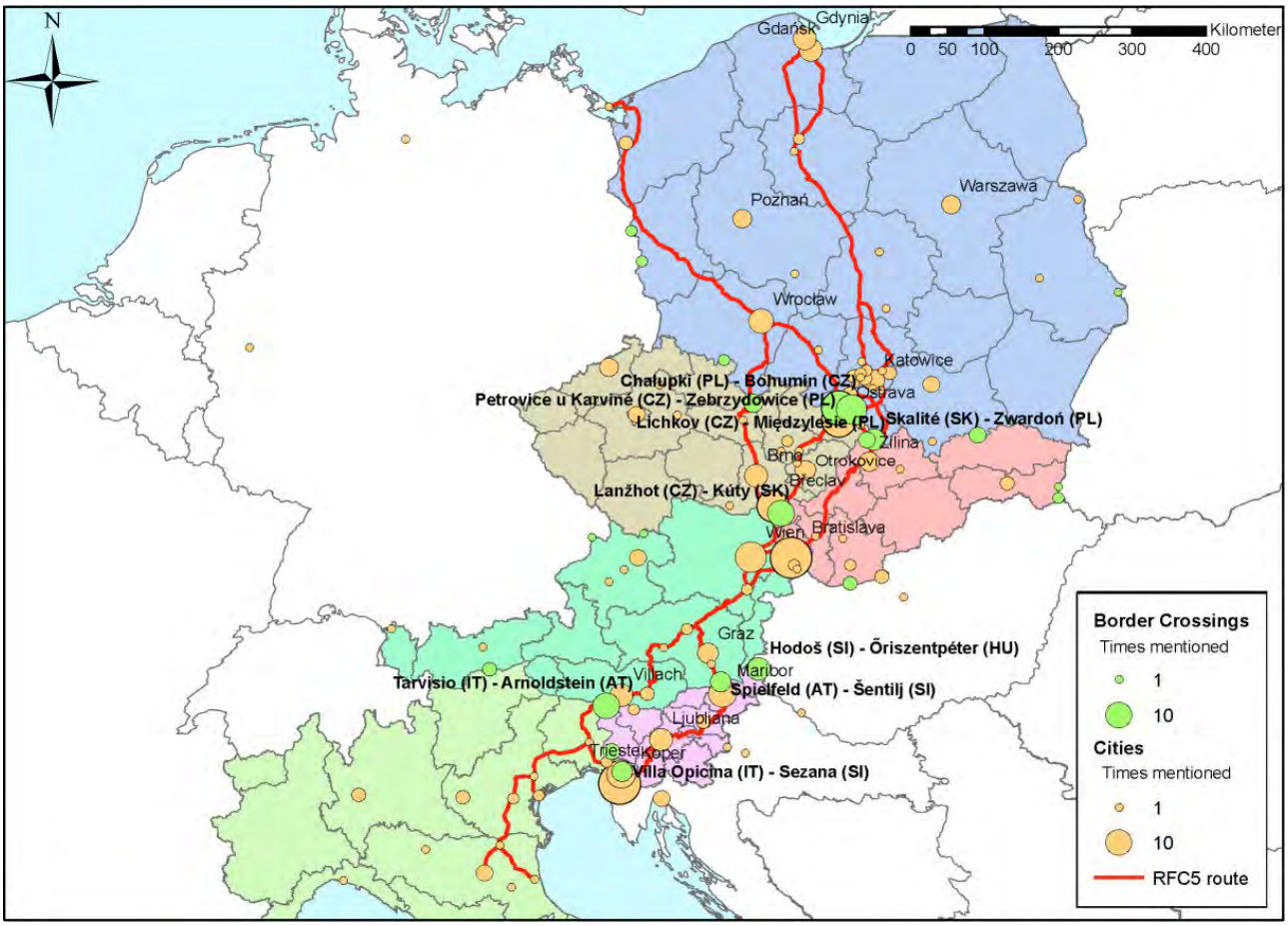


Figure 34: Cities to be included into a Baltic-Adriatic corridor

All additional efforts compared to the existing system of applying for train paths should be avoided.

The statements on minimum requirements concerning the RFC5 can be summarised in three main groups – infrastructure, services and quality indicators. The latter refer to a general demand for quick and cheap rail freight transports allowing enhancing the competitiveness of the rail system. Infrastructural demands can be summarised as a realisation of the TEN-T-specifications on the entire RFC 5. This includes electrification, double tracks, sufficient capacity, train length of 740 meters and the use of vehicles with larger gauges and higher axle loads. Particularly vehicle size and train length were mentioned often.

3.3.6. Mode choice decisions

The stated preferences survey allows calculating utility functions describing mode choice decisions of shippers and logistic companies based on the decision whether to use rail or road transports for a given shipment. The finally selected utility function is based on the "1-Choice"-dataset, meaning that only the first choice of the respondents was taken into account. This model includes all attributes presented to the respondents (transport costs, transport time, probability of delays, and probability of damaged/lost goods) as well as the fact if the good transported is rail affine and the total distance covered. The transport costs account for 64% of the explanatory power of the attributes, thus it is by far the most important aspect whereas the probability of delays is of less importance.

The attributes enter the final model by means of normalised factors; the term "factor" refers to the fact, that not absolute numbers (costs in Euros), but relative changes are taken into account (relative differences between the values of the modes), "normalised" means, that the factors of both alternatives are divided by the factor of the road alternative. Thus, the attribute value of the road alternative has always a value of "1"; the value of the corresponding alternative of the rail transport shows relative differences to this value. Almost 75% of the decisions made by the respondents can be explained using this model; the adjusted rho-square is 0.234 which is a very satisfying result.

The resulting choice model allows forecasting the development of the modal split by applying a so-called multinomial logit approach. Based on this model, also the impacts of the RFC5 can be analysed.

3.4. Phase III: Forecast

3.4.1. Methodical approach

Objective of phase III is to comprehensibly estimate future freight transport demand along the RFC5 for the years of forecast 2015, 2020 and 2030. As shown in Figure 35, based on the analysis of current situation and results of revealed and stated preference survey a freight demand model for the base year of 2012 for whole investigation area was compiled. Main working steps were the updating of road and rail network elements and generating freight demand Origin/Destination (O/D) matrices on NUTS3-level based on data from Eurostat and detailed national statistics by using own modelling techniques (see main report of TMS).

By using examinations of national infrastructure managers concerning cross-border traffic on the network level, freight demand model and assignment model including a rail freight constraint function were calibrated to create plausible network loads for rail traffic. Another modelling part was the implementation of a mode choice model based on the stated preference survey. Therefore, different utility functions of a multinomial logit discrete choice model were statistically tested and with the chosen model direct effects of implementing RFC5 services in terms of a new rail supply quality on the Corridor could be modelled.

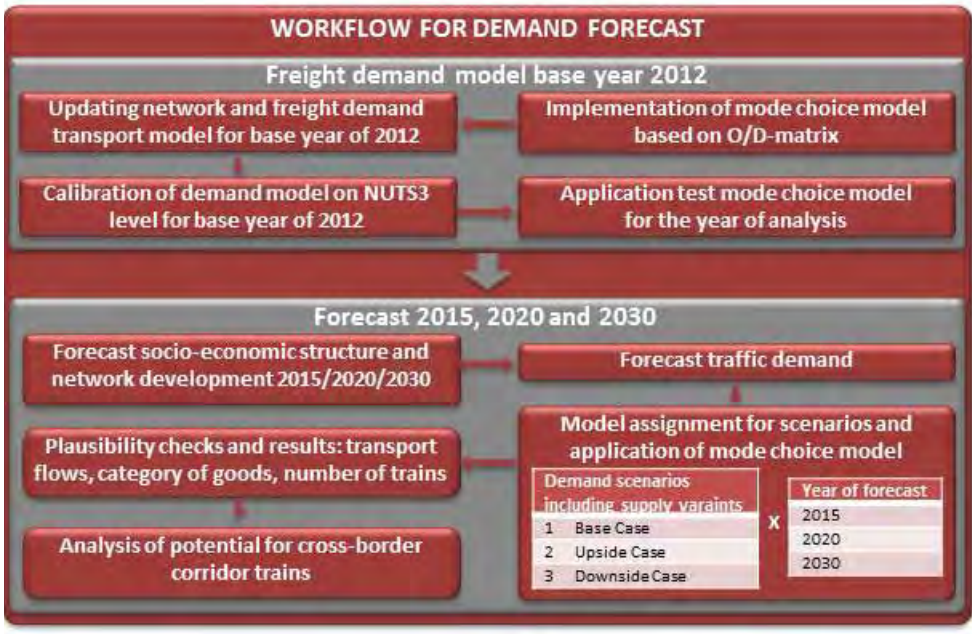


Figure 35: Work flow of demand forecast

Forecasts started by defining future scenarios for the years of 2012, 2020 and 2030. The freight demand forecast itself is based on the forecast of socio-economic structure, mainly the Gross Domestic Product (GDP). Future traffic demand was derived on the level of O/D matrices by using GDP-growth factors and a simplified overall elasticity within the model. Afterwards, future freight transport demand could be assigned and rail network loads for the whole RFC5 investigation area lay the base for analysing future potential of corridor trains and possible pre-arranged train paths'.

In the following text, only main results of the modelling process are given on Corridor level. For more detailed information concerning underlying assumptions, the modelling process and detailed results (e.g. capacity analysis, rough estimate of passenger trains, detailed network loads on national level) please refer to main report of TMS.

3.4.2. Freight demand model for base year 2012

In order to show actual state of transported goods between RFC5 countries, Figure 36 comprises a visualisation of transport flows between these countries. Transport volumes for the year 2012 are given in Million net-tonnes per year but excludes import/exports from RFC5 ports. Figure 37 shows same visualisation for road transport volumes between the RFC5 countries for the year 2012.

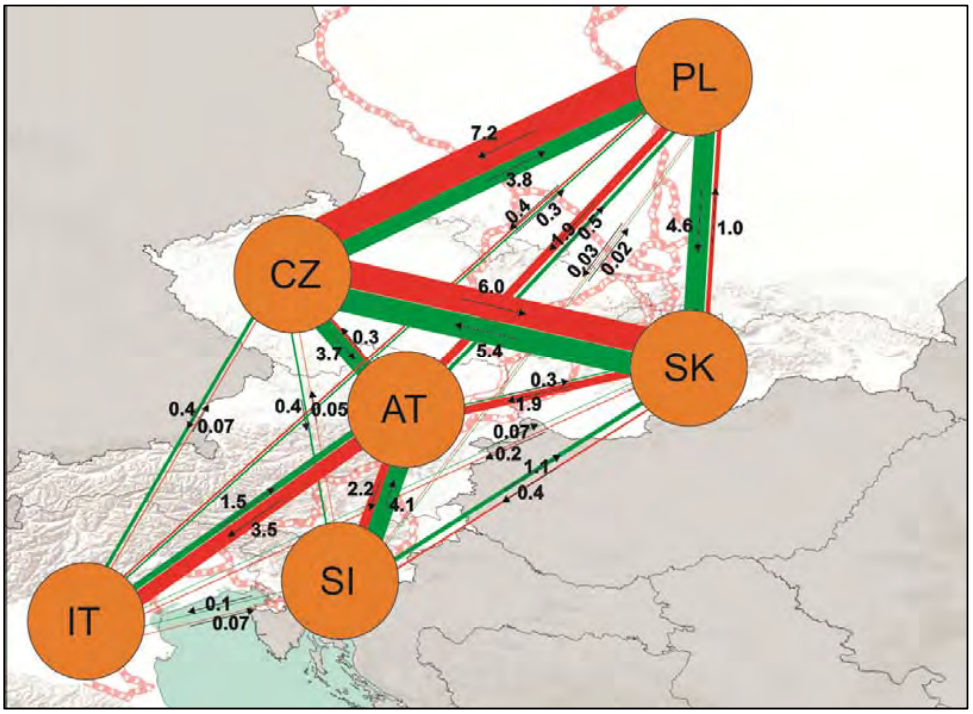


Figure 36: Rail freight transport year 2012 - Import/export between RFC5 countries from model O/D matrices in Million net-tonnes per year exclusive RFC5 ports
Source: Eurostat table [rail_go_typeall]

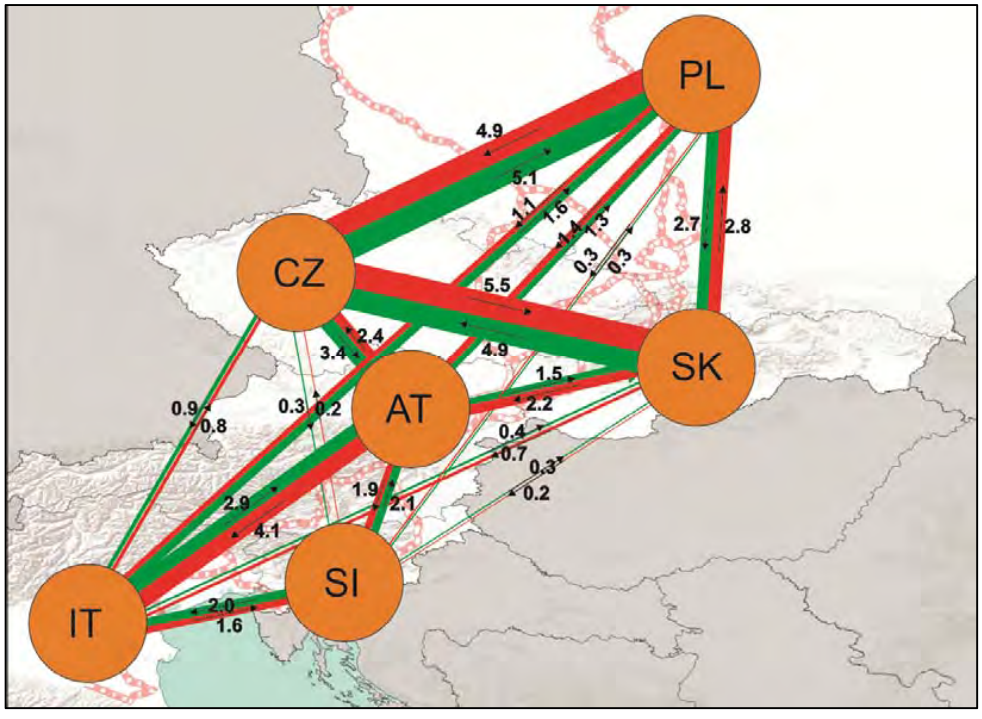


Figure 37: Road freight transport year 2012 - Import/export between RFC5 countries from model O/D matrices in Million tonnes per year exclusive RFC5 ports
Source: Eurostat table [road_go_ta_tott]

Finally, Figure 38 shows cross-border rail freight transportation in Million net-tonnes for the year 2012 on the network level. The given data was directly taken from national infrastructure managers, but needed some harmonisation due to differences in the national statistics of two sides of the same border crossing.

GDP (Gross Domestic Product) of every country. Short and medium term GDP-growth projections until the year 2020 have been calculated by the Institute for Advanced Studies. Long-term projections until the year 2030 were adjusted to meet those of the OECD.

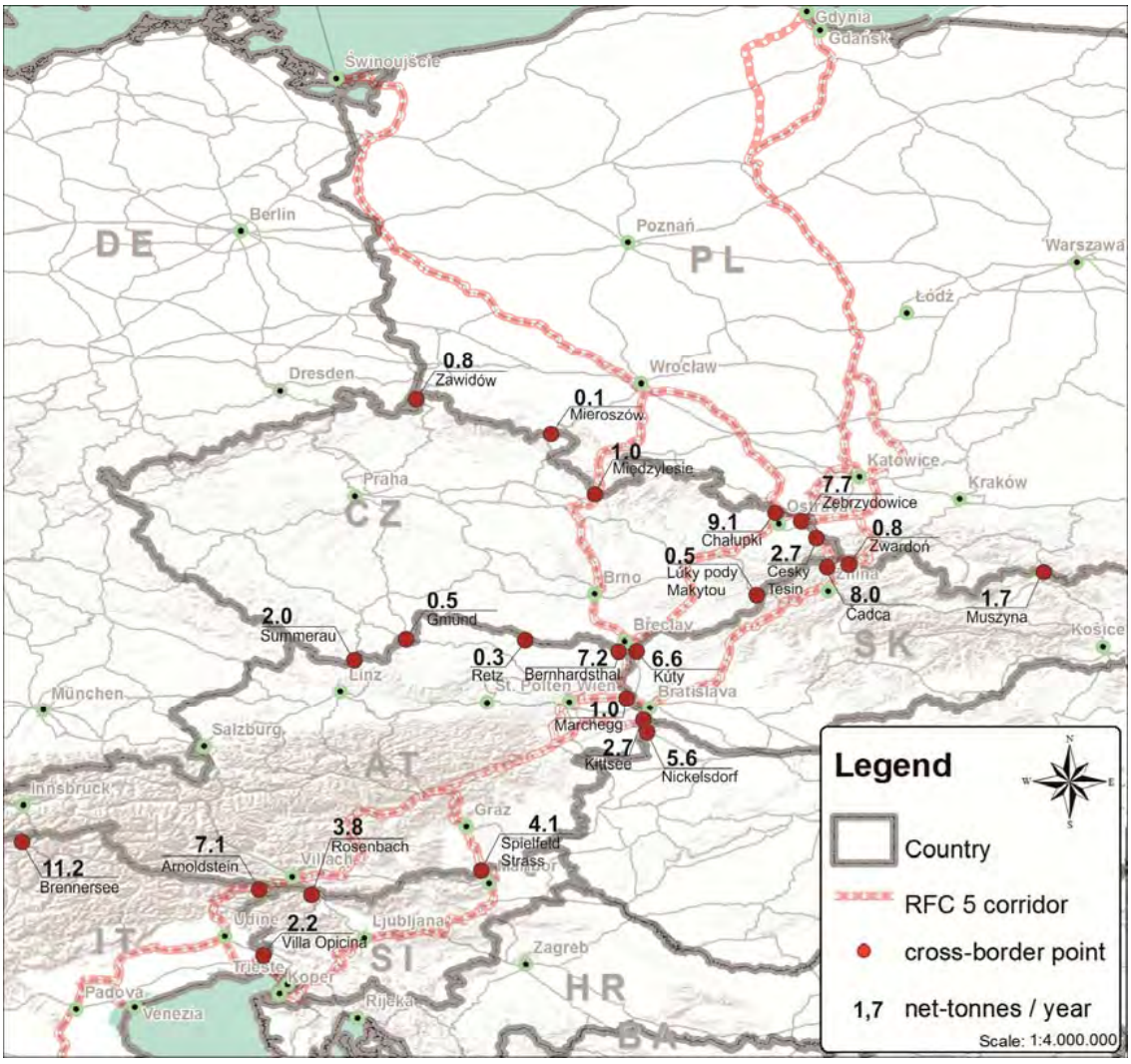


Figure 38: Cross-border rail freight transportation in million net-tonnes in the year 2012
Source: all RFC5 infrastructure managers, 2014

3.4.3. Forecast 2015 / 2020 / 2030

3.4.3.1. Definition of scenarios and GDP-forecasts

Freight transport demand is ultimately derived from economic activity which is measured by

Using scenario techniques is a proper tool for coping with different uncertainties when estimating future demand. For the TMS of RFC5 three different scenarios have been defined: one base-case scenario, one up-case and one down-case scenario.

In Table 5 the base-case scenario GDP forecasts for all RFC5 countries are summarized, using the most recent information available from October 2014[9]. For the years after 2015 only average yearly growth rates for three different 5-year intervals are provided.

by taking GDP-growth factors directly to project O/D matrices was used and varying assumptions of GDP-growth factors in the down- and up-case scenario should cope for this simplified approach.

Table 5: GDP forecasts for RFC5 countries base-case scenario

YEAR	2010	2011	2012	2013	2014	2015	2015-2020	2020-2025	2025-2030
Italy	1.7%	0.4%	-2.4%	-1.9%	-0.3%	0.3%	1.3%	1.4%	1.5%
Austria	1.8%	2.8%	0.9%	0.3%	0.8%	1.5%	1.9%	1.8%	1.9%
Poland	3.9%	4.5%	2,0%	1.6%	3.2%	3.2%	3.1%	2.5%	2.5%
Czech Republic	2.5%	1.8%	-1,0%	-0.9%	2.4%	2.2%	2.8%	2.4%	2.9%
Slovakia	4.4%	3,0%	1.8%	0.9%	2.4%	2.5%	3.1%	2.8%	2.6%
Slovenia	1.3%	0.7%	-2.5%	-1.1%	1.8%	1.4%	2.2%	2.2%	1.8%

In terms of sensitivity analysis, following assumptions have been made for the down- and up-case scenarios for both EU countries and world regions outside EU:

- Down-case scenario: half (½) GDP growth factors of base-case
- Up-case scenario: GDP growth factors of base-case +0.5% points per year

As shown by the elasticity analysis (see main report of TMS), statistical data from Europe of the last decade generate in parts statistically insignificant product elasticities which is mainly owed to the very volatile years during the economic crisis. Therefore, a simplified approach

Furthermore, RFC5 ports have been modelled autonomous as extra traffic cell with their own forecasting model, depending on GDP development of most important trade partners of different world regions. Therefore, main trade partners were aggregated and their average growth forecast was used for estimating growth of trade flows of every single port. We use Koper as an example: In the year 2012, almost 22% of total imports can be allocated to Asia (China, South Korea), 21% to Africa (Algeria, Morocco, Egypt), 14% to South America (Brasilia, Columbia) and 10% to North America (USA, Canada). Corresponding GDP-growth forecasts are given in Table 6.

Table 6: Worldwide GDP forecast growth in average yearly per period

GDP Forecast	average yearly growth per period			
	2012-2015	2015-2020	2020-2025	2025-2030
Worldwide	2.8%	3.7%	3.2%	3.1%
European Union	0.8%	1.2%	1.1%	1.1%
Russia	0.9%	2.1%	3.0%	2.7%
USA	2.3%	2.7%	2.4%	2.4%
China	7.4%	6.2%	5.0%	5.0%
rest of the World	4.2%	4.5%	3.8%	3.2%

[9] As described above regional forecasts on a NUTS3 level were carried out and are included in the transport demand model. The factors presented here represent only a summary on a national level.

On the supply side, all relevant infrastructure investment plans for rail and road as well as for main terminals and the sea ports and the corresponding time schedules given by every RFC5 country were included as basic assumption in all scenarios. Figure 39 shows an overview of the planned rail infrastructure investments along the RFC5 which were used in the forecast model.

In respect to the implementation of RFC5 by the end of 2015, assumptions for the effects of starting RFC services on the transport supply side were explicitly taken into account for all relevant O/D relations:

- Transport costs change due to lower transaction costs and higher flexibility
- Transport time decreases due to preference track clearance for PAPs

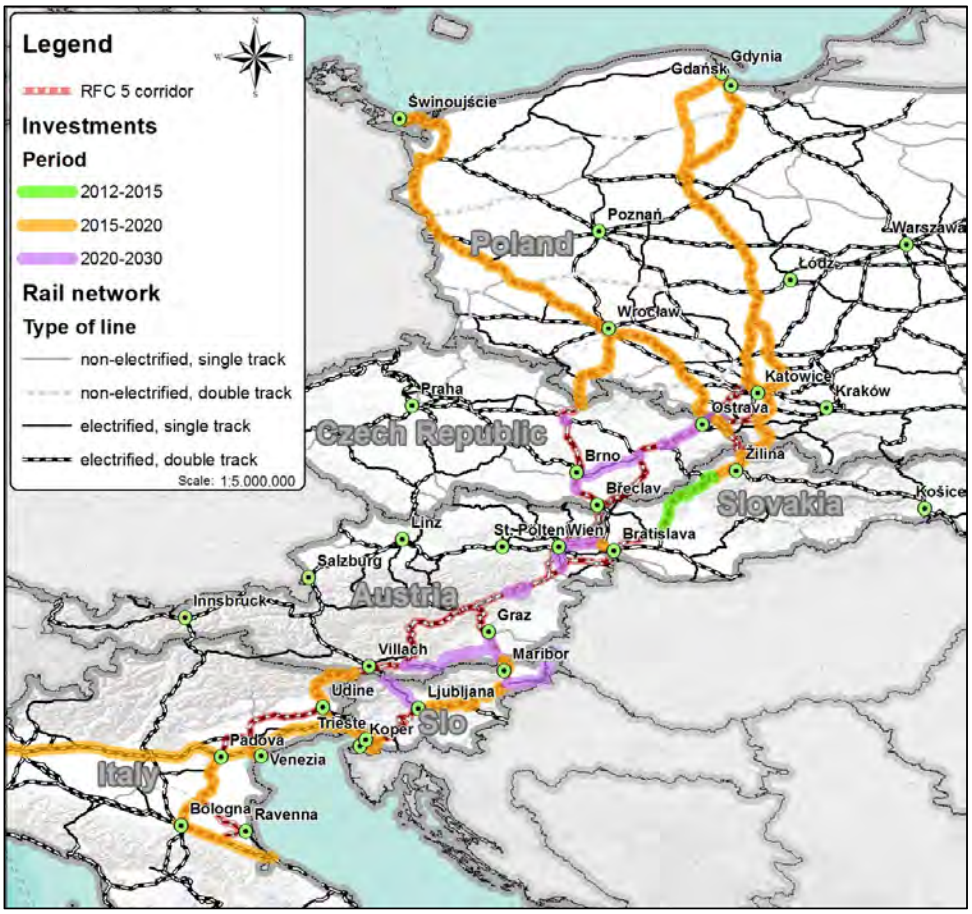


Figure 39: Rail infrastructure investments in RFC5 countries

At this point it has to be mentioned, that some of the planned infrastructure investments and corresponding time schedules seem to be very ambitious. Nevertheless, a good infrastructure is a key factor for economic development and therefore these plans were included without any changes. This has to be kept in mind when interpreting demand forecasts.

- Punctuality increases due to preference track clearance for PAPs
- Waiting time at borders decreases

Table 7: Assumption for modelling modal split effects of RFC5

Parameter	Year 2020	Year 2030
Transport costs	-3%	-7%
Transport time	-3%	-7%
Punctuality	+3 percentage points	+7 percentage points
Waiting time per RFC5-border	-15 minutes each	-20 minutes each

Different assumptions for the year 2020 and 2030 reflect a learning effect of the rail transport system over the time.

Finally, only few scenarios were selected for presenting results. Figure 40 shows an overview of the basic assumptions.

c) Ports are forecasted separately: forecast of international trading destinations (Asia region, Africa, and so on) have been taken and therefore, especially for the Adriatic port very strong growth perspective is given
d) Last but not least: all given rail infrastructure update and investment project were assumed

Year	Supply	Demand		
		Base Case	Downside Case	Upside Case
2015	Infrastructure investments only	X		
	Infrastructure investments with RFC5 service			
2020	Infrastructure investments only	X		
	Infrastructure investments with RFC5 service	X		
2030	Infrastructure investments only	X	X	X
	Infrastructure investments with RFC5 service	X	X	X

Figure 40: Overview of selected scenarios and basic assumptions for forecasting

3.4.3.2. Transport demand forecast

When interpreting forecast results of this transport market study in comparison to other studies, one has to be aware of the differences of following assumptions:

a) Economic growth factors are given by the Institute for Advanced Studies (IHS). The short term factors derived from their own economic forecast model, the long term factors in accordance with OECD forecast. If one does not agree with underlying growth factors of base case scenario, he can use numbers given by down case scenario.
b) Transport volumes are directly derived from economic growth with 1:1 elasticity, since more detail empiric investigation has not brought plausible results.

to be realised as given by every RFC5 country (even if some of these investment plans seem to be very optimistic). Therefore, no bigger capacity restraints on the rail network are taken into account.

All following results, tables and figures concerning freight transport demand are given for the base-case scenario including infrastructure investments and RFC service in operation. Variations of up-case and down-case scenarios are presented only in terms of selected results in the next chapter.

Figure 41 shows estimated development of total freight demand volumes (sum of rail and road) and rail freight demand volumes separately for the RFC5 countries excluding RFC5 ports and

Figure 42 shows the same statistics for the RFC5 ports. This separate visualisation shows the high importance of sea ports especially for Slovenia: First, share of rail transport in Koper is very high and second, this rail freight traffic from Koper plays a major role for the total rail freight traffic volume in Slovenia. Therefore future development of Koper is crucial for Slovenian rail traffic while in other countries like Italy or Poland RFC5 ports play a less important role for the total rail freight volumes of each country.

sions or other crisis like the Russian/Ukraine crisis and reflects relatively strong growth perspective of eastern European countries. By looking at estimated development of RFC5 seaports, even stronger growth can be expected due to strong dependencies of world economic growth outside of Europe. Additionally, it should be kept in mind that the scenarios include all infrastructure investments, which is probably a prerequisite so that enough capacities are available in

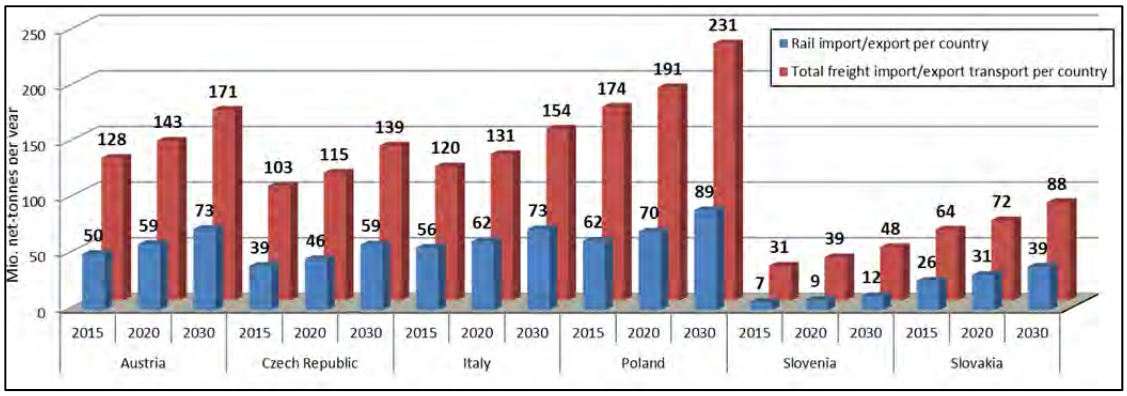


Figure 41: Sum of road and rail freight transport volumes: Import/export of RFC5 countries; base-case scenario with RFC service 2015, 2020 and 2030 without seaport traffic
Source: Eurostat tables [road_go_ta_tott], [rail_go_typeall], national statistics, IKK forecast base-case scenario

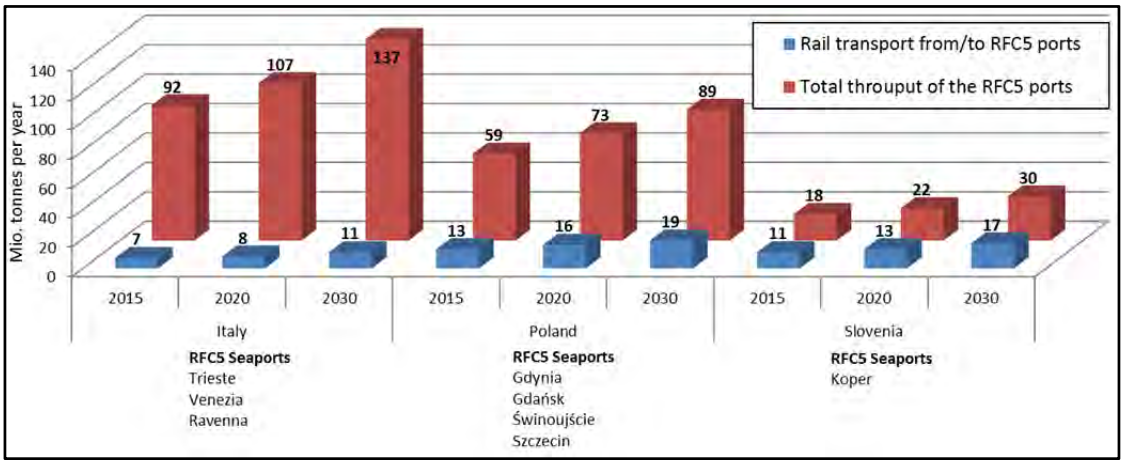


Figure 42: Sum of road and rail freight transport volumes: Import/export of RFC5 countries; base-case scenario with RFC service 2015, 2020 and 2030 without seaport traffic
Source: Eurostat tables [road_go_ta_tott], [rail_go_typeall], national statistics, IKK forecast base-case scenario

The freight demand forecast points out a development without longer periods of recession and the network to cope with the projected rail freight demand growth.

Freight demand model for year 2020

In the figures below are presented all flows between RFC5 countries by mode (separately Road-Figure 43- and Rail - Figure 44) with the effects of RFC5 services in the base case scenario. The figures show a lower growth for transport by Road than the one by Rail

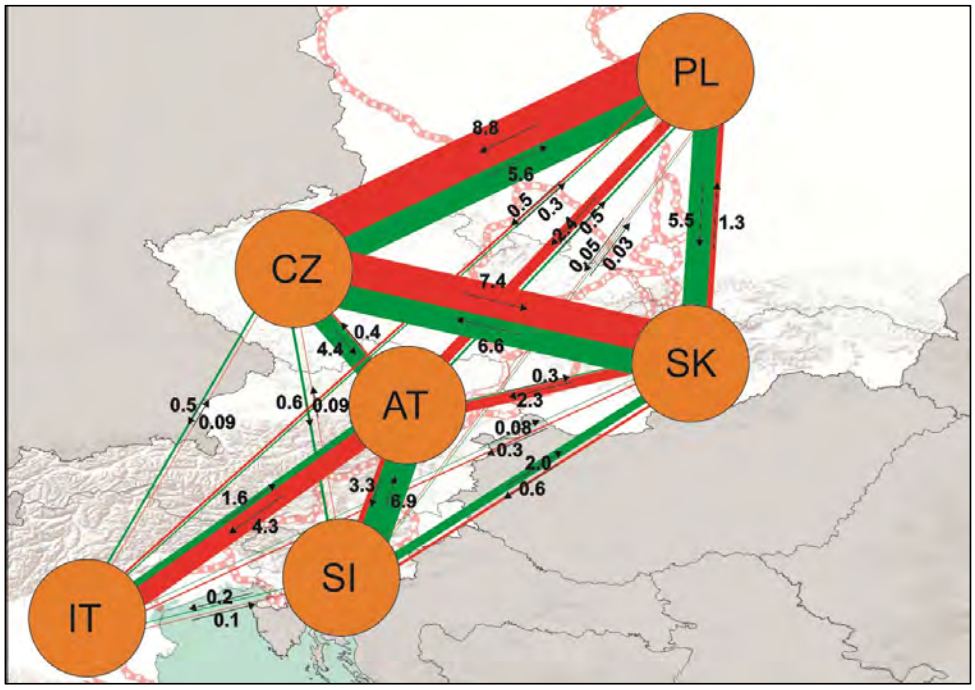


Figure 43: Rail freight transport year 2020 base-case including RFC5 service - Import/export between RFC5 countries from model O/D matrices in Mio net-tonnes per year

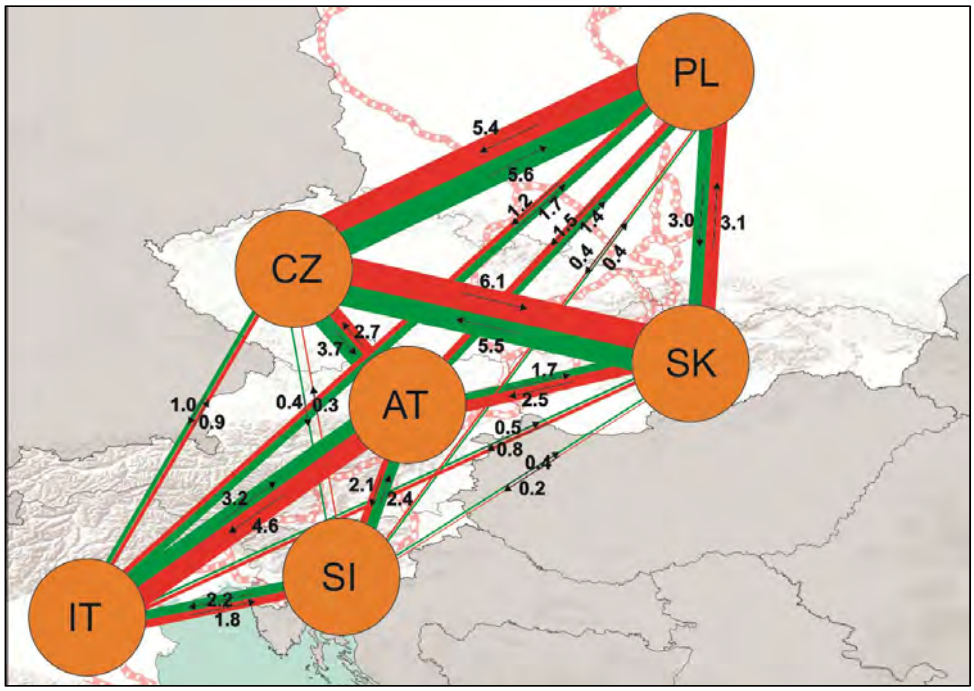


Figure 44: Road freight transport year 2020 base-case including RFC5 service- Import/export between RFC5 countries from model O/D matrices in Mio net-tonnes per year

Freight demand model for year 2030

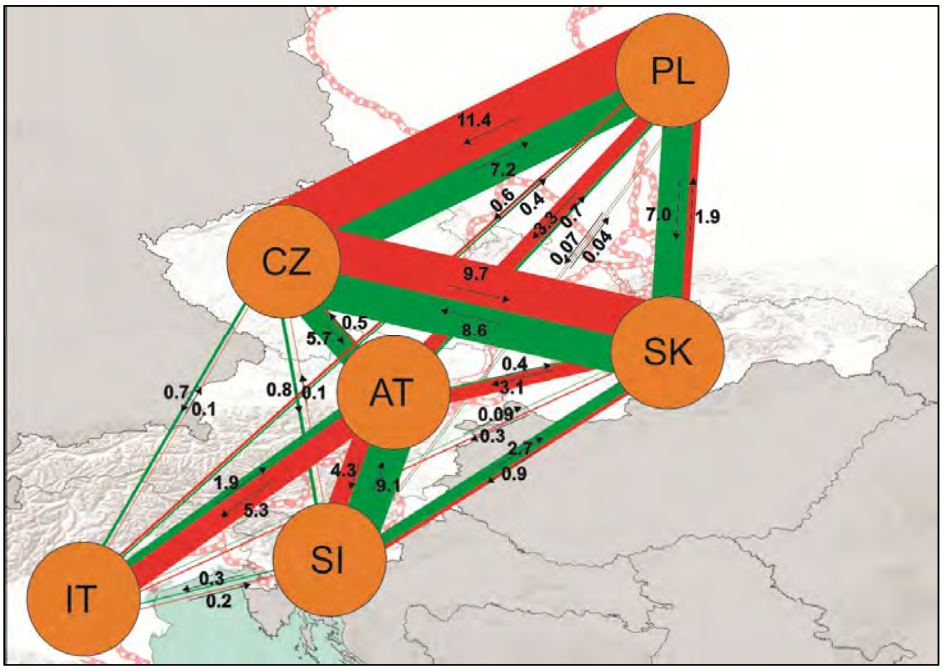


Figure 45: Rail freight transport year 2030 base-case including RFC5 service - Import/export between RFC5 countries from model O/D matrices in Mio net-tonnes per year

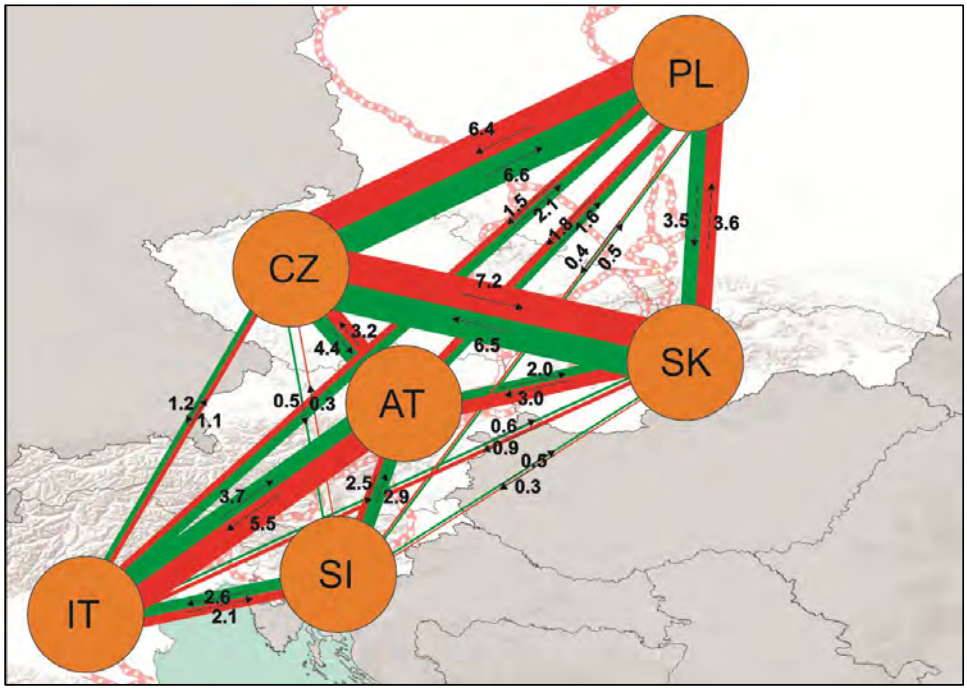


Figure 46: Road freight transport year 2030 base-case including RFC5 service - Import/export between RFC5 countries from model O/D matrices in Mio net-tonnes per year

3.4.3.3. Assignment results: rail freight traffic network loads

In the transport model, freight demand is given in the form of O/D matrices which are all documented in the main report of TMS for RFC5. By assigning those O/D matrices on the network model by using route choice algorithm, freight traffic network loads can be presented. Figure 47 shows rail assignment results for base-case scenario including RFC service for the year 2030. Colours give a network load category and numbers represent network loads in million net-tonnes per year.

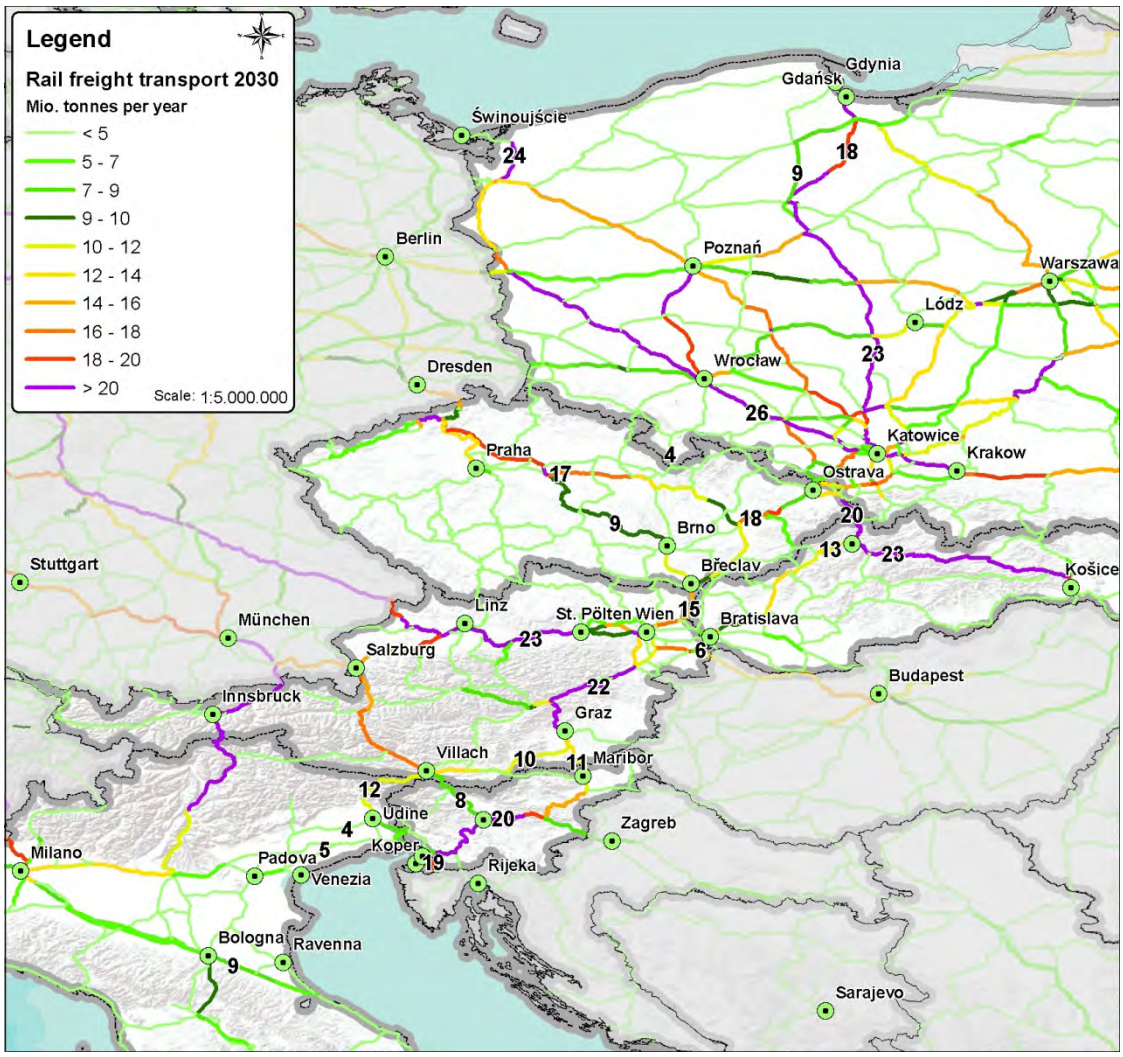


Figure 47: Rail freight traffic network loads, base-case scenario with RFC service for 2030

In comparison to network-loads of actual state in the year 2012 (Figure 38) forecast for 2030 (Figure 47) indicates strong growth along the whole RFC5. While on the southern parts between Slovenia/Italy and Austria the strong growth of Adriatic seaports overwrites weak economic growth, on the north-eastern part of RFC5 strong economic growth of Poland, Slovakia and the Czech Republic drives freight demand on the network.

To give an impression of the development over time, the Figure 48 to Figure 50 show the development of rail freight network loads in million net-tonnes per year for base-case scenario and the forecasting periods 2015, 2020 and 2030.

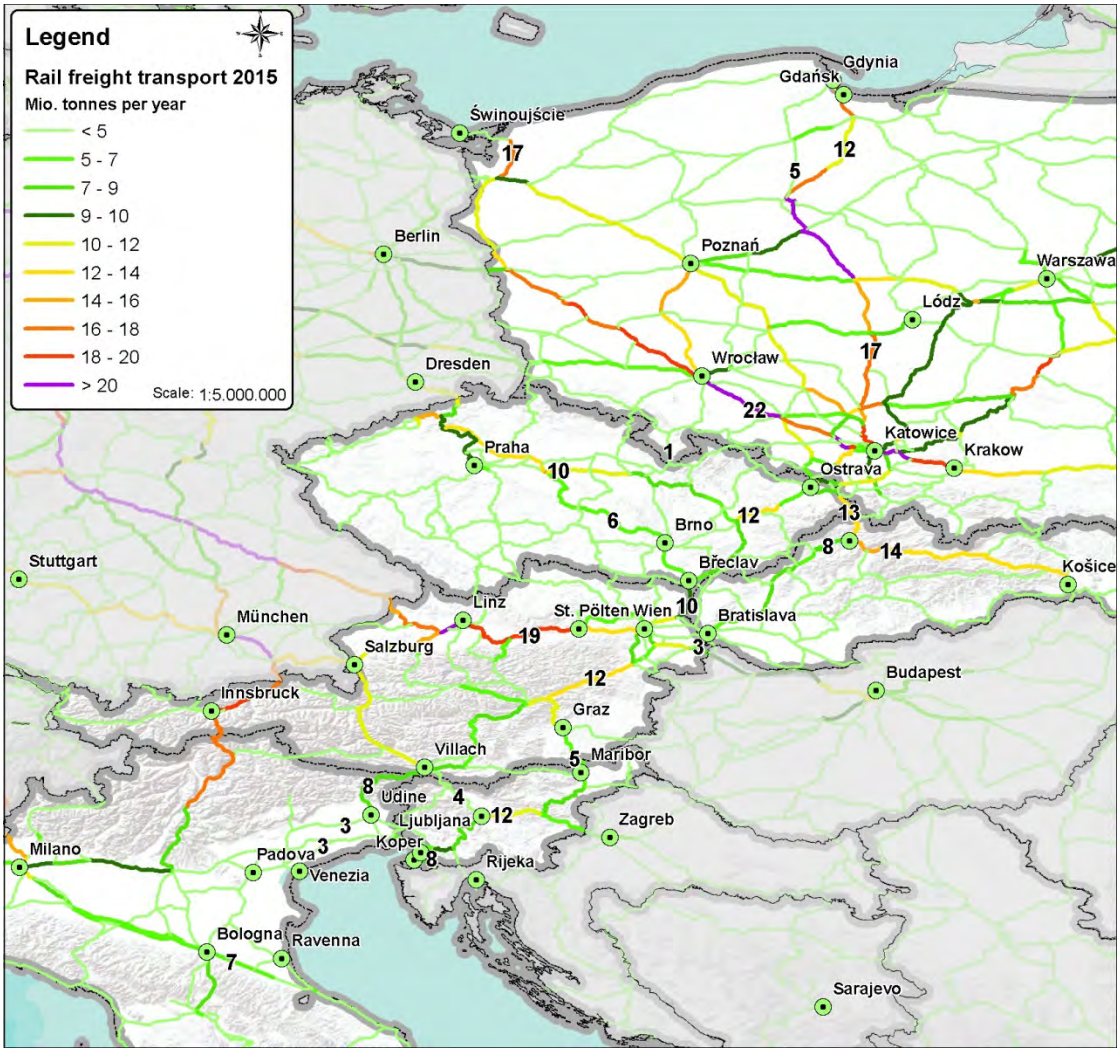


Figure 48: Rail freight traffic network loads, base-case scenarios with RFC service for 2015.

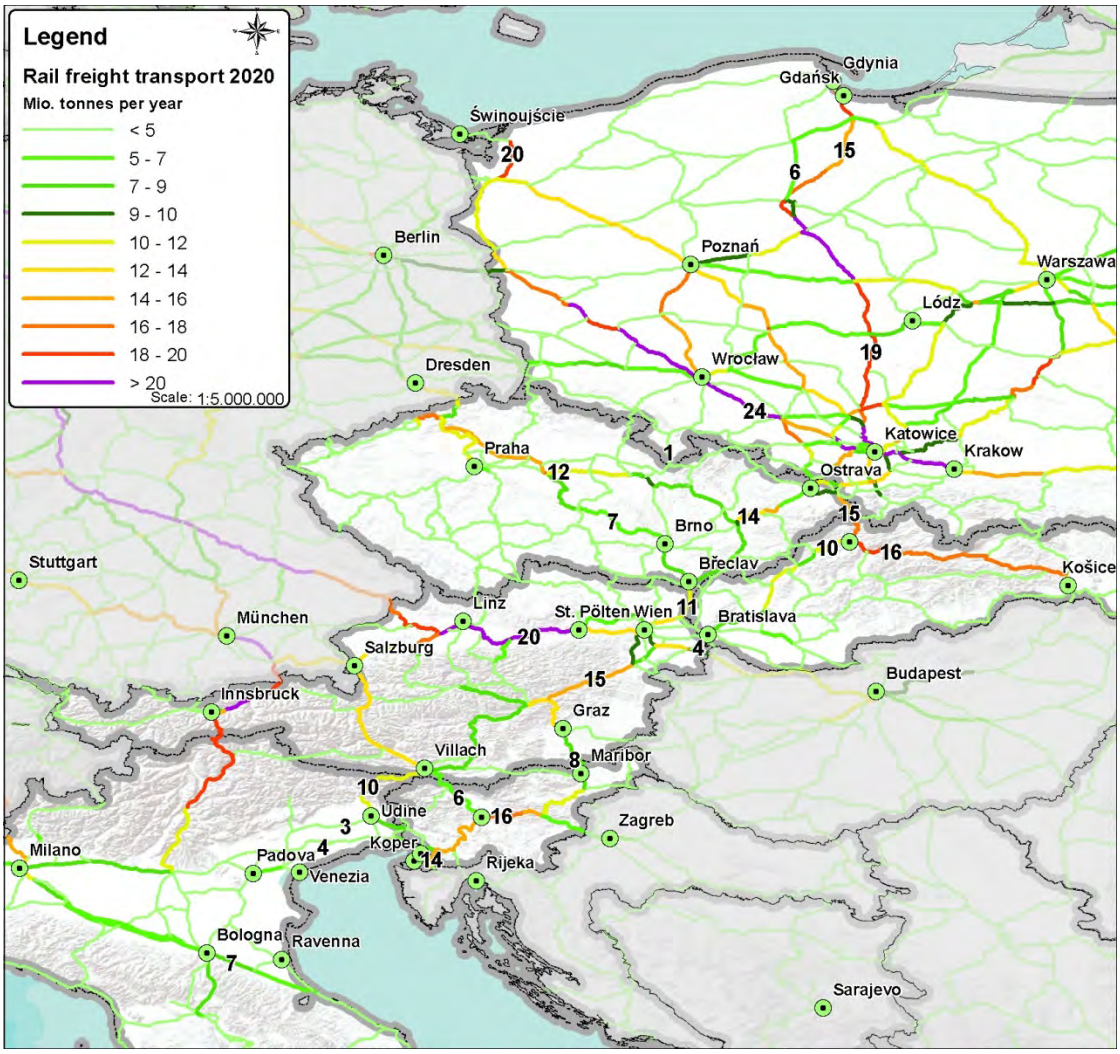


Figure 49: Rail freight traffic network loads, base-case scenarios with RFC service for 2020

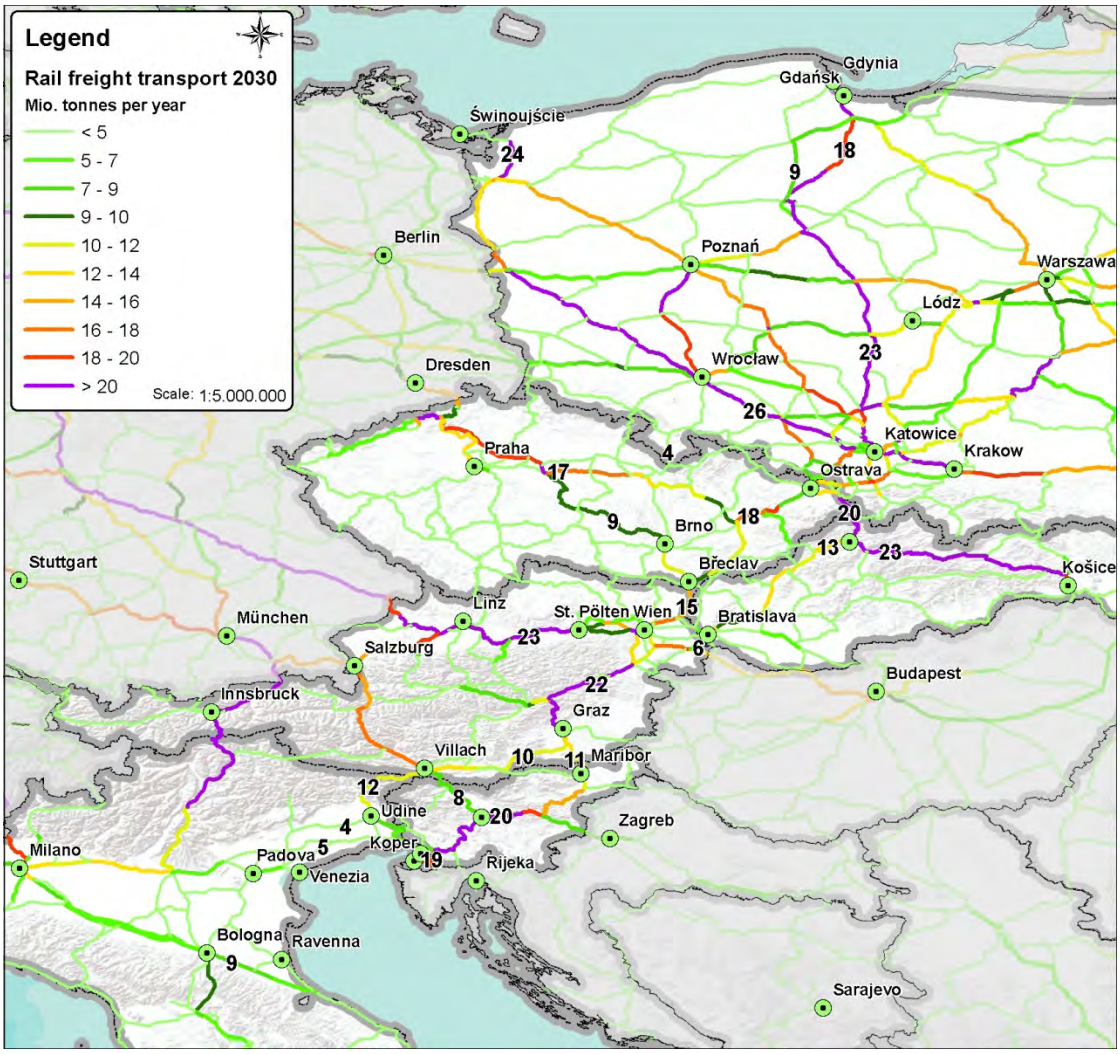


Figure 50: Rail freight traffic network loads, base-case scenarios with RFC service for 2030

By comparing base-case scenario excluding and including RFC service, the direct effects of implementing Rail Freight Corridors can be estimated. figure 51 and figure 52 show the modal split effect in terms of shifting freight traffic from road to rail due to implementing RFC service. Again, colours give a network load category and numbers represent network loads in million net-tonnes per year. For correct interpretation of these results it has to be kept in mind, that modal split effects are a sort of "if - then" forecast: If introducing RFC service leads to a better rail supply in terms of lower costs, lower waiting times at borders and so on, then effects will be as shown in figure 51 and figure 52.

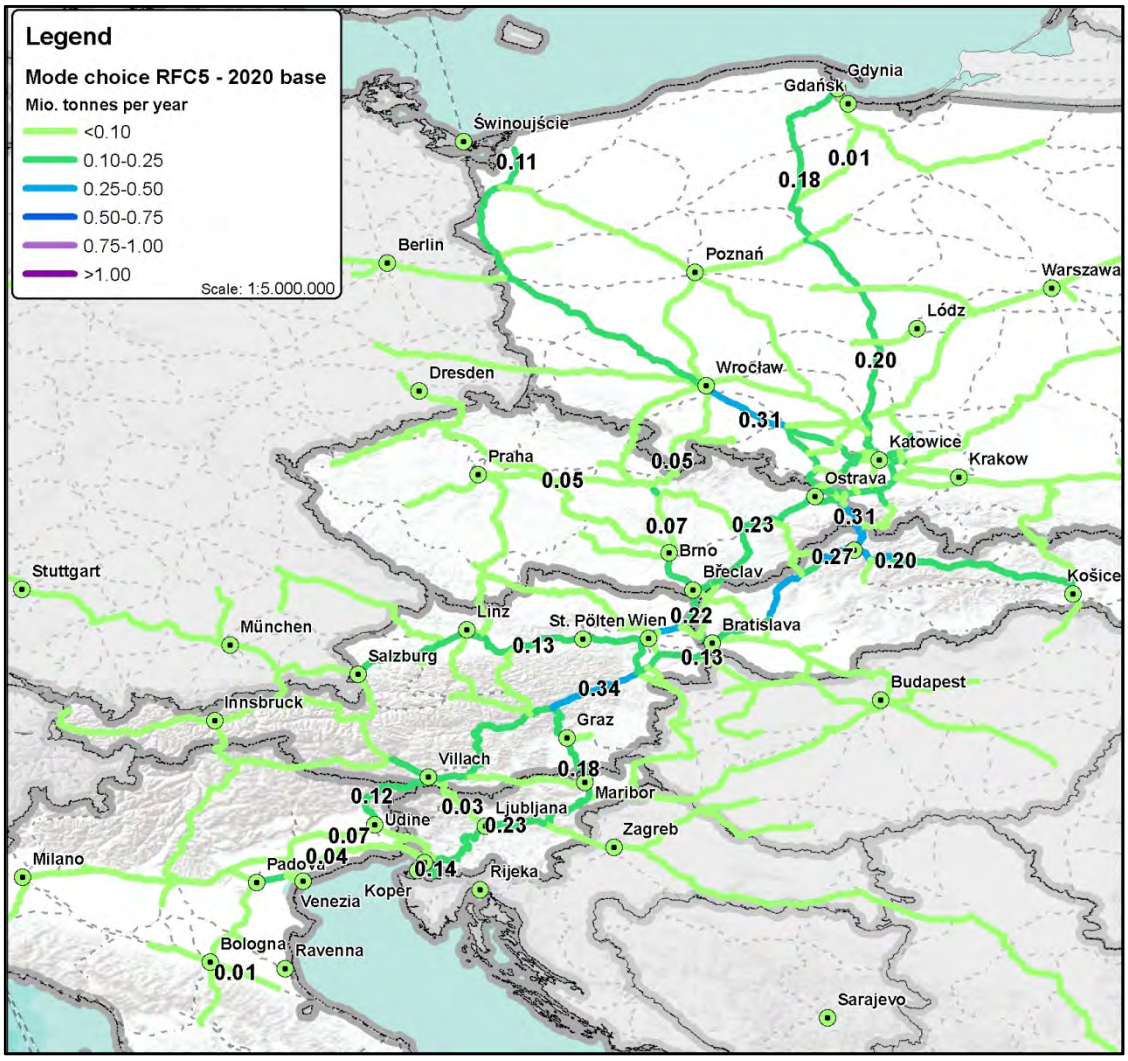


Figure 51: Rail freight traffic network loads, direct modal split effects of RFC5 service in the year 2020; base-case scenario

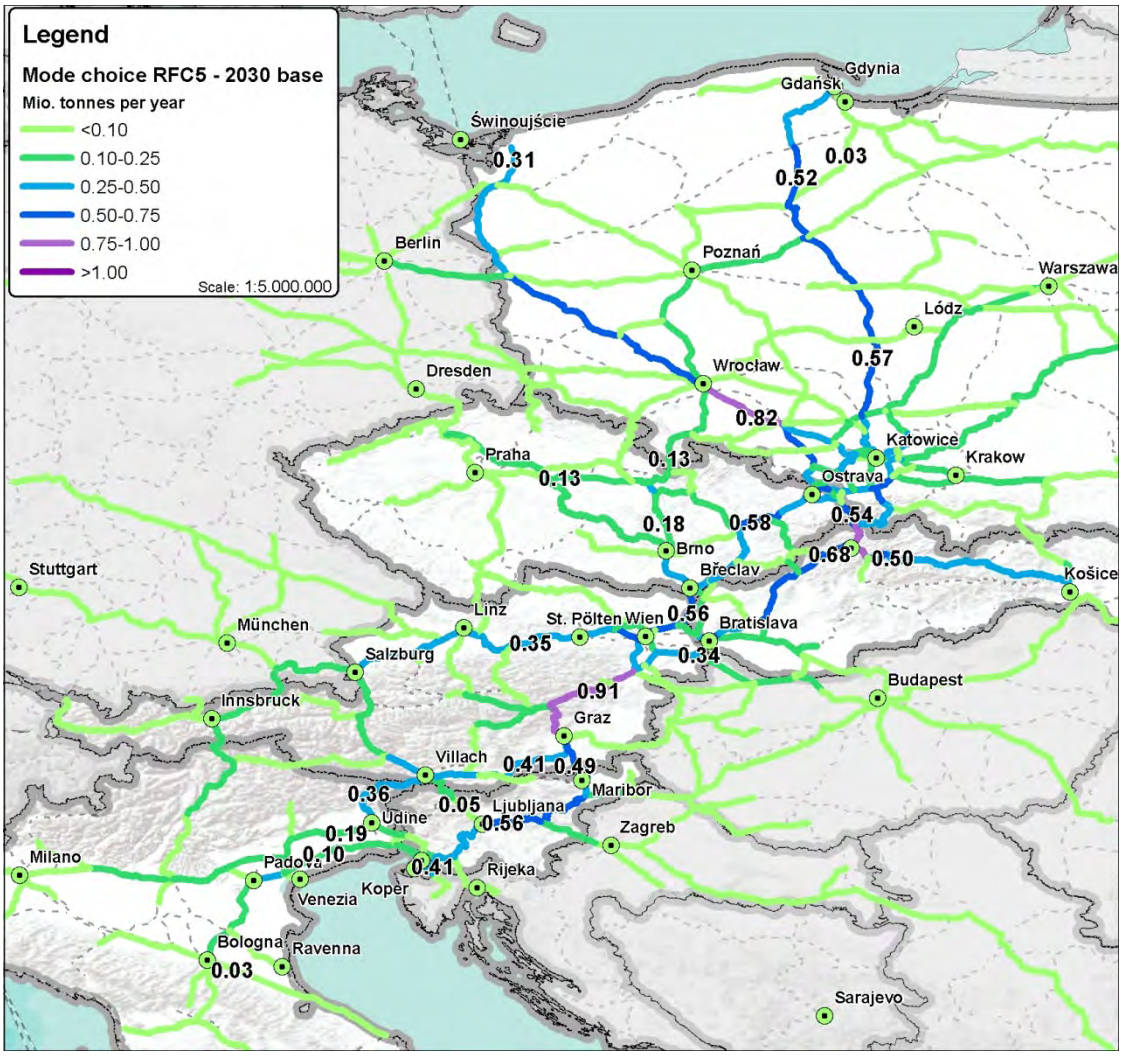


Figure 52: Rail freight traffic network loads, direct modal split effects of RFC5 service in the year 2030; base-case scenario

Finally, freight traffic network loads in net-tonnes per year can be converted into a potential for corridor trains. We use an average corridor train for the whole investigation area, which has a weight of 580 net-tonnes and runs 250 days a year. By using these assumptions, Figure 53 shows the potential for corridor trains in the base-case scenario with RFC service for the year 2020 and Figure 54 shows the same for base-case scenario in the year 2030. Blue colour marks corridor trains running on parts of RFC5 and green colour marks trains on the rest of the rail network.

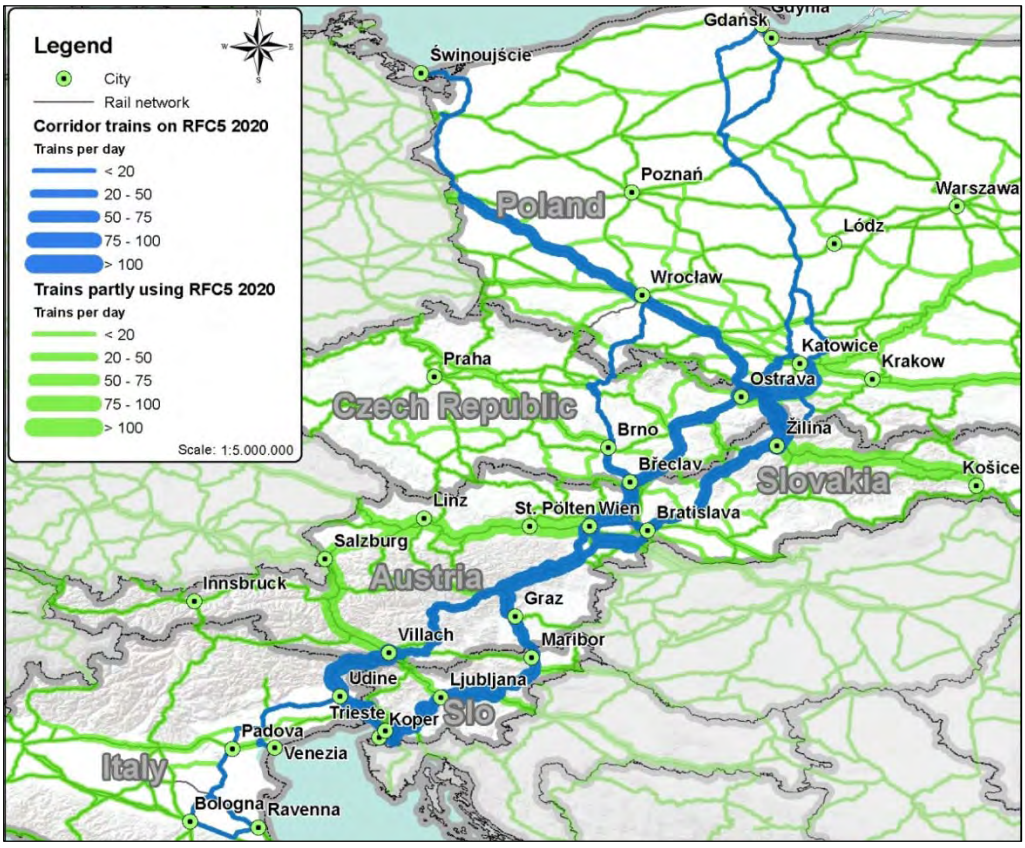


Figure 53: Potential of corridor trains 2020: possible number of daily border-crossing trains on RFC5; base-case scenario with RFC service

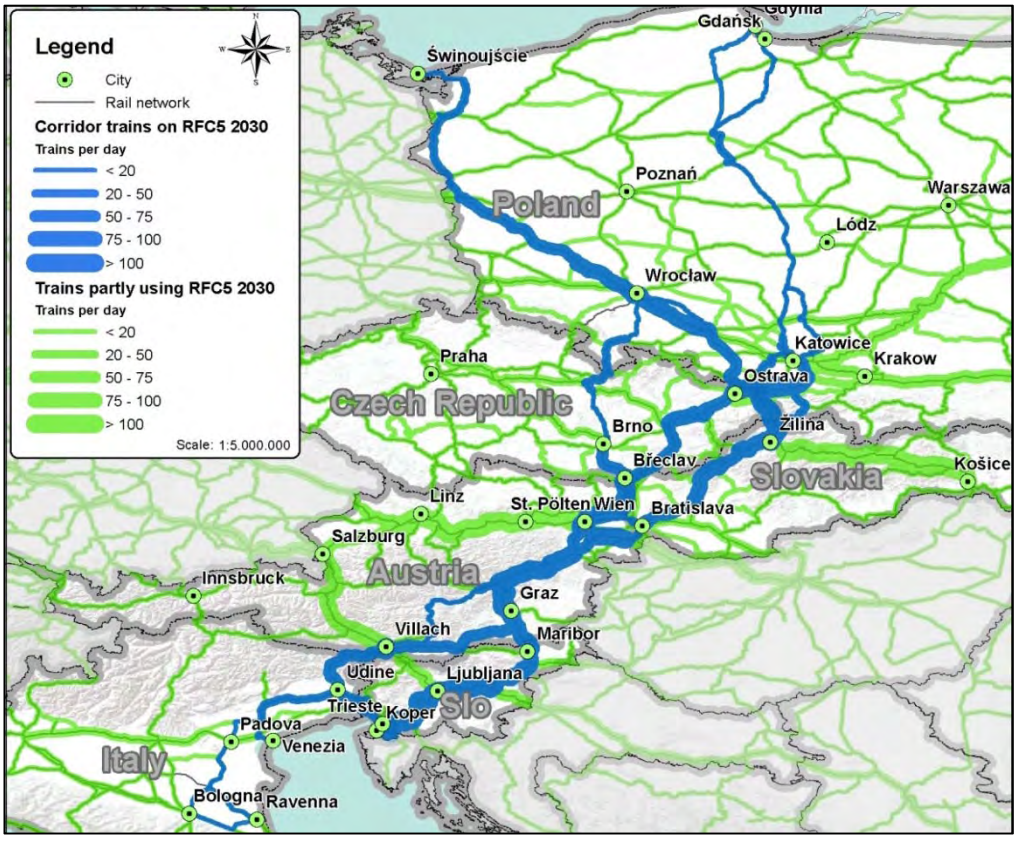


Figure 54: Potential of corridor trains 2030: possible number of daily border-crossing trains on RFC5; base-case scenario with RFC service

To give a better overview of modelling results for the different scenarios with their assumptions concerning future development, a summary of estimated rail freight traffic network loads at all border crossings along the RFC5 is given in Table 8.

southern Polish regions are largely dependent on imports through the North Sea and Baltic ports and this will put pressure on the RFC5-infrastructure to allow for larger amounts of goods being handled and transported.

Table 8: RFC5 cross-border rail freight traffic in million net-tonnes per year

Border crossing		base case			down-case	up-case
		2015	2020*	2030*	2030*	2030*
PL-CZ	Międzylesie - Lichkov	0,83	1,00	4,31	3,59	4,43
PL-CZ	Chałupki - Bohumin	10,35	11,53	14,36	11,32	14,94
PL-CZ	Zebrzydowice - Petrovice	7,84	8,44	11,52	8,40	12,18
PL-CZ	Zebrzydowice -Cesky Tesin	2,63	3,89	4,64	2,88	6,01
PL-SK	Zwardoń-Skalite	1,28	1,40	2,74	2,41	3,66
CZ-SK	Mosty und Jablunkova - Čadca	12,58	15,41	20,40	15,10	22,24
CZ-AT	Břeclav - Bernhardsthal	9,64	10,89	15,24	12,87	15,84
SK-AT	Devínska Nová Ves - Marchegg	1,86	2,12	2,66	2,25	2,76
SK-AT	Bratislava - Petržalka - Kittsee	3,61	4,40	5,85	5,51	7,18
AT-SI	Spiefeld Strass - Šentilj	5,35	7,71	11,30	9,19	12,27
AT-IT	Arnoldstein - Tarvisio Boscoverde	7,50	10,11	11,72	9,12	12,62
SI-IT	Sežana - Villa Opicina	3,00	4,17	4,56	3,58	6,28

*years 2020 and 2030 inclusive RFC5 service

3.5. Conclusion

Socio-economic analysis shows, that Rail Freight Corridor 5 connects Italian industrial areas and Adriatic ports to the strong industrialised areas of Poland, Slovakia and Czech Republic and Austria. The connection to Poland ports in the North links those eastern European industrial centres to the Scandinavian countries as well as to world trade flows of Asia, Africa and America. Since freight transport volumes are dependent on trade flows and the latter are directly linked to economic development, RFC5 will serve as an infrastructure backbone and will support growing together of the connected economies.

Furthermore, sea shipping shift to Adriatic ports will significantly rise over the coming years and therefore the hinterland connection provided by RFC5 will become increasingly important. On the other hand, industrial production in the

By conducting a comprehensive survey in all RFC5 countries, many interesting insights to the transport market could be derived. To state only one out of several results, requirements for the RFC service are summarised in keywords: C-OSS has to act as a real single contact point; offered tracks should be flexible; a customer friendly service should include information of the process of applying for tracks and shipments on the track; there is a particular demand for quick and short-term allocation of requested paths. In addition, the statements on minimum requirements for the RFC5 can be summarised in three main groups – infrastructure, services and quality indicators. The latter refer to a general demand for quick and cheap rail freight transports allowing enhancing the competitiveness of the rail system. Infrastructural demands can be summarised as a realisation of the TEN-T-specifica-

tions on the entire RFC5. This includes electrification, double tracks, sufficient capacity, train length of 740 meters and increase of axle load.

Based on the analysis of current situation and results of survey a freight demand model for the base year of 2012 was calibrated and forecasts for the years of 2015, 2020 and 2030 were compiled for different scenarios. Results of forecasts can be summarised as following:

Generally, base-case scenario reflects relatively strong growth projections for eastern European countries and rail infrastructure investments (which are a basic assumption for all scenarios) produce adequate capacities to cope with growth of rail freight traffic.

By looking at the down-case scenario, one can see much lower increase of rail freight traffic loads through the assumptions of lower GDP-growth. This could also be interpreted as a scenario, where GDP-growth keeps strong but effects on rail freight traffic are much lower due to lower GDP-to-trade elasticities. Nevertheless, as long as there will be no fundamental crisis, rail freight traffic should increase over the next century along RFC5.

Lower economic growth of Italy results in lower growth of rail freight traffic on Italian borders. Low share of rail concerning Italian ports gives a hint for possible future potential for shifting freight traffic from road to rail.

In contrast Slovenian borders show strong growth of rail freight traffic loads due to economic growth and much more due to very strong growth of in- and outgoing traffic of Koper. Especially for Slovenia, infrastructure investments are crucial to enable this development.

For Poland, Slovakia and Czech Republic strong economic growth leads to strong increase of freight demand. Especially in the last five to ten years, this growth was very much covered by road transportation. Rail infrastructure investments and strengthening efficiency of rail freight operation (e.g. through introducing Rail Freight Corridors) is very important to enable also growth of rail freight traffic as shown in the forecast of this study.

Additional factor, which could have influence on RFC 5 rail freight flows is interaction with other Rail Freight Corridors. Due to the fact that RFC 5 crosses or overlaps four other Rail Freight Corridors, numbers: 6, 7, 8 and 9, future prognosis of change of RFC 5 traffic have to take into account potential in- and outflow of trains running along other Rail Freight Corridors too.

>> 4. List of measures

4.1. Coordination of infrastructure works

RFC5 will apply "RNE guidelines for Works and Possessions" :
http://www.rne.eu/tl_files/RNE_Upload/Downloads/RFC%20Guidelines/Guideline%20-%20Punctuality%20Monitoring%20V2.0.pdf

Timeline of publication of Works and Possessions is compatible with RNE guidelines:

1. X-24 Initial publication of major possessions based on available information,
2. X-17 More detailed information on major possessions - can be taken into consideration before starting the construction of pre-arranged paths (PaPs),
3. X-12 Detailed coordinated possessions – issued prior to the publication of PaPs at X-11,
4. X-9 Update - prior to the deadline for path requests at X-8,
5. X-4 Update - prior to final allocation and for planning of reserve capacity for ad-hoc trains.

4.2 Corridor One stop shop

This chapter addresses the scope and the vision of the corridor regarding the Corridor One Stop Shop, presenting applicable definitions (see the Glossary in the Annex 1) and documentation to prepare a common field of comprehension in this specific topic.

4.2.1. Applicable documentation

Documents, which could contribute to and rule the C-OSS set-up and operation are as follows:

- EU Regulation 913/2010 (including the Handbook to the Regulation): spells out the overall framework for setting up the Corridor OSSs,
- EU Directive 2012/34 Establishing a single European railway area,
- RNE Process Handbook for International Path allocation (For Infrastructure Managers),
- RNE Guidelines for Pre-Arranged Paths,
- RNE Guidelines for the Coordination and Publication of Works on the European Rail Freight Corridors,
- RNE Guidelines for Punctuality Targets,
- RNE Guidelines for Freight Corridor Traffic Management,
- RNE PCS Process Guidelines,
- RNE Guidelines for C-OSS.

RFC 5 offer is prepared on the basis of Guidelines elaborated by RNE.

4.2.2. Corridor One Stop Shop (C-OSS) (Art.13)

According to Article 13(1) of the Regulation, the Management Board designates a joint body to provide Applicants with a single place to both request and receive answers relating to infrastructure capacity on the railway lines of RFC 5 for freight trains using at least one PAP section and crossing at least one State border along a freight corridor. According to the Regulation, the essential tasks of this joint body, nominated "Corridor OneStop Shop" (C-OSS) are summarized as following:

A. Regarding the management of capacity request the C-OSS has:
   - to act a single contact point for the applicants,
   - to display available corridor capacity for trains as defined above,
   - to handle requests for the capacity offered as pre-arranged paths and reserve capacity, taking decision about the allocation on behalf of the involved IMs/ABs applying non-discriminatory priority rules,
   - to keep the involved IMs/ABs always informed on the allocation process,
   - to forward any request/application for in-

frastructure capacity which cannot be met by the Corridor OSS to the competent IM(s)/ ABs and communicating their decision to the applicant,
- to keep a registry of the requests.

B. Regarding the delivery of information to the applicant the C-OSS has to:
- provide information included in the Corridor Information Document (CID), also by means of web tools. An overview of the most significant elements is given below:
  - applicable procedures and access conditions to the corridor capacity, including information regarding the functioning of C-OSS,
  - line/train parameters along the corridor,
  - rules applied in the traffic management,
  - access to the terminals,
  - capacity restrictions.

The C-OSS takes decisions regarding applications for pre-arranged train paths and reserve capacity for freight trains crossing at least one border. Any applications which cannot be met by the C-OSS will be forwarded to the competent infrastructure managers, who will take a decision on the application and communicate this decision to the one-stop shop for further processing.
According to the RFC 5 Management Board decision the dedicated model for the C-OSS was implemented in RFC 5. The dedicated model is defined in the RNE Guideline for C-OSS as : "Dedicated OSS, a joint body set up or designated by a Corridor organization supported by a coordinating IT-tool".
C-OSS will perform its functions within the Corridor Project Management Office (PMO).

4.3 Capacity allocation principles

RFC5 pursues the enhancement of its performances within the frame of an European network of corridors. Therefore it will make use at the maximal possible extent of available up to date guidelines and standards published by RNE.

The Construction Phase involves mainly the Infrastructure Managers and Allocation Bodies but the corridor will have a role of support and coordination among them. The workflow and timing between the Corridor and the concerned IMs will be part of Corridor One Stop Shop Agreement.

The Corridor will join the overall plan for the process of the yearly time table and RC that is represented currently in the table 9.

Table 9 Process of creation of the corridor PaPs

Date/period	Activity
X-19 – X-16	Preparation phase
X-16 – X-12	Construction phase
X-12 – X-11	Approval and publication
X-11	Publication of pre-arranged paths provided by the IMs/ABs and identification among them of the designated Network PaPs
X-11 – X-8	Application for the Annual Timetable
X-8	Deadline for submitting path requests
X-8 – X-7,5	Pre-booking phase
X-7.5	Forwarding requests with “flexible approaches” (e.g. Feeder/Outflow) or “special treatments” to IMs/ABs
X-7.5	Possible return so remaining (unused) pre-arranged paths to the competent IMs/ABs – based on the decision of the Corridor MB – for use during the elaboration of the annual timetable by the IMs/ABs
X-7,5 – X-5,5	Path construction phase for flexible approaches
X-5,5	Finalisation of path construction for requested “flexible approaches” by the IMs/ABs and delivering of the results to C-OSS for information and development of the draft timetable
X-5	Publication of the draft timetable for pre-arranged paths – including sections provided by the IMs/ABs for requested “flexible approaches” by the C-OSS
X-5 – X-4	Observations from applicants
X-4 – X-3,5	Post-processing and final allocation
X-8 – X-4	Late path request application phase
X-4 – X-2	Late path request allocation phase
X-4 – X-2	Planning (production) reserve capacity for ad-hoc traffic
X-2	Publication reserve capacity for ad-hoc traffic
X-2 – X+12	Application and allocation phase for ad hoc path requests
X+12 – X+15	Evaluation phase

More in detail, for the preparation phase a process will be developed to create and maintain a deeper knowledge of the corridor market and customers by means of following up the transport market study (and its updates), taking advantages from the RAG/TAG opinions, following up the customer satisfaction survey and analyzing the yearly feedback of the allocation process.

This will allow:

- to structure the yearly offer of the corridor capacity in a manner suitable for the customer demand. The offer could take the form of: "fixed" PAPS (with exact definition of departure/arrival/passing times at all major nodes) or FlexPAPs for which, with exclusion of arrival/departure time at the borders, there is more flexibility to adjust the timing during the timetable construction. The offer along the corridor could also consists of a mix of both products.
- to allow the Management Board to take the decisions related to the not requested PAPs whether and in which extent such PAPs can be used by the C-OSS for the reserve capacity.

Pre- and final allocation will be performed in a non-discriminatory way applying the priority rules drafted in the RNE guidelines (see website: http://www.rne.eu/tl_files/RNE_Upload/Downloads/RFC%20Guidelines/Guidelines%20for%20C-OSS%20V5.pdf)

and decided in the Framework for Capacity Allocation drafting of which is in the obligations of the Executive Board.
The RFC 5 Executive Board has taken decision stablishing Framework for Capacity Allocation on 26.02.2015. This Corridor Framework is valid for one timetable period.

Mandatory tool for corridor capacity requests is PCS.

4.4 Authorized Applicants

According to article 15 of the Regulation 913/2010 an applicant may directly apply to the C-OSS for the allocation of pre-arranged train paths/ reserve capacity. If the pre-arranged train path/reserve capacity was allocated by the C-OSS accordingly, the applicant, in order to use those PAPs, shall appoint to the C-OSS, within the time as decided by the Management Board, the executing railway undertaking(s) which concludes the necessary individual contracts with the IMs or ABs concerned relying on the respective national network access conditions.
The C-OSS will forward the name of the RU(s) to the concerned IM(s)/AB(s), without prejudice of the conditions of the IM(s)/AB(s). The rights and obligations of Applicants will have been described in the Corridor Information Document (CID) – Book 4.

4.5 Traffic management

The main objective of corridor traffic management is to allow a smooth run of the freight trains along PAPs assigned by C-OSS. RNE has developed guidelines (see: in order to facilitate the challenging handling of this topic in a harmonized way also in a multi-corridor view. RFC5 has set up a dedicated WG which is developing the measures foreseen in the RNE guidelines, both for the regular and for the disturbed traffic management. A first set of cross border existing general operational information has been collected to be published in CID. The structure of the information comprises the following elements:

a) identification of the border crossing,
b) infrastructure parameters of the cross border section,
c) information about differences between traffic rules of neighbouring IMs,
d) language to be used at border,
e) possibilities of running through the border stations without stops (administrative or technical),
f) rules od advance notice, especially for the exceptional consignments,
g) methods of giving permissions for engine driver to run through the border sections,

h) required tasks of RUs in case of disturbance of traffic (due to failing communication, failure of safety systems, etc.),
i) rules for written driving instructions for engine drivers,
j) rules for notifications in extraordinary situations,
k) rules of labor safety, fire services, workplace accident,
l) others.

In order to improve the traffic management coordination and communication among involved IMs, the use of the following RNE IT tools is foreseen:

- TIS Train Information System, that provides real time information about train running on the corridor,
- TCCCOM Traffic Control Center Communication, that enables to call up predefined messages which will be released on each side of the border in the native language.

4.6 Traffic management in case of disturbances

Traffic control centers (TCCs) manage the train traffic both according to the contracted time table and in case of disturbance. RFC5 pursues, in principle, to maintain on time corridor trains that are not delayed.

The IMs strive to respect cross-border handover times to the largest extent possible in order not to impact the regularity of international transport but each IM however dispatches all trains, including corridor trains, according to its national guidelines.

The corridor has set up a working group to tackle the topics related to traffic management in case of disturbances, defining "corridor trains" and agreeing on general priority principles that have been individuated in the following set:

- trains to clear emergency or disruption situations have always priority,
- in case of conflict between two or several delayed trains, the priority is given to the solution enabling the fastest return to regular operations,
- Railway Undertakings can set a priority on one or several trains among their trains.

The working group already collected existing bilateral agreement and communication rules to be presented in CID.

The Corridor Management Board is also aware of the importance of proper monitoring of the train performances along the corridor, since the reliability of the transport is an important quality aspect. In this field the corridor will follow the RNE Guidelines (see:http://www.rne.eu/tl_files/RNE_Upload/Downloads/RFC%20Guidelines/Guideline%20%20Punctuality%20Monitoring%20V2.0.pdfa) that set up the general frame to deliver a repeatable process to measure and report on train punctuality. The detection of the causes for delays is of great importance to start any improvement action.

Punctuality will be measured on the basis of comparisons between the running time planned in the original timetable (contracted time table) of a train identified by its train number and the actual running time at defined measuring points. A measuring point is a specific location on the route where the trains running data is captured. In principle is possible to measure punctuality at departure, at arrival or at any intermediate point.

Punctuality will be measured by setting a threshold up to which trains will be considered as punctual and building up a percentage.

Definition of train sample, measuring points, frequency of the report, threshold for punctuality, etc. are still under elaboration by the working group.

4.7 Information to be provided

The RFC5 Management Board will draw up, regularly update and publish a document containing:

a) information regarding access to the Corridor infrastructure,
b) information regarding conditions and methods of accessing terminals attached to the Corridor,

c) information regarding procedures for allocation of dedicated capacity on the Corridor,
d) information regarding infrastructure charges,
e) information on all that is relevant for the Corridor in the national network statements and extracted for the Corridor Information Document,
f) information concerning procedures referred to in Articles 13,14,15,16 and 17 of Regulation 913/2010.

4.8 Quality evaluation

The Corridor Management Board intends to put in place a corridor governance based on quality performance.

As regards the capacity allocation Framework for capacity allocation includes specific indicators defined by the Executive Board. The process of capacity allocation shall be evaluated on an annual basis. The evaluation shall be done after the allocation of the annual timetable.

4.8.1 Performance monitoring report

The Article lays down the requirements to monitor the performance of rail freight services on the Corridor (Art. 19(2)).

The performance of RFC 5 is to be measured on several parameters at pre-defined points along the RFC. The performance report will be published once a year.
The possible parameters to be defined:
- number of offered paths;
- number of rejected paths;
- weight and length of trains;
- train/Kms
- punctuality
- undocumented delays
- total amount of minutes for delay reasons..

4.8.2 Satisfaction survey

The Article lays down the requirements to perform a customer survey (Art. 19(3)).
The performance of RFC 5 is to be measured on several parameters at pre-defined points along the RFC. The performance report will be published once a year.

The possible parameters to be defined:
- infrastructure standards;
- journey times;
- border crossing procedures;
- terminal services;
- punctuality.

>> 5. Objective performance of RFC 5

Art. 19 of the Regulation requires the Management Board to monitor the performances of the corridor and to publish results once a year.

The steps needed to meet this requirement of the Regulation are:

1. Definition of the strategic vision of the corridor
2. Definition of appropriate and viable key performance indicators (KPIs)
3. Setting of reachable quantitative objectives.

1. Definition of the strategic vision of the corridor
The Management Board has already drawn the general strategic vision of the corridor that is expected to perform accordingly to customer needs and contributing to the shift of freight transport from road to rail.

For the mid-term the Corridor Management Board concentrates on:
- Quality of the capacity offered
- Quality of the corridor services, both in the planning and operation phase

- Communication with the customers. For the long-medium term the Corridor will pursue:
  - Reduction of the bottlenecks, especially by means of soft measures
  - Enhancement of interoperability.

The role of the corridor, in the long term view, is to support the involved IMs/ABs in:

a) recognizing the needs that rise from the international view of the market and customers' demand for services and performances and

b) developing coordinated actions and priorities able to maximize the efforts of each corridor partner.

2. Definition of appropriate and viable key performance indicators (KPIs)

The first step will be preparation of the key performance indicators addressing the quality of the PAPs.

3. Setting of reachable quantitative objectives

Quantitative objectives need to be specific and reachable. To set them properly afirst baseline needs to be measured. The organization, procedures and tools to perform such measurement are under preparation.

>> 6. Investment Plan

6.1 Metodology

Following the Regulation 913/2010 EU, which states that within the framework of a freight corridor, good coordination between the Member States and the Infrastructure Managers concerned will be ensured, sufficient priority will be given to rail freight traffic, effective and adequate links to other modes of transport will be set up and conditions will be created which are favorable to the development of competition between rail freight service providers.

The Management Board of Rail Freight Corridor 5 Baltic-Adriatic (RFC5) considers investment planning along the corridor as a very important matter. Therefore the Management Board with the assistance of the Working Group Infrastructure has drawn up the Investment Plan, which includes details of indicative investments in infrastructure along the freight corridor. This plan includes: planned projects for necessary developments, type of works, estimate Investment cost and potential financial sources available for development, list of bottlenecks, description of bottlenecks, plan for removing bottlenecks, expected start and end of realization. The complete Investment Plan is presented in the chapter 6.2: " List of the projects". The chapter 6.4 shows plan of deployment relating to the interoperable systems including deployment plan of ERTMS. This List of the projects in the chapter 6.2 is provided on an indicative basis. A number of technical, political or financial factors may affect the completion of the listed projects. It is therefore possible that some of these projects will not be put into service or will be delayed.

6.2 List of the projects

Table 10 : The table of planned projects

The table of planned projects and bottlenecks

Country	Line/section or station/terminal/junction	Work type	Project description	Increasing of capacity	increasing of interoperability	Electri-fication	Project duration		Financing medium plan (until 2020)	
							Start (Year)	End (Year)	Estimate Investment cost (M€)	Sources (EU/National/ Other)
PL	Port Szczecin	Modernisation	Improvement of the rail access to the sea ports in Szczecin and Świnoujście - port stations modernisation, higher speed limits, increase of capacity, axle load to 221 kN	yes				2020	110,77	EU
PL	Port Gdańsk & Port Gdynia	Modernisation	Infrastructure improvement of the rail access to the port in Gdańsk - port stations modernisation, allow train length operation to 650-750m, higher speed limits, increase of capacity, axle load to 221 kN	yes				2020	160,00	EU
			Improvement of the rail access to the sea port in Gdynia - port station modernisation, higher speed limits, increase of capacity, axle load to 221 kN	yes				2020	190,00	EU
PL	Budgoszcz - Gdynia	Modernisation	Work on the alternative route Bydgoszcz - Trójmiasto, including lines 201 and 203 stage I with electrification - allow train length operation to 650-750m, higher speed limits, increase of capacity, axle load to 221 kN	yes	yes	yes		2021	87,70	EU
			Work on the alternative route Bydgoszcz - Trójmiasto, including lines 201 and 203 stage II with electrification - allow train length operation to 650-750m, higher speed limits, increase of capacity, axle load to 221 kN	yes	yes	yes		2021	299,00	EU
PL	Szczecin - Wrocław	Modernisation / reconstruction	Works on line C-E 59 section Wrocław Brochów / Grabiszyn – Głogów – Zielona Góra – Rzepin – Szczecin Podjuchy - allow train length operation to 650-750m, higher speed limits, increase of capacity, axle load to 221 kN	yes	yes			2022	239,00	EU
PL	Wrocław - Opole	Modernisation	Works on railway line C-E 30 section Opole Groszowice - Jelcz - Wrocław Brochów allow train length operation to 650 750m, higher speed limits, increase of capacity, axle load to 221 kN	yes	yes			not fixed	70,00	EU
PL	Wrocław - Międzylesie	Modernisation / reconstruction	Works on railway line C-E 59 section Wrocław – Kamieniec Ząbkowicki - allow train length operation to 650-750m, higher speed limits, increase of capacity, axle load to 221 kN	yes	yes			not fixed	119,60	EU
			Works on railway line C-E 59 section Kamieniec Ząbkowicki – Międzylesie - allow train length operation to 650-750m, higher speed limits, increase of capacity, axle load to 221 kN	yes	yes			not fixed	76,50	EU
PL	Opole - Kędzierzyn Koźle	Modernisation	Works on railway lines E 30 on section Kędzierzyn Koźle - Opole Zachodnie - allow train length operation to 650-750m, higher speed limits, increase of capacity, axle load to 221 kN	yes	yes			2018	70,00	EU
PL	Chorzew Siemkowice - Częstochowa - Zawiercie	Reconstruction	Works on railway line no. 146 section Wyczerpy – Chorzew Siemkowice - removal of local speed limits, increase of capacity, axle load to 221 kN	yes	yes			2020	35,80	EU
			Works on railway line no. 1 section Częstochowa - Zawiercie - removal of local speed limits, increase of capacity, axle load to 221 kN	yes	yes			2020	71,70	EU
PL	Kędzierzyn Koźle - Katowice	Reconstruction	Works on railway lines no. 132, 138, 147, 161, 180, 654, 655, 657, 658, 699 section Gliwice – Bytom – Chorzów Stary – Mysłowice Brzezinka – Oświęcim and Dorota – Mysłowice Brzezinka - removal of local speed limits, increase of capacity, axle load to 221 kN	yes	yes			2019	71,70	EU
PL	Kędzierzyn Koźle - Chałupki	Modernisation / reconstruction	Works on line E 59 section Kędzierzyn Koźle - Chałupki (state border) - remove local speed limits, increase of capacity, axle load to 221 kN	yes	yes			not fixed	N/A	EU
PL	Katowice - Tychy - Czechowice Dziedzice - Zebrzydowice	Modernisation / reconstruction	Works on main routes (E 30 and E 65) in Silesian area, stage I: line E 65 on section Będzin - Katowice - Tychy - Czechowice Dziedzice - Zebrzydowice - allow train length operation to 650-750m, higher speed limits, increase of capacity, axle load to 221 kN	yes	yes			2021	980,00	EU
pl	Czechowice Dziedzice - Zwardoń	Modernisation / reconstruction	Works on railway line no. 139 section Czechowice Dziedzice - Bielsko Biała - Zwardoń (state border) - remove local speed limits, increase of capacity, axle load to 221 kN	yes	yes			not fixed	84,20	EU
PL	Gdańsk/Gdynia - Tczew - Katowice	Modernisation / reconstruction	Works on railway line C-E 65 section Bydgoszcz – Tczew - works on stations, improvement of track condition	yes	yes			not fixed	170,00	EU
			Works on railway line C-E 65 section Chorzów Batory - Tarnowskie Góry - Karsznice - Inowrocław - Bydgoszcz – Maksymilianowo - higher speed limits, increase of capacity, axle load to 221 kN	yes	yes			2020	240,00	EU
SK	Čadca - Žilina	Reconstruction	Implementation ETCSL2+GSM-R (gsm-r ČR/SR-Čadca - Žilina - Bratislava);etcs L2 Ča-Ži	yes	yes		2014	2015	46,5	35,5M€ EU/6,2NF, 4,6other
SK	Čadca - Žilina	Modernisation	Track modernisation section Krásno n/K- Čadca - SR/ČR , real.	yes	yes		2020	2022		
SK	Púchov - Žilina	Modernisation	modernisation (II.et. Pov. Teplá - Žilina) including ETCS L1, GSM-R	yes	yes		2014	2016	157	Modern. 85%EÚ/15N
SK	Púchov - Žilina	Modernisation	modernisation 160km/h(I.et. Púchov - Pov. Teplá) including ETCS L1	yes	yes		2015	2018	300	Modern. 85%EÚ/15N/other
SK	Púchov -Nové Mesto n/V	Modernisation	Modernisation 160km/h, I.+II.et. NMV - Zlatovce	yes	yes		2009	2014	251	85%EÚ/15N
SK	Púchov -Nové Mesto n/V	Modernisation	Modernisation 160 km/h, III.et. Zlatovce - T.Teplá	yes	yes		2012	2015	255	85%EÚ/15N
SK	Púchov -Nové Mesto n/V	Modernisation	Modernisation 160 km/h, IV-V.et. T.Teplá - Ilava - Beluša	yes	yes		2009	2014	267	85%EÚ/15N
SK	Púchov -Nové Mesto n/V	Modernisation	Modernisation 160 km/h, VI.et. Beluša - Púchov	yes	yes		2012	2015	109	85%EÚ/15N
SK	Nové Mesto nad Váhom - Bratislava Rača		Implementation GSM-R (ČR-Čadca - Žilina - Bratislava) (=item 3)		yes		2014	2015	46,5	35,5M€ EU/6,2NF, 4,6other
SK	Bratislava hl. st. - Devínska Nová Ves	Reconstruction	Electrification of line Devínska Nová Ves - Marchegg (Austria)	yes	yes	yes	2018	2018	5	3,8EU/0,6NF,0,5other
SK	junction Bratislava	Reconstruction	Implementation ERTMS Kúty - junction Bratislava	yes	yes		2018	2019	104,6	88,9M€/15NF

Country	Line/section or station/terminal/junction	Work type	Project description				Project duration		Financing medium plan (until 2020)	
				Increasing of capacity	increasing of interoperability	Electri-fication	Start (Year)	End (Year)	Estimate Investment cost (M€)	Sources (EU/National/ Other)
SK	junction Bratislava	Reconstruction	ŽSR, Terminal of intermodal traffic Bratislava, 1. et.	yes	yes		2019	2020	46,3	33EÚ/5N/7other
SK	Leopoldov	New	ŽSR, Terminal of Intermodal traffic Leopoldov, 1. et.	yes	yes		2019	2020	45,71	cca50%EÚ/50N
SK	junction Žilina	New	ŽSR, Terminal of Intermodal traffic Žilina, 1. et.	yes	yes		2012	2015	25,5	cca50%EÚ/50N
CZ	Petrovice u Karviné - Ostrava Svinov	New capacity	Ostrava junction modernisation, new track for higher capacity, higher speed limits	yes	yes		N/A	N/A	N/A	Public + EU
CZ	Dětmarovice - Mosty u Jablůnkova	Reconstruction	Reconstruction of section Český Těšín - Dětmarovice	yes	yes		2015	2017	N/A	Public + EU
CZ	Ostrava Svinov - Hranice na Moravě	New capacity	Ostrava junction modernisation, new track for higher capacity, higher speed limits	yes	yes		N/A	N/A	N/A	Public + EU
AT	Border AT/CZ - Vienna	Upgrade	Upgrade of existing doupble track line Border AT/CZ (next to Bernhardsthal) - Wien-Süßenbrunn: - Upgrade maximum speed up to 160km/h – increase of capacity – Modernisation of railway stations	yes			not fixed	not fixed	620,5	OeBB considers to apply for EU cofunding (CEF)
AT	Border AT/SK - Vienna	Upgrade	Upgrading single track line Wien-Stadlau - Border AT/SK (next to Marchegg) - Upgrade maximum speed up to 160km/h – increase of capacity (partial second track) – Electrification (15KV / 16,7Hz)	yes	yes	yes	works already startet	not fixed	549,6	OeBB considers to apply for EU cofunding (CEF)
AT	Vienna - Wampersdorf (via Ebreichsdorf)	Upgrade	Upgrade of existing single track line Wien-Meidling - Wampersdorf: – Upgrade maximum speed up to 200km/h – increase of capacity (construction of second track) – Modernisation of railway stations	yes	yes		works already startet	2024	871,8	OeBB considers to apply for EU cofunding (CEF)
AT	Gloggnitz - Mürzzuschlag	New line	Construction of Semmering Base Tunnel: – Maximum speed: 230km/h – Maximum inclination: ~10‰	yes	yes		works already startet	2026	3122	OeBB considers to apply for EU cofunding (CEF)
AT	Bruck an der Mur - Graz	Upgrade	Upgrade of existing doupble track line Bruck an der Mur - Graz: – increase of capacity until traffic starts on the new Koralm line – Modernisation of railway stations	yes	yes		2015	2023	219,3	OeBB considers to apply for EU cofunding (CEF)
AT	Graz - Klagenfurt	New line	Construction of new line between Graz and Klagenfurt: – Maximum speed: 230km/h – Maximum inclination: ~10‰	yes	yes		works already startet	2023	5367,3	OeBB considers to apply for EU cofunding (CEF)
AT	Graz - Werndorf	Upgrade	Upgrade between the Station Graz und the Station Werndorf: - increase of capacity (partly construction of third und fourth track)	yes	yes		2016	2023	111,5	OeBB considers to apply for EU cofunding (CEF)
AT	Werndorf - Border AT/SL	Upgrade	Upgrade of existing single/double track Line – Upgrade maximum speed up to 160km/h – Construction of a second track	yes	yes		not fixed	not fixed	570	OeBB considers to apply for EU cofunding (CEF)
AT	Border AT/SK - Border AT/SL and Boder AT/IT	Upgrade	Upgrade to ERTMS level 2 (all BA Corridor)		yes		not fixed	not fixed	190	OeBB considers to apply for EU cofunding (CEF)
SL	Station Divaca	Adjustment	Divača junction modernization, new track for higher capacity, longer tracks,	yes	yes	yes	2012	2015	33	
SL	section Ljubljana - Divača	Preparing documentation	adjustments for larger loading gauge		yes				485	
SL	section Divača - Koper	Preparing documentation	ad new track (from sigle track line to double track line)	yes						
SL	Station Ljubljana (node)	Preparing documentation	Ljubljana junction/node modernisation, new track for higher capacity, longer tracks,	yes	yes	yes			24	
SL	section Zidani Most - Pragersko	Preparing documentation, work in progres	higher category (C3 to D4)		yes		2014	2018	300	160/140/0
SL	section Maribor - Šentilj	Preparing documentation	ad new track (from sigle track line to double track line)	yes					120	
IT	Udine	Upgrade	Udine Railway Junction Upgrading	yes			Start of Constructi on	2020	60	Public
IT	Palmanova - Udine	Upgrade	Infrastructural works for doubling of railway section Palmanova-Udine (completion)	yes	yes		Initial Plan Study	not fixed	170	
IT	Tarvisio - Udine	Upgrade	Technological upgrading (SCC) of the railway section Udine-PM VAT -Tarvisio in the Friuli Venezia-Giulia region (completion)	yes	yes		Initial Plan Study	not fixed	19	

Country	Line/section or station/terminal/junction	Work type	Project description				Project duration		Financing medium plan (until 2020)	
				Increasing of capacity	increasing of interoperability	Electri-fication	Start (Year)	End (Year)	Estimate Investment cost (M€)	Sources (EU/National/ Other)
IT	Venezia - Trieste	Upgrade	Speed increase of the Venezia-Trieste conventional railway line	yes			Start of Construction	2020	30	Public
IT	Venezia - Ronchi dei Legionari	New line	New High Speed railway line Venezia-Trieste: section Venezia - Ronchi dei Legionari	yes	yes	yes	Initial Plan Study	not fixed	5701,3	Public + EU
IT	Ronchi dei Legionari - Trieste	New line	New High Speed railway line Venezia-Trieste: section Ronchi dei Legionari - Trieste	yes	yes	yes	Initial Plan Study	not fixed	1745,8	Public + EU
IT	Trieste - Divaca	New line	New High Speed railway line Trieste-Divaca	yes	yes	yes	Initial Plan Study	not fixed	1040	Public + EU
IT	Trieste	Upgrade	Upgrading and improvement of the railway infrastructure at Campo Marzio and the Port of Trieste	yes	yes		Initial Plan Study	2020	50	Public + EU
IT	Venezia - Trieste	Upgrade	Technological upgrading of the sections of the BA and Mediterranean Corridors in the Friuli Venezia-Giulia and Veneto regions (futher interventions)	yes	yes		Initial Plan Study	not fixed	80	
IT	Monfalcone-Bivio S.Polo	Upgrade	Infrastructural works for doubling of railway section Monfalcone - Bivio S.Polo and Monfalcone RailwayJunction Upgrading	yes	yes		Initial Plan Study	not fixed	70	
IT	Torviscosa - Monfalcone	Upgrade	Technological upgrading (BCA) of the railway section Torviscosa-Monfalcone in the Friuli Venezia-Giulia region (phase)	yes	yes		Start of Construction	2020	6	Public
IT	Venezia	Upgrade	Mestre Railway Junction: Improvement of the Bivi railway line	yes			Initial Plan Study	not fixed	120	Public + EU
IT	Bologna - Rimini	Upgrade	Speed increase of the Adriatic Line Bologna-Bari (signalling)	yes			Initial Plan Study	2020	43	Public
IT	Bologna - Rimini	Upgrade	Speed increase of the Adriatic Line Bologna-Bari (infrastructure)	yes			Initial Plan Study	2020	22	Public
IT	Padova - Trieste/Tarvisio	Upgrade	Works to allow train length operation to 750m on the BA Corridor on railway sections Padova-Trieste/Tarvisio (phases)		yes		Initial Plan Study	2020	20	Public
IT	Padova-Bologna - Bari	Upgrade	Works to allow train length operation to 650-750m on railway section Bologna-Bari (phases)		yes		Initial Plan Study	2020	30	Public
IT	Bologna - Padova	Upgrade	Technological Upgrading of the Padova-Bologna railway line (phase)	yes	yes		Initial Plan Study	2020	55	Public
IT	Bologna - Padova	Upgrade	Technological Upgrading of the Padova-Bologna railway line (futher interventions)	yes	yes		Initial Plan Study	not fixed	105	
IT	Novara - Trieste	Upgrade	ERTMS installment on the BA Corridor railway sections (Novara – Villa Opicina)	yes	yes		Final design	2020	66	Public

6.3 Benefits of the projects

Main benefits to be achieved thanks to processing of investments are:

1) bottleneck relief in order to make the infrastructure more available;
2) increasing of safety/security;
3) better protection of environment in order to comply with EU law but also to make the projects more acceptable;
4) achievement of higher speed to increase competitiveness, especially regarding the road transportation;
5) deployment of railway interoperability to increase competitiveness;
6) punctuality improvement, as provided by the surveys made for the TMS.
7) maintenance of railway infrastructure (especially the renewal of tracks is essential);
8) capacity improvement.

6.4 Plan of deployment relating to the interoperable systems

In 1995 the European Commission defined a global strategy for the development of the European Rail Traffic Management System ERTMS with the objective to prepare its future implementation on the European railway network and incorporated it into the interoperability Directives and subsequently into the Technical Specifications for Interoperability of the Control-Command and Signalling subsystem both for the high-speed and the conventional European railway system.

On the 25th January 2012 adopted European Commission last version of TCSI CCS in Decision 2012/88/EU on the technical specification for interoperability relating to the control-command and signalling subsystems of the trans-European rail system. This Decision gives a set of mandatory specifications to ensure interoperability of Class A.

Technical scope of this TSI concerns the Control-Command and Signalling On-board Subsystem and the Control-Command and Signalling Trackside Subsystem. Geographical scope is the trans-European rail system, i.e. the trans-European conventional and high-speed rail systems as set out in points 1 and 2 of Annex I to Directive 2008/57/EC (Railway Interoperability Directive).

Technical specifications of interoperability comprises the following subsystems:

- INF – infrastructure
- ENE – energy
- CCS – control-command and signalling
- TAF – Telematic applications or freight subsystem (when relevant for the infrastructure)

For freight traffic management the most important are implementation of CCS and TAF requirements.

CCS TSI specifies only the requirements that are necessary to ensure the interoperability of the trans-European rail system and demonstrate compliance with the essential requirements.

The Control-Command and Signalling Subsystems include the following parts:

- train protection;
- radio communication;
- train detection.

The Class A train protection system is ERTMS/ETCS.

The Class A radio system is GSM-R.

For Class A train detection this TSI specifies only the requirements for the interface with other subsystems.

For ETCS system is the current version of the mandatory requirements of the basic specification 2 (Baseline 2) version 2.3.0d, which is currently strictly required. In another version of the basic specification 3 (Baseline 3), which was included in that TSI by the Commission Decision 2012/696/EU (amending former Commission decision 2012/88/EU from 25. 1. 2012) are taken measures to ensure backward compatibility to version 2.3.0d systems. It means that vehicles equipped with ETCS on-board part of the basic

specification version 3 may be operated on track-side ETCS version of the basic specification 2.

Last above mentioned Decision divided set of specification into two parts:
- set of specifications # 1 (ETCS baseline 2 and GSM-R baseline 0),
- set of specifications # 2 (ETCS baseline 3 and GSM-R baseline 0).

In the last Commission decision (EU) 2015/14 of 5 January 2015 (amending again Decision 2012/88/EU on the technical specification for interoperability relating to the control-command and signalling subsystems of the trans-European rail system and valid from 1. 7. 2015) was changed the geographical scope of this TSI. This geographical scope was extended on the other parts of the network of the whole rail system, following the extension of scope as described in Annex I section 4 to Directive 2008/57/EC.

Not coordinated deployment of interoperable systems might result in some additional bottlenecks or obstacle to fluent transport on the corridor.

In this above mentioned Decision is set of specification divided again into two parts:
- set of specifications # 1 (ETCS baseline 2 and GSM-R baseline 0) with minor changes especially in the field of GSM-R (new EIRENE FRS version 7.4.0 and SRS version 15.4.0),
- set of specifications # 2 (ETCS baseline 3 and GSM-R baseline 0) with the same changes in the field of GSM-R like in set of specifications # 1 and with definition of basic subset - 026 in new version 3.4.0.

The following are descriptions of CCS migrations and geographic displays the current status of ERTMS on the Corridor RFC5.

Overview the Corridor

state of the works on deployment of the ERTMS in the countries along the RFC5 is presented below.

Poland

Current situation

Almost all lines (17 000 km of tracks) are equipped with Class B control command system (SHP).
One section of line Grodzisk Mazowiecki – Zawiercie (224 km) is equipped with ETCS Level 1, was put in service in December 2014. On the line Warsaw - Gdynia, as well as on the line Opole Zachodnie - Wroclaw - Legnica - Bielawa Dolna, there is ongoing implementation of the ETCS L2

The first pilot project for the implementation of GSM-R network for the 82 km section (Legnica – Węgliniec – Bielawa Dolna) was completed in March 2014. Test phase of ETCS L2 is in progress. Till the end of 2015 it is planned to complete implementation of the GSM-R on approx. 1400 km railway lines.

Future situation

In line with the ongoing work on updating the strategic document "Master Plan for railway transport in Poland to 2030", it is also planned updating of the National Implementation Plan for ERTMS, which includes the timetable for implementation of ERTMS for both ETCS and GSM-R. It is expected that the implementation of ERTMS will take place in the framework of horizontal projects financed by the Cohesion Fund and the Connecting Europe Facility. Due to its range, installation of GSM-R will be realized basically from the Cohesion Fund, while the ETCS will be implemented on the two main east - west railway – lines (E 20 and E 30). Further implementation of ETCS, including lines from RFC 5, will be performed after 2020, giving priority to core TEN-T lines (2030), followed by comprehensive TEN-T lines (2050), where as one of the first will be considered the railway lines of the comprehensive network covered investment projects co-financed from the EU perspective of 2007-2013 and 2014-2020.

Migration

ETCS system shall be implemented on lines with entirely upgraded signalling. In most cases such an upgrading must be preceded by changes in track layout. Therefore ETCS implementation must be done as a final phase in railway line upgrading.

Class B control command system (SHP) will remain in use minimum up to the year 2025 in particular as it covers many railway lines not foreseen for the implementation of the class A system (ETCS). SHP devices will stay also on railway lines being equipped with ETCS as mixed traffic is foreseen – those lines will be used by trains equipped and trains not equipped with ETCS on-board devices.

Class A train radio-communication system (GSM-R) will be implemented first on in an appropriate way to enable switching-off of the 150 MHz system. Function RADIOSTOP of the 150 MHz radio, on lines covered by GSM-R implementation, will be used up to the switching off of the radio system 150 MHz on those lines.

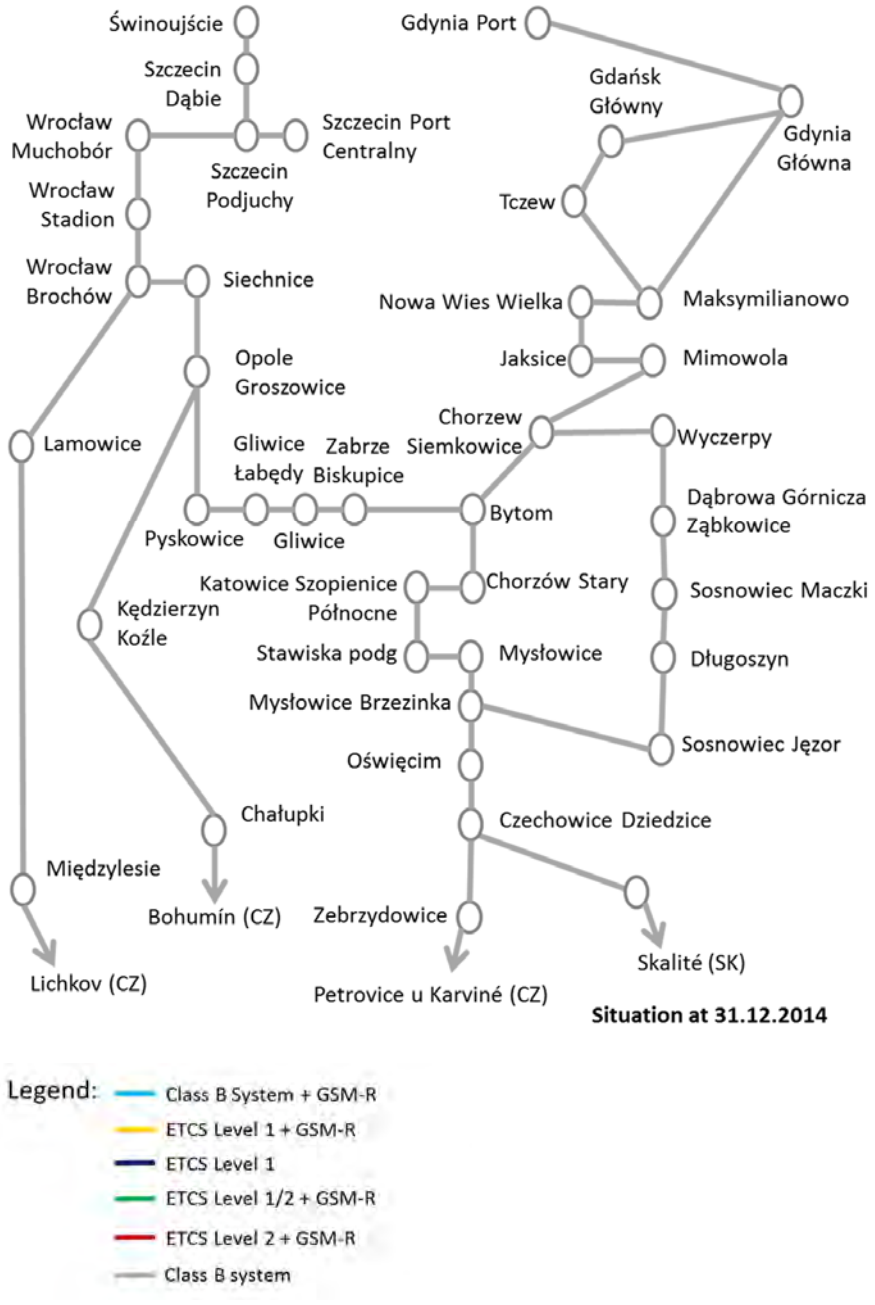


Figure 55: CCS description and ERTMS Corridor Section scheme of the Polish part of the Corridor

Czech Republic

Current situation

Fulfilment of the basic goals of TSI CCS is in terms of routes RFC5 is closely linked with National Implementation Plan for ERTMS in Czech Republic, according actually approved version from 10. 2. 2015. This National plan covers the all the railway lines yet included in the routes of network RFC5.

GSM-R generally designated as a system for transmission of data to trains, is installed on the 1132 km double track main railway lines in the Czech Republic. Due to this fact there are no problems with deployment of this system as the first step before installing ETCS L2 system on selected lines.

Most of main lines of the conventional network in Czech Republic are equipped with national system LS. It is a system using the continuous transmission of the aspects by means of coded track circuits. In case of transmission of restrictive or prohibitive aspects it controls the specified reaction of a person driving the rail vehicle. According to TSI CCS CR it is national train protective equipment of the Class B and according to Czech law is used for maximum speed up to 160 km/h.

Actually is under construction the first commercial project for ERTMS in Czech Republic Kolín – Břeclav – state border Austria. Its small part (only Břeclav – state border Austria) is part of RFC5.

All projects in the Czech Republic on RFC5 lines are planned and realized always under currently valid technical specification. The main benefits in the area of interoperability are meeting GC gauge parameter needed especially for container transport, higher level of operational safety, increasing of line capacity and speed of trains.

The most important project for increasing of interoperability on RFC5 will be deployment of ETCS system Petrovice u Karviné – Břeclav planned for 2015 – 2017 which will allow transit of all international trains fitted with this system from Austria to Poland via Czech Republic.

Future situation

As mentioned in the currently valid National Implementation Plan for ERTMS approved in 2015 the main goal is to achieve full interoperability of the selected national railway network (ERTMS corridor E, TEN-T lines) by the end of 2020. This covers also RFC5 railway lines where an implementation and use of ERTMS L2 (2.3.0d) is envisaged by 2018 (GSM-R is already in operation). This is essentially a network of trans-European conventional rail network according to the EP and Council Regulation (EU) no. 1315/2013 of 11 December 2013 on Union guidelines for the development of trans-European transport networks.

Migration

In Migration strategy in the ETCS system is based on use of dual equipment on the track enabling concurrent operation of the vehicles equipped with ETCS and the vehicles equipped with national LS system only where the national LS system may have the important role as a backup system for cases of ETCS system outage. Implementation strategy for TSI CCS is based on the fact that the ETCS system will be implemented markedly slower than GSM-R system. The implementation rate is limited first of all by the accessible volume of financial means, not only in the track part area, but above all in the area of vehicles equipment with the mobile part of the system. In the view of ETCS system implementation expensiveness it is necessary to measure the implementation effort in accordance with TSI CCS CR on rail freight corridor lines too.

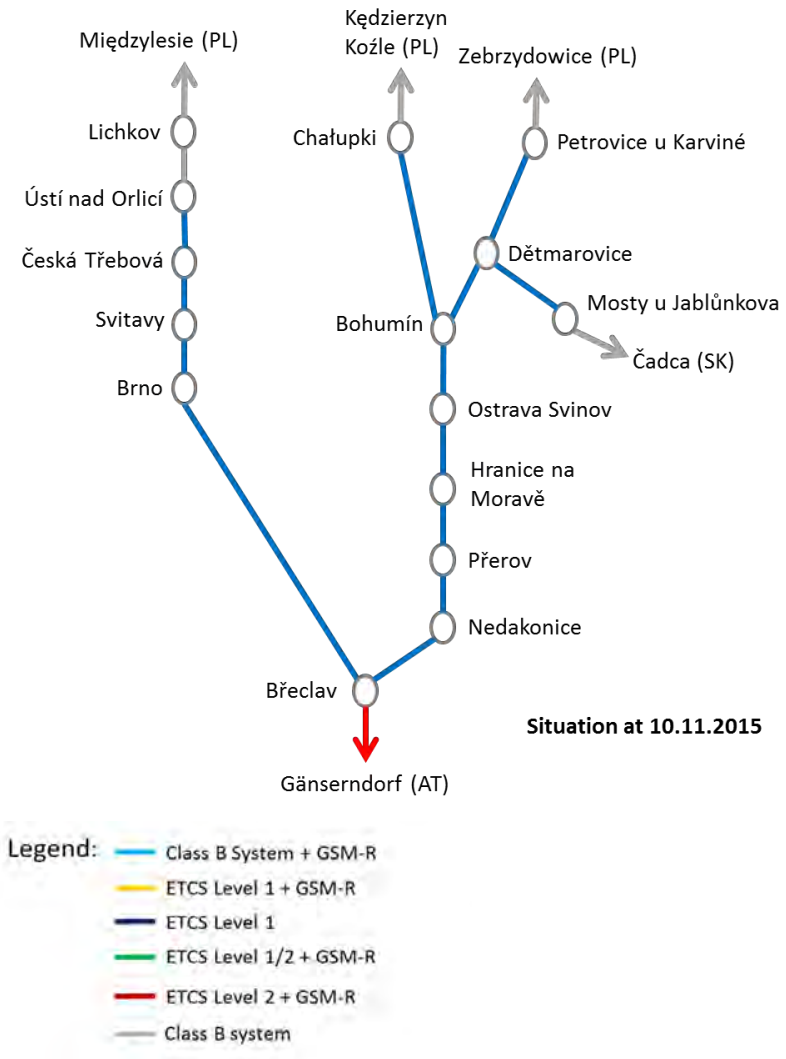


Figure 56: CCS description and ERTMS Corridor Section scheme of the Czech part of the Corridor

Slovakia

Current situation

ŽSR have started with implementation GSM-R and ETCS last decade. GSM-R is in an operation in railway junction Bratislava and on the track section Bratislava – Galanta - Nové Zámky.

ETCS L1 has been implemented on a modernized part of RFC 5 Bratislava Rača – Nové Mesto nad Váhom – Zlatovce cca 100 km of line. Technical details are in accordance to SRS 2.3.0.d. ETCS trains can be operated at speed 160km/h.

National system Class B system (LS) is implemented on the most of sections in Bratislava junction, on the sections Púchov – Žilina and Žilina – Čadca – state border CZ.

Migration and future situation

Migration strategy is based on current situation of different equipment of signalling systems on track sections. Line Bratislava Rača – Žilina will be equipped with ETCS L1 and GSM-R without parallel national system Class B (LS). On the section Žilina – Čadca – state border CZ have started project of implementation ETCS L2 in 2014 and Class B system LS will be kept. In accordance with modernization projects GSM-R will be in operation in 2015 on the most ŽSR sections of RFC5 and MSC in Bratislava will be upgraded too. Projects of track modernization include implementation of ETCS and finalization is expected in 2018.

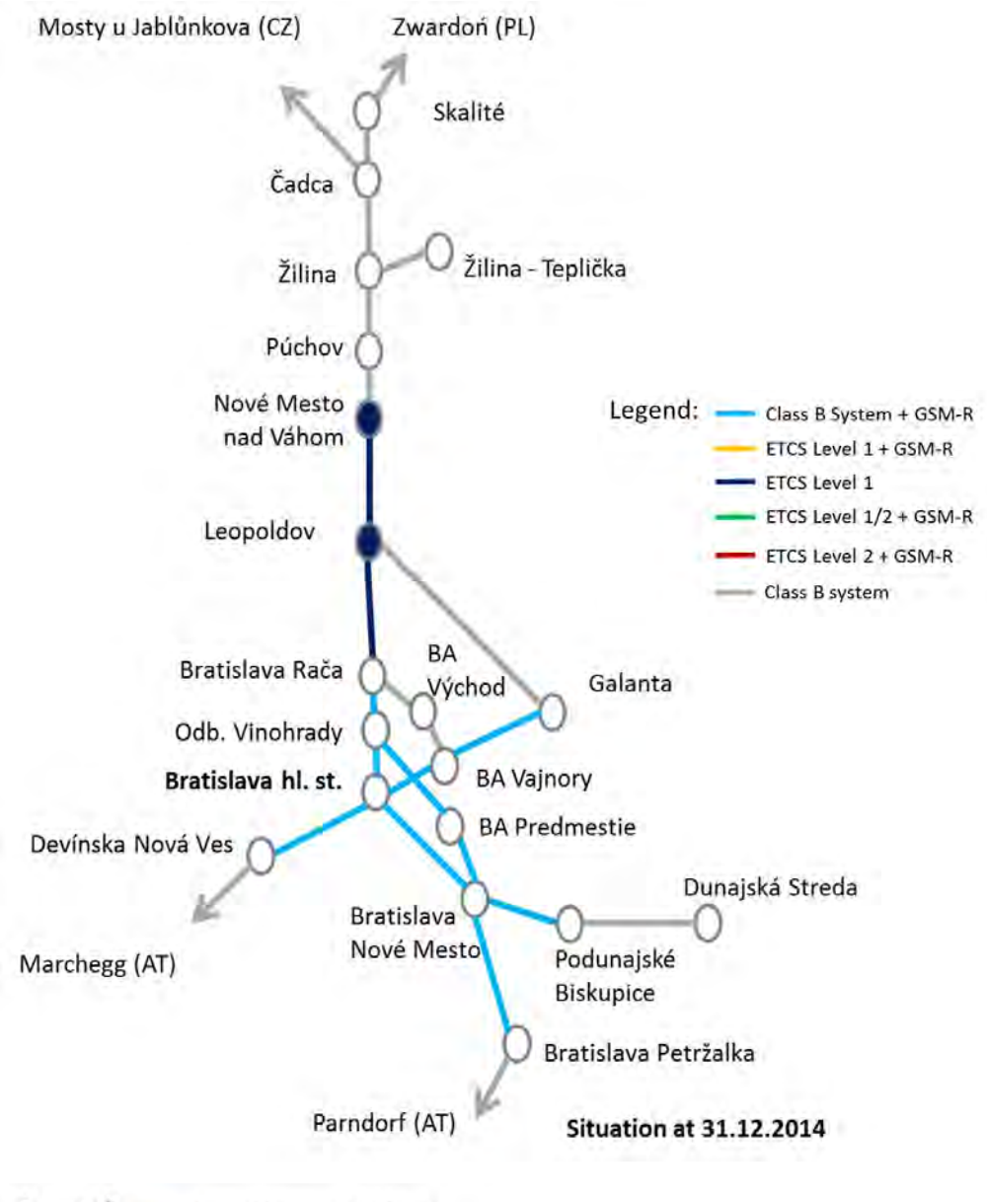


Figure 57: CCS description and ERTMS Corridor Section scheme of the Slovak part of the Corridor

Austria

Current situation

The implementation of ERTMS on the ÖBB rail-network is and will be done in accordance to the European implementation plan the national implementation plan and the lines described in the TSI CCS (2012/88/EU) chapter 7.3.4. "Specific lines constituting the corridors".

All the ÖBB lines on the RFC5 are currently equipped with the Class B system PZB which is a spot transmission system commissioned for speed up to 160 km/h.

The implementation of GSM-R for voice communication on all TEN lines of the ÖBB rail-network is already finished. For GSM-R on lines foreseen for ETCS L2 operation a QoS evaluation for data communication is required. Based on this evaluation the upgrade of the GSM-R system for data communication is done.

The ETCS L2 implementation based on the European specifications (BL 2.3.0d) on the section Břeclav – Wien has been finished and is in operation since 20th October 2014.

Migration and future situation

Following the national ERTMS implementation plan, on all lines of RFC 5 the fitting with ETCS L2 is foreseen up to 2025. On the existing lines on the RFC 5 the existing Class B system PZB will still be in operation in parallel to the ETCS lineside equipment to give RU's the possibility for a smooth migration for their vehicles. For the new HS lines on the corridor which are currently under construction (e.g. HS line Graz – Klagenfurt) only ETCS L2 without lineside signalling is foreseen.

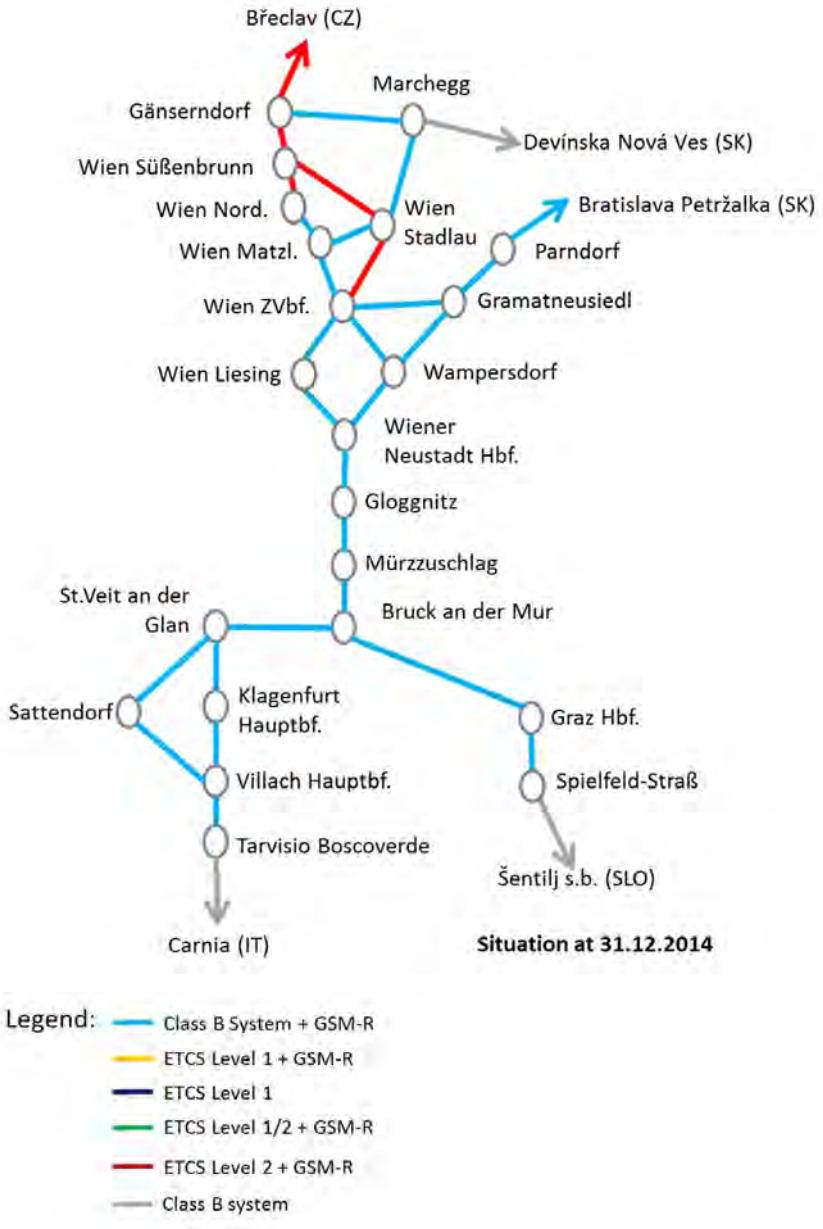


Figure 58: CCS description and ERTMS Corridor Section scheme of the Austrian part of the Corridor

Slovenia

Current situation

The line from Pragersko to Sežana b.s. is a double track, the lines from Šentilj to Pragersko (35 km) and Divača-Koper (48 km) as well as the connections lines to the Terminals Celje-Velenje (38 km) and Ljubljana-Novo Mesto (76 km) are a single track.

According to section 7.3.2.5 of the Commission Decision of 25 January 2012 on the technical specification for interoperability relating to control-command and signalling subsystem of the trans-European rail system, the Slovenian Ministry declared with notification to the EU DG Mobility and Transport on 21 December 2012 the progress of implementation the ERTMS on Corridor D section in Slovenia, which is located also with RFC5.

Slovenian part of ERTMS deployment on RFC5 is a part of project »Deployment of ERTMS/ETCS on Corridor D«, for which the European Commission with the Decision C (2008) 7888 of 10.12.2008 and in an annex to that Decision no. C (2011) 3250 of 6.5.2011 named as project no. 2007-EU-60120-P and project no. 2009-EU-60122-P approved funding for the TEN-T co-financing in the Republic of Slovenia.

The trackside deployment of the ETCS requested level 1 with version 2.3.0d, which overlade the existing INDUSI I60 national signalling system. The transition period of 3 years will allow using ETCS level 1 and/or INDUSI I60 indifferently.

For the infrastructure project in July 2012 was signed a contract for the ETCS implementation of the two pilot sections, as well as for other sections in the Slovenian part of Corridor D. The Contract deals with the ETCS implementation on pilot sections with completion by the end of 2013, which is in line with the Decision under project no. 2007-EU-60120-P.

All sections of the RFC5 will be equipped with GSM-R. The conclusion of public procurement procedure was finished in the first half of 2013, the contract was signed in July 2013.The GSM-R project is in the execution stage for deployment of the GSM-R on the whole railway network in Slovenia.

Migration and future situation

The lines from Pragersko to Sežana b.s. and Divača-Koper ETCS level 1 is in deployment phase. According to the contract with the constructor, the deadline for end of works is 30 November 2015.

GSM-R is in installation and it is planned to be in operation on the entire section and end of works is envisaged by February 2016.

For Section Pragersko-Šentilj as part of Corridor 5 the deployment of Level 2 is defined. The Level 2 deployment requested the adequate upgrade of the interlocking and equipment on the line for possible data exchange with the RBC and connection with GSM-R.

For connections lines to the Terminals (Celje-Velenje and Ljubljana-Novo Mesto) the deployment of Level 3 is defined.

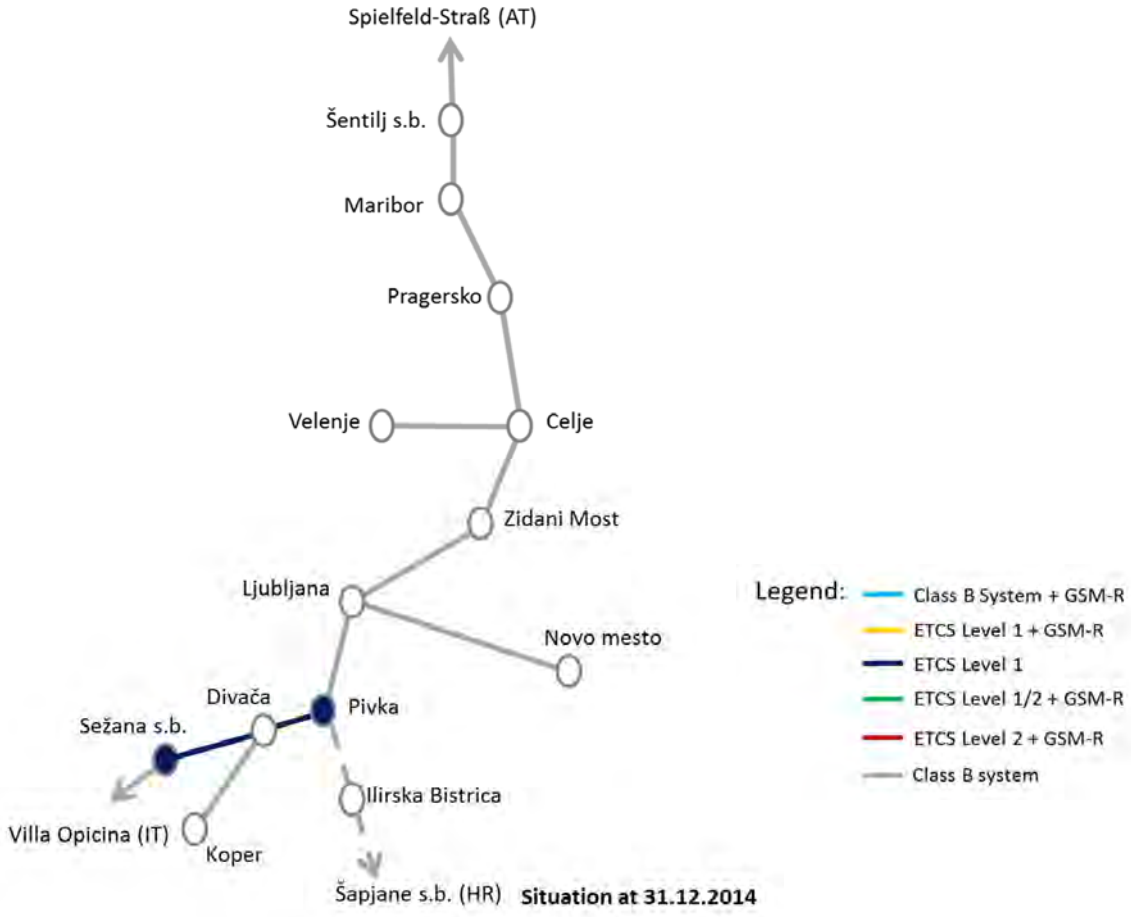


Figure 59: CCS description and ERTMS Corridor Section scheme of the Slovenian part of the Corridor

Italy

Current situation

All Italian corridor line sections are equipped with the national class B system SMCT (Sistema di controllo marcia treno). SCMT is a relatively new system implemented in only 5 years (2003-2008), based on an interoperable technology since SCMT messages can be shared with ETCS because SCMT consists of trackside balises and encoders. SCMT provides Automatic train protection (ATP) functions which imply an homogeneous technology both on track side and on-board sub systems in order to allow the exchange of information between them in safety conditions.

GSM-R is installed and operates on most of the entire Italian rail infrastructure and on all the lines being part of the Baltic-Adriatic corridor.

Migration and future situation

The ERTMS deployment plan on the Italian sections of RFC5 is still in a draft status and is subject to a financing agreement with the Italian Ministry of Transport.

In general, ERTMS implementation will be driven by the following main factors:

a. Need to ensure a technically harmonised and time synchronised ERTMS deployment along the entire corridor. In fact, only continuous trackside ERTMS coverage along the principal European lines will create the necessary incentives for train operating companies to invest in on board ERTMS equipment.
b. Need to align ERTMS trackside implementation with the timing of other main infrastructure and technological works on the corridor line sections in order to limit as a much as possible train operation disturbances and optimising the overplacing of ERTMS with the required adaptation of the existing CCS systems.

As a consequence, a stepwise ERTMS implementation is being defined, considering two time scenarios: 2020 and 2025/2030.

Priority in ERTMS deployment will be given to:

a) those line sections which are subject to the European obligations stated in the TSI CCS EU Decision 2012/88 (belongino to ERTMS Corridor D), namely:
   - Castelfranco Veneto – Treviso,
   - Treviso – Venezia Mestre;
   - Cervignano -Bivio S.Polo,
   - Bivio S. Polo – Bivio d'Aurisina,
   - Bivio d'Aurisina-Villa Opicina,
   - Bivio d'Aurisina- Trieste,

b) The TEN-T core lines, with the exception of those railway links interested by significant infrastructure upgrading works expected to be completed after 2020;

c) Those TEN-T comprehensive lines which provide a primary connection to the main ports and terminals not served by core TEN-T lines.

The migration strategy foresees the over posing of ERTMS on the existing national class B system.

The ETCS level to be used on the Italian lines involved in the migration process will be based on the need to safeguard both the capacity needs and the principle of minimal intrusiveness on performances currently offered.

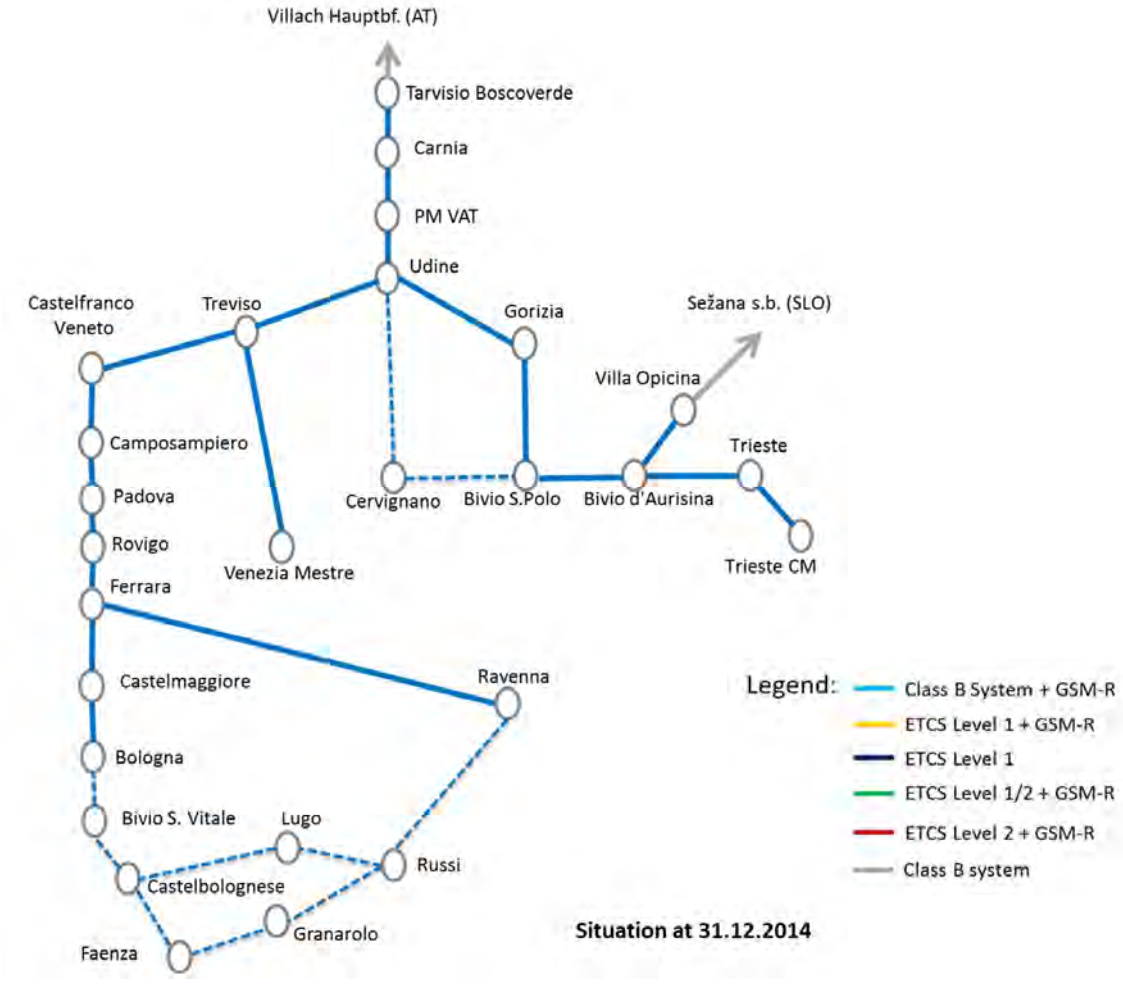


Figure 60: CCS description and ERTMS Corridor Section scheme of the Italian part of the Corridor

Telematics applications for freight services TSI TAF

The Commission Regulation 62/2006 concerning the technical specifications for interoperability relating to the Telematics applications for freight subsystem of the trans European conventional rail system was adopted on 23 December 2005 and published in the Official Journal of the European Union on 18 January 2006.

It was amended by Commission Regulation (EU) Noo328/2012 of 17 April 2012, published in the Official Journal of the European Union on 18 April 2012.

Commission Regulation 62/2006 has been replaced by Commission Regulation (EU) No 1305/2014 published in the Official Journal of the European Union on 11 December 2014 and applies from 1 January 2015.

The TAF TSI sets the functional and technical standards for exchanging harmonised information between infrastructure managers, railway undertakings and other stakeholders.

Telematics applications for freight services, including information systems (real-time monitoring of freight and trains), marshalling and allocation systems, reservation, payment and invoicing systems, management of connections with other modes of transport and production of electronic accompanying documents
TAF TSI functions require defining:

- When (at which point in a specific process)
- What (which kind of information and content) has to be sent to
- Whom (partner or partners) and
- How (which format) the data must be exchanged between the partners.
- Where (reporting point) location under contractual agreement where the information must be exchanged between the partners.

TAF TSI defines:

- Defined TAF TSI Messages
- TAF TSI Message structure
- TAF TSI Process
- TAF TSI Location Reference Files

TAF TSI reduces IT complexity for single players:

- Who are my partners (TAF TSI Company Reference Files)
- Where (IT world) are my partners (TAF TSI Metadata)
- How to connect to my partner (TAF TSI Metadata)
- How to translate some existing messages (TAF TSI Metadata and Common Interface).

The TEN-T-funded Strategic European Deployment Plan for the implementation of TAF TSI (TAF SEDP) was developed by the rail sector in 2006-2007. The European Railway Agency has taken over the deliverables of this project which are now included in ERA Technical Documents (TDs) and are referred to in the annex to the Commission Regulation on TAF TSI as amended by Commission Regulation (EU) No 328/2012. Changes to these technical documents are managed by the European Railway Agency.

There is Implementation Guide available at the UIC Web site. Sector Working Groups have provided a solid basis for the implementation guidelines, however these guidelines have to be updated due to technical changes done by ERA. The following implementation guides are published and were used as the basis for implementation:

- Train Monitoring
- Train Preparation
- Short-Term Path Request
- Wagon Orders
- Wagon Movement
- Reference Files
- Rolling Stock Reference Database
- Train Identification (TID)

Short reports of RFC 5 IMs related the implementation of TAF TSI

Poland

The implementation of TAF TSI applies to the entire network of PKP PLK S.A. In March 2012 PKP PLK S.A. elaborated the Master Plan for implementation of TAF TSI. This plan was submitted to ERA.
PKP PLK S.A. is a member of the Special Group (within UIC) for development and implementation of the common elements of TAF TSI. As part of the work of this group there have been developed the Universal Interface and Reference Database containing the location codes and codes of businesses related to rail transport. Since December 2012 PKP PLK S.A. the Universal Interface through which messages are sent to and from the company's IT systems has been operating. Initially, these were test messages between PKP PLK S.A. <-> DB Netz, but since May 2013 Universal Interface is used industrially to send three types of messages to Train Information System. Two of these messages: (1) Contracted Time Table and (2) Train Running Information, are TAF TSI messages. Number of messages sent per day by PKP PLK S.A. exceeds 5,000. In the next stage it is planned to launch messages concerning forecast of Train Running Information. Further work will include messages related to the ordering of the train path. The main part of the work related to the implementation of TAF TSI in PKP PLK S.A. includes the development of specialized modules in IT systems SEPE and SKRJ. Development of an internal module to support TAF TSI is also provided in the SEPE II system, which is in the design stage. At the same time attention should be drawn to the need of running close cooperation with national freight RU's, since direct cooperation with them greatly facilitate the process of implementation of the entire system.

Czech Republic

SŽDC (Railway Infrastructure Administration, state organization) is actively involved in the implementation of the TAF TSI. The implementation of EC Regulation 62/2006 dealing with TSI TAF by railway sector was launched in autumn 2008 after a preparatory period. Since 2007 SŽDC is adapting the development of its information systems with respect to the requirements laid down in above mentioned Regulation.

Status of implementation of European regulations for TSI TAF / TAP is in terms of the SŽDC as the national IM in a high degree of completion. At the same time the most important information systems and telematics applications of Railway undertakings are fully or substantially adapted so that their communication with the SŽDC is become compatible with TSI TAF/ TAP. SŽDC released different functions progressively and Railway undertakings triggers, with the logical phase delay, these functions on their own side. All processes and reports are based on the implementation of two basic identifiers TR ID and PA ID. Launching of ID PR is in a high degree of completion.

Basic processes and messages are in routine operation or in an advanced stage of development. Not to say that the implementation was before the end, but it can be said that the terms set out in the SŽDC's implementation master plan should be met.

It is necessary to say that a high degree of completion of the implementation of the European regulation TSI TAF / TAP in Czech Republic may be the confirmation that the selected pan-European concept is functional and that it is a realistic path to the mutual data exchange between the different actors of the liberalized railway market.

TAF TSI Master Plan of SŽDC is formed from following basic activities:

- Common requirements
- Path request
- Train preparation
- Train running

The overall deadline for compliance with the above mentioned activities is set on the the end of 2017.

Slovakia

ŽSR have been dealing with TAF in a last decade. The first national study Implementation TAF TSI in ZSR has been elaborated in 2005 and National Plan for Implementation TAF TSI reflected Master Plan from 2007. Informatic systems have been developed for electronic exchange data with main national freight operator ZSSK Cargo. An initial plan 2012 have been shifted for many reasons (upgrade informatic system PIS, ISI, etc.), since May 2013 when a new Master Plan have been published. ŽSR have prepared technical conditions for a test operation for two type of information - Train composition and Train Running. A new "ŽSR Feasibility study for Implementation TAF, TAP TSI" is under process of preparation.

Austria

ÖBB Infrastruktur AG has stated its masterplan in 2012, and was incorporated like all other European masterplans in the Common Masterplan. Defined milestones referring to TAF TSI implementation are:

To implement the Common Components is the first milestone.

To fill the CRD (Central Repository Domain, a common repository node in the network containing the reference files) is the first part.

To establish the Reference Files Function is the second part.

ÖBB Infrastruktur AG licensed the Common Interface from the CCG (Special Group from UIC) and adjusted it to the configuration, which is needed for ÖBB Infrastruktur AG.

At the moment there is no reason or plan to derive from the original masterplan of ÖBB Infrastruktur AG.

Slovenia

Compliance with the Regulation will be achieved through the existing IT system for rail traffic management, which has been funded by SŽ. For the purposes of establishing CI, SŽ is participating in CCG; the incorporation of CI into the existing IT infrastructure will be the first major milestone. By modernizing the existing IT system, service-oriented system architecture will be established as the basis of a successful message exchange. In the following phases emphasis will be put on maximum use of the existing information exchange systems along with the use of and participation in "central" rail IT systems such as TIS and PCS. Full compliance with the relevant TAF-TSI requirements will be achieved by providing trains with suitable train identifiers.

The following functions are jointly realised by both Infrastructure Managers and Railway Undertakings.

Preconditions:

- Common Interface
- Reference Files
- Transport Identifiers (Train ID, Path ID, Path Request ID, Case Reference ID)

Functions:
- Train Running Information
- Train Forecast
- Service Disruption
- Train Enquiries
- Train Preparation
- Infrastructure Restriction Notice
- Adhoc Path Request

The individual TAF messages/functions will be developed on a step-by-step basis (i.e. a phase-based approach). Central systems such as TIS and PCS will be used in Phase I and partially Phase II.

Italy

According to the provisions of the Regulation 62/2006 and 454/2012, RFI presented the national deployment plan.

RFI has been actively involved in the implementation of the TAF TSI. In 2011 RFI was CCG prototype test partner, as well as DB Netz, RNE and Raildata, for the validation of TAF TSI general architecture. In particular macro-area user functionalities and batch processes were tested based on inbound and outbound messages.

The implementation of the TAF and TAP TSI is foreseen until the end of 2016 with the exception of the functionalities related to the TTID (Train-Transport Identification) for which more detailed technical specification are expected and which is planned within 2020.

The implementation project is structured if the following steps:
1. Impact analysis on the existing national systems and definition of the technical and functional specifications needed
2. Development of the new functions
3. Release of the systems.

6.5 Capacity management plan

The capacity management plan has the objective to monitor the development of the capacity along the corridor assuring that this development is as harmonized as possible and so also safeguarding the national investments. The Corridor MB has set up a working group in order to analyse this issue.

>> 7. STRUCTURE OF THE CORRIDOR INFORMATION DOCUMENT

On the basis of the RailNetEurope (RNE) common structure of Corridor Information Document (hereafter CID), the CID of RFC 5 consists of 5 Books. There are proposed structures available for each book. The Network Statement Excerpts part follows the structure of national Network Statements.

The CID is built up as follows:

- Book 1 – Generalities;
- Book 2 – Network Statement Excerpts;
- Book 3 – Terminal Description;
- Book 4 – Procedures for Capacity and Traffic Management;
- Book 5 – Implementation Plan;

All Books can be executed under different processes but the Network Statement Excerpts part should be drawn up in accordance with the procedure set out in Directive 2012/34/EU.

The CID should contain:

- all the information in relation with the freight corridor from the national Network Statements;
- information on terminals;
- information on capacity allocation (OSS operation) and traffic management, also in the event of disturbance
- the Implementation Plan that contains:
  - the characteristics of the freight corridor;
  - the essential elements of the Transport Market Study that should be carried out on a regular basis;
  - the objectives for the freight corridor;
  - the investment plan described in the regulation;
  - measures to implement the provisions for co-ordination of work, capacity allocation (OSS), traffic management etc.

The CID is an international document, therefore it is written in English.

The structure of CID for RFC5 follows the recommendation of RNE, which is widely accepted and generally applied by rail freight corridors.

Annex 1

Glossary/abbreviations

AB	Allocation Body
Allocation	Means the allocation of railway infrastructure capacity by an Infrastructure Manager or Allocation Body. When the Corridor OSS takes the allocation decision as specified in Art. 13(3) of 913/2010, the allocation itself is done by the Corridor OSS on behalf of the concerned IMs, which conclude individual national contracts for the use of infrastructure based on national network access conditions.
Applicant/Applicants	. As per Art.3 (19): Applicant (Directive 2012/34/EU) "Applicant' means a railway undertaking or an international grouping of railway undertakings or other persons or legal entities, such as competent authorities under Regulation (EC) No 1370/2007 and shippers, freight forwarders and combined transport operators, with a public-service or commercial interest in procuring infrastructure capacity. Applicant' means a railway undertaking or an international grouping of railway undertakings or other persons or legal entities, such as competent authorities under Regulation (EC) No 1370/2007 and shippers, freight forwarders and combined transport operators, with a public-service or commercial interest in procuring infrastructure capacity
CC	Common Components – TAF TSI
CCG	Common Components Group – TAF TSI
Connecting point	A point in the network where a Corridor cross another Corridor and it is possible to shift the services applied for from one Corridor to the other.
Corridor OSS	A joint body designated or set up by the RFC organisations for Applicants to request and to receive answers, in a single place and in a single operation, regarding infrastructure capacity for freight trains crossing at least one border along the freight Corridor (EU Regulation No 913/2010, Art. 13). The Corridor One-Stop Shop.
Corridor Information Document (CID)	Document giving a detailed description of the corridor
Dedicated capacity	Capacity which has to be foreseen by the Corridor Organisations to fulfil the requirements of Regulation 913/2010. It refers to pre-arranged paths and reserve capacity.
Diversionary lines	Diversionary lines are routes to be used by RFC5 in case when principal route is blocked or closed for temporarily reasons
EEIG	European Economic Interest Grouping
Feeder and outflow path	Any path/path section prior to reaching an operation point on RFC (feeder path) or any path/path section after leaving the RFC at an operation point (outflow path). The feeder and/or outflow path may also cross a border section which is not a part of a defined RFC.
Flexible approach	When an Applicant requests adjustments to a pre-arranged path, as e.g. different station for change of drivers or shunting, that is not indicated in the path publication. Also if the Applicant requests feeder and/or outflow paths connected to the pre-arranged path and/or a connecting path between different RFCs, these requests will be handled with a flexible approach.
Handover point	Point where the responsibility changes from one IM/AB to another.
IM	Infrastructure Manager
Interchange point	Location where the transfer of responsibility for the wagons, engine(s) and the load of a train goes from one RU to another RU. Regarding a train running, the train is taken over from one RU by the other RU, which owns the path for the next journey section.
MB	Management Board
Overlapping section	Railway infrastructure sections where two or more Corridors share the same infrastructure.
PCS	Path Coordination System, IT system delivered and maintained by RNE
PIM	Project Implementation Manager

PMO	Project Management Office
Pre-arranged path (PaP)	A pre-constructed path on a Rail Freight Corridor according to the Regulation 913/2010. A PaP may be offered either on a whole RFC or on sections of the RFC forming an international path request crossing one or more international borders.
Pre-constructed path product	Any Kind of pre-constructed path, i.e. a path constructed in advance of any path request and offered by IMs; applicants can then select a product and submit a path request. Pre-constructed path products are either: - Pre-arranged paths (PaP) on Rail Freight Corridors or - Catalogue paths (CP) for all other purposes
Principal lines	Principal lines are routes for which RFC5 prepares an offer of PaPs and Reserve Capacity.
RB	Regulatory Body
Reserve capacity (RC)	Capacity – e.g.Pre-arranged paths kept available during the running timetable period for ad-hoc market needs (Art 14(5) Regulation 913/2010).
RFC	Rail Freight corridor. A Corridor organised and set up in accordance with Regulation 913/2010. A "List of initial freight corridors" is provided in the Annex of the Regulation.
RFC5	Baltic Adriatic Rail Freight Corridor 5
RFC-Handbook (DG MOVE working document)	Handbook on Regulation concerning a European rail network for competitive freight.
RNE	Rail Network Europe
RU	Railway Undertaking
TAF	Telematics Applications for Freight
TCCCOM	Traffic Control Center Communication, that enables to call up predefined messages which will be released on each side of the border in the native language
TMS	Transport Market Study
TIS	Train Information System, IT system delivered and maintained by RNE
TSI	Technical Specifications of Interoperability
TSI CCS	Technical Specifications of Interoperability Control Command and Signalling
TSI ENE	Technical Specifications of Interoperability Energy
TSI INF	Technical Specifications of Interoperability Infrastructure
X-8 (months)	Deadline for requesting paths for the annual timetable (Annex III(2), Directive 2012/34/EU).
X-11 (months)	Deadline for publication of pre-arranged paths (Annex VII (4), Directive 2012/34/EU).
X	Starting date of the timetable
X-2	Two months before starting date of the timetable
WG	Working Group

Annex 2

Table of Modification

(basing on remarks sent to IP for RFC 5 published on 13.04.2015. State on 21 October 2015)

Pos	Sent by/ date	Refers to	Description	RFC 5 PMO recommendation/action
1.	PKP PLK S.A/ 13.04.2015.	Table 2, section Wrocław - Opole	Should be "Wrocław - Jelcz – Opole" to define the exact section	Amended. Exact section included in Table 2.
2.	PKP PLK S.A/ 13.04.2015	page 46, top right "The **tracks** offered should be flexible, the services costumer friendly. This includes the provision of information referring to both, the process of applying for **tracks** and shipments on the track."	The sentences are not clear. Shouldn't be "paths"?	Amended Term "tracks" on page 47 has been changed into "paths"
3.	PKP PLK S.A/ 13.04.2015	Fig. 34	Section between Katowice and Wien is hardly readable. Enlarging this piece on a separate drawing should be considered	The map was made by Consultant of TMS. To be taken into consideration during TMS update
4.	PKP PLK S.A/ 13.04.2015	page 78, middle left "One section of line Grodzisk Mazowiecki – Zawiercie (224 km) is equipped with ETCS Level 1, putting in service is foreseen on December 2014"	One section of line Grodzisk Mazowiecki – Zawiercie (224 km) is equipped with ETCS Level 1, was put in service in December 2014	Amended
5.	PKP PLK S.A/	page 78, middle left	It is not clear to which section refers the paragraph "*The first pilot*	Amended. The text has been changed as

	13.04.2015		*project for the implementation of GSM-R network for the 82 km section was completed in March 2014. Test phase of ETCS L2 is in progress*." (probably Legnica - Bielawa Dolna).	follows: *The first pilot project for the implementation of GSM-R network for the 82 km section (Legnica – Węgliniec – Bielawa Dolna) was completed in March 2014. Test phase of ETCS L2 is in progress. Till the end of 2015 it is planned to complete implementation of the GSM-R on approx.1400 km railway lines.*
6.	PKP PLK S.A/ 13.04.2015	page 78, bottom left and upper right	Description of the Future situation (*National Implementation Plan for ERTMS*) is out of date	*The text has been not changed* • *because the PKP expert in WG Interoperabilty/ERTMS confirmed that the text is up to date, because Poland didn't update NIP for ERTMS yet".*
7.	PKP PLK S.A/ 13.04.2015	page 78, bottom left and upper right	"while the ETCS will be implemented on the two main **roads** east - west (E 20 and E 30)."	Amended. The term "main **road** east-west" was changed into "while the ETCS will be implemented on the two main east-west **railway lines** (E 20 and E 30) – accepted.
8.	Železnice Slovenskej republiky/ 13.04.2015		„On polish territory the line Katowice – Zwardoň – border PL/SK is in the maps indicated as principal line but in the table describing the RFC 5 lines it is indicated as alternative line. I think there has to be consistency between maps and tables. The continuation of line on Slovak territory is principal line. We are interested to have the whole slovak-polish line section as principal line".	Amended. On 04/05/2015 meeting MB agreed that Polish section of Czechowice-Dziedzice – Zwardoń to be principal line and Polish section of Wrocław - Międzylesie - to be kept as alternative line.
9.	RFI/ 14.04.2015	Pag.14:	the map of Italy must clearly show that the line Udine-Cervignano-Bivio S. Polo is a diversionary route, not principal	Amended. *Figure 9 (RFC 5 sections in Italy) on* page 14. has been changed
10.	WG	Chapter 6.4 pages	Add new text on page 77 -77 after the sentence " For Class A train	Amended. Suggested text has been adopted.

	Interoperability/ ERTMS 16.04.2015	77,78	detection this TSI specifies only the requirements for the interface with other subsystems" as follows: *For ETCS system is the current version of the mandatory requirements of the basic specification 2 (Baseline 2) version 2.3.0d, which is currently strictly required. In another version of the basic specification 3 (Baseline 3), which was included in that TSI by the Commission Decision 2012/696/EU (amending former Commission decision 2012/88/EU from 25. 1. 2012) are taken measures to ensure backward compatibility to version 2.3.0d systems. It means that vehicles equipped with ETCS on-board part of the basic specification version 3 may be operated on trackside ETCS version of the basic specification 2.* *Last above mentioned Decision divided set of specification into two parts:* - *set of specifications # 1 (ETCS baseline 2 and GSM-R baseline 0),* - *set of specifications # 2 (ETCS baseline 3 and GSM-R baseline 0).* *In the last Commission decision (EU) 2015/14 of 5 January 2015 (amending again Decision 2012/88/EU on the technical specification for interoperability relating to the control-command and signalling subsystems of the trans-European rail system and valid from 1. 7. 2015) was changed the geographical scope of this TSI. This geographical scope was extended on the other parts of the network of the whole rail system, following the extension of scope as described in Annex I section 4 to Directive 2008/57/EC.* *In this above mentioned Decision is set of specification divided*	

			again into two parts: - *set of specifications # 1 (ETCS baseline 2 and GSM-R baseline 0) with minor changes especially in the field of GSM-R (new EIRENE FRS version 7.4.0 and SRS version 15.4.0),* - *set of specifications # 2 (ETCS baseline 3 and GSM-R baseline 0) with the same changes in the field of GSM-R like in set of specifications # 1 and with definition of basic subset - 026 in new version 3.4.0.* up to "The following are descriptions of CCS migrations……."	
11.	WG Interoperability/ ERTMS 16.04.2015	Chapter 6.4 page 79 Czech Republic including scheme (first scheme is correct).	New text, new scheme Fulfilment of the basic goals of TSI CCS is in terms of routes RFC5 is closely linked with National Implementation Plan for ERTMS in Czech Republic, according actually approved version from 10. 2. 2015. This National plan covers the all the railway lines yet included in the routes of network RFC5. GSM-R generally designated as a system for transmission of data to trains, is installed on the 1132 km double track main railway lines in the Czech Republic. Due to this fact there are no problems with deployment of this system as the first step before installing ETCS L2 system on selected lines.	Amended *Figure 56*
12	BCT Gdynia/ 17.04.2015	point 2.2.4 corridor Terminals Poland table	Please kindly correct point 2.2.4 corridor Terminals Poland table. Presently we are under construction of the new rail infrastructure. In October 2015 we will obtain 3 new rail tracks of 650 meters each (presently 3x300m) for container operations and additional 2 rail tracks of 300m multipurpose (break bulk cargo).	In amended version of IP note has been included.

13	WG Interoperability/ ERTMS/ 20.04.2015	Chapter 6.4. (page 79)	PKP requested: a) the complete PKP graph (missing names of stations on the right site of graph) in Chapter 6.4. I inserted the complete graph of PKP in the Midterm report v.3.1.	Amended new graph of ERTMS in Poland(Figure 55)
14	WG nteroperability/ ERTMS/ 20.04.2015	Chapter 6.4 (page 79, 80)	SŽCD requested: new text about current situation in Czech Republic (first two paragraphs) in Chapter 6.4, as follows: Fulfilment of the basic goals of TSI CCS is in terms of routes RFC5 is closely linked with National Implementation Plan for ERTMS in Czech Republic, according actually approved version from 10. 2. 2015. This National plan covers the all the railway lines yet included in the routes of network RFC5. GSM-R generally designated as a system for transmission of data to trains, is installed on the 1132 km double track main railway lines in the Czech Republic. Due to this fact there are no problems with deployment of this system as the first step before installing ETCS L2 system on selected lines.	Amended
15	WG Interoperability/ ERTMS/ 20.04.2015	Chapter 6.4 (page 79)	SŽCD requested: new text about current situation in Czech Republic (last three paragraphs) in Chapter 6.4 I inserted the changed text of SŽCD in the Midterm report v.3.1. *All projects in the Czech Republic on RFC5 lines are planned and realized always under currently valid technical specification. The main benefits in the area of interoperability are meeting GC gauge parameter needed especially for container transport, higher level of operational safety, increasing of line capacity and*	Amended

			speed of trains. *The most important project for increasing of interoperability on RFC5 will be deployment of ETCS system Petrovice u Karviné – Břeclav planned for 2015 – 2017 which will allow transit of all international trains fitted with this system from Austria to Poland via Czech Republic.*	
16	WG Interoperability/ ERTMS/ 20.04.2015	Chapter 6.4 (page 79)	SŽCD requested: corrected graph of SŽCD in Chapter 6.4. I inserted the corrected graph of SŽCD in the Midterm report v.3.1.	. Amended. New graph of ERTMS in Czech Republic (Figure 56)
17	WG Interoperability/ ERTMS/ 24.04.2015	Chapter 6.4 (page 84)	Please change the Slovenian scheme (the next station in Italy is Villa Opicina and not Trieste).	Amended. New graph of ERTMS in Slovenia (Figure 59)
18	Ministry of Infrastructure and Development 27.04.2015	Chapter 2 (2.2.1.) page 11 and beyond	It seems that the designations of primary and secondary lines could have a more readable format (different color, dashed lines, etc.), the legend is not complete (i.e. lack of border crossings logos description);	Amended New Figures: 3 (*Routing of RFC 5*), 4 *(RFC 5 sections in Poland*), 9 (RFC 5 sections in Italy)
19	Ministry of Infrastructure and Development 27.04.2015	Chapter 2 (2.2.2.) Table 1 pages 15-16	The parameters of RFC5 sections should be verified (item 1 already raises doubts concerning the number of tracks - line number 201 is a double-track, unless RFC5 goes along track line 228 by Gdynia Chylonia);	Amended
20	Ministry of Infrastructure and Development 27.04.2015	Chapter 2 (2.2.3.) Table 2 page 22	Sections of lines - it seems that there is no bottlenecks description for section Czechowice-Dziedzice - Zwardoń - it is a single-track section and it is necessary to improve its performance;	PKP PLK standpoint: „Forecast in TMS for 2030 amounts to 2,7 mln ton, num*b*er of trains 20 - 50 trains for a day (taking into account this volume of traffic it it

				will be in low *area* of section), when present capacity of 53 trains a day is considered. *Due to a.m. we do not consider this as bottleneck*."
21	Ministry of Infrastructure and Development 27.04.2015	Chapter 2 (2.2.4.) page 24	• after a brief review of the list of terminals, it seems that the terminals located on the line C-E 59 in the vicinity of Wrocław are missing. How do terminals on Łódź and Kraków, or in Braniewo fit into RFC5? This should be clarified • Data on intermodal terminals should be verified. One can refer to the European Commission working plan, made by the Coordinator K. Bodewig. Alternatively, a document by Polish Academy of Science on the corridor Baltic – Adriatic could be consulted: https://www.ewaluacja.gov.pl/Dokumenty_ewaluacyjne/Documents/IGiPZ_PAN_Baltyk_Adriatyk_TENT_10122014.pdf	PKP PLK standpoint: This table included terminals not only directly connected to the Corridor, but also indirectly via other railway-lines not included in the Corridor. Terminal in Łódź is connected with Corridor via line Zduńska Wola – Łódź (in core network), terminal in Braniewo via Malbork and Tczew (lines in core network), terminal in Kraków via Katowice (lines in core network).
22	Ministry of Infrastructure and Development 27.04.2015	Chapter 3.4 page 53	Investment plan needs to be improved, section C-E 59 Szczecin - Świnoujście should be marked green, section Zawiercie - Katowice - green, section Katowice - Chałupki - green, section Czechowice-Dziedzice - Zebrzydowice - orange;	To be taken into consideration during TMS update
23	Ministry of Infrastructure and Development 27.04.2015	Chapter 6.2 page 74	The list of investments requires changes. According to the list of projects included in the Implementation Document for SRT (details on the amounts and periods of implementation are also included in this document) the following sections should be considered: - Wrocław – Zielona Góra – Szczecin, - Będzin – Katowice – Czechowice Dziedzice – Zebrzydowice, - Kędzierzyn Koźle – Opole, - Gliwice – Oświęcim, - Chorzów – Bydgoszcz – Maksymilianowo, - Opole – Jelcz – Wrocław,	Amended

			- Wyczerpy – Chorzew Siemkowice, - Bydgoszcz – Tczew, - Częstochowa – Zawiercie, - Wrocław – Kamieniec Ząbkowicki, - Kędzierzyn Koźle – Chałupki (granica państwa), - Czechowice Dziedzice – Bielsko-Biała – Zwardoń (granica państwa), - Kamieniec Ząbkowicki – Międzylesie. In addition, a list of projects should be complemented by ongoing projects included in WPIK 2015.	
24	PKP Cargo Logistics/ 27.04.2015	Section 2.2. RFC5 characteristics, Figure 4	We have some doubts concerning including a border crossing Skalite-Zwardoń (PLK-ZSR) in the routing of RFC5.This border crossing has not been used in rail freight transport for some time and in our opinion, due to the poor technical parameters of the line, it is not possible to carry out rail freight operations on the section, both in international and cross-border traffic. As the infrastructure parameters of the border crossing Zebrzydowice/Petrovice are much better, we suggest rerouting RFC5. We propose that RFC5 runs through the border crossing Zebrzydowice/Petrovice and then along the section Petrovice-Mosty/u Jablonkova –Cadca. From our point of view, the section Czechowice – Zwardoń/Skalite-Cadca could only be an alternative, but it will require enourmous investments in order to improve its parameters so that they fulfill RUs` requirements.	(See point 8)
25	PKP Cargo Logistics/ 27.04.2015	Section 2.2.2 Infrastructure parameters Table 1 “The list of bottlenecks along RFC5”	The sheet is not clear	Table has been modified.
26	PKP Cargo Logistics/ 27.04.2015	Section 2.2.2 Infrastructure parameters	We suggest to complement the table with the information about measures and solutions, which have to be applied in order to remove bottlenecks.	Categories of bottlenecks has been agreed. Analysis of bottlenecks are to be made.

		Table 1 “The list of bottlenecks along RFC5”		Information regarding measures and solutions will be in future amended version.
27	PKP Cargo Logistics/ 27.04.2015	Section 2.2.2 “Corridor terminals” Figure 10 “The list of terminals along RFC5 in Poland”	1. The list includes the terminal CARGOSPED-terminal Braniewo, which is not directly located of the corridor. But if the location and the distance of the terminal gravitate to RFC5, then including this terminal in the corridor`s routing is justified. 2. It is required to provide the names of terminals` operators/managers in addition to terminals` names (the same remark applies to the remaining tables in section 2.2.4) 3. “List of RFC5 Seaports” – complement the list with the short information on the respective ports.	Ad 1. PKP PLK standpoint – see point 21 Ad 2. The detailed information is to be included in CID Book 3 (if Terminals supply Terminal Questionnaires) Ad 3. The list was supplemented with see ports web site addresses.
28	PKP Cargo Logistics/ 27.04.2015	Section 3 “Essential elements of the Transport Market Study”	We propose to supplement this section with the description of the factors having impact on the activity of the economy of Sweden, Lithuania, Latvia, Estonia and the Kaliningrad Oblast in the corridor 5 as these regions will also generate the volume of transported goods along RFC5.	The study was made by Consultant of TMS. To be taken into consideration during TMS update. The supplement shall be done as TMS update in 2018
29	Lugo Terminal S.p.A 30.04.2015	Infrastructure parameters Access to terminal	Having studied the document we are now aware of the fact that some Terminals or Transfer Stations along RFC5 have been introduced in the Plan and to our surprise in no way our Terminal in Lugo di Romagna (RA) is mentioned as being a possible Terminal along RFC5 although our Terminal is situated on the Ferrara - Ravenna Corridor as well as on the Bologna - Ravenna and Bologna - Faenza - Ravenna Corridor. Our Terminal has 8 tracks with lengths varying from 800 Mt. to 1.000 Mt.and can therefore handle several full trains at the time. We noticed that the Terminals or Transfer Stations indicated in the Implementation Plan, do not all represent this kind of capacity and we therefore suggest and ask to include our Terminal as being one of the optional Terminals along RFC5 in the Implementation Plan.	To include information in amended version of IP Information about terminal included in verified IP and in CID Book 3.
30	PCC	tPCC Intermodal terminal	Terminal has now 4 tracks ca 700 m each (not 2, as it was year before, and it	Amended

	Intermodal S.A. Terminal Kontenerowy w Kutnie ul. Intermodalna 5 99-300 Kutno/ 04.05.2015	Kutno (page 24).	is in IP).	
31	Trenitalia S.p.A. Divisione Cargo Sviluppo Business Cargo / 05.05.2015	general	From the discussion held in other corridors meeting, the major need – at least from a RUs perspective - is having an acceptable degree of coordination between corridors structures in terms of governance, rules of participation for RUs, communications between IMs and RUs for several items (i.e. coordination of works /disruption on the network). It is necessary to harmonize as much as possible the framework conditions existing in each corridor in order to guarantee better workflows between actors involved. The Implementation Plan should reflect these market needs.	Topic to be included in RFC Talk meeting agenda. Additional text expressing that RFC 5 is going to harmonize terms of governance, participation rules, communication between RFC 5, IM s, RUs, etc. with other RFCs following the guidelines elaborated by RNE has been included in Chapter 1 *Introduction.*
32	Trenitalia S.p.A. Divisione Cargo Sviluppo Business Cargo / 05.05.2015	general	Another example could be put forward concerning the Transport Market studies provided by the Regulation. It is necessary to have a more effective coordination between the Transport Market Studies of all Freight corridors provided in the Regulation in order to avoid - in particular for the intermodal maritime traffics towards Italy - the multiple counting of the same traffics (that could be present in the traffic forecasts of several alternative ports, i.e North Europe ports, Spanish Ports, Italian Ports or Slovenian ports and could be counted in the forecast of Corridors 1,3,5,6). Reliable and coordinated figures for all corridors should be provided.	Topic to be included in RFC Talk meeting agenda. Additional text expressing that RFC 5 is going to harmonize terms of governance, participation rules, communication between RFC 5, IM s, RUs, etc. with other RFCs following the guidelines elaborated by RNE has been Included in Chapter 3.
33	Trenitalia S.p.A. Divisione	Infrastructure parameters	Further development of the issue concerning bottlenecks is advisable. Analysis contained in the IP is quite exhaustive, but there should be an indication (i.e. timeline) related to a clear “road map” with removal	Categories of bottlenecks has been agreed. Analysis of bottlenecks is to be made. Information regarding measures and solutions

	Cargo Sviluppo Business Cargo / 05.05.2015		actions proposed.	will be in future amended version.
34	Trenitalia S.p.A. Divisione Cargo Sviluppo Business Cargo / 05.05.2015	*Traffic Performance management (4.8.1)*	*We deem advisable to proceed towards the implementation of harmonised KPIs between Corridors, taking into account the works already done on other Corridors (1,2) promoting a set of common standards. On point 4.8.1, the only KPI shared with other Corridors is punctuality. To this aim, we would propose:* *-to replace "weight and length of trains" with "Ton Kms" (already used in RFC2): measures the amount of tons that are transported over RFC per kilometer).* *- the insertion of " undocumented delays" (related to each IM) and "total amount of minutes for delay reason" (KPIs of Corridor 1)*	- List of possible parameters has been amended in verified IP subchapter 4.8.1 page 69. Instead of suggested by Trenitalia "Ton kms" we applied "train/kms ".
35	RFI/ 06.05.2015	Bottlenecks Table 2 page23	<u>New list</u> of bottlenecks on the Italian Section (to replace the previous one) to insert on the last version of IP of RFC5: The list above has been compiled ensuring as much as possible consistent with the nature of the projects in other countries, considering the medium-long period and the TMS. Please, it's important that on the IP, for the bottlenecks on the Italian section, it's written and specified that: *"All the Bottlenecks in the table have been considered on the base of the future development of freight traffics and Corridors. At the moment, in the short term, there are no bottlenecks on the corridor"*.	Included in amended IP – Table 2 page 22
36	Michał Litwin RFC5 RAG Spokesperson/ 5.05.2015	general	Capacity allocation principles. Please consider using of the Harmonized FCA which was jointly developed by some RFCs, Regulators and the European Commission so that a harmonized RFC-wide FCA can be developed.	RFC 5 ExBo approved FCA commonly elaborated by MoTs. See point 31 – included. Explained also in CID Book 4

				Standpoint of Cap/TT/C-OSS: *RFC C-OSS will allocate paths according to the rules from harmonized FCA which has been signed by the Ministries*
37	Michał Litwin RFC5 RAG Spokesperson/ 5.05.2015	Chapter 4.8.1	Concerning the section on Traffic Performance management (4.8.1) we deem advisable to proceed towards the implementation of harmonized KPIs between Corridors. On point 4.8.1, the only KPI shared with other Corridors is punctuality. To this aim, we would propose: • to replace "weight and length of trains" with "Ton*Kms" (already used in RFC2: measures the amount of tons that are transported over RFC per kilometer). • the insertion of " undocumented delays" (related to each IM) and "total amount of minutes for delay reason" (KPIs of Corridor 1)	See point 34
38	Michał Litwin RFC5 RAG Spokesperson/ 5.05.2015	general	Coordination between Corridor`s bodies.	In amended IP version included information that RFC 5 will cooperate with other RFCs in scope of harmonization of RFCs offer to AA. Included in Chapter 3 .
39	Michał Litwin RFC5 RAG Spokesperson/ 5.05.2015	Sub-chapter 2.2.3 Bottlenecks	Bottlenecks: we suggest adding clear "road map" providing precise information which actions should be taken in order to eliminate each bottleneck.	Categories of bottlenecks has been agreed. Analysis of bottlenecks is to be made. Information regarding measures and solutions will be in future amended version.
40	Michał Litwin RFC5 RAG Spokesperson/ 5.05.2015	general	We would like to know what role of C-OSS is foreseen for the future. Is it designed only to sell PAPs, or will it also be possible to obtain an ad-hoc route via C-OSS (in future)? Given that flexibility is crucial for competitiveness of rail, allowing ad hoc scheduling via C-OSS as well would increase competitiveness of railway along the Corridor.	Will be taken into consideration during next update of IP.
41	Michał Litwin	general	If a PAP/capacity is reserved by an Authorised Applicant, what is a	Till RNE will complete its work, individual IM's

	RFC5 RAG Spokesperson/ 5.05.2015		deadline for it to choose a RU and what is the deadline for the RU to conclude an arrangement with IM(s)? We know that RNE is working on the issue, so using their findings can contribute to common, harmonised approach.	regulations are applicable. Explained in CID Book 4
42	Michał Litwin RFC5 RAG Spokesperson/ 5.05.2015	general	The IP refers a little to operating languages, especially at border sections. We would welcome vision of bilingual IM`s staff (dispatchers) at border stations. Given that in border regions usually live some bilingual people, hiring (or training) bilingual staff by IM`s is much more efficient than training of hundreds of loco drivers. We are aware that it is impossible in a short-term, but we should focus on finding efficient mid- and long-term solutions that will build competitiveness of international rail freight. Such a solution is being considered on some Corridors, and the harmonization approach should for the issue be applied respectively.	This remark is addressed to IMs. This issue is under responsibility of IMs.
43	Michał Litwin RFC5 RAG Spokesperson/ 5.05.2015	general	We would welcome stressing more support for Flexi-PAPs.	It is up the IM if chooses flex or fixPap. In our RFC most PaPs will be flex though.
44	Michał Litwin RFC5 RAG Spokesperson/ 5.05.2015	Subchapter 2.2.4 Corridor terminals	The list of terminals should also inform who is the operator /owner of a terminal.	See point 27 (2)
45	Michał Litwin RFC5 RAG Spokesperson/ 5.05.2015	Chapter 3 TMS	The TMS would give better picture of Corridors potential if it caught most important demand factors concerning Sweden, Lithuania, Latvia, Estonia and The Kaliningrad Oblast as these regions will also generate the volume on the transported goods along RFC5. We suggest issuing a supplement covering these part of the study. TMS: we are not sure if volumes counted in RFC5 TMS were present in the traffic forecasts of several alternative ports, i.e North Europe ports,	The study was made by Consultant of TMS. To be taken into consideration during TMS update The supplement shall be done as TMS update in 2018. Then it can be considered to include in TOR such requirements.

			Spanish Ports, Italian Ports or Slovenian ports and could be counted in the forecast of Corridors 1,3,5,6. It is crucial to avoid double-counting of the same volumes.	
46	Michał Litwin RFC5 RAG Spokesperson/ 5.05.2015	Subchapter 2.2.1 Routing	Routing: we doubt that Skalite/Zwardoń (PKP PLK-ZSR) border crossing can be used in international rail freight operations due to its poor technical parameters. We suggest rerouting RFC5 through Zebrzydowice/Petrovice (-Mosty u Jablonkova-Cadca) and using Skalite-Zwardoń only as an alternative route.	(See point 8) Pa*P*s *on both routes will be available for TT 2016*
47	Michał Litwin RFC5 RAG Spokesperson/ 5.05.2015	general	We have been informed that some additional obstacles have recently occurred at Italian border sections ant RFC3 (see below). We would like to be assured that implementing RFCs is a step toward Single European Railway Area. Border line access requirements should be limited to the absolute minimum. *"The Italian Safety Authority (ANSF) has recently come up with the requirement to have safety certificates signed by all RUs operating on the border section (between the physical state border and the border station on Italian territory). Italian Term: Autorizzazione accesso al tratti ed alle stazioni di confine (Riferimento: nota ANSF 006878/2014 del 09/10/2014)"*	RFI standpoint of 24.06.2015: 1. *The ANSF is the Italian National Safety Agency, so it is not in the power of RFI or of the corridor to intervene in its decisions/rules;* 2. *The mentioned rules are not new: they exist since the establishment of the European framework for the railway safety;* 3. *Already in 2011 there has been a review modifying the roles in the granting of certifications, but not in the contents of them;* 4. *The regulation is actually a simplification of the processes required to run on the railway infrastructure. Following the European legislation, a railway undertaking, in order to run trains, must normally have:* a. *A license (this is given by Italian*

				Ministry of Transport) *b. A safety certificate (this is given by ANSF that verifies the safety management system of the RU)* *c. A certificate to circulate (this is given by RFI) and it is a technical document making sure that the rolling stocks are compliant with the infrastructure technologies where the RU wants to run* *The ANSF is legally responsible for the whole infrastructure on the Italian territory starting from the "legal" **border**.* *In some cases the first Italian station is not exactly ON the border, but some kilometers inside the Italian territory (example: Border-Tarvisio Boscoverde about 8.6 Km).* *It is a fact that technical systems do not change along the line, but in a station and that the neighboring IM gives the path to a station and not in the middle of the line section.* *The mentioned guidelines aim to describe the "certification" needed by a RU to run the kilometers between border and first station, where systems change (those 8.6 Km.)* *The required documentation for cross border sections is reduced compared to the documentation normally requested for the Italian infrastructure, so I do not see it as an additional obstacle, given that RUs have to provide that they are safe in running in Italy.*

				The guidelines have their fundaments in the following legislation: *Directive EU 2004/49* *Decreto legislativo 162 del 10/08/2007 (Italian law)* *Decreto ANSF 04/2012 (ANSF Regulation).*
48	**Jan ILÍK** **Ministerial Counsellor** **Ministry of Transport** 08.07.2015	chapter 2.2.3.	It would be good to classify bottlenecks into several categories (e.g. capacity problems, infrastructure problems, operation problems). This should enable us to understand better the whole situation along the corridor because different categories of bottlenecks need different solutions.	Categories of bottlenecks has been agreed. Analysis of bottlenecks is to be made. Information regarding measures and solutions will be in future amended version.
49	Jan ILÍK Ministerial Counsellor Ministry of Transport 08.07.2015	chapter chapter 2.2.4.	We would suggest to make a distinction between terminal and marshalling yards in chapter 2.2.4. because they play a bit different role – (container) terminals are an interface between modes whereas marshalling yards serves only for those goods transports which are already moved by rail. This differentiation should allow us better understand the potential of the corridor and to unify the structure of information provided. We would also welcome to organize the terminals in the table either alphabetically or geographically (from North to South). The terminal in Ostrava Šenov should be also included as well as marshalling yards which are not listed for the CZ – at least in Břeclav, Přerov, Ostrava, Bohumín and Česká Třebová + Český Těšín.	Amended marshalling yards have been included in revised IP.
50	Jan ILÍK Ministerial Counsellor Ministry of Transport 08.07.2015	table 2	table 2 includes "Ostrava junction" twice (in the CZ part). Also the information for the line section Brno – Přerov is not accurate. Lack of capacity is OK but very low speed could be misleading because the speed interval on the line is 80 – 100 km/h with some local restrictions. We would suggest to replace it by following text: Lack of capacity and insufficient speed according to TEN-T requirements.	Amended according to decision of MB of 28.07.2015 in scope of definition of bottlenecks categories. Regarding section Brno- Přerov – the wording in IP is in accordance to WG Infrastructure proposal.
51	Jan ILÍK Ministerial	pages 79 and 80	We would also like to point out in February 2015 the updated version of Czech ERTMS IP was approved so the chapter on pages 79 and 80	Amended in accordance with explanation received from SŽCD – see points 11, 14 and 15

	Counsellor Ministry of Transport 08.07.2015		should be modified. In the subchapter "Future situation" the second sentence does not give a sense. It has not been finished.	
52	Jan ILÍK Ministerial Counsellor Ministry of Transport 08.07.2015	2.2.1. Routing	Additionally it would be good to provide an explanation why the route Wroclaw – Miedzylesie – Brno – Břeclav is no more a part of principal network but is newly proposed as a diversional one. To me personally this change is a bit surprise because both sides (CZ+PL) agreed it makes a sense to offer an alternative western routing with the corridor capacity.	MB decision. See point 8.
53	Jan ILÍK Ministerial Counsellor Ministry of Transport 08.07.2015		It would be good to keep the same methodology when describing the freight demand and its prognosis. Whereas figures 36 and 37 (p. 50) do not include RFC5 ports figures 43 – 46 (p. 56 and 57) do. Please keep the pictures and the methodology consistent.	To be taken into consideration during TMS update.
54	Jan ILÍK Ministerial Counsellor Ministry of Transport 08.07.2015		We would also welcome some explanation of the prognosis presented on figures 48 – 54. Some results presented could open questions so it would be good to explain some of the results in advance. Especially when knowing the fact the north-south axis across PL, CZ and AT is used for the same way of transportation with the significant share of steel industry products, coal products, cars.	To be taken into consideration during TMS update.
55	Jan ILÍK Ministerial Counsellor Ministry of Transport 08.07.2015		it would be good to mention that also a road infrastructure in CZ and SK along RFC5 has not been completed yet but its completion is foreseen in coming years (p. 37 above figure 22).	Amended in chapter 3.
56	MoT AT 13/07/2015	Whole document	A general remark: The document would benefit from additional proofreading (spelling mistakes, missing full stops, repeated paragraphs etc.)	

57	MoT AT 13/07/2015	p. 4 "They **are also expected to be integrated with the TEN-T Network**"	Consider replacing by "They **should also be coordinated with the Core Network Corridors of the TEN-T Network**."	Amended.
58	MoT AT 13/07/2015	Various pages: "Work Group Coordination"	The term "Coordination Work Group" would be more easy to understand ("Work Group Coordination" could imply that several work groups are coordinated).	Amended.
59	MoT AT 13/07/2015	p. 7, figure 2 "**Planned** RFC5 management structure is as follows:"	Isn't this the **implemented** structure as of now?	This issue will be completed after registration of EEIG.
60	MoT AT 13/07/2015	p. 7 "EEIG will be located in Warsaw. The seat of EEIG will be in Warsaw for three years with the option of prolongation."	Wouldn't it be useful to describe the new, now agreed upon EEIG arrangement here? (rotation principle for EEIG)	Text has been modified.
61	MoT AT 13/07/2015	p. 8 "The Executive Board orientates the deployment of all actions foreseen by the implementation plan of the Management Board in order to complete the corridor's technical and economic interoperability."	Sentence is marked as citation (quotation marks) – however no source is provided (it is definitely not Regulation 913/2010) > consider to drop quotation marks or add source (if it is relevant/important)	Amended.
62	MoT AT 13/07/2015	p. 9 "… the Corridor includes **diversionaly routs frequently used for** re-routing trains in case of disturbance on the main	Suggestion for reformulation: "…the Corridor includes **diversionary routes intended for** re-routing trains in the case of disturbance of the main lines …" (RFC 5 routes are not used yet)	Amended.

		lines …"		
63	MoT AT 13/07/2015	p. 13 Map of Austria	Section no. 94 (Marchegg – Gänserndorf) is missing in the map. It is indicated by the green line here: 	Amended.
64	MoT AT 13/07/2015	p. 14 "power supply, type of current and voltage for electrified lines (DC 1.500V, DC 3.000V & AC 25.000V)"	Please add: ""power supply, type of current and voltage for electrified lines (DC 1.500V, DC 3.000V**, AC 15.000V** & AC 25.000V)""	Amended.
65	MoT AT 13/07/2015	p. 15, table 1 Title of table "Infrastructure parameters of RFC5"	Please add the reference date for which the data in the table are valid (01/01/2015?), e.g. "Infrastructure parameters of RFC5 **as of January 1, 2015**"	Added; " as of May 1st 2015.
66	MoT AT 13/07/2015	p. 15, table 1	The columns "Speed limits" are only filled in for Poland. While I understand the intention of this columns (give additional information on speed level beyond max. speed) I am not sure the way the information is given here will be sufficiently clear and easy to interpret for applicants > maybe consider to drop these columns	We suggest *not to delete the column and left it on the table. In further activities we will try to add data from other countries.*
67	MoT AT 13/07/2015	p. 19, table 1	Information on command and control system needs to be corrected: Section no 93 AT (Parndorf – Wien Zvbf.): Austrian system – PZB "yes"; ETCS L1 "no" Section no 94 AT (Marchegg – Gänserndorf): ETCS L2 "no" Section no 95 AT (Marchegg – Wien Stadlau): ETCS L2 "no" Section no 96 AT (Breclav os.n. – Gänserndorf): ETCS L2 "yes" Section no 97 AT (Gänserndorf – Wien Nord /Matzl./Zvbf.) ETCS L2 "yes"	Corrected Table 10 (Sub-chapter 6.2) has been exchanged. A table submitted by WG Infrastructure on 23 July has been included.

68	MoT AT 13/07/2015	p. 22, section 2.2.3	Consider adding a sentence on the criteria that were the basis for inclusion in this table (e.g. definition as bottleneck in national documents / plan? In TEN-T CNC work plan? By IMs?)	
69	MoT AT 13/07/2015	p. 23 line „AT / Wien Meidling – Wampersdorf“	Which of the lines between Wien and Wampersdorf is referred to here? • Section 99 AT [Wien Nord/Matzl./Zvbf. - Wiener Neustadt (via Ebreichsdorf)] • Section 100 AT [Wien Nord/Matzl./Zvbf. – Wiener Neustadt (via Gramatneusiedl)] • Both sections?	We referr to Section 99 AT [Wien Nord/Matzl./Zvbf. - Wiener Neustadt (via Ebreichsdorf)].
70	MoT AT 13/07/2015	p. 23, table 2	The official country code for Slovenia is “SI” not “SL”! (as used in table 1)	Corrected.
71	MoT AT 13/07/2015	p. 28 “… and also to propose a **measurement** of the expected modal shift from road to rail.”	Maybe more appropriate: “… and also to propose a **quantitative estimate** of the expected modal shift from road to rail.”	To be taken into consideration during TMS update.
72	MoT AT 13/07/2015	p. 28, section 3.1.2 Paragraph “Initial Rail Freight Corridor draft according …”	It looks like the routing taken into account in the modelling exercise is the same as the revised routing of the RFC according to Annex II or Regulation 1316. If that is correct (I did not check it in detail) that could be mentioned in the paragraph text. E.g. “The routing considered in transport modelling is (largely) equivalent to the neew routing of RFC5 according to Annex II of Regulation 1316/2013.”	To be taken into consideration during TMS update.
73	MoT AT 13/07/2015	p. 30 “the ratio of world trade growth and world GDP growth is roughly 2 to 1”	The technical term for this indicator is “GDP elasticity of trade” – maybe add: “the ratio of world trade growth **to** world GDP growth **(GDP elasticity of trade)** is roughly 2~~ to 1~~” (delete the “to 1” part).	To be taken into consideration during TMS update.
74	MoT AT 13/07/2015	p. 31, figure 18	It would be interesting to see in the figure a flow for **trade within the RFC5 countries**, e.g. PL-IT, AT-CZ etc. (in the chart: a flow beginning and ending in the RFC5 sector)? This is the market potential for RFC5! (However, I understand this figure is from the TMS and cannot be changed at the current stage any more)	To be taken into consideration during TMS update.
75	MoT AT 13/07/2015	p. 35 footnote 8 / 5	Footnote no. in the text (8) and at bottom of page (5) are not the same!	

76	MoT AT 13/07/2015	p. 37 Paragraph "Main competing mode to rail transport …"	This paragraph is repeated! (already on p. 36)	Amended.
77	MoT AT 13/07/2015	p. 37 "Finally, Figure 23 shows a summary of the initial Corridor 5 rail route **(state July 2014)**, with …"	Please check: What is meant by "state July 2014"? (1) Alignment of the corridor? (figure shows the alignment according to Regulation 913/2010 – in 2014, the route was already defined by Regulation 1316/2013) (2) State of the infrastructure? The caption of figure 23 says the data are for 2012!	Amended.
78	MoT AT 13/07/2015	p. 40 "By looking more deeply into statistics, especially container handling is growing rapidly almost at all ports and **Trieste and Koper benefit strongly from growing world trade flows from e.g. China and South Korea in the last years.**"	Looking at figure 26 it is not obvious how Trieste and Koper **benefited strongly in the last years** (total volumes stagnated in Trieste, only in Koper there was an overall growth in 2005-2012) – maybe a short additional explanation would be helpful (from the TMS?)	To be taken into consideration during next update of TMS.
79	MoT AT 13/07/2015	p. 40, figure 26	Do the values in this figure include containers? (If not, this could maybe explain the question above) It could be useful to include a figure on container growth, if it was much stronger than the growth of total volumes in tonnes.	To be taken into consideration during next update of TMS.
80	MoT AT 13/07/2015	p. 41 The list introduced with "All participants wer asked for • Chacteristics describing …"	This list duplicates the numeration on p. 40 starting with "It aims on identifying (1) how relevant companies …"	To be taken into consideration during next update of TMS.
81	MoT AT	p. 49	Spelling mistake > 2012	Amended.

	13/07/2015	Transport volumes for the year **2102** are given in Million net-tonnes per year		
82	MoT AT 13/07/2015	p. 61, figure 50	Are figures 47 (p. 58) and 50 (p. 61) the same?	To be taken into consideration during next update.
83	MoT AT 13/07/2015	p. 65 "Socio-economic analysis shows, that Rail Freight Corridor 5 connects Italian industrial areas and Adriatic ports to the strong industrialised areas of Poland, Slovakia and Czech Republic."	"Socio-economic analysis shows that Rail Freight Corridor 5 connects Italian industrial areas and Adriatic ports to the strong industrialised areas of Poland, Slovakia ~~**and**~~, the Czech Republic **and Austria**"	Amended.
84	MoT AT 13/07/2015	p. 66 "This could also be interpreted as a scenario, where GDP-growth keeps strong but effects on rail freight traffic are much lower due to lower **GDP-to-trade elasticities**."	"This could also be interpreted as a scenario, where GDP-growth keeps strong but effects on rail freight traffic are much lower due to lower GDP~~-to-trade~~ elasticities **of trade**."	To be taken into consideration during next update of TMS.
85	MoT AT 13/07/2015	p. 68 "The workflow and timing between the Corridor and the concerned IMs will be part of **internal rules**"."	Which / whose internal rules?	Amended to Corridor One Stop Shop Agreement.

86	MoT AT 13/07/2015	p. 69, table 9 "X-7,5 – X-5,5" / path construction phase	Path construction phase for which paths? (Flex-PaPs?) Please add.	Amended.
87	MoT AT 13/07/2015	p. 70 paragraph starting "The Construction Phase involves …"	Duplication from p. 68!	Deleted on page 70.
88	MoT AT 13/07/2015	p. 70 paragraph „The Framework of Capacity Allocation …"	Should be updated (FCA for TT 2016 has been approved by ExBo; for later TTs: under preparation)	Amended.
89	MoT AT 13/07/2015	p. 70 "According to article 15 of the Regulation 913/2010 an applicant may directly apply to the C-OSS for the allocation of pre-arranged train paths/ reserve capacity."	Consider to revise: "According to article 15 of the Regulation 913/2010 ~~**an**~~ applicant**s other than railway undertakings or international groupings of railway undertakings** may directly apply to the C-OSS for the allocation of pre-arranged train paths/ reserve capacity."	Amended.
90	MoT AT 13/07/2015	p. 70 "RNE has developed guidelines (see: in order to facilitate the challenging handling of this topic …"	Something is missing here.	Amended
91	MoT AT 13/07/2015	p. 71 "One can choose to measure the departure, arrival or run through time."	Consider to re-formulate: "In principle it is possible to measure punctuality at departure, at arrival or at any intermediate point".	Corrected
92	MoT AT 13/07/2015	p. 71 "Definition of train sample, measuring points,	Is this information still up-to-date?	Amended

		frequency of the report, threshold for punctuality, etc. are still under evaluation by the working group."		
93	MoT AT 13/07/2015	p. 72, section 4.7 heading "Information provided"	Maybe the heading "**Provision of information**" would be more in line with the other headings in this chapter?	Amended *Information to be provided*
94	MoT AT 13/07/2015	p. 72, section 4.7 points a) to f)	This list is similar but not totally the same as Art. 18 of Regulation 913/2010 – for any specific reason? (If this is meant to be a citation it would be better if it were 100% the same…	It is general scope of publication.
95	MoT AT 13/07/2015	p. 72, section 4.8 "The Corridor Management Board intends to put in place a corridor governance based on quality performance."	(1) "… intends to put in place" > this is required by the Regulation > better to be replaced by "… will put in place" (2) what does "corridor governance" mean in this context? Something like "quality monitoring system" might be more appropriate here. Consider revising!	To be taken into consideration during next update.
96	MoT AT 13/07/2015	p. 72 Paragraph starting "1. Definition of the strategic vision …"	Is it possible to add some points on this strategic vision or (if not) to add a reference where this vision can be found?	To be taken into consideration during next update.
97	MoT AT 13/07/2015	p. 73 "The role of the corridor, in the long term view, is to support the involved IMs/ABs in: a) recognizing the needs that rise from the **national view of the market** and customers' demand for services and performances.	Shouldn't this be "**international** view of the market"?	Amended into *international.*

98	MoT AT 13/07/2015	p. 73, section 6.1	It would be useful to add one sentence on the main source(s) used to compile the list – e.g. IMs investment plans, national investment plans, TEN-T Core Network Corridor project lists	To be supplemented during next update.
99	MoT AT 13/07/2015	p. 75 Austrian projects	This list is rather incomplete! Therefore, consider to align with project list of the Work Plan for the Baltic-Adriatic Core Network Corridor (see excerpt in attachment). We suggest to including the following projects from the CNC project list that are relevant for rail freight transport and which are missing in the implementation Report (see Baltic-Adriatic CNC Corridor Study, Annex: List of Investments, pp. 9–11): • Project AT02 (New section from Graz to Klagenfurt (Koralm railway line and tunnel)) • Project AT04 (Upgrade to ERTMS level 2 (all BA Corridor sections) • Project AT05 (Section upgrade (Graz-Weitendorf)) • Project AT06 (Upgrade section Bernhardsthal to Vienna/Suessenbrunn (e.g. to allow trains speeds of 160km/h.)) • Project AT18 (Railroad stations reconstruction on the line Bruck a.d. Mur - Graz; and line upgrading on the same line to increase capacity until traffic starts on the new Koralm line) For the details on the projects please consult the attached excerpt of the CNC project list.	*Amended by Austrian Railways*.
100	MoT AT 13/07/2015	p. 79 to 85, figures 55 to 60	• It would be useful to use the same legend for all figures! (Currently the figure for Poland is hard to understand if looked at in isolation…) • Only the figure for CZ shows the reference date for which the figure is valid – this should be added to the figures for all Member States!	The date for which figures are valid was enclosed. Legends are the same.
101	MoT AT 13/07/2015	p. 90 "Applicant/Applicants"	Repetition of the text section: "Applicant' means a railway undertaking or an international grouping of railway undertakings or other persons or legal entities, such as competent authorities under Regulation (EC) No 1370/2007 and shippers, freight forwarders and combined transport operators, with a public-service or commercial interest in procuring infrastructure capacity."	Repeated text has been deleted.
102	MoT AT	p. 90	"it is possible to **shift the services applied for from one Corridor to the**	To be taken into consideration during next update.

	13/07/2015	"Connecting point"	**other**." This sounds a little weird > consider revising!	
103	MoT AT 13/07/2015	p. 91 "X"	Isn't "X" is the beginning of a timetable period? (not the time table publication date)	Amended in items X and X-2.
104	Czech Railways and WG Interoperability/ERTMS 18.08.2015	draft no 56 on page 78	*Please indicate that at 15.11.2015 there will be no ETCS system in the section Ústí nad Orlicí – Břeclav – A border but this system will be here in the start of 2016. Due to the unifying reasons the line Ústí n/O and Břeclav – border should be in a blue colour* ( ).	Amended draft 56 on page 78.
105	MoT AT 25/09/2015	p.9	please change the following sentence on page 9 (IP version V3a): "The figure 3 shows the routing of RFC5 and the following figures 4- 9 shows sections of the RFC5 in countries along the corridor." into "The figure 3 shows the routing of RFC5 and the following figures 4- 9 shows sections of the RFC5 in countries along the corridor **at the date of corridor implementation (10/11/2015)**."	Amended 28/09/2015.
106	ExBo 08/10/2015	p.4	Paragraph 7 Second sentence should start "***This statement***" instead of "~~*this ststment*~~";	Amended 21/10/2015.
107	ExBo 08/10/2015	p.5 Paragraph 1	*The text should be modified, while the corridor do not connect only ports of Italy, Slovenia and Poland with main land terminals of other countries on the corridor but also with the land terminals in these three countries, too.* *Maybe it should be written;* *"**Baltic-Adriatic Rail Freight Corridor 5, the north south axis, connects ports in Poland, Slovenia and Italy with main land terminals of all the countries among the corridor**"*	Amended 21/10/2015.
108	ExBo 08/10/2015	Page 7 – Paragraph 2 Second sentence	before Management Board I believe that "***the***" is missing.	Amended 21/10/2015.
109	ExBo 08/10/2015	Page 8 – Paragraph 4	As written it sounds that the Regulatory Bodies and National Safety Authorities are participating the ExBo meetings. So it would be more appropriate when writing;	Amended 21/10/2015.

			"The European Commission is also taking part in the Executive Board work by participating at its meetings. The representatives of Regulatory Bodies and national Safety Authorities are invited to the ExBo meeting when appropriate." or something like that.	
110	ExBo 08/10/2015	Page 8 – Paragraph 8	*The second sentence is not in the context of the paragraph. That is why it would be better when the sentence* ***"Both RAG and TAG have the right to give advice to the MB"*** *would follow the 8 Paragraph as separate one.*	Amended 21/10/2015.
111	ExBo 08/10/2015	Page 9 – general	We would suggest that the definition of principal, diversional, main and alternative routes is given in the Glossary.	Annex 1 – definition added.
112	ExBo 08/10/2015	Page 10 – 14	*In the maps some triangles are indicated without the explanation what they present. Please change Diversionaly for Diversonary in the maps.*	Amended 21/10/2015.
113	ExBo 08/10/2015	Page 22 – Table 2 – SI	*We would really like to get better definition of a bottleneck – as it is stated for SI "Insufficient capacity,* ***longer too short station tracks****"*	Amended 21/10/2015.
114	ExBo 08/10/2015	Pages 23 – 24: tables Page 24	*We insist on the same structure of tables presented. If some data is missing for some countries then please do not use them (e.g. length) at all. This inconsistency provokes and makes many questions possible. We would nevertheless welcome more detailed information provided in the tables with the IP update.* *Information about Intermodal Terminal in Žilina is needed as it has just been completed this summer and Slovakia is currently preparing a tender for concessionaire/operator on this terminal*	Amended 21/10/2015
115	ExBo 08/10/2015	Page 25	*Chapter 3.1.2. – We would welcome a short explanation on the route classification (main vs. div.) – some methodology. Possibly TEN-T Core and Comprehensive network explanation could be used. This does not need a huge investigation and research but makes the whole alignment more robust*	Amended 21/10/2015
116	ExBo	Page 26	*Figure 16 – Corridor routing – the section in AT does not have a proper*	Amended 21/10/2015

	08/10/2015		*shape and colour structure (comparing to other countries).*	
117	ExBo 08/10/2015	Pages 32	*Chapter 3.2.2 – in the bullet-point where a Russia is described should be added one sentence. At least: Despite the current geopoitical situation the Euro-Asian land bridge could be very important for the future development of RFC5.* *Chapter 3.2.3 , 1st paragraph – the information about planned electrification between Vienna and Bratislava should be mentioned.*	Amended 21/10/2015
118	ExBo 08/10/2015	Page 50	*Figure 39 – it should be mentioned in the text that all the pictured investment on Ostrava - Brno - Breclav route are HS lines so with only limited impact on RFC5. More precisely the current infrastructure has been already modernized between CZ/PL and CZ/AT borders however, new HS lines will bring additional capacity also on conventional lines. Projects on conventional lines to be modernized are: Ostrava junction, Přerov junction and modernization Přerov – Brno route.*	To be taken into account during next TMS update.
119	ExBo 08/10/2015	Page 64 – 4.2.1 Last paragraph	*Clearer commitment is missing. Are these guidelines already in the last version or are still developing and who is approving the guidelines (particularly these of the RFCs).*	Amended 21/10/2015
120	ExBo 08/10/2015	Page 65 – Paragraph 4	*It starts with the sentence* ***"According to the decision of the RFC 5 the Management Board agreed…."*** *There is something missing or it is only unclear. Who in the name of RFC 5 decided on something that according to that the Management Board agreed?*	Amended 21/10/2015
121	ExBo 08/10/2015	Page 70 – Investment Plan – Paragraph 2 sentence 6	*While the Executive Board, so representative of the responsible ministries, is responsible for the implementation plan, we might not agree with the statement* ***"The Management Board consider this initial version as an opening, the investment plan will be periodically reviewed"*** *because as such it leads to unclear version of the planned projects as indicated below on some examples. This wording sounds we*	Amended 21/10/2015

			have done something which needs further improvements = our work so far is not 100%.	
122	ExBo 08/10/2015	Page 71 – 73 – Table of planned projects	*PL – In comparison with other countries description of project are the Polish ones in particular cases to general e. g. other countries has modernisation of the line – upgrade axle load, upgrade maximum speed etc, while at the Polish projects is only definition* ***"Works on railway line without additional description"*** *. Moreover within the Project 11 Katowice – Tychy – Czechowice Dziedzice – Zebrzydowice the description refers to the "****Works on main passenger routes…..****"* *SK – Bearing in mind the separate chapter of the IP number 6.4 Plan of deployment relating to the interoperable systems where the ITCS, ERTMS, GSMR…. deployments are described by countries only SK has in the planned projects those activities, too.* *SL – Section Divača – Koper there should no fixed date and estimate investment costs be indicated.*	This table was prepared basing on data received from IMs. Not only SK showed ERTMS /ETCS /GSM-R projects in the Table 6.2.. List of the Polish projects was amended.
123	ExBo 08/10/2015	Page 74	***Plan of deployment relating to the interoperable system*** *should in its summary indicate whether not coordinated deployment of interoperable systems might result in some additional bottlenecks or obstacle to fluent transport on the corridor.*	Amended 21/10/2015.
124	ExBo 08/10/2015	Page 77	*ERTMS information in left side bottom paragraph should be updated - This project ETCS CZ/PL border - CZ/AT border got CEF financing recently.* *Following paragraph – also need update as the new ERTMS IP is valid.* ***SŽDC will provide it at latest by next Friday 16.10.***	Amended 21/10/2015.
125	ExBo 08/10/2015	Page 78	*please correct the city name - Žilina is correct instead of current Žlina.*	corrected 21/10/2015

126	ExBo 08/10/2015	Page 81	*One before last paragraph should end with the sentence.* ***"The completion of work is planned until 2020".***	Amended 21/10/2015
128	BCT Gdynia/ 20.10.2015	point 2.2.4 corridor Terminals Poland table	Referring to remark 12. Right now the first stage is completed (we work on 3x202m tracks) and expect to have the second stage finished on 30.11.2015. This is completely new structure. Old rails were already scrapped. New structure will be 3 container tracks of 675m each under two new rail gantry cranes. Additionally we will have 2 new multipurpose tracks. Outside our terminal there are 6 tracks for waiting and shunting (old ones planned to be extended and electrified after 2020)	Information has been updated.

RFC5
Baltic-Adriatic Corridor

The Executive Board of the Baltic – Adriatic Rail Freight Corridor (RFC 5) on its session in Warsaw on 09 November 2015 unanimously approved the Implementation Plan according to Article 9 of Regulation (EU) No. 913/2010 as being circulated by the PMO on 30 October 2015 and as attached to this document.

Signed by the Members of the Executive Board in Warsaw on 09 November 2015

Reinhard HALLER
Federal Ministry for Transport, Innovation and Technology of Austria

Jan ILÍK
Ministry of Transport of the Czech Republic

Alessandro VIOLI
Ministry of Infrastructure and Transport of Italy

Maciej GŁADYGA
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